



00091210

CORE LABORATORIES INC.  
Petroleum Reservoir Engineering  
DALLAS, TEXAS

Company **PLAINS EXPLORATION COMPANY**Well **MITCHELL NO. 2**Field **RUBY**County **WASHINGTON** State **COLORADO**Location **SW NW 28 2N 54W**Formation **"D" SAND**Cores **DIAMOND CONVENTIONAL**Drilling Fluid **WATER BASE MUD WITH OIL ADDED**Elevation **4534 KB**Report **SERVICE NO. 8**Page **1** of **1**File **RP-2-2169**Date Report **7-19-59**Analysts **DI**

CORE ANALYSIS RESULTS  
*Figures in parentheses refer to footnote remarks*

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY		PORE PERCENT	RESIDUAL SATURATION		PROBABLE PRODUCTION	REMARKS
		HORIZONTAL	VERTICAL		WATER	OIL		
1	4823-24 4819-20	48	21	18.8	17.6	43.5	(2)	Sandstone, Very Fine-grain, Slight Silty, Vertical Fracture.
2	4824-25	45	53	20.9	19.1	50.3	(2)	Sandstone, Very Fine-grain, Slight Silty, Vertical Fracture.
3	4826-26.5	51	34	16.9	9.5	69.9	(2)	Sandstone, V/Fine-grain, Slightly Silty.
4	4827-28	192	186	24.5	10.6	56.4	(2)	Sandstone, Fine-grain, Slightly Silty
5	4828-29	235	157	23.0	13.9	57.9	(2)	Sandstone, Fine-grain, Slightly Silty
6	4829-30	94	51	10.4	12.9	56.2	(2)	Sandstone, Fine-grain, Slightly Silty
7	4830-31	74	21	21.6	13.4	61.0	(2)	Sandstone, Fine-grain, Slightly Silty
8	4831-32	61	10	22.6	14.2	63.0	(2)	Sandstone, Fine-grain, Slightly Silty
9	4832-33	227	227	21.6	13.0	50.5	(2)	Sandstone, Fine-grain, Slightly Silty
10	4833-34	143	135	21.2	12.3	54.6	(2)	Sandstone, Fine-grain, Slightly Silty
11	4834-35	265	224	22.3	15.0	52.0	(2)	Sandstone, Fine-grain, Slightly Silty
12	4835-36	188	138	21.1	18.5	50.7	(2)	Sandstone, Fine-grain, Slightly Silty
13	4836-37	235	137	19.9	19.6	51.2	(2)	Sandstone, Fine-grain, Slightly Silty
14	4837-38	358	293	19.4	16.5	54.5	(2)	Sandstone, Fine-grain, Slightly Silty
15	4838-39	145	137	20.7	18.8	47.7	(2)	Sandstone, Fine-grain, Slightly Silty
16	4839-40 35-36	708	630	21.5	18.2	50.6	(2)	Sandstone, Fine-grain, Slightly Silty
17	4841-42	375	343	17.4	16.1	70.0	(2)	Sandstone, Fine-grain, Slightly Silty
18	4843-44	782	645	21.9	1.0	91.5	(2)	Sandstone, Fine-grain, Slightly Silty
19	4847-48	2770	1995	26.9	0.0	91.1	(2)	Sandstone, Fine-grain, Slightly Silty
20	4856-57	1182	958	25.0	0.0	90.5	(2)	Sandstone, Fine-grain, Slightly Silty

An upward correction of 4 feet is necessary to match log depths.

## NOTE

(\*) REFER TO ATTACHED LETTER

(1) INCOMPLETE CORE RECOVERY - INTERPRETATION RESERVED

(2) OFF LOCATION ANALYSES - NO INTERPRETATION OF RESULTS

This analysis was performed on the basis of the values and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is prepared. The client is responsible for the accuracy of the data furnished and for the validity of the conclusions drawn therefrom. The client is also responsible for the accuracy of the data furnished and for the validity of the conclusions drawn therefrom. The client is also responsible for the accuracy of the data furnished and for the validity of the conclusions drawn therefrom.



## DATA SHEET AND DISCUSSION

**LOCATION:** SW NW (1983 feet South of North line and 663 East of West line),  
Section 28, Township 2 North, Range 54 West, Washington County,  
Colorado.

**COMMENCED:** July 15, 1959

**COMPLETED:** Set 4½" Casing, July 20, 1959

**CONTRACTOR:** Exeter Drilling Company, Denver, Colorado

**CASING:** Set 3 joints, 92 feet of 8 5/8" - 24 pound, 8 round thread new  
casing at 104 with 85 sacks of cement, 2% Calcium Chloride, 4% Gel.  
Set 157 joints, 4922.30 feet, 4½" 9.5 pound 8 round thread new J-55  
casing at 4930 with 125 sacks of 50-50 posmix cement, 2% Gel  
Centralizers at 4927 - 4896, 4862, 4840 and 4809.  
6 sections of Halliburton Roto Wall scratchers 4926 to 4890  
10 sections of Halliburton Roto Wall scratchers 4860 to 4800  
Plug 4896.

**MEASUREMENTS:** All measurements are taken from the kelly bushing which was  
approximately 9 feet above the ground elevation. An upward correction  
of 4 feet is necessary to make drilled depths match log measurements.  
The kelly bushing was 10.5 feet above the casing head.

**ELEVATION:** 4525 ground (Powers) - 4534 Kelly Bushing

<u>Formation</u>	<u>Sample Tops</u>	<u>Log Tops</u>	<u>Datums</u>
Niobrara	3965	3982	+ 552
Timpas	4349	4348	+ 186
Carlile	4400	4402	+ 132
Greenhorn	4479	4484	+ 50
Mowry	4717	4716	- 182
Brown Lime	4726	4722	- 188
"D" Sand	4804	4801	- 267
J" Siltstone	4880	4877	- 343
"J" Sand	4894	4890	- 356
Total Depth	4937	4934	- 400

**DISCUSSION:** The "D" and, 4801 (-267) was 10 feet lower than expected from sub-  
surface work. The sand was cored 4806 to 54 with shows noted from  
4819 to 4838, this section was cut with a number of thin shale  
beds and tight streaks, with an effective pay of about 10 feet.  
Drill stem test #1, 4819 to 4833, proved the formation would give up  
fluid and a commercial well can be expected. The small amount of  
water recovered in the test probably was from the tight streak  
5821-23 and the low permeability sand, 4825 to 4828. By not per-  
forating these zones the well should produce little or no water.  
Below 4836 the shows rapidly disappear and there is no question of  
it being water bearing.

The "J" Sand, 4890, (-356) was drilled and the samples checked for  
shows, none were noted or indicated on the electric log.



The above discussion uses log measurements which are 4 feet less than the drilled measurements.

Submitted by,

*George D Volk.*

GEORGE D. VOLK  
Petroleum Engineer

GDV:sh





WELL COMPLETION REPORT  
Plains Exploration Company  
Mitchell #2 Test Well  
C SW NW Sec. 28-2N-54W  
Washington County, Colorado

RECEIVED  
AUG 18 1959  
OIL & GAS  
CONSERVATION COMMISSION

7-24-59

Western Production Co.'s combination service & spudder unit moved on location @ 6:00 P.M. Rigged up & swabbed to approximately 2500'. Then strung in line. Hole showed to be open to approximately 4900'. Swabbing continued & McCullough called at 12:00 Midnight.

7-25-59

McCullough arrived about 2:00 A.M. Hole thought to be dried up about 6:30 A.M. Ran perforating log only. Log finished about 8:00 A.M. Elevation 4534' @ K.B. K.B. estimated @ 10.5' above top flang. of Braden head. McCullough set log minus 4' to fit "E" log that put T.D. 4896 & logged to 4350'.

Dry test run showed fluid in hole. Bailing w/very small bailer, hole dried up about 5:00 P.M. Showed ok.

Perforated w/one bullet @ 4831½' @ 6:30 P.M. Good show of oil on gun. Ran bailer @ 7:00 P.M. - got 2 gal. muddy water & 2½ gal. good clean oil. In 6 hours had bailed 12 gal. water from bottom. Stopped bailer about 125' off bottom - had about ½ gal. water & 4½ gal. oil. Estimated fluid in hole @ 1400'.

While trying to locate top of water in hole, wire line broke. Since it will take some time for repairs & considering the information we have @ this time, it was decided to perforate while line was being repaired to save time & release perforating truck.

Twelve more bullets from 4830' to 4832' @ 11:45 P.M. 7-25-59, making a total of 13 holes in above zone. Estimated fluid in hole @ this time 1500' by gun. Fair show of gas @ surface but no noticeable increase after the additional 12 holes.

7-26-59

Shot 18 holes from 4824' to 4827' @ 1:00 A.M. 7-26-59. No noticeable increase in gas @ surface. Fluid estimated by gun @ 1800' in hole.

All perforations w/½" type M-3 bullets. Truck left location about 2:15 A.M.

Wire line repaired about 12:30. Crew started getting ready to swab when truck got out of way. Had to run to bottom & put on new flags on line. At 6:00 A.M. had hole swabbed to 3750' or 1150' off bottom. Got 38 bbls. T.F., swabbing down, no clear water would draw off of tank. Oil cut some w/water. Started hourly test, pulling two times per hour, first hour 5.75 bbls., second hour 5.75, third hour 4.60, fourth hour 4.60 & fifth hour 5.75.



7-26-59  
(cont'd.)

Rig broke down @ 11:00 A.M. Started swabbing hole down again @ 5:00 P.M. At 7:20 P.M. had hole swabbed back to 3750', put 38 bbls. fluid in tank swabbing down. Hole continued to fill @ about 5 bbls. per hour on fillup while shut-down.

Lowered swabbing point to 4000' - started hourly test. After levelling off @ 4400', tested for 3 hours as shown below: 1st hour 8.05 bbls., 2nd hour 8.05 & 3rd hour 8.05. Grind out from fluid being swabbed showed some samples 18% caught near last of pull. Samples caught near first of pull as low as 1%. We had no reason to believe that water was increasing. At this time a total of 149 bbls. had been swabbed from well. Same treated w/tretolite & 17 bbls. of water drawn off tank. The 132 bbls. left in tank carried less than 2% water by grindout.

Total fluid swabbed is less than 15% water. At this stage, it is very possible that some could be invasion water but expect that most of it is formation water.

7-27-59

Ran sand pump three times. Hole seemed to be clean & pickup on bottom. Getting ready to run tubing & rods.

Ran 157 Jts. 2" EUE 8 rd. Thrd. 4.70% tubing. 1-3' perforated tub. nipple, 1-1' National std. 2" seating nipple, & used 1-10', 1-6' & 1-4' tubing subs on top of string.

Ran 2" x 1½" x 12' V.P.F.P. Top H.D. pump w/1' strainer nipple. ¾" x 2' rod sub on top of pump. 191 ¾" x 25' D & B rods w/ 1-6' & 1-8' sub on top. Used new 1½" x 16' polish rod.

Tearing down tools to move out.

Elmer E. Duncan  
July 28, 1959



# BIT RECORD

<u>N o.</u>	<u>Make</u>	<u>Size</u>	<u>Type</u>	<u>From - To</u>	<u>Footage Drilled</u>	<u>Hours Run</u>	<u>Condition</u>
1	CP	7 7/8	ESIC	130 - 3203	3073	16	Dull
2	Hughes	"	OSC-3	3203 - 4359	1159	14	Dull
3	CP	"	ESIC	4359 - 4810	451	10	Dull
*	Diamond	6 5/8	Core	4810 - 4858	48	16	Grooved (Salvage)
4	Hughes	7 7/8	OWV	4810 - 4937	127	7	WO

# MUD RECORD

<u>Date</u>	<u>Depth</u>	<u>Wt</u>	<u>Vis</u>	<u>St. Vis</u>	<u>Gel. Strength</u>		<u>pH</u>	<u>Water Loss in cc</u>	<u>Wall Cake in 32nds</u>	<u>Tester</u>	
7/16/59	2020									Plains Mud	
7/17/59	4460	9.9	48	26	0	0	9.5	6	2	"	"
7/18/59	4831	10	65	--	2	18	9.5	5.6	2	"	"
7/20/59	4937	10	75	39	1	9	9.5	5.6	2	"	"



# DRILLING TIME RECORD

From - To

Minutes per 5-foot intervals

Remarks

3900-50	3-3-3-3-3-3-3-4-6
3950-4000	3-3-3-3-3-3-3-4-5
4000-50	4-4-4-4-4-4-4-4-4
4050-4100	4-4-4-4-4-4-4-4-4
4100-50	4-4-4-4-4-5-4-4-4-5
4150-4200	5-5-5-5-5-5-5-5-5
4200-50	5-5-5-5-5-5-5-5-5
4250-4300	5-5-5-5-5-5-5-5-5
4300-50	6-8-6-7-6-5-6-6-9-13
4350-4400	10*-8-7-8-7-7-5-5-6-6
4400-50	5-5-5-5-5-5-6-6-5-5
4450-4500	5-5-5-5-5-6-6-6-6-6
4500-50	6-6-6-6-6-5-4-5-6-6
4550-4600	7-5-6-4-4-4-5-5-5-4
4600-50	4-4-4-4-4-4-4-4-4-4
4650-4700	4-5-5-4-4-5-6-8-7-8
4700-50	8-8-5-4-4-5-4-6-5-3

Minutes per 1-foot intervals

4750-60	1-1-1-1-1-1-1-1-1-1
4760-70	1-1-1-1-1-1-1-1-1-1
4770-80	1-1-1-1-1-1-1-1-1-1
4780-90	1-1-1-1-1-1-1-1-1-1
4790-4800	1-1-1-1-1-1-1-1-1-1
4800-10	1-1-1-1-2-1-2-2-2-2*
4800-20	17-14-13-16-11-8-13-13-12-11
4820-30	13-13-11-18-15-11-13-14-24-32
4830-40	27-35-22-30-22-20-23-21-20-25
4840-50	17-30-24-39-27-11-11-20-26-31
4850-58	21-22-26-25-13-17-20-27*
4858-60	2-2
4860-70	2-2-3-2-3-2-3-3-1-2
4870-80	1-2-1-1-2-1-1-2-2-1
4880-90	2-5-3-4-7-5-5-7-4-3
4890-4900	4-4-4-2-1-1-1-1-1-5
4900-10	5-5-4-6-4-4-6-7-4-4
4910-20	6-6-5-6-3-6-3-3-5-7
4920-30	11-9-7-10-10-10-6-8-6-7
4930-37	9-7-7-7-7-14-27*

Core #1

(\* \_ Trip)



SAMPLE LOG

3900-10	Shale dark gray
20	Ditto
30	Ditto
40	Ditto
50	Ditto
60	Ditto
70	Ditto
80	Ditto
90	Ditto
4000	Ditto
4000-10	Ditto; trace shale gray to dark gray mottled white to brown calcareous
20	Ditto; trace ditto
30	Ditto; trace ditto
40	Ditto; trace ditto
50	Ditto; little ditto
60	Shale gray to dark gray mottled white to brown calcareous and shale dark gray
70	Ditto and ditto
80	Ditto and ditto
90	Ditto and ditto
4100	Ditto and ditto
4100-10	Ditto; little ditto
20	Same
30	Same
40	Same
50	Same
60	Same
70	Same
80	Same
90	Same
4200	Same
4200-10	Same
20	Same
30	Same
40	Same
50	Same
60	Same
70	Same; more shale
80	Same; more shale
90	Same; more shale
4300	Same; more shale
4300-10	Same; more shale
20	Same; more shale
30	Same; more shale
40	Same; more shale; trace limestone gray shaley dense
4349	<u>Timpas</u>
50	Same; more shale; trace ditto
60	Same; more shale
70	Same; more shale
80	Same; trace limestone white dense
90	Shale dark gray and limestone white to buff dense
4400	Ditto and ditto
4400	<u>Carlile</u>
4400-10	Ditto and ditto



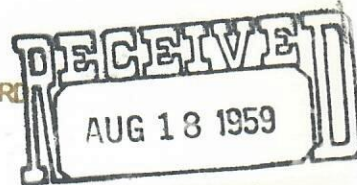
4410-20	Shale dark gray and limestone white to buff dense
30	Ditto; little ditto
40	Ditto; little ditto
50	Ditto; little ditto; trace siltstone gray
60	Ditto; little ditto; trace ditto
70	Ditto; trace ditto; trace ditto
4479	<u>Greenhorn</u>
80	Ditto; trace ditto; trace ditto
90	Ditto; trace ditto
4500	Ditto; trace ditto
4500-10	Ditto
20	Ditto; little siltstone gray
30	Ditto; little ditto
40	Ditto; little ditto; trace limestone buff to brown crystalline
50	Ditto; trace ditto; trace ditto
60	Ditto; trace ditto; trace ditto
70	Ditto; trace ditto; trace ditto
80	Ditto; trace ditto
90	Ditto; trace ditto; trace limestone white dense
4600	Ditto; trace ditto
4600-10	Ditto; trace ditto
20	Ditto; trace limestone gray to buff crystalline
30	Ditto; trace ditto
40	Ditto; trace ditto
50	Ditto
60	Ditto
70	Ditto
80	Ditto
90	Ditto; trace limestone gray to buff crystalline
4700	Ditto; trace ditto
4700-10	Ditto
4717	<u>Mowry</u>
20	Ditto
4726	<u>Brown Lime</u>
30	Ditto; trace bentonite gray
40	Ditto
50	Ditto
55	Ditto; trace siltstone gray
60	Ditto; trace limestone buff crystalline
65	Ditto; trace siltstone gray
70	Ditto
75	Ditto
80	Ditto; trace siltstone gray
85	Ditto
90	Ditto
95	Ditto; trace siltstone gray
4800	Ditto
4804	<u>"D" Sand</u>
4800-05	Ditto
10	Ditto; trace siltstone gray
4810 Circ. 30	
Min.	Ditto; trace ditto
4810 Circ. 45	
Min.	Ditto; trace ditto; trace sand gray fine silty tight, no show
4810 Circ. 60	
Min.	Ditto; trace ditto; trace ditto



4810-58 See Core Description  
4858-65 Shale dark gray to black and sand gray fine partly silty, partly fluor.  
4867 Base of "D"  
70 Ditto and ditto  
75 Ditto; little ditto, some fluorescence  
4880 "J" Siltstone  
80 Ditto; little ditto, some fluorescence  
85 Ditto; trace ditto, some fluorescence, some unconsolidated  
90 Ditto; trace ditto, no show  
4892 or 94 "J" Sand  
95 Ditto; trace siltstone gray to dark gray  
4900 Ditto; little ditto  
4900-05 Ditto; little ditto; little sand gray fine hard tight, no show  
10 Ditto; little sand gray fine partly silty porous, no show; little argillite white  
15 Ditto; little ditto  
20 Ditto; trace ditto; trace unconsolidated  
25 Ditto; little sand brown fine hard tight, quartzitic, no show  
30 Ditto; trace sand gray fine partly silty soft porous, no show  
35 Ditto; little ditto  
4937 Circ. 30  
Min. Ditto; trace ditto, some unconsolidated  
4937 Circ. 60  
Min. Ditto; trace ditto, some unconsolidated; trace argillite white



## CORE DESCRIPTION AND CORE ANALYSIS RECORD

OIL & GAS  
CONSERVATION COMMISSIONCore #1 - 4810 to 58 - Recovery 46½ feet  
4806 to 54 Log Measurements

- 4810-14 (4' - 0") Shale dark gray thinly laminated and slightly reworked with siltstone gray and sand gray fine silty tight, no show.
- 4814-22½ (8' - 6") Sand gray fine very silty tight, no show, thinly laminated and slightly reworked with shale dark gray and siltstone gray (few shale beds 2 to 8 inches thick between 16 and 21).
- 4822½-39½ (17' - 0") Sand gray fine partly silty hard firm vertical fractured, good odor, staining, and fluorescence. Streaks thinly laminated or slightly reworked with shale dark gray. (Sand 22½-25.3 - 60% streaks to 27.6, thin streak at 28, thin streak 32.5 - 33-33.5, 37-38.)
- 4839½-40½ (1' - 0") Shale dark gray to black thinly laminated with siltstone gray, no show.
- 4840½ -46 (5' - 6") Beds of sand gray fine porous. Good to spotty to no show and shale black carbonaceous laminated with siltstone gray.
- 4846-56½ (10' - 6") Sand gray fine porous, no show. (4 inch shale streak between 53 and 54.)



# CASING SUPPLEMENT

	4930	Centralizer 4927
1	<u>32.70</u>	5 sections Roto Wall scratchers
	4897.30	Centralizer 4896 - Plug 4896
2	<u>35.50</u>	1 section Roto Wall scratcher
	4861.80	Centralizer
3	<u>23.13</u>	4 sections of Roto Wall scratchers
	4838.67	Centralizer
4	<u>29.83</u>	5 sections of Roto Wall scratchers
	4808.84	Centralizer
5	<u>32.41</u>	1 section of Roto Wall scratchers
	4776.43	
6	<u>28.72</u>	
	4747.71	
7	<u>32.17</u>	
	4715.54	
8	<u>32.42</u>	
	4683.12	
9	<u>33.25</u>	
	4649.87	
10	<u>27.05</u>	
	4622.82	
11	<u>31.85</u>	
	4590.97	
12	<u>31.05</u>	
	4559.92	
13	<u>31.76</u>	
	4528.16	
14	<u>30.07</u>	
	4498.09	
15	<u>31.95</u>	
	4466.14	



## DRILL STEM TEST RECORD

Drill Stem Test Record #1 - 4823 to 37  
4820 to 34 Log Measurements

Straddle packer test with total depth at 4858. The tool was open for one minute with the blow reaching the bottom of a bucket of water, then shut in for 30 minutes, open 60 minutes and shut in 30 minutes. It had a good blow reaching the bottom of the bucket in 20 seconds. Gas reached the surface in 26 minutes and built up to 1200 cubic feet per day (14.5 pounds through 1/8 inch orifice). The test recovered 1120 feet of fluid, 180 feet of oil cut mud, 760 feet of free oil and 180 feet of muddy water.

Initial Flow pressure	128	pounds per square inch				
Final flow pressure	470	"	"	"	"	"
Initial shut in pressure	1162	"	"	"	"	"
Final shut in pressure	1138	"	"	"	"	"
Initial hydrostatic pressure	2650	"	"	"	"	"
Final hydrostatic pressure	2580	"	"	"	"	"
Bleed off pressure	1325	"	"	"	"	"