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CORE LABORATORIES, INC.
 Petroleum Reservoir Engineering
 DALLAS, TEXAS

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CORE ANALYSIS RESULTS

Company **THE ATLANTIC REFINING COMPANY** Formation **UPPER & LOWER TOCITO** File **RP-3-922**
 Well **NAVAJO NO.29** Core Type **DIAMOND CONV.** Date Report **2-11-59**
 Field **HORSESHOE GALLUP** Drilling Fluid **OIL EMULSION MUD** Analysts **CLIFFORD**
 County **SAN JUAN** State **NEW MEX.** Elev. **5554 GR** Location **SEC 31 31N 16W**

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs		POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		hor	vert		OIL	TOTAL WATER	
1	1221-22	0.06	0.02	2.6	7.7	50.0	
2	22-23	0.06	0.02	6.3	11.1	73.0	
3	23-24	0.08	0.02	8.7	33.3	51.7	
4	24-25	0.06	0.04	11.0	19.1	69.1	
5	25-26	0.06	0.03	7.2	11.1	79.2	
6	26-27	1.6	1.1	8.1	14.8	59.3	
7	27-28	0.96	0.04	13.2	21.2	75.8	
8	28-29	0.60	0.02	10.6	13.2	79.2	
9	29-30	0.54	0.09	9.2	13.0	75.0	
10	30-31	0.35	0.04	11.3	24.8	63.7	
11	31-32	0.06	0.04	11.3	12.4	65.5	
12	32-33	443	269	20.2	14.9	32.2	
13	33-34	258	111	20.6	18.0	36.9	
14	34-35	0.16	0.13	17.4	7.5	49.4	
15	35-36	0.17	0.07	9.2	16.3	51.1	
16	36-37	0.26	0.09	8.8	15.9	59.1	
17	37-38	87	44	16.6	25.3	28.3	
18	38-39	0.70	0.41	20.7	12.1	21.7	
19	39-40	100	49	17.8	14.6	37.6	
20	40-41	4.8	4.5	16.7	16.8	44.3	
21	41-42	155	39	18.8	13.8	41.5	
22	42-43	212	12	25.1	12.4	35.9	
23	43-44	279	171	24.8	11.7	34.7	
24	44-45	49	26	21.4	19.6	31.3	
25	45-46	58	35	14.3	18.9	52.4	
26	46-47	17	3.9	18.3	6.0	42.6	
27	47-48	0.70	0.26	13.5	8.9	68.1	
28	48-49	134	77	25.6	12.9	30.9	
29	49-50	372	1.0	17.0	11.2	21.8	
30	50-51	0.43	0.14	7.7	9.1	53.2	
31	51-52	19	4.4	19.0	13.2	29.5	
32	52-53	11	1.0	11.9	23.5	35.3	
33	53-54	0.70	0.41	15.8	12.7	51.3	
34	54-55	0.55	0.26	12.6	19.8	31.0	
35	55-56	0.43	0.09	8.3	15.7	39.8	
36	56-57	0.26	0.20	14.0	17.9	48.6	
37	57-58	0.13	0.06	6.4	7.8	67.2	
38	58-59	0.17	0.06	10.7	4.7	68.2	
39	59-60	0.25	0.02	11.5	4.3	81.7	
40	60-61	0.14	0.05	10.6	6.6	75.5	
41	61-62	0.11	0.07	10.8	6.5	72.2	
42	1262-63	0.07	0.03	11.0	6.4	76.4	

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees assume no responsibility and make no warranty or representations, as to the productivity, proper operation,

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Field	HORSESHOE GALLUP	Drilling Fluid	OIL EMULSION MUD	Analysis	CLIFFORD
County	SAN JUAN	State	NEW MEX.	Elev.	5554 GR
				Location	SEC 31 31N 16W

Lithological Abbreviations

SAND TO SHALE SH CLAY LM	DO. WHITE CO. LIGHT CH GYPSUM GYP	AN-HDRITE ANHY CONGLOMERATE CONG FOSSILIFEROUS FOSS	SANDY SHY SHALY SHY LIMY LMT	FINE FM MEDIUM-MED COARSE CSE	CRYSTALLINE-ELN GRAIN-GRN GRANULAR-GRNL	BROWN-BRN GRAY-GY VUGGY-VGY	FRACTURED FRAC LAMINATION-LAM STYLOLITIC STY	SLIGHTLY-SL/ VERY-V/ WITH W/
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SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY		POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		hor	vert		OIL	TOTAL WATER	
43	1263-64	0.08	0.06	11.2	4.5	76.8	
44	64-65	0.06	0.05	13.8	4.6	75.9	
45	65-66	0.06	0.02	9.4	5.3	73.4	
46	66-67	0.03	0.02	10.1	5.0	79.2	
47	67-68	0.04	0.02	9.5	5.3	84.2	
48	68-69	0.08	0.03	10.3	6.8	79.6	
49	69-70	0.11	0.04	9.2	5.4	90.2	
50	70-71	0.11	0.03	9.4	5.3	89.4	
51	71-72	0.06	0.02	9.2	5.4	89.1	UPPER TOCITO
52	72-73	0.41	0.07	10.8	4.6	85.2	LOWER TOCITO
53	73-74	0.09	0.08	10.4	6.7	82.7	
54	74-75	0.07	0.04	10.5	4.8	81.9	
55	75-76	0.21	0.09	10.4	6.7	86.5	
56	76-77	0.20	0.06	10.4	6.7	86.5	
57	77-78	0.36	0.10	11.5	7.8	85.2	
58	78-79	0.06	0.05	11.1	4.5	79.3	
59	79-80	0.12	0.10	8.3	6.0	79.5	
60	80-81	0.33	0.09	11.5	4.3	80.0	
61	81-82	0.04	0.04	8.3	6.5	81.9	
62	82-83	0.10	0.02	9.5	5.3	80.0	
63	83-84	0.38	0.07	10.1	6.9	81.2	
64	84-85	0.17	0.03	11.2	6.3	85.7	
65	85-86	0.19	0.09	9.3	9.7	74.2	
66	86-87	0.22	0.06	5.1	0.0	60.8	
67	87-88	0.47	0.09	11.2	6.3	89.3	
68	88-89	0.12	0.10	10.4	6.7	84.6	
69	89-90	0.04	0.02	2.7	0.0	70.4	
70	90-91	0.16	0.06	8.6	8.1	84.9	
71	91-92	0.15	0.13	9.9	5.1	86.9	
72	92-93	1.0	0.11	8.0	6.3	78.8	
73	93-94	0.07	0.05	6.8	0.0	67.6	
74	94-95	0.52	0.10	10.0	7.0	80.0	
75	95-96	0.26	0.13	6.4	7.8	78.1	
76	96-97	0.04	0.03	6.9	10.1	79.7	
77	97-98	0.80	0.34	15.3	13.1	30.1	
78	98-99	1.0	0.19	16.6	7.8	30.1	
79	1299-00	4.2	1.0	21.6	13.0	32.4	
80	1300-01	63	2.5	19.0	20.5	38.4	
81	01-02	0.17	0.04	6.7	10.4	71.6	
82	02-03	0.35	0.02	7.5	9.3	58.7	
83	03-04	0.45	0.16	12.1	14.9	57.9	
84	1304-05	0.62	0.13	11.2	14.3	39.3	

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County **SAN JUAN** State **NEW MEX.** Elev **5554 GR.** Location **SEC 31 31N 16W**

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY		POROSITY PERCENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		hor	vert		OIL	TOTAL WATER	
85	1305-06	0.80	0.67	12.5	9.6	60.8	
86	06-07	1.0	0.16	11.3	12.4	67.3	
87	07-08	0.34	0.27	10.8	11.1	63.9	
88	08-09	0.65	0.25	11.1	7.2	63.1	
89	09-10	0.12	0.04	11.7	6.0	75.2	
90	1310-11	0.04	0.01	10.1	6.9	87.1	



DENVER • CASPER
BILLINGS • BISMARCK
LOS ANGELES

LOG NO. 19098 IE Petroleum Information

COMPANY El Paso Natural Gas Company

WELL #8 Horseshoe Canyon

FIELD Horseshoe

LOC (P.I.) NE NE SW

4-30N-16W

San Juan, New Mexico

D NO 19098 IE
4-30N-16W

COUNTY SAN JUAN, N.M.		FIELD #8		LOCATION HORSESHOE CANYON		WELL HORSESHOE CANYON		COMPANY EL PASO NATURAL GAS PRODUCTS CO.	
STATE NEW MEXICO		COUNTY SAN JUAN		LOCATION SEC. 4-30N-16W		FIELD HORSESHOE CANYON		WELL #8	
FILM No.		Elevation: D.F. 5826'		K.B. 5827'		or C.L. 5819'		Other Surveys	
RUN No. ONE		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W		Location of Well	
Date 7-2-58		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W		ML	
First Reading 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W		FILM No.	
Last Reading 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Feet Measured 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Csg. Section 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Csg. Driller 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Depth Reached 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Bottom Driller 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Depth Bottom 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Mud No. 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Depth, Visc. 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Mud Resist. 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Res. BHT 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Rmt 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Rmc 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
pH 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Wtr. Loss 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Bit Size 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Specs. - AM 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
IND. 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Op. Rig Time 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Truck No. 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Recorded By 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			
Witness 1275		2080' FR S/L		3200' FR E/L		SEC. 4-30N-16W			

REMARKS C.D. USED S.O. 1"

Cartridge No. C-208
Panel No. 8-4
Sonde No. C-215

SPONTANEOUS-POTENTIAL millivolts	DEPTHS	CONDUCTIVITY millimhos/m - $\frac{1000}{\text{ohms. m}^2/\text{m}}$
-10 + -4 -1	2" = 100'	INDUCTION 400 200 0 600 400
	CSG. 128'	RESISTIVITY -ohms. m ² /m 16" NORMAL 0 100

Bar chart showing induction values: 400, 200, 0, 600, 400.