PROJECT RIO BLANCO
COMPARATIVE POSTDETONATION
HYDROLOGIC TESTING

January 31, 1974

MASTER

by
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SUMMARY

The three nuclear explosives for Project Rio Blanco were detonated at 1000:00.12 $\pm$ 0.01 second, Mountain Daylight Time, or 1600:00.12 $\pm$ 0.01 second, Greenwich Mean Time, on May 17, 1973. The three explosions occurred within the Fort Union and Mesaverde formations at depths of 5,838.5 feet, 6,229.7 feet, and 6,689.5 feet. The three explosions occurred nearly simultaneously as planned and were completely contained. The preliminary indications are that the yields of the three explosives totalled approximately 90 kt. The elevation of the ground at the emplacement well, RB-E-01, is 6,629.9 feet above mean sea level. RB-E-01 is located 1,080.50 feet south of the north line and 1,188.49 feet east of the west line in Section 14, Township 3 South, Range 98 West of 6th P.M., Rio Blanco County, Colorado, which corresponds to geodetic coordinates of 108°21'59" west longitude and 39°47'35" north latitude.

Postdetonation testing was performed in the close-in Rio Blanco wells RB-D-1, -D-2, -D-3, -S-3, and -W-1.

The transmissivities measured in pre- and postdetonation testing are compared in Table 1.

Table 1. Pre- and postdetonation transmissivities.

<u>Well</u>	<u>Zone</u>	<u>Transmissivity (ft²/d)</u>	
		<u>Predetonation</u>	<u>Postdetonation</u>
RB-D-1	B	66(+18)*	108(+32)
RB-D-2	A	763(+229)	4,401(+1,634)
RB-D-3	B	8(+2)	18(+14)
RB-S-3	A	674(+188)	1,603(+898)
RB-W-1	Alluvium	19(+6)	233(+152)

These data show that a very small but statistically significant increase in transmissivity has occurred in the B Zone at the 100-ft location while no significant increase has occurred at the location 1,300 ft from the emplacement well. No statistically significant increase in transmissivity occurred in the A Zone at the 100-ft location, however, and a greater than 3-fold increase in A Zone transmissivity was calculated for the 1,300-ft location. The A and B zones at both locations were below the calculated maximum depth of spall. The greater A Zone increase at the 1,300-ft location is

* Value in parathensis is expected range at a 95-percent or 2-sigma probability level.

attributed to the additive effect of the 3 explosives. The 100-ft location probably experienced a screening effect which reduced the maximum experienced yield to a value intermediate between that produced by 1 or 2 explosives.

The alluvium aquifer exhibited a statistically significant increase in transmissivity of greater than 3-fold. This aquifer was within the spalled region.

The measured changes in water level during the period 1 week pre- to 1 week postdetonation are summarized in Table 2.

Table 2. Water level changes.

<u>Well</u>	<u>Zone</u>	<u>Water Level</u>		<u>Changes</u>
		<u>1 Week Predetonation</u>	<u>1 Week Postdetonation</u>	
RB-D-1	B	43	33	10
RB-D-2	A	Flowing	Flowing	--
RB-D-3	B	12	12	0
RB-S-3	A	40	31	9
RB-W-1	Alluvium	41	38	3

Increases in static water levels were observed in all 3 zones at the 100-ft location while there was little indication of an increase at the 1,300-ft location.

No significant change in storage coefficient was observed in either the A or B zone. No information on storage coefficients in the alluvial aquifer was available.

Interference tests across the Mahogany Zone at both the 100- and 1,300-ft locations showed no postdetonation communication.

Addition testing will be undertaken and the data presented in subsequent reports.

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1. INTRODUCTION

Predetonation Project Rio Blanco hydrologic testing provided information on three aspects of the hydrologic regime in the emplacement well area:

1. Transmissivity and water quality data from each of the three aquifers - alluvium, A aquifer (above the Mahogany Zone), and B aquifer (below the Mahogany Zone).
2. A and B aquifer continuity information resulting from tests of well pairs completed in the same aquifer.
3. A to B aquifer interference testing to determine degree of communication across the Mahogany Zone.

The predetonation testing sequence was replicated by a postdetonation hydrologic testing program. This report presents the results of the postdetonation testing program and compares these results with the information developed and reported predetonation. (1, 2)

2. SUMMARY OF POSTDETONATION HYDROLOGIC TESTING

A. ALLUVIUM AQUIFER

1. Transmissivity

All water level measurements made during this testing sequence were referenced to the top of the casing in Well RB - W - 1, elevation 6,628.80 feet above sea level, location 1,238.48 feet east of the west line, FWL, 961.16 feet south of the north line, FNL, of Section 14, Township 3 South, Range 98 west, 6th primary meridian.

The test conditions and equipment were similar to those used in the predetonation testing.⁽²⁾ The specific data developed during the testing is presented in Tables 3 and 4 and graphically displayed in Figures 1 and 2. The calculated transmissivities are:

$$T1 \downarrow = \frac{0.079 \times 1.021}{0.3} = 269 \text{ ft}^2/\text{d}$$

$$T1 \uparrow = \frac{0.079 \times 1.021}{0.3} = 269 \text{ ft}^2/\text{d}$$

$$T2 \downarrow = \frac{0.079 \times 1.042}{0.3} = 275 \text{ ft}^2/\text{d}$$

$$T2 \uparrow = \frac{0.079 \times 1.042}{0.7} = 118 \text{ ft}^2/\text{d}$$

The $T2 \uparrow$ transmissivity looks low, probably because of the lack of a critical reading at 7-1/2 minutes in the buildup. The average transmissivity is $233 \text{ ft}^2/\text{d}$ and the estimated standard deviation⁽³⁾ is $76 \text{ ft}^2/\text{d}$; hence, at a 95 percent confidence level, the transmissivity is within the interval $233 (\pm 152) \text{ ft}^2/\text{d}$ or 81 to $385 \text{ ft}^2/\text{d}$ (it probably is near $270 \text{ ft}^2/\text{d}$).

The predetonation transmissivity range for RB-W-1 was $19(\pm 6) \text{ ft}^2/\text{d}$ or 13 to $25 \text{ ft}^2/\text{d}$. Thus, there is no overlapping of the transmissivity ranges, and a statistically significant increase in transmissivity has occurred. This is not surprising since the alluvial aquifer is in the spalled region, and the spallation at this depth would be expected

Table 3. Postdetonation Test No. 1, Alluvial Zone, RB-W-1, 7/5/73 to 7/6/73.

<u>Date</u> <u>Time</u>	<u>Meter</u> <u>Reading*</u> <u>(gal.)</u>	<u>Pressure</u> <u>(psig)</u>	<u>t + Δt</u> <u>(days)</u>	<u>Δt</u> <u>(hours)</u>	<u>Δt</u> <u>t + Δt</u>	<u>Remarks</u>
7/5/73						
1515	31,520.4	10.2	0			Start
1516	31,526.8	9.3	0.00069			
1517	31,532.1	8.8	0.00139			
1518	31,537.8	8.5	0.0021			
1520	31,543.5	8.3	0.0035			
1522	31,554.3	8.0	0.0049			
1524	31,565.1	7.9	0.0062			
1527	31,581.5	7.9	0.0083			
1530	31,599.9	7.9	0.010			
1540	31,651.7	7.8	0.017			
1600	31,764.0	7.7	0.031			Conductivity = 1,450 micromhos at 59° F (water level 46.0') Shut-in
1603	31,775.0	7.7	0.033 (hours)	0	0	
1604		8.7	0.817	0.0167	0.021	
1605		9.2	0.833	0.033	0.040	
1606		9.5	0.850	0.05	0.059	
1607		9.7	0.867	0.0667	0.077	
1609		9.9	0.9	0.10	0.11	
1611		10.1	0.93	0.133	0.14	
1615		10.1	1.0	0.20	0.2	
1621		10.2	1.1	0.30	0.27	
7/6/73						
1115		10.2	18.0	17.2	0.96	

*Rate = $\frac{254.6}{48}$ = 5.3 GPM
 = 7,638 GPD
 = 1,021 ft³/d

Table 4. Postdetonation Test No. 2, Alluvial Zone, RB-W-1, 7/9/73.

<u>Time</u> <u>(min)</u>	<u>Meter</u> <u>Reading*</u> <u>(gal.)</u>	<u>Pressure</u> <u>(psig)</u>	<u>t + Δt</u> (days)	<u>Δt</u> <u>(hours)</u>	<u>Δt</u> <u>t + Δt</u>	<u>Remarks</u>
0	0	10.3	0			Start
1	6.0	9.3	0.00069			
2	11.8	8.8	0.00139			
5	28.8	8.1	0.00347			
10.5	59.4	8.0	0.0729			
21	116.2	7.9	0.0146			
30	164.4	8.0	0.0208			
45	244.6	7.9	0.0312			
60	324.7	8.0	0.0417	0		Shut-in
			(hours)			
61		8.8	1.02	0.0167	0.0164	
62		9.4	1.03	0.033	0.032	
65		10.2	1.08	0.083	0.077	
70		10.4	1.167	0.167	0.143	Water level 40.54'
80		10.4	1.333	0.333	0.25	

$$\begin{aligned}
 \text{*Rate} &= \frac{324.7}{60} = 5.41 \text{ GPM} \\
 &= 7.793 \text{ GPD} \\
 &= 1,042 \text{ ft}^3/\text{d}
 \end{aligned}$$

Figure 1. RB-W-1 Postdetonation Test No. 1.

Figure 2. RB-W-1 Postdetonation Test No. 2.

to produce open fracturing with the associated increase in transmissivity.

2. Water Quality

Several water samples were taken during or shortly after the transmissivity tests. The results of the chemical analyses of the water are presented in Table 5 and Figure 3. Following the detonation, the dissolved solids content of the water shifted from a sodium chloride - magnesium calcium sulphate to a fresher sodium chloride - magnesium/calcium sulphate/carbonate. This change probably resulted from a regional freshening of the water, caused by an unusually large winter snowfall and subsequently greater aquifer recharge, and by the increased mixing in this aquifer resulting from the locally increased transmissivity.

3. Water Levels

The static water level in RB - W - 1 was at 38 ft a week after detonation. This was a 9-ft increase from the 47-ft level measured in March. The static water level had declined to 41 ft at the time of the postdetonation transmissivity testing in July 1973. Part of the rise in water level was caused by a regional response to the increased aquifer recharge, but a probable residual detonation-connected increase of 3 ft was measured on May 25, 1973.

B. GREEN RIVER A AQUIFER

1. Transmissivity

Information on the A aquifer was obtained from two wells: RB - D - 02, elevation 6,579.53 ft, location 2,010 ft FWL and 26 ft FSL of Sec 11, T3S, R98W; and RB - S - 03, elevation 6,630 ft, location 1,225 ft FWL and 956 ft FNL of Sec 14, T3S, R98W.

The basic information obtained during the testing of RB - D - 2 is presented in Tables 6 through 8 and displayed graphically in Figures 4 through 6. The calculated transmissivities from the data are:

$$T_2 = \frac{0.079 \times 26,434}{1.1/2.31} = 4,385 \text{ ft}^2/\text{d}$$

$$T_3 = \frac{0.079 \times 26,534}{0.95/2.31} = 5,095 \text{ ft}^2/\text{d}$$

$$T_4 = \frac{0.079 \times 24,477}{1.2/2.31} = 3,722 \text{ ft}^2/\text{d}$$

Table 5. Postdetonation water samples, RB-W-1.

<u>Date</u> <u>Hour</u>	<u>7/5/73</u> <u>1545</u>	<u>7/13/73</u> <u>1445</u>
Conductivity @ 25° (mmhos/cm)	1,900	1,900
Ph	6.8	7.4
Dissolved Solids (ppm)	1,499	1,377
Sodium (Na) (ppm)	263	208
Calcium (Ca) (ppm)	119	112
Magnesium (Mg) (ppm)	103	95
Chloride (Cl) (ppm)	105	94
Sulfate (SO ₄) (ppm)	470	430
Phenol Alkalinity (CaCO ₃) (ppm)	0.0	0.0
Total Alkalinity (CaCO ₃) (ppm)	556	548
Potassium (K) (ppm)	2.0	1.3
Iron (Fe) (ppm)	0.23	0.67
Sulfide (H ₂ S) (ppm)	*	*

* None detected (less than 0.1 ppm).

Figure 3. Diagrammatic representation of pre- and postdetonation water quality.

Table 6. Postdetonation Test No. 2, A Zone, RB-D-2, 7/20/73 to 7/21/73.

<u>Date Time</u>	<u>Meter Reading* (BBL)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u> (days)	<u>Δ t</u> (hours)	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
7/20/73						
1100	14,070	44.2	0			Start
1101	14,074	35.8	0.00069			
1102	14,076	34.8	0.00139			
1103	14,080	34.6	0.00208			Water level 22.0'
1104	14,083	34.5	0.0028			Water level 22.3'
1105	14,086	34.4	0.0035			Water level 22.55'
1110	14,103	34.2	0.0069			Water level 23.0'
1115	14,119	34.1	0.0104			Water level 23.2'
1130	14,168	33.9	0.0208			Water level 23.67'
1145	14,218	33.8	0.0312			Water level 23.75'
1200	14,267	33.8	0.0417			Water level 23.89'
1545	15,004	33.5	0.198			Water level 24.49'
1615	15,102	33.5	0.219			Water level 24.51'
2020	15,925	-	-			Power went off

*Rate = 4,712 BPD
= 26,434 ft³/d

Table 7. Postdetonation Test No. 3, A Zone, RB-D-2, 7/21/73 to 7/22/73.

<u>Date</u> <u>Time</u>	<u>Meter</u> <u>Reading*</u> <u>(BBL)</u>	<u>Pressure</u> <u>(psig)</u>	<u>t + Δ t</u> (days)	<u>Δ t</u> <u>(hours)</u>	<u>Δ t</u> <u>t + Δ t</u>	<u>Remarks</u>
7/21/73						
1305	15,925	44.3	0			On
1306	15,928	36.1	0.00069			Water level 18.66'
1307	15,931	35.0	0.0014			Water level 21.20'
1308	15,934	34.7	0.0021			Water level 21.89'
1310	15,941	34.5	0.0035			Water level 22.36'
1315	15,951	34.4	0.0069			Sample
1318	15,969	34.35	0.0090			Water level 22.70'
7/22/73						
1155			0.951			Water level 24.72'
1202	20,445		0.956			Off (water to surface in 30.6 sec)

*Rate = 4,728 BPD
= 26,524 ft³/d

Table 8. Postdetonation Test No. 4, A Zone, RB-D-2, 7/23/73 to 7/24/73.

<u>Date Time</u>	<u>Meter Reading* (BBL)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u>	<u>Δ t (hours)</u>	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
7/23/73			(days)			
1335	20,445.2	44.3	0			On
1336	20,448.4	36.0	0.00069			
1337	20,451.7	35.0	0.0014			
1338	20,455.0	34.9	0.0021			
1340	20,461.6	34.7	0.0035			Water level 22.1'
1345	20,478.0	34.5	0.0069			Water level 22.44'
1350	20,494.4	34.4	0.0104			Water level 22.68'
1400	20,527.2	34.3	0.0174			Water level 22.93'
1431	20,629.9	34.1	0.0389			Water level 23.3'
1500	20,724.0	34.1	0.059			Water level 23.55'
1600	20,920.8	33.9	0.101			Water level 23.85'
7/24/73						
1205	24,872.3	33.4	0.938			Water level 24.98'
1300	25,051.5	33.4	0.976			Water level 25.10'
						Shut-in (water to surface in 30.9 sec)

$$\begin{aligned}
 \text{*Rate} &= \frac{4,606}{0.976} = 4,720 \text{ BPD} \\
 &= 24,477 \text{ ft}^3/\text{d}
 \end{aligned}$$

Figure 4. RB-D-2 Postdetonation Test No. 2.

Figure 5. RB-D-2 Postdetonation Test No. 3.

Figure 6. RB-D-2 Postdetonation Test No. 4.

The first test was aborted because of repeated power failures. The transmissivities were determined only from the drawdown portion of the tests because the recoveries were too rapid to yield buildup data. The average transmissivity is 4,401 ft²/d and the estimated standard deviation is 817 ft²/d. Thus the "A" zone transmissivity at this location is between 2,766 and 6,036 ft²/d at a 95-percent confidence level.

The predetonation transmissivity of RB - D - 2 was in the range of 534 to 992 ft²/d; hence, there has been a statistically significant increase in transmissivity.

A spinner survey was run in RB - D - 2 on 7/2/73 by Frank Welder, USGS (Figure 7). This survey indicated that only about 10 percent of the flow was coming into the well above the top of the Parachute Creek Member, 383 ft below ground level (GL) and that 50 percent of the flow was coming into the hole at levels more than 600 ft below ground level. Thus, an increase in transmissivity has occurred in the lower half of the A zone at this location. This increase is below the preliminary estimates of the depth of the spill. (4)

The basic information obtained during the postdetonation testing of RB-S-3 is presented in Tables 9 and 10 and graphically displayed in Figures 8 and 9. The calculated transmissivities are:

$$T3 \downarrow = \frac{0.079 \times 2,120}{0.2/2.31} = 1,934 \text{ ft}^2/\text{d}$$

$$T3 \uparrow = \frac{0.079 \times 2,120}{0.25/2.31} = 1,548 \text{ ft}^2/\text{d}$$

$$T4 \downarrow = \frac{0.079 \times 3,104}{0.38/2.31} = 1,010 \text{ ft}^2/\text{d}$$

$$T4 \uparrow = \frac{0.079 \times 2,104}{0.2/2.31} = 1,920 \text{ ft}^2/\text{d}$$

The first and second tests were aborted when they interfered with other activities on the emplacement well pad. The average transmissivity is 1,603 ft²/d, and the estimated standard deviation is 449 ft²/d. The resulting transmissivity is in the range of 705 to 2,501 ft²/d at a 95-percent confidence level. This compares with a predetonation transmissivity range of 486 to 862 ft²/d, hence no statistically significant increase in transmissivity was calculated for this location.

Figure 7. RB-D-2 spinner survey.

Table 9. Postdetonation Test No. 3, A Zone, RB-S-3, 7/9/73 to 7/13/73 .

Date Time	Meter Reading* (gal.)	Pressure (psig)	$t + \Delta t$	Δt (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
7/9/73			(days)			
1000	20,714	16.4	0			Water level 28.1' On
1100	21,377	12.9	0.042			
1230	22,368	12.9	0.104			Water level 35.85'
1400	23,366	12.9	0.167			Water level 36.04'
7/10/73						
1045	37,068	12.9	1.03			Water level 36.09' Off
			(hours)			
1050		14.9	24.83	0.083	0.0033	Water level 33.29'
1055		15.8	24.92	0.167	0.0067	Water level 31.21'
1100		16.9	25	0.25	0.01	Water level 28.67'
1115		17.1	25.25	0.5	0.020	
1130		17.1	25.5	0.75	0.029	
1145		17.1	25.75	1.0	0.039	Water level 28.21'
7/12						
955			71.92	47.17	0.66	Water level 27.98'
7/13						
935			95.58	70.83	0.74	Water level 27.90'

*Rate = 11 GPM
= 15,858 GPD (378 B/D)
= 2,120 ft³/d

Table 10. Postdetonation Test No. 4, A Zone, RB-S-3, 7/18/73 to 7/20/73.

<u>Date Time</u>	<u>Meter Reading (gal.)</u>	<u>Pressure (psig)</u>	<u>t + Δt</u> (days)	<u>Δt (hours)</u>	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
7/18/73 1045	67,358.9	16.4	0			On Water level 28.18'
1046	67,369.8		0.00069			
1046.5		15.6				
1047	67,380.5	15.2	0.0013			Water level 30.93'
1047.5		14.8				
1048	67,390.0	14.6	0.0021			Water level 32.31'
1048.5		14.4				
1050	67,412.1	13.9	0.0035			Water level 33.93'
1050.5		13.9				
1052.5		13.4				Water level 35.16'
1053		13.3				
1055	67,465.0	13.0	0.0009			Water level 36.0'
1055.5		13.0				
1057		13.0				Water level 36.38'
1100	67,517.9	12.75	0.0104			Water level 36.55'
1100.5		12.75				
1102		12.75				Water level 36.60'
1105	67,570.8	12.75	0.0139			Water level 36.60'
1105.5		12.75				
1106.5		12.75				Water level 36.60'
1115	67,677.4	12.70	0.0208			Water level 36.67'
1116		12.7				Water level 36.67'
1116.5		12.7				
1130	67,838.6	12.7	0.031			Water level 36.80'
1131		12.7				Water level 36.80'
1131.5		12.7				

Table 10. Postdetonation Test No. 4, A Zone, RB-S-3, 7/18/73 to 7/20/73. (Cont.)

<u>Date</u> <u>Time</u>	<u>Meter</u> <u>Reading</u> (gal.)	<u>Pressure</u> (psig)	<u>t + Δ t</u>	<u>Δ t</u> (hours)	<u>Δ t</u> <u>t + Δ t</u>	<u>Remarks</u>
7/18/73						
1145	68,005.3	12.7	0.0417			Water level 36.81' Bubble tube ~ 66.15'
1215	68,319.9	12.6	0.0625			Water level 36.95' Bubble tube ~ 65.93'
1245	68,648.2	12.6	0.083			Water level 36.92' Bubble tube ~ 66.03'
1345	69,301.5	12.6	0.125			Water level 36.99' Bubble tube ~ 66.10'
1500	70,121.3	12.7	0.177			Water level 36.64' Bubble tube ~ 65.91'
1600	70,778.5	12.75	0.219			Water level 36.50'
2400		12.35	0.552			
7/19/73						
1010	82,713.8	12.7	0.983			Water level 36.76'
1115	83,424.7	12.7	1.021	0		Water level 36.76' Off
			(hours)			
1116		13.4	24.52	0.0167	0.00068	Water level 35.01'
1117		13.9	24.53	0.033	0.00135	Water level 33.93'
1118		14.4	24.55	0.05	0.00204	Water level 32.85'
1120		14.9	24.58	0.83	0.0034	Water level 31.65'
1125		15.65	24.67	0.167	0.0068	Water level 30.03'
1130		15.95	24.75	0.25	0.0101	Water level 29.21'
1135		16.1	24.83	0.33	0.0133	Water level 28.78'
1145		16.3	25.0	0.5	0.02	Water level 28.44'

Table 10. Postdetonation Test No. 4, A Zone, RB-S-3, 7/18/73 to 7/20/73. (Cont.)

<u>Date Time</u>	<u>Meter Reading (gal.)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u>	<u>Δ t (hours)</u>	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
1200		16.35	25.25	0.75	0.030	Water level 28.25'
1215		16.4	25.5	1.0	0.039	Water level 28.17'
1245		16.4	26.0	1.5	0.058	Water level 28.08'
1315		16.45	26.5	2.0	0.075	Water level 28.04'
1415		16.5	27.5	3.0	0.109	Water level 27.99'
1515		16.5	28.5	4.0	0.140	Water level 27.98'
7/20/73						
1000		16.5	47.25	22.75	0.481	Water level 27.88'

Figure 8. RB-S-3 Postdetonation Test No. 3.

Figure 9. RB-S-3 Postdetonation Test No. 4.

2. A Zone Water Quality

Water samples were collected and analyzed. The postdetonation analytical results are presented in Table 11. The average dissolved solids content of the water is about 700 ppm. This is not significantly different from the predetonation average of 666 ppm.

3. A Zone Water Levels

The static water level at the 1,300-ft RB-D-2, RB-D-3 location was above the top of casing (+ 2 ft GL), and the well was flowing predetonation at a rate of about 10 GPM. The RB-D-2 well was plugged with a packer from about a week predetonation to a week postdetonation. When the packer was removed, the well started to flow at a rate of about 50 GPM. The RB-D-2 well was subsequently shut in and a static pressure of 3.5 psig was measured. The flow rate and static pressure declined to about 20 GPM and 2.3 psig, respectively, in a 2-month period following detonation.

Water levels at the RB-S-3 location increased from about 40 ft a week prior to the detonation to about 31 ft a week after the detonation. The static water level continued to rise slowly during June and July 1973 and was less than 28 ft at the end of the period.

C. GREEN RIVER B AQUIFER

1. Transmissivities

Information on the B aquifer was obtained from two wells: RB-D-1 (elevation 6,629.68 ft and located 1,212 ft FWL and 975 ft FNL of Sec 14, T3S, R98W) and RB-D-3 (elevation 6,579.69 ft and located 1,990 ft FWL and 2 ft FSL of Sec 11, T3S, R98W).

Table 11. Postdetonation A Zone water quality information.

<u>RB - S - 3</u>								
Date (1973)	7/2	7/2	7/5	7/13	7/31	8/3	8/29	<u>Avg</u>
Conductivity @25°C (mmhos/cm)	750	750	700	800	930	800	850	694
Ph	7.8	7.9	7.9	8.2	7.9	7.8	7.9	
ΣSolids (ppm)	643	640	759	692	811	641	671	
Na (ppm)	185	185	201	192	200	176	200	
Ca (ppm)	6	8	15	7	22	11	15	
Mg (ppm)	12	10	15	8	13	11	10	
Cl (ppm)	13	11	18	16	10	5	9	
SO4 (ppm)	30	27	110	35	150	40	35	
CaCO3 (phenol) (ppm)	-	-	4	36	16	10	36	
CaCO3 (Total) (ppm)	400	404	408	432	432	408	414	
Fe (ppm)	1.6	1.5	2.1	0.8	5.0	0.1	0.7	
H2S (ppm)	-	-	-	-	-	-	-	
K (ppm)	1	1	1	-	1	1	2	
<u>RB - D - 2</u>								
Date (1973)	6/6	6/22	7/2	7/21	7/27	8/2	8/29	<u>Avg</u>
Conductivity @25°C (mmhos/cm)	940	860	850	950	960	820	930	703
Ph	1.7	7.8	7.6	7.9	8.0	8.5	7.9	
ΣSolids (ppm)	744	697	678	694	722	701	684	
Na (ppm)	210	200	190	190	193	188	215	
Ca (ppm)	8	11	8	18	22	11	16	
Mg (ppm)	16	16	14	11	14	10	0	
Cl (ppm)	13	9	10	10	9	7	10	
SO4 (ppm)	75	68	76	53	56	70	39	
CaCO3 (phenol) (ppm)	-	-	-	8	20	50	48	
CaCO3 (Total) (ppm)	430	404	388	430	450	424	380	
Fe (ppm)	-	0.1	-	-	0.1	1.5	0.3	
H2S (ppm)	-	-	-	-	-	-	-	
K (ppm)	-	-	-	-	-	-	40	

The basic information obtained from the postdetonation testing of RB - D - 1 is presented in Tables 12 through 14 and Figures 10 through 12. The calculated transmissivities are:

$$T1 \downarrow = \frac{0.079 \times 5.190}{4.0} = 103 \text{ ft}^2/\text{d}$$

$$T1 \uparrow = \frac{0.079 \times 5.190}{3.2} = 128 \text{ ft}^2/\text{d}$$

$$T2 \uparrow = \frac{0.079 \times 5.065}{4.4} = 91 \text{ ft}^2/\text{d}$$

$$T3 \downarrow = \frac{0.079 \times 5.682}{10/2.31} = 104 \text{ ft}^2/\text{d}$$

$$T3 \uparrow = \frac{0.079 \times 5.682}{9.2/2.31} = 113 \text{ ft}^2/\text{d}$$

The average transmissivity is 108 ft²/d and the standard deviation is 16 ft²/d. Thus, the B Zone postdetonation transmissivity in the emplacement well area is between 92 and 124 ft²/d, at a 95 percent confidence level. This compares with a predetonation range of 48 to 84 ft²/d. Hence, a small but statistically significant increase in transmissivity has occurred in this location.

The basic information obtained from the postdetonation testing of RB - D - 3 is presented in Tables 15 and 16 and in Figures 13 and 14. The calculated transmissivities are:

$$T2 \downarrow = \frac{0.079 \times 1.851}{14.8/2.31} = 23 \text{ ft}^2/\text{d}$$

$$T2 \uparrow = \frac{0.079 \times 1.851}{23.2/2.31} = 15 \text{ ft}^2/\text{d}$$

$$T3 \downarrow = \frac{0.079 \times 1.951}{32/2.31} = 11 \text{ ft}^2/\text{d}$$

$$T3 \uparrow = \frac{0.079 \times 1.951}{14/2.31} = 25 \text{ ft}^2/\text{d}$$

Table 12. Postdetonation Test No. 1, B Zone, RB-D-1, 6/5/73 to 6/29/73.

Date Time	Meter Reading* (BBL)	Pressure (psig)	$t + \Delta t$ (days)	Δt (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
6/5/73						
1530	2,991	49.9	0			Started Water level 29.96'
1545	3,001	43.8	0.010			
1600	3,010	42.4	0.021			
1615	3,020	41.2	0.031			Conductivity = 1,500 micromhos at 70°F
1630		40.7	0.042			
1700		39.9	0.062			
1800		38.8	0.104			
2000		37.6	0.188			
2400		36.3	0.354			
6/6/73						
800	3,613	35.3	0.688			
1300	3,804	34.9	0.896			
1800		34.9	1.104			
2400		34.5	1.354			
6/7/73						
600		33.9	1.604			
1200		33.7	1.854			
6/10/73						
1200		33.1	4.854			
2400		33.1	5.354			
6/11/73						
1505	8,520	33.1	5.983			
1600	8,561	33.1	6.021	0		Shut-off

*Rate = 925 BPD
= 5,190 ft³/d

Table 12. Postdetonation Test No. 1, B Zone, RB-D-1, 6/5/73 to 6/29/73. (Cont.)

<u>Date Time</u>	<u>Meter Reading* (BBL)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u> (hours)	<u>Δ t</u> (hours)	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
1615		39.9	144.75	0.25	0.0017	
1630		41.9	145.0	0.50	0.0034	
1645		43.1	145.25	0.75	0.0052	
1700		44.5	145.5	1.0	0.0069	
1800		45.1	146.5	2.0	0.0137	
1900		45.8	147.5	3.0	0.0203	
2000		46.2	148.5	4.0	0.0269	
2200		46.8	150.5	6.0	0.0399	
2400		47.1	152.5	8.0	0.0525	
6/12/73						
400		47.7	156.5	12	0.0767	
800		47.9	160.5	16	0.0997	
1000		48.2	162.5	18	0.1108	Water level 32.81'
1200		48.8	164.5	20	0.1216	
1500		48.7	167.5	23	0.1373	Water level 31.21'
1800		48.9	170.5	26	0.1525	
2400		49.2	176.5	32	0.1813	
6/13/73						
800		49.5	184.5	40	0.2168	
940		49.3	186.2	41.67	0.2238	Water level 29.59'
1430		49.5	191.0	-		
1600		49.5	192.5	-		
2400		49.5	200.5	56	0.2793	
6/14/73						
1100		49.8	211.5	67	0.3168	

*Rate = 925 BPD
= 5,190 ft³/d

Table 12. Postdetonation Test No. 1, B Zone, RB-D-1, 6/5/73 to 6/29/73. (Cont.)

<u>Date</u> <u>Time</u>	<u>Meter</u> <u>Reading*</u> <u>(BBL)</u>	<u>Pressure</u> <u>(psig)</u>	<u>t + Δ t</u> <u>(hours)</u>	<u>Δ t</u> <u>(hours)</u>	<u>Δ t</u> <u>t + Δ t</u>	<u>Remarks</u>
6/15 900		50.1	233.5	89	0.381	Water level 27.6'
6/20 1040		50.8	355.2	266.2	0.749	Water level 26.28'
6/29 1030		51.8	571.2	482.1	0.844	

* Rate = 925 BPD
= 5,190 ft³/d

Table 13. Postdetonation Test No. 2, B Zone, RB-D-1, 6/29/73 to 7/2/73.

Date Time	Meter Reading* (BBL)	Pressure (psig)	$t + \Delta t$ (days)	Δt (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
6/29/73						
1030	8,594	51.8	0			Started
1045		47.0	0.010			
1100		45.5	0.021			
1150	8,645	42.8	0.055			
1220	8,667	42.0	0.070			
1645	8,830	38.9	0.177			
2400	-	38.7	0.562			Conductivity = 2,200 micromhos at 79°F
6/30/73						
930	9,468	36.8	0.958			Sample Shut-in
1105	9,518	39.9	1.024			
1115	9,524	38.7	1.03	0	-	
			(hours)			
1130		44.0	25	0.25	0.01	
1145		45.5	25.25	0.5	0.02	
1200		46.1	25.5	0.75	0.029	
1215		47.0	25.75	1.0	0.039	
1315		48.1	26.75	2.0	0.075	
1500		49.3	28.5	3.75	0.132	
1800		50.5	31.5	6.75	0.214	
2400		50.9	37.5	12.75	0.34	
7/1/73						
600		50.5	43.5	18.75	0.43	
1200		51.0	49.5	24.75	0.5	
1800		51.8	55.5	30.75	0.55	
2400		51.0	61.5	36.75	0.60	

7/1/73 - 7/2/73

Cycled between 50.6 and 52.0 psig

$$\begin{aligned}
 \text{*Rate} &= 930/1.03 = 902.9 \text{ BPD} \\
 &= 5,065 \text{ ft}^3/\text{d}
 \end{aligned}$$

Table 14. Postdetonation Test No. 3, B Zone, RB-D-1, 7/16/73 to 7/19/73.

Date Time	Meter Reading* (gal.)	Pressure (psig)	$t + \Delta t$ (days)	Δt (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
7/16/73						
1115	37,068	37.8	0			On Water level 24.00'
1116	37,100	37.2	0.00069			
1117	37,130	37.0	0.00139			
1120	37,223	35.8	0.0035			
1125	37,343		0.0069			
1130	37,494	31.6	0.0104			
1145	37,947	30.8	0.0208			
1150		29.2	0.0243			Water level 42.68'
1200	38,398	28.6	0.0312			
1230	39,744	28.4	0.0521			
1300	40,184	28.4	0.0625			
1315	40,580		0.0833			
1400	42,387	7.2	0.115			Water level 50.00' Ran new bubble tube.
1430	42,858	6.8	0.135			
1445		6.8	0.146			
1500	43,775	6.6	0.198			Water level 52.00'
1700		5.9	0.240			
2100		5.3	0.406			
7/17/73						
400		4.3	0.698			
800		3.8	0.865			
1115	79,571.7	3.6	1.0	0		Shut-in Water level 59.39'
			(hours)			
1120		8.0	24.083	0.083	0.0034	
1125		9.2	24.167	0.167	0.0069	

*Rate = 5,682 ft³/d

Table 14. Postdetonation Test No. 3, B Zone, RB-D-1, 7/16/73 to 7/19/73. (Cont.)

<u>Date Time</u>	<u>Meter Reading* (gal.)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u>	<u>Δ t (hours)</u>	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
1130		10.2	24.25	0.25	0.0103	
1145		11.8	24.5	0.5	0.0204	Water level 42.78'
1200		12.8	24.75	0.75	0.0303	Water level 38.29'
1215		13.4	25.0	1.0	0.040	Water level 36.45'
1315		14.8	26.0	2.0	0.077	Water level 33.47'
1415		15.4	27.0	3.0	0.111	Water level 31.39'
1800		16.7	30.75	6.75	0.220	
2400		17.0	36.75	12.75	0.347	
7/18/73						
1000		17.9	46.75	22.75	0.487	Water level 25.36'
1415		17.95	51.0	27.0	0.529	Water level 25.19'
7/19/73						
1015		18.5	71.0	47.0	0.662	Water level 24.36'

*Rate = 5,682 ft³/d

Figure 10. RB-D-1 Postdetonation Test No. 1.

Figure 11. RB-D-1 Postdetonation Test No. 2.

Figure 12. RB-D-1 Postdetonation Test No. 3.

Table 15. Postdetonation Test No. 2, B Zone, RB-D-3, 7/25/73 to 7/28/73.

Date Time	Meter Reading* (BBL)	Pressure** (psig)	t + Δ t (days)	Δ t (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
7/25/73 1205	9,704	40.5 (s)				On Water level 2.46' Bubble tube 96.02'
1207		31.0 (s)	0.0014			Water level 24.41'
1208		27.1 (s)	0.0021			Water level 33.42'
1210		19.7 (s)	0.0035			Water level 50.51'
1215		4.3 (s)	0.0069			Water level 86.09'
1220		50.6 (l)	0.0104			
1235		44.0 (l)	0.0208			Water level 167.59'
1250		33.4 (l)	0.0312			Water level 192.08'
1323	9,724	25.0 (l)	0.0542			Water level 211.48'
1400		23.8 (l)	0.0799			Water level 214.25'
1500		21.8 (l)	0.122			Water level 218.87'
1700		20.8 (l)	0.205			Water level 221.18'
1900		19.8 (l)	0.288			Water level 223.49'
2200		19.2 (l)	0.413			Water level 224.88'
2400		19.0 (l)	0.497			Water level 225.34'
7/26/73 600		18.0 (l)	0.747			Water level 227.65'
910	9,992	16.1 (l)	0.878			Water level 232.04'
1000		16.3 (l)	0.913			Water level 231.79'
1120	10,021	16.6 (l)	0.969			Water level 230.83'
1135	10,025	16.6 (l)	0.979			Water level 230.73'
1210	10,033	16.6 (l)	1.003	0		Shut-in

*Rate = 330 BPD
= 1,851 ft³/d

** (s) = short bubble tube, (l) = long bubble tube

Table 15. Postdetonation Test No. 2, B Zone, RB-D-3, 7/25/73 to 7/28/73. (Cont.)

Date Time	Meter Reading* (BBL)	Pressure** (psig)	t + Δ t (hours)	Δ t (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
1211		19.0 (l)	24.1	0.0167	0.00069	Water level 225.34'
1212		21.0 (l)	24.03	0.033	0.00137	Water level 220.72'
1213		23.0 (l)	24.05	0.05	0.0021	Water level 216.10'
1215		26.8 (l)	24.08	0.083	0.0034	Water level 207.32'
1216.75		29.7 (l)	24.11	0.1125	0.0047	Water level 200'
1220		35.5 (l)	24.167	0.167	0.0069	Water level 187.22'
1228		47.0 (l)	24.3	0.30	0.0123	Water level 160.66'
1230		49.4 (l)	24.33	0.33	0.0136	Water level 155.12'
1256		1.0 (s)	24.77	0.767	0.031	Water level 93.71'
1300		3.5 (s)	24.92	0.92	0.037	Water level 87.94'
1311.33			25.106	1.02	0.041	Water level 75'
1315		11.1 (s)	25.167	1.08	0.043	Water level 70.38'
1320		13.2 (s)	25.25	1.167	0.046	Water level 66.38'
1325		14.9 (s)	25.33	1.25	0.049	Water level 62.31'
1330		16.5 (s)	25.42	1.33	0.052	Water level 58.74'
1346		20.2 (s)	25.68	1.6	0.062	Water level 48.71'
1400		22.8 (s)	26.0	1.92	0.074	Water level 44.01'
1530		30.0 (s)	27.42	3.33	0.12	Water level 28.59'
1643		32.2 (s)	28.63	4.55	0.159	Water level 23.20'
1800		34.2 (s)	29.92	5.83	0.195	Water level 17.02'
2000		35.6 (s)	31.92	7.83	0.245	Water level 13.78'
2400		37.0 (s)	35.92	11.83	0.329	Water level 10.55'
7/27/73						
600		38.2 (s)	41.92	17.83	0.425	Water level 7.78'
1000		38.4 (s)	45.92	21.83	0.475	Water level 7.57'
1555			51.83	27.75	0.535	Water level 6.38'
7/28/73						
1125			71.42	47.33	0.663	Water level 4.43'

*Rate = 330 BPD
= 1,851 ft³/d

** (s) = short bubble tube, (l) = long bubble tube

Table 16. Postdetonation Test No. 3, B Zone, RB-D-3, 7/28/73 to 7/30/73.

Date Time	Meter Reading* (BBL)	Pressure** (psig)	$t + \Delta t$ (days)	Δt (hours)	$\frac{\Delta t}{t + \Delta t}$	Remarks
7/28/73						
1130	10,033	39.8 (s)	0			Start
						Water level 4.43'
1131		34.8 (s)	0.00069			Water level 15.63'
1132		31.4 (s)	0.0014			Water level 23.49'
1133		26.2 (s)	0.0021			Water level 35.50'
1135	10,035	17.4 (s)	0.0035			Water level 55.83'
1140	10,037	2.8 (s)	0.0069			Water level 90.71'
1142	10,039	33.2 (s)	0.0104			Long tube in
1200	10,044	44.4 (l)	0.0208			Water level 166.67'
1215	10,048	33.4 (l)	0.031			Water level 192.08'
1230	10,052	27.4 (l)	0.042			Water level 205.94'
1330	10,067	20.6 (l)	0.083			Water level 221.64'
1400		19.3 (l)	0.104			Water level 224.65'
1500		18.0 (l)	0.146			Water level 227.65'
1700		16.9 (l)	0.229			Water level 230.19'
1900		16.2 (l)	0.312			Water level 231.81'
2400		14.9 (l)	0.521			Water level 234.81'
7/29/73						
800		13.9 (l)	0.854			Water level 237.12'
1200	10,388	13.8 (l)	1.0208	0		Water level 237.35'
						Shut-in
			(hours)			
1201		16.0 (l)	24.52	0.0167	0.00069	Water level 232.27'
1202		18.8 (l)	24.53	0.033	0.0013	Water level 225.80'
1203		20.8 (l)	24.55	0.05	0.0020	Water level 221.18'
1205		24.8 (l)	24.58	0.083	0.0034	Water level 211.94'
1210		33.6 (l)	24.67	0.167	0.0068	Water level 191.61'
1215		41.4 (l)	24.75	0.25	0.0101	Water level 173.60'
1245		0.2 (l)	25.25	0.75	0.0297	

*Rate = 348 BPD
= 1,951 ft³/d

** (s) = short bubble tube, (l) = long bubble tube

Table 16. Postdetonation Test No. 3, B Zone, RB-D-3, 7/28/73 to 7/30/73. (Cont.)

<u>Date Time</u>	<u>Meter Reading* (BBL)</u>	<u>Pressure (psig)</u>	<u>t + Δ t</u>	<u>Δ t (hours)</u>	<u>$\frac{\Delta t}{t + \Delta t}$</u>	<u>Remarks</u>
1300		7.8 (s)	25.5	1.0	0.039	Water level 78' ~
1330		17.8 (s)	26.0	1.5	0.058	Water level 54.90'
1400		23 (s)	26.5	2.0	0.075	Water level 42.89'
1500		27.7 (s)	27.5	3.0	0.109	Water level 32.03'
1700		32.3 (s)	29.5	5.0	0.169	Water level 21.41'
1900		33.0 (s)	31.5	7.0	0.22	Water level 19.79'
2400		35.0 (s)	36.5	12.0	0.329	Water level 15.17'
7/30/73						
600		36.5 (s)	42.5	18.0	0.424	Water level 11.71'
1135		38.1 (s)	48.083	23.58	0.49	Water level 8.08'
1540			52.167	27.67	0.53	Water level 7.24'

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*Rate = 348 BPD
= 1,951 ft³/d

Figure 13. RB-D-3 Postdetonation Test No. 2.

Figure 14. RB-D-3 Postdetonation Test No. 3.

The average transmissivity is $18 \text{ ft}^2/\text{d}$ and the standard deviation is $7 \text{ ft}^2/\text{d}$. Thus, the B Zone transmissivity at this location is between 4 and $32 \text{ ft}^2/\text{d}$. The predetonation range was 6 to $11 \text{ ft}^2/\text{d}$. Thus, there is no statistically significant change in transmissivity although a small increase probably occurred.

2. Water Quality

A number of water samples were taken from the RB-D-1 and RB-D-3 wells postdetonation. The water analysis data is presented in Tables 17 and 18. The dissolved solids are predominately sodium-carbonate and the quality did not change significantly from pre- to postdetonation.

3. Water Levels

An extrapolation of the RB-D-1 static water levels back to early postdetonation time yields a level of about 30 ft below the top of casing of 6,600 ft above sea level. This compares with a predetonation static level of 42.9 ft. Thus, there appears to be a 10-ft detonation-connected increase in the static water level. The static water level appears to be rising, probably because of the increased recharge.

An extrapolation of the static water level at the RB-D-3 location to early postdetonation time yields a value of about 12 ft. This compares with a predetonation level of about 12 ft, measured on 5/10/73. The level then rose to the surface in the month following the detonation.

Thus on June 18, 1973, the water level at the RB-D-3 location was about 6,570 ft and at the RB-D-1 location (EW) at 6,604 ft.

Table 17. Results of postdetonation water analyses, RB-D-1.

Date	6/5	6/22	6/30	7/13	7/16	7/21	8/3
Conductivity @25°C (mmhos/cm)	1,600	1,600	2,400	1,420	2,170	2,270	2,250
Ph	7.1	7.9	7.6	7.7	7.8	7.8	7.8
Σ Solids (ppm)	1,249	1,391	1,824	1,248	1,950	1,988	1,990
Na (ppm)	190	430	580	375	600	630	630
Ca (ppm)	78	8	8	4	9	9	11
Mg (ppm)	86	5	2	1	3	4	3
Cl (ppm)	13	7	6	13	4	9	2
SO ₄ (ppm)	490	5	10	35	25	1	2
CaCO ₃ (phenol) (ppm)	0	0	0	0	0	40	24
CaCO ₃ (total) (ppm)	470	944	1,224	824	1,316	1,340	1,350
Fe (ppm)	-	0.4	0.1	1.4	0.42	0.7	0.9
H ₂ S (ppm)	-	-	-	ND	ND	ND	ND
K (ppm)	-	-	2	1	2	3	2

Table 18. Results of postdetonation water analyses, RB-D-3.

Date	7/2	7/31	8/2
Conductivity @25°C (mmhos/cm)	1,550	2,000	2,010
Ph	7.7	8.1	8.0
Σ Solids (ppm)	1,146	1,782	1,847
Na (ppm)	360	565	560
Ca (ppm)	6	11	16
Mg (ppm)	8	13	9
Cl (ppm)	8	8	1
SO ₄ (ppm)	4	3	15
CaCO ₃ (phenol) (ppm)	0	20	36
CaCO ₃ (total) (ppm)	764	1,192	1,260
Fe (ppm)	0.6	1.0	0.2
H ₂ S (ppm)	-	ND	ND
K (ppm)	0	0	2

D. INTERFERENCE TESTING

1. Mahogany Zone Continuity

Communication between the A and B zones through the Mahogany Zone or via permeable paths associated with the wells was tested by pumping one well of a pair of nearby wells, one of which is completed above and one below the Mahogany Zone. Two pairs are available, RB-D-1 and RB-S-3 at the EW pad and RB-D-2 and RB-D-3 at the satellite location about 1,300-ft northwest of the EW.

The RB-D-1 well, a B Zone completion, was pumped for a 5-day period while recording the water level in RB-S-3, an A Zone completion located about 25 ft to the north. The water level in RB-S-3 increased at an average rate of about 0.1 ft per day during the period of pumping in RB-D-1. The water level in RB-S-3 continued to increase at about the same rate for 2 days following pumping. At this time the rise in water level slowed down as the static level of about 28 ft was approached. Thus, there was no indication of communication between the wells during this test. Pumping RB-S-3 and recording the water level in RB-D-1 likewise yielded no indication of communication.

The most sensitive test of communication between wells at the RB-D-2, RB-D-3 location occurred when RB-D-2 was pumped at the time the water level in RB-D-3 had just reached the top of the casing. No reduction in water level was observed during the 1-day pumping test, and a change of as little as 0.01 ft would have been apparent.

Thus, there is no indication of postdetonation communication across the Mahogany Zone.

2. A Zone Testing

Water level changes in the RB-S-3 well during pump tests in the RB-D-2 well were observed. The water level, rate, and time information was analyzed to determine whether any significant change in the storage capacity was apparent when pre- and postdetonation values are compared. The calculated transmissivities and storage coefficients are:

	<u>Transmissivity</u> <u>(ft²/d)</u>	<u>Storage</u> <u>Coefficient</u>
Predetonation	766	$2.2 (+1.8) \times 10^{-3}$
Postdetonation	3,577(+1,600)	$1.0 (+0.9) \times 10^{-3}$

The pre- and postdetonation storage coefficients are not significantly different at the 95-percent probability level. The pre-and postdetonation transmissivities compare favorably with the calculated single well values.

3. B Zone Testing

Only one pre- and one postdetonation storage coefficient test was made in the B Zone. The calculated values are:

	<u>Transmissivity</u> <u>(ft²/d)</u>	<u>Storage</u> <u>Coefficient</u>
Predetonation	62	1.0×10^{-3}
Postdetonation	577	0.1×10^{-3}

The pre- and postdetonation coefficients are not too different. The predetonation transmissivity compares favorably with single well values; however, the calculated postdetonation transmissivity is much higher than any single well value. This raises some doubt as to the validity of the calculated postdetonation storage coefficient.

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4. Project Rio Blanco "Project Directors Completion Report D+30 Days (Detonation Related Activities)", NVO-135, July 1973, pp 8.