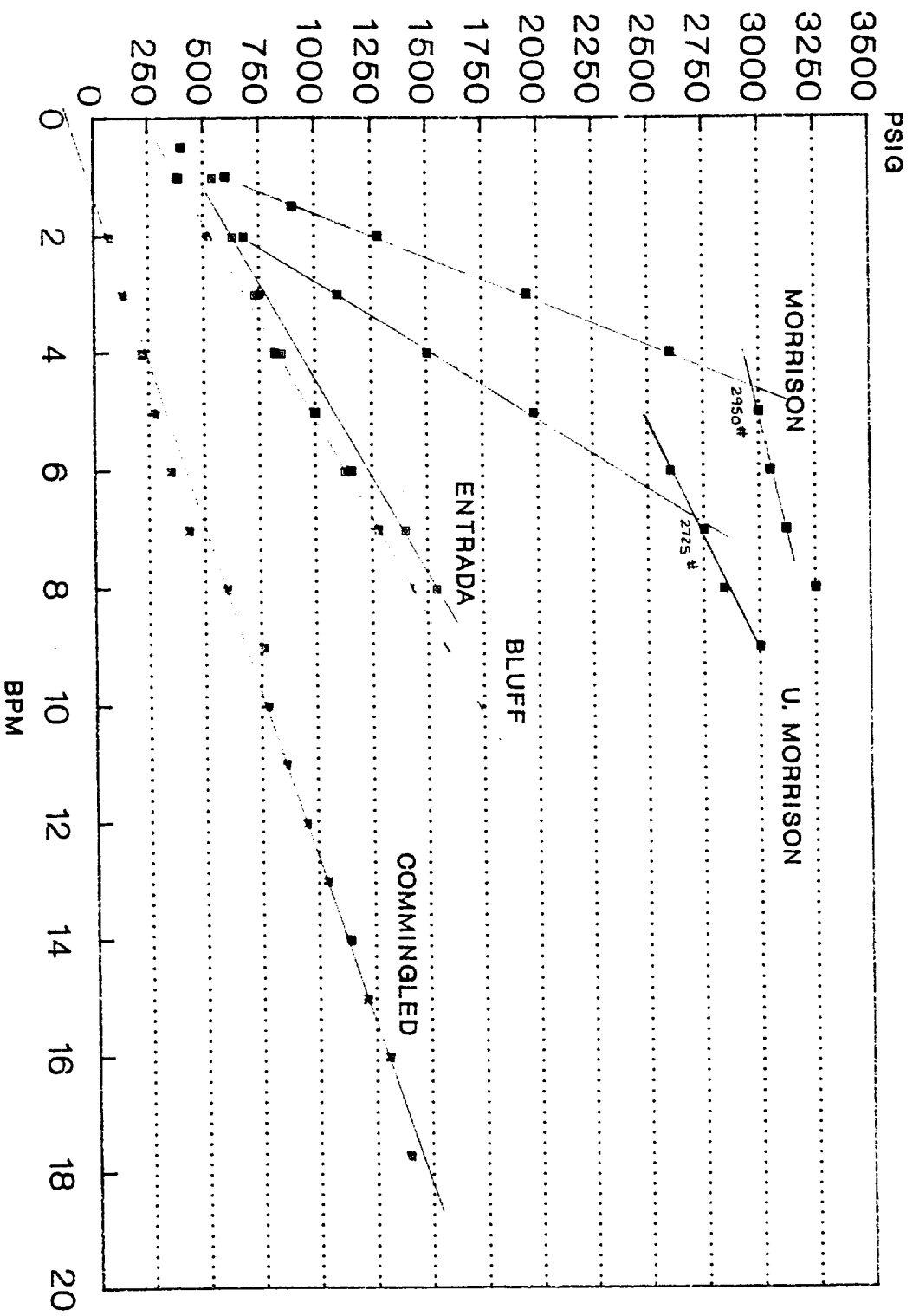


MIDDLE MESA SWD #1
STEP RATE TEST
RESULTS

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MIDDLE MESA SWD #1
NEBU 502 STEP-RATE TEST



BLACKWOOD & NICHOLS CO., LTD.

P.O. BOX 1237

DURANGO, COLORADO 81302-1237

(303) 247-0728

Completion Report

Northeast Blanco Unit No. 502 - Salt Water Disposal Well

Middle Mesa SWD #1

LOCATION: 1650' FNL, 1480' FEL
Section 32, T31N, R7W
San Juan County, New Mexico

1-26-90 Step Rate Tests Summary

Entrada - Perforations: 8786' to 8899'

<u>Step</u>	<u>Rate</u>	<u>Tubing</u>	<u>Casing</u> (Note, no BHP)
1	2.0	540	440
2	2.5	630	520
3	3.0	730	580
4	4.0	850	625
5	5.0	1000	740
6	6.2	1130	880
7	8.3	1400	1020
8	9.4	1540	1100

Pumped 363 Bbls fresh water with 1% KCl down 3-1/2" tubing set at 8764'. ISIP - 950 psig; 5 minutes - 830; 10 minutes - 760; 15 minutes - 760 psig. Job complete 1-11-90.

Bluff - Perforations: 8514' to 8634'

<u>Step</u>	<u>Rate</u> (BPM)	<u>Tubing</u> <u>Pres.</u>	<u>Casing</u> <u>Pres.</u>	<u>Bottomhole</u> <u>Pressure</u>
1	1	390	260	3945.0
2	2	520	480	4076.5
3	3	760	710	4204.9
4	4	820	820	4318.0
5	5	1000	990	4492.4
6	6	1160	1080	4654.4
7	7	1280	1180	4813.5
8	8	1450	1330	4960.2
9	9	1590	1410	5049.2
10	10	1730	1530	5172.3

Pumped 310 Bbls of 1% KCl water down 3-1/2" x 7" annulus. Tubing set at 8490'. ISIP - 1400 psig; 5 minutes - 1190 10 minutes - 1050. Job complete 1-15-90.

Morrison - Perforations: 8300' to 8460'

<u>Step</u>	<u>Rate</u> <u>(BPM)</u>	<u>Tubing</u> <u>Pres.</u>	<u>Casing</u> <u>Pres.</u>	<u>Bottomhole</u> <u>Pressure</u>
1	0.5	400	320	3961
2	1.0	600	550	4180
3	1.5	900	800	4504
4	2.0	1280	1240	4862
5	3.0	1950	2010	5556
6	4.0	2600	2710	6200
7	5.0	3000	3120	6313
8	6.0	3050	3200	6663
9	7.0	3120	3290	6759
10	8.0	3250		6880

Pumped 382 Bbls of 1% KCl water down 3-1/2" x 7" annulus.
Tubing set at 8274'. ISIP - 2900 psig; 5 minutes - 2300;
10 minutes - 2050; 15 minutes - 1910 psig. Job complete
1-17-90.

Upper Morrison - Perforations: 8064' to 8260'

<u>Step</u>	<u>Rate</u> <u>(BPM)</u>	<u>Tubing</u> <u>Pres.</u>	<u>Casing</u> <u>Pres.</u>	<u>Bottomhole</u> <u>Pressure</u>
1	1.0	380	380	3858
2	2.0	680	750	4221
3	3.0	1100	1150	4628
4	4.0	1500	1630	5091
5	5.0	1980	2150	5570
6	6.0	2600	2750	5757
7	7.0	2750	2930	6363
8	8.0	2840	3050	6593
9	9.0	3000	3210	6608

Pumped 439 Bbls of 1% KCl water down 3-1/2" x 7" annulus.
Tubing set at 8058'. ISIP - 2800 psig; 5 minutes - 2020;
10 minutes - 1750; 15 minutes - 1550 psig. Job complete
1-19-90.

Morrison, Bluff, and Entrada Zones
Perforations from 8064' to 8899'
Pressure bomb set at 8900'

<u>Step</u>	<u>Rate</u> <u>(BPM)</u>	<u>Casing</u> <u>(psig)</u>	<u>Bottomhole</u> <u>Pressure</u>
1	2.0	70	3835
2	3.0	130	3900
3	4.0	220	3970
4	5.0	280	4040
5	6.0	350	4115
6	7.0	430	4195
7	8.0	600	4410
8	9.0	760	4518
9	10.0	780	4551
10	11.0	860	4574
11	12.0	950	4635
12	13.0	1040	4724
13	14.0	1140	4818
14	15.0	1210	4925
15	16.0	1310	4991
16	17.7	1400	5174

Pumped 691 Bbls of 1% KCl water down 7" casing. Maximum rate 17.7 BPM @ 1400 psig. ISIP - 1100 psig; 5 minutes - 810; 10 minutes - 670; 15 minutes - 580 psig. Job complete 1-21-90.

Observed fall-off for four hours:

<u>Delta Time</u> <u>(Hours)</u>	<u>Pressure</u> <u>(psig)</u>
0.000	4592.60
0.083	4484.90
0.167	4414.70
0.250	4363.30
0.333	4330.50
0.417	4311.80
0.917	4227.50
1.417	4180.70
1.917	4152.70
2.417	4129.30
2.917	4110.60
3.417	4096.50
3.917	4087.20
4.417	4059.10