

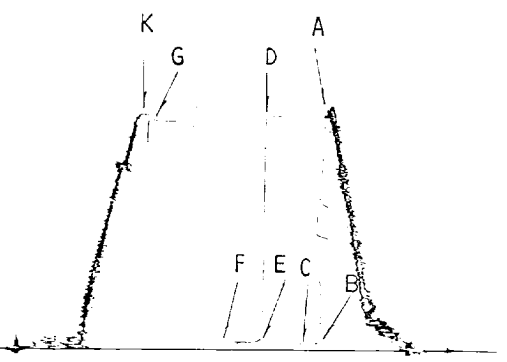
Harvill's Drill Stem Testing

Contractor Landis Drilling	Surface Choke 1/8"	Mud Type Fresh Water
Rig No. 1	Bottom Choke 5/8"	Weight 8.5
Spot 610' FSL & 760' FWL	Hole Size 7 7/8"	Viscosity 28
Sec. 23	Rat Hole Size --	Water Loss --
Twp. 18 S	DP Size & Weight 4 1/2" XH 16.60	Filter Cake --
Rng. 32 E	Wt. Pipe None	Resistivity -- @ 9,000 Ppm. NaCl
Field Wildcat	I.D. of DC 2 1/2"	Bottom Hole Temp. 103°F
County Lea	Length of DC 685'	
State New Mexico	Total Depth 5610'	
Elevation 3780' KB	Type of Test Conventional	

Operator **MARSHALL & WINSTON, INC.**
 Address **See Distribution**
 Well Name & No. **Querecho Federal #1**
 Formation **Delaware**
 Test Interval **5588' - 5610'**
 DST No. **2**
 Ticket No. **233**
 Date **1/12/86**

Opened Tool @ 17:25 hrs.
Flow No. 1 (30) 30* min.
Shut-in No. 1 (60) 55* min.
Flow No. 2 (60) 62* min.
Shut-in No. 2 (120) 104* min.
Flow No. 3 None Taken min.
Shut-in No. 3 " " min.
*Computed

Recorder Type Kuster AK-1
No. 13750 Cap. 7950 psi
Depth 5604 feet
Inside [] Outside [X]



Initial Hydrostatic	A	2451.9
Final Hydrostatic	K	2427.6
Initial Flow	B	85.9
Final Initial Flow	C	48.6
Initial Shut-in	D	2418.4
Second Initial Flow	E	119.6
Second Final Flow	F	70.9
Second Shut-in	G	2361.8
Third Initial Flow	H	
Third Final Flow	I	
Third Shut-in	J	

Pipe Recovery: 137' Total fluid = 0.83 bbl.
 30' Drilling fluid with a trace of gas = 0.18 bbl.
 20' Gas cut, free oil = 0.12 bbl.
 87' Drilling fluid = 0.53 bbl.

Co. Rep. **Charlie Pappas**
 Tester **Eugene Harvill**

Top Sample: 9,000 ppm Cl.
 Bottom Sample: 9,000 ppm Cl.

1st Flow: Tool opened with a weak blow and remained through flow period.

2nd Flow: Tool opened with no blow, began a weak blow in 20 minutes and remained through flow period.

Harvill's Drill Stem Testing

Marshall & Winston, Inc.
Operator

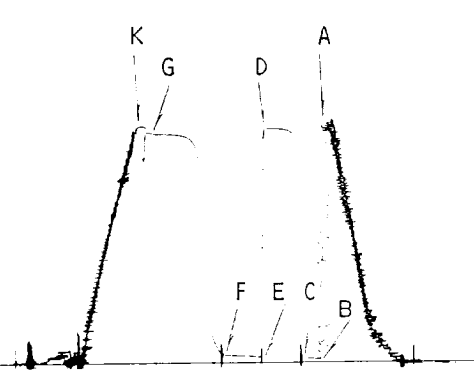
Querecho Federal #1
Well Name and No.

2
DST No.

Inside Recorder

PRD Make Kuster AK-1
No. 13751 Cap. 7875 @ 5568'

	Press	Corrected
Initial Hydrostatic	A	2420.0
Final Hydrostatic	K	2396.6
Initial Flow	B	36.2
Final Initial Flow	C	47.9
Initial Shut-in	D	2366.1
Second Initial Flow	E	55.1
Second Final Flow	F	74.9
Second Shut-in	G	2317.3
Third Initial Flow	H	
Third Final Flow	I	
Third Shut-in	J	



PRD Make _____
No. _____ Cap. _____ @ _____

	Press	Corrected
Initial Hydrostatic	A	
Final Hydrostatic	K	
Initial Flow	B	
Final Initial Flow	C	
Initial Shut-in	D	
Second Initial Flow	E	
Second Final Flow	F	
Second Shut-in	G	
Third Initial Flow	H	
Third Final Flow	I	
Third Shut-in	J	

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Querecho Federal #1

Well Name and No.

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DST No.

This pressure chart analysis has been made on the basis of the liquid recovery and equations applicable to liquid recovery tests, the Horner extrapolation method and fluid properties from Vasquez & Beggs correlations.

1. The pressure extrapolation plot indicates a maximum initial reservoir pressure of 2424 psi and a maximum final reservoir pressure of 2373 psi which is equivalent to a subsurface pressure gradient of 0.42 psi/ft at the recorder depth of 5604 feet. The difference between the extrapolated initial and final shut-in pressures (51 psi) is not considered important.
2. The Average Production Rate which was used in this analysis, 5.7 barrels/day, has been calculated from analysis of the flow pressure curves using a liquid gradient for the recovered oil of 0.370 psi/ft.
3. The calculated Total Effective Transmissibility of 24.87 md.-ft./cp. indicates an Average Permeability to the produced oil of 22.10 md. for the estimated 10 feet of effective porosity within the total 22 feet of tested interval.
4. The calculated Skin Factor of 66.4 indicates significant well-bore damage was present at the time of this formation test.
5. The evaluation criteria used in the drillstem test analysis system indicate this is a good mechanical test and the results obtained in this analysis should be reliable within reasonable limits relative to the assumptions which have been made.

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DST No.

T E S T P A R A M E T E R S

DRILLPIPE CAPACITY	0.0142 BBL/FT	HOLE SIZE	7.875 IN
DRILLCOLLAR CAPACITY	0.0061 BBL/FT	PAY THICKNESS	10 FT (EST)
DRILLCOLLAR LENGTH	685 FT	VISCOSITY	8.89 CP
BOTTOM HOLE TEMP	103 DEG F	COMPRESSIBILITY	.000001 1/PSI
POROSITY FRACTION	.12 (EST)	1ST FLOW TIME	30 MIN
RECORDER NUMBER	13750	1ST SHUT-IN TIME	55 MIN
RECORDER DEPTH	5604 FT	2ND FLOW TIME	62 MIN
ELEVATION	3780 FT (KB)	2ND SHUT-IN TIME	104 MIN
DATUM	-1824 FT		

C A L C U L A T I O N S

EXTRAPOLATED INITIAL SHUT-IN PRESSURE (PSI)	2423.7
NUMBER OF POINTS USED	11
SLOPE (PSI/LOG CYCLE)	24.0
EXTRAPOLATED FINAL SHUT-IN PRESSURE (PSI)	2372.5
NUMBER OF POINTS USED	5
SLOPE (PSI/LOG CYCLE)	37.4
AVERAGE PRODUCTION RATE (BARRELS/DAY)	5.7
TRANSMISSIBILITY (MD.-FT./CP.)	24.87
FLOW CAPACITY (MD.-FT.)	221.04
PERMEABILITY (MD.)	22.10
PRODUCTIVITY INDEX (BARRELS/DAY/PSI)002
DAMAGE RATIO	11.3
SKIN FACTOR (S)	66.4
PRESSURE DROP DUE TO SKIN (PSI)	2259.3
APPROXIMATE RADIUS OF INVESTIGATION (FT.)	154.6
DRAWDOWN FACTOR (%)	2.1
POTENTIOMETRIC SURFACE (FT.)	3703.9

Harvill's Drill Stem Testing Sampler Report

Company Marshall & Winston, Inc. Date 1/12/86
Well Name & No. Querecho Federal #1 Ticket No. 233
County Lea State New Mexico
Test Interval 5588'- 5610' DST No. 2

Total Volume of Sampler: 2250 cc.
Total Volume of Sample: 1800 cc.
Pressure in Sampler: 135 psig
Oil: 300 cc.
Water: None cc.
Mud: 1500 cc.
Gas: 0.1 cu. ft.
Other: None

Sample: 9,000 ppm Cl.

Resistivity

Make Up Water _____ @ _____ of Chloride Content _____ ppm.

Mud Pit Sample _____ @ _____ of Chloride Content 9,000 ppm.

Gas/Oil Ratio 53/1 cu.ft./bbl. Gravity 34.0 °API @ 60 °F

Where was sample drained On location.

Remarks: _____

Harvill's Drill Stem Testing

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Querecho Federal #1
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DST No.

RSI-SCF/STB	53.00
GAS GRAVITY(AIR=1)65
RES TEMP-F	103.00
OIL GRAVITY	34.00
BUBBLE POINT PRESSURE ..	362.95

OIL PROPERTIES

<u>PRESSURE-PSIA</u>	<u>BO-RB/STB</u>	<u>RS-SCF/STB</u>	<u>UO-CP</u>	<u>CO-1/PSI</u>
100.0	1.0301	11.5	8.24	0.000000
200.0	1.0370	26.1	7.26	.001878
300.0	1.0446	42.3	6.42	.001324
363.0	1.0497	53.0	5.96	.001125
400.0	1.0494	53.0	5.97	.000007
500.0	1.0489	53.0	6.03	.000005
600.0	1.0486	53.0	6.10	.000004
700.0	1.0483	53.0	6.19	.000004
800.0	1.0481	53.0	6.28	.000003
900.0	1.0480	53.0	6.39	.000003
1000.0	1.0479	53.0	6.50	.000003
1100.0	1.0478	53.0	6.63	.000002
1200.0	1.0477	53.0	6.76	.000002
1300.0	1.0476	53.0	6.90	.000002
1400.0	1.0476	53.0	7.05	.000002
1500.0	1.0475	53.0	7.20	.000002
1600.0	1.0475	53.0	7.37	.000002
1700.0	1.0475	53.0	7.54	.000002
1800.0	1.0474	53.0	7.72	.000001
1900.0	1.0474	53.0	7.90	.000001
2000.0	1.0474	53.0	8.10	.000001
2100.0	1.0474	53.0	8.30	.000001
2200.0	1.0473	53.0	8.51	.000001
2300.0	1.0473	53.0	8.73	.000001
2372.5	1.0473	53.0	8.89	.000001
2400.0	1.0473	53.0	8.95	.000001
2500.0	1.0473	53.0	9.18	.000001

Harvill's Drill Stem Testing

Marshall & Winston, Inc.
Operator

Querecho Federal #1
Well Name and No.

2
DST No.

RECORDER NO. 13750 DEPTH 5604 FT.

INITIAL FLOW

<u>DT(MIN)</u>	<u>PRESSURE(P SIG)</u>
0	85.9
5	63.0
10	51.1
15	46.5
20	45.8
25	45.5
30	48.6

RECORDER NO. 13750 DEPTH 5604 FT.

FINAL FLOW

<u>DT(MIN)</u>	<u>PRESSURE(P SIG)</u>
0	119.6
5	85.2
10	73.3
15	67.5
20	65.7
25	63.9
30	64.0
35	64.1
40	67.4
45	68.9
50	70.8
55	69.5
60	70.9
62	70.9

Harvill's Drill Stem Testing

Marshall & Winston, Inc.
Operator

Querecho Federal #1
Well Name and No.

2
DST No.

RECORDER NO. 13750 DEPTH 5604 FT.

INITIAL SHUT-IN

INITIAL FLOW TIME: T = 30 MIN.

<u>DT(MIN)</u>	<u>LOG((T+DT)/DT)</u>	<u>PRESSURE(P SIG)</u>	<u>DP(P SIG)</u>
0		48.6	0.0
1	1.491	60.1	11.5
2	1.204	121.8	73.2
3	1.041	185.1	136.4
4	.929	311.3	262.6
5	.845	720.3	671.7
6	.778	1290.8	1242.2
7	.723	2127.5	2078.8
8	.677	2253.6	2204.9
9	.637	2348.4	2299.8
10	.602	2367.4	2318.7
12	.544	2382.5	2333.9
14	.497	2394.3	2345.7
16	.459	2403.1	2354.5
18	.426	2410.1	2361.5
20	.398	2412.8	2364.1
22	.374	2414.6	2366.0
24	.352	2415.9	2367.2
26	.333	2415.9	2367.3
28	.316	2416.0	2367.3
30	.301	2417.4	2368.8
35	.269	2417.9	2369.3
40	.243	2418.1	2369.4
45	.222	2418.2	2369.6
50	.204	2418.3	2369.7
55	.189	2418.4	2369.8

EXTRAPOLATED PRESSURE: 2423.7 PSI
SLOPE: 24.0 PSI/LOG CYCLE
POINTS USED: 11

Harvill's Drill Stem Testing

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Querecho Federal #1
Well Name and No.

2
DST No.

RECORDER NO. 13750 DEPTH 5604 FT.

FINAL SHUT-IN

TOTAL FLOW TIME: T = 92 MIN.

<u>DT(MIN)</u>	<u>LOG((T+DT)/DT)</u>	<u>PRESSURE(P SIG)</u>	<u>DP(P SIG)</u>
0		70.9	0.0
1	1.968	72.9	2.0
2	1.672	75.3	4.4
3	1.501	80.1	9.1
4	1.380	82.6	11.7
5	1.288	88.4	17.5
6	1.213	95.5	24.6
7	1.151	102.0	31.1
8	1.097	114.3	43.4
9	1.050	124.5	53.6
10	1.009	137.8	66.9
12	.938	166.0	95.1
14	.879	199.6	128.6
16	.829	239.6	168.7
18	.786	285.2	214.3
20	.748	355.4	284.5
22	.714	450.8	379.8
24	.684	578.9	508.0
26	.657	763.8	692.9
28	.632	1015.1	944.2
30	.609	1381.6	1310.7
40	.519	2239.7	2168.8
50	.453	2324.3	2253.4
60	.404	2347.6	2276.7
70	.364	2358.2	2287.3
80	.332	2361.0	2290.1
90	.306	2361.3	2290.4
100	.283	2361.7	2290.8
104	.275	2361.8	2290.9

EXTRAPOLATED PRESSURE: 2372.5 PSI
SLOPE: 37.4 PSI/LOG CYCLE
POINTS USED: 5

2800

HORNER PLOT

Marshall & Winston, Inc.
Querecho Federal #1, DST #2
Interval: 5588' - 5610'

Recorder No. 13750 @ 5604'

$P^*_i = 2423.7$ psi

$P^*_f = 2372.5$ psi

INITIAL SHUT-IN

FINAL SHUT-IN

2000

1600

1200

800

400

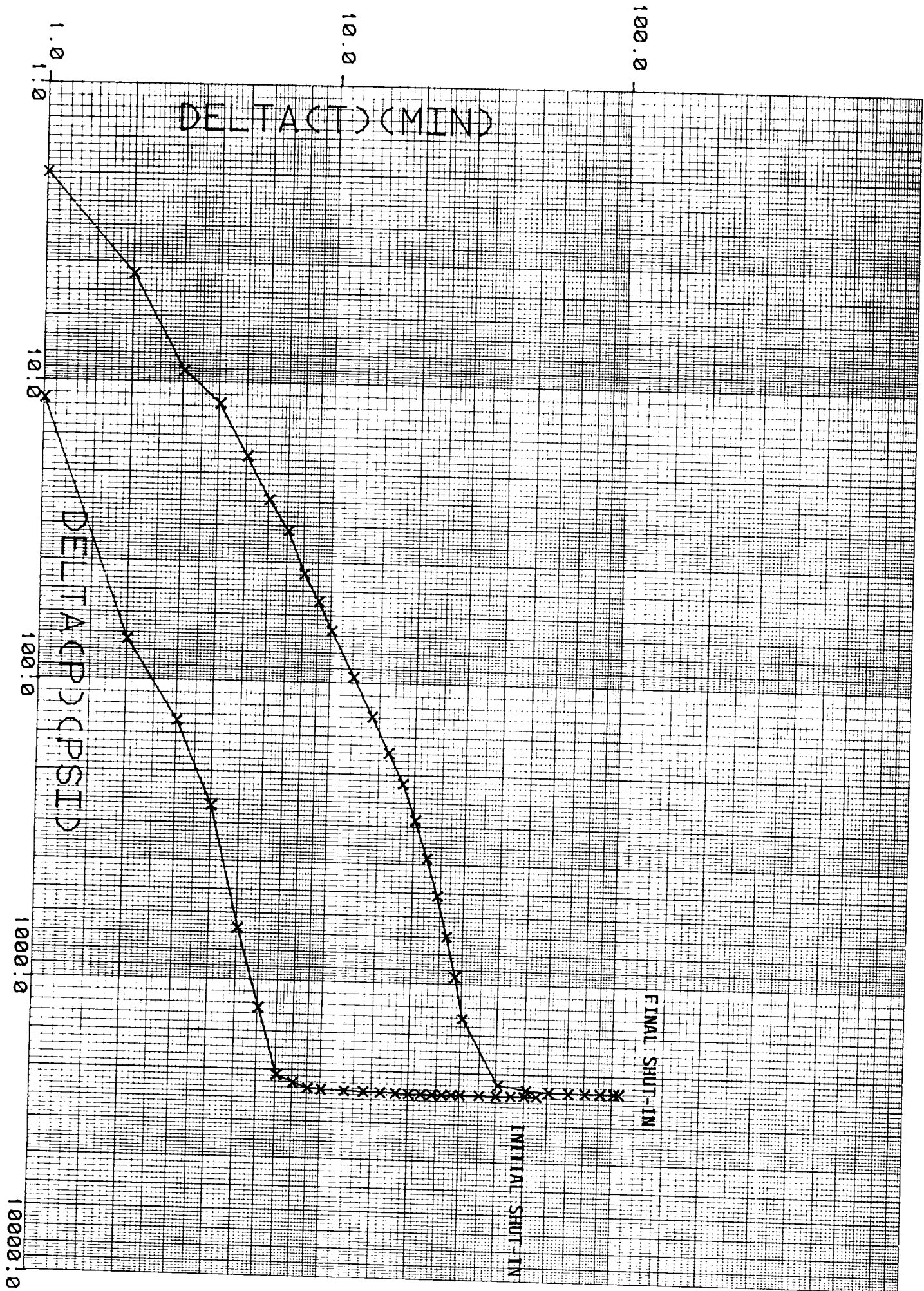
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PRESSURE (PSI)

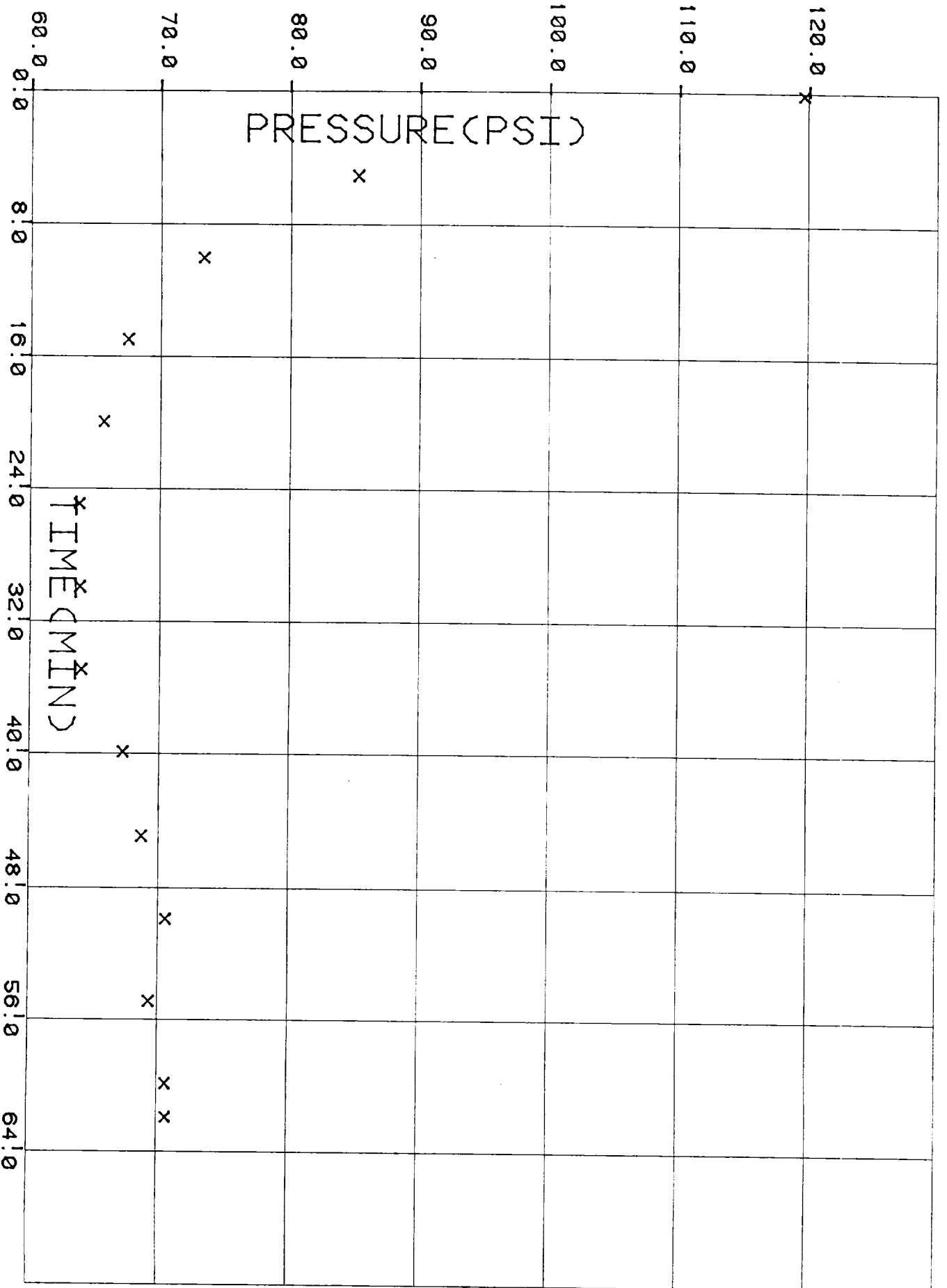
~~CCT+DTD~~
~~XDTD~~

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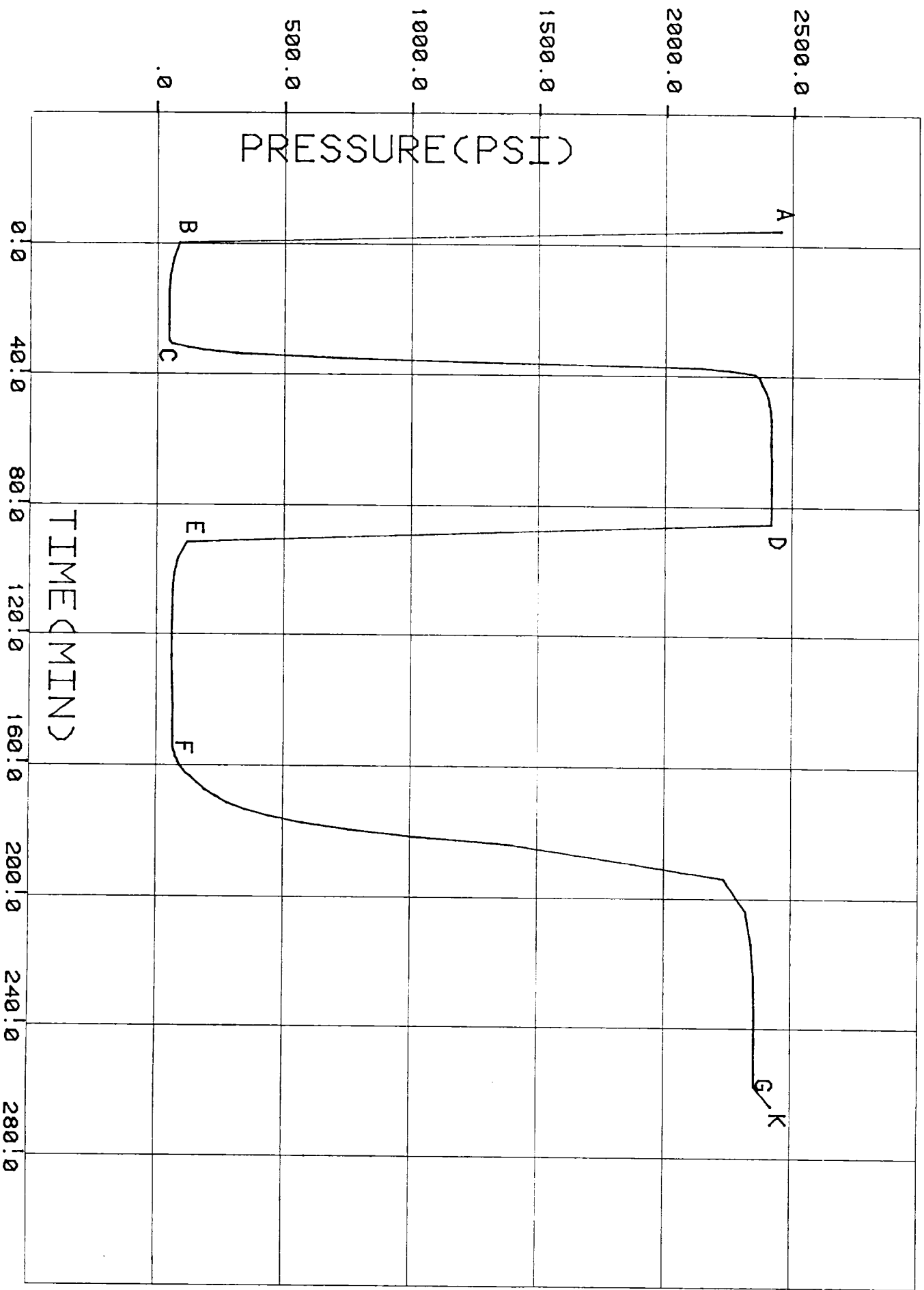
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SECOND FLOW



GAUGE NO. 13750 @ 5604 FT.



Harvill's Drill Stem Testing

Marshall & Winston, Inc.
Operator

Querecho Federal #1
Well Name and No.

MARSHALL & WINSTON INC. 3
310 W. - #10 DESTA DR.
MIDLAND TX 79705

MAR-WIN DEVELOPMENT 1
P.O. BOX 4482
TOPEKA KS 66604

MEWBORNE OIL CO. 1
ATTN MR. PAUL HADEN
400 W. ILLINOIS SUITE 1270
MIDLAND TX 79701

TXO PRODUCTION CO. 1
ATTN MR. ANDY OHARE
900 WILCO BLDG.
MIDLAND TX 79701

NEW MEXICO OIL CONSERVATION COMM. 1
P.O. BOX 1980
HOBBS NM 88240

BUREAU OF LAND MANAGEMENT 1
P.O. BOX 1778
CARLSBAD NM 88220