

Dave -

Based on surface pressures it appears that the well will take water at about 35 BPM @

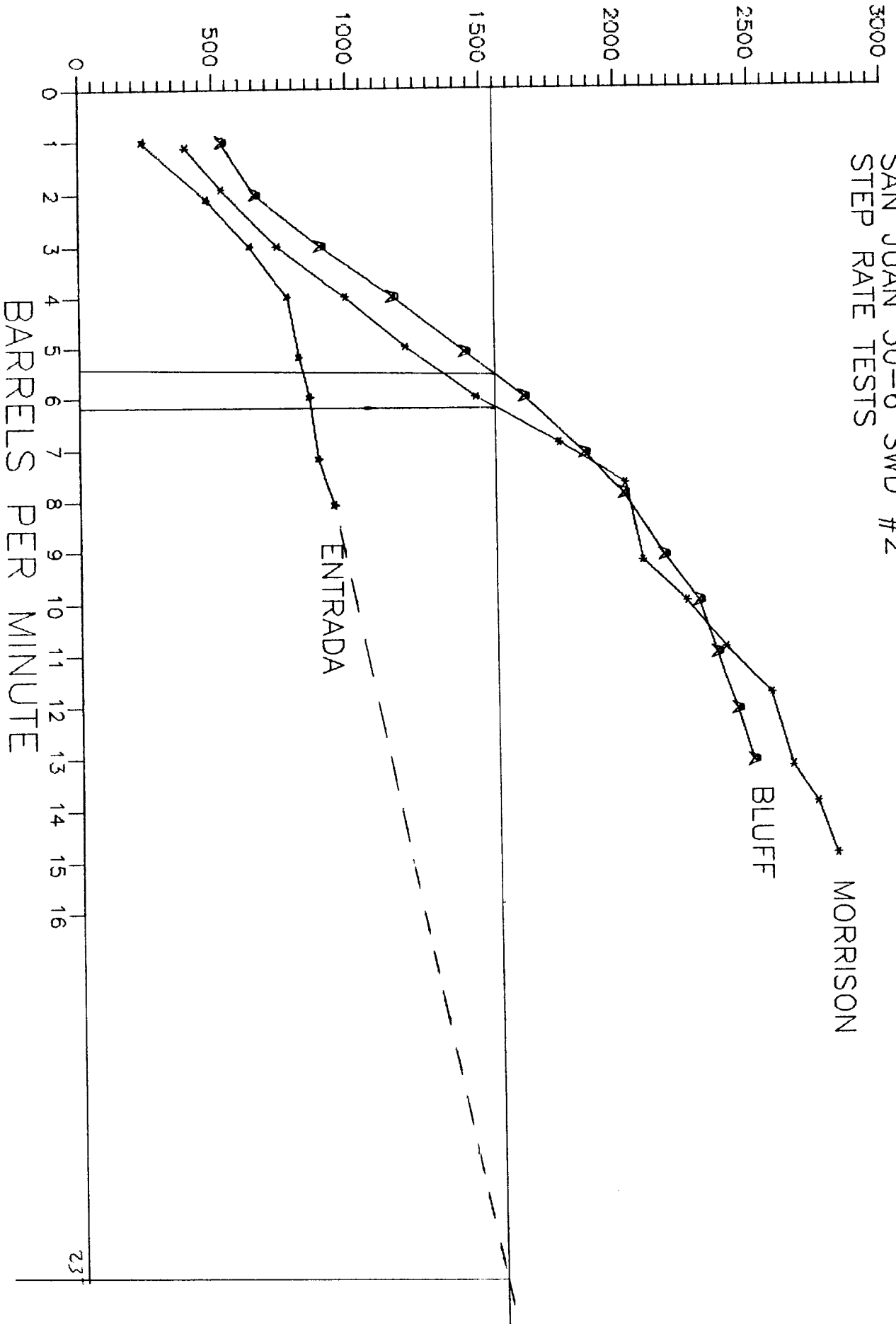
1560 psi.

Entrada	23 BPM
Morrison	6.2
Bluff	<u>5.3</u>
	<u>34.5 BPM</u>

The proximity of the surface parting pressure and rates may indicate communication between the Bluff and Morrison unless the lithology and other factors indicate they should track this close to each other. We will follow up.

SURFACE PRESSURE PSI

SAN JUAN 30-6 SWD #2
STEP RATE TESTS



SANJUAN 30--6 W2

ENTRADA

RATE	BPM	P _s	P _h
1	1	240	
2	2.1	480	
3	3	640	
4	4	780	
5	5.2	820	
6	6	860	
7	7.2	894	
8	8.1	952	

BLUFF

1	1	534	
2	2	660	
3	3	902	
4	4	1170	
5	5.1	1440	
6	6	1660	
7	7.1	1884	
8	7.9	2030	
9	9.1	2180	
10	10	2310	
11	11	2376	
12	12.1	2452	
13	13.1	2510	

MORRISON

1	1.1	400
2	1.9	534
3	3	742
4	4	994
5	5	1218
6	6	1480
7	6.9	1792
8	7.7	2038
9	9.2	2100
10	10	2266
11	10.9	2410
12	11.8	2578
13	13.2	2656
14	13.9	2748
15	14.9	2820

ANALYSIS NO. 51-13-90

API FORM 45-1

FIELD RECEIPT NO. _____

API WATER ANALYSIS REPORT FORM

Company <u>Mordian</u>		Sample No.	Date Sampled
Field	Legal Description	County or Parish <u>Rio Arriba</u>	State <u>NM</u>
Lease or Unit	Well <u>30-6 Injection #2</u>	Depth	Formation <u>Morrison</u>
Type of Water (Produced, Supply, etc.)	Sampling Point	Water. B/D	
		Sampled By	

DISSOLVED SOLIDS

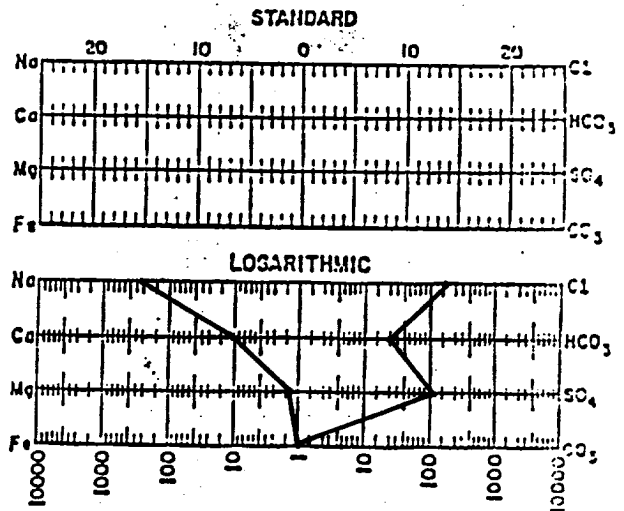
CATIONS	mg/l	me/l
Sodium, Na (calc.)	<u>7469</u>	<u>324.74</u>
Calcium, Ca	<u>234</u>	<u>11.68</u>
Magnesium, Mg	<u>20</u>	<u>1.65</u>
Barium, Ba	<u>—</u>	<u>—</u>
Potassium, K ⁺	<u>167</u>	<u>4.27</u>

OTHER PROPERTIES

pH	<u>7.30</u>
Specific Gravity, 60/60 F.	<u>1.016</u>
Resistivity (ohm-meters) <u>62° F.</u>	<u>.42</u>
Total hardness	<u>664</u>

ANIONS	mg/l	me/l
Chloride, Cl	<u>7468</u>	<u>210.66</u>
Sulfate, SO ₄	<u>4900</u>	<u>102.02</u>
Carbonate, CO ₃	<u>0</u>	<u>0</u>
Bicarbonate, HCO ₃	<u>1809</u>	<u>29.66</u>
OH	<u>0</u>	<u>0</u>

WATER PATTERNS — me/l



Total Dissolved Solids (calc.) 22067

Iron, Fe (total) #, ## 0.0 ppm

Sulfide, as H₂S no9

REMARKS & RECOMMENDATIONS:

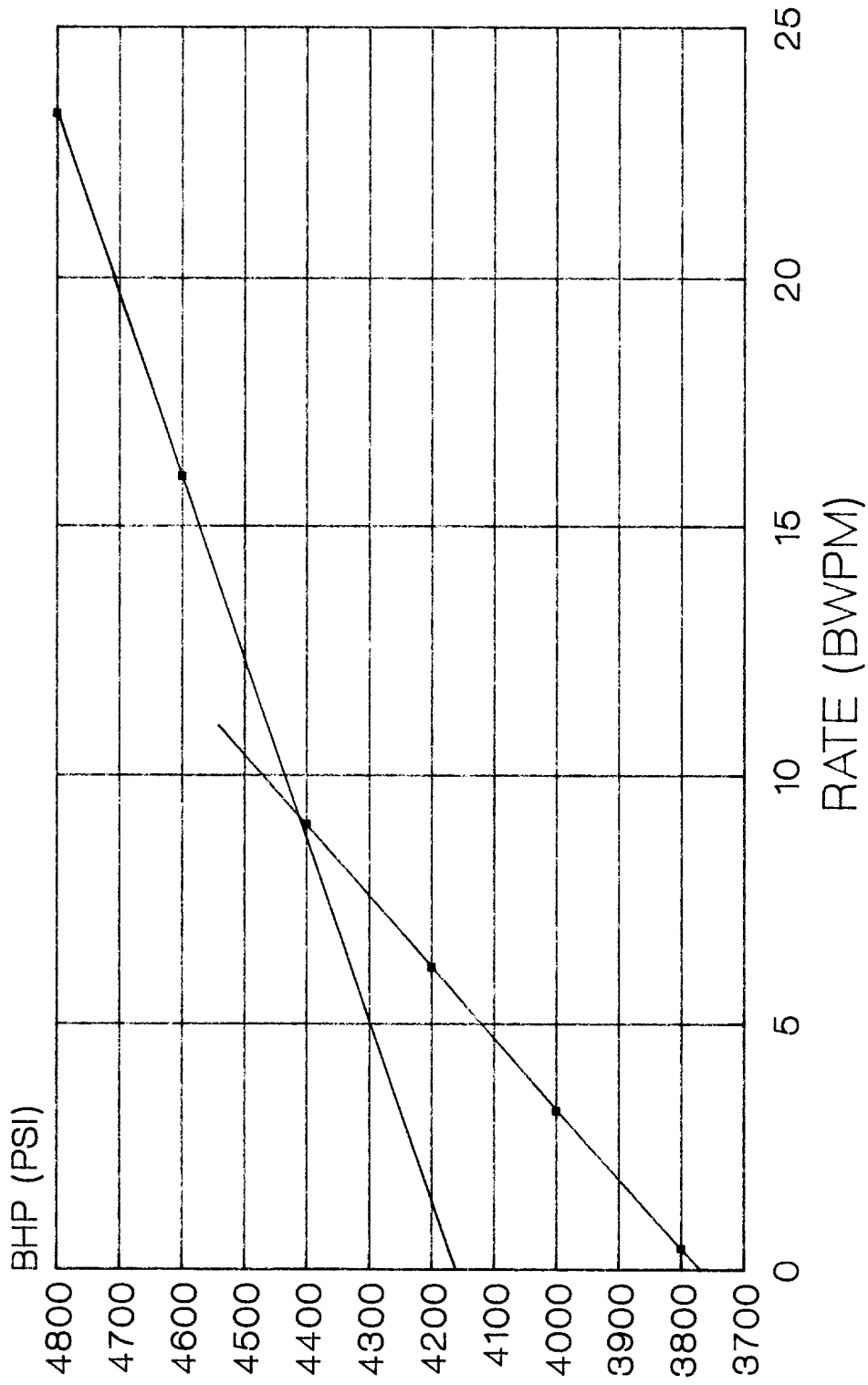
ANALYST: J. Lee

THE WESTERN COMPANY OF
NORTH AMERICA, FARMINGTON, NM
(505) 327-6222

Please refer any questions to: BRIAN AULT District Engineer

SAN JUAN 30-6 UNIT SWD #2

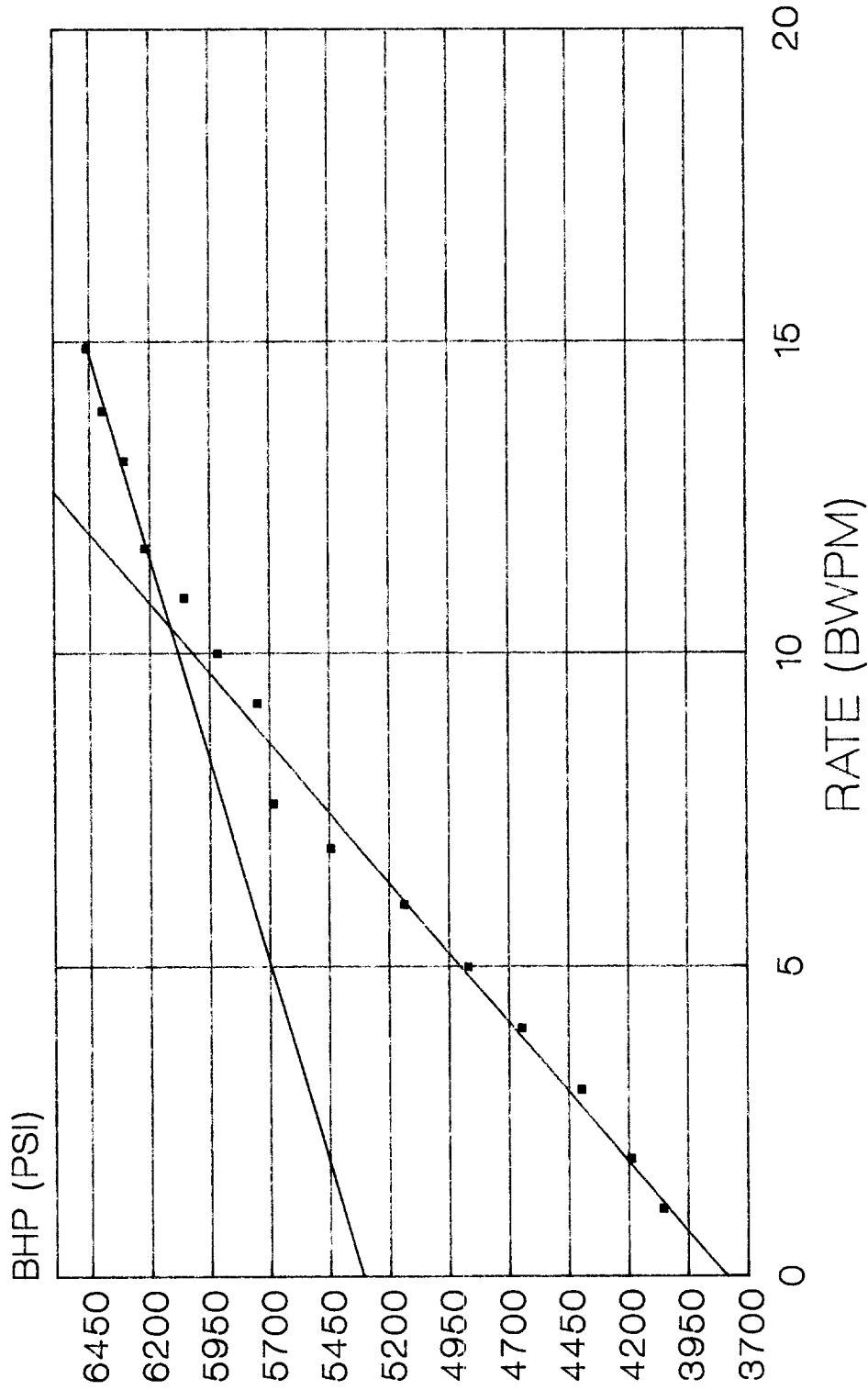
PREDICTED COMPOSITE STEP RATE TEST



PARTING PRESSURE 4412 BHP @ 9.17 BPM
Fracture Gradient = 0.523 psi/ft

SAN JUAN 30-6 UNIT SWD #2

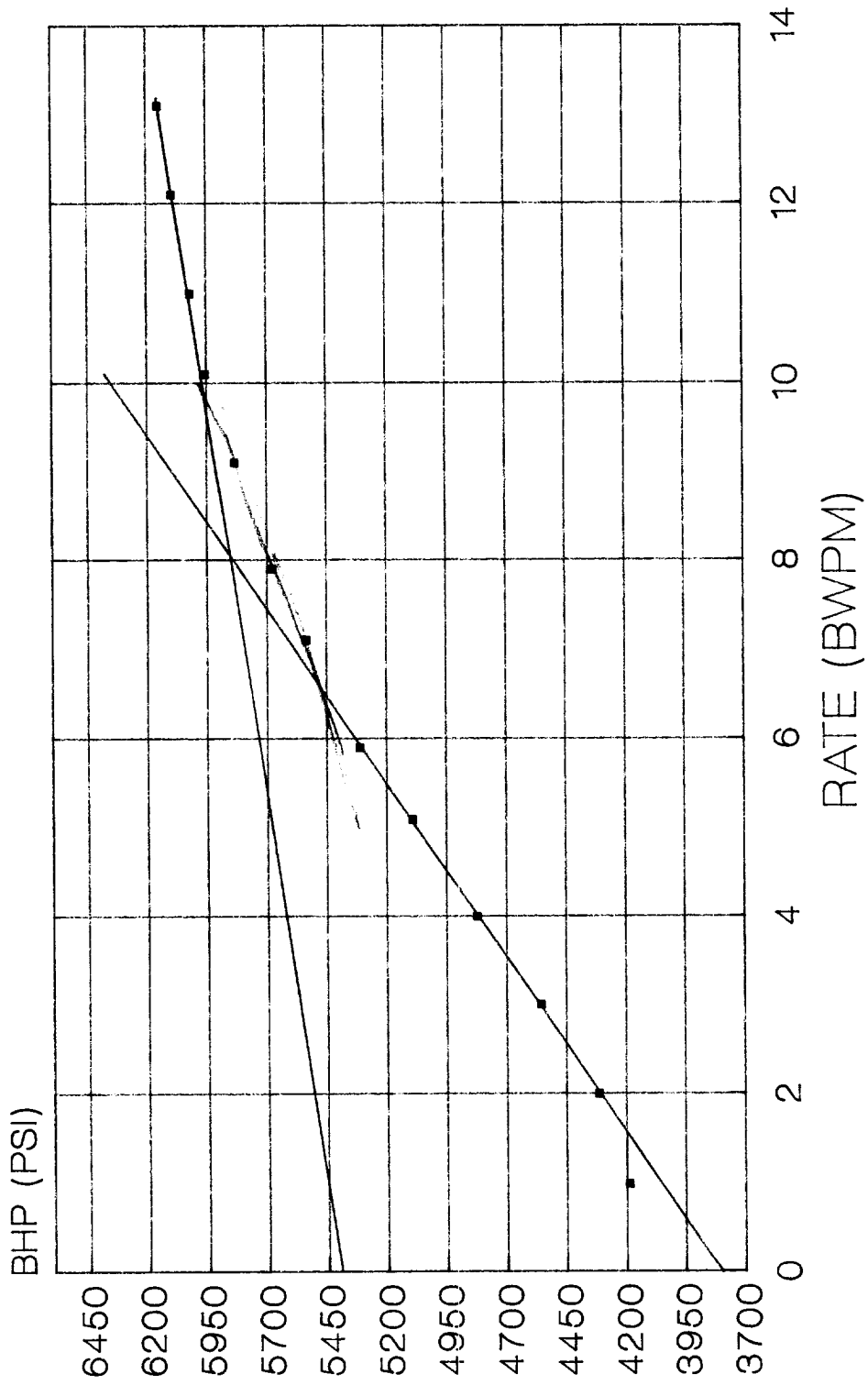
UPPER MORRISON FORMATION STEP RATE



PARTING PRESSURE 6118 BHP @ 10.44 BPM
Fracture Gradient = 0.725 psi/ft

SAN JUAN 30-6 UNIT SWD #2

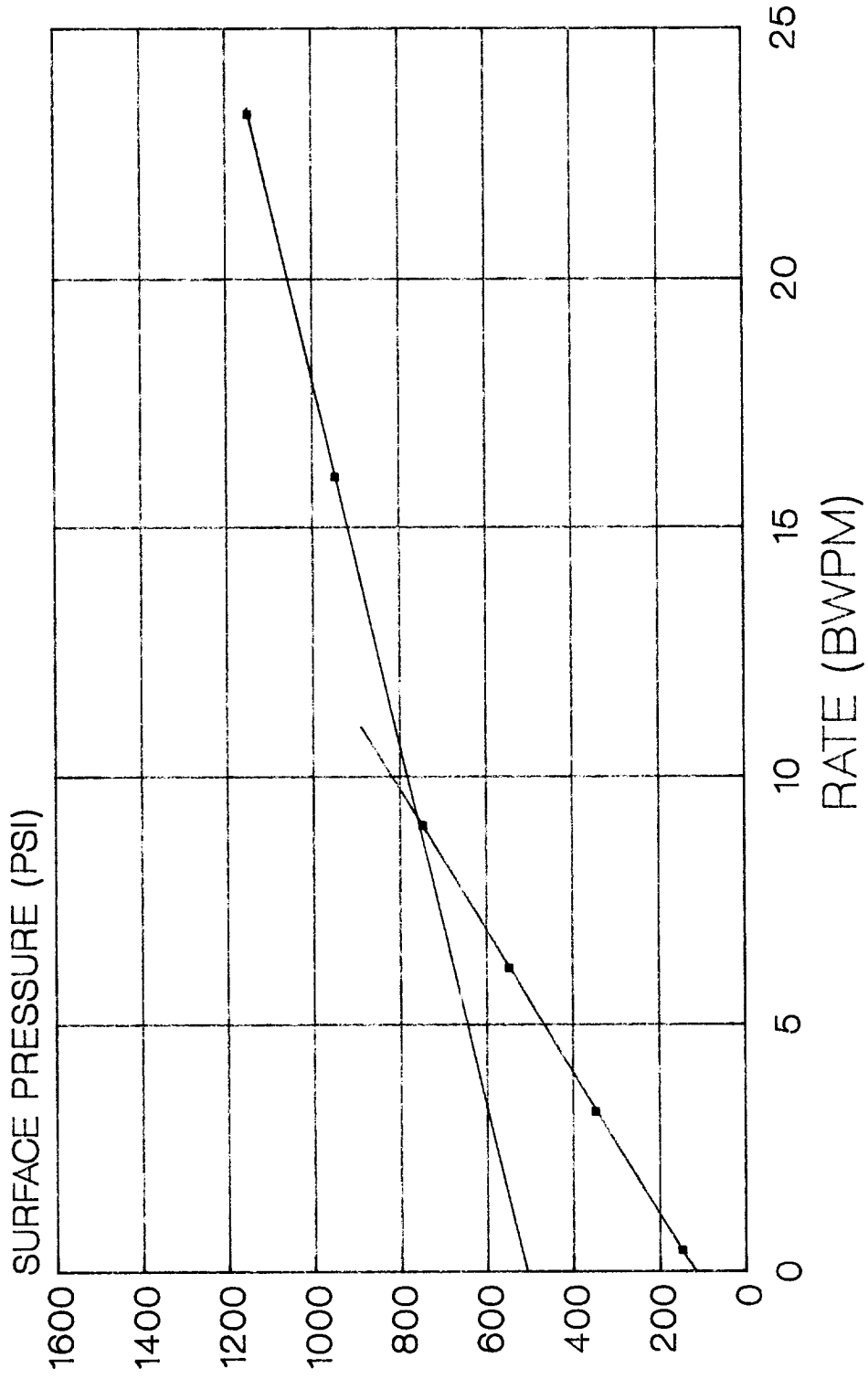
BLUFF FORMATION STEP RATE TEST



PARTING PRESSURE 5908 BHP @ 9.363 BPM
Fracture Gradient - 0.70 psi/ft

SAN JUAN 30-6 UNIT SWD #2

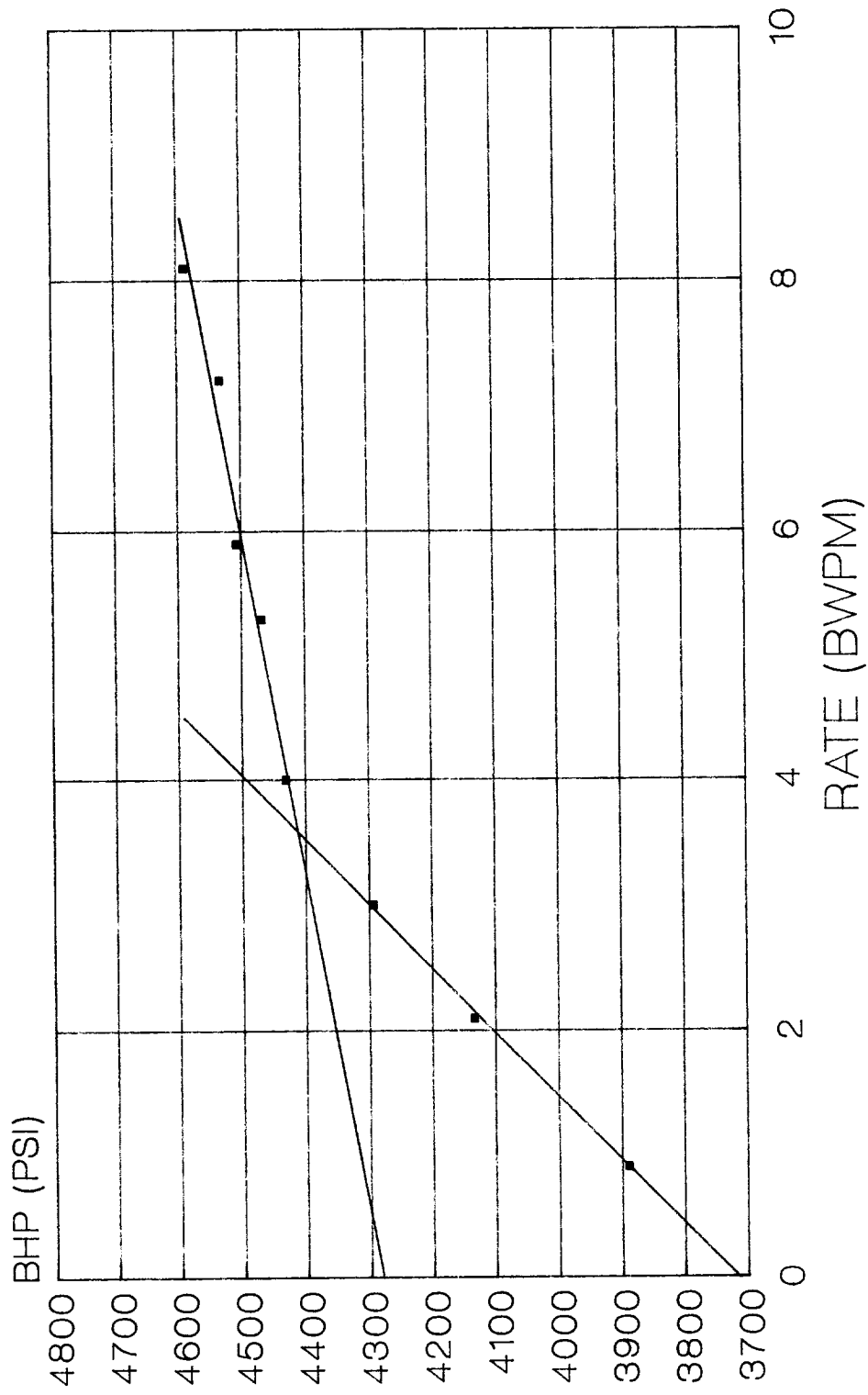
PREDICTED COMPOSITE STEP RATE TEST



PARTING PRESSURE 759 SP @ 9.17 BPM

SAN JUAN 30-6 UNIT SWD #2

ENTRADA FORMATION STEP RATE TEST



PARTING PRESSURE 4413 BHP @ 3.58 BPM
Fracture Gradient = 0.523 psi/ft

PROPPANT & FLUID DESCRIPTION STEP RATE FRESH H2O ENTRADA	7S,B.W
NUMBER OF PERFORATIONS	92
PERFORATION DIAMETER	.50 inches
SPECIFIC GRAVITY OF FLUID	1.00
TREATING DEPTH	8775 ft
FRICTION PRESSURE GRADIENT	1.1 psi/Kft
REFERENCE RATE	20 BPM
LENGTH OF TREATING STRING	8687 ft
CAPACITY OF TREATING STRING	132 bbl
CLOSURE STRESS	3700 psi
CASING INSIDE DIAMETER	6.366 inches
TUBING OUTSIDE DIAMETER	6.366 inches
FRICTION PRESSURE CURVE SLOPE	1.33
TUBING INSIDE DIAMETER	6.366 inches
HH FLUID IN TUBING FOR TOOL	0 psi
PLOTTER PRESSURE P2/P3/P6/P7	3 2/3/6/7
HH FLUID IN TUBING FOR P2	0 psi

PICK A RECORD	IDUMP GRAPHICS	1	2	IADD	I ON SORTIME
ON WITH JOB	I*OFF SORTIME	1	ENTER	IREPLACE	IDELETE

SANJUAN 30-6 #2

ENTRADA

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2	2.1	480	
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BLUFF

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11	11	2376
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