

Drill Stem Tests from Well 30-015-20204

• Three Drill Stem Tests from OCD records show

- Rw value of .18 at 62 DegF (.151 at 75 DegF) at depth 3,360 to 3,447'.
- Rw value of .078 at 66 DegF (.069 at 75 DegF) at depth 4,286' to 4,330'.
- Rw value of .095 at 75 DegF (.095 at 75 DegF) at depth 4,434' to 4,471'.

None of these Drill stem tests match Rw of .047 at 75 DegF for 30-015-20204 from the SPE paper quoted September 1982 survey of water resistivity study.

GRACE CARLSBAD BRUSHY CANYON RW

The nearest Brushy Canyon Formation water sample is located in 10-225-27E. The RW of the sample is from the UNOCAL Tracy #1, 10-225-27E, API # 30-015-20204. The published RW is 0.047 ohm-meters at a depth of 4434' and 75 degrees Fahrenheit. The Unocal Tracy was drilled to a total depth of 10,693'. To get an accurate bottom hole temperature of the Brushy Canyon Formation, the UNOCAL Federal AJ #1, 10-225-27E, API # 30-015-23282 was used because it was drilled to a total depth of 4,500' and had a bottom hole temperature of 98 degrees Fahrenheit. The UNOCAL Federal AJ #1 well is located approximately 1/4 of a mile to the southeast from the UNOCAL Tracy #1 well. The Brushy Canyon top is at 3,760', and the base of the Brushy Canyon is at 5,301' in the UNOCAL Tracy #1. The Brushy Canyon top is at 3,768', in the UNOCAL Federal AJ #1, and it was TD'd in the Brushy Canyon Formation. When the Brushy Formation RW, measured at 75 degrees Fahrenheit, is converted to the Brushy Canyon bottom hole temperature of 98 degrees Fahrenheit, the calculated RW is 0.036 ohm-meters.

Equation to convert published RW at 75 degrees Fahrenheit to the Brushy Canyon Formation bottom hole temperature of 98 degrees Fahrenheit:

$$RW(\text{Formation Temperature}) = RW(\text{measured}) \times \frac{(\text{Temperature of RW measured} + 6.77)}{(\text{Temperature of Formation} + 6.77)}$$

$$RW(\text{Formation Temperature}) = 0.047 \Delta \text{ meters} \times \frac{(75^{\circ}\text{F} + 6.77)}{(98^{\circ}\text{F} + 6.77)}$$

$$RW(\text{Formation Temperature}) = 0.036 \Delta \text{ meters}$$

A Survey of Resistivities of Water From Subsurface Formations in West Texas and Southeastern New Mexico

September 1982

Published by the Society of Petroleum Engineers in cooperation with:
Permian Basin Section of SPE
Permian Basin Well Logging Society of SPWLA

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EDDY

UNOCCAN						
83001510867	16	18-215-29E	6350.	0.170	BST	
83001520092	11	07-205-31E	5020.	0.282	BST	
83001520179		18-225-25E	3448.	0.858		
83001520179		18-225-25E	3332.	0.257		
83001520179		10-225-25E	3524.	0.180		
83001520204	1	10-225-27E	4434.	0.047		
CORRAL CANYON						

September 1982

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AUG 1 - 1969 FOSTER TESTING - 1124

OBSOLETE, VERB

O. C. C.

O. C. C.

AMERICAN, OFFICE

AMERICAN, OFFICE

TEST TICKET NO. 2676

ORDER NO. 130 13

DATE FEBRUARY 27, 1969

COMPANY UNION OIL COMPANY OF CALIFORNIA, TRACY WELLS NO. 1 TEST NO. 3

FIELD WILDCAT COUNTY EDDY STATE NEW MEXICO DISTRICT HOBBS

MAIL CHARTS TO AS DIRECTED

MAIL INVOICE TO UNION OIL COMPANY OF CALIFORNIA, P. O. BOX 671, MIDLAND, TEXAS 79701

FORMATION TESTED	DELAWARE	TOTAL DEPTH	4,471'	PERFORATION DEPTH	4,436'	TEST DEPTH	8 3/4'
INTERVAL TESTED	4,434'	TO	4,471'	APPROX. LENGTH	37'	DAY HOLE	-
WELL TEST	4 1/2"XH-3.80"ID	TEST DEPTH	4 1/2"XH	PERFORATION	DT	TEST	8 1/2"
TIME TAKEN TO SET	5:00	1.5X	2.0	PERFORATION	4	HOURS	22
TIME TOOL OPEN	5:30	1.5X	2.0	TEST DEPTH	1	HOURS	-
INITIAL SHUT IN	1	SHUT IN	-	APPROX. PERFORATION	2	HOURS	-
REFERENCE TYPE	AK-1	CONDUCTIVITY	5.000/9.500	PERFORATION	1261	DEPTH	1482
TOP PERFORATION DEPTH	4,456'	APPROX. PERFORATION	-	PERFORATION	-	DEPTH	4,471'
TEST DEPTH	-	APPROX. PERFORATION	-	PERFORATION	-	DEPTH	N/A
APPROX. STAGE SHUT IN TOOL JOINT	X	HIGH PRESSURE	1130	PERFORATION	YES	NO	PERFORATION
MUD TYPE	BRINE WATER	MUD WEIGHT	-	PERFORATION	-	PERFORATION	-
CHOKES PERFORATION	1"	CHOKES	5/8"	PERFORATION	NO	PERFORATION	-
CONVENTIONAL TEST	YES	PERFORATION	-	PERFORATION	-	PERFORATION	-
SECOND ASSEMBLY	YES	TOTAL AIR	YES	PERFORATION	YES	PERFORATION	-
SAMPLES	YES	PERFORATION	YES	PERFORATION	YES	PERFORATION	-
SURFACE ACTION	TOOL OPENED WITH FAIR TO GOOD FLOW, OPENED THROUGH 1" CHOKES GOOD FLOW DECREASING TO NEAR SHUT IN, CLOSED CHOKES NEAR FLOW REMAINDER OF TEST.						
RECOVERY	120' SALT WATER WITH TRACE OF OIL (1 GALLON)						
REMARKS	SAMPLER CONTENTS: 4000 CC WATER, 20 MINUTE PRE FLOW, 37' PERFORATION, 540' TOTAL DRILL COLLAR LENGTH.						
TESTER	C. E. GRI		TEST APPROVED BY C. F. PYE				

TEST NO.	TEST DEPTH	PERFORATION	PERFORATION	PERFORATION	PERFORATION
1	INITIAL HYDROSTATIC PRESSURE	1261	2175	2175	2175
2	INITIAL SHUT IN PRESSURE	1656	1656	1656	1656
3	INITIAL FLOW PRESSURE	34	34	34	34
4	FINAL FLOW PRESSURE	52	52	52	52
5	FINAL SHUT IN PRESSURE	1629	1629	1629	1629
6	FINAL HYDROSTATIC PRESSURE	2175	2175	2175	2175

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AUG 6 - 1969

D. C. C.
ARTEAGA, OFFICE

FOSTER TESTERS, INC.
ODessa, TEXAS

TEST TICKET NO. 8675
ORDER NO. 120MD
DATE FEBRUARY 26, 1969

COMPANY UNION OIL COMPANY OF CALIFORNIA, TRACY WELL NO. 1 TEST NO. 2
FIELD WILDCAT COUNTY EDDY STATE NEW MEXICO DISTRICT HOOBS
MAIL CHARTS TO AS DIRECTED
MAIL INVOICE TO UNION OIL COMPANY OF CALIFORNIA, P. O. BOX 671, MIDLAND, TEXAS 79701

PERFORATION TESTED	DEL MAR	TOTAL DEPTH	4.330'	PERFORATION DEPTH	4.286'	TEST DEPTH	8 3/4'
EXTERNAL VESSEL	4.286'	NO	4.330'	PERFORATION LENGTH	44'	RAT HOLE	-
DRILL PIPE	4 1/2" XH-3.00" ID	DRILL PIPE	4 1/2" XH-2 3/8" ID	DRILL PIPE	BT	PIPE 8 1/2"	NO. 2
TIME PERFORATION SET	4:45	TIME X 3/4"	PERFORATION SET	4	HOURLY	22	PERFORATION
TIME TOOL OPEN	4:47	TIME X 3/4"	TOOL OPEN	1	HOURLY	-	PERFORATION
EXTERNAL CHUT IN	1	HOURLY	-	EXTERNAL CHUT IN	2	HOURLY	-
RECORDED TYPE	AK-1	CAPACITY	6.0000 9.5000	RECORDED VCR	1261	SECTION	14K12
TOP RECORDED DEPTH	4.281'	BOTTOM RECORDED DEPTH	4.286'	RECORDED DEPTH	-	-	-
FOUR STAGE CHUT IN TOOL	X 3/4"	MAXIMUM TEMPERATURE	102°	MAXIMUM WELD VCR	X 3/4"	RECORDED CUT	YES X
MUD TYPE	BRINE WATER	MUD TEMPERATURE	-	VISCOSITY	-	FLUID CASE	-
DRILL PIPE	1"	DRILL PIPE	5/8"	DRILL PIPE	NO	DRILL PIPE	-
CONVENTIONAL TEST	YES	STRONG TEST	-	STRONG TEST	-	STRONG TEST	-
SECOND ASSEMBLY	YES	ROTARY JAW	YES	STRONG TEST	YES	STRONG TEST	-
SAMPLER	YES	PRE FLOW TOOL	YES	STRONG TEST	YES	STRONG TEST	-
SURFACE ACTION	TOOL OPENED ON PRE FLOW WITH GOOD BLOW GOING TO STRONG BLOW. TOOL OPENED ON FLOW PERIOD WITH STRONG BLOW GOING TO VERY STRONG. NO GAS CO. OUT TO SURFACE.						
RECOVERY	95' FREE OIL. 80' SMT WATER. RESISTIVITY 0.78 AT 66°, 12,000 P.P.M. CHLORIDES. REC: 5 BPLS. OIL & 4 BPLS. WATER. P.P.M. CHLORIDES. 3244' GAS IN DRILL PIPE & COLLARS. OIL GRAVITY 40 AT 72°F.						
REMARKS	SAMPLER CONTENTS: 3000 CC WATER. 2 CU. FT. GAS. 20 MINUTE PRE FLOW. 45' PERFORATION. 640' TOTAL DRILL COLLAR LENGTH						
TESTER	C. F. CARL		TEST APPROVED BY		C. F. FYE		

		CLASSIFIED NO.	RECORDED NO.	TESTED NO.	PERFORATION NO.
A	INITIAL HYDROSTATIC PRESSURE	P.S.L.	2113	P.S.L.	P.S.L.
D	INITIAL SHUT IN PRESSURE	P.S.L.	1661	P.S.L.	P.S.L.
C	INITIAL FLOW PRESSURE	P.S.L.	48	P.S.L.	P.S.L.
B	FINAL FLOW PRESSURE	P.S.L.	86	P.S.L.	P.S.L.
E	FINAL SHUT IN PRESSURE	P.S.L.	1586	P.S.L.	P.S.L.
F	FINAL HYDROSTATIC PRESSURE	P.S.L.	2113	P.S.L.	P.S.L.

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AUG 6 - 1969

O. C. C.
ARTESIA, OFFICE

FOSTER TESTERS, INC.
CORPORATE OFFICE

WELL TRACT NO. 8573
COST NO. 120 10
DATE FEBRUARY 22, 1969

COMPANY UNION OIL COMPANY OF CALIFORNIA TRACT TRACY WELL NO. 1 TEST NO. 1
FIELD WILDCAT COUNTY EDDY STATE NEW MEXICO DISTRICT HOBBS
MAIL CHARTS TO AS DIRECTED
MAIL INVOICE TO UNION OIL COMPANY OF CALIFORNIA, P. O. BOX 671, VIKING, TEXAS 79701

FORMATION TESTED	DELAWARE	TOTAL DEPTH	3,447'	PACKER DEPTH	3,360'	START TOTAL	5,342'
INTERVAL TESTED	3,360'	TO	3,447'	INTERVAL DEPTH	87'	PAY HOLD	-
HOUL. CODE	41"XH-3,80"ID	HOUL. CODE	41"XH	HOUL. CODE	BT	HOUL. CODE	83"
TIME Packer SET	4:35	A.M. X P.M.	P.M.	TIME Packer SET	4	HOUL. CODE	25
TIME TOOL OPEN	4:40	A.M. X P.M.	P.M.	TIME TOOL OPEN	1	HOUL. CODE	-
INITIAL SHUT IN	1	HOUL. CODE	-	INITIAL SHUT IN	2	HOUL. CODE	-
HOUL. CODE	8X-1	HOUL. CODE	6,000'	HOUL. CODE	1483	HOUL. CODE	1482
TOP PRODUCTION DEPTH	3,442'	TOP PRODUCTION DEPTH	3,442'	TOP PRODUCTION DEPTH	3,442'	TOP PRODUCTION DEPTH	3,442'
TOP PRODUCTION DEPTH	6758	TOP PRODUCTION DEPTH	6758	TOP PRODUCTION DEPTH	6758	TOP PRODUCTION DEPTH	6758
FOUR TRACK SHUT IN TIME	X	FOUR TRACK SHUT IN TIME	X	FOUR TRACK SHUT IN TIME	X	FOUR TRACK SHUT IN TIME	X
MUD TYPE	H2O	MUD TYPE	H2O	MUD TYPE	H2O	MUD TYPE	H2O
GRINDING - YES	1"	GRINDING - YES	1"	GRINDING - YES	1"	GRINDING - YES	1"
CONVENTIONAL TEST	YES	CONVENTIONAL TEST	YES	CONVENTIONAL TEST	YES	CONVENTIONAL TEST	YES
SECURED ACTUALLY	NO	SECURED ACTUALLY	NO	SECURED ACTUALLY	NO	SECURED ACTUALLY	NO
SAMPLED	YES	SAMPLED	YES	SAMPLED	YES	SAMPLED	YES
SURFACE ACTION	TOOL OPENED WITH STRONG BLOW. GAS TO SURFACE IN 5 MIN. ON PRE FLOW. TOOL	SURFACE ACTION	TOOL OPENED WITH STRONG BLOW. GAS TO SURFACE IN 5 MIN. ON PRE FLOW. TOOL	SURFACE ACTION	TOOL OPENED WITH STRONG BLOW. GAS TO SURFACE IN 5 MIN. ON PRE FLOW. TOOL	SURFACE ACTION	TOOL OPENED WITH STRONG BLOW. GAS TO SURFACE IN 5 MIN. ON PRE FLOW. TOOL
OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO	OPENED WITH GOOD BLOW ON FLOW PERIOD. OIL TO SURFACE IN 30 MIN. FLOWED 3-8 BLS. ON TO
PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD	PT. 1. REVERSED OUT 33.7 BLS. OIL. GRAVITY 30 AT 1000 P.S.I. 3 BLS. DRILLING MUD
BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS	BELOW CIRCULATING SUR. 48,000 P.P.M. CHLORIDES. RESISTIVITY 0.18 AT 62°F. WATER IN SITS
36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.	36,000 P.P.M. CHLORIDES. SAMPLER CONTENTS: 1.2 CAL. F. GAS. 3.5% OIL. NO WATER.
REMARKS	20 MINUTE PRE FLOW. 20' PERFORATION. 464' TOTAL DRILL COLLAR LENGTH.	REMARKS	20 MINUTE PRE FLOW. 20' PERFORATION. 464' TOTAL DRILL COLLAR LENGTH.	REMARKS	20 MINUTE PRE FLOW. 20' PERFORATION. 464' TOTAL DRILL COLLAR LENGTH.	REMARKS	20 MINUTE PRE FLOW. 20' PERFORATION. 464' TOTAL DRILL COLLAR LENGTH.
TESTER	C. E. CARL	TESTER	C. E. CARL	TESTER	C. E. CARL	TESTER	C. E. CARL

		HOUL. CODE	HOUL. CODE	HOUL. CODE	HOUL. CODE
A	INITIAL HYDROSTATIC PRESSURE	P.S.I.	1595	P.S.I.	P.S.I.
B	INITIAL SHUT IN PRESSURE	P.S.I.	1627	P.S.I.	P.S.I.
C	INITIAL FLOW PRESSURE	P.S.I.	697	P.S.I.	P.S.I.
D	FINAL FLOW PRESSURE	P.S.I.	1024	P.S.I.	P.S.I.
E	FINAL SHUT IN PRESSURE	P.S.I.	1627	P.S.I.	P.S.I.
F	FINAL HYDROSTATIC PRESSURE	P.S.I.	1595	P.S.I.	P.S.I.