

EL PASO NATURAL GAS COMPANY
OPEN FLOW TEST DATA

DUAL COMPLETIONDATE December 5, 1956

Operator El Paso Natural Gas Company		Lease Ludwick #14	
Location 1650'N, 992'E, Sec. 6-29-10		County San Juan	State New Mexico
Formation Pictured Cliffs		Pool Astec	
Casing Diameter 7"	Set At: Feet 4159	Tubing Diameter 1 1/4"	Set At: Feet 2297
Pay Zone From 2243	To 2282	Total Depth 4810 Packer @ 2364	
Stimulation Method Sand Water Frac		Flow Through Casing X	Flow Through Tubing

Choke Size, Inches .750	Choke Constant, C 14.1605		
Shut-In Pressure, Casing 612	PSIG	12 - PSIA 624	Days Shut-In 15
Shut-In Pressure, Tubing 621	PSIG	12 - PSIA 633	
Flowing Pressure, Casing 287	PSIG	12 - PSIA 299	Working Pressure, Pw 301
Flowing Pressure, Tubing 287	PSIG	12 - PSIA 313	
Temperature, Casing 66	F	n .85	Fpv (From Tables) 1.030
Temperature, Tubing 66	F	n .85	Gravity .670

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

$$C = 14.1605 \times 299 \times .9943 \times .9463 \times 1.030 = 4103$$

MCF/D

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

$$A_{cf} = \left(\frac{400,689}{302,720} \right)^n (1.3236)^{.85} \times 4103 = 1.2690 \times 4103$$

$$A_{cf} = 5207 \text{ MCF/D}$$

TESTED BY K. C. McBride

WITNESSED BY

L. D. Galloway
L. D. Galloway

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

EL PASO NATURAL GAS COMPANY
GAS WELL TESTTo: Mr. E. E. Alsup
From: Gas Engineering DepartmentDate: December 5, 1956
Place: Farmington, New MexicoDUAL COMPLETIONSubject: Test data on El Paso Natural Gas Company well, LUDWICK #14,
San Juan County, New Mexico

Tested By: K. C. McBride

Location Sec. 6 T. 29 R. 10 , 1650'N, 992'E

Shut-In Pressure SIPC 612 psig
SIPT 621 psig ; (Shut-in 15 days)0.750" Choke Volume 4103 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 5207 MCF/D

Working Pressure On Tubing = 301 Psig

Producing Formation Pictured Cliffs

Stimulation Method Sand Water Frac

Total Depth 4810 Packer @ 2364

Field Aztec

H₂S Sweet to lead acetate.cc: D. H. Tucker
R. W. Harris
W. T. HollisD. V. Rittmann
Bill Parrish
H. H. Lines~~XXXXXXXXXX~~

W. M. Rodgers

~~XXXXXXXXXX~~

Drilling Department

B. D. Adams

Roland Hamblin

Jack Purvis

W. V. Holik

C. C. Kennedy

E. J. Coel, Jr. (6)

A. J. Dudenhoeffer

File

L. D. Galloway
L. D. Galloway

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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1. The first step is to identify the problem.
 2. The second step is to define the problem.
 3. The third step is to analyze the problem.
 4. The fourth step is to develop a solution.
 5. The fifth step is to implement the solution.
 6. The sixth step is to evaluate the solution.
 7. The seventh step is to monitor the solution.
 8. The eighth step is to maintain the solution.
 9. The ninth step is to improve the solution.
 10. The tenth step is to document the solution.

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...has been identified in the following manner:

- [illegible]

produced through the 2" tubing and the Pictured Cliffs gas will be produced through the casing.

8. A Garrett sidedoor flow nipple was installed in the 2" tubing string immediately above the production packer. This flow nipple will enable bottom hole pressure tests to be taken if it is required at a future date.
9. Initial potential tests have been run and commercial production has been found at both zones. A packer leakage test has been run and witnessed by the Artec office of the New Mexico Oil Conservation Commission. This test shows no communication in the well bore between the two producing formations.

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

The offset operators of this dual completion acreage have been notified and enclosed are letters from these operators waiving any objections to this completion. Also enclosed are the following:

- (a) Two copies of the schematic diagram of the mechanical installations.
- (b) Two copies of the plots showing the location of this well and the offset operators.
- (c) Two copies of the affidavit from the packer setting company stating that the packer used was set at the depth shown.
- (d) Two copies of the packer leakage tests as observed by a member of the N.M.O.C.C.
- (e) Two copies of the initial potential tests showing commercial production from the two zones.

It is intended to dedicate the N/2 of Section 6, T29N, R10W, to the Mesa Verde formation, and the NE/4 of Section 6, T29N, R10W to the Pictured Cliffs formation.

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

Yours truly,

ORIGINAL SIGNED E. J. COEL

E. J. Coel
Senior Petroleum Engineer

EJC:ajh

Enc.

cc: R. L. Hamblin
Emery Arnold
P. T. McGrath

[illegible][illegible][illegible]

WILE, FIRST, 8 months to 1 year and sometimes in whole or in part
WILE, FIRST, 8 months to 1 year and sometimes in whole or in part
WILE, FIRST, 8 months to 1 year and sometimes in whole or in part

1960; was beneficiary of POW benefits and holds United States
citizenship in North Carolina. He has been married 3 times.

ORIGINAL SIGNED E. J. COLE

10-11-68 - 1968-1970