Case No.

1596

Large Exhibits

Memo

To

Dear

...ge submitted by
Tom Polack after the
hearing, Exp. #1
Purports to show that
...ke by and by
...ose that appear on
...the Stratigraphic
...from N32 to 37...
...ation on Exp. #1
...Polacks.

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 3

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation UPPER & LOWER TOCITO File RP-3-922
Well NAVAJO NO.29 Core Type DIAMOND CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analysis CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location: SEC 31 T31N R16W

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
91	1395-96	0.80	0.67	12.1	9.6	60.8	
96	96-97	1.0	0.16	13.3	12.4	67.3	
97	97-98	0.96	0.27	10.8	11.1	63.9	
98	98-99	0.40	0.31	11.1	7.2	65.1	
99	99-00	0.52	0.36	11.7	6.9	73.0	
00	1310-11	0.04	0.01	10.1	6.9	87.1	

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 contained herein (which in any case are only opinions based on an inspection of samples and observations and materials supplied as above) are not guarantees or warranties as to the productiveness of any oil sand or zone, or the proper completion of any well.

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

File RP-3-915 Page No. 4
Well Navajo No. 30

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
27	1265.5	1.2	12.6	12.7	68.2		
28	31-32	9.69	11.9	11.8	64.6		
29	46-47	0.45	12.1	9.9	62.0		
30	47-48	0.48	7.6	5.3	83.0		
31	48-49	0.58	8.1	2.5	49.3		
32	1265.48	0.06	2.8	7.1	82.9		

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 2

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation UPPER & LOWER TOCITO File RP-3-922
Well NAVAJO NO.29 Core Type DIAMOND CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analysis CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location: SEC 31 T31N R16W

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
43	1263-64	0.08	0.06	11.2	4.5	78.8	
44	64-65	0.06	0.05	12.8	4.4	73.9	
45	65-66	0.06	0.02	9.1	5.3	77.4	
46	66-67	0.03	0.02	10.1	5.0	79.2	
47	67-68	0.04	0.02	9.1	5.2	78.6	
48	68-69	0.08	0.03	10.3	6.8	79.6	
49	69-70	0.21	0.04	9.7	7.1	80.2	
50	70-71	0.11	0.03	9.2	5.3	79.4	
51	71-72	0.06	0.02	9.2	5.3	80.4	
52	72-73	0.41	0.07	10.8	7.4	80.2	
53	73-74	0.09	0.08	10.1	6.9	80.0	
54	74-75	0.07	0.04	10.3	6.8	81.9	
55	75-76	0.81	0.09	10.1	6.7	80.7	
56	76-77	0.06	0.04	10.6	6.7	80.2	
57	77-78	0.36	0.10	11.1	7.4	81.2	
58	78-79	0.06	0.05	11.1	6.5	79.3	
59	79-80	0.32	0.10	9.3	6.0	79.5	
60	80-81	0.26	0.09	9.5	6.2	80.0	
61	81-82	0.06	0.04	9.3	5.5	81.9	
62	82-83	0.10	0.08	9.5	5.3	80.0	
63	83-84	0.29	0.09	10.1	6.9	81.2	
64	84-85	0.19	0.09	11.3	6.9	79.7	
65	85-86	0.25	0.08	9.2	6.7	81.2	
66	86-87	0.47	0.09	12.1	7.0	80.8	
67	87-88	0.15	0.10	10.1	6.3	82.3	
68	88-89	0.06	0.02	9.9	6.0	81.6	
69	89-90	0.16	0.06	8.6	5.0	80.4	
70	90-91	0.15	0.13	9.9	6.1	82.7	
71	91-92	1.0	0.11	8.0	6.3	82.8	
72	92-93	0.96	0.07	9.8	6.8	79.6	
73	93-94	0.52	0.10	10.0	7.0	80.0	
74	94-95	0.36	0.12	8.4	7.8	78.1	
75	95-96	0.06	0.02	8.9	10.1	79.7	
76	96-97	0.80	0.36	15.3	13.1	79.7	
77	97-98	1.0	0.19	16.6	7.8	80.1	
78	98-99	4.2	1.0	23.6	13.0	80.2	
79	1399-00	60	2.3	19.0	20.3	84.4	
80	00-01	0.37	0.06	6.7	10.4	71.4	
81	01-02	0.25	0.02	7.5	9.3	84.7	
82	02-03	0.65	0.26	12.3	14.9	77.9	
83	1303-04	0.62	0.13	11.2	14.7	79.1	

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 1

CORE ANALYSIS RESULTS

Company The Atlantic Refining Company Formation As Noted File RP-3-918
Well Navajo No. 30 Core Type Diamond Date Report 2-3-59
Field Horseshoe Gallup Drilling Fluid Oil Emulsion Analysis Glisford
County San Juan State New Mexico Elev. 5492.12' Location Sec. 31-31N-16W

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
	Upper Tocito						
1	1160-61	0.03	0.4	33.3	38.1		
2	61-62	<0.01	6.2	29.0	54.9		
3	62-63	0.01	9.2	21.7	69.3		
4	63-64	<0.01	7.8	37.2	52.6		
5	1164-65	0.04	6.6	27.3	59.1		
6	1169-70	0.20	5.2	13.5	55.8		
7	70-71	79	15.0	16.0	28.7		
8	71-72	253	18.7	13.9	31.5		
9	72-73	0.10	11.4	27.2	51.6		
10	73-74	106	18.8	18.6	25.0		
11	74-75	0.08	10.1	20.6	46.6		
12	75-76	140	9.7	14.4	34.1		
13	76-77	91	13.4	14.9	28.4		
14	77-78	0.05	9.0	15.6	40.1		
15	78-79	8.5	11.3	25.7	31.0		
16	1179-80	0.04	9.7	16.5	48.4		
17	1187-88	1.1	17.7	16.9	33.3		
18	88-89	0.40	11.7	12.8	42.7		
19	1189-90	0.02	9.3	17.0	47.2		
	Lower Tocito						
20	1233-34	96	19.5	15.4	40.0		
21	34-35	176	17.3	17.9	32.4		
22	35-36	0.48	12.1	11.6	47.1		
23	36-37	0.01	8.0	6.2	78.9		
24	37-38	0.24	10.3	11.6	75.6		
25	38-39	0.05	12.6	11.1	68.2		
26	1239-40	0.07	13.6	11.7	64.7		

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CASE NO. 1596
THE ATLANTIC REFINING CO.
EXHIBIT NO. 2

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 1

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation UPPER & LOWER TOCITO File RP-3-922
Well NAVAJO NO.29 Core Type DIAMOND CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analysis CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location: SEC 31 T31N R16W

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
1	1263-64	0.08	0.06	11.2	4.5	78.8	
2	64-65	0.06	0.05	12.8	4.4	73.9	
3	65-66	0.06	0.02	9.1	5.3	77.4	
4	66-67	0.03	0.02	10.1	5.0	79.2	
5	67-68	0.04	0.02	9.1	5.2	78.6	
6	68-69	0.08	0.03	10.3	6.8	79.6	
7	69-70	0.21	0.04	9.7	7.1	80.2	
8	70-71	0.11	0.03	9.2	5.3	79.4	
9	71-72	0.06	0.02	9.2	5.3	80.4	
10	72-73	0.41	0.07	10.8	7.4	80.2	
11	73-74	0.09	0.08	10.1	6.9	80.0	
12	74-75	0.07	0.04	10.3	6.8	81.9	
13	75-76	0.81	0.09	10.1	6.7	80.7	
14	76-77	0.06	0.04	10.6	6.7	80.2	
15	77-78	0.36	0.10	11.1	7.4	81.2	
16	78-79	0.06	0.05	11.1	6.5	79.3	
17	79-80	0.32	0.10	9.3	6.0	79.5	
18	80-81	0.26	0.09	9.5	6.2	80.0	
19	81-82	0.06	0.04	9.3	5.5	81.9	
20	82-83	0.10	0.08	9.5	5.3	80.0	
21	83-84	0.29	0.09	10.1	6.9	81.2	
22	84-85	0.19	0.09	11.3	6.9	79.7	
23	85-86	0.25	0.08	9.2	6.7	81.2	
24	86-87	0.47	0.09	12.1	7.0	80.8	
25	87-88	0.15	0.10	10.1	6.3	82.3	
26	88-89	0.06	0.02	9.9	6.0	81.6	
27	89-90	0.16	0.06	8.6	5.0	80.4	
28	90-91	0.15	0.13	9.9	6.1	82.7	
29	91-92	1.0	0.11	8.0	6.3	82.8	
30	92-93	0.96	0.07	9.8	6.8	79.6	
31	93-94	0.52	0.10	10.0	7.0	80.0	
32	94-95	0.36	0.12	8.4	7.8	78.1	
33	95-96	0.06	0.02	8.9	10.1	79.7	
34	96-97	0.80	0.36	15.3	13.1	79.7	
35	97-98	1.0	0.19	16.6	7.8	80.1	
36	98-99	4.2	1.0	23.6	13.0	80.2	
37	1399-00	60	2.3	19.0	20.3	84.4	
38	00-01	0.37	0.06	6.7	10.4	71.4	
39	01-02	0.25	0.02	7.5	9.3	84.7	
40	02-03	0.65	0.26	12.3	14.9	77.9	
41	1303-04	0.62	0.13	11.2	14.7	79.1	
42	04-05	0.14	0.09	10.6	6.6	75.5	
43	05-06	0.11	0.07	10.8	6.3	78.8	
44	1306-07	0.07	0.03	11.0	6.1	76.4	

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 1

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation GALLUP File RP-3-901
Well NAVAJO NO.28 Core Type DIAMOND CORE Date Report 1-6-59
Field HORSESHOE GALLUP Drilling Fluid WATER BASE MUD Analysis CLIFFORD
County SAN JUAN State NEW MEXICO Location

Lithological Abbreviations

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MAXIMUM	PERMEABILITY 90°	POROSITY %	RESIDUAL SATURATION PORE VOLUME OIL	RESIDUAL SATURATION PORE VOLUME WATER	SAMPLE DESCRIPTION AND REMARKS
1	1335-36	0.08	4.2	16.7	51.5		
2	66-65	2.3	6.1	19.7	39.4		
3	65-66	178	20.4	15.7	35.3		
4	66-67	0.24	12.0	5.8	62.5		
5	67-68	2.5	12.4	13.7	37.1		
6	68-69	295	22.3	12.5	30.2		
7	69-70	274	18.5	16.2	35.7		
8	70-71	140	21.6	12.5	35.6		
9	71-72	0.16	11.0	6.4	62.5		
10	72-73	393	22.8	11.0	33.8		
11	73-74	28	17.7	14.1	38.6		
12	74-75	0.13	15.0	14.7	66.1		
13	75-76	0.06	9.5	9.5	62.7		
14	76-77	106	11.9	10.1	61.3		
15	77-78	0.12	8.7	13.8	56.0		
16	78-79	0.06	11.2	12.5	67.8		
17	79-80	0.19	8.5	14.7	62.1		
18	80-81	0.77	12.0	17.5	49.1		
19	81-82	0.33	7.7	20.2	39.0		
20	82-83	0.13	9.2	15.1	45.2		
21	1183-84	<0.01	5.6	9.1	59.0		
22	1221-22	0.12	9.6	9.3	62.4		
23	22-23	0.07	7.3	9.4	79.0		
24	23-24	0.27	8.1	9.7	64.5		
25	24-25	<0.01	10.4	6.7	60.3		
26	25-26	0.08	4.2	6.6	76.8		
27	26-27	0.04	7.3	6.9	78.7		
28	27-28	1.1	9.7	12.3	69.3		
29	28-29	0.12	5.3	13.2	51.0		
30	29-30	0.20	13.0	10.8	61.2		
31	30-31	0.18	12.1	11.6	66.1		
32	31-32	0.61	11.6	13.6	62.2		
33	32-33	0.61	13.2	13.4	61.3		
34	1270-71	0.06	9.4	9.6	81.0		

SERVICE NO.8 NO INTERPRETATION OF RESULTS

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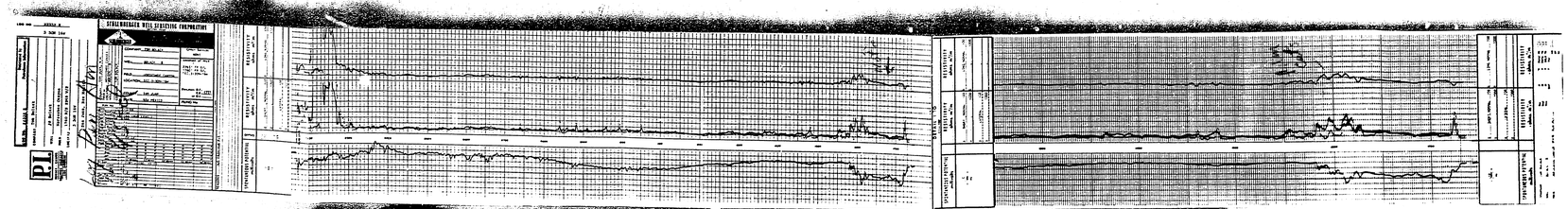
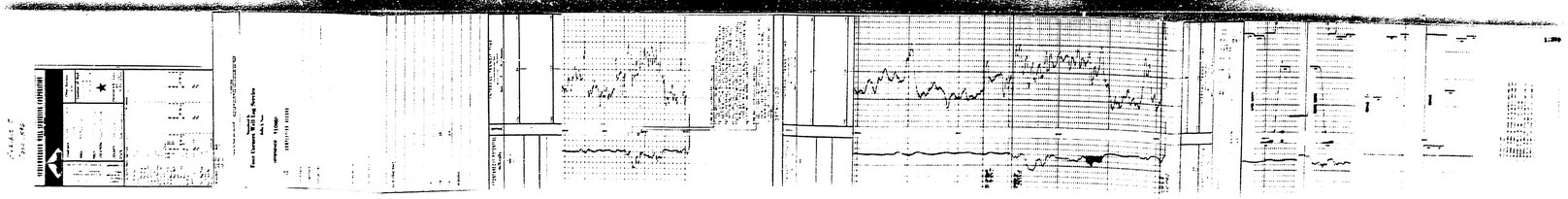




NE D

SW D'

SE

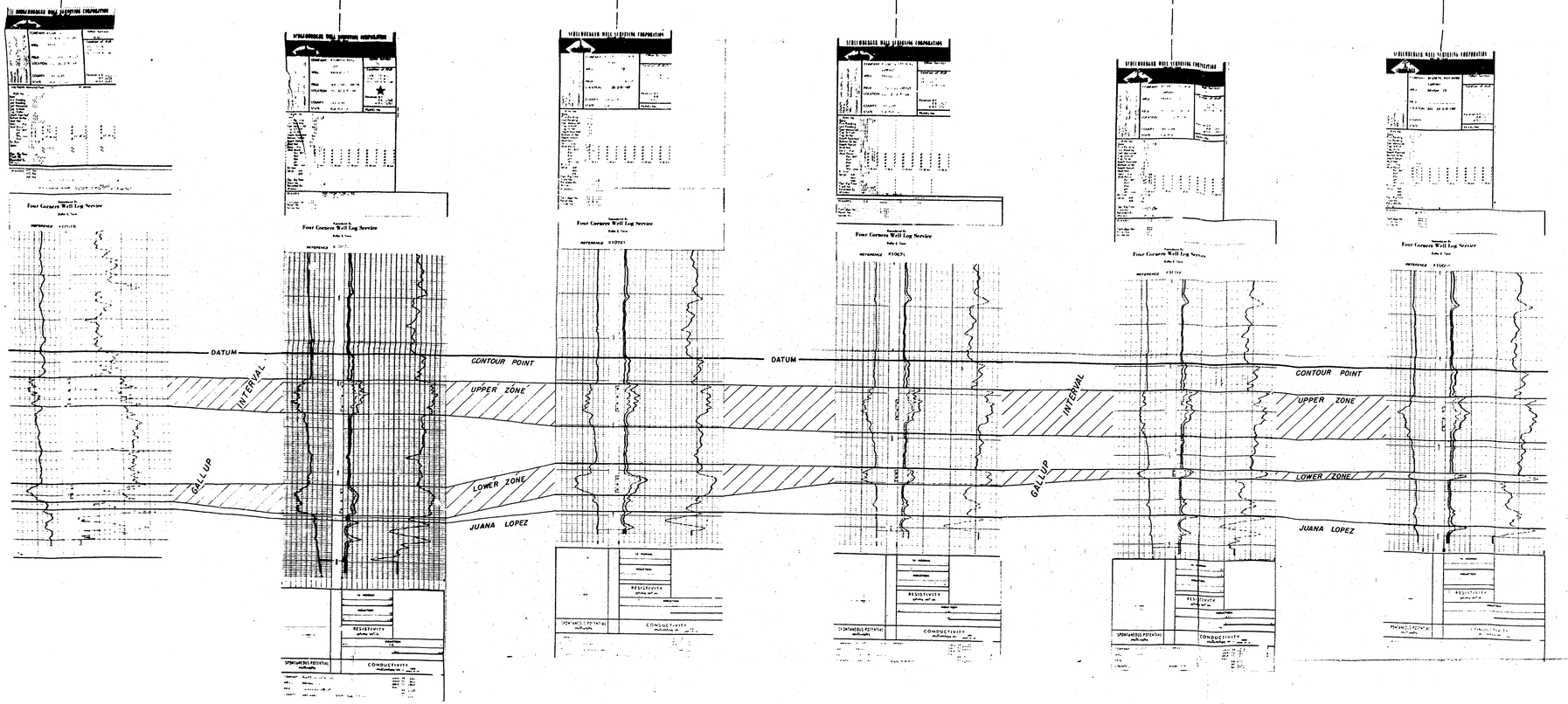
Appx 1/3 Mi

Appx 1/3 Mi

Appx 1/3 Mi

Appx 1/3 Mi

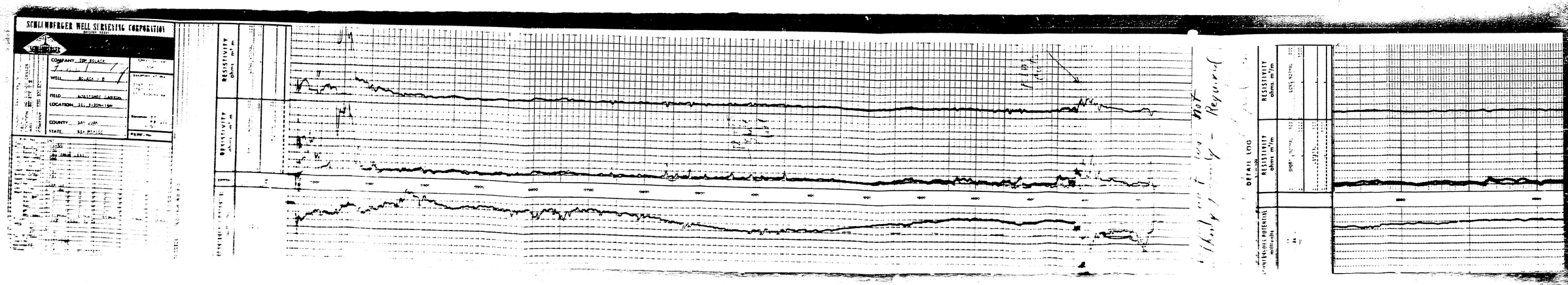
Appx 1/3 Mi



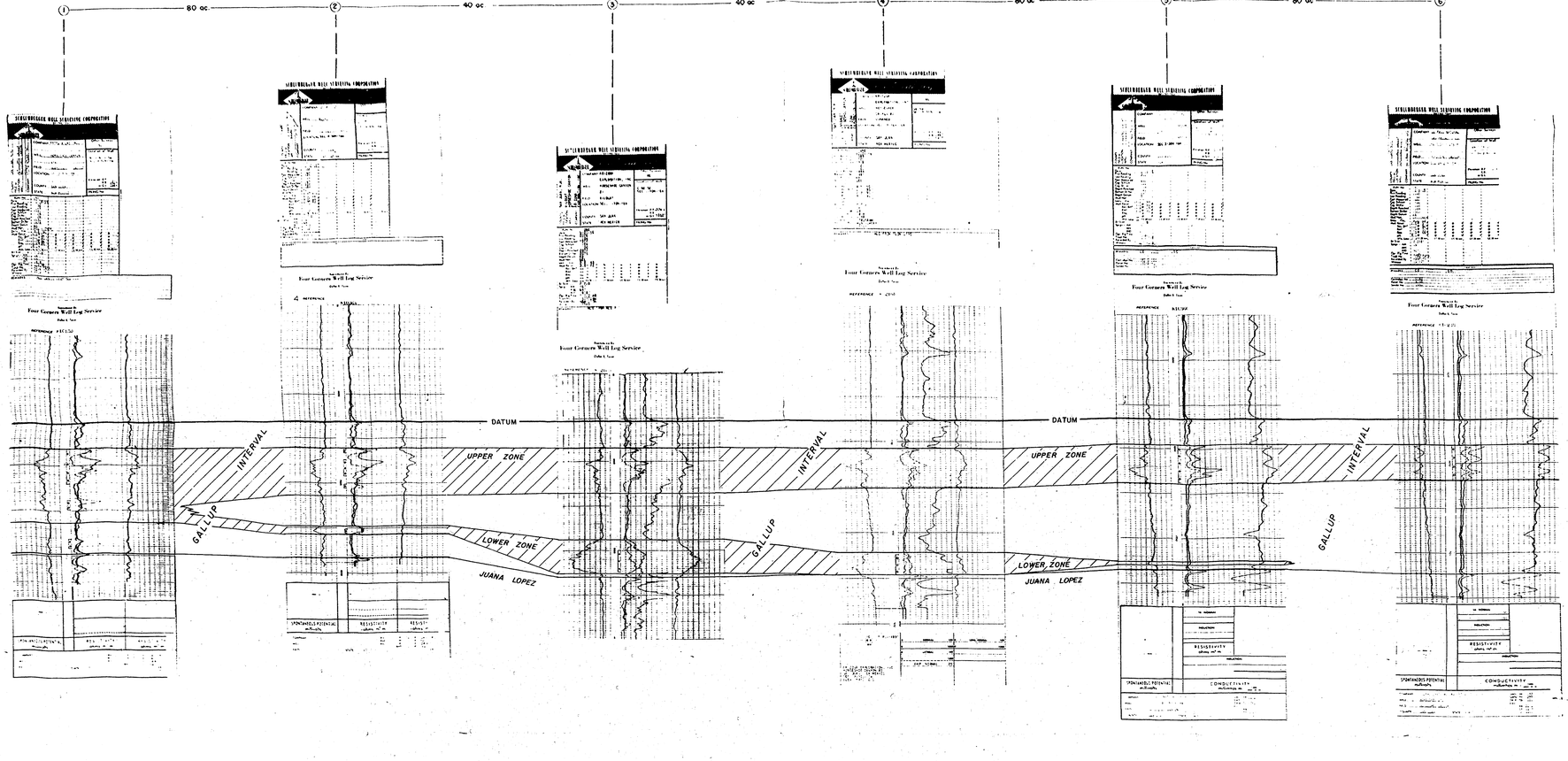
CROSS SECTION D—D'
NORTHWEST-GALLUP POOL
MT SW SE CYCLE SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 100'
Geology By: D. Jeffers - Jan 1959
Drafted By: J. Irvin & K. Williams

THE ATLANTIC REFINING CO.
EXHIBIT NO. 4
CASE NO. 1546



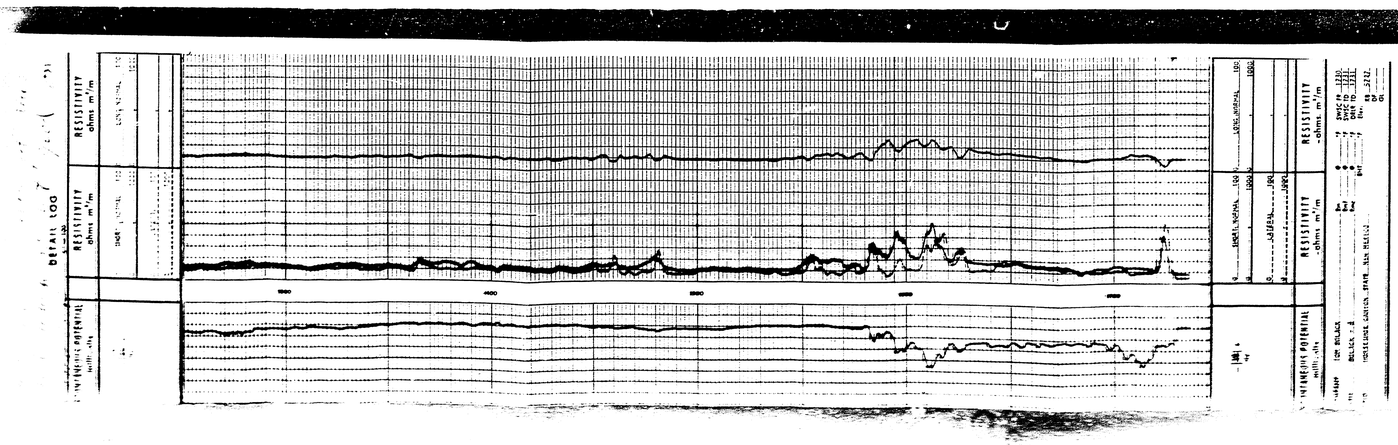
SW



CROSS SECTION C--C'
BISTI-GALLUP POOL
SW NE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 200'
Geology By: D. Jeancy - Jan 1959
Drafted By: J. Irvin & K. Fillmore

THE ATLANTIC REFINING CO.
EXHIBIT NO. 5
CASE NO. 1576



A

NW

1 — 3/4 Mi. — 2 — 3/4 Mi. — 3 — 3/4 Mi. — 4 — 3/4 Mi. — 5 — 3/4 Mi. — 6 — 3/4 Mi.

DATUM

CONTOUR POINT

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

A'

SE

4 — 3/4 MI. — 5 — 3/4 MI. — 6 — 3/4 MI. — 7 — 3/4 MI. — 8 — 1 1/2 MI. — 9

CONTOUR POINT

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

DATUM

CONTOUR POINT

UPPER ZONE

LOWER ZONE

JUANA LOPEZ

CONTOUR POINT

UPPER ZONE

LOWER ZONE

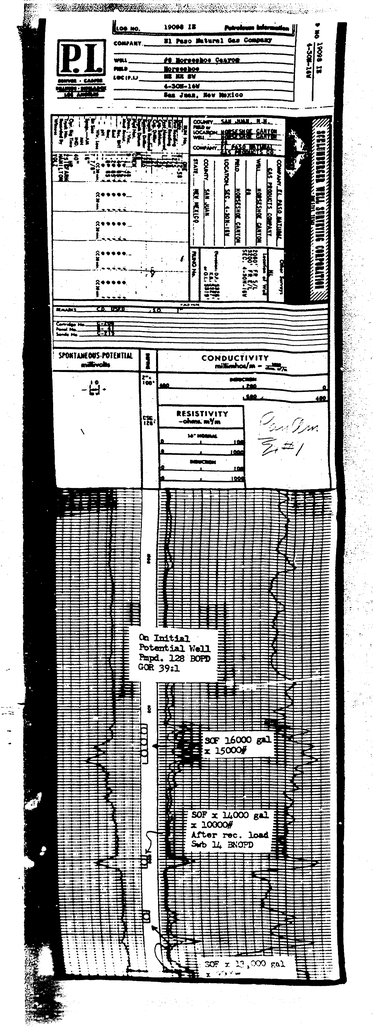
JUANA LOPEZ

CROSS SECTION A-A'

SHOWING GALLUP POOL
AS AN OPEN SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 20" = 100'
Geology By: R. Jeans - Jan 1958
Drafted By: J. Irwin & K. Killgore

THE ATLANTIC REFINING CO.
EXHIBIT NO. 9
CASE NO. 2176



B

SW

① 80 Ac. ② 80 Ac. ③ 80 Ac. ④ 80 Ac. ⑤ 80 Ac. ⑥

B'

NE

CONTOUR POINT

DATUM

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

CROSS SECTION B — B'

ROSWELL-GALLUP POOL
DE-AN CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 2" = 100'
Geology By: D. Jarvis - Jan 1959
Drafted By: J. Irvin & K. Wilson

ATLANTIC REFINING CO
EXHIBIT NO. 4
CASE NO. 1271

CROSS SECTION B — B'

BOOKCLIFF-GALLUP POOL
DATUM CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

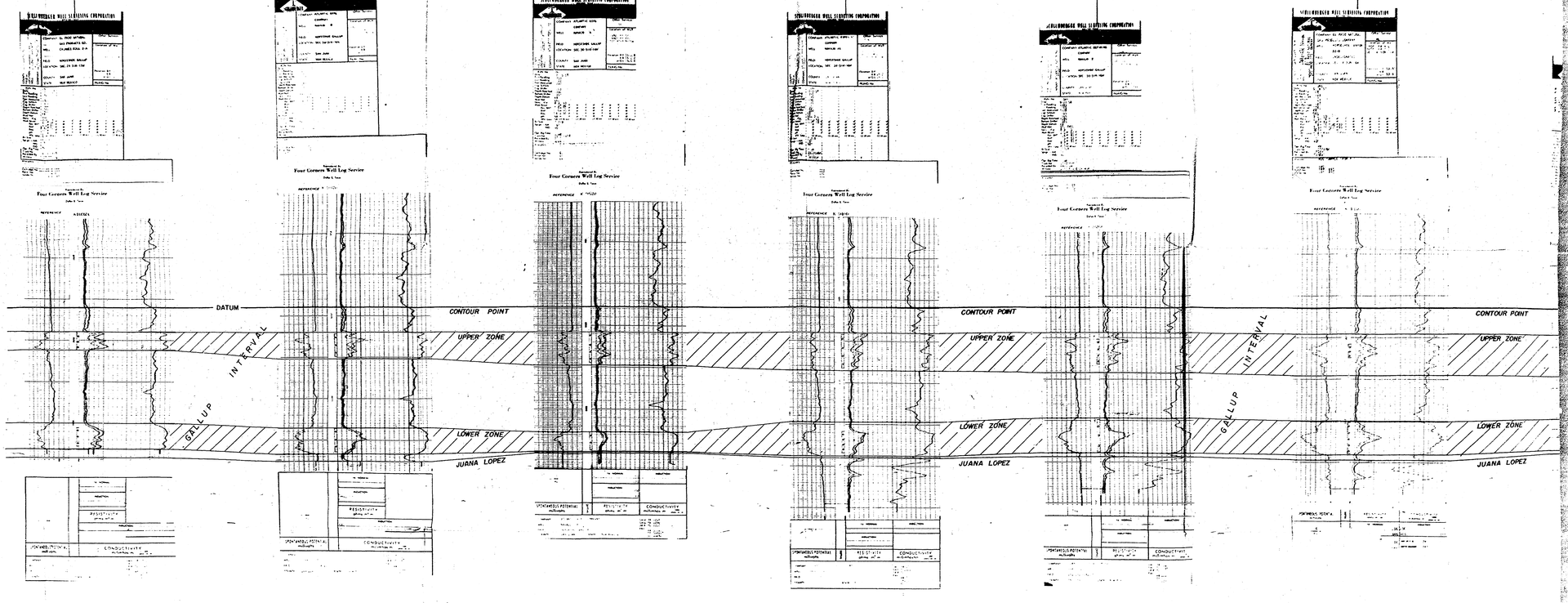
Horizontal Scale: None
Vertical Scale: 2½" = 100'
Geology By: D. Jones - Jan 1959
Drafted By: J. Irvin & E. Wilson

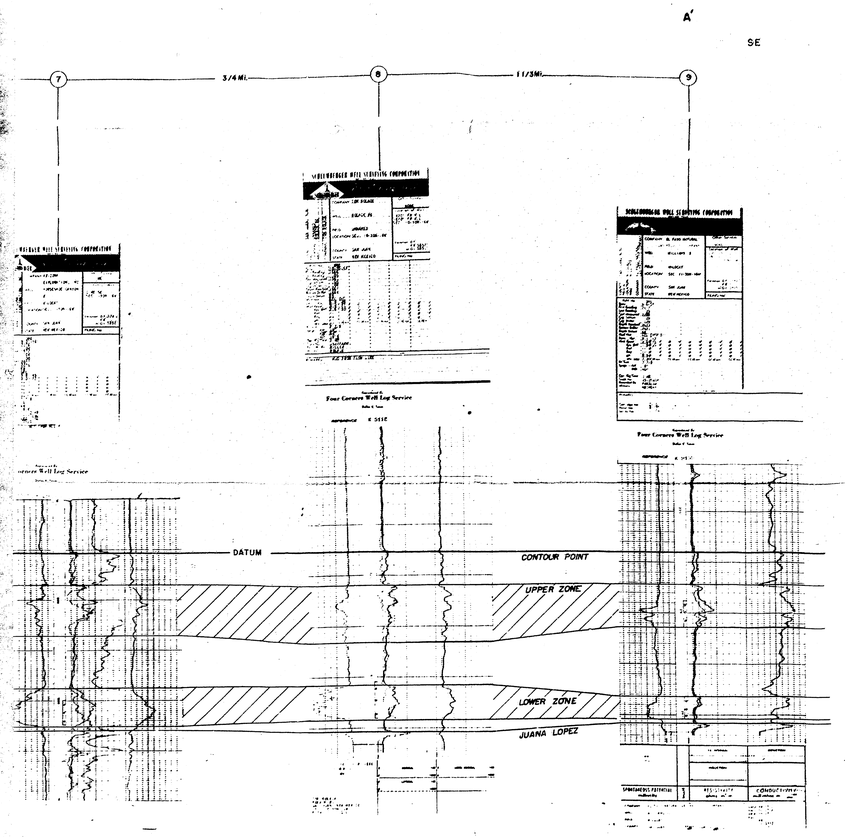
ATLANTIC REFINING CO
EXHIBT NO. 4
CASE NO 1516

A

NW

1 — 3/4 Mi. — 2 — 3/4 Mi. — 3 — 3/4 Mi. — 4 — 3/4 Mi. — 5 — 3/4 Mi. — 6 — 3/4 Mi.





CROSS SECTION A - A'

SOUTHEAST CAPULIN FIELD,
UNION COUNTY, NEW MEXICO
OF THE GALLUP FORMATION
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 20' = 100'
Geology By: D. Jennings - Jan 1959
Drafted By: J. Irvin & E. Williams

THE ATLANTIC REFINING CO
EXHIBIT NO. _____
CASE NO. _____

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 3

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation UPPER & LOWER TOCITO File RP-3-922
Well NAVAJO NO.29 Core Type DIAMOND CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analyst CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location SEC 35 T30N R16W

Lithological Abbreviations

Sample	Depth	Permeability Maximum	Permeability 90°	Porosity %	Residual Saturation Oil %	Residual Saturation Water %	Lithological Abbreviations
99	1305-06	0.80	0.67	12.3	9.4	66.8	
98	06-07	1.0	0.16	12.1	10.4	69.3	
97	07-08	0.36	0.27	11.1	11.1	63.9	
96	08-09	0.45	0.25	11.1	7.2	63.1	
95	09-10	0.32	0.26	11.7	6.8	72.5	
94	1310-11	0.04	0.01	10.1	6.9	87.1	

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 CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analyst CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location SEC 35 T30N R16W

Lithological Abbreviations

UPPER TOCITO
LOWER TOCITO

CASE NO. 1516
THE ATLANTIC REFINING CO.
EXHIBIT NO. 3

CORE LABORATORIES, Inc.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page No. 1

CORE ANALYSIS RESULTS

Company THE ATLANTIC REFINING COMPANY Formation UPPER & LOWER TOCITO File RP-3-922
Well NAVAJO NO.29 Core Type DIAMOND CORE Date Report 2-11-59
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analyst CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location SEC 35 T30N R16W

Lithological Abbreviations

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
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Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analyst CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location SEC 35 T30N R16W

Lithological Abbreviations

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

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Lithological Abbreviations

UPPER TOCITO
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Petroleum Reservoir Engineering
DALLAS, TEXAS

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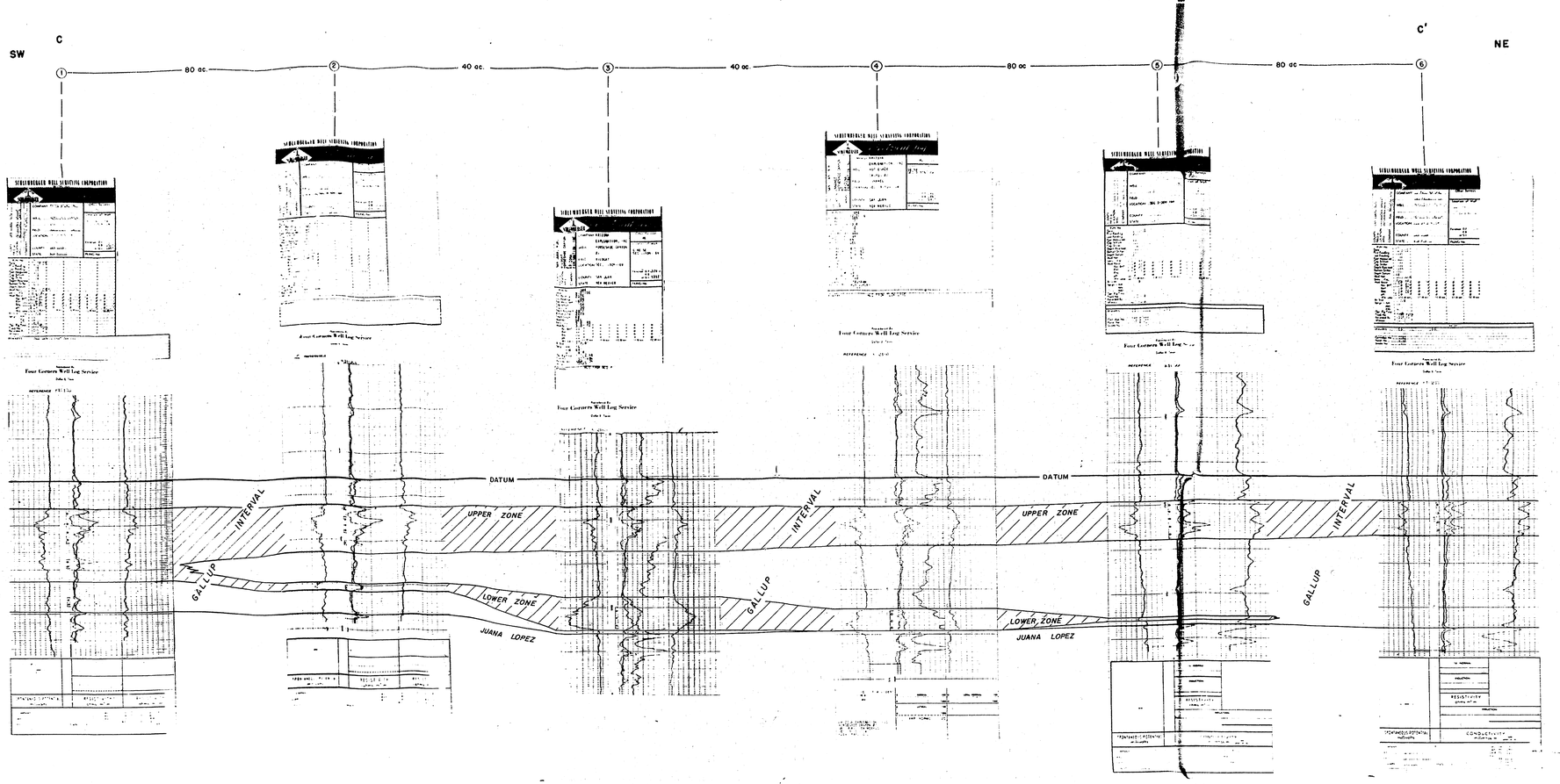
Field HORSESHOE GALLUP Drilling Fluid OIL EMULSION MUD Analyst CLIFFORD
County SAN JUAN State NEW MEX. Elev. 5554 GR Location SEC 35 T30N R16W

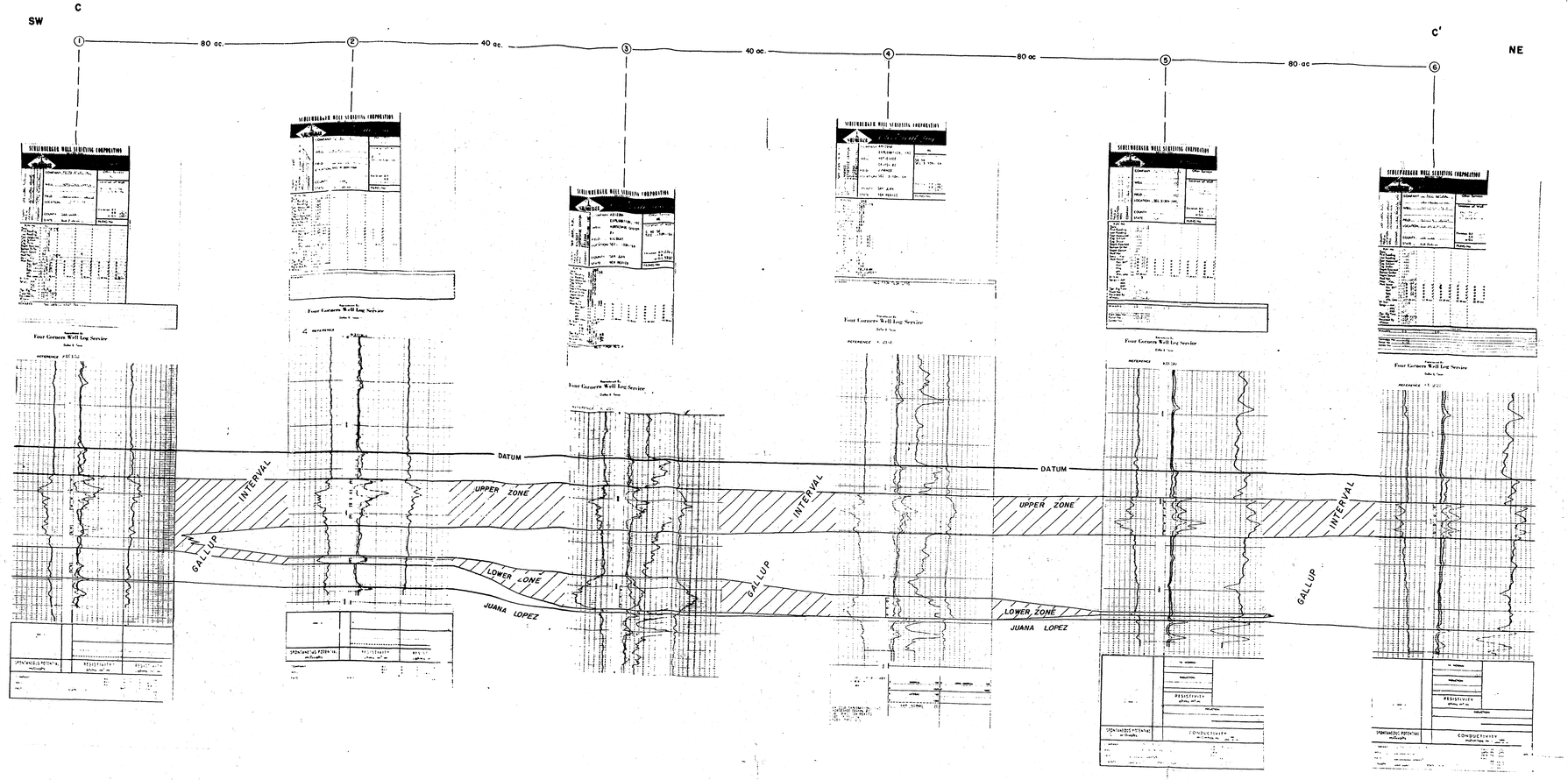
Lithological Abbreviations



CROSS SECTION C—C'
BOOMERANG-GALLUP POOL
AN N-S CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 200'
Geology By: D. Jennings - June 1959
Drafted By: J. Irish & E. Williams

THE ATLANTIC REFINING CO.
EXHIBIT NO. 5
CASE NO. 1477



CROSS SECTION C – C'
HOGBACK-GALLUP POOL
N M OIL CONS. COMMISSION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 200'
Geology By: B. Jeanes - Jan 1959
Drafted By: J. Irvin & E. Hillman

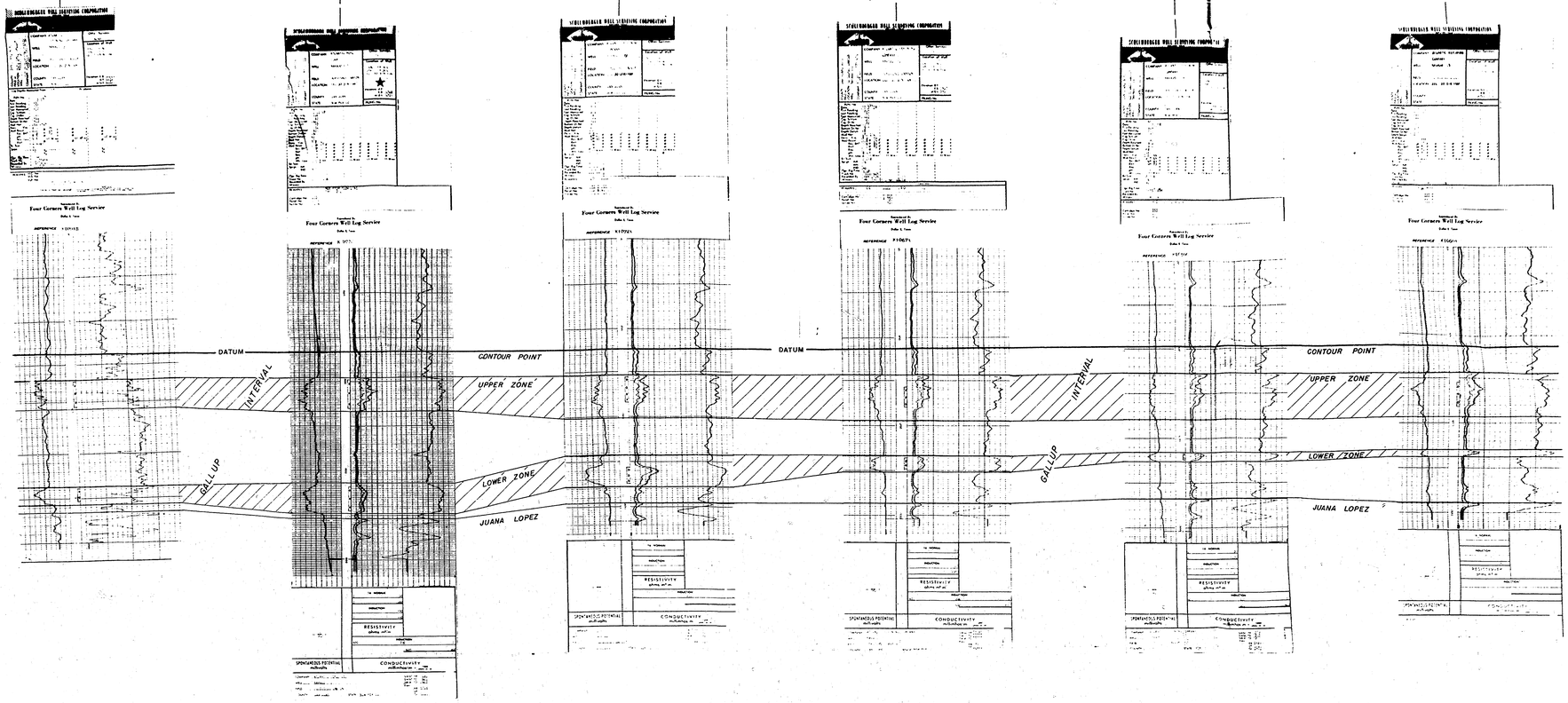
THE ATLANTIC REFINING CO.
EXHIBIT NO. 7
CASE NO. 1546

NE D

SW D'

SE

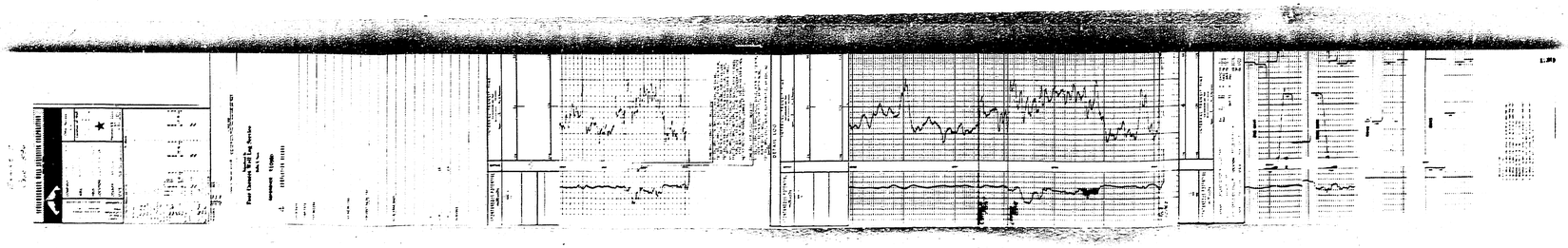
① Appx 1/3 Mi ② Appx 1/3 Mi ③ Appx 1/3 Mi ④ Appx 1/3 Mi ⑤ Appx 1/3 Mi ⑥

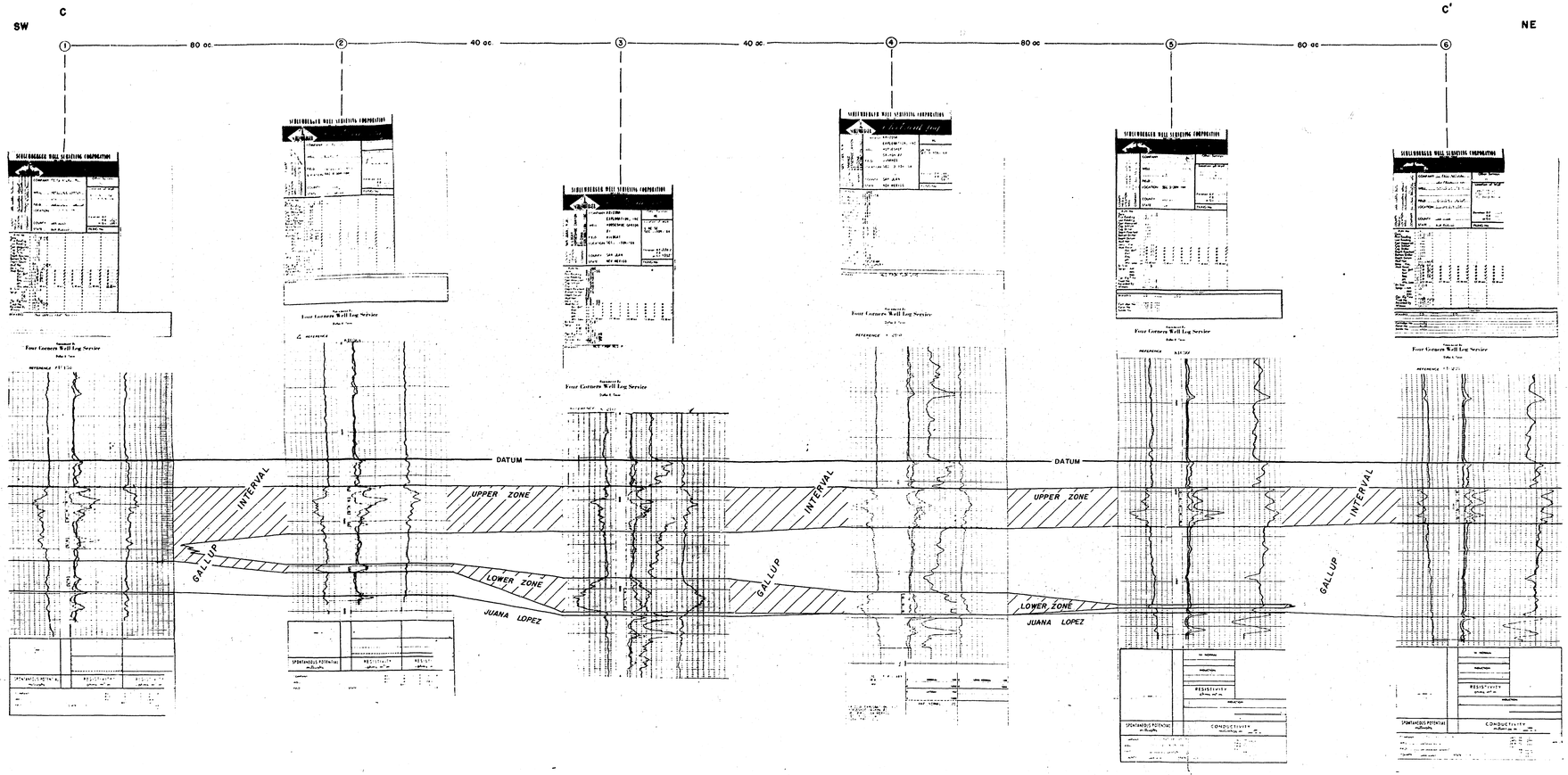


CROSS SECTION D—D'
NORTHEAST-GALLUP POOL
NE-SW-SE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 100'
Geology By: D. Jessup - Jan 1959
Drafted By: J. Irvin & K. Williams

THE ATLANTIC REFINING CO.
EXHIBIT NO. 2
CASE NO. 2574





CROSS SECTION C–C'
SCHWERDT-GALLUP POOL
IN NE CORNER SECTION 17
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 200'
Checked By: D. Swaney - Jan 1959
Drafted By: J. Irvin & K. Willson

THE ATLANTIC REFINING CO.
EXHIBIT NO. 5
CASE NO. 1577

B

SW

80 Ac. 80 Ac. 80 Ac. 80 Ac. 80 Ac.

B'

NE

1 2 3 4 5 6

SCHLUMBERGER WELL SURVEYING CORPORATION

Four Corners Well Log Service

DATUM

CONTOUR POINT

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

RESISTIVITY

CONDUCTIVITY

SPONTANEOUS POTENTIAL

CROSS SECTION B — B'

SOUTHWEST-ALLEY POOL
SO.-NE. CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 2" = 100'
Geology By: R. Young - Jan 1959
Drafted By: J. Irvin & E. Wilson

ATLANTIC REFINING CO.
EXHIBIT NO. 4
CASE NO. 1596

SCHLUMBERGER WELL SURVEYING CORPORATION

Electric Log

COMPANY

WELL

FIELD

LOCATION

COUNTY

STATE

Other Surveys

Location of Well

Elevation: K.B.
D.F.
G.L.

Log Depths Measured From

ft. above

1/100,000

INTERVAL TRANSIT TIME

DETAIL LOG

RESISTIVITY

CONDUCTIVITY

SPONTANEOUS POTENTIAL

SCHLUMBERGER WELL SURVEYING CORPORATION

Stella Inc.

COMPANY ATLANTIC REFINING CO.
WELL NAVAJO
FIELD WILDCAT
LOCATION SEC. 27-T29N-R13W
COUNTY SAN JUAN
STATE NEW MEXICO

Other Surveys: N/A

Location of Well:

Elevation: K.B. 5611
D.F.
G.L.

Log Depths Measured From K.B. Ft. above

RUN No.				
Date				
First Reading				
Last Reading				
Csg. Measured				
Csg. Schlum.				
Csg. Driller				
Depth Reached				
Bottom Driller				
Mud Not.				
Dens. Visc.				
Mud Resist.				
Res. BHT				
pH				
Wtr. Loss				
Rmf				
Bit Size				
Spacing				
	To		To	
	To		To	

Opr. Rig Time
Truck No.
Recorded By
Witness

REMARKS: CC-No. WB-No.

Velocity (feet per second)

1/500 1/1000

Interval Transit (microseconds per foot)

INTERVAL TRANSIT TIME

DEPTHS

SPONTANEOUS POTENTIAL millivolts

DETAIL LOG

INTERVAL TRANSIT TIME

DEPTHS

SPONTANEOUS POTENTIAL millivolts

Four Common Well Log Service

Type A

Type B

Type C

Type D

A

NW

1 — 3/4 Mi. — 2 — 3/4 Mi. — 3 — 3/4 Mi. — 4 — 3/4 Mi. — 5 — 3/4 Mi. — 6 — 3/4 Mi. — 7 — 3/4 Mi. — 8

DATUM

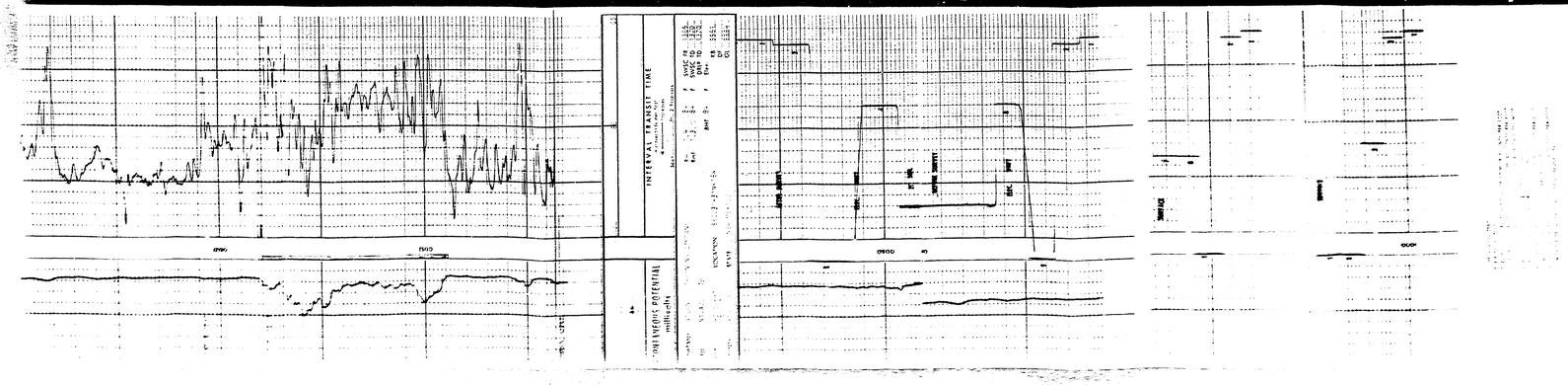
CONTOUR POINT

UPPER ZONE

GALLUP INTERVAL

LOWER ZONE

JUANA LOPEZ



CROSS SECTION A-A'

NORTHWEST GALLUP FIELD
NW-SE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 20' = 200'
Geology By: D. Jessee - Jan 1959
Drafted By: J. Lewis & E. Ellison

THE ATLANTIC REFINING CO
EXHIBIT NO. _____
CASE NO. _____

TB-8-1

CORE ANALYSIS REPORT
FOR
TOM BOLACK
BOLACK 6
SAN JUAN COUNTY, NEW MEXICO
LOCATION: SEC. 10- T30N - R16W

CORE LABORATORIES, INC. — Petroleum Reservoir Engineering

COMPANY TOM BOLACK
WELL BOLACK 6
FIELD
COUNTY SAN JUAN
LOCATION SEC 10-T30N-R16W

DATE ON 10/13/37
DATE OFF 10/20/37
FORMATION MANCOS
STATE NEW MEX. DRLG FLD OIL EMULSION
REMARKS SAMPLED BY REPRESENTATIVE OF CLIENT

FILE NO RP-3-627 PC
ENGRS KRC, JE
ELEV
CORES DIAMOND

SAND ___ LIMESTONE ___ CONGLOMERATE ___ CHERT ___
SHALE ___ DOLOMITE ___

COMPLETION COREGRAPH

TABULAR DATA and INTERPRETATION

PERMEABILITY O-O
TOTAL WATER O-O
OIL SATURATION % ▲-▲

	DEPTH	FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	OIL SATURATION PER CENT OF PORE SPACE	TOTAL WATER PER CENT OF PORE SPACE	REMARKS
1	1509-10	0.01	3.6	5.6	33.3		
2	10-11	0.03	8.3	26.5	67.5		
3	11-12	<0.01	4.8	14.6	60.4		
4	12-13	0.06	7.1	7.0	70.5		
5	13-14	0.01	3.1	9.0	54.9		
6	14-15	0.06	12.4	20.2	59.8		
7	15-16	0.02	7.5	17.3	61.3		
8	16-17	0.26	15.2	32.1	69.7		
9	17-18	0.30	12.5	34.6	67.2		
10	18-19	0.29	16.3	36.5	63.5		
11	19-20	0.12	10.7	35.0	65.3		
12	20-21	0.07	9.8	7.3	74.8		
13	21-22	0.08	12.3	31.4	68.1		
14	22-23	0.09	9.3	7.5	64.5		
15	23-24	0.03	11.8	5.9	78.0		
16	24-25	0.13	12.4	13.5	69.8		
17	25-26	0.16	13.4	10.4	68.2		
18	26-27	1.3	12.8	12.5	62.5		
19	27-28	0.21	13.2	9.4	81.0		
20	28-29	1.2	11.9	9.4	79.0		
21	29-30	1.3	12.4	8.1	80.6		
22	30-31	0.06	7.7	18.2	68.0		
23	31-32	0.09	12.7	5.5	78.8		
24	32-33	0.03	8.4	5.8	82.2		
25	33-34	0.48	8.3	8.4	75.1		
26	34-35	0.18	11.8	10.3	77.5		
27	35-36	0.06	5.8	3.4	77.5		
28	36-37	0.04	3.4	0.0	58.6		
29	37-38	0.08	6.7	0.0	78.7		
30	38-39	0.05	11.0	3.8	85.5		
31	1539-40	0.06	5.8	0.0	70.0		

CORE LABORATORIES, INC. — Petroleum Reservoir Engineering

COMPANY TOM BOLACK
WELL BOLACK 6
FIELD
COUNTY SAN JUAN
LOCATION SEC 10-T30N-R16W

DATE ON 10/20/37
DATE OFF 10/20/37
FORMATION MANCOS
STATE NEW MEX.
REMARKS SAMPLED BY REPRESENTATIVE OF CLIENT

FILE NO RP-3-628 PC
ENGRS KRC, JE
ELEV 5654' GL
CORES DIAMOND

SAND ___ LIMESTONE ___ CONGLOMERATE ___ CHERT ___
SHALE ___ DOLOMITE ___

COMPLETION COREGRAPH

TABULAR DATA and INTERPRETATION

PERMEABILITY O-O
TOTAL WATER O-O
OIL SATURATION % ▲-▲

	DEPTH	FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	OIL SATURATION PER CENT OF PORE SPACE	TOTAL WATER PER CENT OF PORE SPACE	REMARKS
1	1604-05	290	20.5	16.0	66.0		
2	05-06	140	22.9	21.9	66.9		
3	06-07	320	19.0	18.8	61.0		
4	07-08	307	23.1	20.3	62.1		
5	08-09	44	17.8	19.5	50.4		
6	09-10	63	19.1	20.7	61.4		
7	10-11	181	20.7	15.1	57.0		
8	11-12	146	22.4	17.1	60.7		
9	12-13	157	22.1	19.4	60.3		
10	13-14	96	20.4	22.7	66.9		
11	14-15	202	20.8	19.3	65.4		
12	15-16	400	20.5	16.7	65.4		
13	16-17	21	17.3	16.4	68.5		
14	17-18	134	15.9	20.7	66.1		
15	18-19	36	19.5	21.0	66.4		
16	19-20	77	17.3	20.2	53.7		
17	20-21	243	22.0	20.9	64.5		
18	21-22	320	20.9	23.4	60.5		
19	22-23	501	22.7	19.4	59.7		
20	23-24	341	19.3	14.2	66.7		
21	24-25	368	19.3	18.2	65.8		
22	25-26	101	19.7	22.2	65.4		
23	26-27	203	21.1	20.0	62.2		
24	27-28	555	21.3	19.0	63.2		
25	28-29	222	19.1	17.8	65.0		
26	29-30	321	19.7	19.2	63.2		
27	30-31	186	21.1	20.9	65.0		
28	31-32	126	20.4	18.4	62.4		
29	32-33	332	21.0	20.2	61.8		
30	33-34	307	19.4	17.0	63.3		
31	34-35	269	21.2	17.2	59.2		
32	35-36	197	21.3	17.8	60.8		
33	36-37	55	22.1	19.4	60.8		
34	1637-38	50	20.1	15.9	57.5		

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

October 20, 1937

Mr. Tom Bolack
1010 North Beetle
Farmington, New Mexico

Subject: Core Analysis
Bolack 6 Well
San Juan County, New Mexico
Location: Sec. 10-T30N-R16W

Dear Sir:

Diamond coring equipment and oil emulsion mud were used to core the interval from 1590 to 1640 feet in the Bolack 6. Representatives of Tom Bolack selected samples of the recovered formation on which analysis was desired, and submitted these samples to the Farmington laboratory. The results of the analysis are presented in this report.

Mancos sand from 1604 to 1638 feet is characterized throughout by very favorable residual oil and total water saturations, and the interval is interpreted to be oil productive. Comparatively high permeability predominates in the zone, the observed values ranging from 21 to 555 millidarcys and averaging 207 millidarcys. The total observed productive capacity of the section is 7038 millidarcy-feet, entirely adequate to support excellent rates of oil production without the necessity of treatment. The average porosity in this zone is 20.1 per cent, and the empirically calculated connate water saturation is 39 per cent of pore space.

Estimates of recoverable oil have been calculated for the Mancos sand between 1604 and 1638 feet using the observed core analysis data in conjunction with estimated reservoir fluid characteristics considered applicable. These estimates are presented on page one of the report, and are subject to the conditions set forth in the body of and in the footnotes to the summary page.

Page Two

Mr. Tom Bolack
Bolack 6 Well

We sincerely appreciate this opportunity to be of service to you, and trust that this report will prove useful in making a preliminary evaluation of the Mancos sand analyzed from this zone.

Very truly yours,
Core Laboratories, Inc.
C. D. Harris
District Manager

JDH:TLK:ee
7 cc. - Addressee

CORE LABORATORIES, INC.
Petroleum Engineering
DALLAS, TEXAS

File RP-3-628 PC
Tom Bolack
Bolack 6 Well

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Mancos 1604 0-1638 0

FEET OF SAND RECOVERED FROM FORMATION:	34 0	AVERAGE TOTAL WATER SATURATION, PER CENT OF PORE SPACE:	44 1
FEET OF SAND INCLUDED IN AVERAGE:	34 0	AVERAGE CONNATE WATER SATURATION, PER CENT OF PORE SPACE:	(c) 39
AVERAGE PERMEABILITY, MILLIDARCYS:	207	OIL GRAVITY, °API:	(e) 42
PRODUCTIVE CAPACITY, MILLIDARCY-FEET:	7038	ORIGINAL SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL:	(e) 100
AVERAGE POROSITY, PER CENT:	20 1	ORIGINAL FORMATION VOLUME FACTOR, BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL:	(e) 1 11
AVERAGE RESIDUAL OIL SATURATION, PER CENT OF PORE SPACE:	19 2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE, BARRELS PER ACRE-FOOT:	866

Calculated maximum solution gas drive recovery is 209 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 564 barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (Figures taken as footnotes for further discussion of recovery estimates.)

FORMATION NAME AND DEPTH INTERVAL:	
FEET OF SAND RECOVERED FROM FORMATION:	AVERAGE TOTAL WATER SATURATION, PER CENT OF PORE SPACE:
FEET OF SAND INCLUDED IN AVERAGE:	AVERAGE CONNATE WATER SATURATION, PER CENT OF PORE SPACE:
AVERAGE PERMEABILITY, MILLIDARCYS:	OIL GRAVITY, °API:
PRODUCTIVE CAPACITY, MILLIDARCY-FEET:	ORIGINAL SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL:
AVERAGE POROSITY, PER CENT:	ORIGINAL FORMATION VOLUME FACTOR, BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL:
AVERAGE RESIDUAL OIL SATURATION, PER CENT OF PORE SPACE:	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE, BARRELS PER ACRE-FOOT:

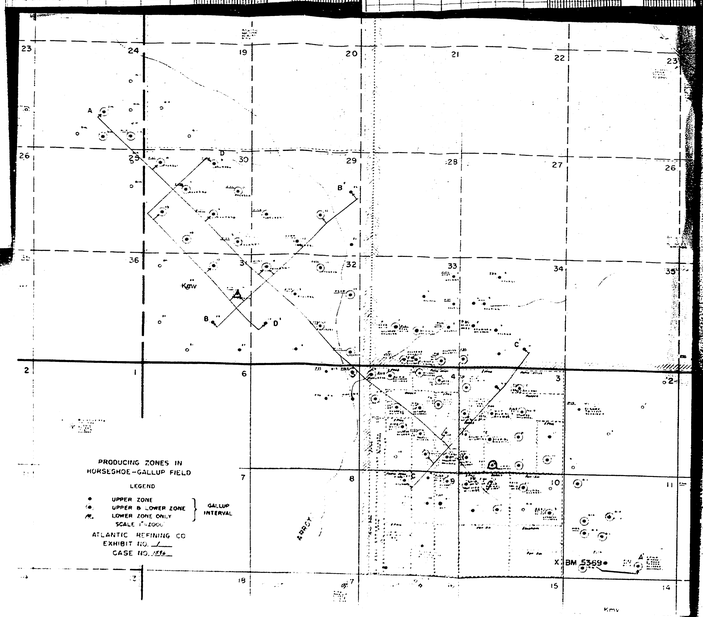
Calculated maximum solution gas drive recovery is ___ barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is ___ barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (Figures taken as footnotes for further discussion of recovery estimates.)

Calculations: [illegible] Remarks: [illegible]

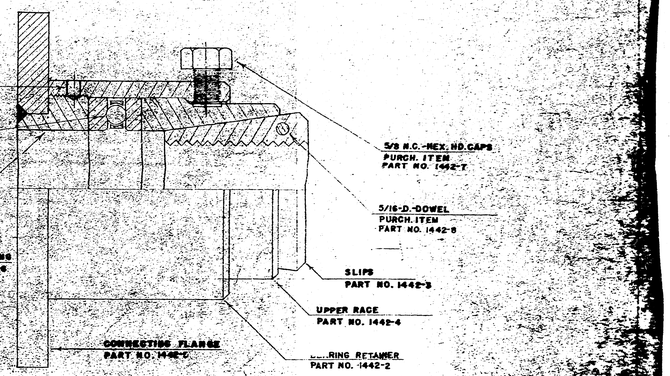
Key recovery estimates represent theoretical maximum recoveries of oil by solution gas and water drive. They assume that production is carried on under reservoir pressures, i.e., no accounting is taken of production at less or of pore damage in other zones. The effect of factors tending to reduce ultimate recovery, such as economic limits on oil production rates, gravity effects, or water channeling, is not considered. Neither have these factors been considered which may tend to increase ultimate recovery, such as pressure maintenance by gas or water injection, or the use of gas for gravity drainage or pool-wide water drive. Detailed predictions of ultimate recovery to specific abandonment conditions may be made on an engineering study to which consideration is given to the above factors and to economic factors.

TB-8-9

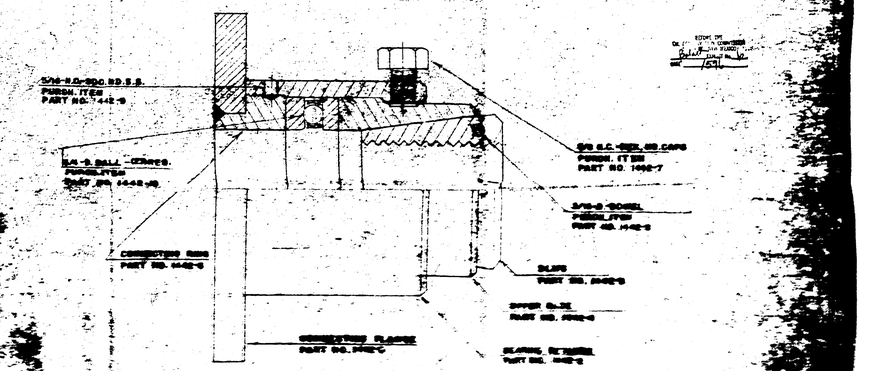
CORE ANALYSIS REPORT
FOR
TOM BOLACK
BOLACK 6
SAN JUAN COUNTY, NEW MEXICO
LOCATION: SEC. 10- T30N - R16W



2- EUE- ROTATING SLIP ASSEMBLY
PROPERTY OF
BROWN OIL TOOLS, INC.
DESIGN BY - C.C.BROWN DATE - 8-8-51 DRAWN BY - J.R.B.
SKETCH NO. 1410
FILE NO. T-1-6
BOOK NO. 1442

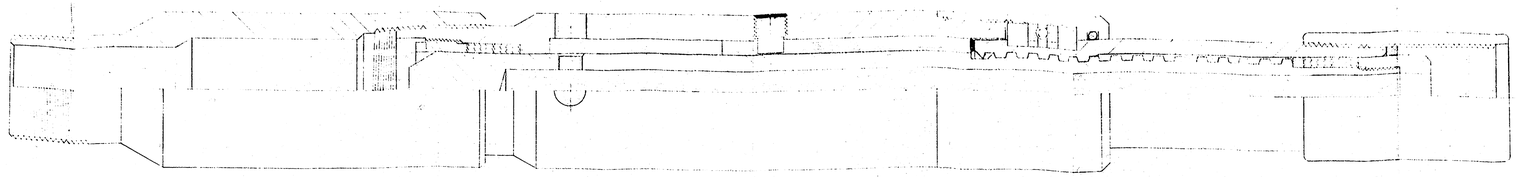


2- EUE- ROTATING SLIP ASSEMBLY
PROPERTY OF
BROWN OIL TOOLS, INC.
DESIGN BY - C.C.BROWN DATE - 8-8-51 DRAWN BY - J.R.B.
SKETCH NO. 1410
FILE NO. T-1-6
BOOK NO. 1442

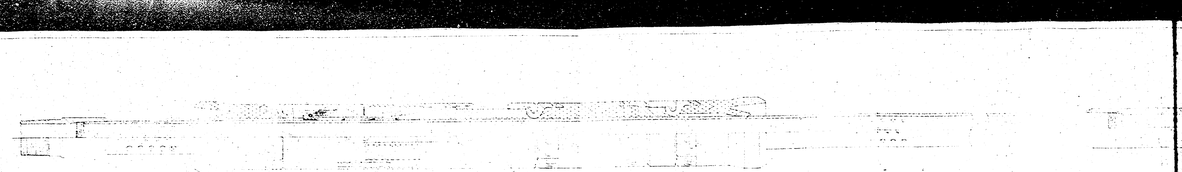


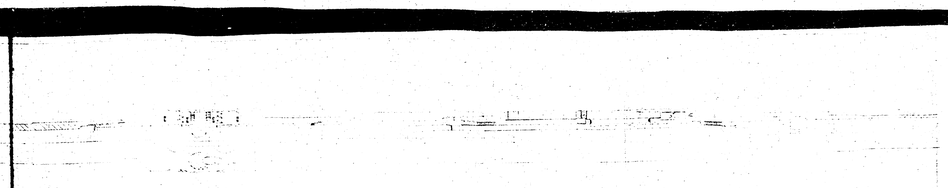
BROWN TYPE A ZONE SELECTOR

PROPERTY OF
BROWN OIL TOOLS INC.
DESIGN BY C.C. BROWN DRAWN 4-22-58 BY O.G.C.
SKETCH NO. 1808 FILE NO. EE-3-3



BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 3
CASE No. 672



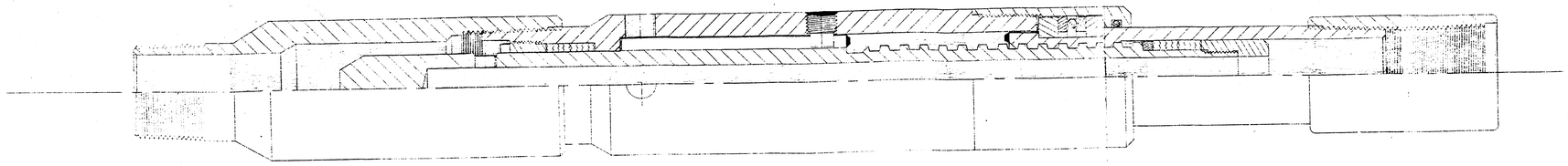


BROWN DUO PAK PACKER, HYDRAULIC HOLD DOWN,
TYPE A ZONE SELECTOR AND ROTATING TUBING HEAD
PROPERTY OF
BROWN OIL TOOLS, INC.
DESIGN BY C.C. BROWN DRAWN 11-3-54 BY JNS
SKETCH NO. 1808 FILE NO. EE-3-3

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 3
CASE No. 672

BROWN TYPE A ZONE SELECTOR

PROPERTY OF
BROWN OIL TOOLS INC.
DESIGN BY C.C. BROWN DRAWN 9-23-54 BY JNS
SKETCH NO. 1808 FILE NO. E E-3-3



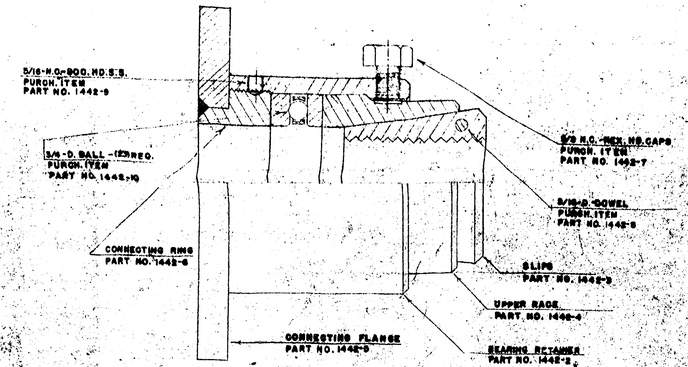
BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 3
CASE No. 672

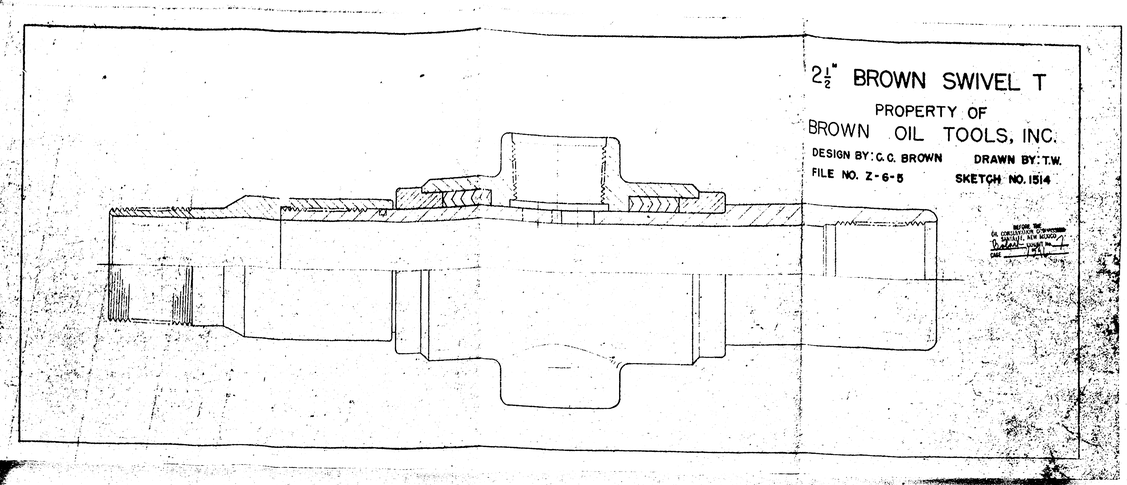
BROWN TYPE A ZONE SELECTOR

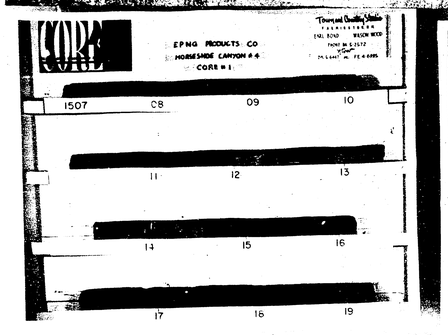
PROPERTY OF
BROWN OIL TOOLS INC.
DESIGN BY C.C. BROWN DRAWN 4-21-58 BY O.G.C.
SKETCH NO. 1808 FILE NO. EE-3-3

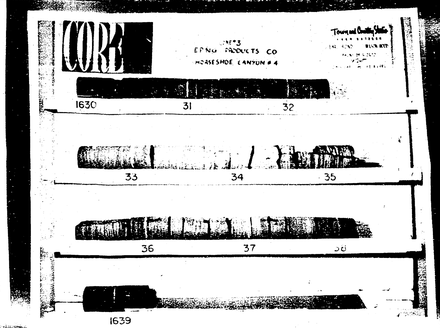
BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 3
CASE No. 672

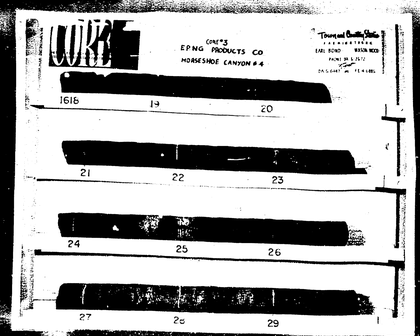
2- EUE- ROTATING SLIP ASSEMBLY
PROPERTY OF
BROWN OIL TOOLS, INC.
DESIGN BY - C. C. BROWN DATE - 8-8-51 DRAWN BY- J.R.S.
SKETCH NO. 1410 FILE NO. Y-1-8
BOOK NO. 1442

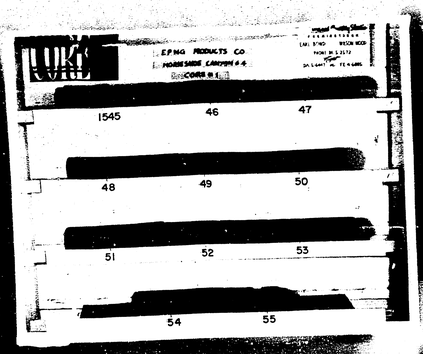


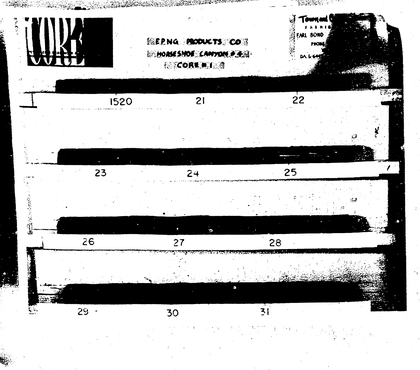


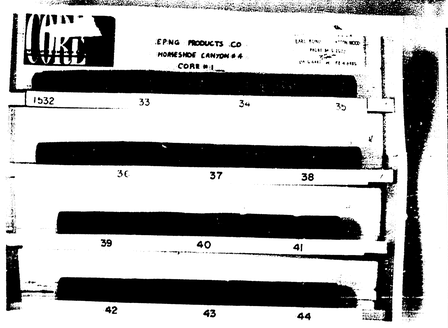


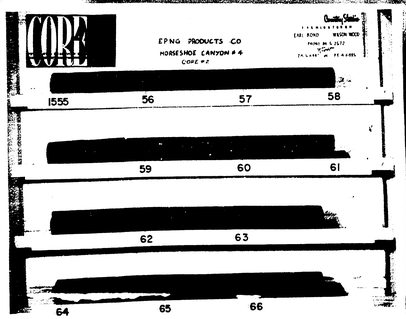


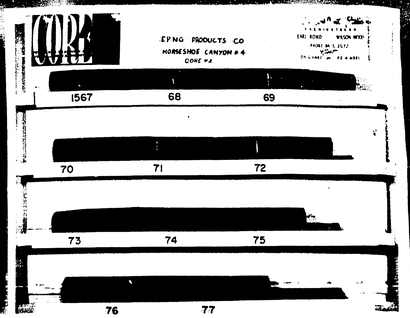


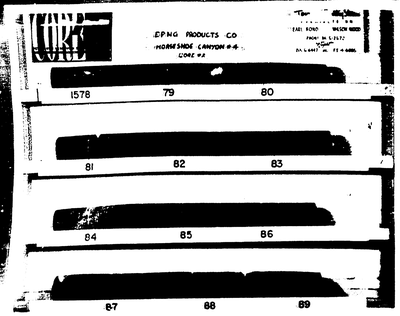


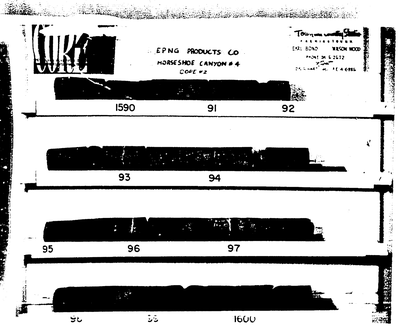


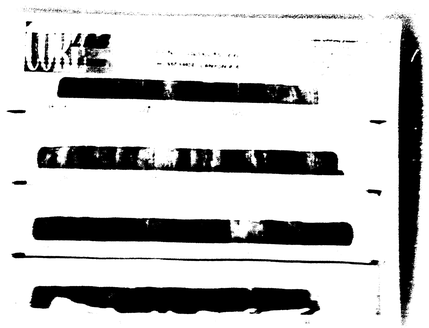


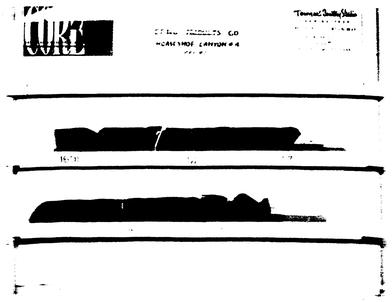


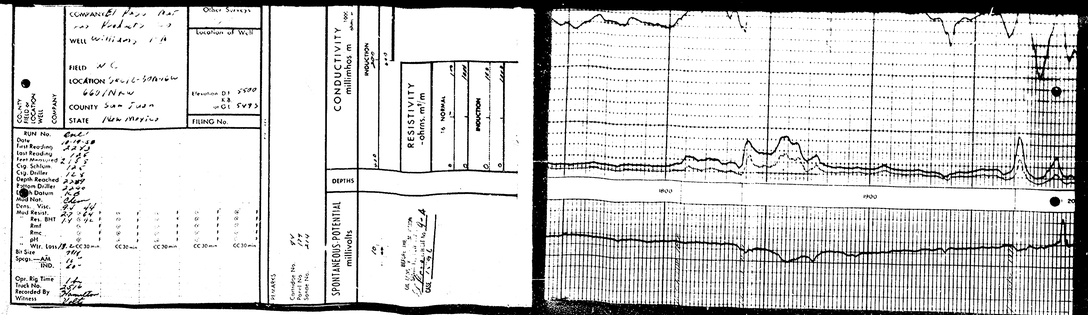




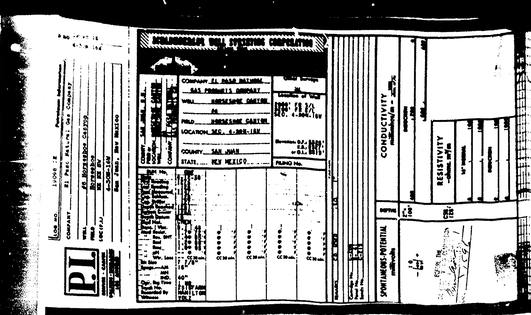


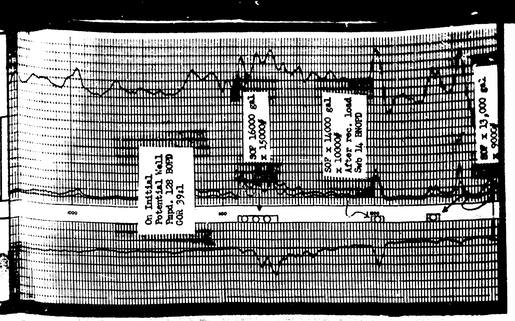


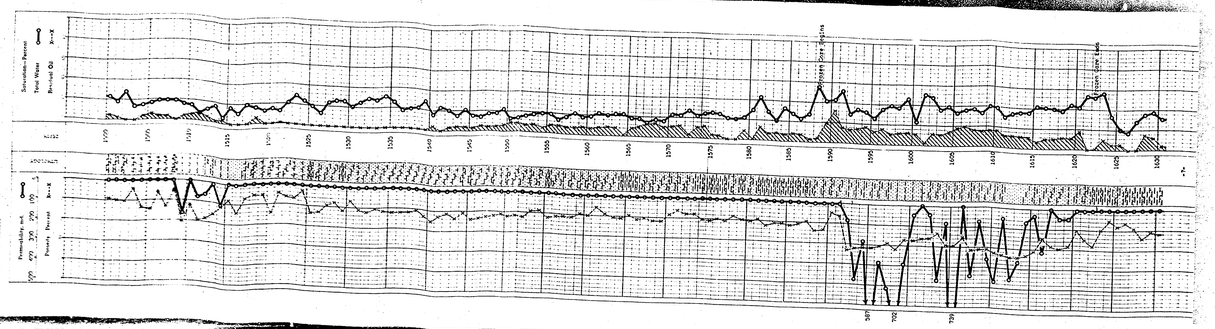


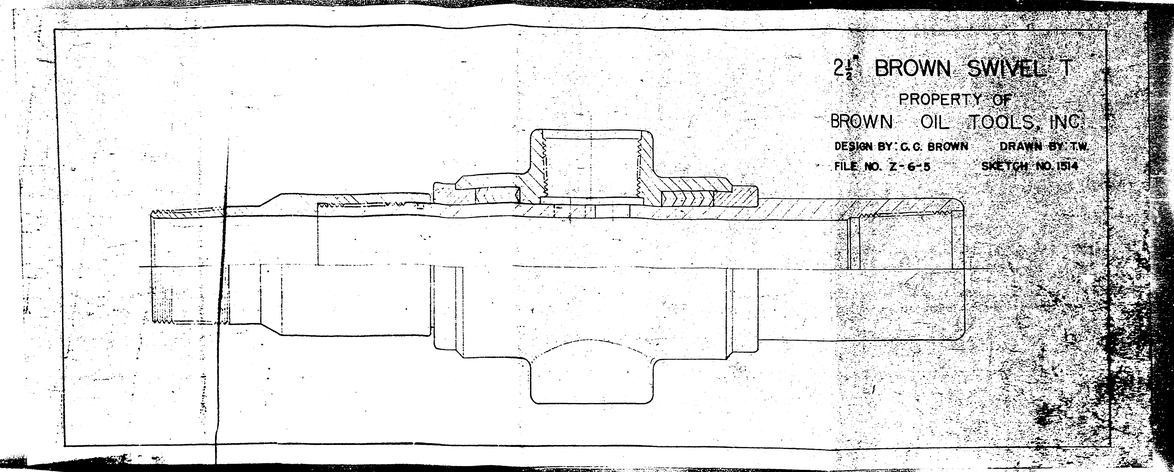

COMPANY El Paso Nat. Gas Products Co.
WELL Williams 1-A
FIELD W.C.
LOCATION 990/S & 660/W
COUNTY San Juan
STATE New Mexico
Other Surveys
Location of Well
Elevation DF 5690
GL 5673
FILING No.
RUN No. One
Date 4-29-57
Time
First Reading 4-29-57
Last Reading 4-29-57
Feet Measured 2,150
Csg. Schlum 1,674
Csg. Driller 1,674
Depth Reached 2,147
Depth Driller 2,150
Depth Datum Grd.
Mud Wat. Gel
Dens. Visc. 9.2 54
Mud Resist. Res. @ MT 77 @ 64
Res. @ MT
Res. @ MT
Wtr. Loss 11.4 cc 30 min
Bit Size 7 7/8
Spcs. — Am.
TOD. 2
Opr. Rig Time
Truck No.
Recorded By
Witness
CC 30 min
CC 30 min
CC 30 min
REMARKS
Centralizer No. 5
Sonde No. 217
CONDUCTIVITY millimhos m
RESISTIVITY ohms, m²/m
16" NORMAL
INDUCTION
DEPTHS
SPONTANEOUS POTENTIAL millivolts
GR CPM
GR API
CASE 4.5

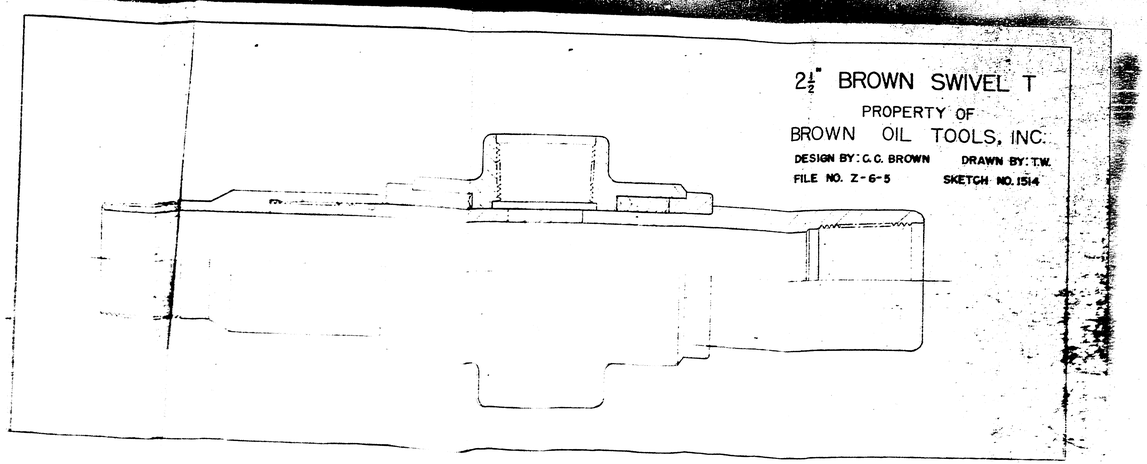
1800
1900


COMPANY EL PASO NATURAL GAS PRODUCTS COMPANY
WELL HORSESHOE CANYON
NO. 4
FIELD HORSESHOE CANYON
LOCATION SEC. 4-30N-15W
COUNTY SAN JUAN
STATE NEW MEXICO
FILING No.
CONDUCTIVITY millimhos m
RESISTIVITY ohms m²/m
SPONTANEOUS POTENTIAL millivolts
DEPTHS


On Initial Potential Test 3-8-59
Tested 3-28-59
CAOF 391
SCF x 16400 psi x 1.0000
SCF x 16400 psi x 1.0000
After Frac. Test
Sec 14, BHCPD
SCF x 15,000 psi x .9000


COREGRAPH
Company: El Paso Natural Gas Products Company
Well: Horseshoe Canyon No. 4
Field: Horseshoe Canyon
Elevations: Lower Gallup Sand
County: San Juan
State: New Mexico
File: EP-3027
Date: April 15, 1958
Drilling Fluid:
Remarks: Dipped Velocity History Tests
Saturation-Percent
Total Water
Residual Oil
Bo/Bw
Formation Factor
Porosity-Percent
Bo/Bw
Upper Gallup Sand
Lower Gallup Sand


2½" BROWN SWIVEL T
PROPERTY OF
BROWN OIL TOOLS, INC.
DESIGN BY: G.G. BROWN
DRAWN BY: T.W.
FILE NO. Z-6-5
SKETCH NO. 1514


2½" BROWN SWIVEL T
PROPERTY OF
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DESIGN BY: G.G. BROWN
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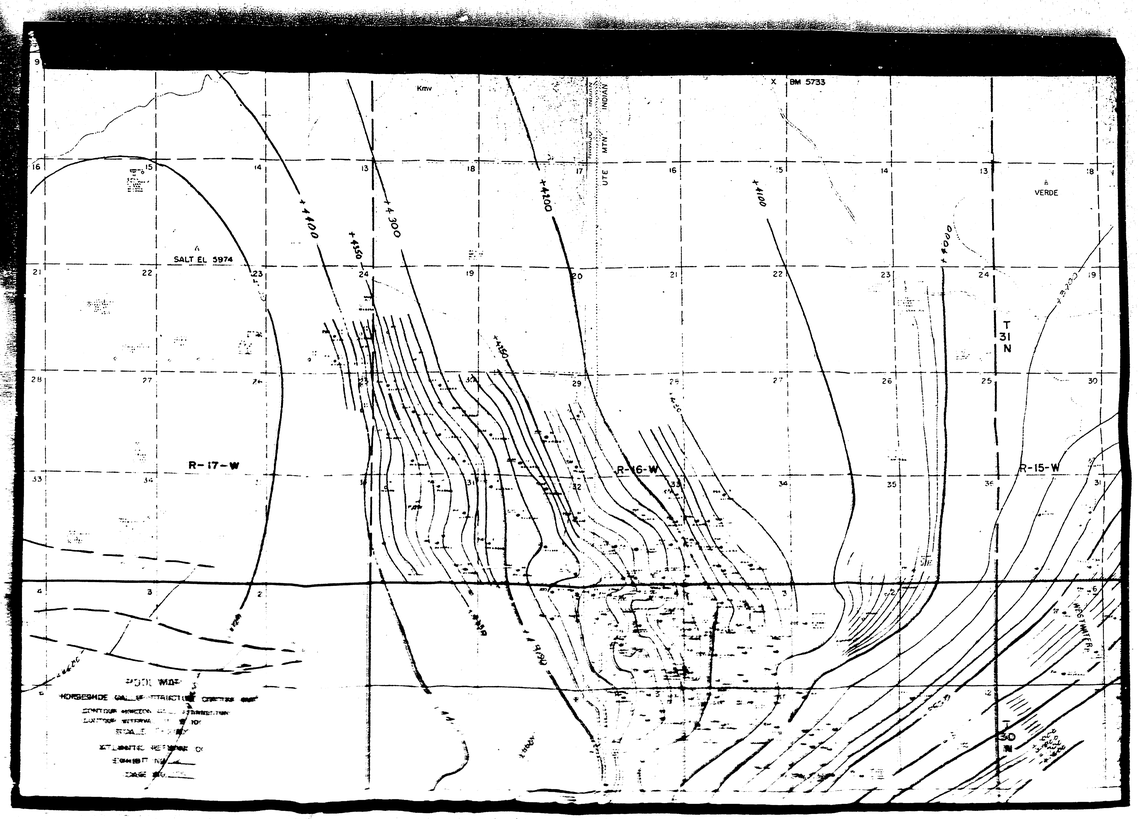

SALT EL 5974
BM 5733
VERDE
UTE MTN INDIAN
R-17-W
R-16-W
R-15-W
T 31 N
T 30 N
+4400
+4300
+4200
+4100
+4000
+3900
+3800
+3700
+3600
+3500
+3400
+3300
+3200
+3100
+3000
+2900
+2800
+2700
+2600
+2500
+2400
+2300
+2200
+2100
+2000
+1900
+1800
+1700
+1600
+1500
+1400
+1300
+1200
+1100
+1000

NORTHWEST — SOUTHEAST CROSS SECTION

RANGER LAKE PENNSYLVANIAN POOL

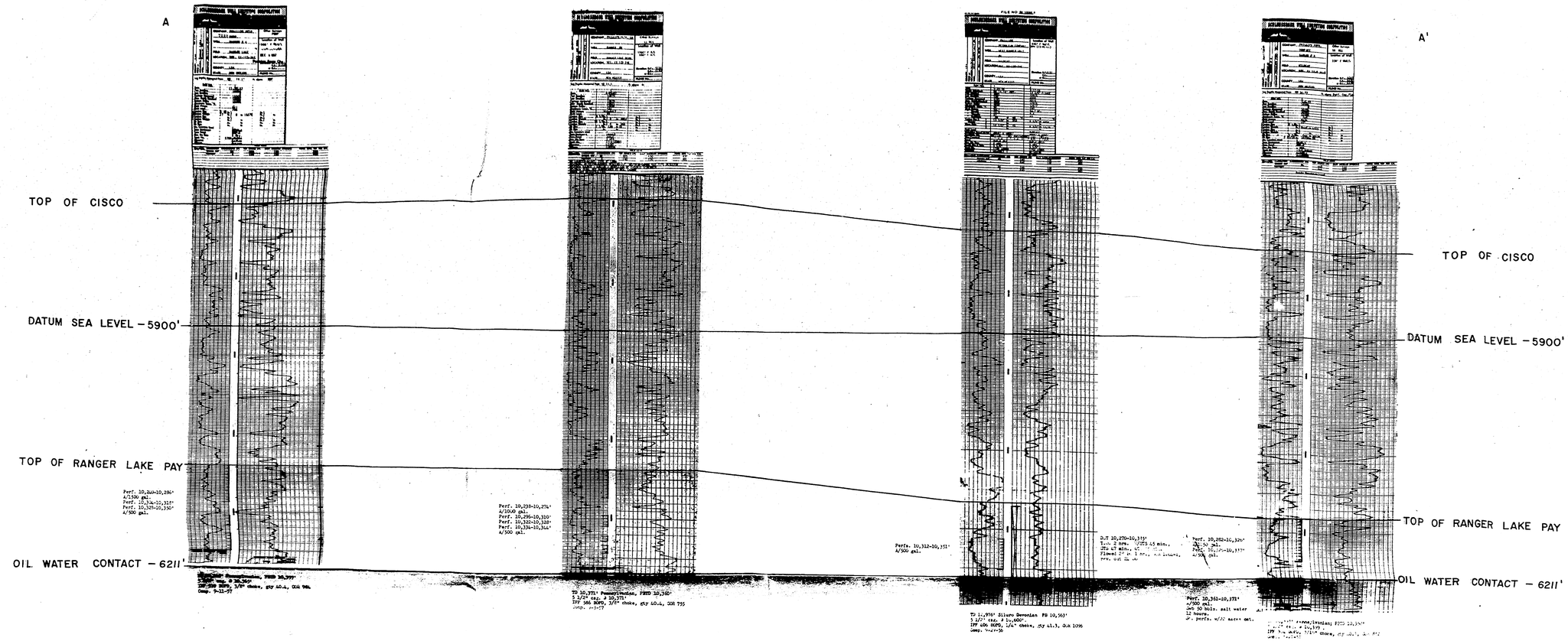
T-12-S, R-34-E

LEA, CO., NEW MEXICO

SCALE

HORIZONTAL 1" = 150'

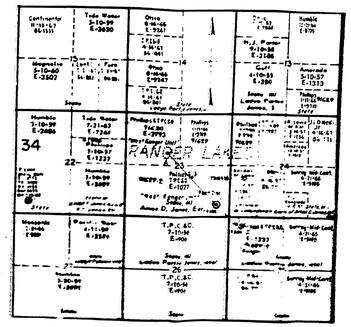
VERTICAL 1" = 40'

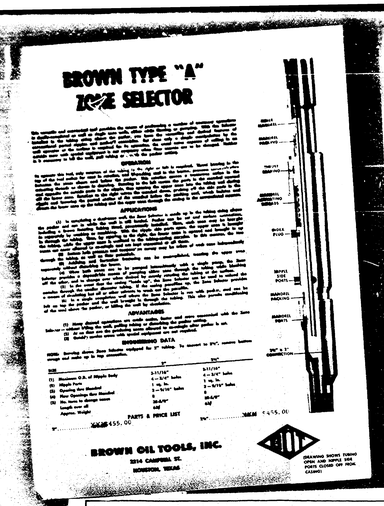


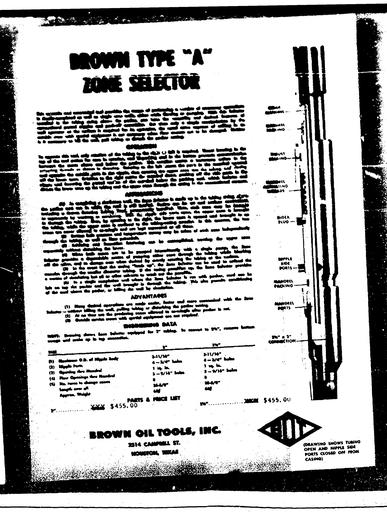
GEOLOGY BY: R. E. GRAMLY

DRAFTSMAN: DAVID BIZZELL

DATE: 2-9-59




BROWN TYPE "A"
ZONE SELECTOR
OPERATION
APPLICATIONS
ADVANTAGES
DIMENSIONAL DATA
PARTS & PRICE LIST
BROWN OIL TOOLS, INC.
3314 CAMPBELL ST.
HOUSTON, TEXAS

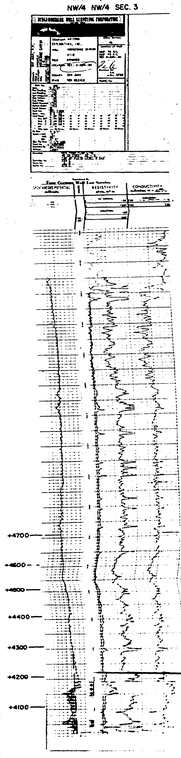

BROWN TYPE "A"
ZONE SELECTOR
OPERATION
APPLICATIONS
ADVANTAGES
DIMENSIONAL DATA
PARTS & PRICE LIST
BROWN OIL TOOLS, INC.
3314 CAMPBELL ST.
HOUSTON, TEXAS

CROSS SECTION A-A'

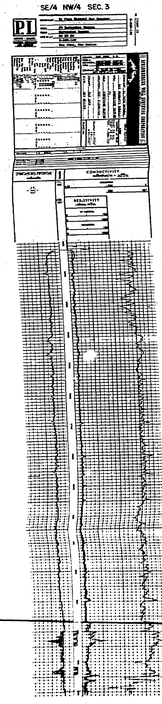
HORSESHOE GALLUP FIELD

SAN JUAN CO., NEW MEXICO

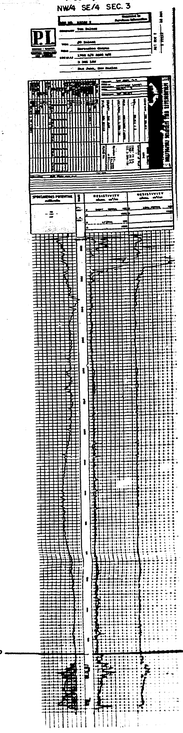
EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 1-B
T-30-N, R-16-W
NW/4 NW/4 SEC. 3



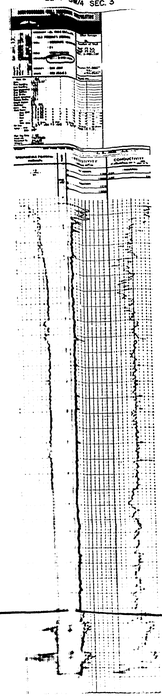
EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 9
T-30-N, R-16-W
SE/4 NW/4 SEC. 3



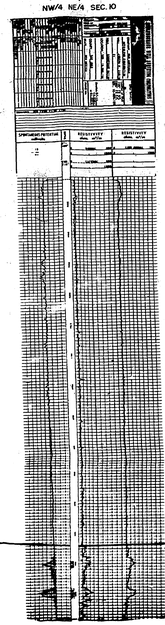
TOM BOLACK
BOLACK NO. 8
T-30-N, R-16-W
NW/4 SE/4 SEC. 3



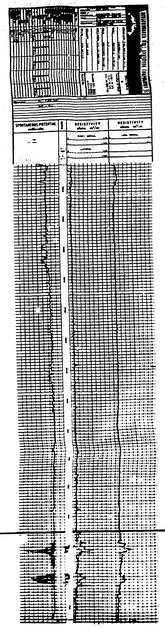
EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 4
T-30-N, R-16-W
SE/4 SW/4 SEC. 3



PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 1
T-30-N, R-16-W
NW/4 NE/4 SEC. 10



PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 2
T-30-N, R-16-W
SE/4 NE/4 SEC. 10



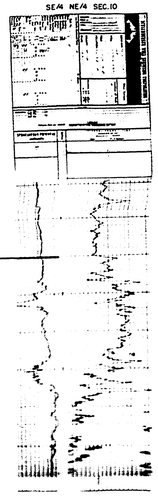
+4700
+4600
+4500
+4400
+4300
+4200
+4100

T. GALLUP

T. GALLUP

CHANGE IN VERTICAL SCALE

PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 2
T-30-N, R-16-W
SE/4 NE/4 SEC. 10



DENOTES SAND

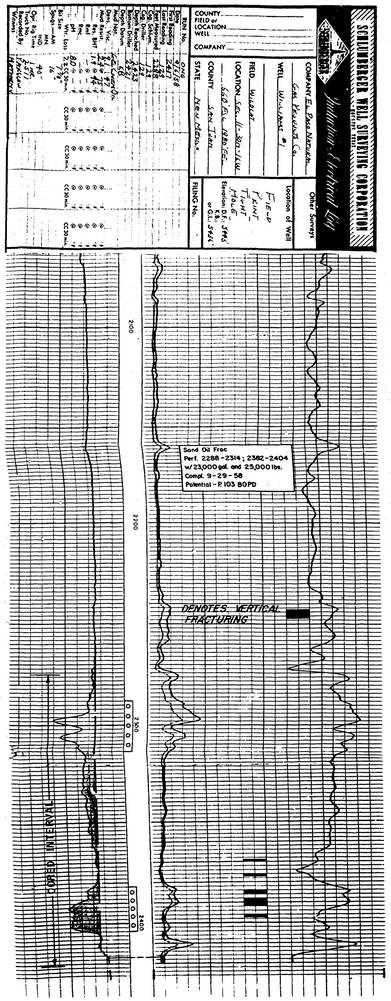
INDUCTION - ELECTRIC LOG

EL PASO NATURAL GAS PRODUCTS CO.

WILLIAMS NO. 1

T-30-N, R-16-W

SW/4 SE/4 SEC. 11



CORE DESCRIPTION

El Paso Natural Gas Products Company's #1 Williams, Section 11, T-30-N, R-16-W

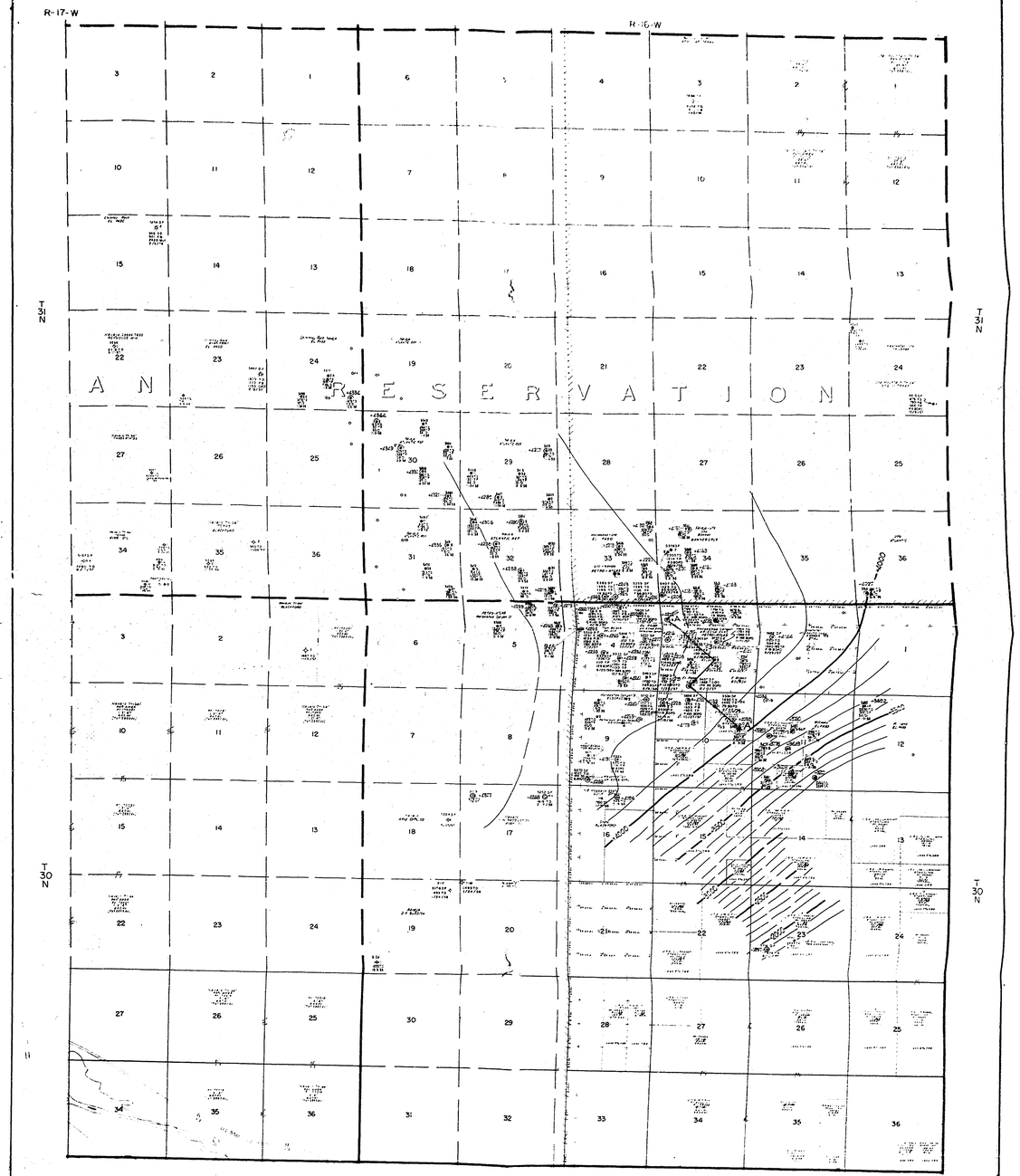
Core #1: 2275-2311', Recovered 36'
2' sh, dk gy, hd, calc; w/thin stks & blebs lt gy, fn glac ss
1' Ls, lt gy, fo, hd, n-calc cmtd, flauc; w/stks sh as above
4' Sh, as above; w/numerous stks & blebs ss as above
4' Sh as above; w/numerous stks, med-crse, more glauc, w/sh pellets
2' Sh as above; w/w/thin stks fn, hd, glauc ss as before, no pellets
7' Ss, sh, med-very, glauc, tgt, calc cmtd to shly, w/thin sh stks & blebs, occas. sh pellets & sh matrix inclus.
4' Ss, as above, clean, por, oil sat, w/sl/frac, few sh blebs
5' Ss, as above, tgt, calc cmtd to shly matrix; w/interbeds dk gy sh
4' Ss, as above, clean, por, sat as above - (sl/frac port)
5' Ss. as above, tgt, calc cmtd to shly matrix; w/interbeded dk gy sh

Core #2: 2311-2360, Recovered 50'
2' Ss, gy, fn-vfn, glauc, tgt, shly; w/stks clean cmtd ss & dk gy sh.
1' Sh, dk gy, hd; w/thin stks, fn, glauc ss
1' Ss, as above, shly
3' Sh, dk gy, v/ady & calc, shly ss.
3' Sh, dk gy, shy
2' Sh, dk gy, v/ady - almost shly ss.
8' Sh, dk gy, shy
2' Sh, dk gy, hd; w/thin stks fn glauc ss
13' Sh, dk gy, hd; shy & glauc
3' Sh, dk gy, hd; w/thin stks fn glauc ss
11' Sh, dk gy, hd; sl/shy & glauc
8' Sh, dk gy, hd; w/w/thin stks fn glauc ss
1' Sh, dk gy, hd; sl/shy

Core #3: 2349-2400', Recovered 31'
10' Sh, dk gy, hd, sl/shy & glauc; w/few w/thin stks & blebs glauc ss; vert frac 69-70 & 76-77
1' Ss and sh as above, interbedded
2' Ss, med-lwr, vfw-gr, tgt, calc, cmtd, flauc; w/thin stks dk gy sh
1' Ss & sh, as above, interbedded; ss has spotty fluor
3' Ss as above; w/sl/por stks fluor ss; w/wtr w/thin sh stks; vert fracs w/fluor 84-86
9' Ss as above; clean, por, oil sat, fluor; w/occasional tgt shly stks 1'-4" thick; vert fracs w/fluor 88-91
3' Ss .s above, tgt, shly; fluor in por. clean blebs ss; vert/frac w/fluor 96-97
2' Ss as above, clean, hd, sl/por, calc cmtd, fair fluor
2' No recovery

Core #4: 2400-2421, Recovered 18-1/2'
1' Sh, fn-vfw, glauc shly
4' Ss, dk gy-gy, hd, vcs; w/thin stks dk brn, fn sln, ds ls
1' Ls, dk brn, fn sln, hd; w/thin sh stks
2½' Ss as above; w/w/thin ls stks
6" No recovery

BEFORE THE OIL CONSERVATION COMMISSION SANTA FE, NEW MEXICO
Case No. 1 Exhibit No. 1
Case 1956

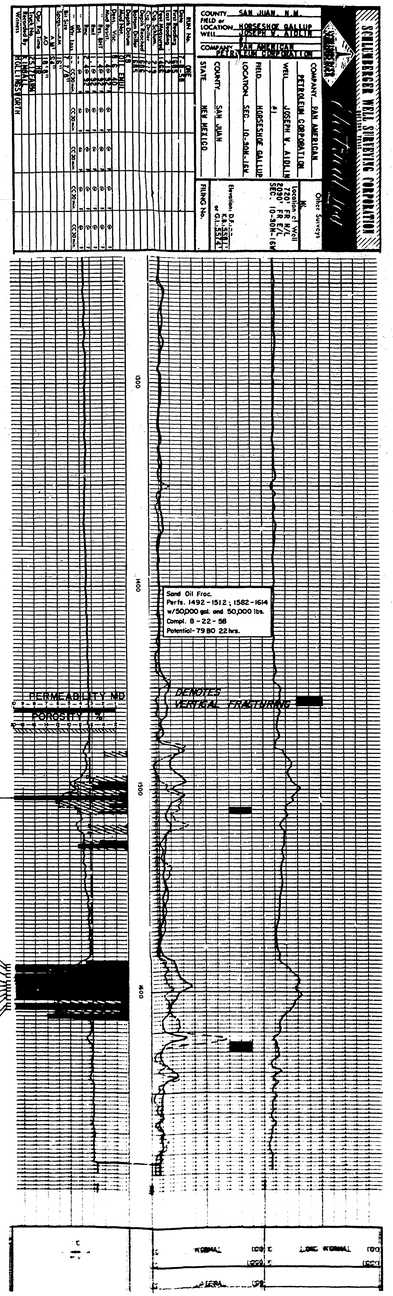


BEFORE THE OIL CONSERVATION COMMISSION
Case No. 1 Exhibit No. 2
Case 1956

STRUCTURE MAP
HORSESHOE GALLUP FIELD
TOP OF GALLUP
C. I. = 100'
SAN JUAN CO., NEW MEXICO
SCALE 1" = 2000'

LOG - CORE CORRELATION

PAN AMERICAN
JOSEPH W AIDLIN "A" NO. 1
T-30-N, R-16-W
NW/4 NE/4 SEC. 10



CORE DESCRIPTION

1480-83 TIGHT SAND W/SHALE LAMINATIONS

1483-97 SHALE W/SCATTERED SAND LAMINATIONS

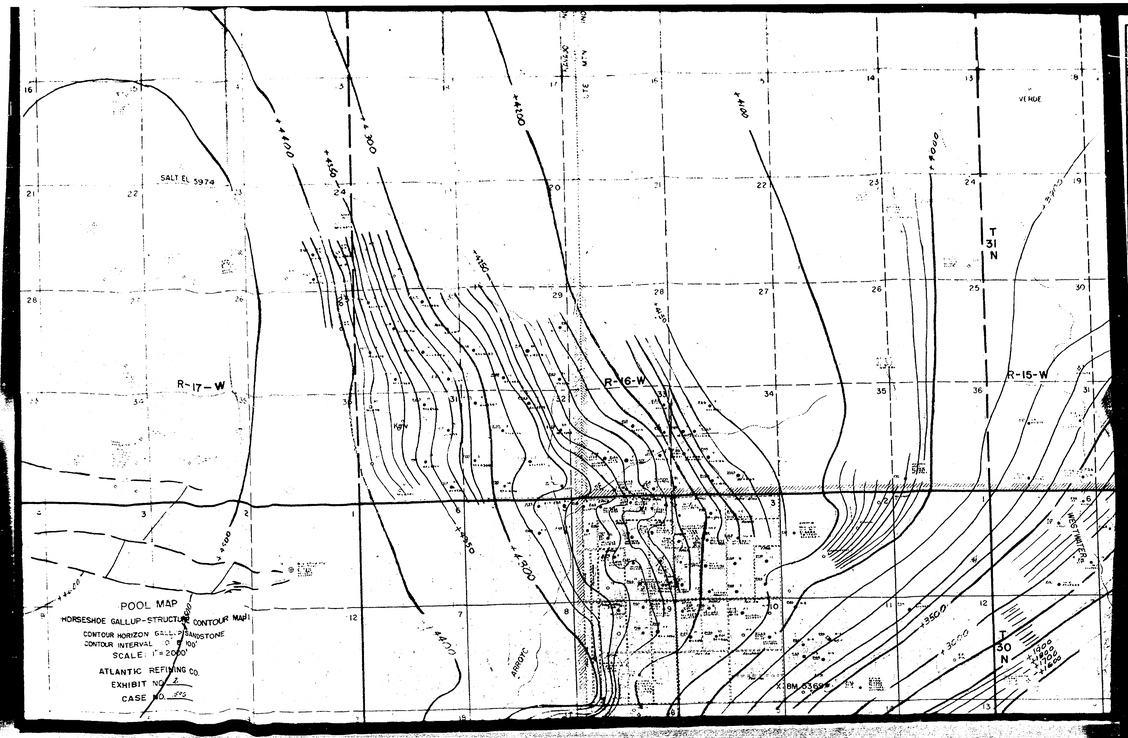
1497-99 TIGHT TO MED GRAINED SAND W/SCATTERED SHALE LAMINATIONS
1499-1502 MED GRAINED SAND W/SHALE INTERBEDS
1502-1506 TIGHT TO MED GRAINED SAND W/SHALE LAMINATIONS
1502-06 MED GRAINED SAND W/SHALE INTERBEDS & LAMINATIONS
1506-09 TIGHT TO MED SAND W/SHALE LAMINATIONS
1509-12 TIGHT GRAINED SAND W/SHALE LAMINATIONS & VERTICAL FRACTURES
1512-19 SHALE W/TIGHT SAND LAMINATIONS
1519-21 SHALE TIGHT GRAINED SAND
1521-30 SHALE W/THIN SCATTERED SAND LAMINATIONS

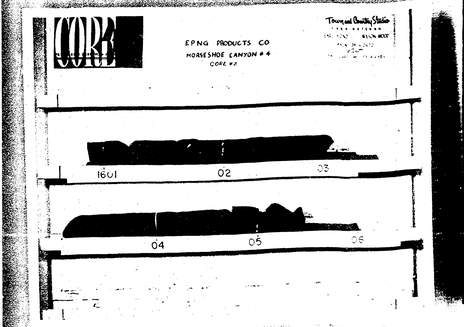
1578-84 SHALE,SLIGHTLY CALCAREOUS,VERY SLIGHT SAND INCLUSIONS & LAMINATIONS
1584-94 TIGHT SAND W/CRAFT SHALE LAMINATIONS BLEEDING GAS & OIL
1594-1605 MED GRAINED SAND W/SHALE LAMINATIONS (SCATTERED) BLEEDING GAS & OIL
1605-14 TIGHT SAND W/SHALE LAMINATIONS (SCATTERED)
1614-23 SHALE W/SCATTERED THIN SAND LAMINATIONS
1623-25 TIGHT SAND W/SHALE LAMINATIONS
1625-30 SHALE W/SCATTERED THIN SAND LAMINATIONS W/VERTICAL FRACTURES
1630-36 FOSSIL CHIP SHALE, VERY FOSSILIFEROUS

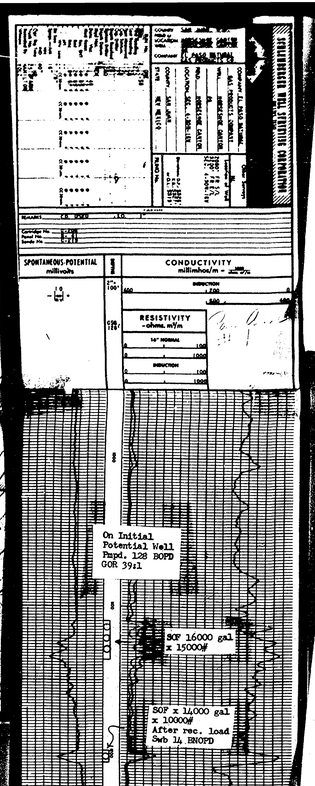
Case No.

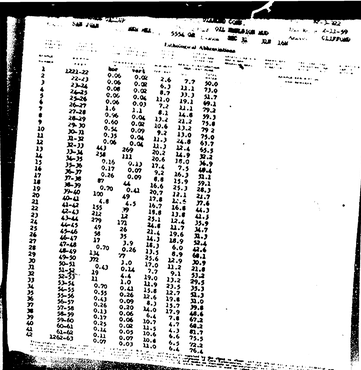
1596

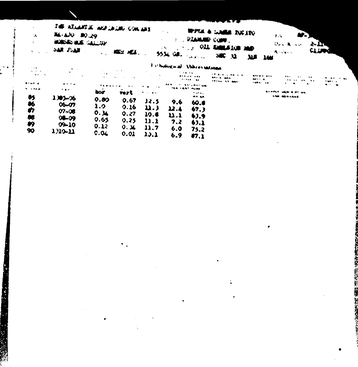
Large Exhibits

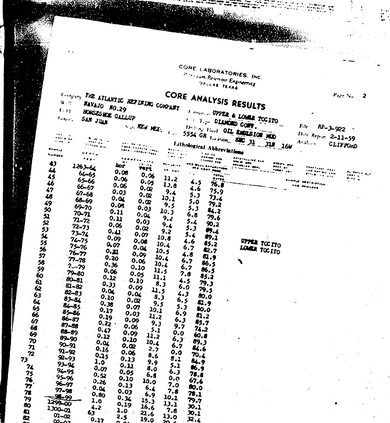


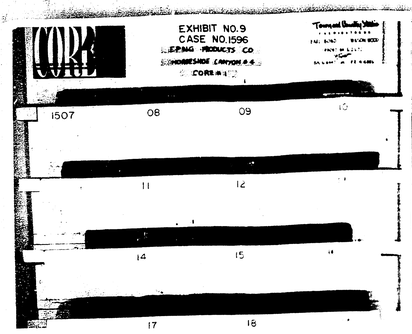


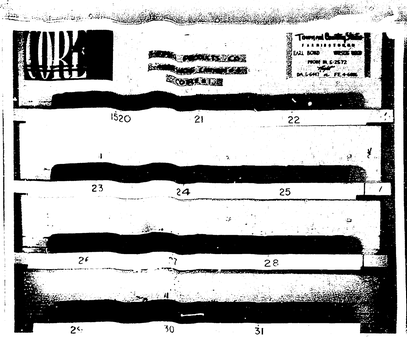


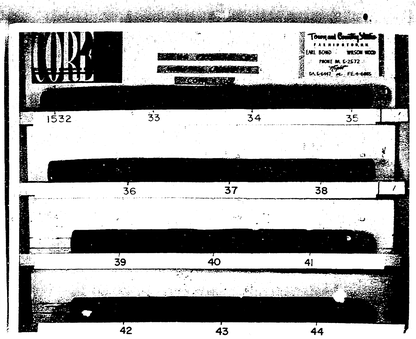


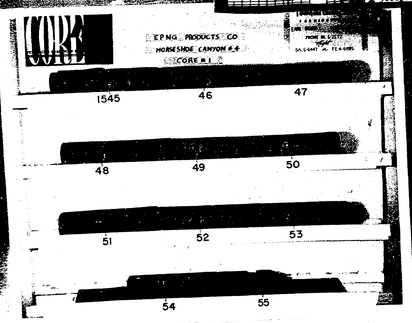


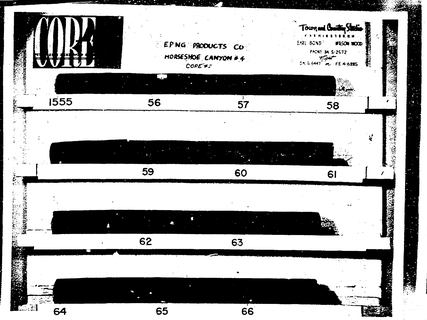


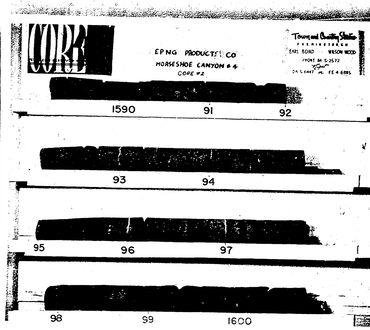


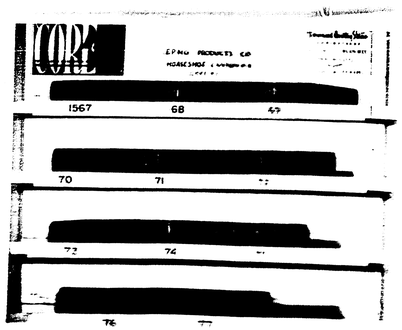


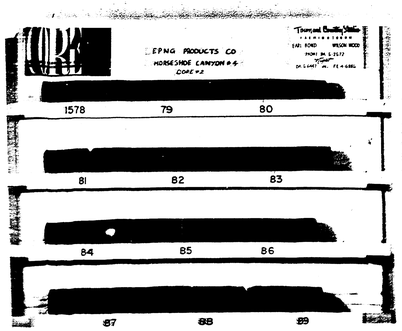


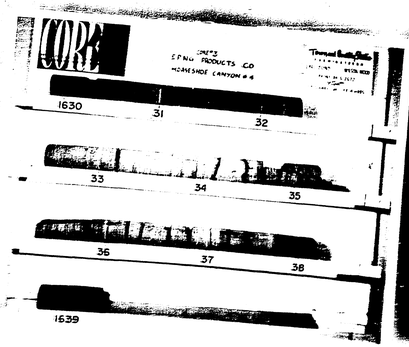


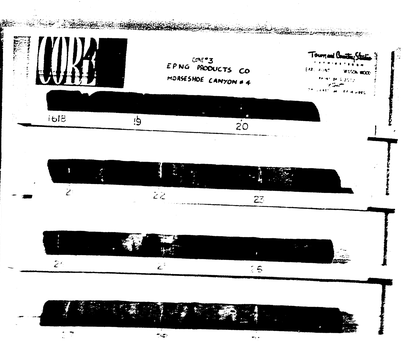


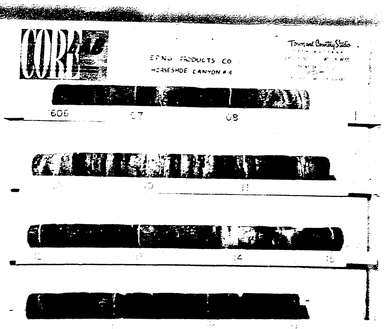






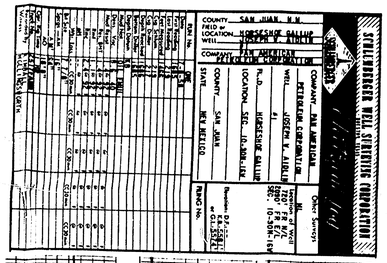


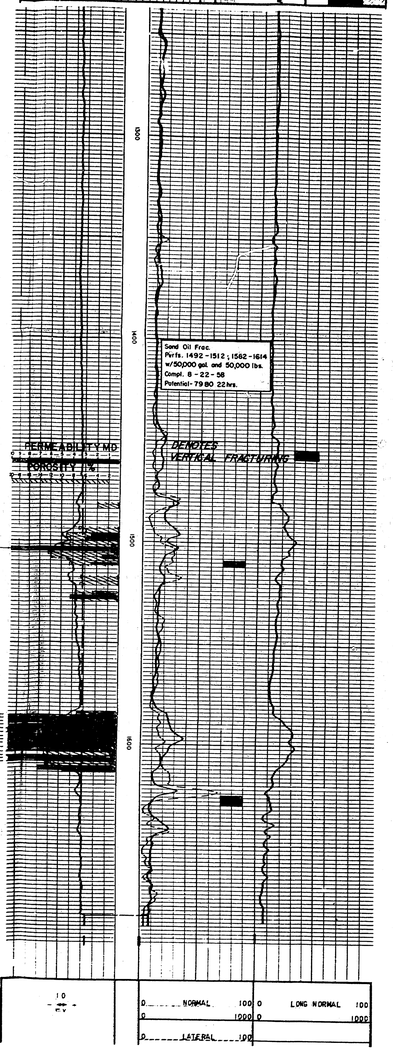




LOG - CORE CORRELATION

PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 1
T-30-N, R-16-W
NW/4 NE/4 SEC. 10





CORE DESCRIPTION

1480-83 TIGHT SAND W/SHALE LAMINATIONS

1483-93 SHALE W/SCATTERED SAND LAMINATIONS

1493-97 TIGHT TO MED GRAINED SAND W/SCATTERED SHALE LAMINATIONS.
1497-99 MED GRAINED SAND W/SHALE INTERBEDS
1499-1502 TIGHT TO MED GRAINED SAND W/SHALE LAMINATIONS
1502-06 MED GRAINED SAND W/SHALE INTERBEDS & LAMINATIONS
1506-09 TIGHT TO MED SAND W/SHALE LAMINATIONS
1509-12 TIGHT GRAINED SAND W/SHALE LAMINATIONS & VERTICAL FRACTURES
1512-19 SHALE W/TIGHT SAND LAMINATIONS
1519-21 SHALE TIGHT GRAINED SAND
1521-30 SHALE W/THIN SCATTERED SAND LAMINATIONS

1576-84 SHALE, SLIGHTLY CALCAREOUS, TIGHT SILTSTONE SAND INCLUSIONS & LAMINATIONS

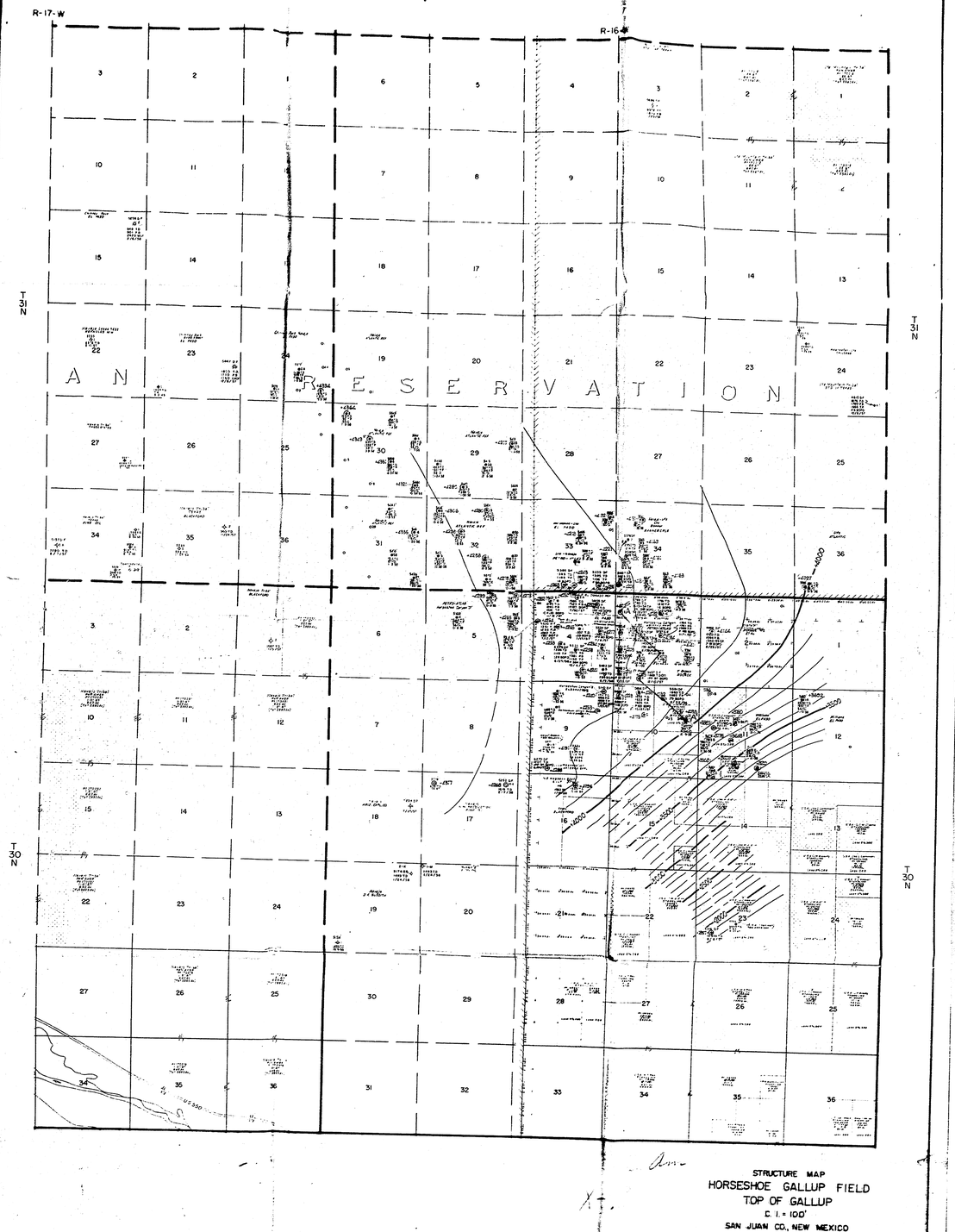
1584-94 TIGHT SAND W/HEAVY SHALE LAMINATIONS. BLEEDING GAS & OIL

1594-1605 MED GRAINED SAND W/SHALE LAMINATIONS (SCATTERED) BLEEDING GAS & OIL

1605-14 TIGHT SAND W/SHALE LAMINATIONS (SCATTERED)

1614-23 SHALE W/SCATTERED THIN SAND LAMINATIONS
1623-25 TIGHT SAND W/SHALE LAMINATIONS
1625-30 SHALE W/SCATTERED THIN SAND LAMINATIONS W/VERTICAL FRACTURES
1630-36 POKER CHIP SHALE, VERY FOSSILIFEROUS

X-4



STRUCTURE MAP
HORSESHOE GALLUP FIELD
TOP OF GALLUP
C. I. = 100'
SAN JUAN CO., NEW MEXICO
SCALE 1" = 2000'

PRODUCING ZONES IN
HORSESHOE-GALLUP FIELD
LEGEND
UPPER ZONE
UPPER & LOWER ZONE
LOWER ZONE ONLY
GALLUP INTERVAL
SCALE: 1"=1000'
ATLANTIC REFINING CO
EXHIBIT NO. 1
CASE NO. 1222
Kgiv
ARROYO
X BM 5369

PRODUCING ZONES IN
HORSESHOE-GALLUP FIELD
LEGEND
UPPER ZONE
UPPER & LOWER ZONE
LOWER ZONE ONLY
GALLUP INTERVAL
SCALE: 1"=2000'
ATLANTIC REFINING CO
EXHIBIT NO. 1
CASE NO. 1597
Kgiv
ARROYO
X BM 5369

A
NW
1
3/4 Mi.
2
3/4 Mi.
3
3/4 Mi.
4
3/4 Mi.
5
3/4 Mi.
6
3/4 Mi.
SCHLUMBERGER WELL SURVEYING CORPORATION
Four Corners Well Log Service
DATUM
CONTOUR POINT
UPPER ZONE
GALLUP INTERVAL
LOWER ZONE
JUANA LOPEZ

A'

SE

4 — 3/4 MI. — 5 — 3/4 MI. — 6 — 3/4 MI. — 7 — 3/4 MI. — 8 — 1 1/3 MI. — 9

CONTOUR POINT

DATUM

CONTOUR POINT

CONTOUR POINT

UPPER ZONE

UPPER ZONE

UPPER ZONE

GALLUP INTERVAL

LOWER ZONE

LOWER ZONE

LOWER ZONE

JUANA LOPEZ

JUANA LOPEZ

JUANA LOPEZ

CROSS SECTION A – A'

BISHOPS-GALLUP POOL
SAN JUAN COUNTY, NEW MEXICO
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 100'
Geology By: D. Deering - Jan 1959
Drafted By: J. Irwin & K. Killgore

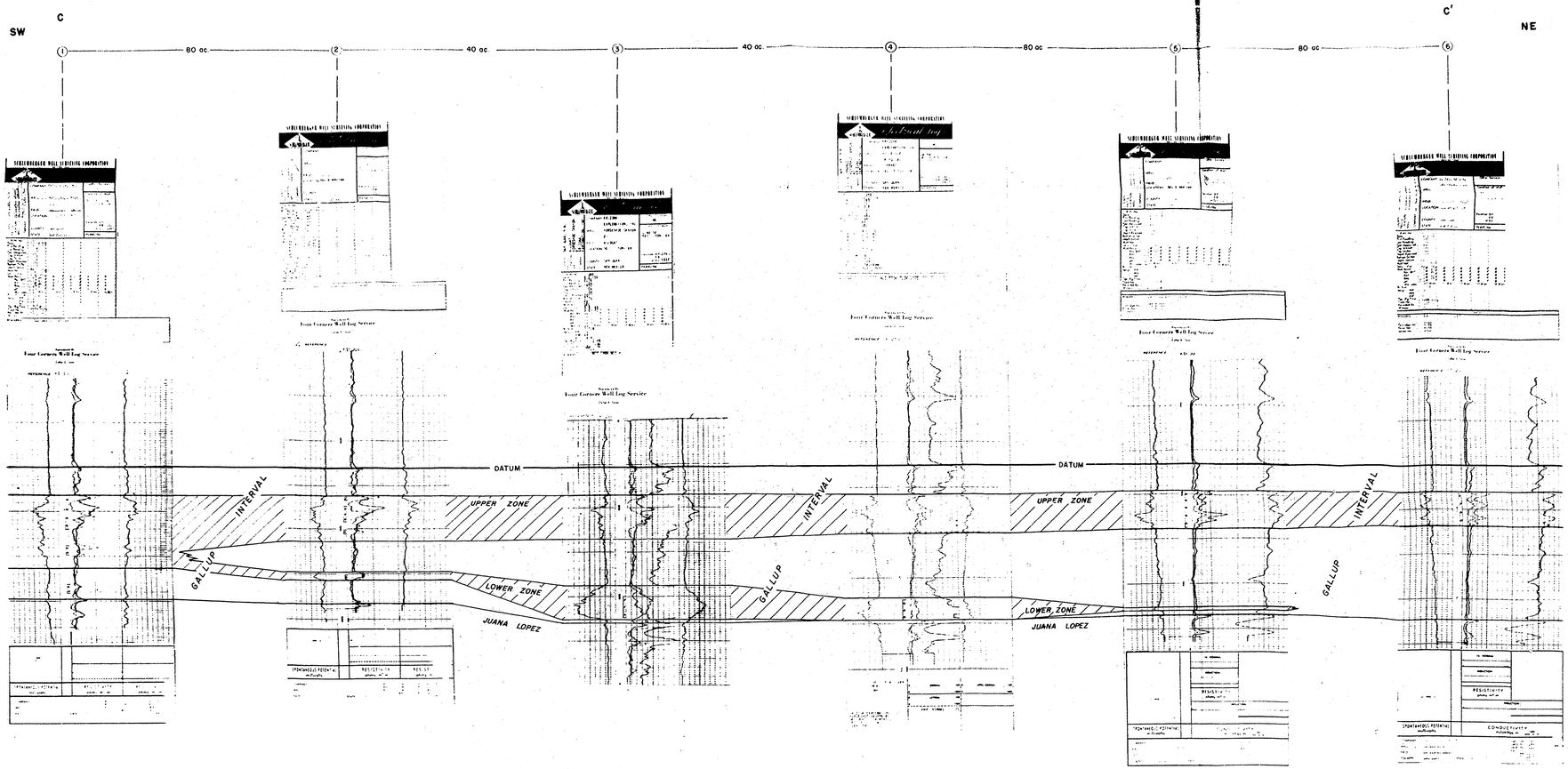
THE ATLANTIC REFINING CO.
EXHIBIT NO. 2
CASE NO. 497

CROSS SECTION B — B'

NORTHEAST-GALLUP POOL
SW-NE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 2" = 100'
Geology By: D. Jessup - Jan 1959
Drafted By: J. Irvin & E. Wilson

ATLANTIC REFINING CO
EXHIBIT NO. 3
CASE NO. 1377



CROSS SECTION C–C'
BOMBING-CALLUP POOL
IN 'N' CROSS SECTION
OF THE CALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 1" = 100'
Geology By: D. Swamp – Jan 1959
Drafted By: J. Irvin & K. Wilson

THE ATLANTIC REFINING CO.
EXHIBIT NO. 4
CASE NO. 1547

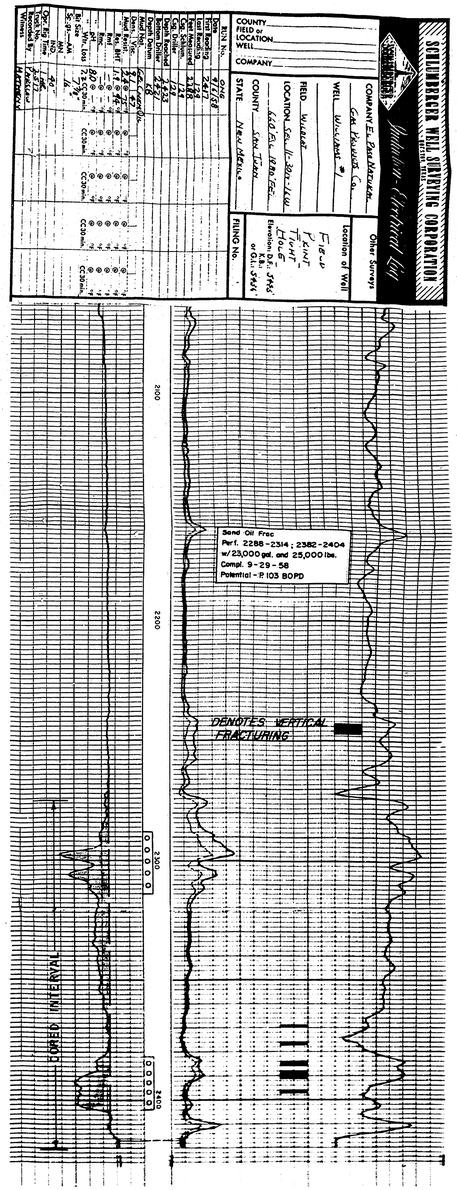
INDUCTION - ELECTRIC LOG

EL PASO NATURAL GAS PRODUCTS CO.

WILLIAMS NO. 1

T-30-N, R-16-W

SW/4 SE/4 SEC. 11



CORE DESCRIPTION

El Paso Natural Gas Products Company's #1 Williams, Section 11, T-30-N, R-16-W

Core #1: 2275-2311', Recovered 36'
2' sh, dk gy, hd, calc; w/thin stks & blebs lt gy, fn glauc ss
1' Ss, lt gy, fn, hd, calc cmtd, blauc; w/stks sh as above
4' Sh, as above; w/thin stks & blebs ss as above
2' Sh as above; w/thicker ss stks, med-cse, more glauc, w/sh pellets
2' Sh as above; w/w/thin stks fn, hd, glauc ss as before, no pellets
7' Ss, wh, med-cse, glau., tgt, calc cmtd to shly, w/thin sh stks & blebs, occas. sh pellets & ch matrix inclus.
4' Ss, as above, clean, por, oil sat, w/sl/bldg, few sh bleb
5' Ss, as above, tgt, calc cmtd to shly matrix; w/interbeds dk gy sh
4' Ss, as above, clean, por, sat as above - (sl/less por?)
5' Ss. as above, tgt, calc cmtd to shly matrix; w/interbeded dk gy sh

Core #2: 2311-2369, Recovered 58'
2' Ss, gy, fn-cse, glauc, tgt., shly; w/stks clean cmtd ss & dk gy sh.
1' Sh, dk gy, hd; w/w/thin stks, fn, glauc ss
3' Sh, dk gy, sdy & glauc
3' Sh, dk gy, v/sdy - almost shly ss.
3' Sh, dk gy, sdy
2' Sh, dk gy, v/sdy - almost shly ss.
8' Sh, dk gy, sdy
2' Sh, dk gy, hd; w/thin stks fn glauc ss
11' Sh, dk gy, hd; sdy & glauc
3' Sh, dk gy, hd; w/thin stks fn glauc ss
11' Sh, dk gy, hd; sl/sdy & glauc
8' Sh, dk gy, hd; w/w/thin stks fn glauc ss
1' Sh, dk gy, hd; sl/sdy

Core #3: 2364-2402', Recovered 31'
10' Sh, dk gy, hd, sl/sdy & glauc; w/few w/thin stks & blebs glauc ss; vert frac 69-70 & 76-77
1' Ss and sh as above, interbedded
2' Ss, med-cse, wh-gy, tgt, calc, cmtd, flauc; w/thin stks dk gy sh
1' Ss & sh, as above, interbedded; ss has spotty fluor
3' Ss as above; w/sl/por stks fluor ss; w/abt w/thin sh stks; vert fracs w/fluor 84-86
9' Ss as above; clean, por, oil sat, fluor; w/occasional tgt shly stks 1"-4" thick; vert fracs w/fluor 88-91
3' Ss as above, tgt., shly; fluor in por. clean blebs ss; vert/frac w/fluor 96-97
2' Ss as above, clean, hd, sl/por, calc cmtd, fair fluor
2' No recovery

Core #4: 2402-2421, Recovered 18-1/2'
4" Ss, fn-cse, glauc shly
4½" Sh, dk gy, hd, foss; w/w/thin stks dk brn, fn sln, ds ls
5' Ls, dk brn, fn xln, ds; w/w/thin sh stks
6½" Sh, as above; w/w/thin ls stks
6" No recovery

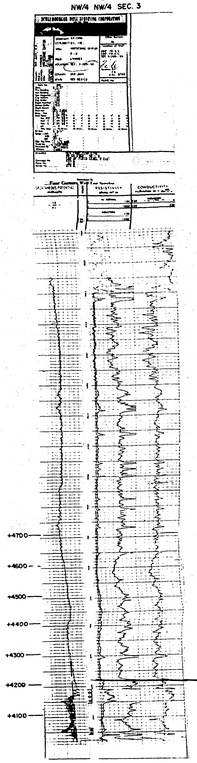
1-5

CROSS SECTION A-A'

HORSESHOE GALLUP FIELD

SAN JUAN CO., NEW MEXICO

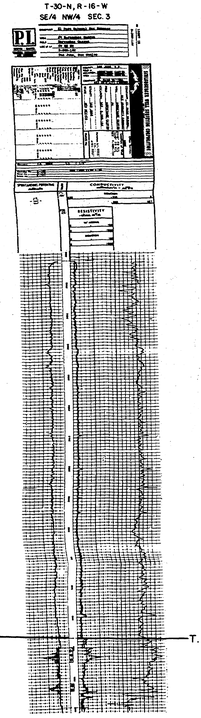
EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 1-B
T-30-N, R-16-W
NW/4 NW/4 SEC. 3



Well was originally completed as Atlantic Refining Co. Lee-Jackson No. 1-B
Completion Date: 6-20-57
Perforations: 1868-92, 1944-62, 1994-2010, 2044-60, 2066-82, 2094-2110, 2134-50 ftws with 15,000 gal and 20,000 lbs.
Potential: 120 BOPD Pumping.

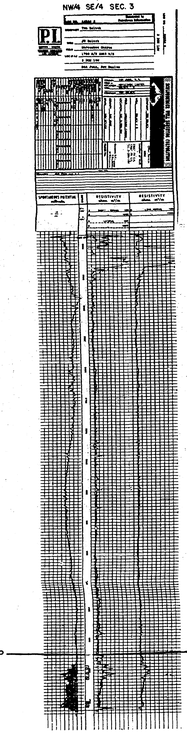
Well was taken over by El Paso Natural Gas Products Co. and converted to a Gallup oil completion as of 1-1-59 by perforating additional gallup 1770-1810, 1830-50, 1870-1910, 1930-37 and 1942-62 and treating with 31,000 gal and 31,000 lbs.
Potential After Workover: 18 BOPD.

EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 9
T-30-N, R-16-W
SE/4 NW/4 SEC. 3



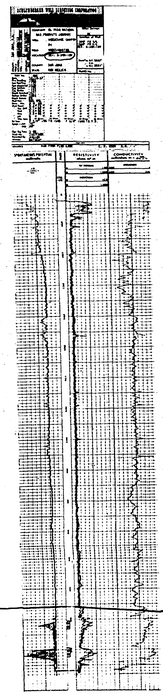
Completion Date - 6-24-57
Perforations - 1670-1748, 1754-62, 1770-1808, 1828-42, 1852-70, 1892-1910, 1930-36, 1942-62 ftws with 16,000 gal and 16,000 lbs.
Potential - 140 BOPD Pumping.

TOM BOLACK
BOLACK NO. 8
T-30-N, R-16-W
NW/4 SE/4 SEC. 3



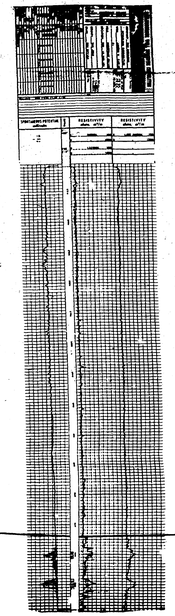
Completion Date - 1-11-59
Perforations - 1585-1650, 1700-1720, 1770-1800, 1830-50, 1870-1910, 1930-37, 1942-62
Stimulation - Sand oil frac with 100,000 gal and 100,000 lbs.
Potential - 140 BOPD Pumping.

EL PASO NATURAL GAS PRODUCTS CO.
HORSESHOE CANYON NO. 4
T-30-N, R-16-W
SE/4 SW/4 SEC. 3



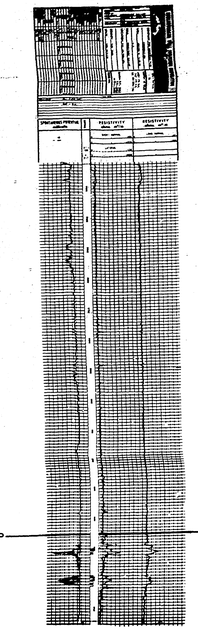
Completion Date - 1-31-57
Perforations - 1599-1627, 1644-1672, 1694-1712, 1730-1770, 1790-1810, 1830-50, 1870-1910, 1930-37, 1942-62
Stimulation - Sand oil frac with 100,000 gal and 100,000 lbs.
Potential - 95 BOPD Pumping.

PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 1
T-30-N, R-16-W
NW/4 NE/4 SEC. 10



Completion Date - 6-24-56
Perforations - 1570-1592, 1610-1632, 1650-1672, 1690-1712, 1730-1750, 1790-1810, 1830-50, 1870-1910, 1930-37, 1942-62
Stimulation - Sand oil frac with 100,000 gal and 100,000 lbs.
Potential - 70 BO in 12 hrs. pumping.

PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 2
T-30-N, R-16-W
SE/4 NE/4 SEC. 10



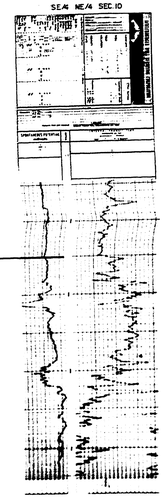
Completion Date - 11-1-56
Perforations - 1530-1550, 1590-1632, 1650-1672, 1690-1712, 1730-1750, 1790-1810, 1830-50, 1870-1910, 1930-37, 1942-62
Stimulation - Sand oil frac with 65,000 gal and 65,000 lbs.
Potential - Map 31 BO in 6 hrs.

T. GALLUP

T. GALLUP

CHANGE IN VERTICAL SCALE

PAN AMERICAN
JOSEPH W. AIDLIN "A" NO. 2
T-30-N, R-16-W
SE/4 NE/4 SEC. 10



DENOTES SAND

CROSS SECTION B — B'

HOSSINGER-GALLUP POOL
SW-NE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: None
Vertical Scale: 50' = 100'
Geology By: D. Jamison - Jan 1959
Drafted By: J. Irvin & L. Killam

ATLANTIC REFINING CO
EXHIBIT NO. 4
CASE NO. 1756

SW

C

C'

NE

① 80 ac. ② 40 ac. ③ 40 ac. ④ 80 ac ⑤ 80 ac ⑥

DATUM

DATUM

UPPER ZONE

INTERVAL

INTERVAL

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

GALLUP

LOWER ZONE

JUANA LOPEZ

GALLUP

CROSS SECTION C - C'
[redacted]-GALLUP POOL
IN THE GREATER VICINITY
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: 1mm
Vertical Scale: 1" = 200'
Geology By: D. Jacoby - Jan 1959
Drafted By: J. Irvin & E. Gilliam

THE ATLANTIC REFINING CO
EXHIBIT NO. ____
CASE NO. ____

NE D SW D' SE

① Appx 1/3 Mi ② Appx 1/3 Mi ③ Appx 1/3 Mi ④ Appx 1/3 Mi ⑤ Appx 1/3 Mi ⑥

DATUM

CONTOUR POINT

INTERVAL

UPPER ZONE

GALLUP

LOWER ZONE

JUANA LOPEZ

CROSS SECTION D--D'
STRUCTURE-GALLUP POOL
OF SW SE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: 1"=
Vertical Scale: 1" = 50'
Geologist: R. Jones
Drafted By: T. Irvin & K. Richards

Unit B, ANTIC REFINING

EXHIBIT NO. ___

CASE NO. ___

A

NW

1 — 3/4 MI. — 2 — 3/4 MI. — 3 — 3/4 MI. — 4 — 3/4 MI. — 5 — 3/4 MI. — 6 — 3/4 MI.

SCHLUMBERGER WELL SURVEYING CORPORATION

Four Corners Well Log Service

DATUM

CONTOUR POINT

UPPER ZONE

INTERVAL

GALLUP

LOWER ZONE

JUANA LOPEZ

RESISTIVITY

CONDUCTIVITY

SPONTANEOUS POTENTIAL

A'

SE

4 — 3/4 MI. — 5 — 3/4 MI. — 6 — 3/4 MI. — 7 — 3/4 MI. — 8 — 1 1/2 MI. — 9

CONTOUR POINT — CONTOUR POINT — DATUM — CONTOUR POINT

UPPER ZONE — UPPER ZONE — UPPER ZONE

GALLUP INTERVAL

LOWER ZONE — LOWER ZONE — LOWER ZONE

JUANA LOPEZ — JUANA LOPEZ — JUANA LOPEZ

CROSS SECTION A – A'

PENNZOIL-GALLUP UNIT
NW-SE CROSS SECTION
OF THE GALLUP INTERVAL
San Juan Co., New Mexico

Horizontal Scale: 1 Inch
Vertical Scale: 20' = 100'
Geology by: B. Jeremy - Jan 1980
Drafted by: J. Lewis & L. Williams

THE ATLANTIC REFINING CO
EXHIBIT NO. _____
CASE NO. _____