UMTRA
Ground Water Project

Calculations referenced in the Final Site Observational Work Plan for the UMTRA Project New Rifle Site

November 1999

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URFL000517

Technical Task Cover Sheet

Discipline Hydrogeology **Number of Sheets** Lots

Project:
UMTRA Groundwater

Site:
New Rifle

Subject:
New Rifle Aquifer Test Data Analyses

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Anderson, M.P., and W.W. Woessner, 1992. Applied Groundwater Modeling, Simulation of Flow and Advective Transport, Academic Press, San Diego, CA.

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USDOE, 1996. Site Observational Work Plan for the UMTRA Project Sites at Rifle, Colorado, Rev. 0.

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New Rifle Aquifer and Recovery Test

Introduction

Aquifer tests were completed at the New Rifle site to collect the hydrogeologic data necessary to characterize the alluvial aquifer. These data were collected to assist in the selection and design of a suitable remedial action for clean up of contaminated groundwater in the vicinity of the former tailings location. Analysis of the data provides a range of transmissivity and associated hydraulic conductivity estimates for the alluvial aquifer. A second objective of the aquifer test was to determine if the alluvial aquifer and the underlying unit, the Wasatch Formation, are hydraulically connected.

Aquifer tests were completed using newly installed wells 200, 201, and 202 as the pumping wells and surrounding wells as observation wells. Locations of each well cluster are shown on Figure 1. These tests were conducted between August and September 1998 and consisted of a pumping and recovery phase, both of which lasted various lengths of time.

Procedure

Aquifer and recovery tests were completed at the well 200 cluster, well 201 cluster, and well 202 cluster. Each test's procedure will be discussed separately.

Well 200 Aquifer and Recovery Test

Two tests were completed at this location, both of which consisted of pumping groundwater from well 200 and monitoring drawdown in observation wells 602, 603, and 195. Well 200 is screened over the bottom ~20 ft of the alluvial aquifer. Well 602 (located 20.9 ft south of the pumping well) is screened for only ~5 ft near the top of the alluvial aquifer. Because of the depth of the screened interval in relation to the pre-test water level surface elevation, the water level in well 602 dropped below the bottom of the screen shortly after the start of each test. As a result, the drawdown and recovery data collected from this observation well could not be analyzed to determine the hydraulic parameters. Well 603 (located 29.3 ft south of well 200) is screened over a ~5 ft interval closer to the bottom of the aquifer. Similar to well 200, well 195 (located 48.2 ft east of well 200) is also screened over the bottom ~20 ft of the alluvium.

Table 1 lists the top and bottom elevations of the screened interval (ft MSL), zone of completion, static water level, and distance from the pumping well for the well cluster. Figure 2 shows a plan view of the well 200 cluster and a cross-section showing the distances between the four wells, screened intervals, the pre-test water table elevation, and the alluvium-Wasatch contact elevation.

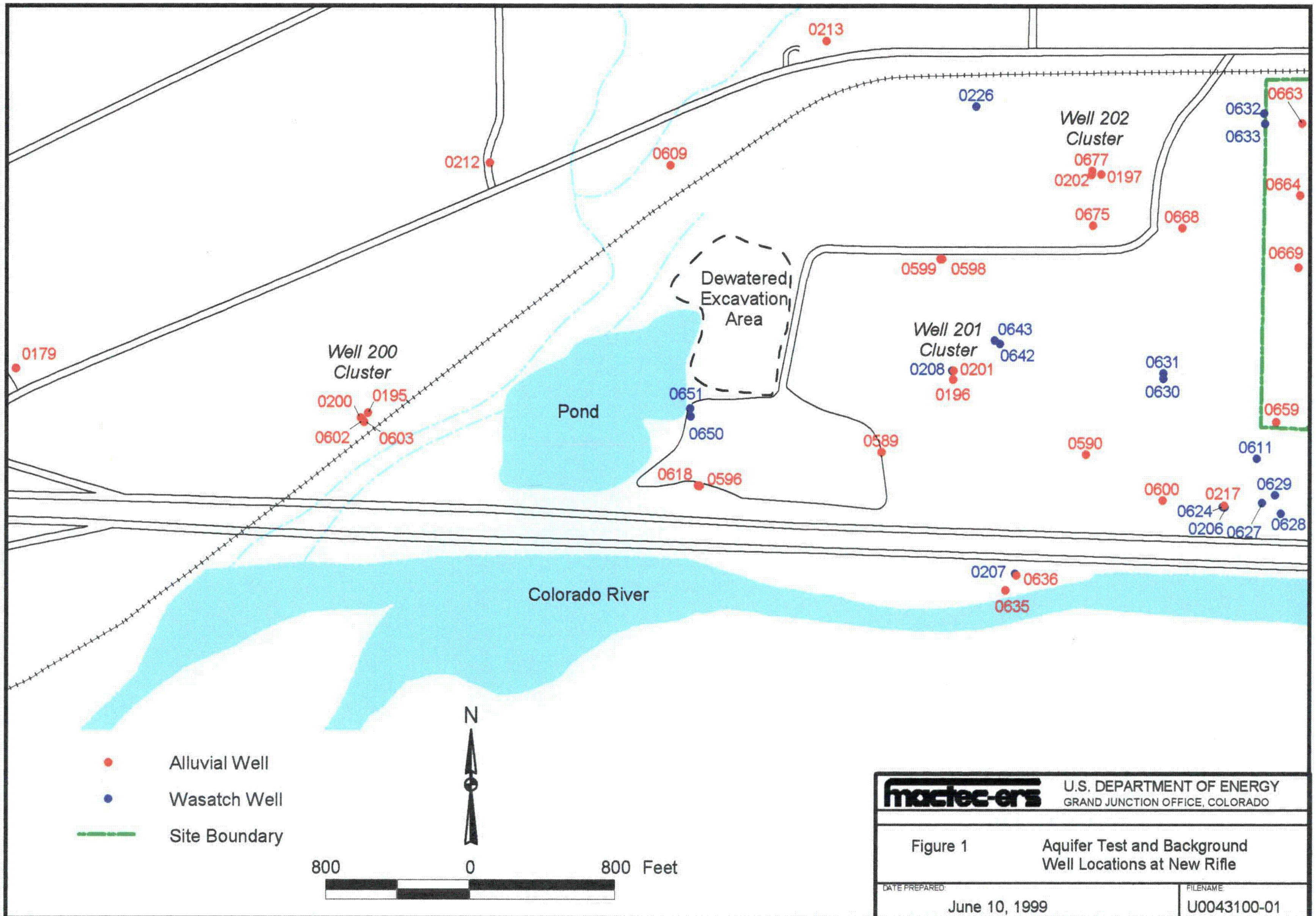

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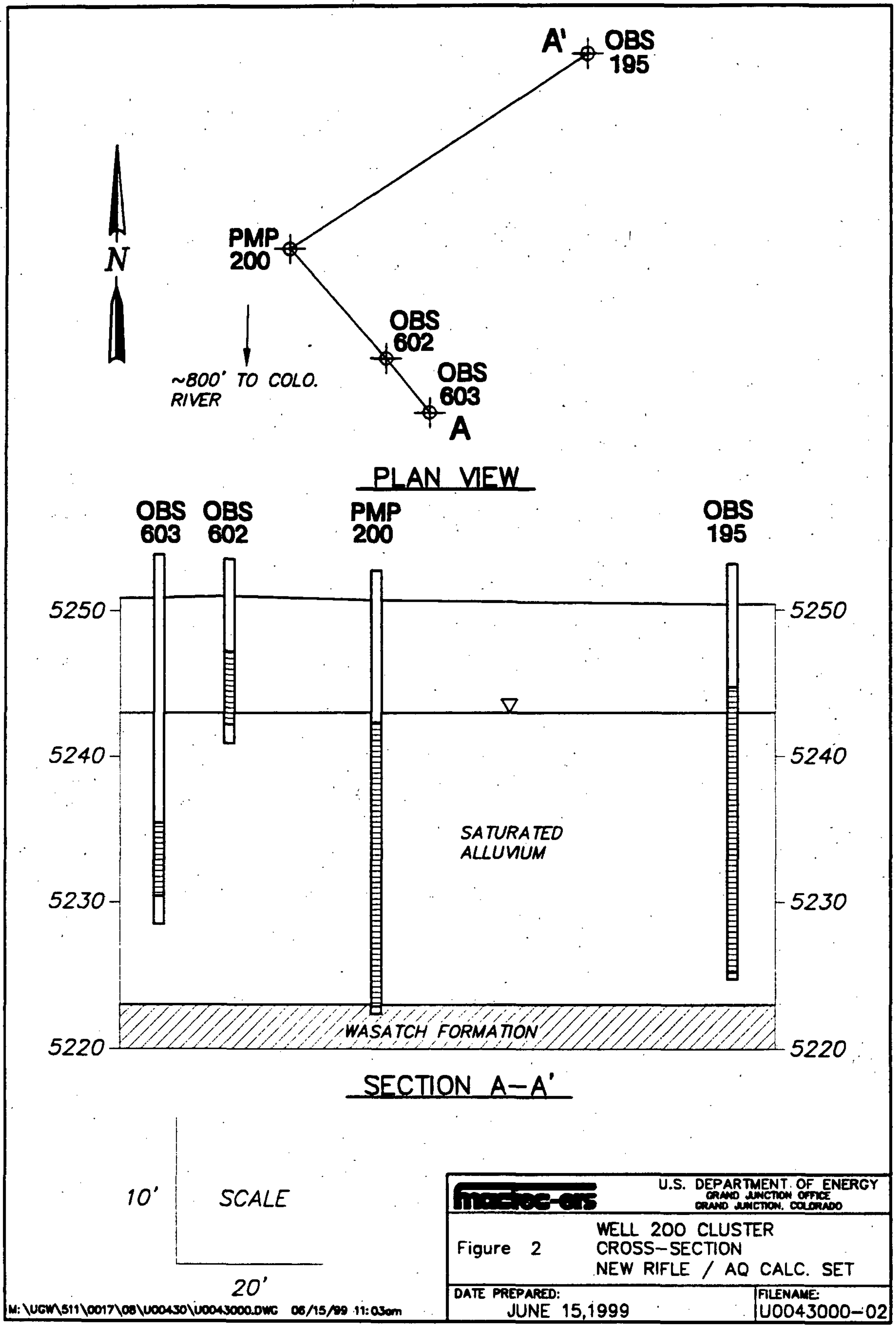
Figure 1



A'
OBS 195
N
PMP 200
OBS 602
OBS 603
A
~800' TO COLO. RIVER
PLAN VIEW
OBS 603
OBS 602
PMP 200
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SATURATED ALLUVIUM
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Figure 2
WELL 200 CLUSTER
CROSS-SECTION
NEW RIFLE / AQ CALC. SET
DATE PREPARED:
JUNE 15,1999
FILENAME:
U0043000-02

Table 1. The 200 Aquifer Test Well Cluster Construction Information

Well No.	Well Diameter ---- Well Type	Top of Screened Interval (ft MSL)	Bottom of Screened Interval (ft MSL)	Zone of Completion	Pre-test WL (ft MSL) 9/14/98	Distance to Well 200 (ft)
200	4 in pumping	5242.31	5222.85	Al	5243.07	NA
602	2 in observation	5247.18	5242.18	Al	5243.19	20.9
603	2 in observation	5235.39	5230.39	Al	5243.14	29.3
195	4 in observation	5244.72	5225.26	Al	5243.19	48.2

Note: WL = Water Level
MSL = Mean Sea Level

Aquifer thickness was calculated by subtracting the water-table elevation from the elevation of the alluvial aquifer-weathered Wasatch contact. This contact in the vicinity of the well 200 cluster location is at an elevation of ~5,224 ft MSL. With a pre-test water table surface elevation of ~5,243 ft MSL at the time the tests were conducted, the alluvial aquifer saturated thickness was ~19 ft.

Pressure transducers were installed in each of the four wells to measure the water level change in each well over the aquifer test periods and throughout the recovery tests. Water levels were measured intermittently by hand (using a well sounder) to confirm the accuracy of the pressure transducers. Each pressure transducer was connected to an eight-channel Hermit 3000 data logger which was programmed using In-Situ, Inc., software (Win-Situ, Version 2.13, 1996) from a laptop computer.

Water levels were also monitored in nearby wells (located outside of the estimated cone of depression) to measure background water table fluctuations prior to, during, and after the aquifer tests and subsequent recovery tests were completed. For the tests completed at the well 200 cluster, wells 179, 212, and 609 were monitored to measure background water table fluctuations in the alluvial aquifer (Figure 1).

The bottom of the intake line for an above ground suction lift pump was set at approximately 20 ft below top of casing (btoc) in well 200. The discharge line was fitted with a control valve (used to control the pump discharge) immediately followed by a flow meter to monitor the flow rate (in gpm) during the pumping period.

The estimated sustainable pumping rate (approximately 55 gpm) was determined by a step test conducted on September 10, 1998. During this step period, the well was pumped at rates of 10, 25, 40, and 55 gpm for approximately one hour at each rate. Water level data collected from the step test and the associated analysis are included in this calculation set.

Pumping for the first test was started on September 14, 1998, at 12:11. After just under 19 hrs of pumping, it was apparent the pumping rate (52.6 gpm) was set too high to sustain a constant rate longer than 24 hrs. As a result, the pump was shut off at 07:05 on September 15, 1998, and the water levels were allowed to recover with 95 percent of the initial water level prior to starting the second test. Recovery data were collected from the time the pump was shut off during the first test until 14:10 on September 15, 1998.

The second test, set at a lower rate (44.5 gpm) compared to the first test, was started at 14:15 on September 15, 1998, and stopped at 16:30 after over 50 hrs of pumping on September 17, 1998. Recovery data were collected from that point until September 21, 1998, at 10:10. All water produced from both tests was transported via polyvinyl chloride (PVC) pipe 110 ft to the west of the test location and discharged using spray evaporation equipment.

Well 201 Aquifer and Recovery Test

Two tests were completed at the well 201 cluster, both of which consisted of pumping groundwater from well 201 and monitoring drawdown in observation wells 196 and 208. Both wells 201 and 196 (well 196 is located 49.9 ft south of well 201) are screened over the bottom ~15 ft of the alluvial aquifer. Well 208 (located 9.8 ft west of well 201) has a ~10 ft screened interval near the top of the Wasatch.

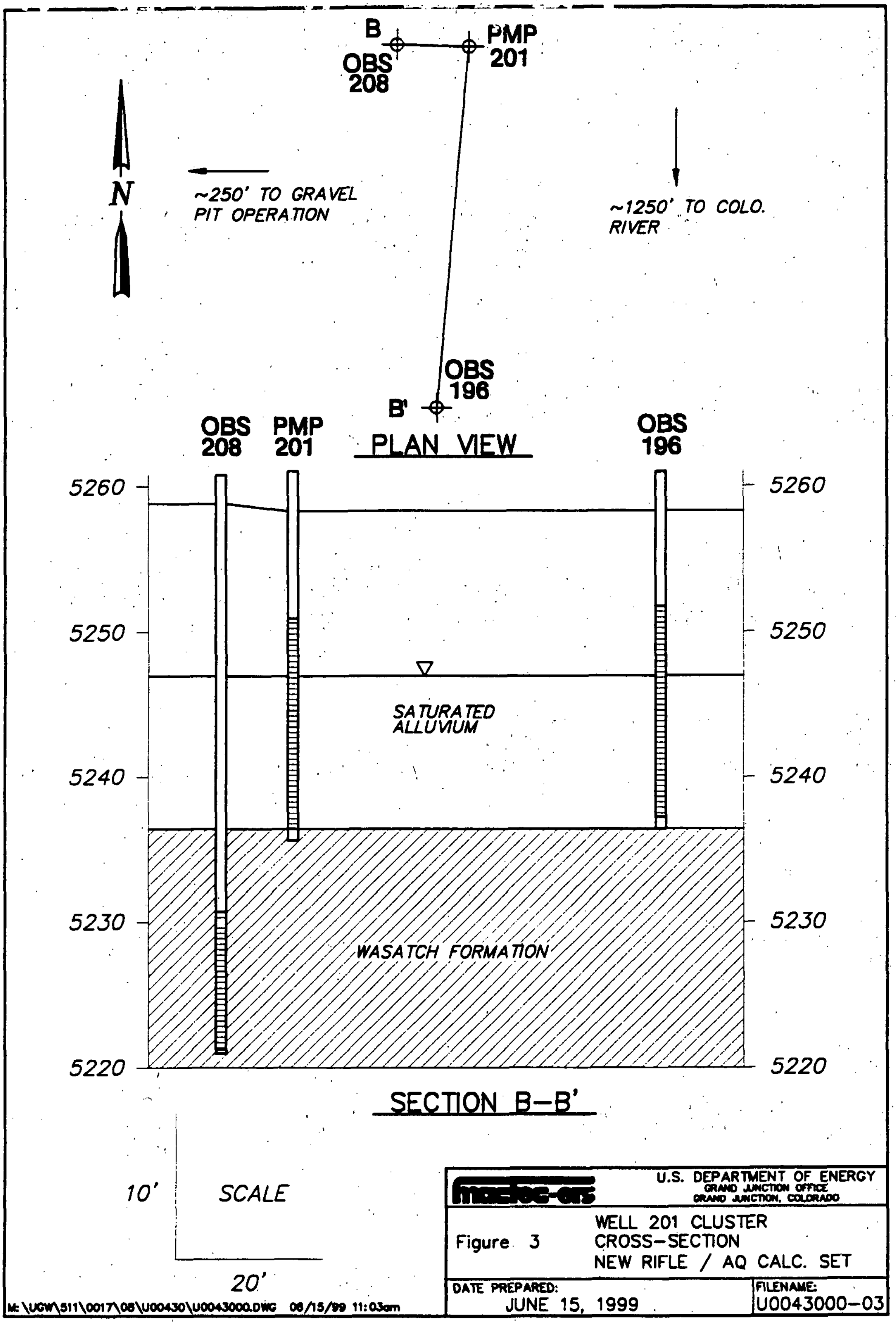
Table 2 lists the top and bottom elevations of the screened interval (ft MSL), zone of completion, static water level, and distance from the pumping well for the well cluster. Figure 3 shows a plan view of the well cluster and a cross-section showing the distances between the three wells, screened intervals, the static water table elevation, and the alluvium-Wasatch contact elevation.

Table 2. The 201 Aquifer Test Well Cluster Construction Information

Well No.	Well Diameter ----- Well Type	Top of Screened Interval (Ft MSL)	Bottom of Screened Interval (ft MSL)	Zone of Completion	Pre-test WL (ft MSL) 8/31/98	Distance to Well 201 (ft)
201	4 in pumping	5250.92	5236.41	Al	5247.11	NA
208	4 in observation	5230.68	5221.28	Ws	5247.22	9.8
196	4 in observation	5251.73	5237.27	Al	5247.14	49.9

Note: WL = Water Level
MSL = Mean Sea Level

Aquifer thickness was calculated by subtracting the water-table elevation from the elevation of the alluvial aquifer-Wasatch contact. This contact in the vicinity of the well 201 cluster location is at an elevation of ~5,237 ft MSL. With a pre-test water table surface elevation of ~5,247 ft MSL at the time the tests were conducted, the saturated alluvial aquifer thickness was ~10 ft.


B
OBS 208
PMP 201
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~250' TO GRAVEL PIT OPERATION
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OBS 196
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WASATCH FORMATION
SECTION B-B'
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20'
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO
Figure 3
WELL 201 CLUSTER
CROSS-SECTION
NEW RIFLE / AQ CALC. SET
DATE PREPARED:
JUNE 15, 1999
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Pressure transducers were installed in each of the three wells to measure the water level change in each well over the aquifer test periods and throughout the recovery tests. Water levels were measured intermittently by hand (using a well sounder) to confirm the accuracy of the pressure transducers. Each pressure transducer was connected to an eight-channel Hermit 3000 data logger which was programmed using In-Situ, Inc., software (Win-Situ, Version 2.13, 1996) from a laptop computer.

Water levels were also monitored in nearby wells (located outside of the estimated cone of depression) to measure background water table fluctuations prior to and after the aquifer tests and subsequent recovery tests were completed. Wells 675, 589, 590, 599 (all of which are screened in the alluvial aquifer), and well 642 (which is screened in the Wasatch) were monitored to measure background water level fluctuations. The location of these background wells is shown in Figure 1.

The bottom of the intake line for an above ground suction lift pump was set at approximately 20 ft btoc in well 201. The discharge line was fitted with a control valve (used to control the pump discharge) immediately followed by a flow meter to monitor the flow rate (in gpm) during the pumping period.

The estimated sustainable pumping rate (approximately 15 gpm) was determined by a step test conducted on August 27, 1998. During the step test, well 201 was pumped at rates of 5, 15, and 20 gpm for approximately one hour at each rate. A second step test was completed on September 9, 1998, with pumping rates of 5, 10, and 15 gpm for approximately one hour at each rate. Data from this second test, which was completed using better control over the pumping rates compared to the first test, were used for the analysis to determine the specific capacity of well 201. A copy of the water level data collected from the second step test and associated analysis are included in this calculation set.

Pumping for the first test was started on August 31, 1998, at 11:30. After 13.3 hrs of an inconsistent pumping rate, it was decided to stop the test, monitor the recovery, and re-start the aquifer test. The pump was stopped at 00:40 on September 1, 1998, and recovery data were collected until 08:35 on the same day at which point the water level recovered to within 95 percent of the initial water level. The second test (with a pumping rate of 12.5 gpm) was started at 08:45 on September 1 and stopped at 08:45 on September 5, 1998, after 96 hrs of pumping. Recovery data were collected until September 8, 1998, at 10:30. All water produced from these tests was transported via PVC pipe 200 ft to the south of the test location and discharged using spray evaporation equipment.

Well 202 Aquifer and Recovery Test

Two tests were also completed at this location, both of which consisted of pumping groundwater from well 202 and monitoring drawdown in observation wells 677 and 197. Well 202 is screened over the bottom ~20 ft of the alluvial aquifer. Well 677 (located 21.3 ft north of the pumping well) has a screened interval of only ~5 ft near the top of the alluvium, and did not provide drawdown data that could be analyzed because the water level dropped below the bottom of the screen during the tests. Well 197 (located 51.9 ft east of well 202) is screened ~20 ft over the base of the alluvial aquifer.

Table 3 lists the top and bottom elevations of the screened interval (ft MSL), zone of completion, static water level, and distance from the pumping well for the well cluster. Figure 4 shows a plan view of the well 202 cluster and a cross-section showing the distances between the wells, screened intervals, the pre-test water table elevation, and the alluvium-Wasatch contact elevation.

Table 3. The 202 Aquifer Test Well Cluster Construction Information

Well No.	Well Diameter ---- Well Type	Top of Screened Interval (Ft MSL)	Bottom of Screened Interval (ft MSL)	Zone of Completion	Pre-test WL (ft MSL) 8/13/98	Distance to Well 200 (ft)
202	4 in pumping	5252.63	5233.17	Al	5251.55	NA
677	2 in observation	5254.31	5249.71	Al	5251.64	21.3
197	4 in observation	5256.51	5237.05	Al	5251.96	51.9
675	2 in observation	5254.96	5248.36	Al	5251.12	279

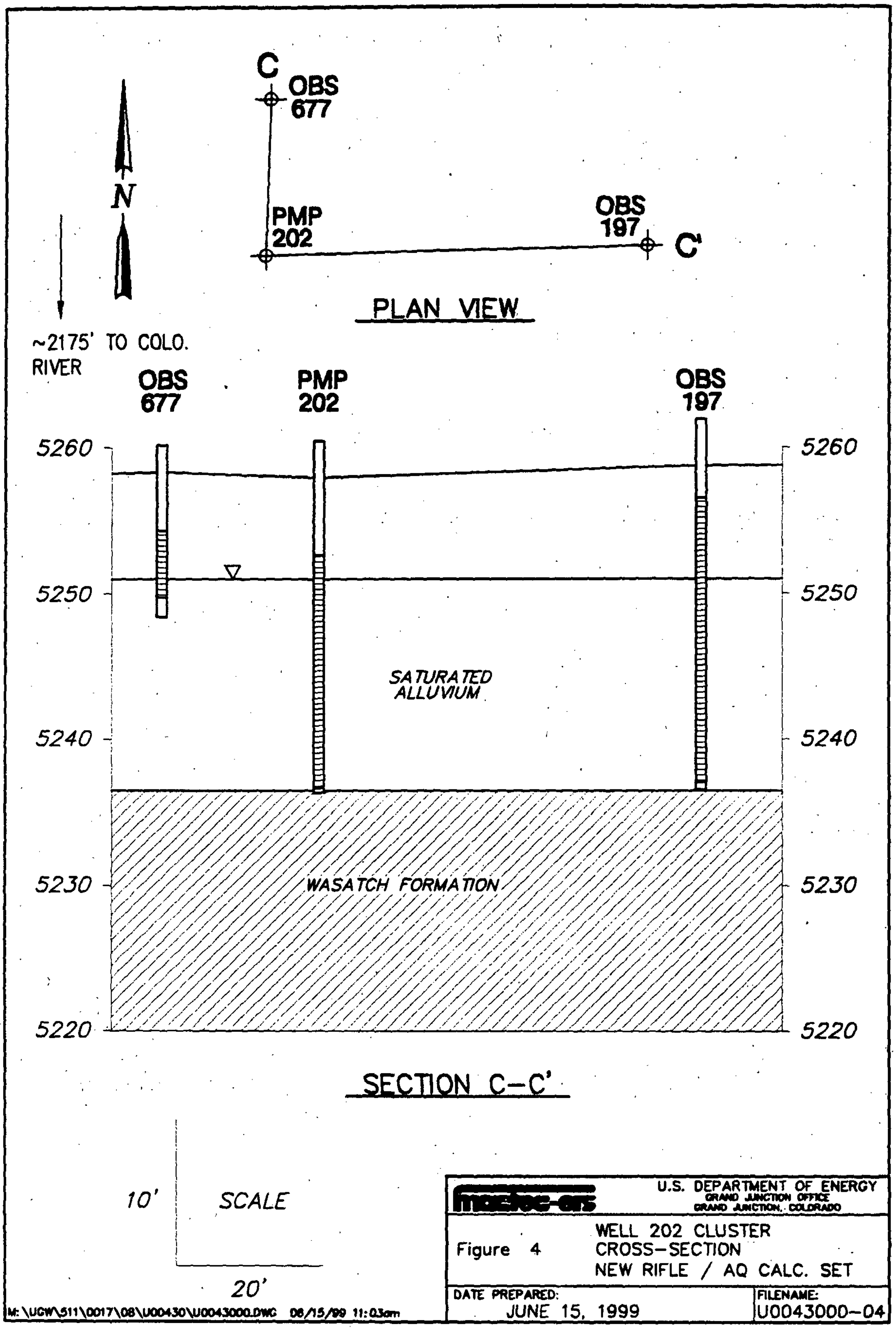
Note: WL = Water Level
MSL = Mean Sea Level

Aquifer thickness was calculated by subtracting the water-table elevation from the elevation of the alluvial aquifer-Wasatch contact. This contact in the vicinity of the well 202 cluster location is at an elevation of ~5,236 ft MSL. With a pre-test water table surface elevation of ~5,251 ft MSL at the time the tests were conducted, the saturated alluvial aquifer thickness was ~14.5 ft.

Pressure transducers were installed in each of the three wells to measure the water level change in each well over the aquifer test periods and throughout the recovery tests. Water levels were measured intermittently by hand (using a well sounder) to confirm the accuracy of the pressure transducers. Each pressure transducer was connected to an eight-channel Hermit 3000 data logger which was programmed using In-Situ, Inc., software (Win-Situ, Version 2.13, 1996) from a laptop computer.

Water levels were also monitored in nearby wells (located outside of the estimated cone of depression) to measure background water table fluctuations prior to and after the aquifer tests and subsequent recovery tests were completed. Alluvial wells 675, 599, 668, and Wasatch well 632 were monitored to measure water table fluctuations in the alluvial aquifer and the Wasatch. During the course of the two aquifer tests, drawdown was noted in background alluvial well 675, located 279 ft from the pumping well. Well construction details for this well are included in Table 3.

The bottom of the intake line for an above ground suction lift pump was set at approximately 19 ft btoc in well 202. The discharge line was fitted with a control valve (used to control the pump discharge) immediately followed by a flow meter to monitor the flow rate (in gpm) during the pumping period.


C
OBS 677
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OBS 197
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~2175' TO COLO. RIVER
OBS 677
PMP 202
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Figure 4
WELL 202 CLUSTER
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The estimated sustainable pumping rate (approximately 95 gpm) was determined by a step test conducted on August 12, 1998. During the step test at this location, well 202 was pumped at rates of 50, 75, and 95 gpm for approximately one hour at each pumping rate. A copy of the water level data collected during the step test and associated analysis are included in this calculation set.

Pumping for the first test was started on August 13, 1998, at 15:30. A leak in the discharge line 30 ft from the pumping well developed after the test was started, and it was decided to quickly stop the test after only 22 hrs of pumping. Recovery data were collected from the time the pump was shut off at 13:30 on August 14, 1998, until 12:15 on August 17, 1998. The second test (with a pumping rate of 80.5 gpm) was started (after the leak was fixed) at 16:00 on August 17 and ran for a total of 44 hrs. Recovery data were collected from 12:00 on August 19, 1998 (the time at which the pump was shut off) until August 25, 1998, at 10:25. All water produced from these tests was transported via PVC pipe 200 ft to the north of the well cluster and discharged using spray evaporation equipment.

Analytical Methods

To determine the hydraulic parameters of the alluvial aquifer, the drawdown data collected from alluvial observation wells were analyzed by a number of different methods. Recovery data collected from alluvial observation wells and pumping wells were also analyzed to determine the hydraulic parameters of the alluvial aquifer.

All observation well drawdown data were analyzed by the Theis Method (Theis, 1935), the Cooper and Jacob Time-Drawdown method (Cooper and Jacob, 1946), and the Neuman Semi-Log Method (Neuman, 1975). Analysis of the data using Neuman□s Semi-Log Method allowed for the estimation of the aquifer specific yield.

If the drawdown data exhibited a delayed yield type of curve, then the data were also analyzed using Neuman□s Delayed Yield Method (both the log and semi-log methods are described by Neuman, 1975). Drawdown data showing a leaky aquifer type curve were also analyzed using the Hantush Method (Hantush and Jacob, 1955). Recovery data were analyzed using the Theis and Jacob Recovery Method (Theis, 1935) and the Neuman Semi-Log Recovery Method (Neuman, 1975).

Hydraulic conductivity estimates were calculated by dividing transmissivities derived by the data analysis of the drawdown and recovery data by the aquifer thickness. With the exception of the Neuman Semi-Log Method, all data analyses were completed using curve-matching techniques available through the "AquiferTest" software package (Röhrich and Waterloo Hydrogeologic, Inc., Version 2.52).

Results

At each location two tests were conducted, the second of which lasted longer compared to the first test and therefore provides a better estimate of the hydraulic parameters. In most cases, the results were similar. Where the tests provided drastically different results, more emphasis should be placed on the results provided by the data collected during the second test. Results of the tests conducted at well clusters 200, 201, and 202 will be discussed separately.

Well 200 Aquifer and Recovery Test

During the first test, a total volume of 59,683 gal of groundwater was pumped from Al well 200 over a period of 18.9 hrs (1134 min), which resulted in an average discharge of 52.6 gpm. The pumping phase of the second test produced 134,056 gal over 50.3 hrs (3015 min), or an average discharge of 44.5 gpm.

Water level data collected from the observation wells during test 1 indicated well 603 had 0.1 ft of drawdown after only 0.5 min of pumping from well 200, while well 195 had 0.1 ft of drawdown after 1.6 min. Test 2 data showed well 603 responded with 0.1 ft of drawdown after 0.6 min of pumping from well 200, while well 195 responded with 0.1 ft of drawdown after 1.6 min of pumping. The small difference between the two tests can be attributed to the different pumping rates used for the two tests. In both tests, the initial response was almost immediate.

At the end of the pumping period in test 1, there was 9.95 ft of total drawdown in pumping well 200, 2.83 ft of drawdown in observation well 603, and 2.24 ft of drawdown in observation well 195. At the end of test 2 (which had the lower pumping rate over a longer period of time compared to test 1) there was 9.23 ft of drawdown in the pumping well, 1.64 ft of drawdown in well 603, and 1.39 ft of drawdown in well 195. Figures 5 and 6 provide graphic displays of the response to pumping in wells 200, 603, and 195 for tests 1 and 2, respectively. Copies of the water level data collected during these tests are included in this calculation set.

During the aquifer and recovery tests there was less than 0.01 ft of water table fluctuation measured in background wells 179 and 212. A fluctuation of 0.45 ft was measured in well 609; however, the water level in this well is believed to be influenced by the dewatering activities associated with the gravel pit operations. Based on these small water level changes measured in wells 179 and 212, it was not necessary to correct the drawdown data.

Drawdown data collected from wells 603 and 195 exhibited a leaky aquifer type of curve. The data collected during the test do not allow for the determination of the source of the leakage (since no wells in this cluster are completed in the underlying unit). As a result, the leakage may be from either the underlying unit or the result of the cone of depression intersecting a surface water body. Hydraulic parameters from the aquifer test analyses are summarized in Table 4. Graphs showing the drawdown and recovery data analyses using the various methods are included in this calculation set.

Table 4. Well 200 Aquifer and Recovery Test Data Analyses Results

Analytical Method	Obs 603 T (ft^2/day)	Obs 603 K (ft/day)	Obs 603 Sy	Obs 195 T (ft^2/day)	Obs 195 K (ft/day)	Obs 195 Sy	Pmp 200 T (ft^2/day)	Pmp 200 K (ft/day)
TEST 1 (Q = 52.6 gpm)								
Drawdown Data								
Theis	1800	95	NA	1138	60	NA	NA	NA
Jacob-Cooper	2693	142	NA	2765	145	NA	NA	NA
Hantush	1014	53	NA	1276	67	NA	NA	NA
Neuman semi-log	2184	115	0.0007	2320	122	0.0022	NA	NA
Recovery Data								
Theis & Jacob	2045	108	NA	1858	98	NA	1286	68
Neuman semi-log	2062	109	NA	1802	95	NA	1768	93
TEST 2 (Q = 44.5 gpm)								
Drawdown Data								
Theis	1211	64	NA	1915	101	NA	NA	NA
Jacob-Cooper	5227	275	NA	4032	212	NA	NA	NA
Hantush	1211	64	NA	1512	80	NA	NA	NA
Neuman semi-log	3652	192	0.00007	3739	196	0.0006	NA	NA
Recovery Data								
Theis & Jacob	1872	99	NA	2347	124	NA	1094	58
Neuman semi-log	1963	103	NA	2574	136	NA	1083	57

Notes: Q - Discharge
Obs = Observation Well
Pmp = Pumping Well
T = Transmissivity
K = Hydraulic Conductivity
Sy = Specific Yield

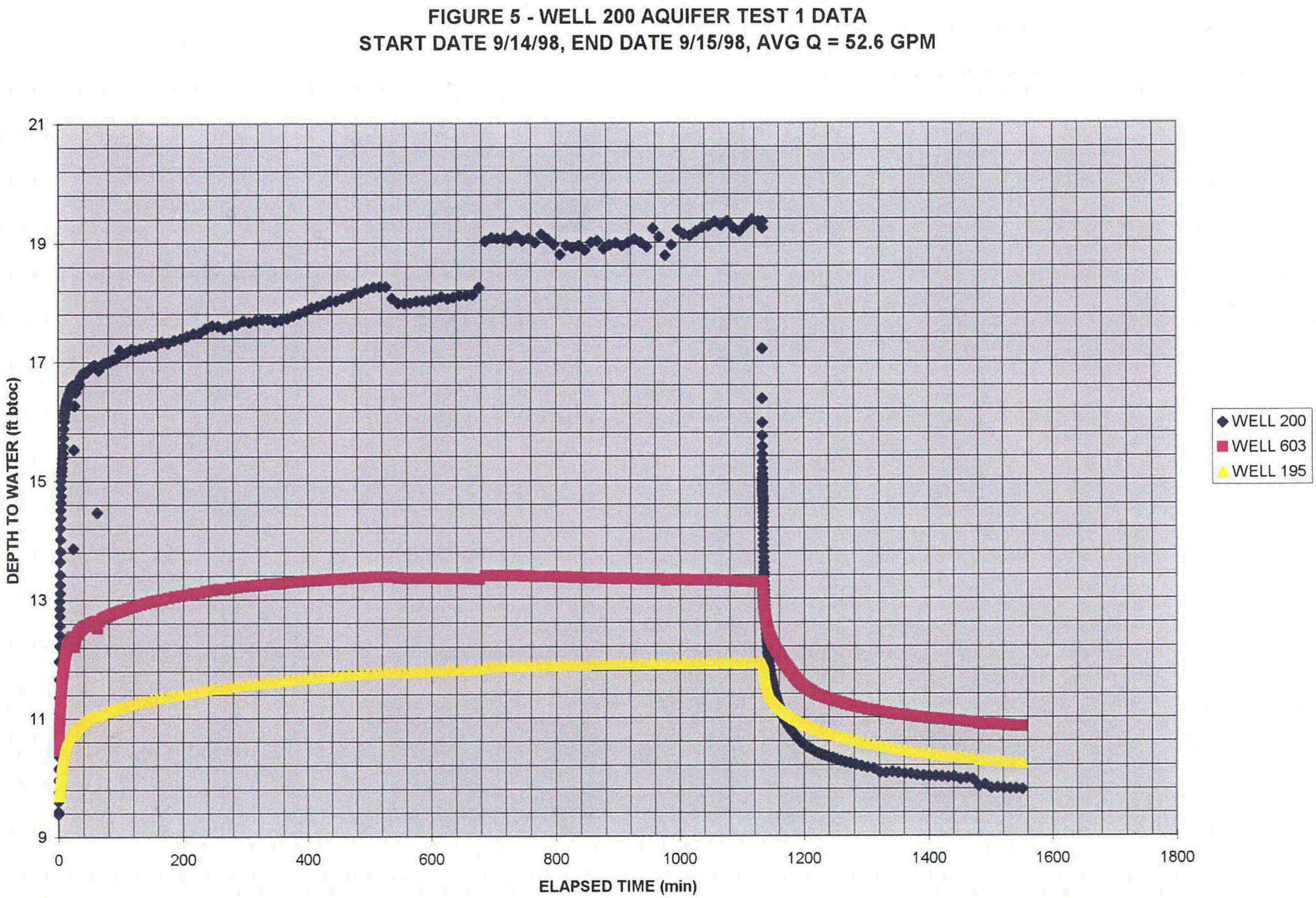
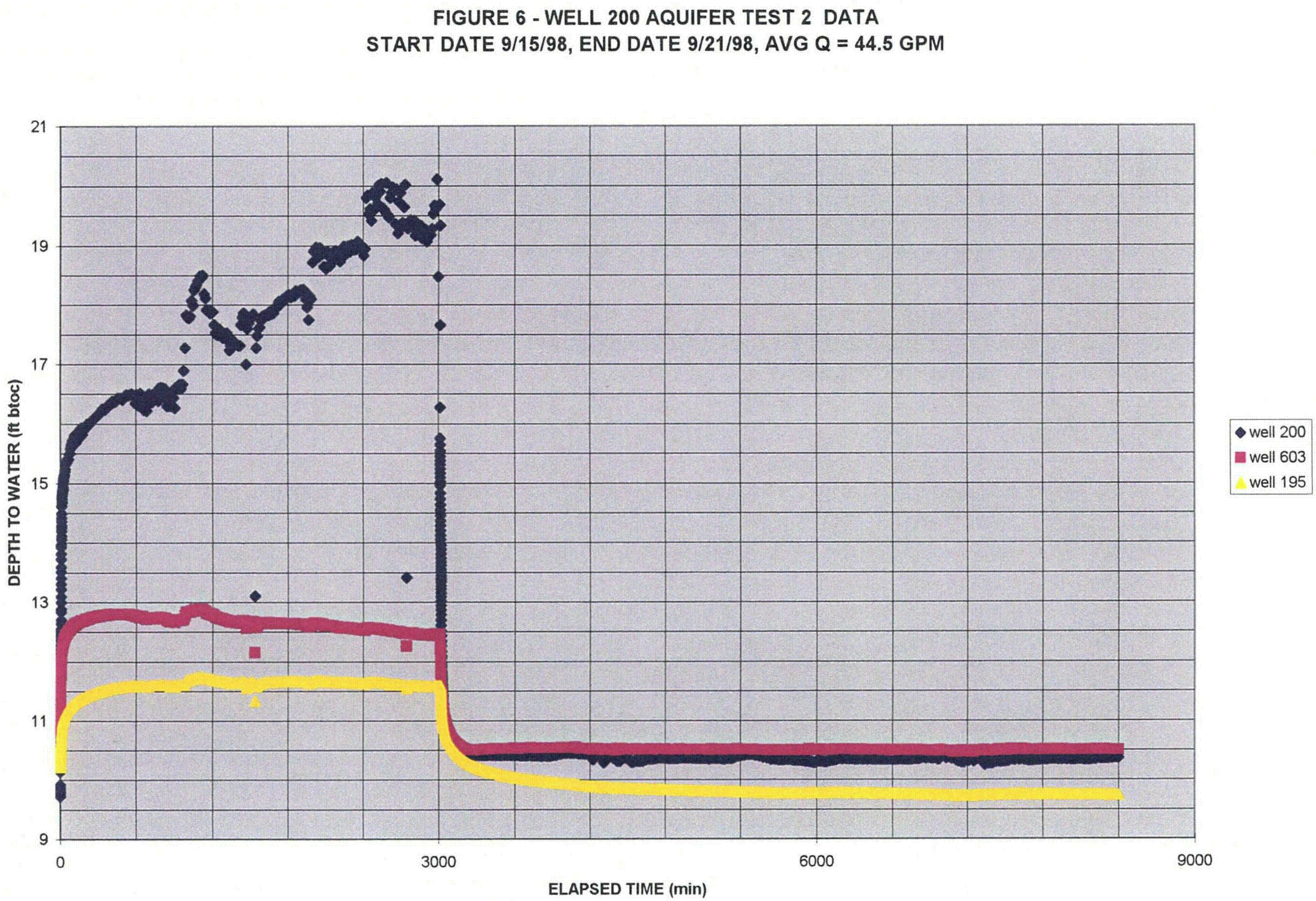


FIGURE 5 - WELL 200 AQUIFER TEST 1 DATA
START DATE 9/14/98, END DATE 9/15/98, AVG Q = 52.6 GPM
DEPTH TO WATER (ft btoc)
ELAPSED TIME (min)
21
19
17
15
13
11
9
0
200
400
600
800
1000
1200
1400
1600
1800
WELL 200
WELL 603
WELL 195



Calculation No. U0042800

Data collected from well 603 during the first aquifer test suggest the transmissivity ranges from 1,014 to 2,693 ft^2/day (which translates into a hydraulic conductivity range from 53 to 142 ft/day) with an estimated specific yield of 0.0007. The analyses of data collected from well 195 data suggest the transmissivity ranges from 1,138 to 2,765 ft^2/day (or a hydraulic conductivity ranging from 60 to 145 ft/day) and a specific yield of 0.0022.

Recovery data collected from the two observation wells and the pumping wells suggest the transmissivity ranges from 1,286 to 2,062 ft^2/day, which is equivalent to a hydraulic conductivity range of 68 to 109 ft/day.

Analyses of drawdown data collected from well 603 during the second aquifer test suggest the transmissivity ranges from 1,211 to 5,227 ft^2/day (or a hydraulic conductivity range from 64 to 275 ft/day) and a specific yield of 0.00007. Analyses of drawdown data collected from well 195 during the same time frame suggest the transmissivity ranges from 1,512 to 4,032 ft^2/day (hydraulic conductivity range of 80 to 212 ft/day) with a specific yield of 0.0006.

Recovery data collected from the two observation wells and the pumping wells during the second test suggest the transmissivity ranges from 1,083 to 2,574 ft^2/day, which is equivalent to a hydraulic conductivity range of 57 to 136 ft/day.

According to the analysis of the drawdown data collected in well 200 during the step test, the specific capacity of the pumping well is 1.05 ft^2/min.

Well 201 Aquifer and Recovery Test

During the first test, a total volume of 12,566 gal of groundwater was pumped from well 201 over a period of 13.3 hrs (800 min), which resulted in an average discharge of 15.7 gpm. The pumping phase of the second test produced 72,048 gal over 96 hrs (5,760 min), or an average discharge of 12.5 gpm.

Water level data collected from the observation wells during test 1 showed well 196 with 0.1 ft of drawdown after 46.2 min of pumping from pumping well 201. During the second test (with the lower pumping rate compared to test 1) there was 0.1 ft of drawdown in observation well 196 after 78.2 min.

At the end of the pumping period in test 1, there was a total drawdown of 5.13 ft in pumping well 201 and 0.42 ft of drawdown in observation well 196. At the end of test 2, there were 6.5 ft of total drawdown in the pumping well and 0.39 ft in well 196. There was 0.14 ft of drawdown in well 208 (screened in the Wasatch) during the first test, and 0.13 ft of drawdown measured during the second test.

Figures 7 and 8 provide graphic displays of the response to pumping in wells 201, 196, and 208 for tests 1 and 2, respectively. Copies of the water level data collected during these tests are included in this calculation set.

During the aquifer and recovery tests there was on average less than 0.035 ft of water table fluctuation measured in background wells 590, 589, 599, and 675. Based on the small changes measured in these background wells, it was not necessary to modify the drawdown data.

Drawdown data collected from well 196 exhibited a leaky aquifer type of curve. Based on the drawdown detected in well 208 during the testing periods (and taking into account the small amount of drawdown measured in the alluvial observation wells) the source of leakage is most likely from the underlying unit.

Hydraulic parameters from the aquifer test analyses are summarized in Table 5. Graphs showing the drawdown and recovery data analyses using the various methods are included in this calculation set.

Table 5. Well 201 Aquifer and Recovery Test Data Analyses Results

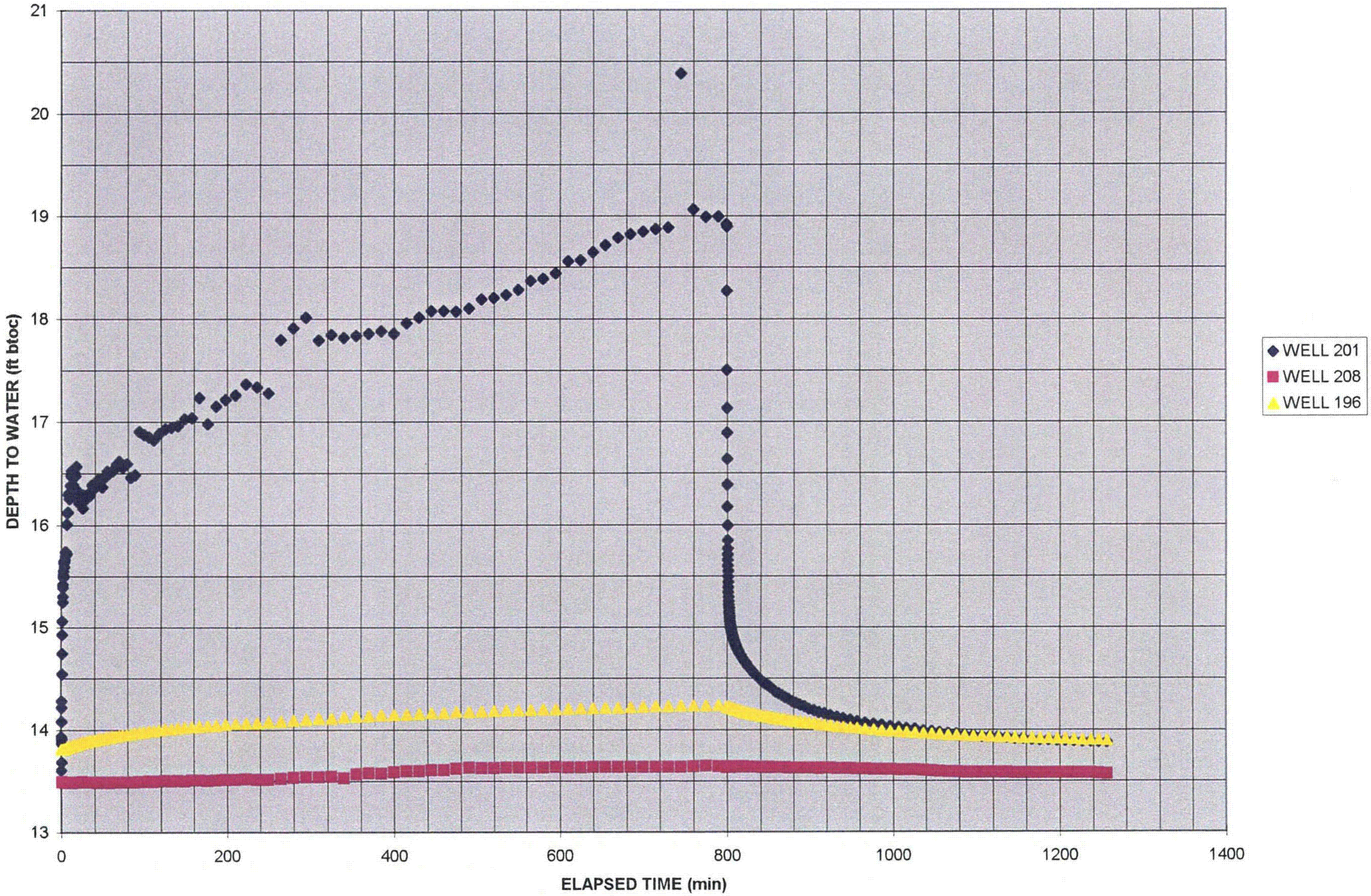
Analytical Method	TEST 1 (Q = 15.7 gpm)					TEST 2 (Q = 12.5 gpm)				
	Obs 196			Pmp 201		Obs 196			Pmp 201	
	T (ft^2/day)	K (ft/day)	Sy	T (ft^2/day)	K (ft/day)	T (ft2/day)	K (ft/day)	Sy	T (ft^2/day)	K (ft/day)
Drawdown Data										
Theis	1699	169	NA	NA	NA	2693	266	NA	NA	NA
Jacob-Cooper	1800	177	NA	NA	NA	2362	233	NA	NA	NA
Hantush	1699	169	NA	NA	NA	1901	189	NA	NA	NA
Neuman semi-log	2409	239	0.056	NA	NA	2262	224	0.036	NA	NA
Recovery Data										
Theis & Jacob	1656	164	NA	812	80	1656	164	NA	924	92
Neuman semi-log	1606	159	NA	852	84	1575	156	NA	630	62

Notes: Q - Discharge
Obs = Observation Well
Pmp = Pumping Well
T = Transmissivity
K = Hydraulic Conductivity
Sy = Specific Yield

Table 5 lists the transmissivity and respective hydraulic conductivity, which was calculated by dividing the transmissivity by the saturated thickness (at the time of the test the saturated thickness was 10.1 ft). This rather shallow saturated thickness compared to the other test locations can be attributed to the dewatering activities associated with the gravel pit operations (the dewatering pit is located ~1,000 ft to the west of the aquifer test location). Historical water level data suggest the saturated thickness at this site varies by ~4 ft throughout the year.

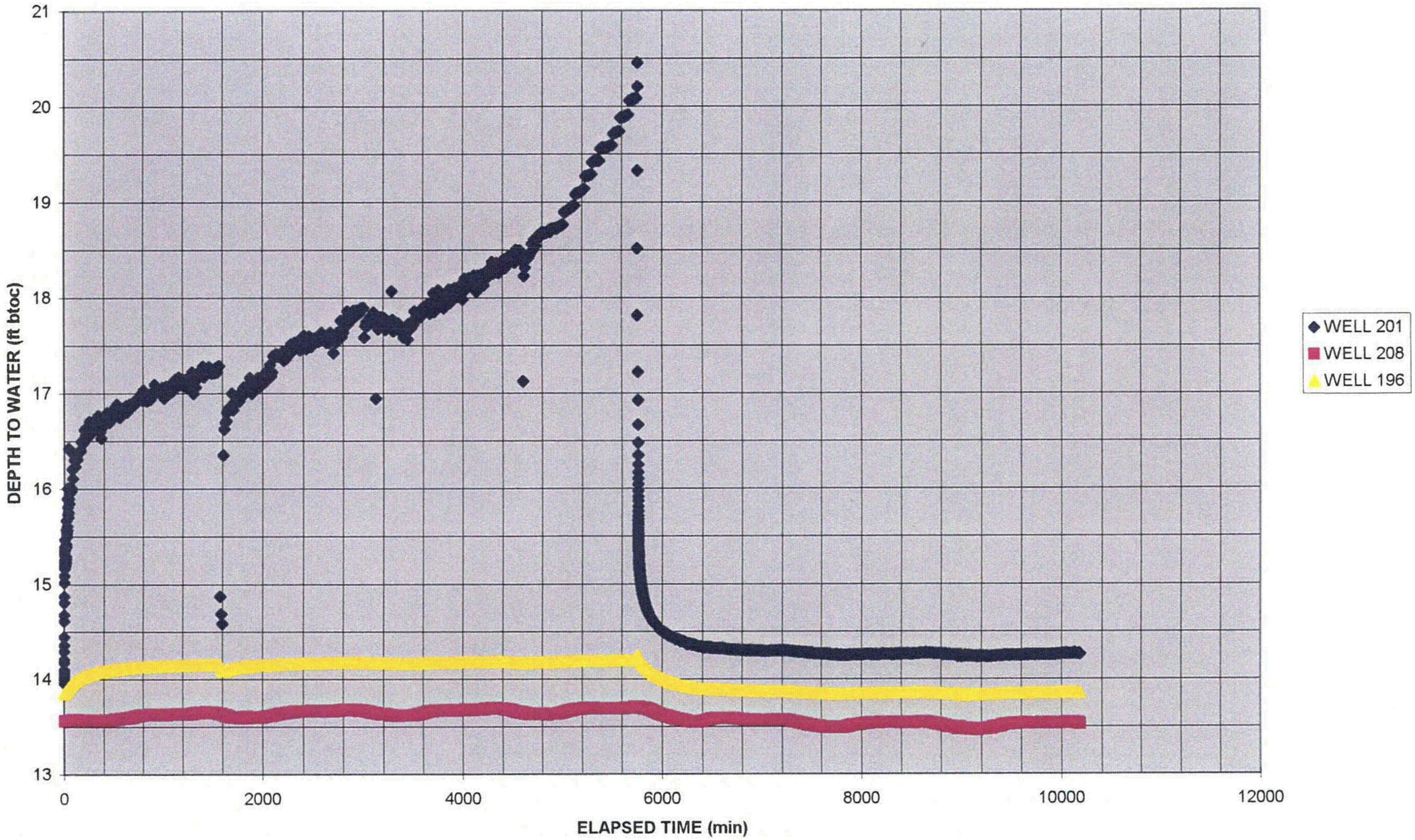
Analyses of drawdown data collected from well 196 during the first aquifer test suggest the transmissivity ranges from 1,699 to 2,409 ft^2/day (which translates into a hydraulic conductivity

FIGURE 7 - WELL 201 AQUIFER TEST 1 DATA
START DATE 8/31/98, END DATE 9/1/98, AVG Q = 15.7 GPM



Calculation No. U0042800

FIGURE 8 - WELL 201 AQUIFER TEST 2 DATA
START DATE 9/1/98, END DATE 9/8/98, AVG Q = 12.5 GPM



range from 169 to 239 ft/day) and a specific yield of 0.056. Recovery data collected from the observation well and the pumping well suggest the transmissivity ranges from 812 to 1,656 ft^2/day, which is equivalent to a hydraulic conductivity range of 84 to 164 ft/day.

Drawdown data collected from well 196 during the second aquifer test suggest the transmissivity ranges from 1,901 to 2,693 ft^2/day (equivalent to a hydraulic conductivity range from 189 to 266 ft/day) with a specific yield of 0.036. Recovery data collected from wells 196 and 201 the second test suggest the transmissivity ranges from 630 to 1656 ft^2/day, which is equivalent to a hydraulic conductivity range of 62 to 164 ft/day.

According to the analysis of the drawdown data collected in well 201 during the step test, the specific capacity of the pumping well is 0.84 ft^2/min.

Well 202 Aquifer and Recovery Test

During the first test, a total volume of 123,330 gal of groundwater was pumped from well 202 over a period of 22 hrs (1320 min), which resulted in an average discharge of 93.4 gpm. The pumping phase of the second test produced 212,389 gal over 44 hrs (2640 min), or an average discharge of 80.5 gpm.

Water level data collected from the observation wells during test 1 indicated well 195 had 0.1 ft of drawdown after 2.1 min of pumping from well 202. The second test showed the same amount of drawdown after 2.7 min. The small difference between the two response times can be attributed to the different pumping rates used for the two tests.

At the end of the pumping period in test 1, there was a total drawdown of 5.63 ft in pumping well 202 and 2.71 ft of drawdown in observation well 195. At the end of test 2, which had the lower pumping rate and lasted twice as long as test 1, there was 5.38 ft of total drawdown in the pumping well and 2.92 ft of drawdown in well 195. Figures 9 and 10 provide graphic displays of the response to pumping in wells 202 and 197 for tests 1 and 2, respectively. Copies of the water level data collected during these tests are included in this calculation set.

During the aquifer and recovery tests there was less than 0.05 ft of water table fluctuation measured in background wells 599 and 668. A water level difference of 0.38 ft was measured in well 675; however, the water level in this well is believed to be influenced the pumping from well 202 (675 is located 279 ft south of 202). As a result, the data from 675 was analyzed to determine hydraulic parameters of the alluvial aquifer for test 2 only (test 1 did not run long enough to provide useful data from 675). Figure 11 shows the well 675 response to pumping during the well 202 second aquifer test. Based on the small water level changes measured in background wells 599 and 668, it was not necessary to modify the drawdown data collected from the observation wells.
Drawdown data collected from well 197 exhibited a delayed yield type of curve. This type of curve varies from the curves produced from data collected from the tests conducted at the 200 and 201 locations, suggesting the subsurface conditions may not be consistent across the site. There were no wells completed in the underlying aquifer in this well cluster; therefore it could not be determined if the underlying unit was impacted during the testing time periods. Hydraulic parameters from the aquifer test analyses are summarized in Table 6. Graphs showing the

drawdown and recovery data analyses using the different methods are included in this calculation set.

Table 6. Well 202 Aquifer and Recovery Test Data Analyses Results

Analytical Method	TEST 1 (Q = 93.4 gpm)					TEST 2 (Q = 80.5 gpm)						
	Obs 197			Pmp 202		Obs 197			Obs 675		Pmp 202	
	T (ft^2/day)	K (ft/day)	Sy	T (ft^2/day)	K (ft/day)	T (ft^2/day)	K (ft/day)	Sy	T (ft^2/day)	K (ft/day)	T (ft^2/day)	K (ft/day)
Drawdown Data												
Theis	3586	246	NA	NA	NA	3096	213	NA	7416	511	NA	NA
Jacob-Cooper	1829	126	NA	NA	NA	1714	119	NA	3470	239	NA	NA
Neuman log	1800	124	0.066	NA	NA	1728	120	0.072	7416	511	NA	NA
Neuman semi-log	1533	106	0.066	NA	NA	1457	101	0.073	4370	301	NA	NA
Recovery Data												
Theis & Jacob	1384	96	NA	1319	91	1146	79	NA	2074	143	1164	80
Neuman semi-log	1318	91	NA	1221	84	1184	82	NA	2066	142	1072	74

Notes: Q - Discharge
Obs = Observation Well
Pmp = Pumping Well
T = Transmissivity
K = Hydraulic Conductivity
Sy = Specific Yield

Table 6 lists the transmissivity and respective hydraulic conductivity, which was calculated by dividing the transmissivity by the saturated thickness (at the time of the test the saturated thickness was 14.5 ft). Historical water level data suggest the saturated thickness at this site varies by ~9 ft throughout the year.

Data collected from well 197 during the first aquifer test suggest the transmissivity ranges from 1,245 to 3,586 ft^2/day (which translates into a hydraulic conductivity range from 86 to 246 ft/day) and a specific yield of 0.066. Analyses of the recovery data collected from wells 197 and 202 suggest the transmissivity ranges from 1,221 to 1,384 ft^2/day, which is equivalent to a hydraulic conductivity range of 84 to 96 ft/day.

Analyses of drawdown data collected from well 197 during the second aquifer test suggest the transmissivity ranges from 1,457 to 3,096 ft^2/day (with a hydraulic conductivity range from 101 to 213 ft/day) with a specific yield of 0.073. The analyses of drawdown data collected from

FIGURE 9 - WELL 202 AQUIFER TEST 1 DATA
START DATE 8/13/98, END DATE 8/17/98, AVG Q = 93.4 GPM

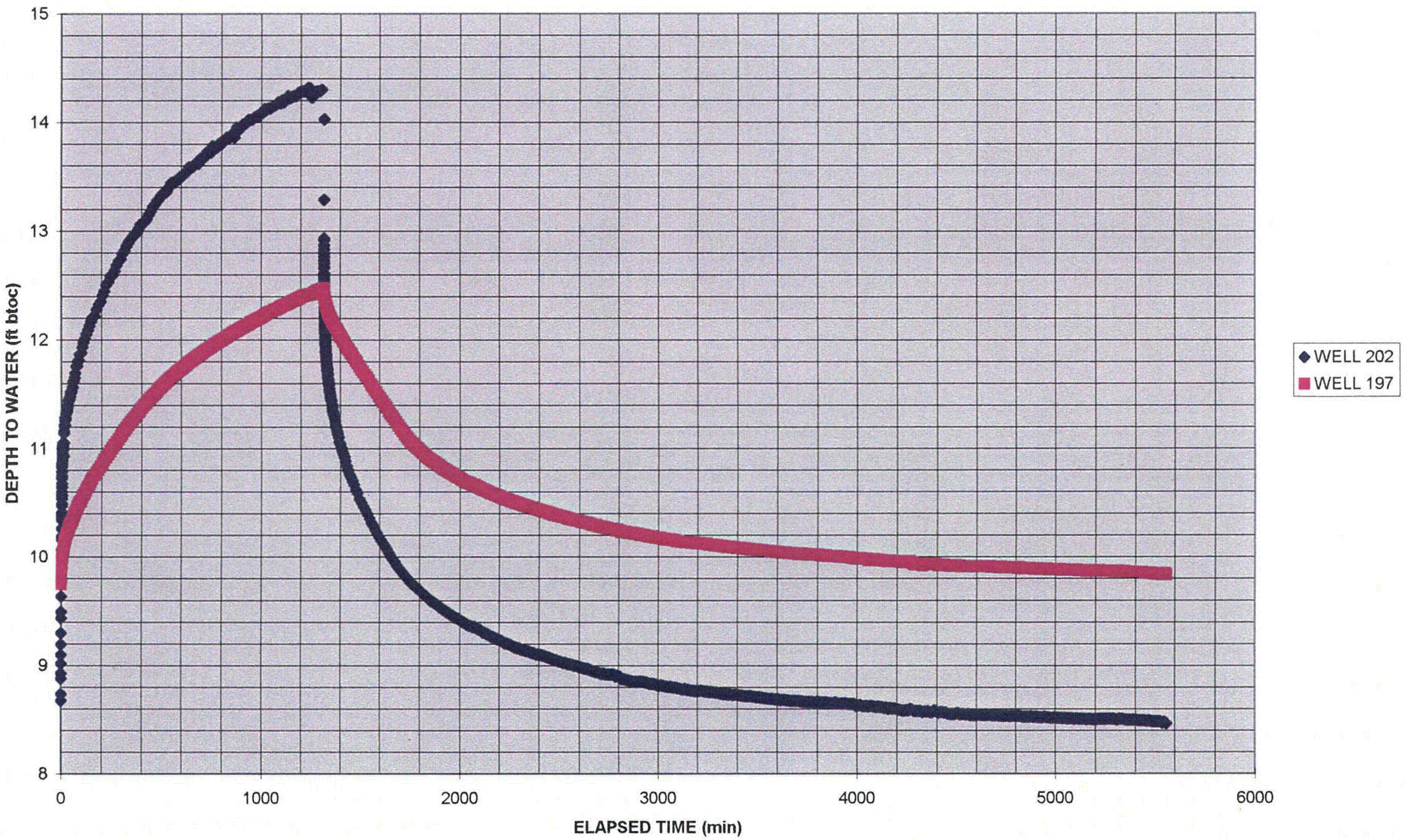
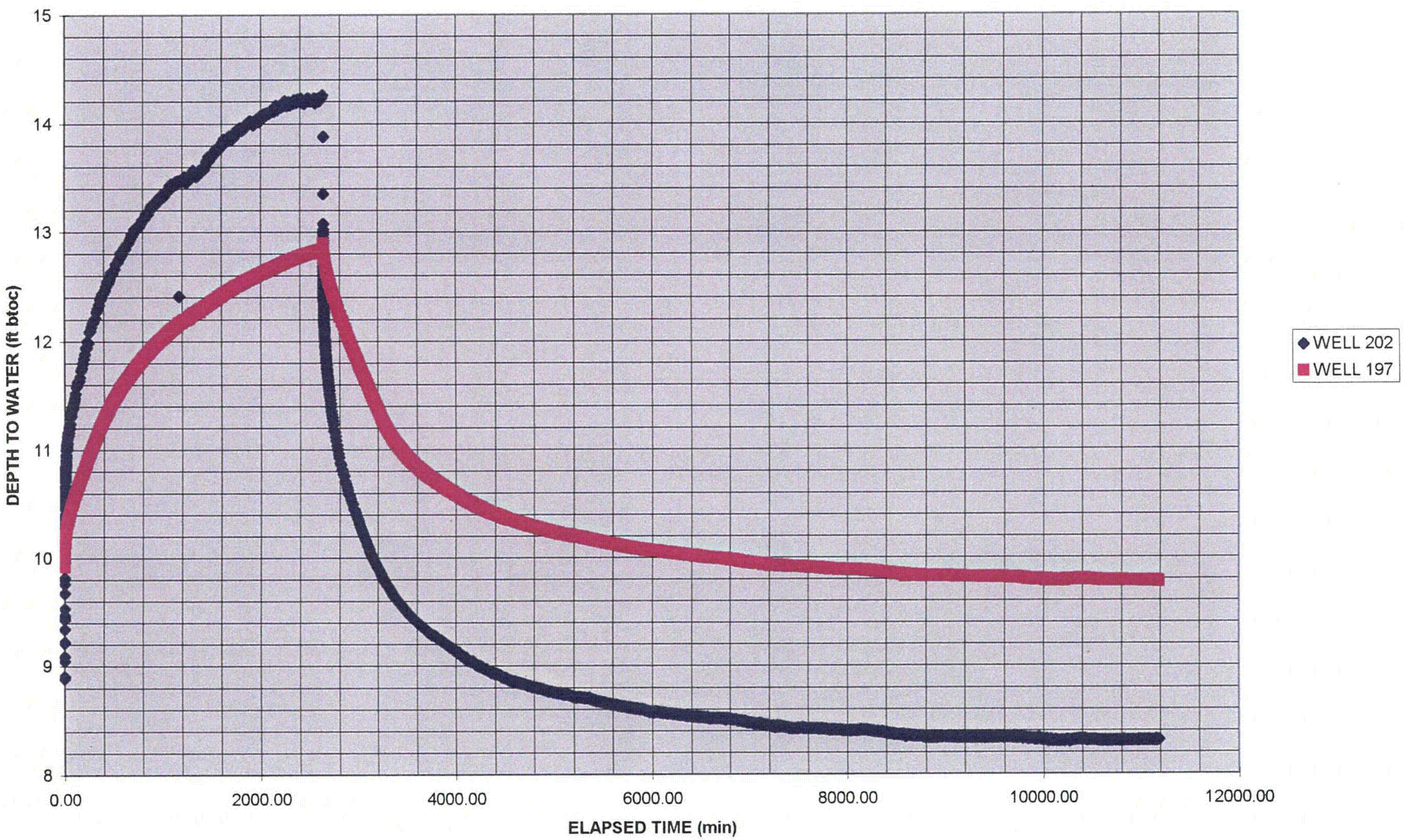
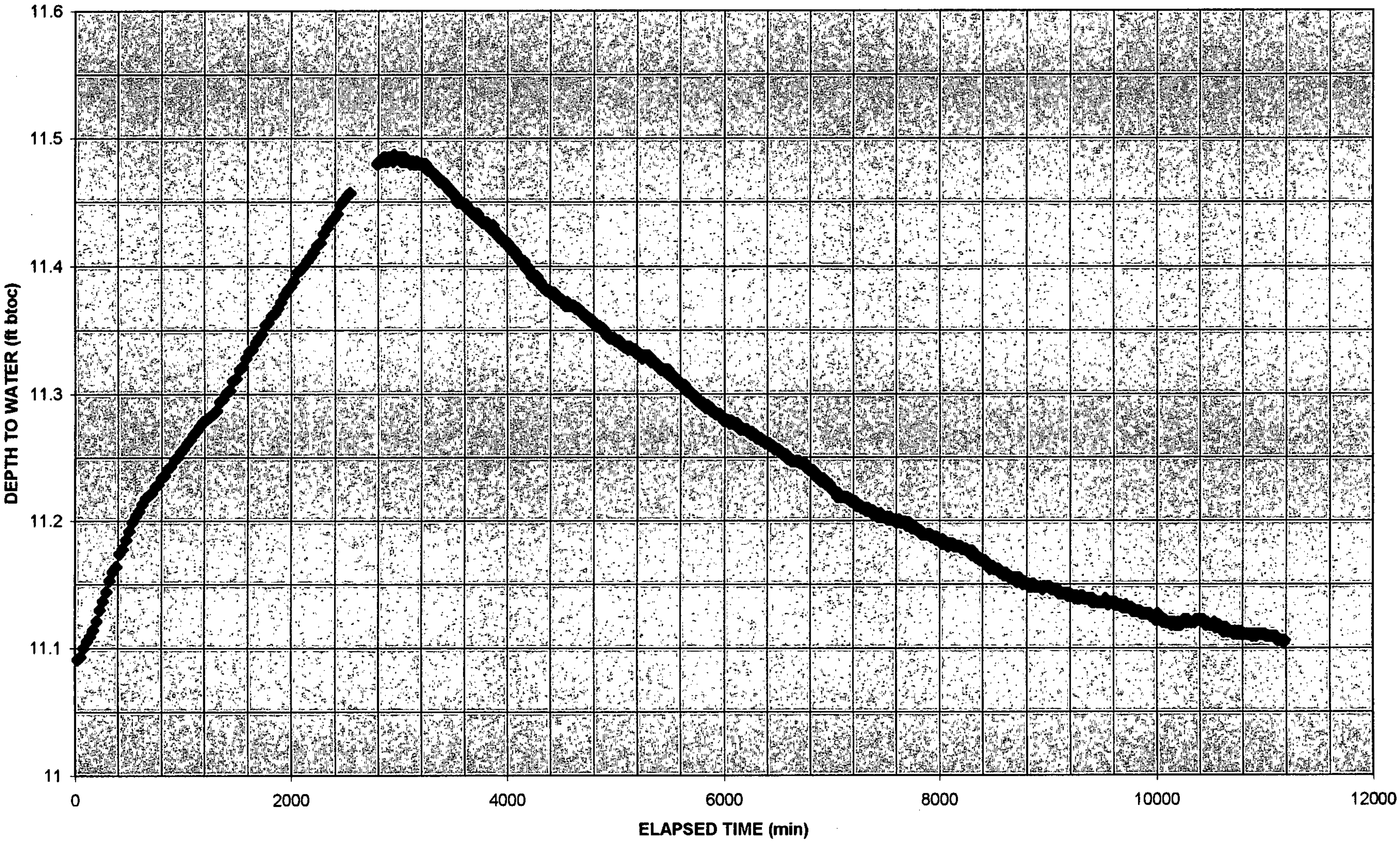


FIGURE 10 - WELL 202 AQUIFER TEST 2 DATA
START DATE 8/17/98, END DATE 8/25/98, AVG Q = 80.5



Calculation No. U0042800

FIGURE 11 - WELL 675 WL DATA
RESPONSE TO WELL 202 AQUIFER TEST 2



Calculation No. U0042800

background well 675 during the same time frame suggest the transmissivity ranges from 3,470 to 7,416 ft^2/day (hydraulic conductivity range of 239 to 511 ft/day).

Recovery data collected from the observation, the background, and the pumping well during the second test suggest the transmissivity ranges from 1,072 to 2,074 ft^2/day, which is equivalent to a hydraulic conductivity range of 74 to 143 ft/day.

According to the analysis of the drawdown data collected in well 202 during the step test, the specific capacity of well 202 is 2.45 ft^2/min.

Conclusions

At the 200 and 201 test locations, a leaky aquifer type of curve resulted from the drawdown data collected from the alluvial observation wells. The data confirm that the source of the leakage was from the underlying aquifer only at the 201 location, insufficient data was available from the 200 test to determine the source of the leakage. At the 202 location, the alluvial observation well data resulted in a delayed yield type of curve, suggesting the subsurface conditions may not be consistent across the site.

Table 7 lists the ranges of the hydraulic conductivity estimated from the data collected during each aquifer test completed at the well 200, well 201, and well 202 locations. In addition, the geometric mean is provided along with the associated standard deviation.

Table 7. STATISTICAL RESULTS FROM THE NEW RIFLE AQUIFER TESTS
(all values in ft/day)

	WELL 200			WELL 201			WELL 202				
	Test 1	Test 2	Test 1 & 2	Test 1	Test 2	Test 1 & 2	Test 1	Test 2	Test 2*	Test 1 & 2	Test 1 & 2*
K RANGE	53 - 145	57 - 275	53 - 275	80 - 239	62 - 266	62 - 266	68 - 246	74 - 511	74 - 213	68 - 511	68 - 246
GEOMEAN	94	111	102	146	158	152	108	155	102	135	105
STD DEV	29	68	53	52	70	60	56	150	46	128	50

Notes: K = Hydraulic Conductivity
GEOMEAN = Geometric Mean
STD DEV = Standard Deviation
* = Does not include 675 results

Taking into consideration the results generated from the analyses of data collected from tests completed at all three locations the hydraulic conductivity ranges from 53 to 511 ft/day (geometric mean of 123 ft/day). This high end of the range is heavily influenced by the data collected from well 675 (which is located 279 ft from well 202).

Excluding the results associated with well 675 the hydraulic conductivity range becomes 53 to 275 ft/day, with a geometric mean of 114 ft/day. While the well 675 data may not provide consistent estimates (compared to the other tests) of the hydraulic parameters, it does indicate that the radius of influence for the well 202 tests exceeded 280 ft.

Previous work completed at the site to estimate the hydraulic conductivity of the alluvial aquifer included aquifer tests conducted between 1983 and 1986 on ten different wells screened in the alluvial aquifer. The analyses of data collected from these tests suggested the hydraulic conductivity ranged from 14.5 to 150 ft/day, with a geometric mean of 70 ft/day (RAP, 1992). Results presented in this calculation set are closer to the higher end of this range.

Additional studies include slug tests completed in 1985 and 1986 on eight alluvial aquifer wells. Analyses of the data collected during these tests indicated the hydraulic conductivity ranged from 0.22 to 1.7 ft/day, with a resulting average of 1.0 ft/day (SOWP, Rev. 0, 1996). The aquifer test data presented in this calculation set is two orders of magnitude greater than the slug test data.

Specific yield estimates for the alluvial aquifer ranged from 0.00007 to 0.073 and is considered to be outside of the range from the literature for this type of unconfined aquifer, which is generally 0.13 to 0.44 (Anderson and Woessner, 1992). However, Neuman (1987) states that specific yields determined from the laboratory drainage experiments on samples of aquifer material are often much larger than values obtained from short term pumping tests.

EQUATIONS USED FOR THE NEUMAN SEMI-LOG METHOD (NEUMAN, 1975)

- **To calculate Transmissivity from late time drawdown data:**

$$T = C_1 (Q/\Delta s_L)$$

Where T = Transmissivity (gal/min/ft)
Q = Avg flow rate (gal/min)
Δs_L = Tenfold increase in drawdown along straight line through late data (ft)
C_1 = Constant used for consistent set of units, = 0.1833 (Neuman, pg. 332)

Note: Once T was calculated, the value was multiplied by 192.5 to ultimately convert T into the units of ft^2/day
(1 gal/min = 192.5 ft^3/day)

- **To calculate Hydraulic Conductivity from late time drawdown data:**

$$K = T / b$$

Where K = Hydraulic conductivity (ft/day)
T = Transmissivity (ft^2/day)
b = Aquifer saturated thickness (ft)

- **To calculate Specific Yield from late time drawdown data:**

$$S_y = C_2 ((T^* t_L) / r^2)$$

Where S_y = Specific Yield (unitless)
C_2 = Constant used for consistent set of units, = 2.246 (Neuman, pg. 332)
T = Transmissivity (ft^2/day)
t_L = Time corresponding to the intersection of a straight line through late drawdown data with s = 0 (days)
r = radial distance from pumping well (ft)

- **To calculate Transmissivity from late time recovery data:**

$$T = C_1 (Q/\Delta s_L)$$

Where T = Transmissivity (gal/min/ft)
Q = Avg flow rate (gal/min)
Δs_L = Tenfold increase in drawdown along straight line through late data (ft)
C_1 = Constant used for consistent set of units, = 0.1833 (Neuman, pg. 332)

Note: Once T was calculated, the value was multiplied by 192.5 to ultimately convert T into the units of ft^2/day
(1 gal/min = 192.5 ft^3/day)

- **To calculate Hydraulic Conductivity from late time recovery data:**

$$K = T / b$$

Where K = Hydraulic conductivity (ft/day)
T = Transmissivity (ft^2/day)
b = Aquifer saturated thickness (ft)

WELL 200 AQUIFER TEST DATA ANALYSES

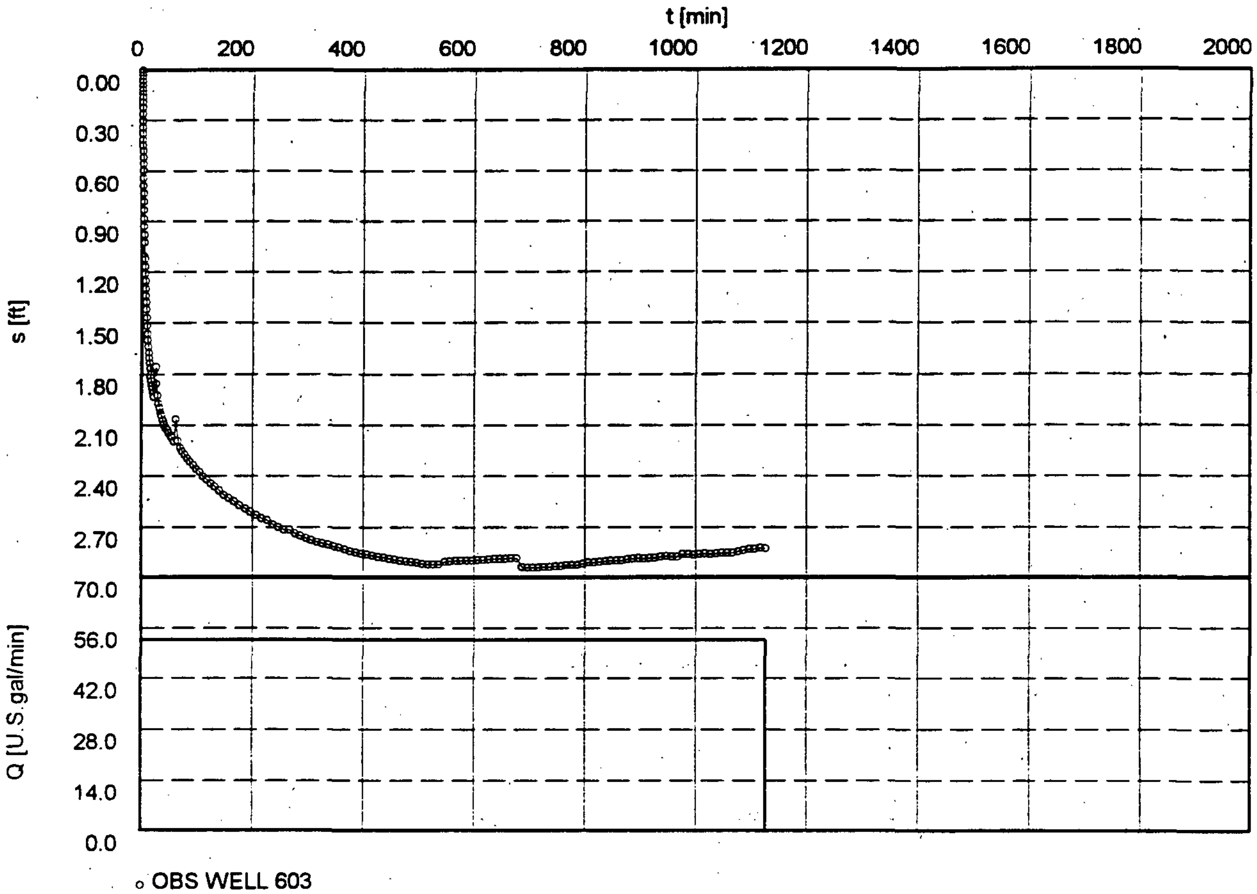
(INCLUDES ANALYSES OF DATA COLLECTED FROM WELLS 603, 195, & 200)

OBSERVATION WELL 603 DRAWDOWN DATA ANALYSES

WELL 200 AQ TEST 1

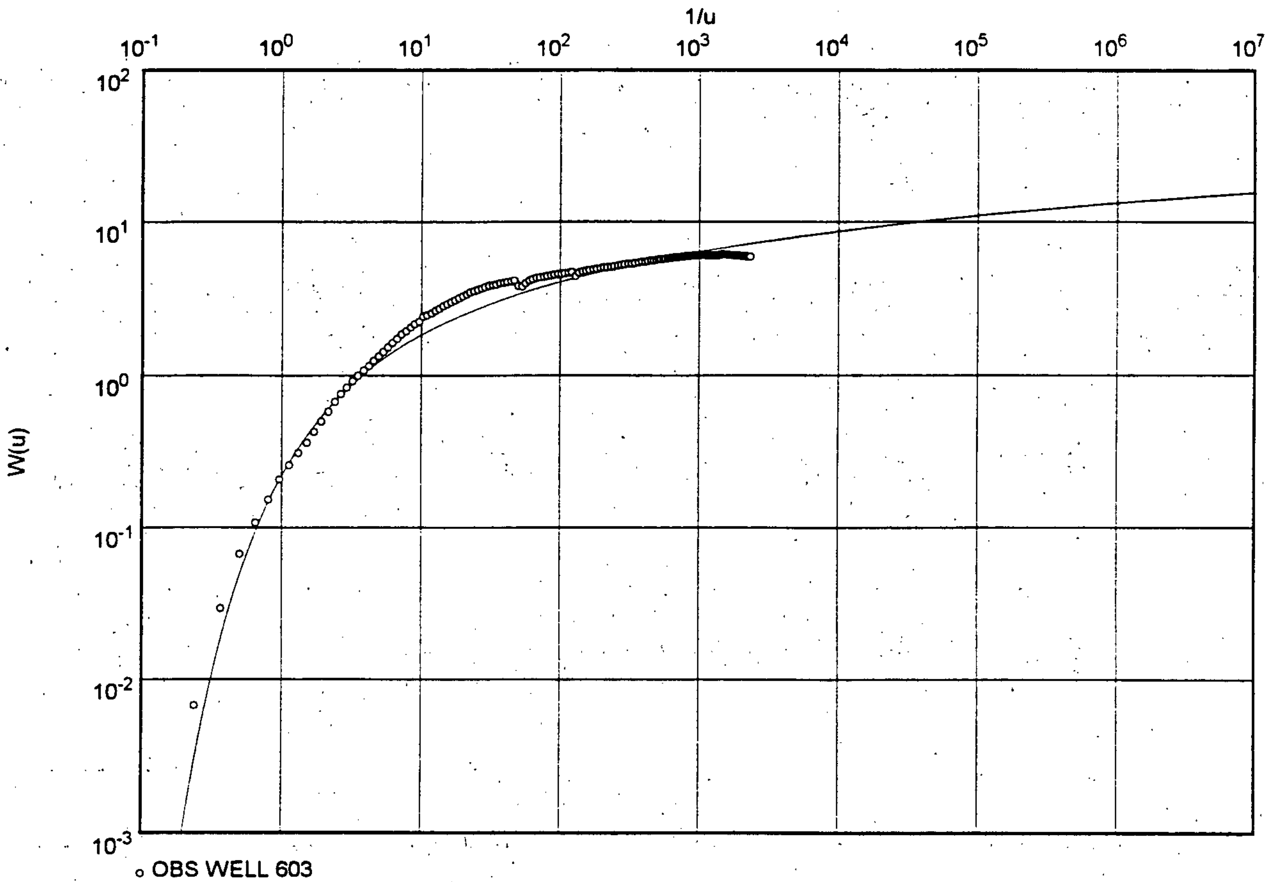
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP / Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Theis analysis method Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	



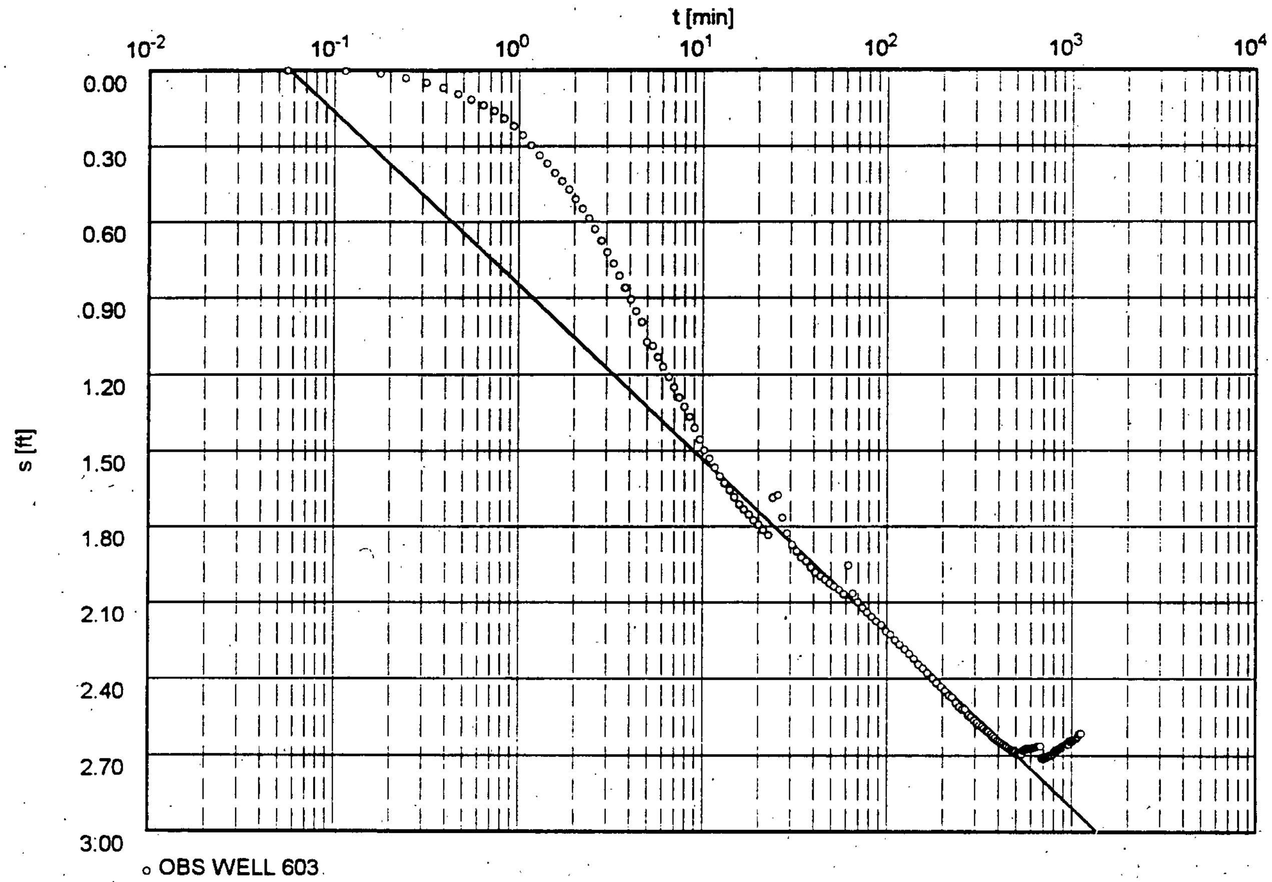
Transmissivity [ft²/min]: 1.25×10^{0}

Hydraulic conductivity [ft/min]: 6.59×10^{-2} = 94.9 Ft/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	



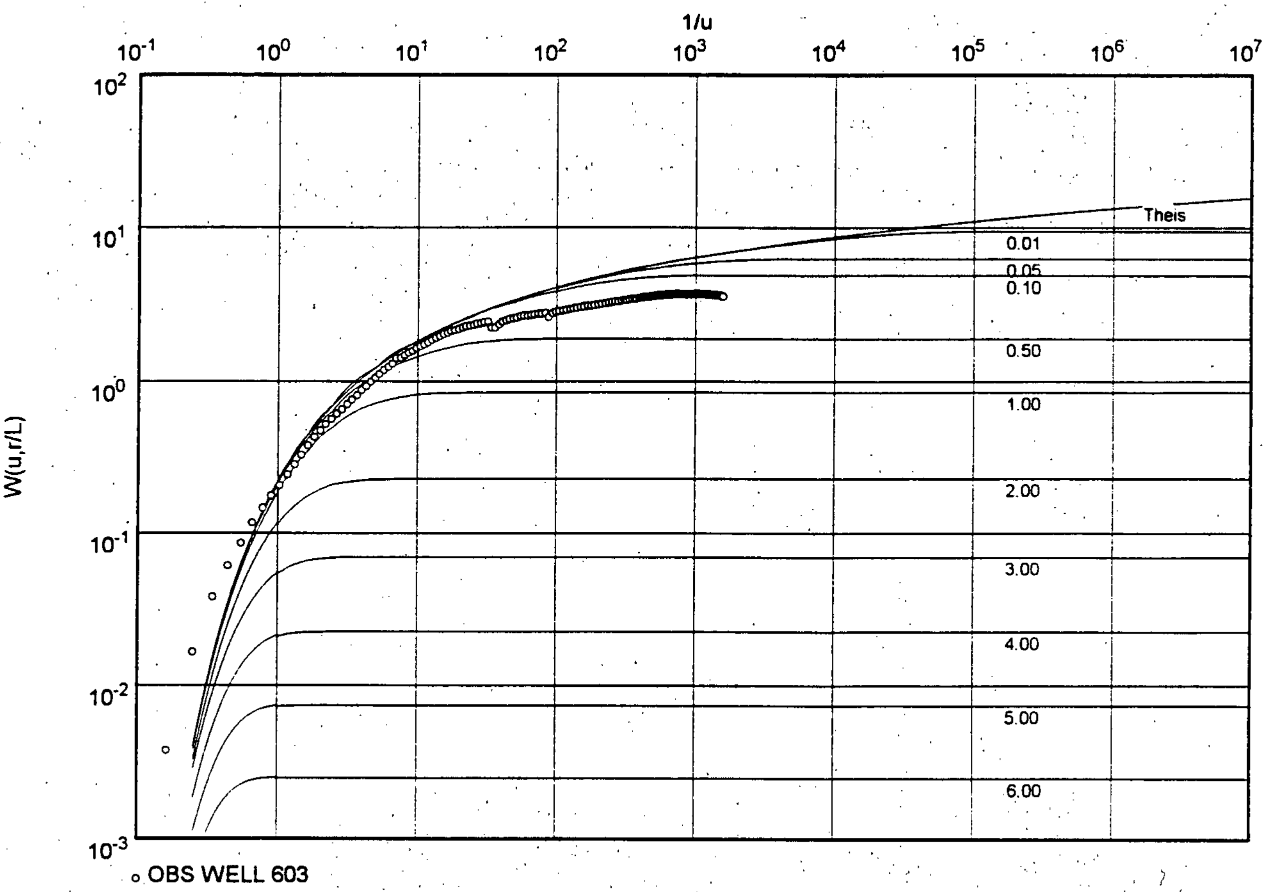
Transmissivity [ft²/min]: 1.87×10^{0}

Hydraulic conductivity [ft/min]: 9.89×10^{-2} - 142.4 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis HANTUSH's method Leaky aquifer, no aquitard storage	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	

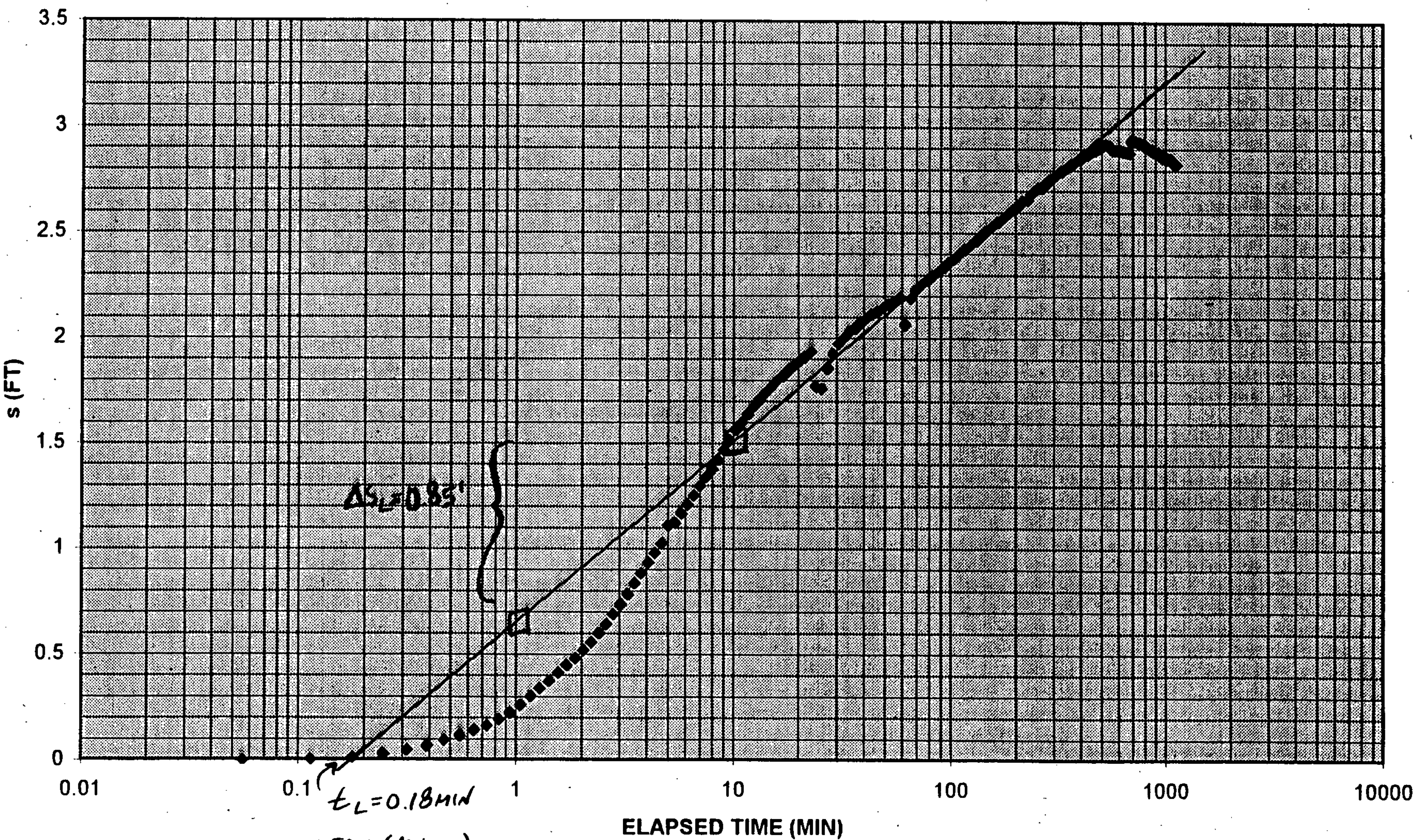


Transmissivity [ft²/min]: 7.04×10^{-1}

Hydraulic conductivity [ft/min]: 3.70×10^{-2} = 53.3 FT/D

Aquifer thickness [ft]: 19.00

OBS WELL 603 - AQ TEST 1 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833 \left(\frac{52.6 \text{ GAL/MIN}}{0.85'} \right) 192.5 = 2183.5 \text{ FT}^2/\text{D}$$

$$K = \frac{2183.5 \text{ FT}^2/\text{D}}{19 \text{ FT}} = \underline{114.9 \text{ FT/D}}$$

(WITHIN RANGE)

$$S_y = 2.246 \frac{(2183.5 \text{ FT}^2/\text{D})(0.0001250)}{(29.3 \text{ FT})^2}$$

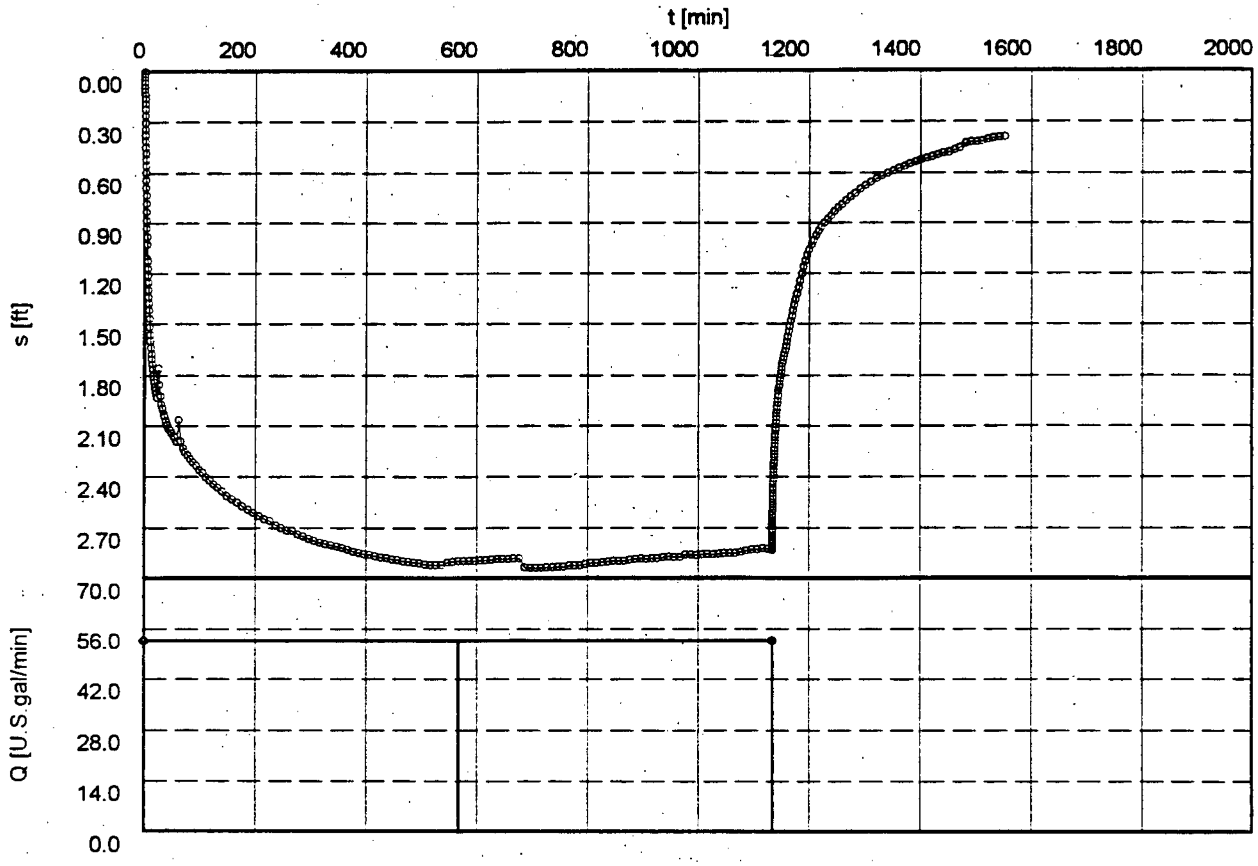
$$\underline{S_y = 0.0007}$$

OBSERVATION WELL 603 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 1

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP / Date: 26.10.1998

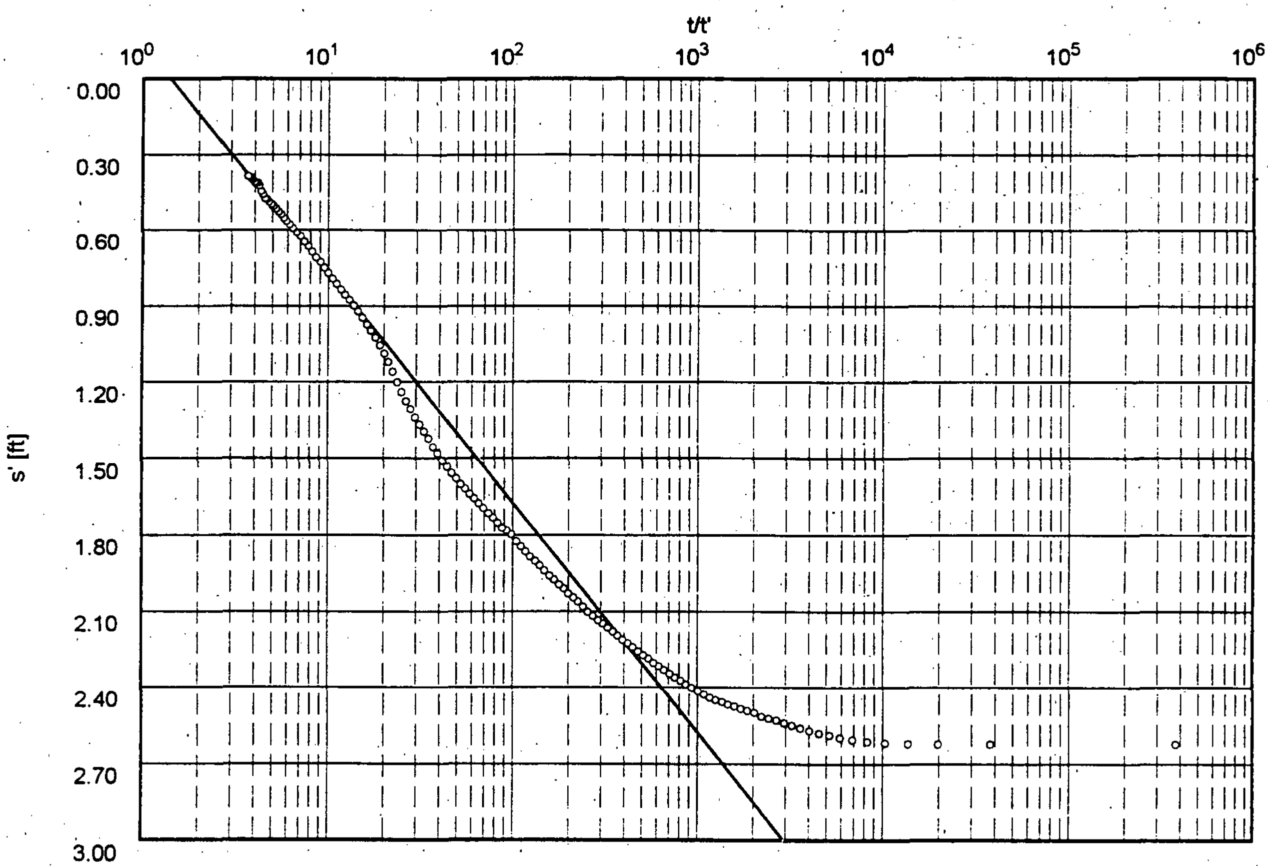
Pumping Test No. WELL 200 AQ REC TEST 1	Test conducted on: 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	



o OBS WELL 603

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

Pumping Test No. WELL 200 AQ REC TEST 1	Test conducted on: 9/15/98
OBS WELL 603	
Discharge 52.60 U.S.gal/min	
	Pumping test duration: 1133.96 min

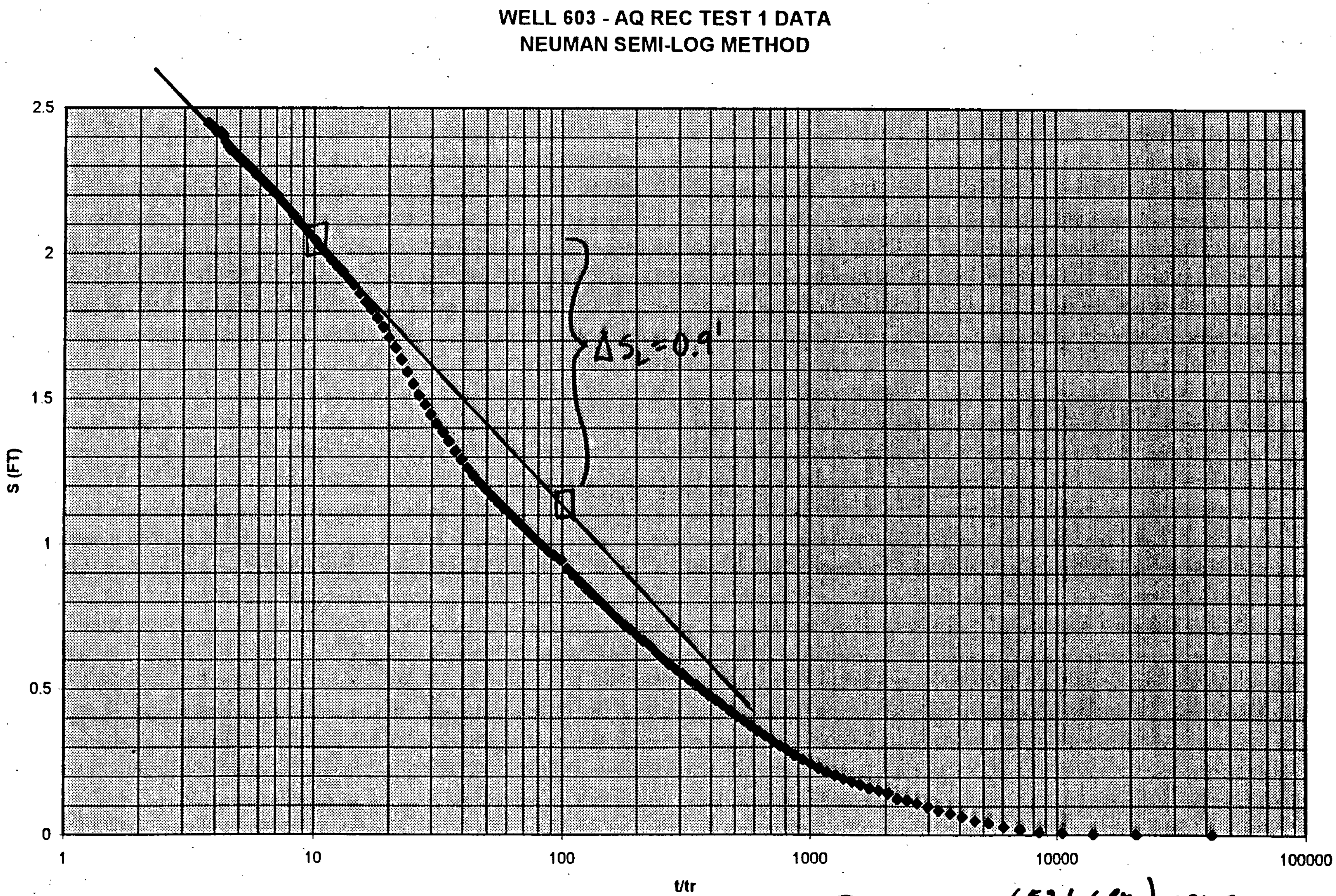


○ OBS WELL 603

Transmissivity [ft²/min]: 1.42×10^0

Hydraulic conductivity [ft/min]: 7.50×10^{-2} = 108.0 FT/DAY

Aquifer thickness [ft]: 19.00



$T_L = 0.1833 \left(\frac{52.6 \text{ GPM}}{0.9 \text{ FT}}\right) 192.5 = \frac{2062.2 \text{ FT}^2/\text{D}}{19 \text{ FT}}$

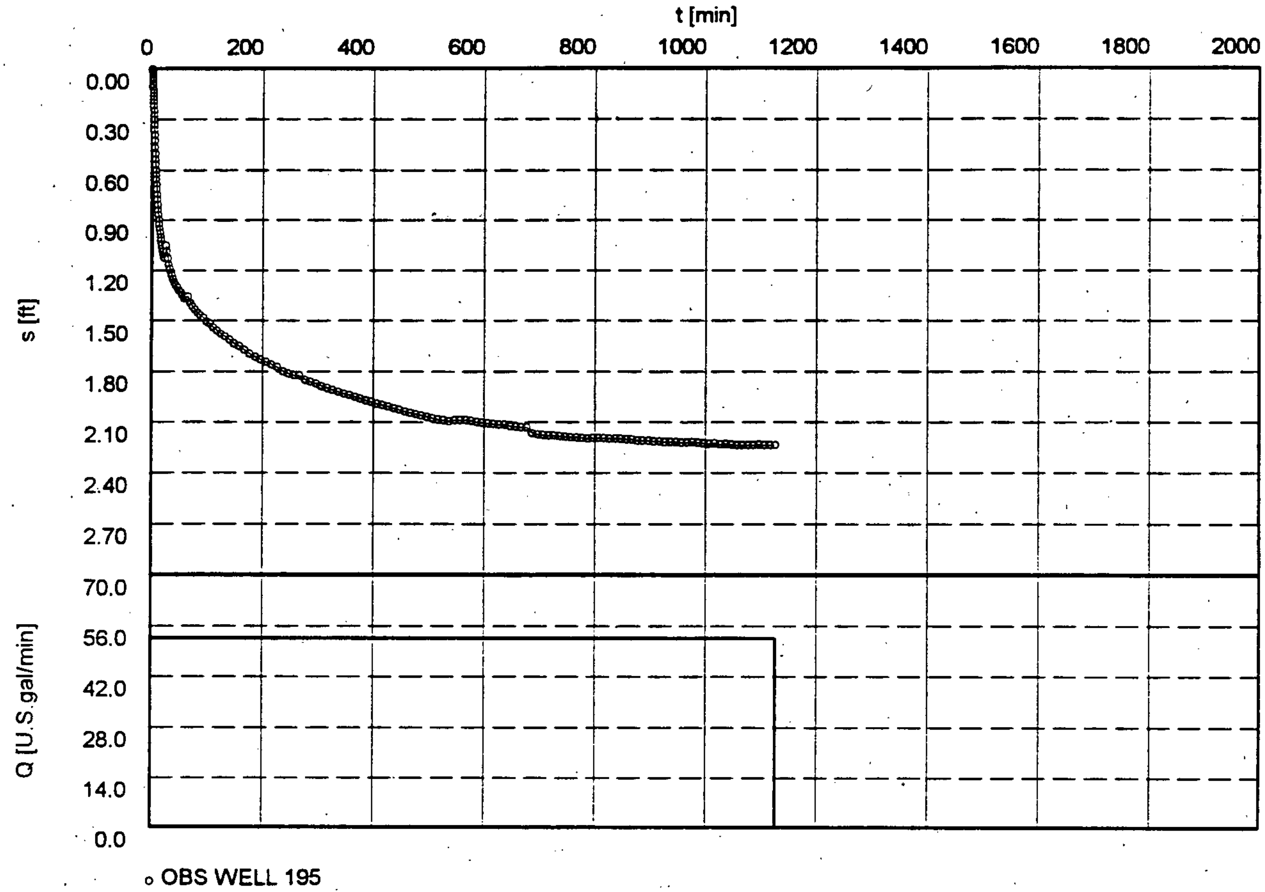
$\underline{K_L = 108.5 \text{ FT/D}}$

OBSERVATION WELL 195 DRAWDOWN DATA ANALYSES

WELL 200 AQ TEST 1

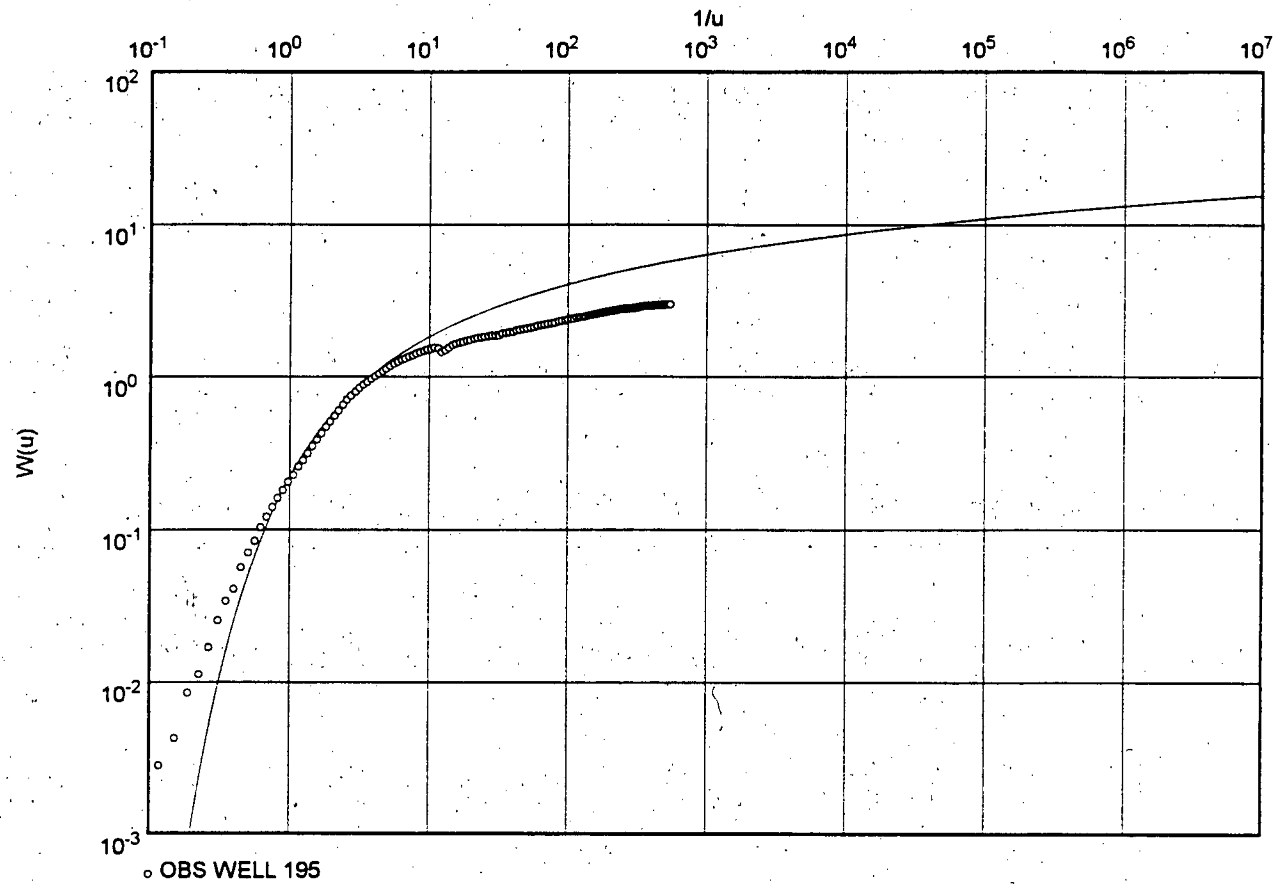
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1	
		Project: UGW - NEW RIFLE	
		Evaluated by: KP	Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Theis analysis method Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	



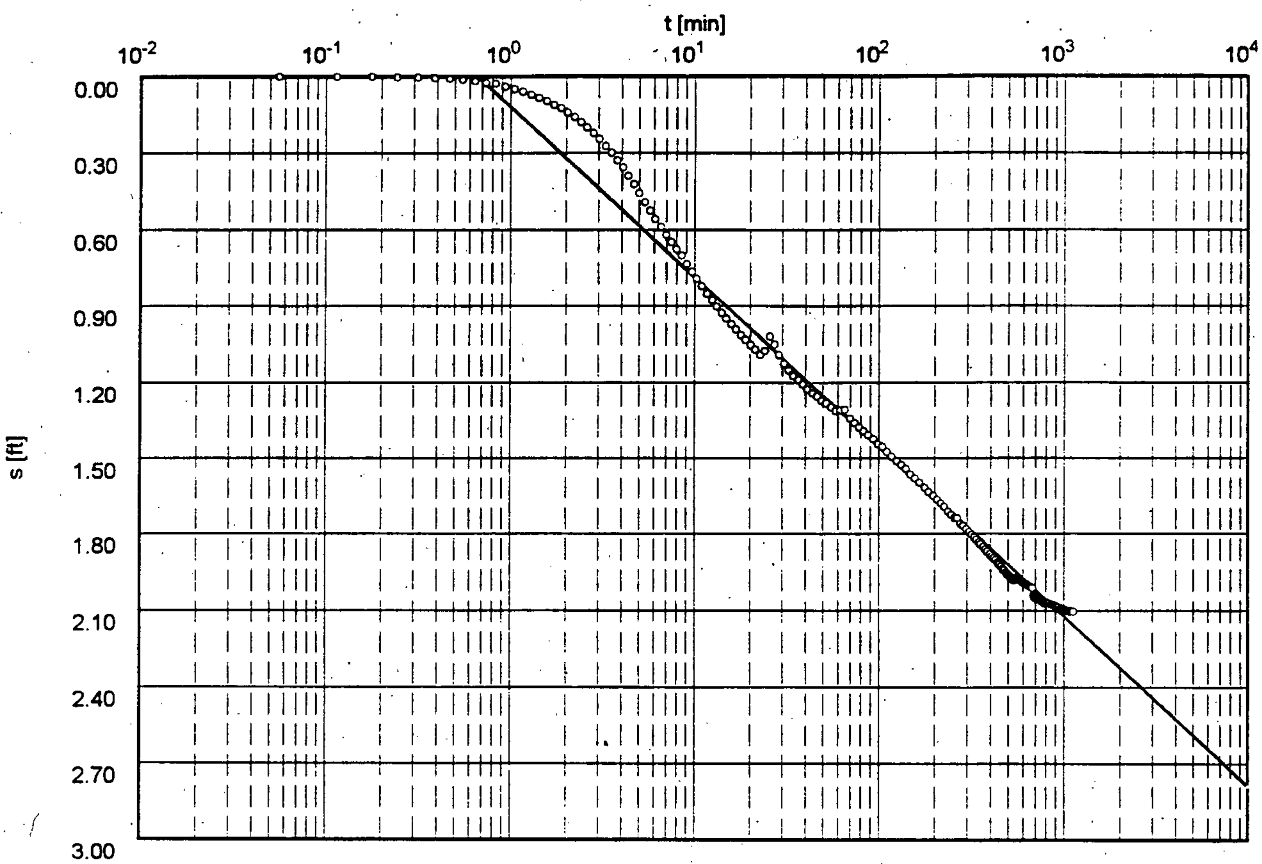
Transmissivity [ft²/min]: 7.90×10^{-1}

Hydraulic conductivity [ft/min]: 4.15×10^{-2} = 59.8 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP | Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	



o OBS WELL 195

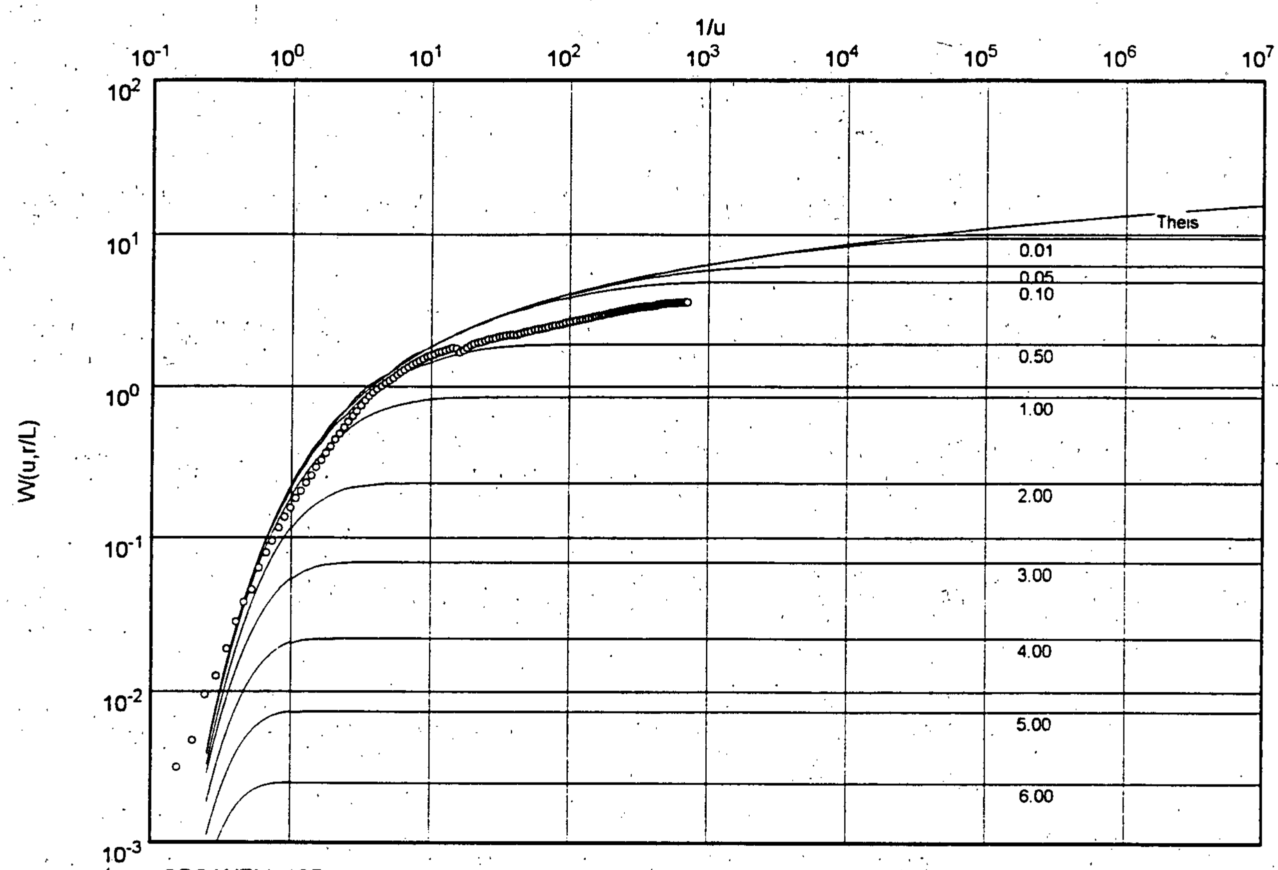
Transmissivity [ft²/min]: 1.92×10^{0}

Hydraulic conductivity [ft/min]: 1.01×10^{-1} = 145.4 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis HANTUSH's method Leaky aquifer, no aquitard storage	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP · Date: 26.10.1998

Pumping Test No. WELL 200 AQ TEST 1	Test conducted on: 9/14 - 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	



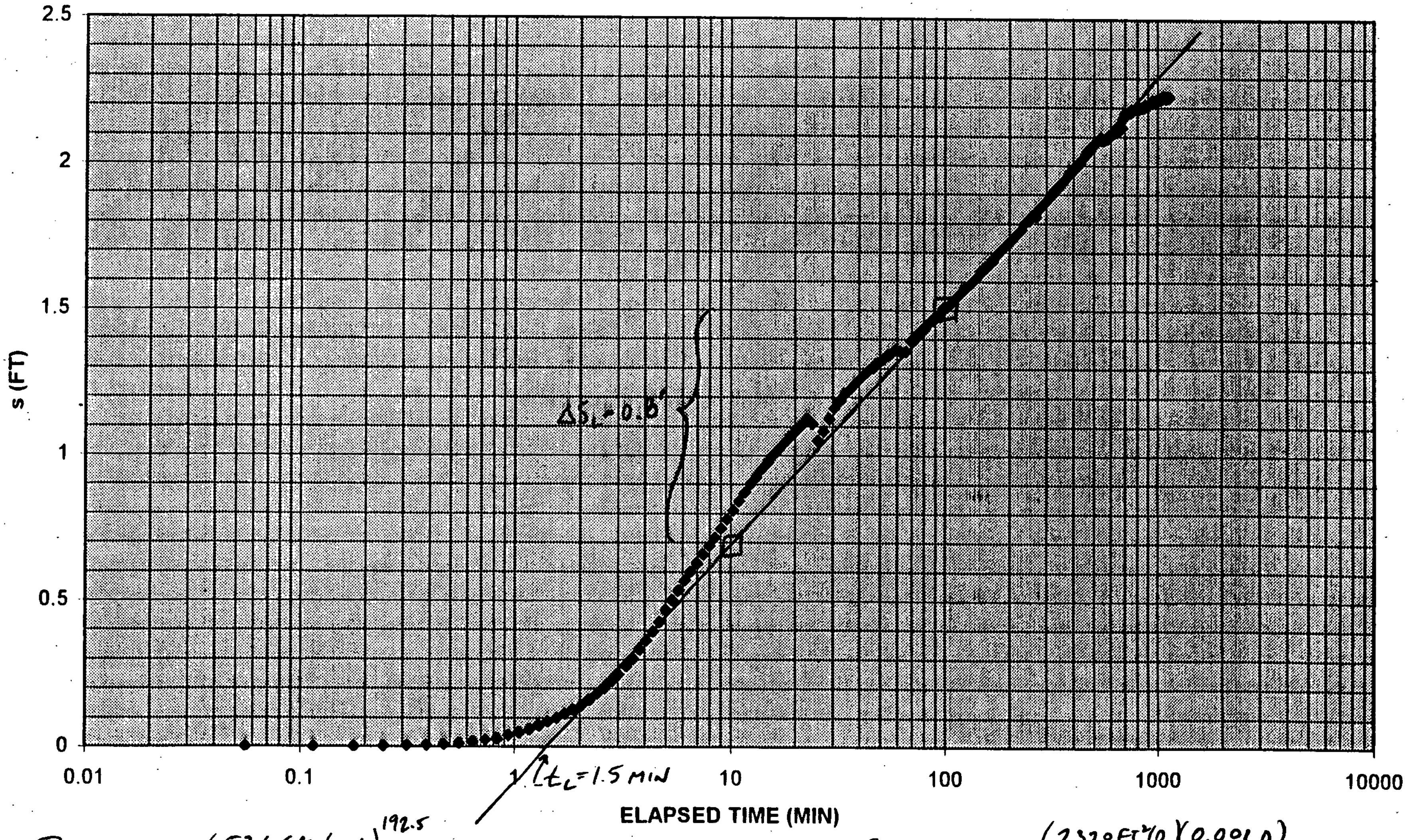
∘ OBS WELL 195

Transmissivity [ft²/min]: 8.86×10^{-1}

Hydraulic conductivity [ft/min]: 4.66×10^{-2} = 67.1 FT/D

Aquifer thickness [ft]: 19.00

OBS WELL 195 - AQ TEST 1 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833\left(\frac{52.6\ \text{GAL/MIN}}{0.8\ \text{FT}}\right)192.5 = 2320\ \text{FT}^2/\text{D}$$

$$S_y = 2.246\,\frac{(2320\ \text{FT}^2/\text{D})(0.001\ \text{D})}{(48.2\ \text{FT})^2}$$

$$K = \frac{2320\ \text{FT}^2/\text{D}}{19\ \text{FT}} = \underline{122.1\ \text{FT/D}}$$

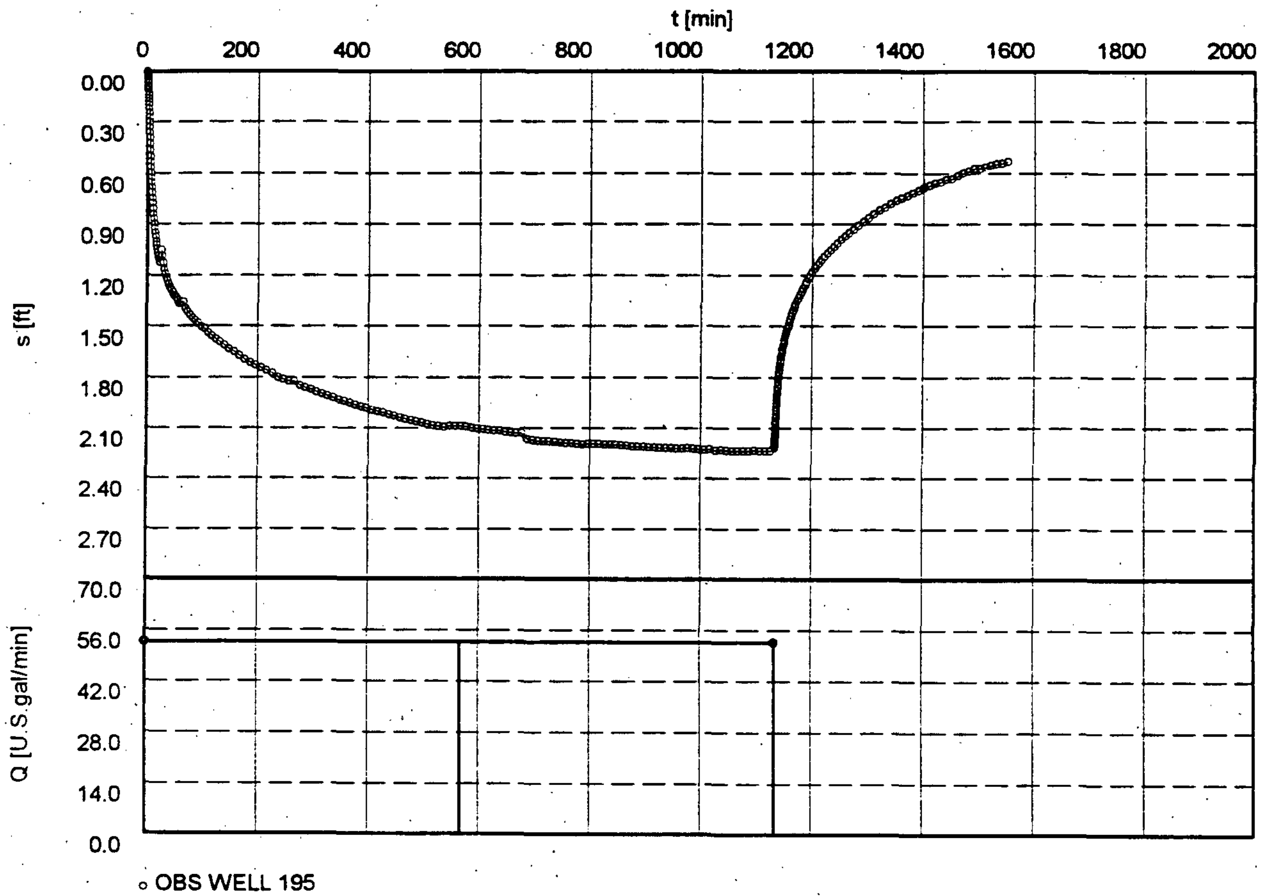
$$\underline{S_y = 0.0022}$$

OBSERVATION WELL 195 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 1

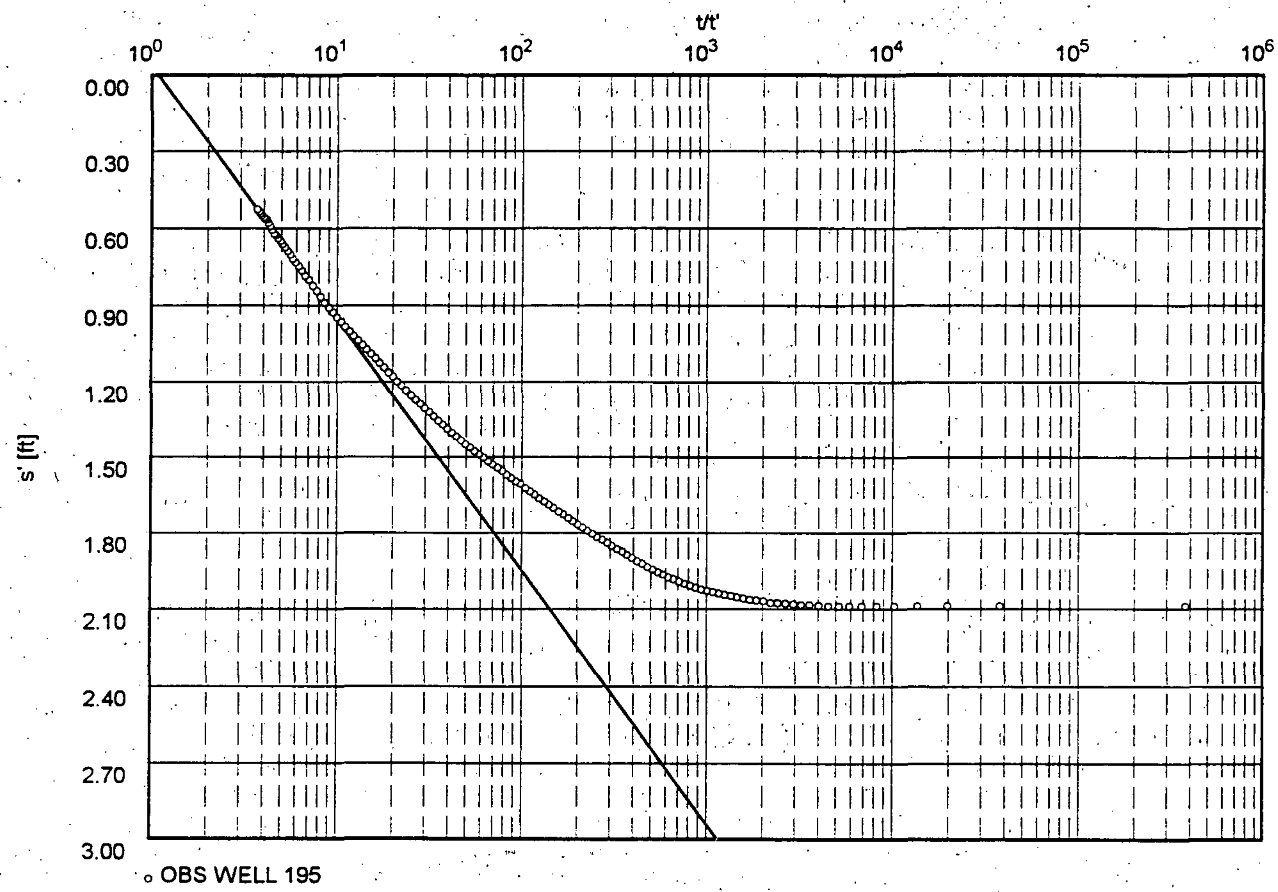
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

Pumping Test No. WELL 200 AQ REC TEST 1	Test conducted on: 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 26.10.1998

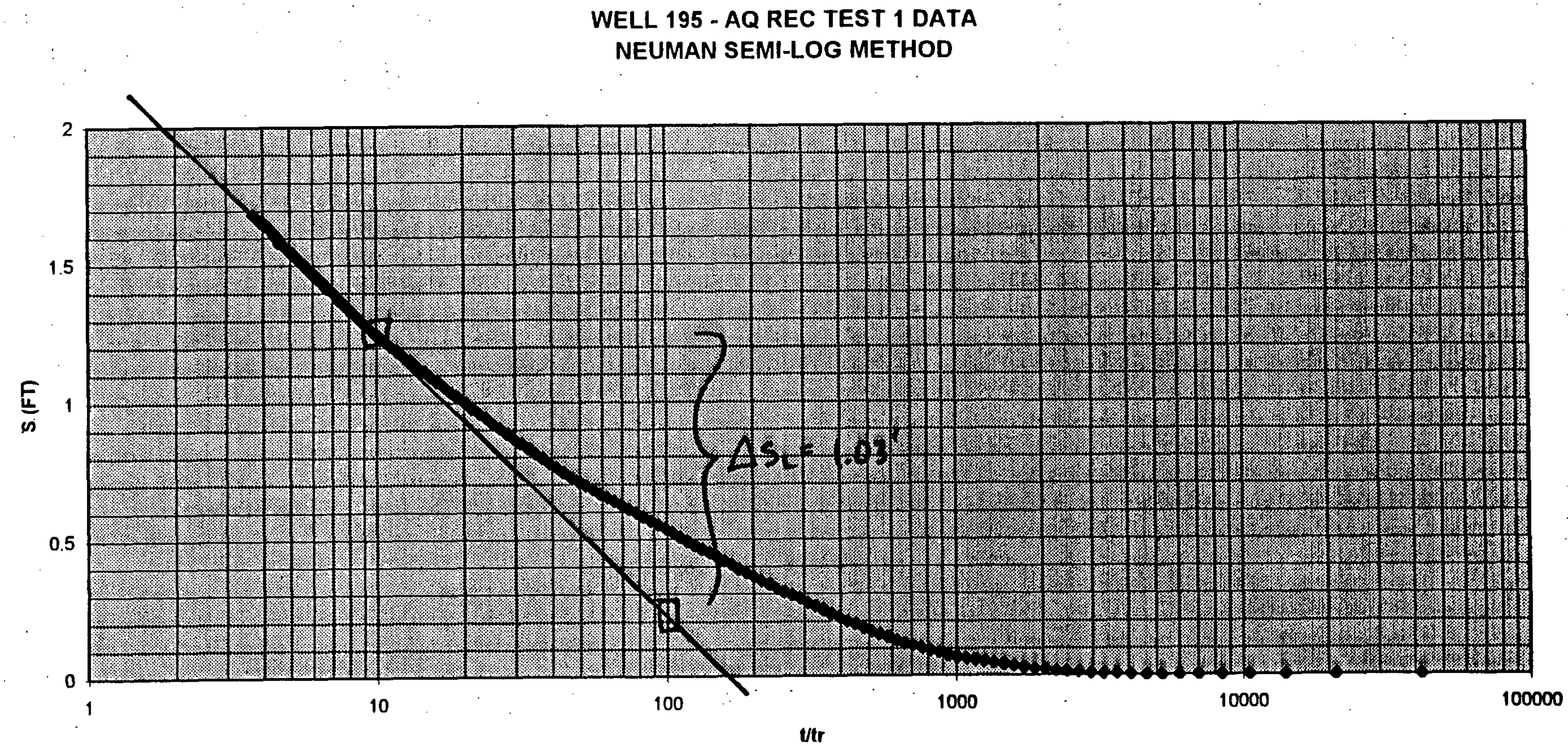
Pumping Test No. WELL 200 AQ REC TEST 1	Test conducted on: 9/15/98
OBS WELL 195	
Discharge 52.60 U.S.gal/min	
	Pumping test duration: 1133.96 min



Transmissivity [ft²/min]: 1.29×10^0

Hydraulic conductivity [ft/min]: 6.83×10^{-2} = 98.4 FT/D

Aquifer thickness [ft]: 19.00



$T_L = 0.1833 \left(\frac{52.6 \text{ GPM}}{1.03'} \right) 192.5 = \frac{1801.9 \text{ FT}^2/\text{D}}{19 \text{ FT}}$

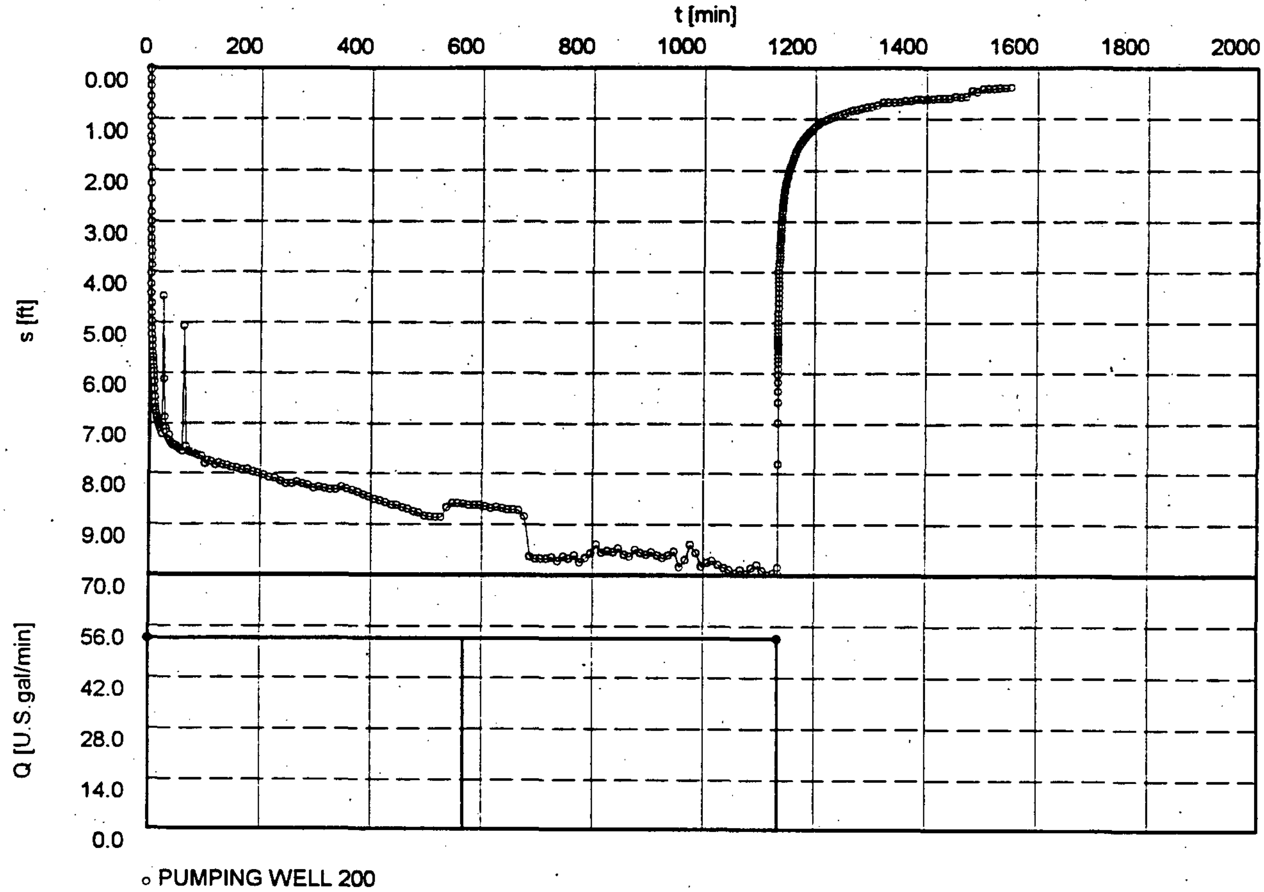
$\underline{K_L = 94.8 \text{ FT/D}}$

PUMPING WELL 200 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 1

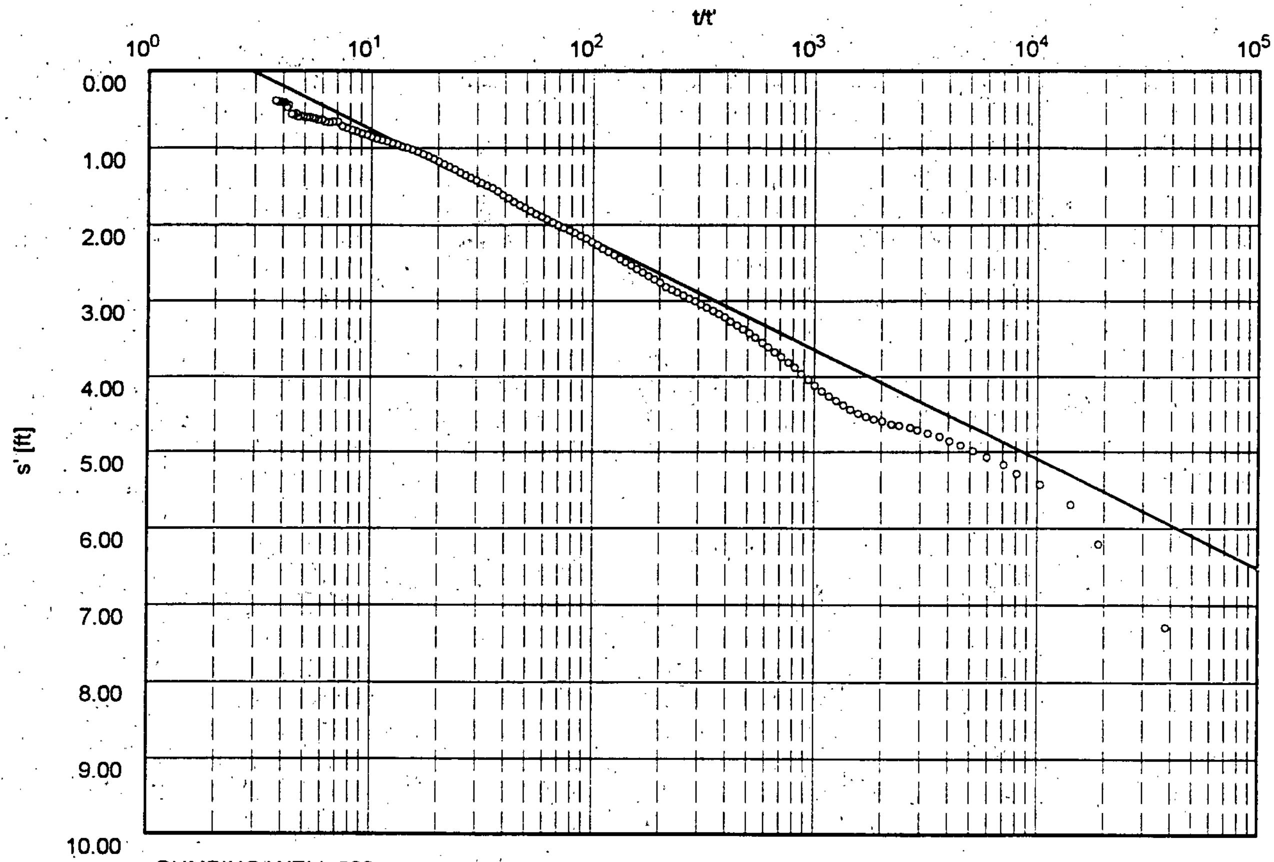
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO. ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE	
		Evaluated by: KP	Date: 26.10.1998

Pumping Test No. WELL AQ REC TEST 1	Test conducted on: 9/15/98
PUMPING WELL 200	
Discharge 52.60 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 26.10.1998

Pumping Test No. WELL AQ REC TEST 1	Test conducted on: 9/15/98
PUMPING WELL 200	
Discharge 52.60 U.S.gal/min	
	Pumping test duration: 1133.96 min



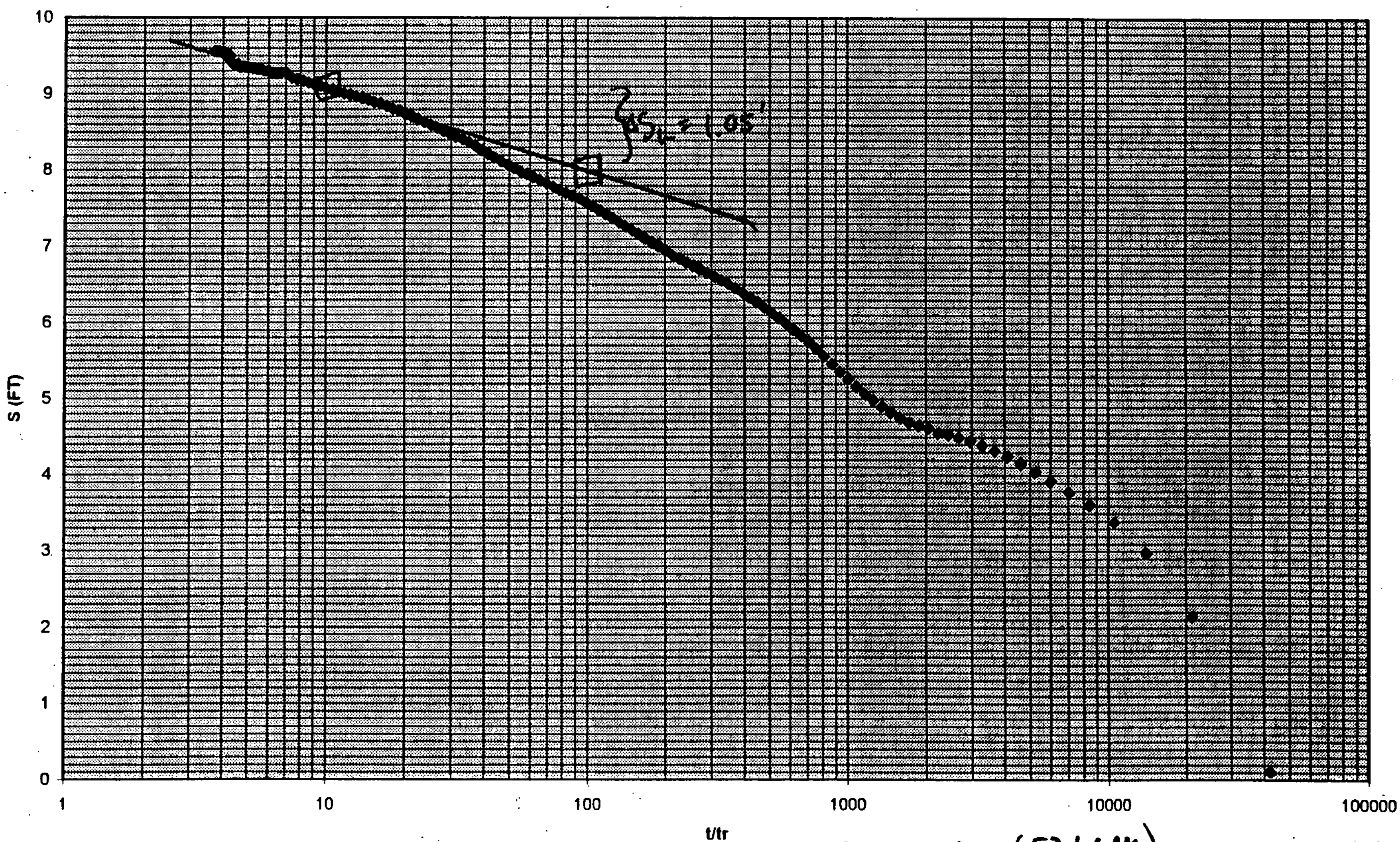
∘ PUMPING WELL 200

Transmissivity [ft²/min]: 8.93×10^{-1}

Hydraulic conductivity [ft/min]: 4.70×10^{-2} = 67.7 FT/D

Aquifer thickness [ft]: 19.00

WELL 200 - AQ REC TEST 1 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833 \left(\frac{52.6\text{GPM}}{1.05'}\right) 192.5 = \frac{1767.6\ \text{FT}^2/\text{D}}{19'}$

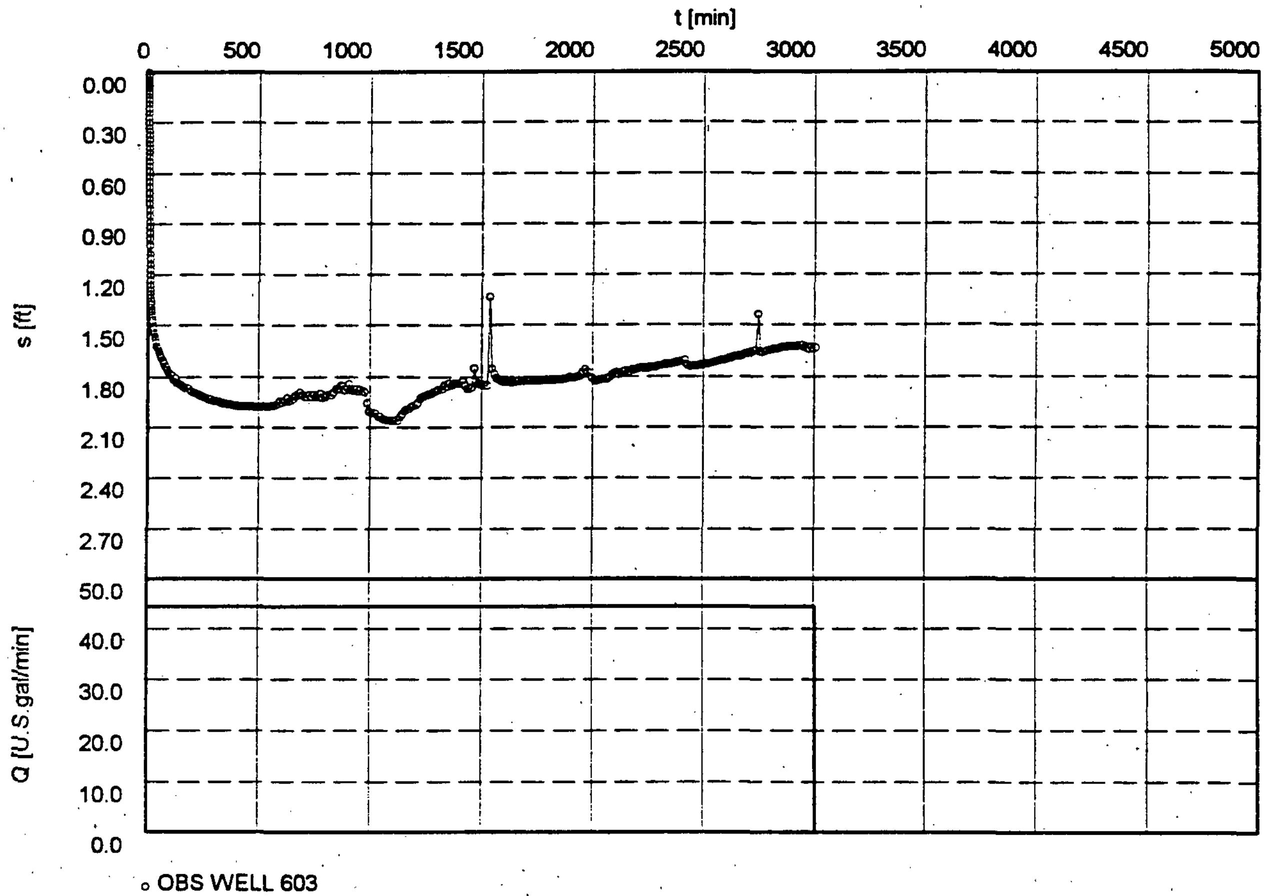
$K_L = \underline{93.0\ \text{FT/D}}$

OBSERVATION WELL 603 DRAWDOWN DATA ANALYSES

WELL 200 AQ TEST 2

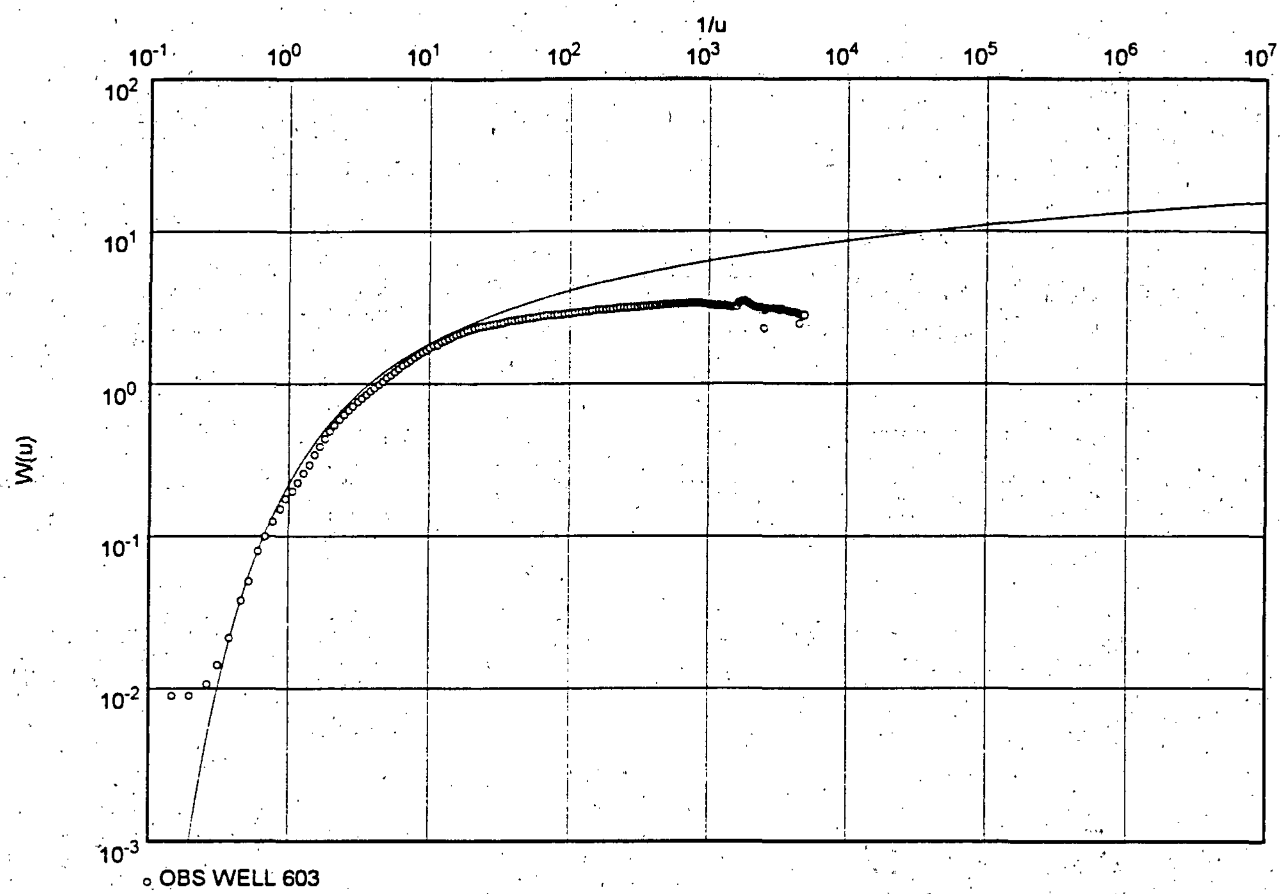
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 15.10.1998

Pumping Test No. 200 AQ TEST	Test conducted on: 9/15 - 9/17/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Theis analysis method Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 15.10.1998

Pumping Test No. 200 AQ TEST	Test conducted on: 9/15 - 9/17/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	



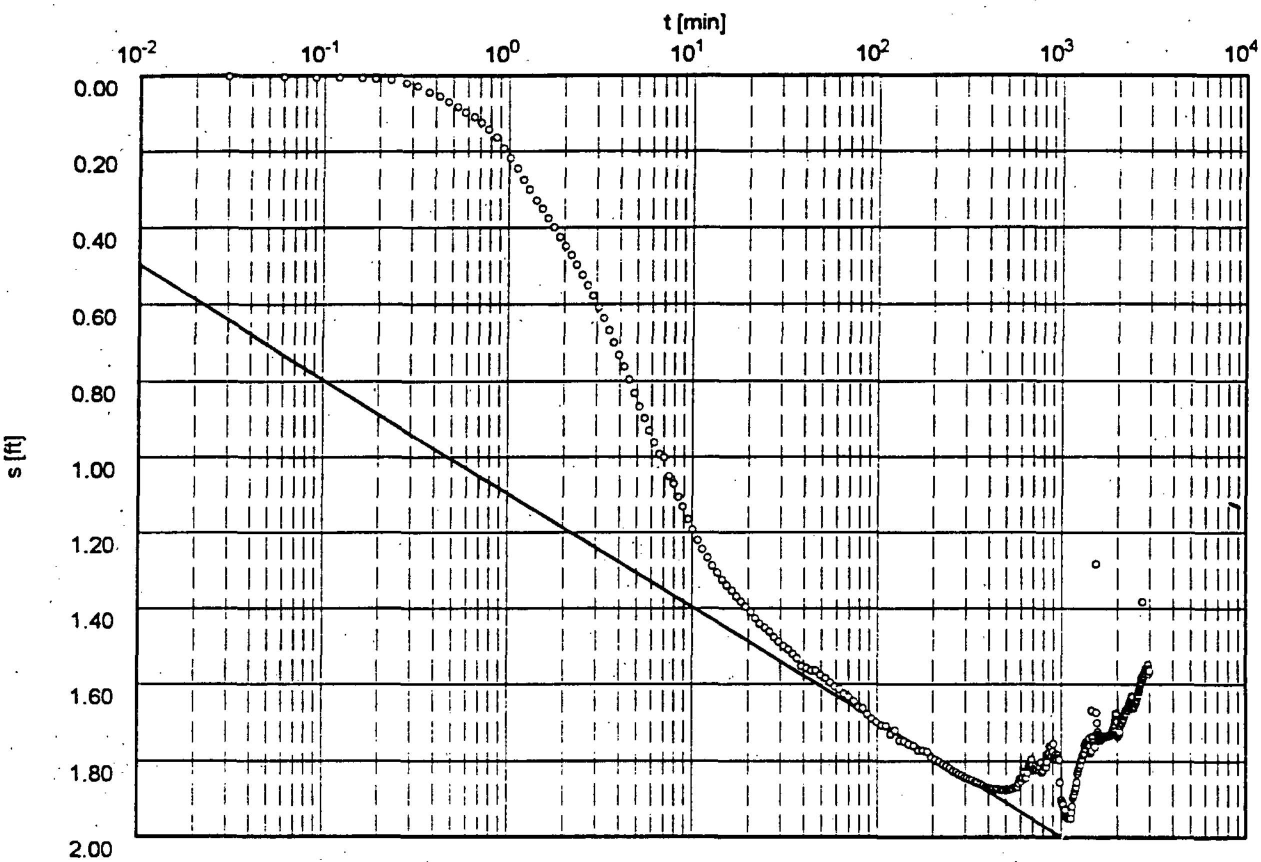
Transmissivity [ft²/min]: 8.41×10^{-1}

Hydraulic conductivity [ft/min]: 4.43×10^{-2} = 63.8 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW.- NEW RIFLE Evaluated by: KP — Date: 15.10.1998

Pumping Test No. 200 AQ TEST	Test conducted on: 9/15 - 9/17/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	



∘ OBS WELL 603

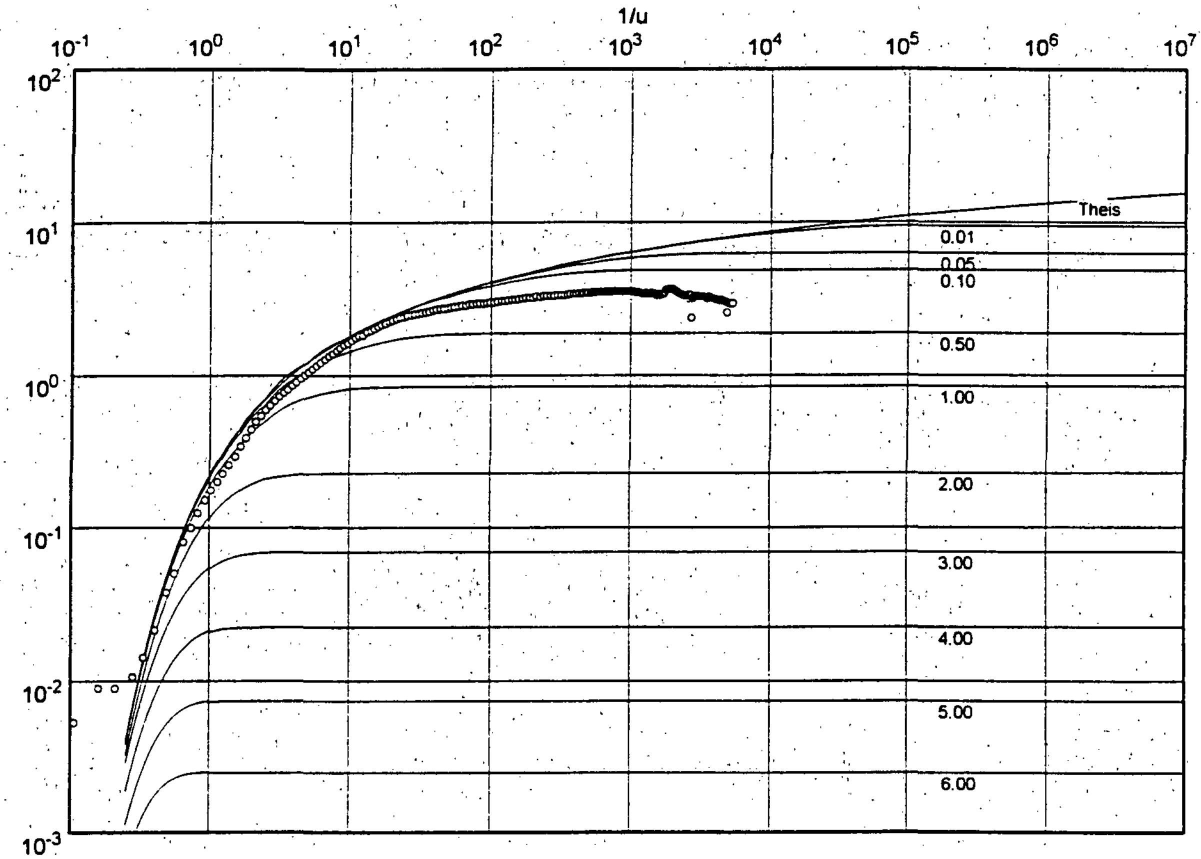
Transmissivity [ft²/min]: 3.63×10^{0}

Hydraulic conductivity [ft/min]: 1.91×10^{-1} = 275.0 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis HANTUSH's method Leaky aquifer, no aquitard storage	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 15.10.1998

Pumping Test No. 200 AQ TEST	Test conducted on: 9/15.- 9/17/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	



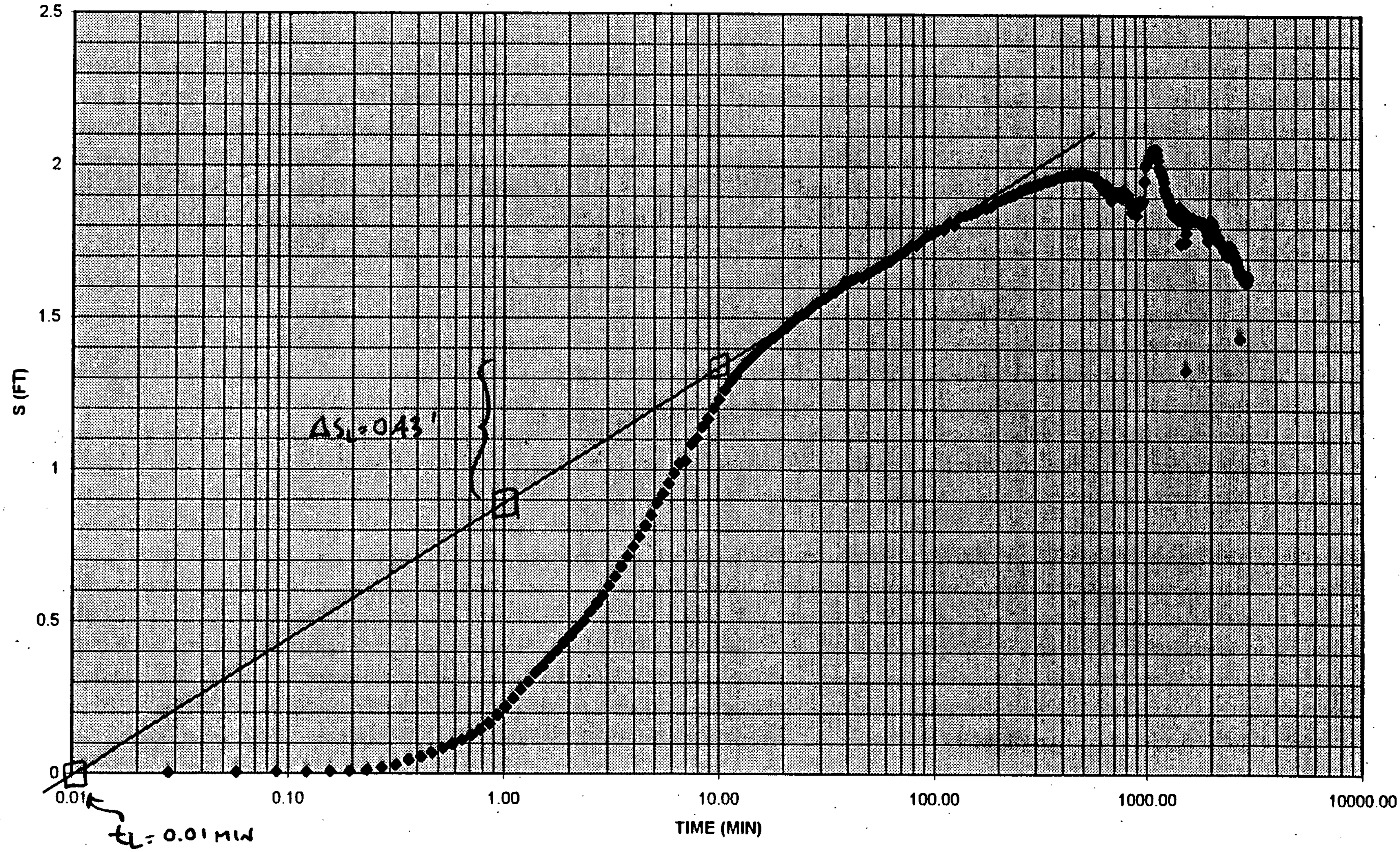
o OBS WELL 603

Transmissivity [ft²/min]: 8.41×10^{-1}

Hydraulic conductivity [ft/min]: 4.43×10^{-2} = 63.8 FT/D

Aquifer thickness [ft]: 19.00

WELL 603 - AQ TEST 2 s DATA
NEUMAN SEMI-LOG METHOD



$T = 0.1833 \left(\frac{44.5 \text{ GAL/MIN}}{0.43 \text{ FT}}\right) 192.5 = 3651.6 \text{ FT}^2/\text{DAY}$

$S_y = 2.246 \frac{(3651.6 \text{ FT}^2/\text{D})(.0000694)}{(29.3 \text{ FT})^2}$

$K = \frac{3651.6 \text{ FT}^2/\text{DAY}}{19.\ldots} = 192.2 \text{ FT/DAY}$

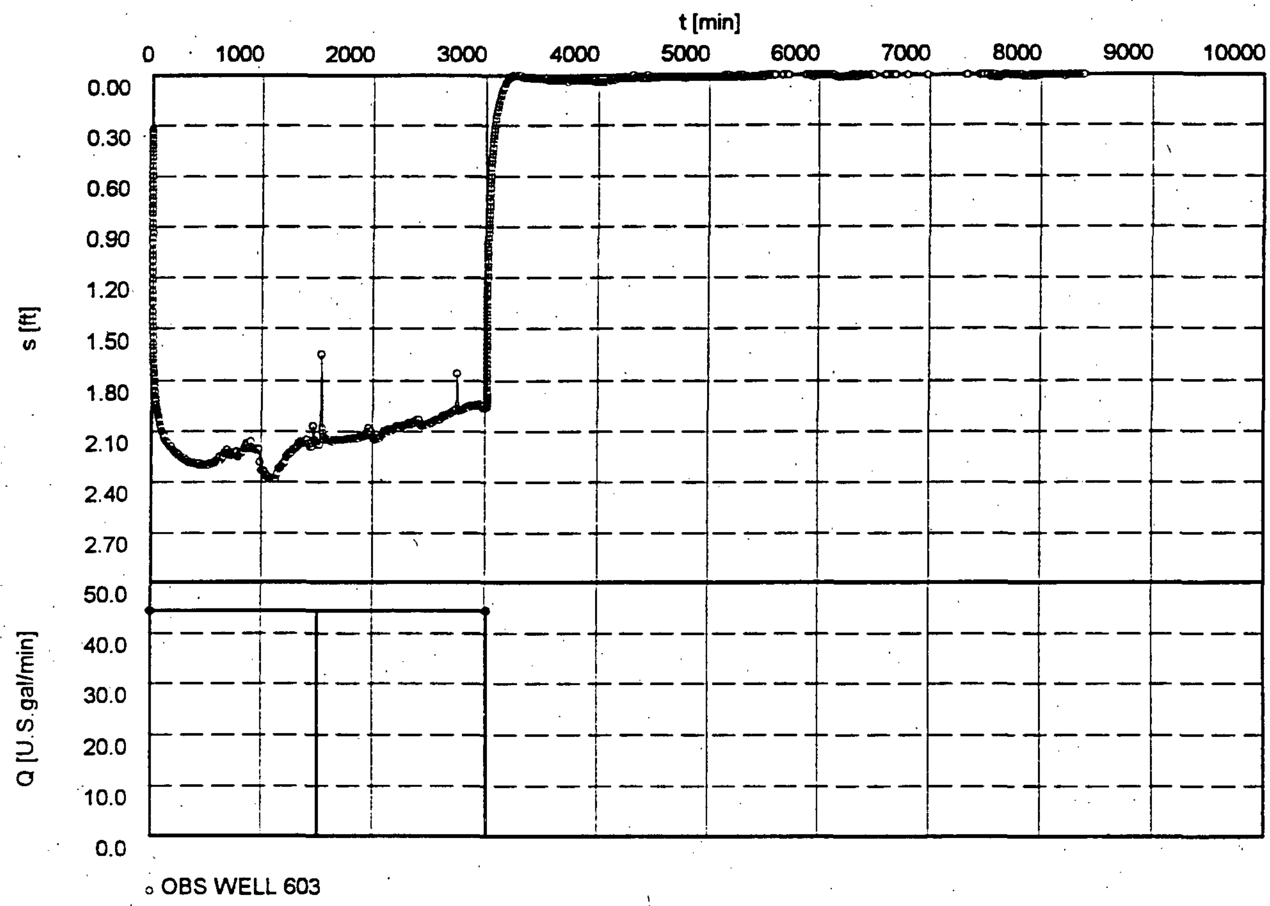
$S_y = 0.000066$

OBSERVATION WELL 603 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 2

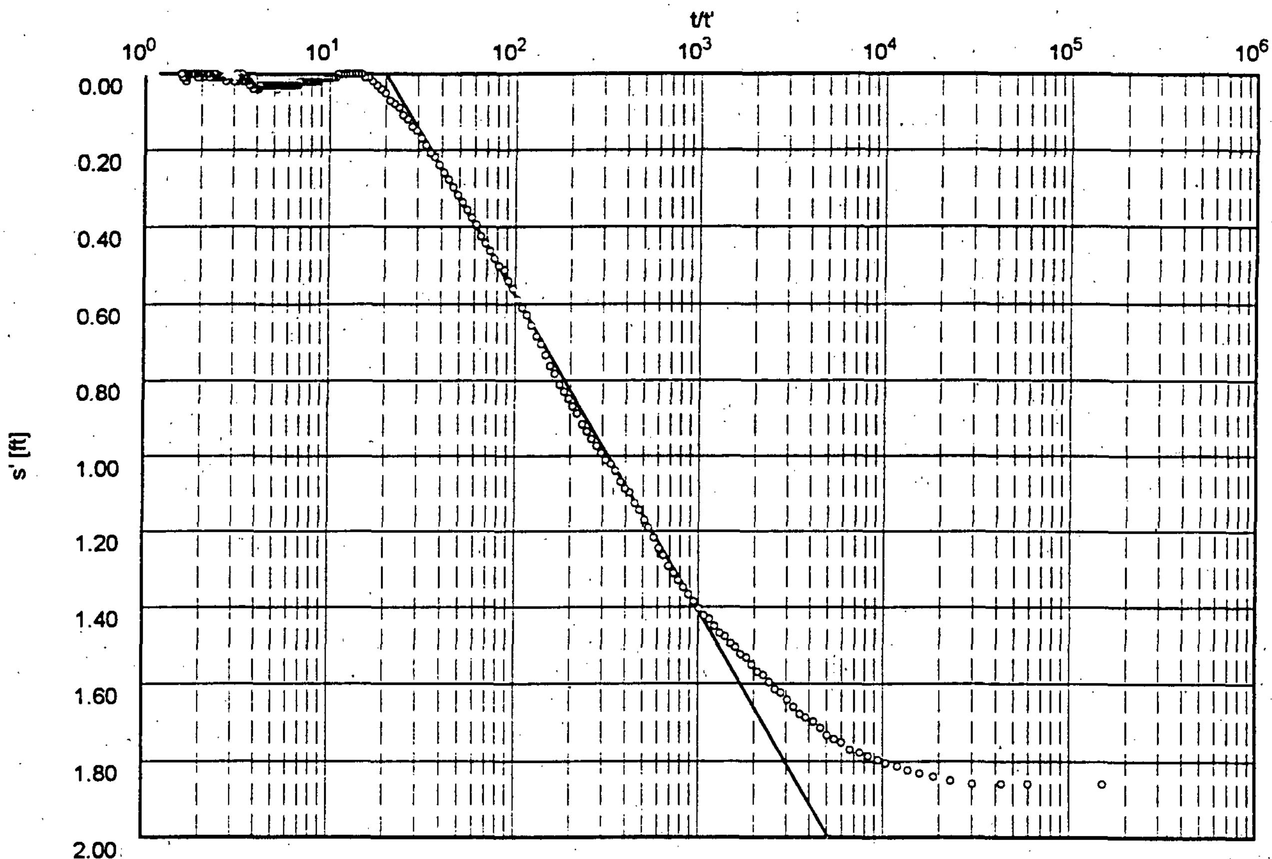
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP / Date: 20.10.1998

Pumping Test No. 200 AQ REC TEST2	Test conducted on: 9/17 - 9/21/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 20.10.1998

Pumping Test No. 200 AQ REC TEST2	Test conducted on: 9/17 - 9/21/98
OBS WELL 603	
Discharge 44.50 U.S.gal/min	
	Pumping test duration: 3014.80 min



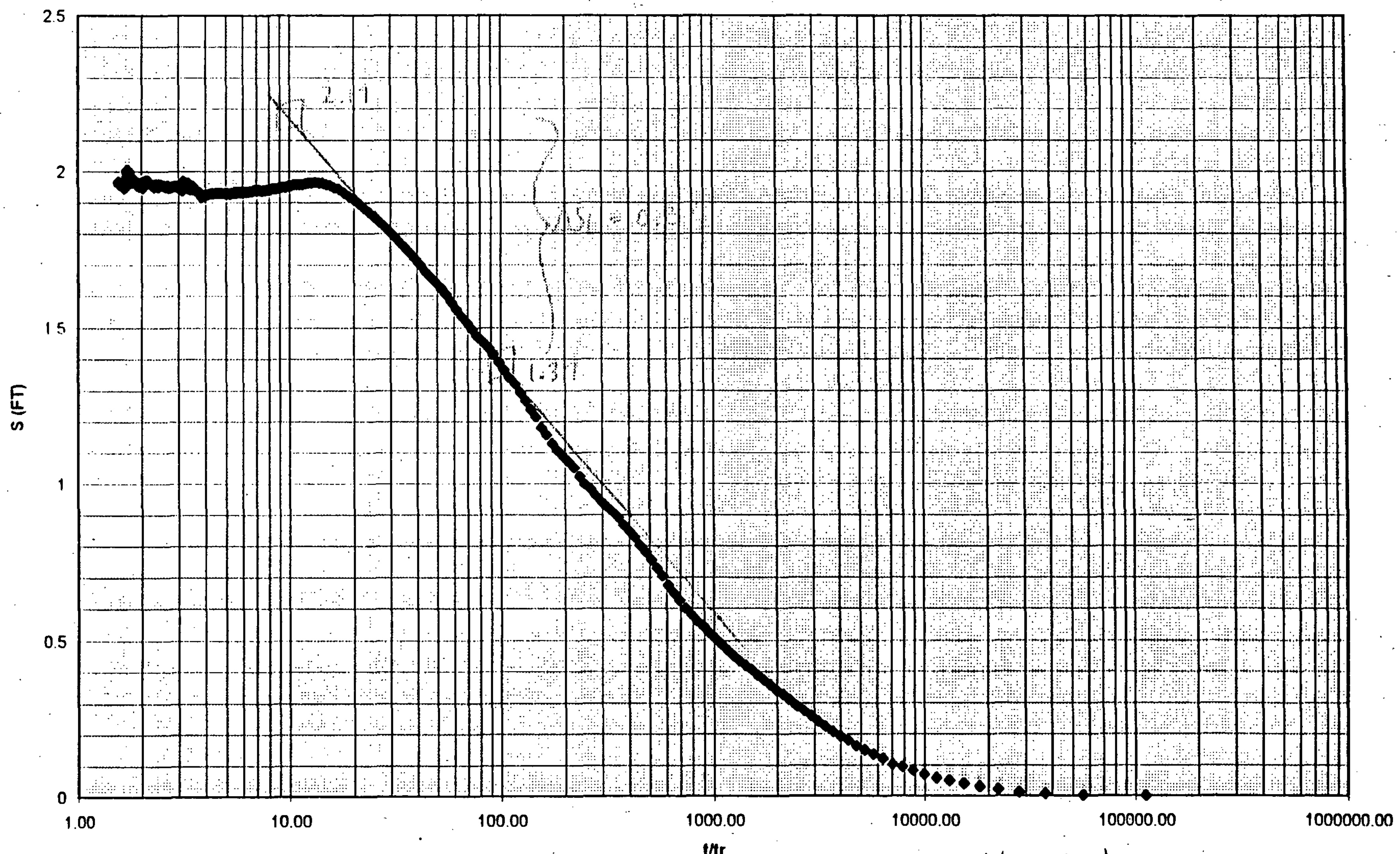
○ OBS WELL 603

Transmissivity [ft²/min]: 1.30×10^0

Hydraulic conductivity [ft/min]: 6.88×10^{-2} = 99.1 Ft/D

Aquifer thickness [ft]: 19.00

WELL 603 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833\left(\frac{44.5 \text{ GPM}}{0.9 \text{ FT}}\right)/92.5 = \frac{1962.7 \text{ FT}^2/\text{D}}{19'}$

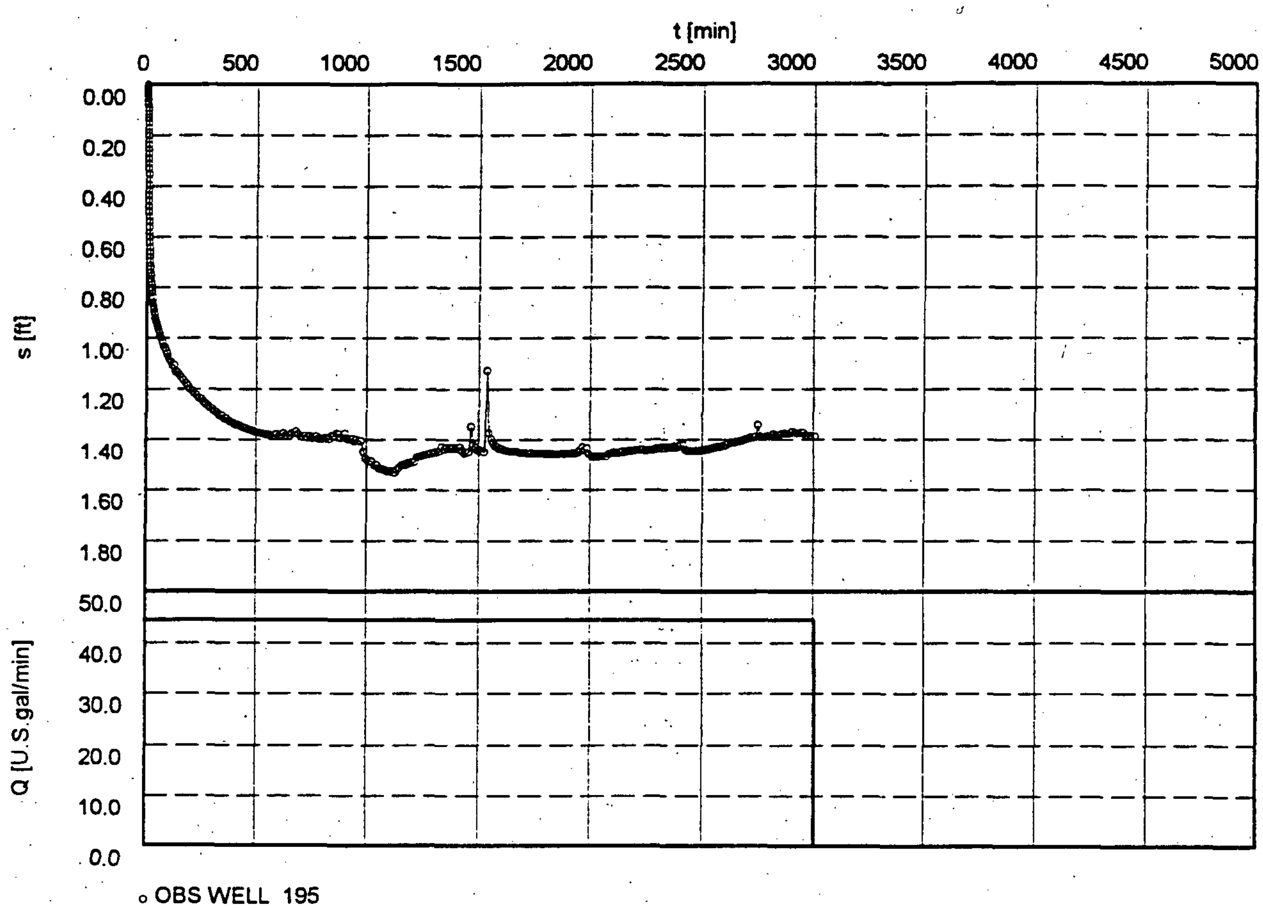
$K_L = 103.3 \text{ FT/D}$

OBSERVATION WELL 195 DRAWDOWN DATA ANALYSES

WELL 200 AQ TEST 2

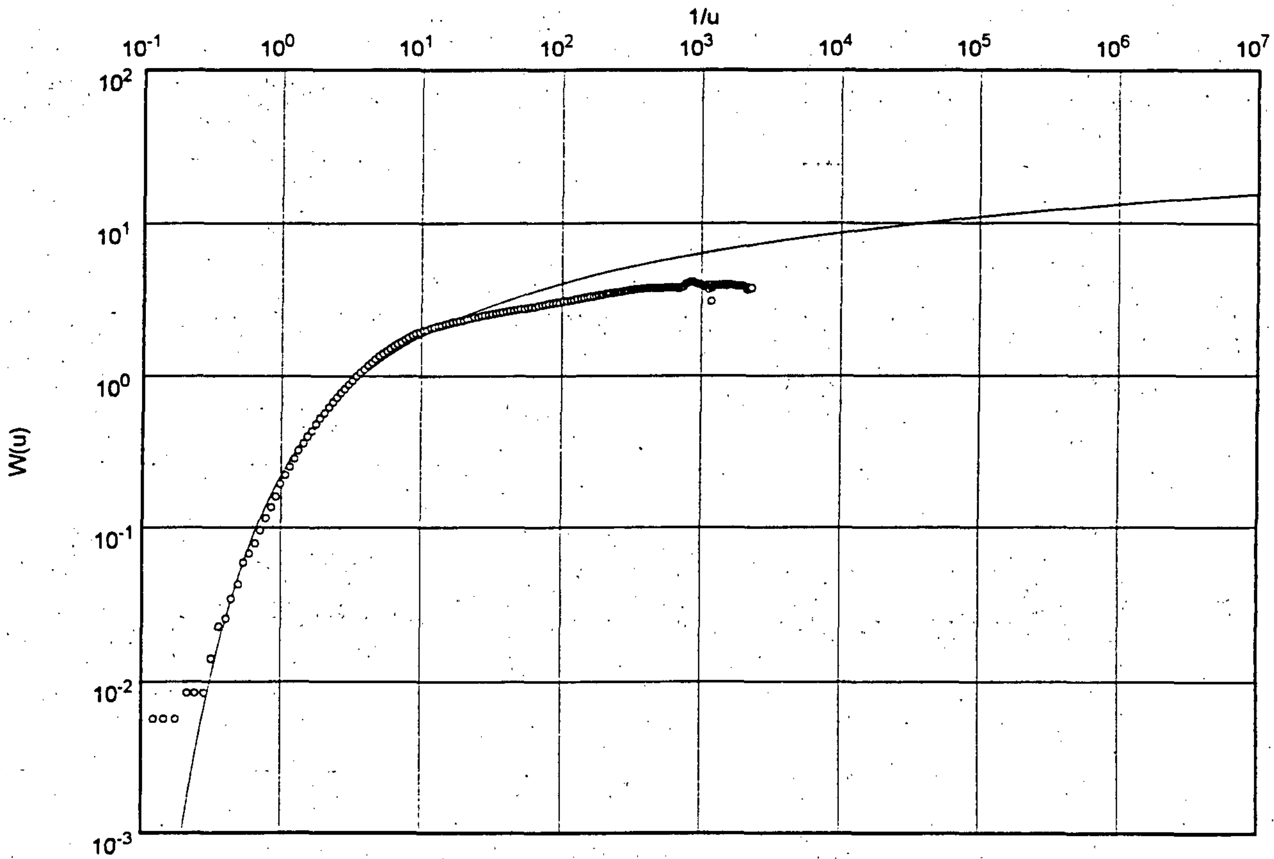
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 15.10.1998

Pumping Test No. 200 AQ TEST 2	Test conducted on: 9/15 - 9/17/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Theis analysis method Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 15.10.1998

Pumping Test No. 200 AQ TEST 2	Test conducted on: 9/15 - 9/17/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	



o OBS WELL 195

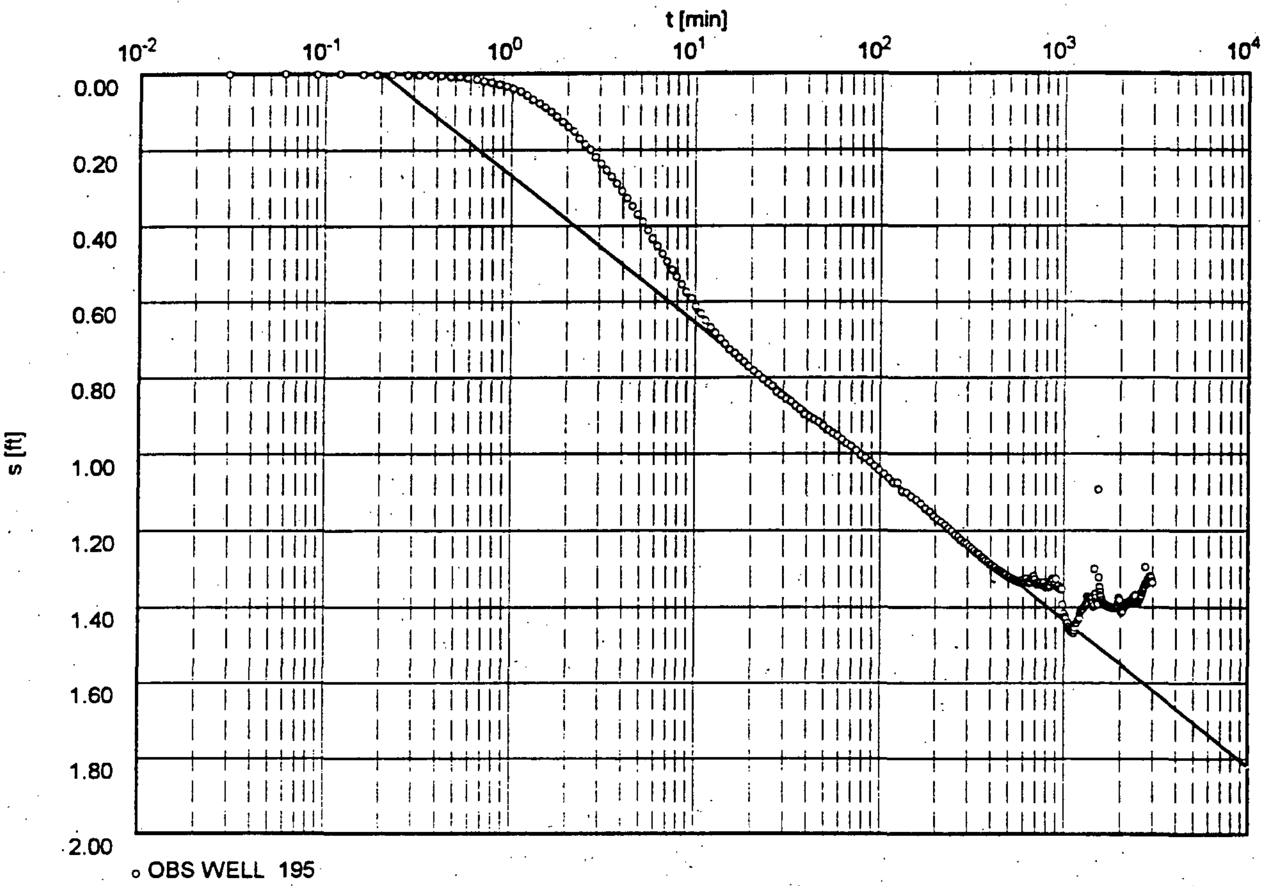
Transmissivity [ft²/min]: 1.33×10^{0}

Hydraulic conductivity [ft/min]: 7.02×10^{-2} = 101.1 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 15.10.1998

Pumping Test No. 200 AQ TEST 2	Test conducted on: 9/15 - 9/17/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	



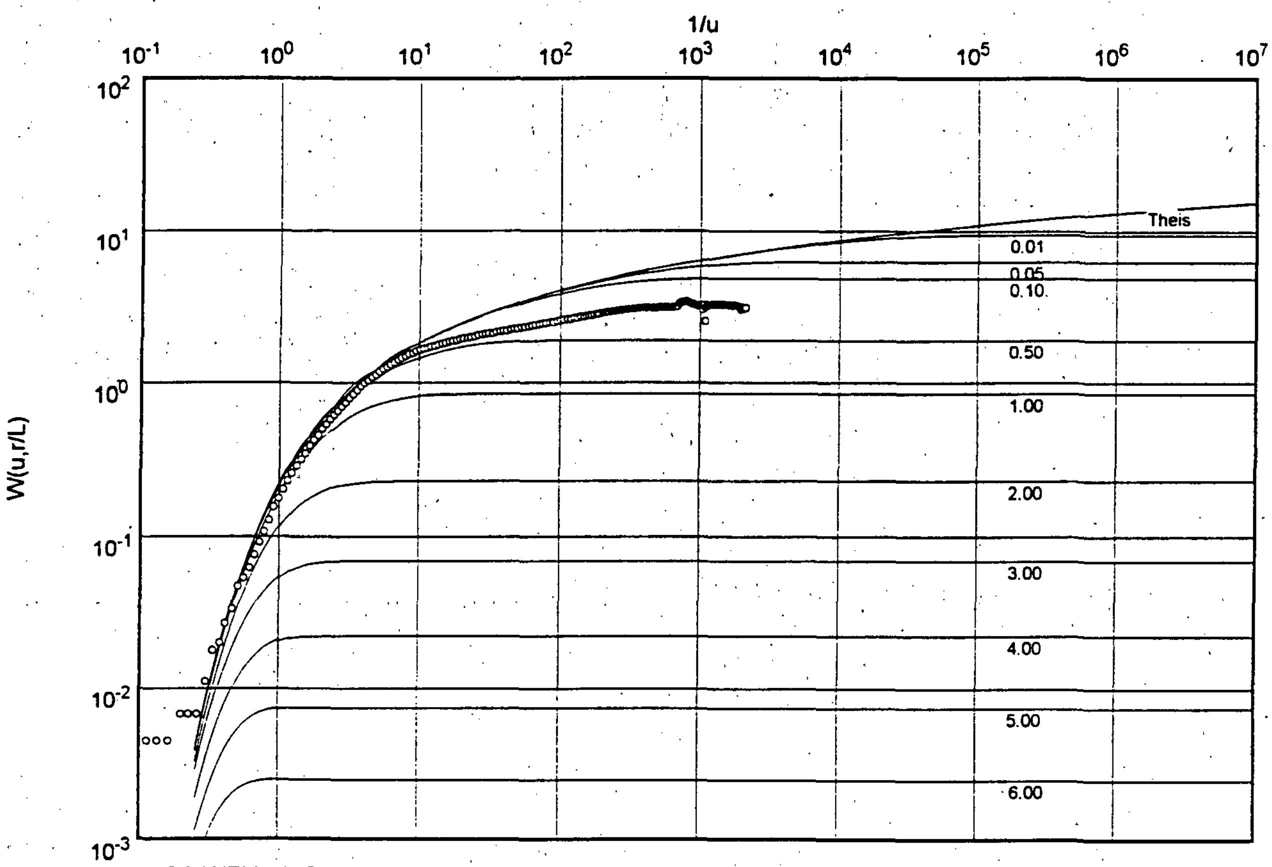
Transmissivity [ft²/min]: 2.80×10^{0}

Hydraulic conductivity [ft/min]: 1.47×10^{-1} = 211.7 FT/D

Aquifer thickness [ft]: 19.00

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis HANTUSH's method Leaky aquifer, no aquitard storage	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 15.10.1998

Pumping Test No. 200 AQ TEST 2	Test conducted on: 9/15 - 9/17/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	



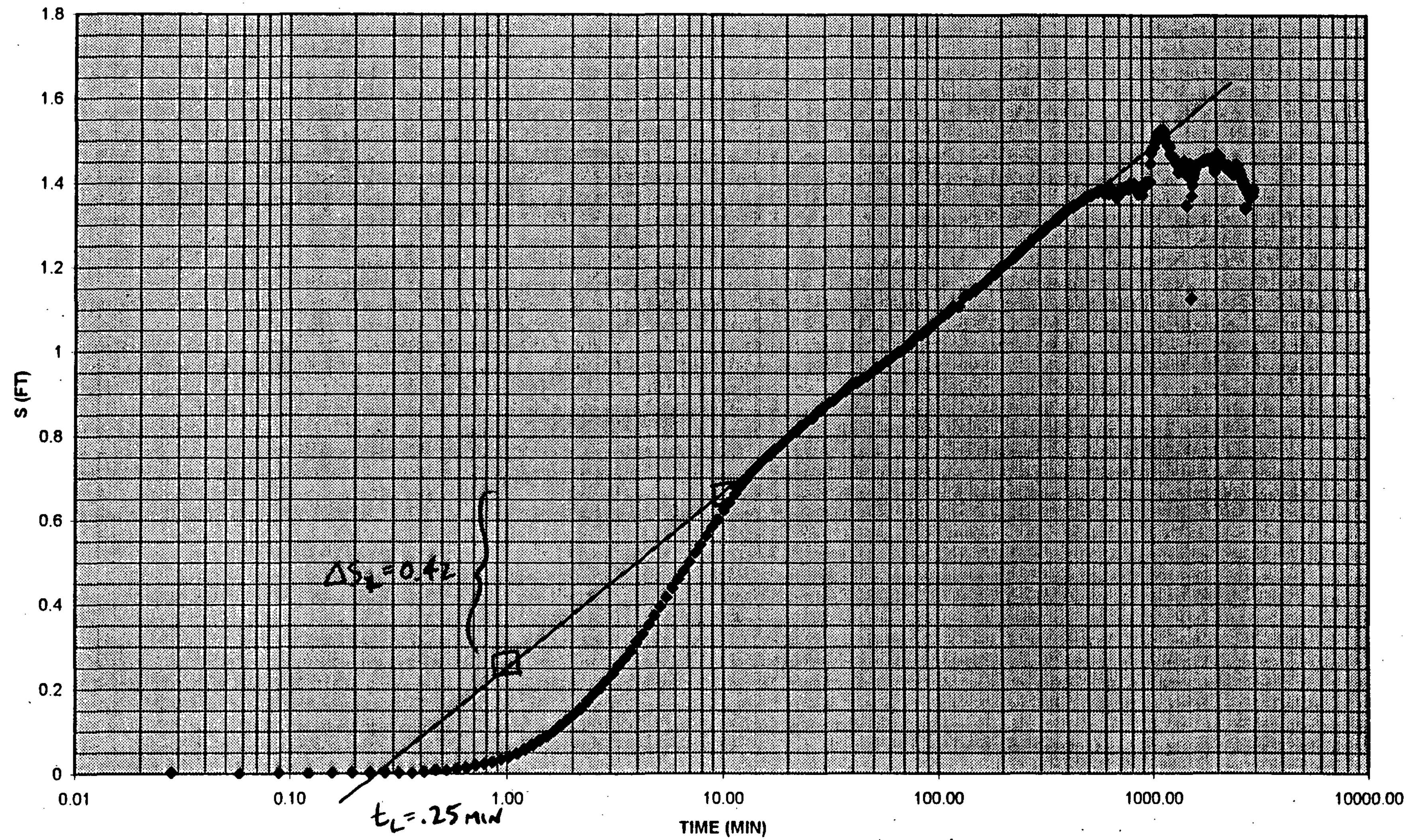
∘ OBS WELL 195

Transmissivity [ft²/min]: 1.05×10^{0}

Hydraulic conductivity [ft/min]: 5.57×10^{-2} = 80.2 FT/D

Aquifer thickness [ft]: 19.00

WELL 195 - AQ TEST 2 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833\left(\frac{44.5\ \text{GAL/MIN}}{.42\ \text{FT}}\right)192.5 = 3738.6\ \text{FT}^2/\text{D}$$

$$K = \frac{3738.6\ \text{FT}^2/\text{D}}{19\ \text{FT}} = \underline{196.2\ \text{FT/D}}$$

$$S_y = \frac{2.246\,(3738.6\ \text{FT}^2/\text{D})(.00017\ \text{D})}{(48.2\ \text{FT})^2}$$

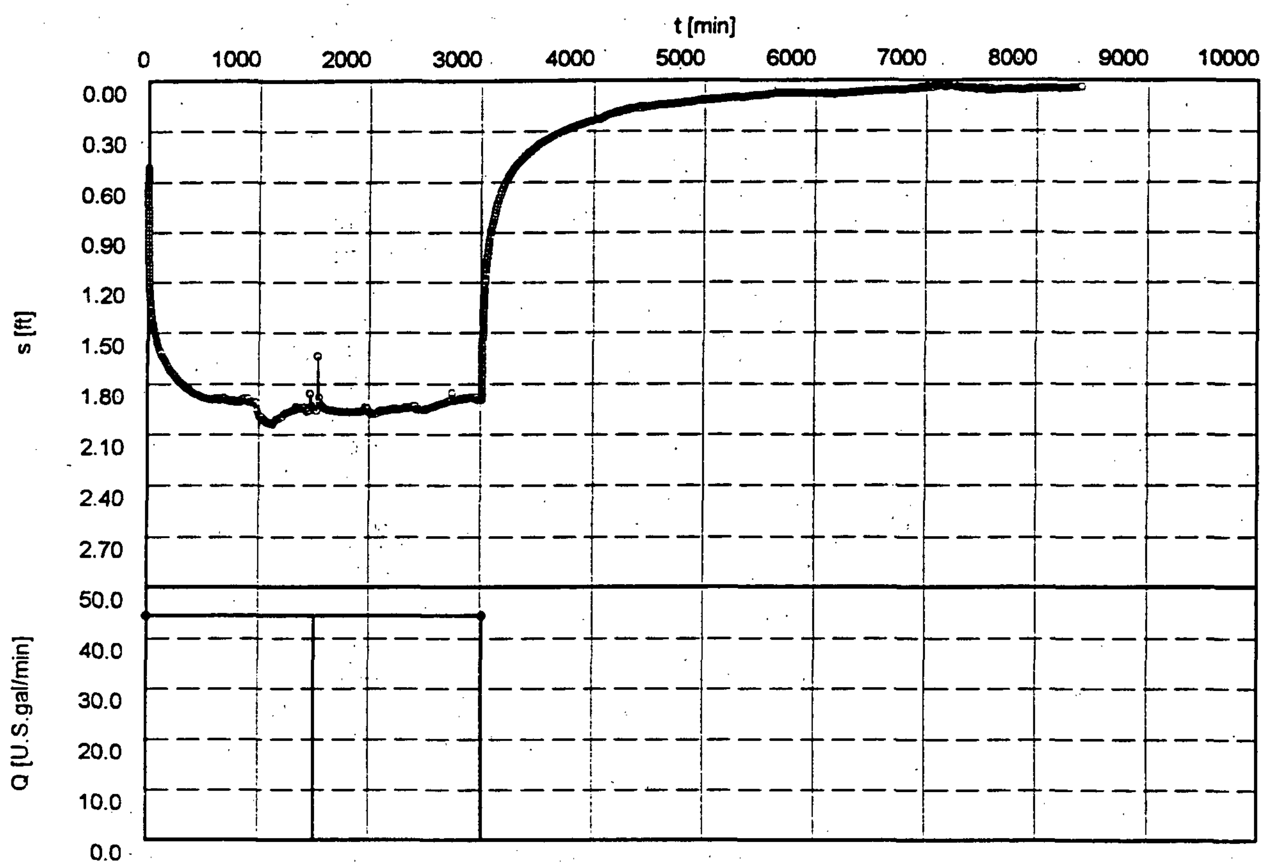
$$S_y = 0.0006$$

OBSERVATION WELL 195 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 2

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 20.10.1998

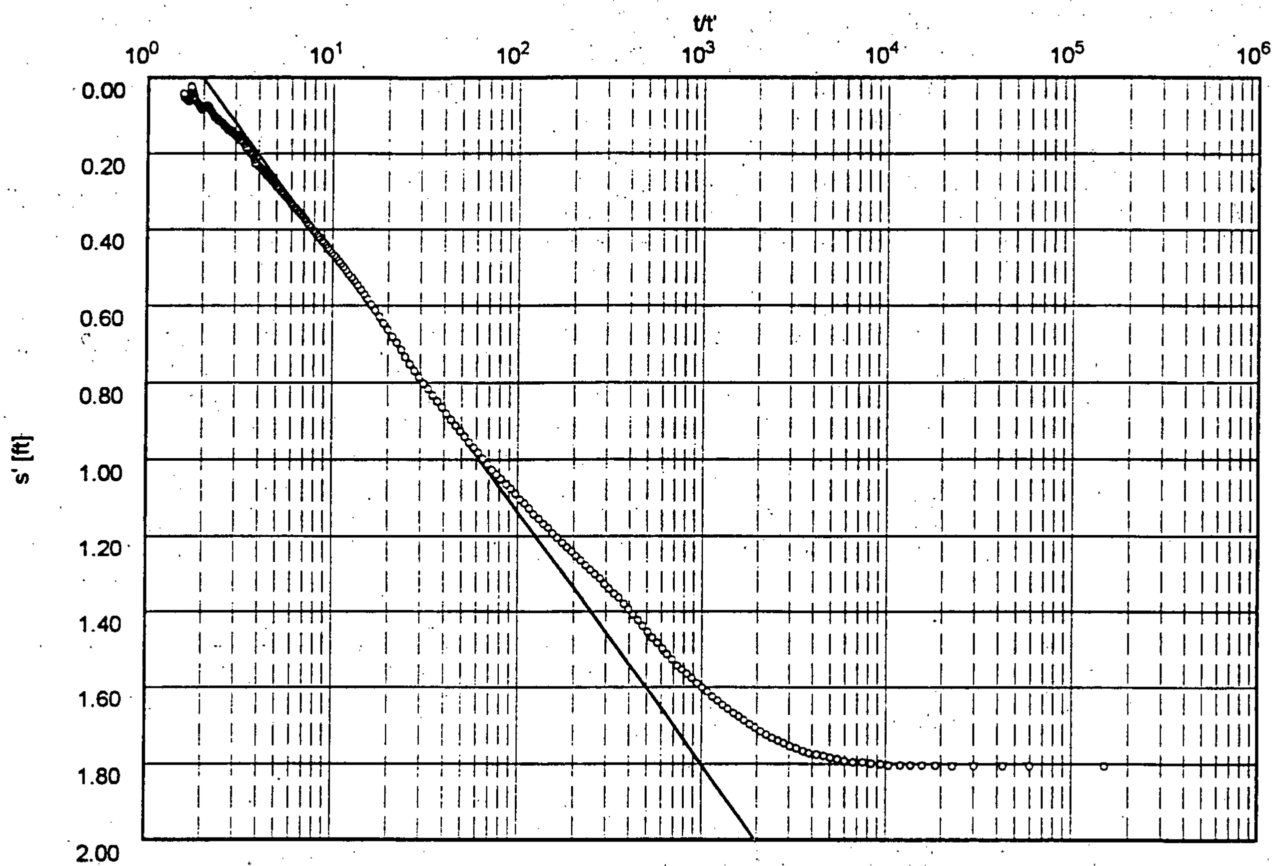
Pumping Test No. 200 AQ REC TEST 2	Test conducted on: 9/17 - 9/21/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	



○ OBS WELL 195

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 20.10.1998

Pumping Test No. 200 AQ REC TEST 2	Test conducted on: 9/17 - 9/21/98
OBS WELL 195	
Discharge 44.50 U.S.gal/min	
	Pumping test duration: 3014.80 min



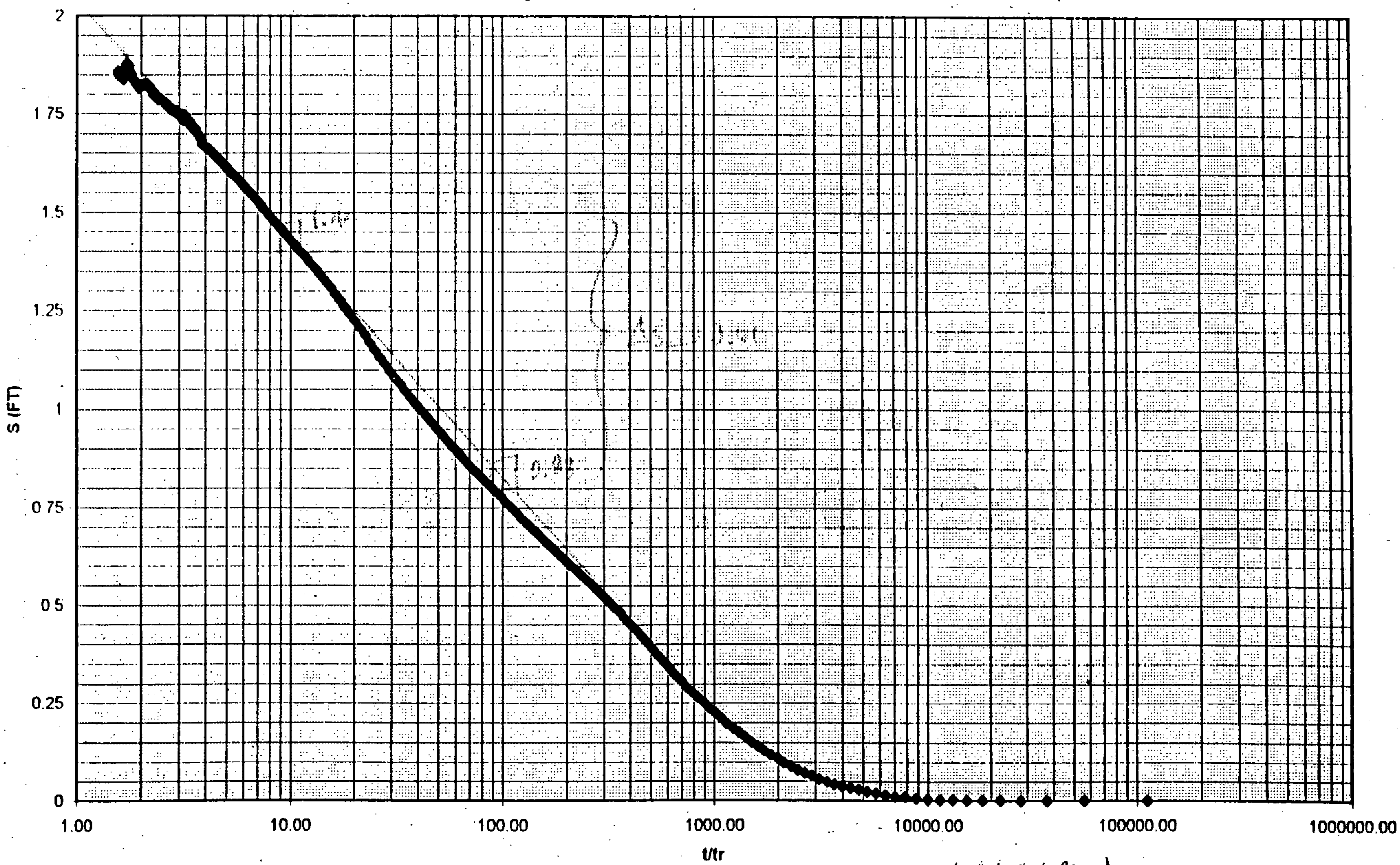
o OBS WELL 195

Transmissivity [ft²/min]: 1.63×10^{0}

Hydraulic conductivity [ft/min]: 8.58×10^{-2} = 123.6 FT/D

Aquifer thickness [ft]: 19.00

WELL 195 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833 \left(\frac{44.5\ gpm}{0.61\ ft}\right) 192.5 = \frac{2574.1\ ft^2/d}{19'}$

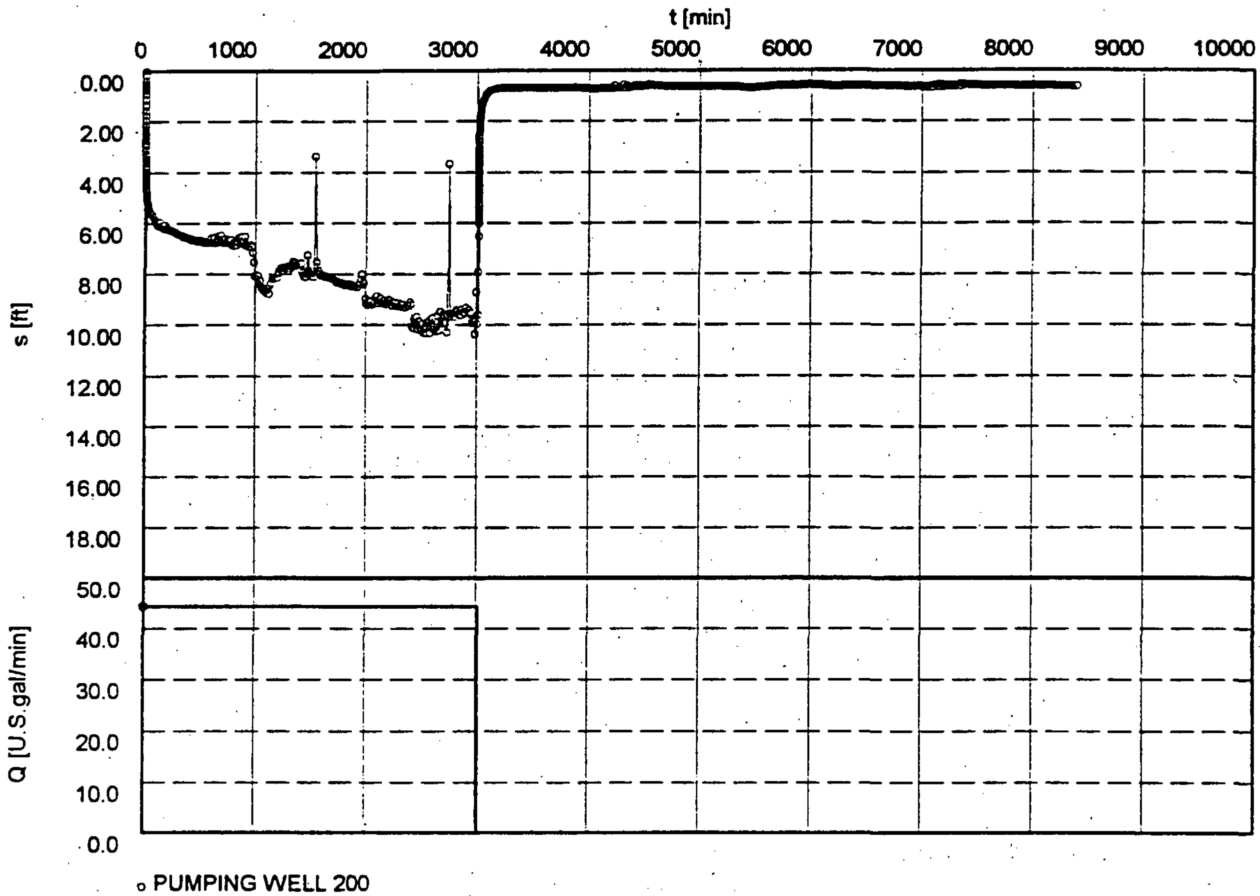
$K_L = 135.5\ ft/d$

PUMPING WELL 200 RECOVERY DATA ANALYSES

WELL 200 AQ TEST 2

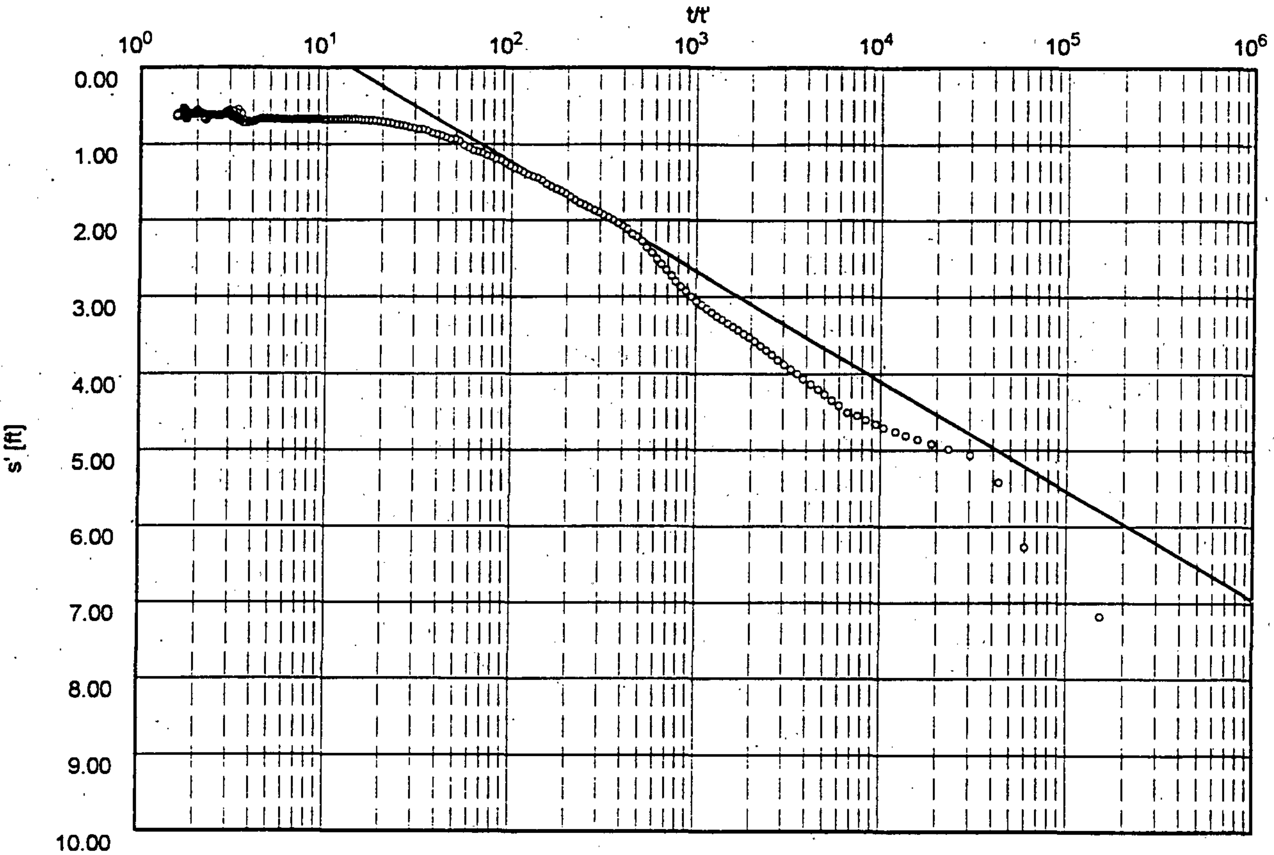
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 20.10.1998

Pumping Test No. 200 REC TEST	Test conducted on: 9/17 - 9/21/98
PUMPING WELL 200	
Discharge 44.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 20.10.1998

Pumping Test No. 200 REC TEST	Test conducted on: 9/17 - 9/21/98
PUMPING WELL 200	
Discharge 44.50 U.S.gal/min	
	Pumping test duration: 3014.80 min

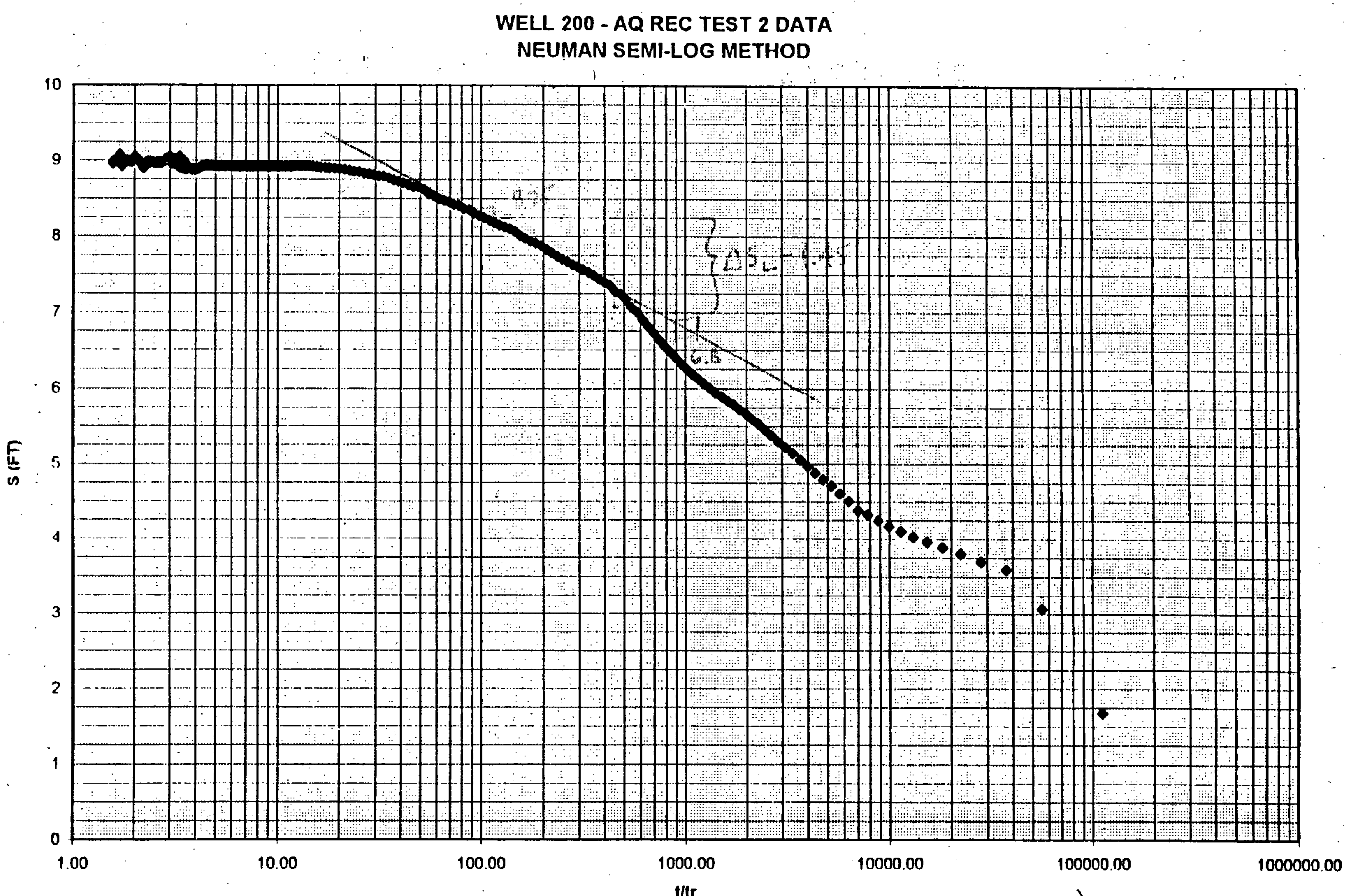


o PUMPING WELL 200

Transmissivity [ft²/min]: 7.60×10^{-1}

Hydraulic conductivity [ft/min]: 4.00×10^{-2} = 57.6 Ft/D

Aquifer thickness [ft]: 19.00



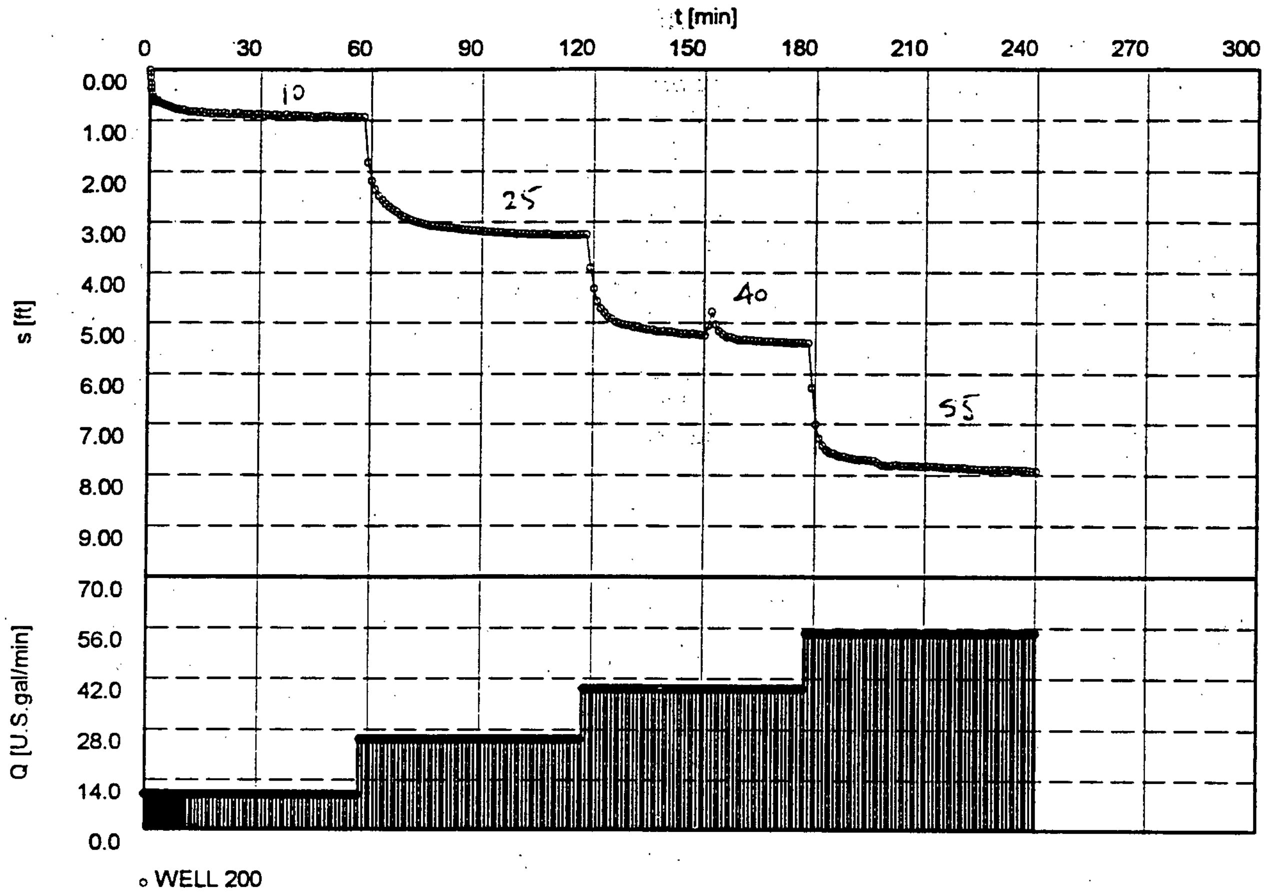
$T_L = 0.1833 \left(\frac{44.5 \text{ GPM}}{1.45'} \right) 192.5 = \frac{1082.9 \text{ ft}^2/\text{D}}{19'}$

$K_L = 56.99 \text{ ft/D}$

PUMPING WELL 200 STEP TEST ANALYSIS

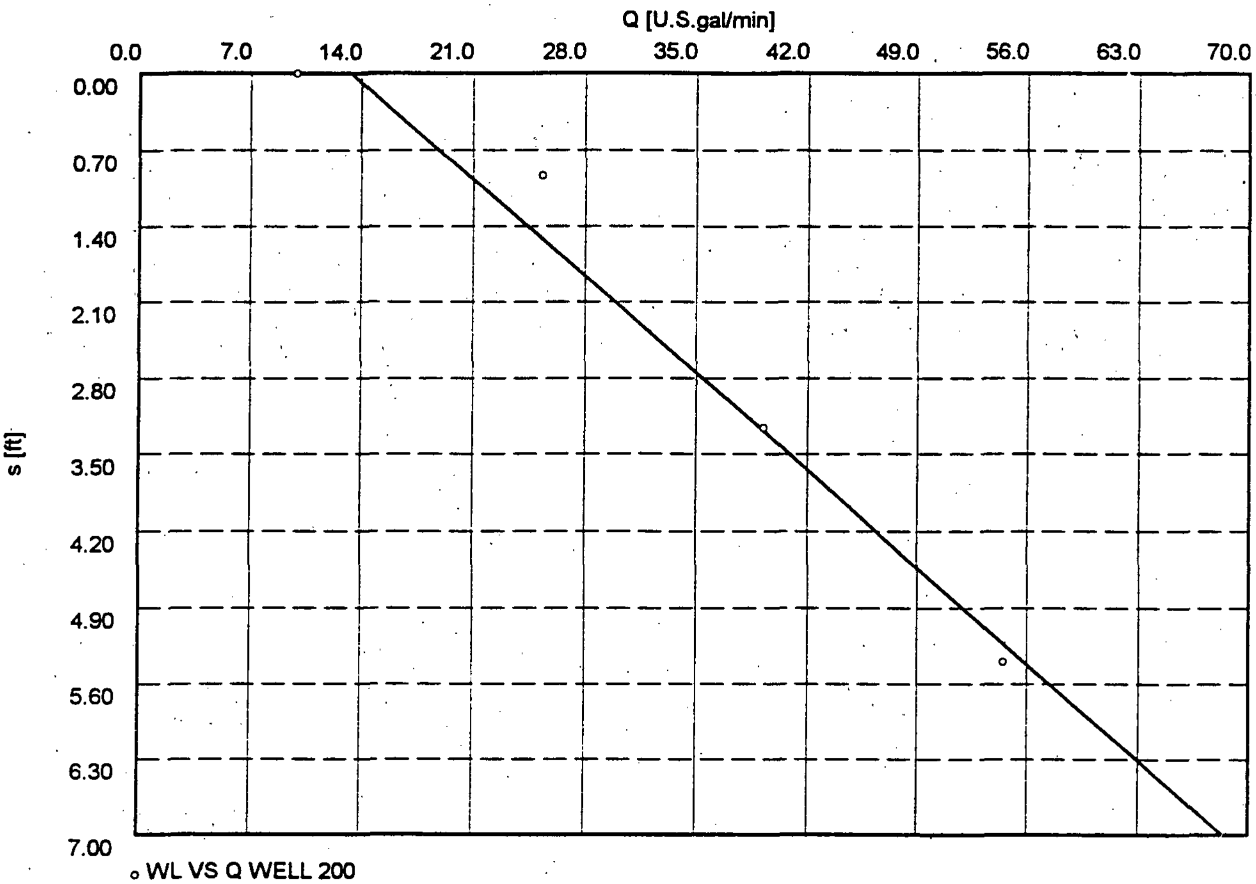
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge.	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 21.10.1998

Pumping Test No. 200 STEP TEST	Test conducted on: 9/10/98
WELL 200	
Discharge 32.68 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Well performance test Determination of specific capacity	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 21.10.1998

Pumping Test No. 200 STEP TEST	Test conducted on: 9/10/98
WELL 200	



specific capacity C [ft²/min]: 1.05×10^{0}

WELL 200 AQUIFER TEST 1 WATER LEVEL DATA

(WELLS 200, 602, 603, & 195)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					distance to	602 = 20.9'
WELL 200 AQUIFER TEST 1 WL DATA				AVG Q = 52.6 GPM		603 = 29.3'
FILE NAME : 200TEST1.XLS						195 = 48.2'
			PUMPING	OBSERVATION	OBSERVATION	OBSERVATION
		ELAPSED	WELL 200	WELL 602	WELL 603	WELL 195
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED						
	9/14/98 12:11:00	0	9.394	10.12	10.455	9.691
	9/14/98 12:11:03	0.0559	9.429	10.12	10.455	9.691
	9/14/98 12:11:07	0.115	9.604	10.12	10.458	9.691
	9/14/98 12:11:11	0.1777	9.753	10.12	10.468	9.691
	9/14/98 12:11:15	0.244	9.96	10.12	10.485	9.693
	9/14/98 12:11:19	0.3144	10.152	10.12	10.503	9.694
	9/14/98 12:11:23	0.3889	10.367	10.12	10.523	9.697
	9/14/98 12:11:28	0.4679	10.548	10.12	10.548	9.699
	9/14/98 12:11:33	0.5515	10.74	10.12	10.571	9.703
	9/14/98 12:11:38	0.64	10.855	10.12	10.595	9.709
	9/14/98 12:11:44	0.7339	11.087	10.12	10.618	9.715
	9/14/98 12:11:50	0.8332	11.363	10.12	10.647	9.72
	9/14/98 12:11:56	0.9385	11.667	10.12	10.679	9.731
	9/14/98 12:12:03	1.05	11.971	10.12	10.715	9.741
	9/14/98 12:12:10	1.1682	12.232	10.12	10.756	9.751
	9/14/98 12:12:18	1.2934	12.407	10.12	10.795	9.764
	9/14/98 12:12:26	1.4259	12.57	10.12	10.83	9.777
	9/14/98 12:12:34	1.5664	12.731	10.12	10.867	9.79
	9/14/98 12:12:43	1.7152	12.854	10.12	10.902	9.805
	9/14/98 12:12:52	1.8727	12.983	10.12	10.936	9.818
	9/14/98 12:13:02	2.0395	13.115	10.12	10.974	9.835
	9/14/98 12:13:13	2.2164	13.261	10.12	11.012	9.852
	9/14/98 12:13:24	2.4037	13.428	10.12	11.053	9.873
	9/14/98 12:13:36	2.602	13.646	10.12	11.097	9.893
	9/14/98 12:13:49	2.8122	13.818	10.12	11.143	9.916
	9/14/98 12:14:02	3.0349	14.018	10.12	11.19	9.94
	9/14/98 12:14:16	3.2707	14.208	10.12	11.239	9.967
	9/14/98 12:14:31	3.5205	14.371	10.12	11.289	9.993
	9/14/98 12:14:47	3.7852	14.514	10.12	11.339	10.024
	9/14/98 12:15:04	4.0655	14.64	10.12	11.387	10.054
	9/14/98 12:15:22	4.3624	14.755	10.12	11.435	10.085
	9/14/98 12:15:41	4.6769	14.878	10.12	11.479	10.119
	9/14/98 12:16:01	5.01	15.004	10.12	11.563	10.157
	9/14/98 12:16:22	5.3629	15.093	10.12	11.578	10.193
	9/14/98 12:16:44	5.7367	15.165	10.12	11.623	10.227
	9/14/98 12:17:08	6.1327	15.222	10.12	11.665	10.26
	9/14/98 12:17:33	6.552	15.308	10.12	11.707	10.291
	9/14/98 12:18:00	6.9964	15.383	10.12	11.751	10.321
	9/14/98 12:18:28	7.467	15.469	10.12	11.793	10.35
	9/14/98 12:18:58	7.9655	15.581	10.12	11.833	10.379
	9/14/98 12:19:30	8.4935	15.724	10.12	11.875	10.407
	9/14/98 12:20:03	9.0529	15.881	10.121	11.923	10.44
	9/14/98 12:20:39	9.6454	16.002	10.12	11.971	10.472

	9/14/98 12:21:16	10.2729	16.085	10.12	12.019	10.501
	9/14/98 12:21:56	10.9377	16.139	10.12	12.055	10.533
	9/14/98 12:22:39	11.6419	16.2	10.12	12.093	10.563
	9/14/98 12:23:23	12.3877	16.254	10.12	12.131	10.591
	9/14/98 12:24:11	13.1777	16.294	10.12	12.161	10.617
	9/14/98 12:25:01	14.0145	16.343	10.12	12.192	10.643
	9/14/98 12:25:54	14.901	16.38	10.12	12.222	10.668
	9/14/98 12:26:50	15.84	16.42	10.123	12.254	10.692
	9/14/98 12:27:50	16.8347	16.449	10.123	12.275	10.713
	9/14/98 12:28:53	17.8884	16.469	10.123	12.299	10.736
	9/14/98 12:30:00	19.0044	16.512	10.123	12.324	10.756
	9/14/98 12:31:11	20.1865	16.541	10.123	12.344	10.776
	9/14/98 12:32:26	21.4387	16.549	10.123	12.365	10.795
	9/14/98 12:33:46	22.7652	16.609	10.123	12.387	10.816
	9/14/98 12:35:10	24.1702	13.866	10.124	12.225	10.8
	9/14/98 12:36:40	25.6585	15.526	10.124	12.215	10.743
	9/14/98 12:38:14	27.235	16.268	10.124	12.311	10.775
	9/14/98 12:39:54	28.9049	16.495	10.124	12.379	10.817
	9/14/98 12:41:41	30.6737	16.563	10.126	12.429	10.855
	9/14/98 12:43:33	32.5474	16.669	10.126	12.458	10.881
	9/14/98 12:45:32	34.532	16.635	10.126	12.487	10.906
	9/14/98 12:47:38	36.6344	16.744	10.126	12.503	10.921
	9/14/98 12:49:52	38.8612	16.778	10.127	12.529	10.942
	9/14/98 12:52:13	41.22	16.816	10.127	12.552	10.962
	9/14/98 12:54:43	43.7187	16.83	10.127	12.568	10.978
	9/14/98 12:57:22	46.3654	16.83	10.127	12.582	10.993
	9/14/98 13:00:10	49.1689	16.867	10.127	12.599	11.01
	9/14/98 13:03:08	52.1385	16.899	10.129	12.615	11.023
	9/14/98 13:06:17	55.2842	16.924	10.129	12.628	11.038
	9/14/98 13:09:37	58.6162	16.947	10.129	12.648	11.055
	9/14/98 13:13:09	62.1457	14.466	10.129	12.519	11.051
	9/14/98 13:16:53	65.8842	16.856	10.129	12.644	11.049
	9/14/98 13:20:51	69.8444	16.945	10.129	12.686	11.087
	9/14/98 13:25:02	74.0392	16.979	10.129	12.711	11.107
	9/14/98 13:29:29	78.4825	16.988	10.129	12.73	11.125
	9/14/98 13:34:11	83.1892	17.008	10.129	12.752	11.142
	9/14/98 13:39:11	88.1747	17.039	10.127	12.771	11.158
	9/14/98 13:44:27	93.4555	17.053	10.127	12.789	11.174
	9/14/98 13:50:03	99.0494	17.202	10.126	12.817	11.196
	9/14/98 13:55:59	104.9747	17.136	10.124	12.832	11.207
	9/14/98 14:02:15	111.251	17.168	10.123	12.858	11.229
	9/14/98 14:08:54	117.8994	17.22	10.121	12.878	11.248
	9/14/98 14:15:57	124.9415	17.191	10.12	12.899	11.267
	9/14/98 14:23:24	132.401	17.222	10.119	12.919	11.284
	9/14/98 14:31:18	140.3025	17.24	10.117	12.942	11.301
	9/14/98 14:39:40	148.6722	17.277	10.116	12.967	11.325
	9/14/98 14:48:32	157.5379	17.283	10.116	12.986	11.342
	9/14/98 14:57:56	166.9289	17.331	10.114	13.006	11.362
	9/14/98 15:07:53	176.8764	17.317	10.114	13.028	11.384
	9/14/98 15:17:53	186.8764	17.363	10.113	13.048	11.403
	9/14/98 15:27:53	196.8764	17.386	10.113	13.067	11.419

9/14/98 15:37:53	206.8764	17.429	10.113	13.085	11.436
9/14/98 15:47:53	216.8764	17.477	10.113	13.105	11.452
9/14/98 15:57:53	226.8764	17.486	10.113	13.114	11.467
9/14/98 16:07:53	236.8764	17.555	10.113	13.141	11.49
9/14/98 16:17:53	246.8764	17.609	10.113	13.157	11.502
9/14/98 16:27:53	256.8764	17.601	10.114	13.17	11.516
9/14/98 16:37:53	266.8764	17.56	10.114	13.17	11.516
9/14/98 16:47:53	276.8764	17.606	10.116	13.195	11.541
9/14/98 16:57:53	286.8764	17.629	10.117	13.205	11.552
9/14/98 17:07:53	296.8764	17.689	10.119	13.22	11.565
9/14/98 17:17:53	306.8764	17.664	10.12	13.23	11.578
9/14/98 17:27:53	316.8764	17.695	10.123	13.242	11.59
9/14/98 17:37:53	326.8764	17.712	10.124	13.249	11.602
9/14/98 17:47:53	336.8764	17.712	10.127	13.259	11.613
9/14/98 17:57:53	346.8764	17.669	10.129	13.266	11.623
9/14/98 18:07:53	356.8764	17.704	10.132	13.274	11.633
9/14/98 18:17:53	366.8764	17.732	10.133	13.285	11.644
9/14/98 18:27:53	376.8764	17.77	10.136	13.295	11.654
9/14/98 18:37:53	386.8764	17.813	10.137	13.303	11.664
9/14/98 18:47:53	396.8764	17.853	10.14	13.31	11.673
9/14/98 18:57:53	406.8764	17.907	10.143	13.316	11.684
9/14/98 19:07:53	416.8764	17.933	10.145	13.323	11.691
9/14/98 19:17:53	426.8764	17.967	10.148	13.33	11.7
9/14/98 19:27:53	436.8764	18.022	10.149	13.335	11.71
9/14/98 19:37:53	446.8764	18.025	10.151	13.342	11.718
9/14/98 19:47:53	456.8764	18.067	10.152	13.346	11.729
9/14/98 19:57:53	466.8764	18.096	10.153	13.352	11.738
9/14/98 20:07:53	476.8764	18.151	10.155	13.358	11.745
9/14/98 20:17:53	486.8764	18.171	10.156	13.359	11.754
9/14/98 20:27:53	496.8764	18.228	10.159	13.365	11.761
9/14/98 20:37:53	506.8764	18.251	10.161	13.373	11.768
9/14/98 20:47:53	516.8764	18.257	10.162	13.375	11.776
9/14/98 20:57:53	526.8764	18.257	10.164	13.377	11.781
9/14/98 21:07:53	536.8764	18.067	10.165	13.374	11.786
9/14/98 21:17:53	546.8764	17.984	10.167	13.359	11.778
9/14/98 21:27:53	556.8764	17.984	10.167	13.355	11.778
9/14/98 21:37:53	566.8764	17.99	10.168	13.351	11.781
9/14/98 21:47:53	576.8764	18.016	10.169	13.352	11.784
9/14/98 21:57:53	586.8764	18.025	10.169	13.351	11.79
9/14/98 22:07:53	596.8764	18.025	10.171	13.351	11.796
9/14/98 22:17:53	606.8764	18.05	10.171	13.349	11.799
9/14/98 22:27:53	616.8764	18.085	10.172	13.348	11.802
9/14/98 22:37:53	626.8764	18.053	10.172	13.345	11.805
9/14/98 22:47:53	636.8764	18.082	10.172	13.343	11.807
9/14/98 22:57:53	646.8764	18.113	10.172	13.342	11.813
9/14/98 23:07:53	656.8764	18.113	10.172	13.341	11.816
9/14/98 23:17:53	666.8764	18.119	10.172	13.339	11.819
9/14/98 23:27:53	676.8764	18.245	10.172	13.339	11.822
9/14/98 23:37:53	686.8764	19.024	10.172	13.391	11.855
9/14/98 23:47:53	696.8764	19.084	10.172	13.396	11.864
9/14/98 23:57:53	706.8764	19.07	10.174	13.396	11.867

	9/15/98 0:07:53	716.8764	19.07	10.174	13.394	11.87
	9/15/98 0:17:53	726.8764	19.041	10.174	13.39	11.871
	9/15/98 0:27:53	736.8764	19.113	10.175	13.391	11.874
	9/15/98 0:37:53	746.8764	19.03	10.175	13.386	11.876
	9/15/98 0:47:53	756.8764	19.07	10.175	13.386	11.88
	9/15/98 0:57:53	766.8764	18.998	10.175	13.38	11.88
	9/15/98 1:07:53	776.8764	19.141	10.175	13.381	11.884
	9/15/98 1:17:53	786.8764	19.056	10.177	13.381	11.889
	9/15/98 1:27:53	796.8764	18.964	10.177	13.373	11.887
	9/15/98 1:37:53	806.8764	18.795	10.177	13.365	11.884
	9/15/98 1:47:53	816.8764	18.952	10.177	13.365	11.887
	9/15/98 1:57:53	826.8764	18.912	10.177	13.361	11.889
	9/15/98 2:07:53	836.8764	18.944	10.177	13.358	11.89
	9/15/98 2:17:53	846.8764	18.867	10.177	13.352	11.89
	9/15/98 2:27:53	856.8764	18.995	10.178	13.354	11.894
	9/15/98 2:37:53	866.8764	19.024	10.178	13.351	11.894
	9/15/98 2:47:53	876.8764	18.889	10.178	13.346	11.899
	9/15/98 2:57:53	886.8764	18.958	10.178	13.341	11.899
	9/15/98 3:07:53	896.8764	18.99	10.178	13.338	11.899
	9/15/98 3:17:53	906.8764	18.944	10.178	13.341	11.903
	9/15/98 3:27:53	916.8764	19.001	10.178	13.339	11.905
	9/15/98 3:37:53	926.8764	19.053	10.178	13.338	11.908
	9/15/98 3:47:53	936.8764	19.001	10.178	13.33	11.908
	9/15/98 3:57:53	946.8764	18.924	10.178	13.327	11.908
	9/15/98 4:07:53	956.8764	19.236	10.178	13.332	11.912
	9/15/98 4:17:53	966.8764	19.09	10.178	13.329	11.913
	9/15/98 4:27:53	976.8764	18.783	10.178	13.314	11.909
	9/15/98 4:37:53	986.8764	18.955	10.178	13.316	11.912
	9/15/98 4:47:53	996.8764	19.213	10.178	13.319	11.915
	9/15/98 4:57:53	1006.8764	19.136	10.178	13.316	11.918
	9/15/98 5:07:53	1016.8764	19.11	10.178	13.31	11.916
	9/15/98 5:17:53	1026.8764	19.184	10.178	13.314	11.922
	9/15/98 5:27:53	1036.8764	19.247	10.18	13.31	11.921
	9/15/98 5:37:53	1046.8764	19.276	10.18	13.309	11.923
	9/15/98 5:47:53	1056.8764	19.345	10.18	13.309	11.925
	9/15/98 5:57:53	1066.8764	19.285	10.18	13.306	11.926
	9/15/98 6:07:53	1076.8764	19.356	10.18	13.301	11.928
	9/15/98 6:17:53	1086.8764	19.245	10.18	13.293	11.926
	9/15/98 6:27:53	1096.8764	19.184	10.18	13.285	11.922
	9/15/98 6:37:53	1106.8764	19.293	10.18	13.284	11.925
	9/15/98 6:47:53	1116.8764	19.382	10.18	13.279	11.925
	9/15/98 6:57:53	1126.8764	19.348	10.18	13.281	11.926
PUMP STOPPED						
	9/15/98 7:04:57	1133.96283	19.348	10.779	13.291	11.91
	9/15/98 7:04:59	1133.98973	19.236	10.779	13.291	11.911
	9/15/98 7:05:01	1134.01653	17.205	10.779	13.291	11.91
	9/15/98 7:05:02	1134.04333	16.371	10.78	13.289	11.91
	9/15/98 7:05:04	1134.07023	15.962	10.78	13.284	11.91
	9/15/98 7:05:05	1134.09703	15.744	10.78	13.28	11.91
	9/15/98 7:05:07	1134.12383	15.569	10.779	13.271	11.91
	9/15/98 7:05:09	1134.15073	15.426	10.779	13.262	11.91

9/15/98 7:05:10	1134.17873	15.303	10.779	13.249	11.909
9/15/98 7:05:12	1134.20833	15.194	10.78	13.241	11.909
9/15/98 7:05:14	1134.23973	15.102	10.779	13.229	11.907
9/15/98 7:05:16	1134.27283	15.025	10.78	13.217	11.904
9/15/98 7:05:18	1134.30803	14.961	10.779	13.206	11.903
9/15/98 7:05:20	1134.34533	14.901	10.779	13.193	11.901
9/15/98 7:05:23	1134.38483	14.858	10.777	13.181	11.898
9/15/98 7:05:25	1134.42673	14.815	10.776	13.171	11.896
9/15/98 7:05:28	1134.47103	14.795	10.774	13.165	11.894
9/15/98 7:05:31	1134.51803	14.735	10.771	13.147	11.888
9/15/98 7:05:34	1134.56783	14.703	10.77	13.137	11.885
9/15/98 7:05:37	1134.62053	14.658	10.776	13.129	11.881
9/15/98 7:05:40	1134.67633	14.597	10.779	13.118	11.875
9/15/98 7:05:44	1134.73553	14.526	10.78	13.108	11.869
9/15/98 7:05:48	1134.79823	14.451	10.78	13.097	11.865
9/15/98 7:05:52	1134.86453	14.371	10.78	13.086	11.859
9/15/98 7:05:56	1134.93483	14.288	10.78	13.075	11.853
9/15/98 7:06:00	1135.00933	14.193	10.779	13.062	11.848
9/15/98 7:06:05	1135.08833	14.093	10.779	13.047	11.842
9/15/98 7:06:10	1135.17203	13.998	10.78	13.033	11.835
9/15/98 7:06:15	1135.26053	13.892	10.78	13.018	11.826
9/15/98 7:06:21	1135.35433	13.789	10.78	13.001	11.819
9/15/98 7:06:27	1135.45373	13.697	10.78	12.985	11.809
9/15/98 7:06:33	1135.55903	13.603	10.78	12.969	11.801
9/15/98 7:06:40	1135.67053	13.522	10.779	12.951	11.791
9/15/98 7:06:47	1135.78873	13.445	10.78	12.934	11.781
9/15/98 7:06:54	1135.91383	13.367	10.779	12.918	11.769
9/15/98 7:07:02	1136.04633	13.287	10.78	12.899	11.759
9/15/98 7:07:11	1136.18683	13.213	10.78	12.883	11.748
9/15/98 7:07:20	1136.33573	13.144	10.78	12.865	11.735
9/15/98 7:07:29	1136.49323	13.081	10.78	12.847	11.722
9/15/98 7:07:39	1136.66003	13.015	10.78	12.829	11.71
9/15/98 7:07:50	1136.83683	12.952	10.78	12.813	11.697
9/15/98 7:08:01	1137.02423	12.9	10.781	12.794	11.684
9/15/98 7:08:13	1137.22253	12.843	10.78	12.777	11.669
9/15/98 7:08:26	1137.43273	12.791	10.781	12.759	11.656
9/15/98 7:08:39	1137.65533	12.742	10.78	12.74	11.643
9/15/98 7:08:53	1137.89123	12.694	10.78	12.724	11.629
9/15/98 7:09:08	1138.14103	12.648	10.781	12.705	11.616
9/15/98 7:09:24	1138.40573	12.599	10.78	12.687	11.603
9/15/98 7:09:41	1138.68603	12.553	10.781	12.665	11.59
9/15/98 7:09:59	1138.98283	12.504	10.781	12.641	11.575
9/15/98 7:10:18	1139.29733	12.467	10.781	12.624	11.561
9/15/98 7:10:37	1139.63053	12.401	10.781	12.607	11.548
9/15/98 7:10:59	1139.98333	12.346	10.781	12.586	11.534
9/15/98 7:11:21	1140.35723	12.295	10.781	12.569	11.52
9/15/98 7:11:45	1140.75323	12.24	10.781	12.547	11.504
9/15/98 7:12:10	1141.17253	12.189	10.781	12.528	11.491
9/15/98 7:12:37	1141.61683	12.134	10.781	12.506	11.475
9/15/98 7:13:05	1142.08753	12.085	10.781	12.484	11.461
9/15/98 7:13:35	1142.58603	12.031	10.781	12.464	11.447

	9/15/98 7:14:07	1143.11403	11.979	10.783	12.444	11.433
	9/15/98 7:14:40	1143.67333	11.925	10.783	12.422	11.418
	9/15/98 7:15:16	1144.26583	11.873	10.783	12.399	11.404
	9/15/98 7:15:53	1144.89333	11.824	10.783	12.377	11.388
	9/15/98 7:16:33	1145.55823	11.773	10.783	12.345	11.371
	9/15/98 7:17:15	1146.26233	11.721	10.781	12.33	11.358
	9/15/98 7:18:00	1147.00823	11.684	10.784	12.317	11.345
	9/15/98 7:18:48	1147.79823	11.641	10.784	12.294	11.33
	9/15/98 7:19:38	1148.63503	11.604	10.784	12.274	11.314
	9/15/98 7:20:31	1149.52153	11.561	10.786	12.253	11.301
	9/15/98 7:21:27	1150.46053	11.52	10.786	12.231	11.287
	9/15/98 7:22:27	1151.45523	11.483	10.786	12.211	11.272
	9/15/98 7:23:30	1152.50883	11.44	10.786	12.189	11.258
	9/15/98 7:24:37	1153.62483	11.403	10.786	12.169	11.244
	9/15/98 7:25:48	1154.80703	11.363	10.786	12.148	11.23
	9/15/98 7:27:03	1156.05923	11.317	10.787	12.127	11.214
	9/15/98 7:28:23	1157.38573	11.274	10.787	12.103	11.2
	9/15/98 7:29:47	1158.79073	11.228	10.787	12.08	11.184
	9/15/98 7:31:16	1160.27903	11.185	10.787	12.055	11.166
	9/15/98 7:32:51	1161.85553	11.133	10.787	12.028	11.15
	9/15/98 7:34:31	1163.52533	11.084	10.787	11.999	11.133
	9/15/98 7:36:17	1165.29423	11.033	10.789	11.97	11.114
	9/15/98 7:38:10	1167.16783	10.987	10.787	11.936	11.097
	9/15/98 7:40:09	1169.15253	10.944	10.789	11.906	11.078
	9/15/98 7:42:15	1171.25483	10.909	10.79	11.877	11.06
	9/15/98 7:44:29	1173.48173	10.872	10.789	11.845	11.043
	9/15/98 7:46:50	1175.84053	10.838	10.789	11.811	11.025
	9/15/98 7:49:20	1178.33923	10.797	10.79	11.778	11.007
	9/15/98 7:51:59	1180.98583	10.76	10.79	11.74	10.989
	9/15/98 7:54:47	1183.78933	10.723	10.79	11.699	10.97
	9/15/98 7:57:45	1186.75903	10.686	10.79	11.657	10.95
	9/15/98 8:00:54	1189.90473	10.645	10.792	11.616	10.933
	9/15/98 8:04:14	1193.23673	10.611	10.793	11.58	10.911
	9/15/98 8:07:46	1196.76623	10.574	10.79	11.545	10.894
	9/15/98 8:11:30	1200.50473	10.542	10.792	11.514	10.873
	9/15/98 8:15:28	1204.46483	10.508	10.79	11.484	10.854
	9/15/98 8:19:39	1208.65973	10.479	10.793	11.458	10.835
	9/15/98 8:24:06	1213.10303	10.453	10.792	11.429	10.817
	9/15/98 8:28:48	1217.80973	10.424	10.793	11.401	10.798
	9/15/98 8:33:47	1222.79523	10.401	10.794	11.379	10.779
	9/15/98 8:39:04	1228.07603	10.378	10.793	11.354	10.76
	9/15/98 8:44:40	1233.66983	10.358	10.796	11.334	10.741
	9/15/98 8:50:35	1239.59523	10.338	10.796	11.312	10.722
	9/15/98 8:56:52	1245.87153	10.318	10.796	11.289	10.704
	9/15/98 9:03:31	1252.51983	10.295	10.794	11.266	10.683
	9/15/98 9:10:33	1259.56203	10.269	10.793	11.244	10.664
	9/15/98 9:18:01	1267.02153	10.244	10.793	11.222	10.644
	9/15/98 9:25:55	1274.92303	10.229	10.794	11.2	10.624
	9/15/98 9:34:17	1283.29273	10.203	10.797	11.18	10.603
	9/15/98 9:43:09	1292.15833	10.18	10.793	11.156	10.579
	9/15/98 9:52:33	1301.54933	10.158	10.794	11.133	10.557

	9/15/98 10:02:29	1311.49683	10.135	10.796	11.114	10.535
	9/15/98 10:12:29	1321.49683	10.071	10.796	11.091	10.512
	9/15/98 10:22:29	1331.49683	10.069	10.803	11.075	10.495
	9/15/98 10:32:29	1341.49683	10.08	10.805	11.06	10.474
	9/15/98 10:42:29	1351.49683	10.069	10.803	11.044	10.457
	9/15/98 10:52:29	1361.49683	10.048	10.8	11.031	10.441
	9/15/98 11:02:29	1371.49683	10.048	10.803	11.018	10.426
	9/15/98 11:12:29	1381.49683	10.026	10.799	11.002	10.408
	9/15/98 11:22:29	1391.49683	10.02	10.8	10.992	10.396
	9/15/98 11:32:29	1401.49683	10.011	10.797	10.979	10.379
	9/15/98 11:42:29	1411.49683	10.008	10.8	10.969	10.366
	9/15/98 11:52:29	1421.49683	10	10.802	10.962	10.354
	9/15/98 12:02:29	1431.49683	9.994	10.802	10.95	10.344
	9/15/98 12:12:29	1441.49683	10	10.802	10.94	10.331
	9/15/98 12:22:29	1451.49683	9.96	10.809	10.937	10.326
	9/15/98 12:32:29	1461.49683	9.974	10.803	10.921	10.308
	9/15/98 12:42:29	1471.49683	9.962	10.796	10.908	10.294
	9/15/98 12:52:29	1481.49683	9.845	10.766	10.884	10.28
	9/15/98 13:02:29	1491.49683	9.871	10.766	10.874	10.267
	9/15/98 13:12:29	1501.49683	9.807	10.777	10.876	10.265
	9/15/98 13:22:29	1511.49683	9.81	10.78	10.87	10.258
	9/15/98 13:32:29	1521.49683	9.805	10.78	10.86	10.248
	9/15/98 13:42:29	1531.49683	9.799	10.779	10.854	10.241
	9/15/98 13:52:29	1541.49683	9.796	10.777	10.85	10.234
	9/15/98 14:02:29	1551.49683	9.787	10.777	10.844	10.225

WELL 200 AQUIFER TEST 2 WATER LEVEL DATA

(WELLS 200, 602, 603, & 195)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 200 AQUIFER TEST 2 WL DATA			AVG Q = 44.5 GPM		
FILE NAME : 200TEST2.XLS					
		PUMPING	OBSERVATION	OBSERVATION	OBSERVATION
	ELAPSED	WELL 200	WELL 602	WELL 603	WELL 195
DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED					
9/15/98 14:15:11	0	9.733	10.779	10.822	10.211
9/15/98 14:15:13	0.028	9.848	10.779	10.824	10.213
9/15/98 14:15:15	0.0577	9.785	10.779	10.825	10.211
9/15/98 14:15:16	0.089	9.81	10.779	10.827	10.213
9/15/98 14:15:18	0.1222	9.888	10.779	10.827	10.211
9/15/98 14:15:21	0.1574	9.802	10.779	10.828	10.213
9/15/98 14:15:23	0.1947	9.721	10.779	10.83	10.213
9/15/98 14:15:25	0.2342	9.917	10.779	10.834	10.213
9/15/98 14:15:28	0.276	10.195	10.779	10.843	10.214
9/15/98 14:15:30	0.3204	10.143	10.779	10.85	10.214
9/15/98 14:15:33	0.3674	10.255	10.779	10.867	10.214
9/15/98 14:15:36	0.4172	10.361	10.779	10.878	10.216
9/15/98 14:15:39	0.4699	10.465	10.779	10.892	10.219
9/15/98 14:15:43	0.5257	10.565	10.779	10.907	10.22
9/15/98 14:15:46	0.5849	10.645	10.78	10.921	10.223
9/15/98 14:15:50	0.6475	10.72	10.78	10.934	10.226
9/15/98 14:15:54	0.7139	10.878	10.78	10.949	10.232
9/15/98 14:15:58	0.7842	11.096	10.779	10.968	10.235
9/15/98 14:16:03	0.8587	11.317	10.779	10.988	10.239
9/15/98 14:16:07	0.9377	11.515	10.779	11.016	10.245
9/15/98 14:16:12	1.0214	11.71	10.779	11.042	10.252
9/15/98 14:16:18	1.1099	11.899	10.779	11.07	10.259
9/15/98 14:16:23	1.2037	12.037	10.779	11.1	10.268
9/15/98 14:16:29	1.303	12.134	10.779	11.126	10.28
9/15/98 14:16:36	1.4084	12.212	10.779	11.154	10.29
9/15/98 14:16:42	1.5199	12.283	10.779	11.177	10.301
9/15/98 14:16:49	1.638	12.367	10.779	11.202	10.313
9/15/98 14:16:57	1.7632	12.438	10.779	11.227	10.326
9/15/98 14:17:05	1.8957	12.504	10.779	11.252	10.339
9/15/98 14:17:13	2.0362	12.553	10.777	11.276	10.352
9/15/98 14:17:22	2.185	12.642	10.777	11.301	10.365
9/15/98 14:17:32	2.3425	12.708	10.779	11.326	10.383
9/15/98 14:17:42	2.5094	12.84	10.779	11.355	10.399
9/15/98 14:17:52	2.6862	12.883	10.777	11.382	10.413
9/15/98 14:18:04	2.8735	13	10.779	11.409	10.432
9/15/98 14:18:15	3.0719	13.098	10.779	11.441	10.449
9/15/98 14:18:28	3.282	13.221	10.779	11.471	10.467
9/15/98 14:18:41	3.5047	13.313	10.779	11.503	10.484
9/15/98 14:18:56	3.7405	13.405	10.779	11.537	10.503
9/15/98 14:19:11	3.9904	13.517	10.777	11.57	10.523
9/15/98 14:19:26	4.255	13.594	10.779	11.602	10.542
9/15/98 14:19:43	4.5354	13.729	10.776	11.637	10.564
9/15/98 14:20:01	4.8322	13.815	10.777	11.673	10.586

9/15/98 14:20:20	5.1467	13.932	10.779	11.711	10.606
9/15/98 14:20:40	5.4799	13.97	10.779	11.742	10.629
9/15/98 14:21:01	5.8327	14.058	10.779	11.777	10.651
9/15/98 14:21:23	6.2065	14.116	10.779	11.81	10.671
9/15/98 14:21:47	6.6025	14.196	10.779	11.842	10.692
9/15/98 14:22:12	7.0219	14.251	10.779	11.851	10.713
9/15/98 14:22:39	7.4662	14.291	10.783	11.905	10.734
9/15/98 14:23:07	7.9369	14.359	10.783	11.925	10.754
9/15/98 14:23:37	8.4354	14.42	10.78	11.963	10.774
9/15/98 14:24:09	8.9634	14.488	10.781	11.99	10.795
9/15/98 14:24:42	9.5227	14.609	10.781	12.025	10.813
9/15/98 14:25:18	10.1152	14.672	10.781	12.054	10.835
9/15/98 14:25:56	10.7427	14.695	10.781	12.085	10.854
9/15/98 14:26:36	11.4075	14.738	10.781	12.111	10.874
9/15/98 14:27:18	12.1117	14.787	10.781	12.134	10.892
9/15/98 14:28:03	12.8575	14.81	10.784	12.158	10.908
9/15/98 14:28:50	13.6475	14.838	10.784	12.178	10.925
9/15/98 14:29:40	14.4844	14.838	10.783	12.197	10.938
9/15/98 14:30:33	15.3709	14.853	10.784	12.213	10.953
9/15/98 14:31:30	16.3099	14.87	10.784	12.229	10.964
9/15/98 14:32:29	17.3045	14.884	10.786	12.245	10.977
9/15/98 14:33:33	18.3582	14.907	10.786	12.259	10.987
9/15/98 14:34:40	19.4742	14.933	10.786	12.274	11
9/15/98 14:35:50	20.6564	14.987	10.786	12.289	11.012
9/15/98 14:37:06	21.9085	15.039	10.784	12.306	11.022
9/15/98 14:38:25	23.235	15.053	10.784	12.322	11.035
9/15/98 14:39:50	24.64	15.088	10.781	12.334	11.045
9/15/98 14:41:19	26.1284	15.09	10.777	12.344	11.054
9/15/98 14:42:53	27.7049	15.125	10.781	12.361	11.07
9/15/98 14:44:34	29.3747	15.125	10.784	12.374	11.079
9/15/98 14:46:20	31.1435	15.151	10.786	12.387	11.089
9/15/98 14:48:12	33.0172	15.196	10.786	12.396	11.096
9/15/98 14:50:11	35.0019	15.211	10.786	12.409	11.108
9/15/98 14:52:17	37.1042	15.242	10.786	12.422	11.118
9/15/98 14:54:31	39.331	15.317	10.806	12.444	11.132
9/15/98 14:56:52	41.6899	15.351	10.792	12.449	11.138
9/15/98 14:59:22	44.1885	15.354	10.786	12.457	11.145
9/15/98 15:02:01	46.8352	15.346	10.771	12.457	11.153
9/15/98 15:04:49	49.6387	15.346	10.776	12.47	11.164
9/15/98 15:07:48	52.6084	15.368	10.774	12.479	11.174
9/15/98 15:10:56	55.754	15.383	10.777	12.492	11.183
9/15/98 15:14:16	59.086	15.409	10.776	12.502	11.19
9/15/98 15:17:48	62.6155	15.403	10.773	12.51	11.201
9/15/98 15:21:32	66.354	15.406	10.779	12.523	11.212
9/15/98 15:25:30	70.3142	15.486	10.776	12.533	11.219
9/15/98 15:29:42	74.509	15.5	10.779	12.545	11.231
9/15/98 15:34:08	78.9524	15.586	10.793	12.562	11.244
9/15/98 15:38:51	83.659	15.606	10.779	12.565	11.25
9/15/98 15:43:50	88.6445	15.658	10.784	12.582	11.261
9/15/98 15:49:07	93.9254	15.712	10.786	12.595	11.273
9/15/98 15:54:42	99.5192	15.712	10.781	12.604	11.285

9/15/98 16:00:38	105.4445	15.753	10.779	12.613	11.295
9/15/98 16:06:54	111.7209	15.801	10.776	12.616	11.305
9/15/98 16:13:33	118.3692	15.761	10.786	12.639	11.319
9/15/98 16:20:36	125.4114	15.692	10.753	12.629	11.319
9/15/98 16:28:03	132.8709	15.718	10.781	12.658	11.343
9/15/98 16:35:57	140.7724	15.87	10.777	12.661	11.347
9/15/98 16:44:20	149.142	15.861	10.777	12.667	11.357
9/15/98 16:53:12	158.0077	15.87	10.77	12.674	11.366
9/15/98 17:02:35	167.3987	15.93	10.773	12.687	11.377
9/15/98 17:12:32	177.3462	15.821	10.748	12.686	11.389
9/15/98 17:22:32	187.3462	15.893	10.75	12.691	11.398
9/15/98 17:32:32	197.3462	15.942	10.77	12.707	11.412
9/15/98 17:42:32	207.3462	15.956	10.767	12.712	11.42
9/15/98 17:52:32	217.3462	15.999	10.758	12.718	11.428
9/15/98 18:02:32	227.3462	15.993	10.758	12.725	11.437
9/15/98 18:12:32	237.3462	16.022	10.76	12.731	11.446
9/15/98 18:22:32	247.3462	16.036	10.763	12.736	11.453
9/15/98 18:32:32	257.3462	16.065	10.761	12.744	11.463
9/15/98 18:42:32	267.3462	16.076	10.761	12.748	11.469
9/15/98 18:52:32	277.3462	16.102	10.764	12.754	11.478
9/15/98 19:02:32	287.3462	16.128	10.766	12.757	11.485
9/15/98 19:12:32	297.3462	16.154	10.768	12.763	11.489
9/15/98 19:22:32	307.3462	16.157	10.767	12.764	11.496
9/15/98 19:32:32	317.3462	16.182	10.786	12.768	11.502
9/15/98 19:42:32	327.3462	16.214	10.787	12.771	11.509
9/15/98 19:52:32	337.3462	16.254	10.79	12.776	11.514
9/15/98 20:02:32	347.3462	16.245	10.79	12.777	11.518
9/15/98 20:12:32	357.3462	16.24	10.792	12.78	11.527
9/15/98 20:22:32	367.3462	16.28	10.793	12.782	11.528
9/15/98 20:32:32	377.3462	16.286	10.794	12.786	11.536
9/15/98 20:42:32	387.3462	16.328	10.797	12.789	11.54
9/15/98 20:52:32	397.3462	16.326	10.8	12.793	11.546
9/15/98 21:02:32	407.3462	16.34	10.797	12.793	11.549
9/15/98 21:12:32	417.3462	16.383	10.8	12.795	11.554
9/15/98 21:22:32	427.3462	16.366	10.8	12.795	11.556
9/15/98 21:32:32	437.3462	16.38	10.8	12.796	11.56
9/15/98 21:42:32	447.3462	16.392	10.8	12.795	11.562
9/15/98 21:52:32	457.3462	16.429	10.802	12.796	11.566
9/15/98 22:02:32	467.3462	16.432	10.802	12.798	11.57
9/15/98 22:12:32	477.3462	16.429	10.803	12.798	11.573
9/15/98 22:22:32	487.3462	16.42	10.805	12.799	11.576
9/15/98 22:32:32	497.3462	16.406	10.807	12.799	11.58
9/15/98 22:42:32	507.3462	16.435	10.809	12.799	11.583
9/15/98 22:52:32	517.3462	16.475	10.81	12.798	11.583
9/15/98 23:02:32	527.3462	16.483	10.81	12.796	11.586
9/15/98 23:12:32	537.3462	16.475	10.809	12.795	11.588
9/15/98 23:22:32	547.3462	16.48	10.809	12.795	11.591
9/15/98 23:32:32	557.3462	16.498	10.809	12.792	11.591
9/15/98 23:42:32	567.3462	16.5	10.809	12.792	11.596
9/15/98 23:52:32	577.3462	16.475	10.81	12.789	11.596
9/16/98 0:02:32	587.3462	16.463	10.81	12.78	11.595

9/16/98 0:12:32	597.3462	16.346	10.812	12.766	11.589
9/16/98 0:22:32	607.3462	16.498	10.812	12.774	11.596
9/16/98 0:32:32	617.3462	16.403	10.815	12.764	11.594
9/16/98 0:42:32	627.3462	16.311	10.812	12.748	11.586
9/16/98 0:52:32	637.3462	16.512	10.813	12.766	11.596
9/16/98 1:02:32	647.3462	16.472	10.815	12.764	11.599
9/16/98 1:12:32	657.3462	16.377	10.813	12.75	11.595
9/16/98 1:22:32	667.3462	16.231	10.813	12.731	11.586
9/16/98 1:32:32	677.3462	16.283	10.815	12.725	11.583
9/16/98 1:42:32	687.3462	16.214	10.815	12.713	11.579
9/16/98 1:52:32	697.3462	16.472	10.818	12.729	11.588
9/16/98 2:02:32	707.3462	16.503	10.818	12.741	11.599
9/16/98 2:12:32	717.3462	16.449	10.818	12.741	11.601
9/16/98 2:22:32	727.3462	16.363	10.825	12.728	11.595
9/16/98 2:32:32	737.3462	16.492	10.82	12.739	11.602
9/16/98 2:42:32	747.3462	16.414	10.823	12.729	11.598
9/16/98 2:52:32	757.3462	16.529	10.822	12.741	11.605
9/16/98 3:02:32	767.3462	16.529	10.82	12.731	11.601
9/16/98 3:12:32	777.3462	16.386	10.823	12.72	11.598
9/16/98 3:22:32	787.3462	16.601	10.825	12.748	11.608
9/16/98 3:32:32	797.3462	16.609	10.825	12.742	11.612
9/16/98 3:42:32	807.3462	16.509	10.825	12.732	11.609
9/16/98 3:52:32	817.3462	16.601	10.825	12.729	11.605
9/16/98 4:02:32	827.3462	16.592	10.828	12.734	11.612
9/16/98 4:12:32	837.3462	16.466	10.829	12.719	11.607
9/16/98 4:22:32	847.3462	16.303	10.829	12.696	11.595
9/16/98 4:32:32	857.3462	16.377	10.829	12.694	11.596
9/16/98 4:42:32	867.3462	16.297	10.829	12.674	11.586
9/16/98 4:52:32	877.3462	16.297	8.39	12.675	11.589
9/16/98 5:02:32	887.3462	16.546	1.726	12.702	11.604
9/16/98 5:12:32	897.3462	16.44	1.474	12.688	11.599
9/16/98 5:22:32	907.3462	16.263	1.687	12.665	11.586
9/16/98 5:32:32	917.3462	16.612	-11.384	12.703	11.609
9/16/98 5:42:32	927.3462	16.612	-11.384	12.702	11.609
9/16/98 5:52:32	937.3462	16.644	-11.384	12.696	11.607
9/16/98 6:02:32	947.3462	16.667	-11.384	12.71	11.615
9/16/98 6:12:32	957.3462	16.589	-11.384	12.7	11.612
9/16/98 6:22:32	967.3462	16.669	-11.384	12.707	11.617
9/16/98 6:32:32	977.3462	16.896	-11.384	12.712	11.615
9/16/98 6:42:32	987.3462	17.277	-11.384	12.776	11.659
9/16/98 6:52:32	997.3462	17.835	-11.384	12.827	11.685
9/16/98 7:02:32	1007.3462	17.792	-11.382	12.834	11.694
9/16/98 7:12:32	1017.3462	17.781	-11.382	12.834	11.695
9/16/98 7:22:32	1027.3462	17.815	-11.382	12.84	11.699
9/16/98 7:32:32	1037.3462	18.076	-11.382	12.857	11.712
9/16/98 7:42:32	1047.3462	17.993	-11.382	12.856	11.712
9/16/98 7:52:32	1057.3462	18.254	-11.385	12.873	11.723
9/16/98 8:02:32	1067.3462	18.302	-11.387	12.876	11.728
9/16/98 8:12:32	1077.3462	18.348	-11.39	12.879	11.73
9/16/98 8:22:32	1087.3462	18.411	-11.392	12.88	11.734
9/16/98 8:32:32	1097.3462	18.434	-11.395	12.882	11.736

9/16/98 8:42:32	1107.3462	18.491	-11.397	12.882	11.737
9/16/98 8:52:32	1117.3462	18.466	-11.4	12.88	11.739
9/16/98 9:02:32	1127.3462	18.503	-11.403	12.882	11.741
9/16/98 9:12:32	1137.3462	18.191	-11.404	12.862	11.733
9/16/98 9:22:32	1147.3462	18.116	-11.407	12.846	11.725
9/16/98 9:32:32	1157.3462	17.919	-11.408	12.822	11.714
9/16/98 9:42:32	1167.3462	17.901	-11.411	12.815	11.711
9/16/98 9:52:32	1177.3462	17.921	-11.414	12.811	11.711
9/16/98 10:02:32	1187.3462	17.864	-11.417	12.8	11.704
9/16/98 10:12:32	1197.3462	17.884	-11.419	12.793	11.704
9/16/98 10:22:32	1207.3462	17.887	-11.422	12.789	11.701
9/16/98 10:32:32	1217.3462	17.672	-11.423	12.776	11.698
9/16/98 10:42:32	1227.3462	17.538	-11.424	12.751	11.682
9/16/98 10:52:32	1237.3462	17.506	-11.427	12.744	11.679
9/16/98 11:02:32	1247.3462	17.497	-11.429	12.736	11.676
9/16/98 11:12:32	1257.3462	17.592	-11.43	12.734	11.675
9/16/98 11:22:32	1267.3462	17.518	-11.432	12.726	11.672
9/16/98 11:32:32	1277.3462	17.492	-11.433	12.725	11.672
9/16/98 11:42:32	1287.3462	17.452	-11.435	12.713	11.667
9/16/98 11:52:32	1297.3462	17.495	-11.436	12.71	11.665
9/16/98 12:02:32	1307.3462	17.44	-11.436	12.7	11.66
9/16/98 12:12:32	1317.3462	17.529	-11.436	12.699	11.659
9/16/98 12:22:32	1327.3462	17.449	-11.438	12.693	11.656
9/16/98 12:32:32	1337.3462	17.24	-11.439	12.671	11.638
9/16/98 12:42:32	1347.3462	17.32	-11.439	12.681	11.649
9/16/98 12:52:32	1357.3462	17.311	-11.44	12.662	11.64
9/16/98 13:02:32	1367.3462	17.403	-11.44	12.671	11.644
9/16/98 13:12:32	1377.3462	17.343	-11.442	12.665	11.644
9/16/98 13:22:32	1387.3462	17.343	-11.44	12.662	11.644
9/16/98 13:32:32	1397.3462	17.331	-11.439	12.659	11.644
9/16/98 13:42:32	1407.3462	17.32	-11.438	12.656	11.643
9/16/98 13:52:32	1417.3462	17.317	-11.435	12.651	11.64
9/16/98 14:02:32	1427.3462	17.664	-11.432	12.671	11.653
9/16/98 14:12:32	1437.3462	17.792	-11.43	12.693	11.666
9/16/98 14:22:32	1447.3462	17.864	-11.429	12.69	11.66
9/16/98 14:32:32	1457.3462	17.85	-11.432	12.686	11.659
9/16/98 14:42:32	1467.3462	16.996	-11.436	12.572	11.559
9/16/98 14:52:32	1477.3462	17.603	-11.439	12.648	11.63
9/16/98 15:02:32	1487.3462	17.689	-11.442	12.662	11.641
9/16/98 15:12:32	1497.3462	17.784	-11.445	12.67	11.65
9/16/98 15:22:32	1507.3462	17.775	-11.446	12.67	11.65
9/16/98 15:32:32	1517.3462	17.838	-11.448	12.677	11.656
9/16/98 15:42:32	1527.3462	17.847	-11.449	12.675	11.659
9/16/98 15:52:32	1537.3462	13.109	-11.449	12.152	11.338
9/16/98 16:02:32	1547.3462	17.274	-11.449	12.576	11.582
9/16/98 16:12:32	1557.3462	17.483	-11.449	12.607	11.609
9/16/98 16:22:32	1567.3462	17.606	-11.448	12.632	11.624
9/16/98 16:32:32	1577.3462	17.629	-11.448	12.639	11.633
9/16/98 16:42:32	1587.3462	17.738	-11.448	12.645	11.638
9/16/98 16:52:32	1597.3462	17.813	-11.446	12.652	11.646
9/16/98 17:02:32	1607.3462	17.778	-11.445	12.648	11.647

9/16/98 17:12:32	1617.3462	17.83	-11.445	12.654	11.652
9/16/98 17:22:32	1627.3462	17.838	-11.443	12.656	11.654
9/16/98 17:32:32	1637.3462	17.827	-11.44	12.658	11.656
9/16/98 17:42:32	1647.3462	17.835	-11.439	12.656	11.657
9/16/98 17:52:32	1657.3462	17.887	-11.438	12.652	11.657
9/16/98 18:02:32	1667.3462	17.844	-11.435	12.645	11.657
9/16/98 18:12:32	1677.3462	17.91	-11.432	12.649	11.659
9/16/98 18:22:32	1687.3462	17.861	-11.43	12.648	11.662
9/16/98 18:32:32	1697.3462	17.933	-11.427	12.651	11.663
9/16/98 18:42:32	1707.3462	17.956	-11.424	12.648	11.663
9/16/98 18:52:32	1717.3462	17.99	-11.422	12.646	11.663
9/16/98 19:02:32	1727.3462	18.062	-11.419	12.648	11.665
9/16/98 19:12:32	1737.3462	18.002	-11.416	12.645	11.663
9/16/98 19:22:32	1747.3462	18.062	-11.414	12.646	11.666
9/16/98 19:32:32	1757.3462	18.056	-11.411	12.645	11.666
9/16/98 19:42:32	1767.3462	18.105	-11.408	12.645	11.666
9/16/98 19:52:32	1777.3462	18.09	-11.407	12.645	11.667
9/16/98 20:02:32	1787.3462	18.125	-11.406	12.643	11.667
9/16/98 20:12:32	1797.3462	18.156	-11.403	12.645	11.669
9/16/98 20:22:32	1807.3462	18.171	-11.401	12.642	11.669
9/16/98 20:32:32	1817.3462	18.156	-11.4	12.642	11.667
9/16/98 20:42:32	1827.3462	18.133	-11.398	12.642	11.669
9/16/98 20:52:32	1837.3462	18.171	-11.395	12.643	11.67
9/16/98 21:02:32	1847.3462	18.151	-11.395	12.642	11.67
9/16/98 21:12:32	1857.3462	18.159	-11.394	12.64	11.67
9/16/98 21:22:32	1867.3462	18.242	-11.394	12.639	11.669
9/16/98 21:32:32	1877.3462	18.199	-11.392	12.636	11.667
9/16/98 21:42:32	1887.3462	18.228	-11.392	12.635	11.669
9/16/98 21:52:32	1897.3462	18.222	-11.391	12.626	11.666
9/16/98 22:02:32	1907.3462	18.251	-11.391	12.63	11.666
9/16/98 22:12:32	1917.3462	18.254	-11.39	12.629	11.666
9/16/98 22:22:32	1927.3462	18.262	-11.39	12.626	11.666
9/16/98 22:32:32	1937.3462	18.239	-11.39	12.623	11.665
9/16/98 22:42:32	1947.3462	18.102	-11.388	12.614	11.66
9/16/98 22:52:32	1957.3462	17.959	-11.388	12.601	11.654
9/16/98 23:02:32	1967.3462	17.75	-11.387	12.581	11.641
9/16/98 23:12:32	1977.3462	18.151	-11.387	12.598	11.652
9/16/98 23:22:32	1987.3462	18.099	-11.385	12.603	11.647
9/16/98 23:32:32	1997.3462	18.723	-11.385	12.629	11.669
9/16/98 23:42:32	2007.3462	18.907	-11.385	12.64	11.676
9/16/98 23:52:32	2017.3462	18.889	-11.385	12.648	11.681
9/17/98 0:02:32	2027.3462	18.973	-11.384	12.646	11.679
9/17/98 0:12:32	2037.3462	18.938	-11.384	12.643	11.682
9/17/98 0:22:32	2047.3462	18.818	-11.384	12.638	11.679
9/17/98 0:32:32	2057.3462	18.967	-11.384	12.638	11.679
9/17/98 0:42:32	2067.3462	18.901	-11.384	12.636	11.679
9/17/98 0:52:32	2077.3462	18.858	-11.382	12.632	11.678
9/17/98 1:02:32	2087.3462	18.649	-11.382	12.616	11.669
9/17/98 1:12:32	2097.3462	18.635	-11.382	12.608	11.665
9/17/98 1:22:32	2107.3462	18.617	-11.382	12.6	11.66
9/17/98 1:32:32	2117.3462	18.895	-11.382	12.61	11.666

9/17/98 1:42:32	2127.3462	18.818	-11.381	12.606	11.665
9/17/98 1:52:32	2137.3462	18.663	-11.381	12.597	11.662
9/17/98 2:02:32	2147.3462	18.712	-11.381	12.591	11.659
9/17/98 2:12:32	2157.3462	18.878	-11.381	12.6	11.663
9/17/98 2:22:32	2167.3462	18.792	-11.381	12.595	11.659
9/17/98 2:32:32	2177.3462	18.912	-11.381	12.585	11.656
9/17/98 2:42:32	2187.3462	18.91	-11.381	12.588	11.659
9/17/98 2:52:32	2197.3462	18.849	-11.381	12.585	11.656
9/17/98 3:02:32	2207.3462	18.783	-11.381	12.578	11.653
9/17/98 3:12:32	2217.3462	18.735	-11.381	12.572	11.65
9/17/98 3:22:32	2227.3462	18.792	-11.381	12.575	11.65
9/17/98 3:32:32	2237.3462	18.855	-11.381	12.574	11.652
9/17/98 3:42:32	2247.3462	18.984	-11.381	12.578	11.656
9/17/98 3:52:32	2257.3462	18.867	-11.381	12.571	11.653
9/17/98 4:02:32	2267.3462	18.867	-11.381	12.571	11.653
9/17/98 4:12:32	2277.3462	18.987	-11.381	12.571	11.653
9/17/98 4:22:32	2287.3462	18.995	-11.382	12.569	11.653
9/17/98 4:32:32	2297.3462	18.895	-11.382	12.562	11.647
9/17/98 4:42:32	2307.3462	19.01	-11.382	12.563	11.649
9/17/98 4:52:32	2317.3462	18.998	-11.382	12.558	11.646
9/17/98 5:02:32	2327.3462	18.932	-11.382	12.549	11.641
9/17/98 5:12:32	2337.3462	19.03	-11.382	12.556	11.646
9/17/98 5:22:32	2347.3462	18.938	-11.382	12.549	11.641
9/17/98 5:32:32	2357.3462	19.07	-11.382	12.552	11.644
9/17/98 5:42:32	2367.3462	19.038	-11.381	12.547	11.641
9/17/98 5:52:32	2377.3462	18.973	-11.381	12.54	11.638
9/17/98 6:02:32	2387.3462	18.987	-11.381	12.539	11.64
9/17/98 6:12:32	2397.3462	18.984	-11.381	12.534	11.637
9/17/98 6:22:32	2407.3462	18.829	-11.381	12.533	11.634
9/17/98 6:32:32	2417.3462	18.95	-11.379	12.53	11.634
9/17/98 6:42:32	2427.3462	19.806	-11.379	12.559	11.652
9/17/98 6:52:32	2437.3462	19.84	-11.379	12.565	11.656
9/17/98 7:02:32	2447.3462	19.531	-11.379	12.565	11.657
9/17/98 7:12:32	2457.3462	19.611	-11.379	12.563	11.656
9/17/98 7:22:32	2467.3462	19.422	-11.379	12.563	11.657
9/17/98 7:32:32	2477.3462	19.886	-11.381	12.562	11.657
9/17/98 7:42:32	2487.3462	19.6	-11.381	12.556	11.656
9/17/98 7:52:32	2497.3462	19.811	-11.384	12.558	11.653
9/17/98 8:02:32	2507.3462	19.917	-11.385	12.55	11.653
9/17/98 8:12:32	2517.3462	19.706	-11.388	12.552	11.65
9/17/98 8:22:32	2527.3462	20.018	-11.39	12.55	11.652
9/17/98 8:32:32	2537.3462	19.906	-11.391	12.546	11.649
9/17/98 8:42:32	2547.3462	20.038	-11.394	12.542	11.646
9/17/98 8:52:32	2557.3462	19.634	-11.395	12.54	11.644
9/17/98 9:02:32	2567.3462	19.617	-11.398	12.534	11.641
9/17/98 9:12:32	2577.3462	19.565	-11.4	12.531	11.64
9/17/98 9:22:32	2587.3462	20.052	-11.403	12.53	11.638
9/17/98 9:32:32	2597.3462	19.519	-11.406	12.529	11.637
9/17/98 9:42:32	2607.3462	19.474	10.921	12.526	11.634
9/17/98 9:52:32	2617.3462	19.8	10.921	12.517	11.625
9/17/98 10:02:32	2627.3462	19.886	10.921	12.515	11.627

9/17/98 10:12:32	2637.3462	19.978	10.923	12.511	11.624
9/17/98 10:22:32	2647.3462	19.949	10.923	12.507	11.623
9/17/98 10:32:32	2657.3462	19.362	10.929	12.507	11.62
9/17/98 10:42:32	2667.3462	19.949	10.93	12.504	11.618
9/17/98 10:52:32	2677.3462	19.21	10.929	12.501	11.617
9/17/98 11:02:32	2687.3462	19.74	10.929	12.495	11.614
9/17/98 11:12:32	2697.3462	19.886	10.929	12.492	11.612
9/17/98 11:22:32	2707.3462	19.31	10.926	12.489	11.609
9/17/98 11:32:32	2717.3462	19.385	10.929	12.482	11.604
9/17/98 11:42:32	2727.3462	19.651	10.929	12.476	11.602
9/17/98 11:52:32	2737.3462	20.02	10.933	12.473	11.601
9/17/98 12:02:32	2747.3462	13.413	10.927	12.259	11.553
9/17/98 12:12:32	2757.3462	19.29	10.929	12.478	11.599
9/17/98 12:22:32	2767.3462	19.362	10.929	12.482	11.604
9/17/98 12:32:32	2777.3462	19.428	10.927	12.478	11.602
9/17/98 12:42:32	2787.3462	19.373	10.927	12.475	11.601
9/17/98 12:52:32	2797.3462	19.393	10.929	12.472	11.599
9/17/98 13:02:32	2807.3462	19.422	10.92	12.466	11.596
9/17/98 13:12:32	2817.3462	19.17	10.924	12.462	11.589
9/17/98 13:22:32	2827.3462	19.225	10.924	12.465	11.595
9/17/98 13:32:32	2837.3462	19.285	10.926	12.462	11.595
9/17/98 13:42:32	2847.3462	19.333	10.921	12.457	11.592
9/17/98 13:52:32	2857.3462	19.336	10.923	12.454	11.589
9/17/98 14:02:32	2867.3462	19.13	10.924	12.451	11.585
9/17/98 14:12:32	2877.3462	19.233	10.914	12.449	11.588
9/17/98 14:22:32	2887.3462	19.253	10.916	12.449	11.588
9/17/98 14:32:32	2897.3462	19.276	10.917	12.449	11.586
9/17/98 14:42:32	2907.3462	19.067	10.921	12.447	11.579
9/17/98 14:52:32	2917.3462	19.193	10.913	12.449	11.583
9/17/98 15:02:32	2927.3462	19.222	10.914	12.446	11.585
9/17/98 15:12:32	2937.3462	19.176	10.911	12.446	11.585
9/17/98 15:22:32	2947.3462	19.279	10.913	12.44	11.583
9/17/98 15:32:32	2957.3462	19.537	10.913	12.453	11.582
9/17/98 15:42:32	2967.3462	19.674	10.904	12.453	11.594
9/17/98 15:52:32	2977.3462	19.614	10.914	12.465	11.598
9/17/98 16:02:32	2987.3462	20.109	10.901	12.451	11.596
9/17/98 16:12:32	2997.3462	18.471	10.897	12.459	11.598
9/17/98 16:22:32	3007.3462	19.691	10.903	12.456	11.598
PUMP STOPPED					
9/17/98 16:30:00	3014.82	19.341	10.901	12.462	11.601
9/17/98 16:30:02	3014.847	17.662	10.901	12.462	11.601
9/17/98 16:30:04	3014.874	16.275	10.901	12.46	11.601
9/17/98 16:30:05	3014.901	15.75	10.903	12.456	11.601
9/17/98 16:30:07	3014.928	15.644	10.903	12.45	11.601
9/17/98 16:30:09	3014.956	15.538	10.903	12.441	11.6
9/17/98 16:30:10	3014.9857	15.452	10.903	12.433	11.6
9/17/98 16:30:12	3015.017	15.381	10.903	12.423	11.6
9/17/98 16:30:14	3015.0502	15.312	10.904	12.412	11.599
9/17/98 16:30:16	3015.0853	15.243	10.906	12.404	11.599
9/17/98 16:30:19	3015.1227	15.171	10.906	12.392	11.597
9/17/98 16:30:21	3015.1622	15.097	10.906	12.379	11.594

9/17/98 16:30:23	3015.204	15.017	10.906	12.367	11.591
9/17/98 16:30:26	3015.2483	14.965	10.906	12.36	11.591
9/17/98 16:30:29	3015.2953	14.836	10.906	12.341	11.587
9/17/98 16:30:32	3015.3452	14.736	10.906	12.328	11.581
9/17/98 16:30:35	3015.3978	14.635	10.906	12.315	11.577
9/17/98 16:30:38	3015.4537	14.546	10.906	12.302	11.572
9/17/98 16:30:42	3015.5128	14.457	10.906	12.284	11.568
9/17/98 16:30:46	3015.5755	14.371	10.904	12.27	11.564
9/17/98 16:30:50	3015.6418	14.285	10.904	12.255	11.558
9/17/98 16:30:54	3015.7122	14.205	10.904	12.238	11.552
9/17/98 16:30:58	3015.7867	14.125	10.904	12.222	11.545
9/17/98 16:31:03	3015.8657	14.047	10.904	12.204	11.536
9/17/98 16:31:08	3015.9493	13.964	10.904	12.188	11.529
9/17/98 16:31:13	3016.0378	13.89	10.903	12.172	11.522
9/17/98 16:31:19	3016.1317	13.815	10.901	12.153	11.512
9/17/98 16:31:25	3016.231	13.743	10.904	12.137	11.503
9/17/98 16:31:31	3016.3363	13.677	10.904	12.123	11.491
9/17/98 16:31:38	3016.4478	13.617	10.904	12.105	11.483
9/17/98 16:31:45	3016.566	13.557	10.904	12.09	11.472
9/17/98 16:31:53	3016.6912	13.505	10.904	12.074	11.461
9/17/98 16:32:01	3016.8237	13.451	10.906	12.056	11.451
9/17/98 16:32:09	3016.9642	13.394	10.906	12.042	11.438
9/17/98 16:32:18	3017.113	13.339	10.907	12.027	11.426
9/17/98 16:32:27	3017.2705	13.279	10.91	12.01	11.414
9/17/98 16:32:37	3017.4373	13.216	10.91	11.992	11.403
9/17/98 16:32:48	3017.6142	13.155	10.91	11.975	11.388
9/17/98 16:32:59	3017.8015	13.087	10.907	11.956	11.375
9/17/98 16:33:11	3017.9998	13.015	10.904	11.938	11.362
9/17/98 16:33:24	3018.21	12.94	10.906	11.918	11.348
9/17/98 16:33:37	3018.4327	12.869	10.907	11.902	11.335
9/17/98 16:33:51	3018.6685	12.785	10.91	11.882	11.322
9/17/98 16:34:06	3018.9183	12.699	10.912	11.861	11.31
9/17/98 16:34:22	3019.183	12.608	10.912	11.836	11.293
9/17/98 16:34:39	3019.4633	12.519	10.912	11.813	11.278
9/17/98 16:34:57	3019.7602	12.436	10.91	11.787	11.261
9/17/98 16:35:16	3020.0747	12.338	10.904	11.758	11.245
9/17/98 16:35:36	3020.4078	12.269	10.903	11.733	11.23
9/17/98 16:35:57	3020.7607	12.166	10.903	11.707	11.213
9/17/98 16:36:19	3021.1345	12.097	10.904	11.682	11.197
9/17/98 16:36:43	3021.5305	12.065	10.91	11.66	11.181
9/17/98 16:37:08	3021.9498	11.988	10.904	11.633	11.164
9/17/98 16:37:35	3022.3942	11.939	10.912	11.615	11.149
9/17/98 16:38:03	3022.8648	11.899	10.912	11.595	11.135
9/17/98 16:38:33	3023.3633	11.853	10.904	11.57	11.117
9/17/98 16:39:05	3023.8913	11.816	10.907	11.553	11.106
9/17/98 16:39:38	3024.4507	11.781	10.913	11.538	11.091
9/17/98 16:40:14	3025.0432	11.744	10.912	11.519	11.078
9/17/98 16:40:51	3025.6707	11.713	10.913	11.5	11.063
9/17/98 16:41:31	3026.3355	11.675	10.91	11.479	11.049
9/17/98 16:42:14	3027.0397	11.641	10.916	11.463	11.037
9/17/98 16:42:58	3027.7855	11.604	10.912	11.438	11.024

9/17/98 16:43:46	3028.5755	11.558	10.901	11.41	11.01
9/17/98 16:44:36	3029.4123	11.515	10.9	11.391	10.998
9/17/98 16:45:29	3030.2988	11.466	10.904	11.374	10.985
9/17/98 16:46:25	3031.2378	11.428	10.912	11.354	10.972
9/17/98 16:47:25	3032.2325	11.403	10.914	11.332	10.959
9/17/98 16:48:28	3033.2862	11.368	10.91	11.304	10.946
9/17/98 16:49:35	3034.4022	11.331	10.91	11.281	10.933
9/17/98 16:50:46	3035.5843	11.279	10.897	11.247	10.917
9/17/98 16:52:01	3036.8365	11.242	10.903	11.224	10.905
9/17/98 16:53:21	3038.163	11.222	10.909	11.196	10.892
9/17/98 16:54:45	3039.568	11.193	10.903	11.169	10.879
9/17/98 16:56:15	3041.0563	11.159	10.903	11.141	10.863
9/17/98 16:57:49	3042.6328	11.124	10.909	11.121	10.849
9/17/98 16:59:29	3044.3027	11.099	10.906	11.096	10.837
9/17/98 17:01:16	3046.0715	11.067	10.906	11.073	10.821
9/17/98 17:03:08	3047.9452	11.033	10.901	11.047	10.808
9/17/98 17:05:07	3049.9298	10.995	10.899	11.025	10.794
9/17/98 17:07:13	3052.0322	10.972	10.904	11.007	10.781
9/17/98 17:09:27	3054.259	10.938	10.904	10.99	10.768
9/17/98 17:11:48	3056.6178	10.921	10.91	10.968	10.755
9/17/98 17:14:18	3059.1165	10.889	10.906	10.945	10.74
9/17/98 17:16:57	3061.7632	10.869	10.912	10.927	10.726
9/17/98 17:19:45	3064.5667	10.849	10.909	10.904	10.71
9/17/98 17:22:43	3067.5363	10.812	10.909	10.882	10.695
9/17/98 17:25:52	3070.682	10.78	10.903	10.857	10.681
9/17/98 17:29:12	3074.014	10.72	10.897	10.837	10.665
9/17/98 17:32:44	3077.5435	10.688	10.901	10.818	10.65
9/17/98 17:36:28	3081.282	10.688	10.906	10.801	10.634
9/17/98 17:40:26	3085.2422	10.665	10.907	10.783	10.618
9/17/98 17:44:37	3089.437	10.636	10.899	10.761	10.602
9/17/98 17:49:04	3093.8803	10.616	10.897	10.743	10.586
9/17/98 17:53:46	3098.587	10.599	10.897	10.724	10.57
9/17/98 17:58:46	3103.5725	10.568	10.899	10.706	10.554
9/17/98 18:04:02	3108.8533	10.55	10.897	10.69	10.536
9/17/98 18:09:38	3114.4472	10.548	10.899	10.671	10.521
9/17/98 18:15:34	3120.3725	10.53	10.899	10.655	10.504
9/17/98 18:21:50	3126.6488	10.519	10.9	10.638	10.486
9/17/98 18:28:29	3133.2972	10.504	10.9	10.623	10.469
9/17/98 18:35:32	3140.3393	10.493	10.9	10.607	10.45
9/17/98 18:42:59	3147.7988	10.484	10.901	10.593	10.431
9/17/98 18:50:53	3155.7003	10.47	10.901	10.58	10.412
9/17/98 18:59:15	3164.07	10.461	10.903	10.566	10.395
9/17/98 19:08:07	3172.9357	10.453	10.903	10.552	10.376
9/17/98 19:17:31	3182.3267	10.447	10.906	10.542	10.359
9/17/98 19:27:28	3192.2742	10.436	10.909	10.532	10.341
9/17/98 19:37:28	3202.2742	10.433	10.909	10.52	10.324
9/17/98 19:47:28	3212.2742	10.43	10.91	10.514	10.309
9/17/98 19:57:28	3222.2742	10.424	10.912	10.508	10.293
9/17/98 20:07:28	3232.2742	10.421	10.913	10.504	10.28
9/17/98 20:17:28	3242.2742	10.415	10.914	10.5	10.269
9/17/98 20:27:28	3252.2742	10.415	10.916	10.5	10.257

9/17/98 20:37:28	3262.2742	10.415	10.916	10.498	10.245
9/17/98 20:47:28	3272.2742	10.413	10.916	10.5	10.235
9/17/98 20:57:28	3282.2742	10.415	10.916	10.5	10.227
9/17/98 21:07:28	3292.2742	10.421	10.917	10.501	10.216
9/17/98 21:17:28	3302.2742	10.418	10.916	10.504	10.208
9/17/98 21:27:28	3312.2742	10.418	10.913	10.504	10.2
9/17/98 21:37:28	3322.2742	10.421	10.912	10.505	10.193
9/17/98 21:47:28	3332.2742	10.418	10.907	10.505	10.183
9/17/98 21:57:28	3342.2742	10.421	10.904	10.508	10.177
9/17/98 22:07:28	3352.2742	10.421	10.901	10.508	10.17
9/17/98 22:17:28	3362.2742	10.421	10.897	10.513	10.163
9/17/98 22:27:28	3372.2742	10.418	10.894	10.513	10.156
9/17/98 22:37:28	3382.2742	10.418	10.89	10.513	10.148
9/17/98 22:47:28	3392.2742	10.418	10.886	10.514	10.142
9/17/98 22:57:28	3402.2742	10.421	10.881	10.517	10.137
9/17/98 23:07:28	3412.2742	10.418	10.877	10.517	10.129
9/17/98 23:17:28	3422.2742	10.421	10.874	10.518	10.125
9/17/98 23:27:28	3432.2742	10.421	10.868	10.52	10.119
9/17/98 23:37:28	3442.2742	10.424	10.864	10.52	10.113
9/17/98 23:47:28	3452.2742	10.421	10.858	10.521	10.108
9/17/98 23:57:28	3462.2742	10.421	10.854	10.523	10.102
9/18/98 0:07:28	3472.2742	10.421	10.848	10.523	10.098
9/18/98 0:17:28	3482.2742	10.421	10.844	10.524	10.092
9/18/98 0:27:28	3492.2742	10.421	10.837	10.524	10.087
9/18/98 0:37:28	3502.2742	10.418	10.831	10.521	10.08
9/18/98 0:47:28	3512.2742	10.415	10.825	10.523	10.076
9/18/98 0:57:28	3522.2742	10.415	10.818	10.523	10.071
9/18/98 1:07:28	3532.2742	10.418	10.812	10.523	10.067
9/18/98 1:17:28	3542.2742	10.421	10.808	10.526	10.063
9/18/98 1:27:28	3552.2742	10.418	10.799	10.526	10.058
9/18/98 1:37:28	3562.2742	10.424	10.796	10.527	10.055
9/18/98 1:47:28	3572.2742	10.418	10.787	10.527	10.05
9/18/98 1:57:28	3582.2742	10.418	10.782	10.527	10.047
9/18/98 2:07:28	3592.2742	10.418	10.776	10.529	10.044
9/18/98 2:17:28	3602.2742	10.418	10.769	10.527	10.039
9/18/98 2:27:28	3612.2742	10.415	10.76	10.529	10.037
9/18/98 2:37:28	3622.2742	10.418	10.754	10.529	10.032
9/18/98 2:47:28	3632.2742	10.415	10.747	10.527	10.028
9/18/98 2:57:28	3642.2742	10.413	10.74	10.529	10.024
9/18/98 3:07:28	3652.2742	10.415	10.736	10.529	10.021
9/18/98 3:17:28	3662.2742	10.413	10.727	10.529	10.018
9/18/98 3:27:28	3672.2742	10.418	10.727	10.532	10.016
9/18/98 3:37:28	3682.2742	10.413	10.715	10.529	10.012
9/18/98 3:47:28	3692.2742	10.413	10.707	10.532	10.009
9/18/98 3:57:28	3702.2742	10.413	10.701	10.53	10.006
9/18/98 4:07:28	3712.2742	10.415	10.694	10.53	10.003
9/18/98 4:17:28	3722.2742	10.415	10.688	10.534	10.003
9/18/98 4:27:28	3732.2742	10.418	10.682	10.536	9.999
9/18/98 4:37:28	3742.2742	10.413	10.675	10.532	9.995
9/18/98 4:47:28	3752.2742	10.41	10.668	10.533	9.993
9/18/98 4:57:28	3762.2742	10.413	10.661	10.534	9.99

9/18/98 5:07:28	3772.2742	10.41	10.652	10.533	9.989
9/18/98 5:17:28	3782.2742	10.41	10.648	10.533	9.984
9/18/98 5:27:28	3792.2742	10.41	10.64	10.533	9.981
9/18/98 5:37:28	3802.2742	10.407	10.635	10.533	9.979
9/18/98 5:47:28	3812.2742	10.404	10.626	10.532	9.977
9/18/98 5:57:28	3822.2742	10.407	10.624	10.532	9.974
9/18/98 6:07:28	3832.2742	10.407	10.614	10.532	9.971
9/18/98 6:17:28	3842.2742	10.407	10.61	10.53	9.968
9/18/98 6:27:28	3852.2742	10.404	10.598	10.532	9.967
9/18/98 6:37:28	3862.2742	10.407	10.594	10.53	9.964
9/18/98 6:47:28	3872.2742	10.401	10.585	10.532	9.961
9/18/98 6:57:28	3882.2742	10.404	10.583	10.532	9.96
9/18/98 7:07:28	3892.2742	10.407	10.575	10.533	9.96
9/18/98 7:17:28	3902.2742	10.41	10.57	10.533	9.957
9/18/98 7:27:28	3912.2742	10.415	10.567	10.534	9.955
9/18/98 7:37:28	3922.2742	10.418	10.56	10.534	9.952
9/18/98 7:47:28	3932.2742	10.421	10.554	10.533	9.95
9/18/98 7:57:28	3942.2742	10.427	10.548	10.534	9.948
9/18/98 8:07:28	3952.2742	10.43	10.541	10.534	9.945
9/18/98 8:17:28	3962.2742	10.436	10.534	10.534	9.944
9/18/98 8:27:28	3972.2742	10.438	10.528	10.536	9.942
9/18/98 8:37:28	3982.2742	10.447	10.521	10.537	9.941
9/18/98 8:47:28	3992.2742	10.45	10.513	10.537	9.939
9/18/98 8:57:28	4002.2742	10.447	10.503	10.537	9.938
9/18/98 9:07:28	4012.2742	10.453	10.499	10.537	9.936
9/18/98 9:17:28	4022.2742	10.456	10.493	10.54	9.935
9/18/98 9:27:28	4032.2742	10.461	10.484	10.537	9.934
9/18/98 9:37:28	4042.2742	10.453	10.476	10.539	9.932
9/18/98 9:47:28	4052.2742	10.453	10.469	10.54	9.931
9/18/98 9:57:28	4062.2742	10.456	10.463	10.54	9.929
9/18/98 10:07:28	4072.2742	10.453	10.454	10.537	9.925
9/18/98 10:17:28	4082.2742	10.467	10.45	10.545	9.928
9/18/98 10:27:28	4092.2742	10.453	10.446	10.533	9.918
9/18/98 10:37:28	4102.2742	10.45	10.437	10.529	9.913
9/18/98 10:47:28	4112.2742	10.438	10.43	10.527	9.91
9/18/98 10:57:28	4122.2742	10.441	10.427	10.527	9.907
9/18/98 11:07:28	4132.2742	10.444	10.418	10.526	9.905
9/18/98 11:17:28	4142.2742	10.447	10.409	10.523	9.903
9/18/98 11:27:28	4152.2742	10.438	10.399	10.526	9.902
9/18/98 11:37:28	4162.2742	10.433	10.394	10.524	9.902
9/18/98 11:47:28	4172.2742	10.438	10.388	10.523	9.897
9/18/98 11:57:28	4182.2742	10.459	10.388	10.524	9.897
9/18/98 12:07:28	4192.2742	10.447	10.373	10.516	9.889
9/18/98 12:17:28	4202.2742	10.459	10.379	10.523	9.893
9/18/98 12:27:28	4212.2742	10.413	10.353	10.511	9.884
9/18/98 12:37:28	4222.2742	10.344	10.342	10.508	9.884
9/18/98 12:47:28	4232.2742	10.341	10.346	10.517	9.889
9/18/98 12:57:28	4242.2742	10.444	10.352	10.514	9.881
9/18/98 13:07:28	4252.2742	10.427	10.349	10.518	9.881
9/18/98 13:17:28	4262.2742	10.41	10.349	10.521	9.886
9/18/98 13:27:28	4272.2742	10.436	10.337	10.516	9.877

9/18/98 13:37:28	4282.2742	10.407	10.327	10.514	9.874
9/18/98 13:47:28	4292.2742	10.407	10.326	10.517	9.877
9/18/98 13:57:28	4302.2742	10.395	10.324	10.518	9.877
9/18/98 14:07:28	4312.2742	10.286	10.294	10.498	9.867
9/18/98 14:17:28	4322.2742	10.43	10.327	10.517	9.873
9/18/98 14:27:28	4332.2742	10.332	10.301	10.508	9.87
9/18/98 14:37:28	4342.2742	10.372	10.303	10.507	9.868
9/18/98 14:47:28	4352.2742	10.413	10.303	10.511	9.868
9/18/98 14:57:28	4362.2742	10.407	10.304	10.513	9.868
9/18/98 15:07:28	4372.2742	10.407	10.297	10.508	9.861
9/18/98 15:17:28	4382.2742	10.395	10.297	10.516	9.864
9/18/98 15:27:28	4392.2742	10.364	10.287	10.508	9.861
9/18/98 15:37:28	4402.2742	10.364	10.262	10.492	9.854
9/18/98 15:47:28	4412.2742	10.393	10.29	10.513	9.862
9/18/98 15:57:28	4422.2742	10.315	10.293	10.524	9.868
9/18/98 16:07:28	4432.2742	10.375	10.269	10.501	9.852
9/18/98 16:17:28	4442.2742	10.312	10.267	10.504	9.857
9/18/98 16:27:28	4452.2742	10.361	10.293	10.523	9.862
9/18/98 16:37:28	4462.2742	10.367	10.277	10.514	9.86
9/18/98 16:47:28	4472.2742	10.384	10.278	10.513	9.857
9/18/98 16:57:28	4482.2742	10.375	10.278	10.516	9.857
9/18/98 17:07:28	4492.2742	10.37	10.277	10.513	9.854
9/18/98 17:17:28	4502.2742	10.349	10.275	10.514	9.855
9/18/98 17:27:28	4512.2742	10.352	10.271	10.513	9.854
9/18/98 17:37:28	4522.2742	10.329	10.267	10.516	9.855
9/18/98 17:47:28	4532.2742	10.295	10.262	10.513	9.852
9/18/98 17:57:28	4542.2742	10.295	10.262	10.51	9.851
9/18/98 18:07:28	4552.2742	10.304	10.264	10.513	9.852
9/18/98 18:17:28	4562.2742	10.321	10.267	10.511	9.852
9/18/98 18:27:28	4572.2742	10.335	10.267	10.513	9.845
9/18/98 18:37:28	4582.2742	10.315	10.264	10.508	9.848
9/18/98 18:47:28	4592.2742	10.332	10.262	10.51	9.844
9/18/98 18:57:28	4602.2742	10.315	10.262	10.508	9.847
9/18/98 19:07:28	4612.2742	10.335	10.262	10.51	9.842
9/18/98 19:17:28	4622.2742	10.315	10.259	10.507	9.844
9/18/98 19:27:28	4632.2742	10.332	10.261	10.51	9.847
9/18/98 19:37:28	4642.2742	10.347	10.262	10.51	9.844
9/18/98 19:47:28	4652.2742	10.335	10.261	10.511	9.845
9/18/98 19:57:28	4662.2742	10.352	10.262	10.511	9.841
9/18/98 20:07:28	4672.2742	10.355	10.265	10.511	9.842
9/18/98 20:17:28	4682.2742	10.355	10.264	10.513	9.839
9/18/98 20:27:28	4692.2742	10.355	10.262	10.511	9.841
9/18/98 20:37:28	4702.2742	10.355	10.262	10.511	9.841
9/18/98 20:47:28	4712.2742	10.361	10.262	10.513	9.839
9/18/98 20:57:28	4722.2742	10.361	10.262	10.513	9.839
9/18/98 21:07:28	4732.2742	10.364	10.262	10.514	9.841
9/18/98 21:17:28	4742.2742	10.37	10.264	10.514	9.839
9/18/98 21:27:28	4752.2742	10.367	10.262	10.514	9.838
9/18/98 21:37:28	4762.2742	10.367	10.261	10.514	9.838
9/18/98 21:47:28	4772.2742	10.37	10.262	10.516	9.839
9/18/98 21:57:28	4782.2742	10.375	10.262	10.516	9.835

9/18/98 22:07:28	4792.2742	10.37	10.262	10.516	9.836
9/18/98 22:17:28	4802.2742	10.37	10.262	10.514	9.833
9/18/98 22:27:28	4812.2742	10.367	10.261	10.511	9.831
9/18/98 22:37:28	4822.2742	10.361	10.261	10.508	9.829
9/18/98 22:47:28	4832.2742	10.364	10.259	10.51	9.831
9/18/98 22:57:28	4842.2742	10.367	10.261	10.511	9.832
9/18/98 23:07:28	4852.2742	10.361	10.261	10.508	9.829
9/18/98 23:17:28	4862.2742	10.367	10.259	10.51	9.831
9/18/98 23:27:28	4872.2742	10.364	10.259	10.51	9.829
9/18/98 23:37:28	4882.2742	10.367	10.259	10.511	9.829
9/18/98 23:47:28	4892.2742	10.364	10.258	10.511	9.828
9/18/98 23:57:28	4902.2742	10.364	10.257	10.511	9.828
9/19/98 0:07:28	4912.2742	10.37	10.258	10.513	9.826
9/19/98 0:17:28	4922.2742	10.37	10.258	10.511	9.825
9/19/98 0:27:28	4932.2742	10.372	10.259	10.51	9.822
9/19/98 0:37:28	4942.2742	10.375	10.259	10.51	9.822
9/19/98 0:47:28	4952.2742	10.372	10.257	10.507	9.819
9/19/98 0:57:28	4962.2742	10.372	10.257	10.51	9.822
9/19/98 1:07:28	4972.2742	10.372	10.257	10.507	9.819
9/19/98 1:17:28	4982.2742	10.372	10.255	10.508	9.819
9/19/98 1:27:28	4992.2742	10.37	10.254	10.508	9.819
9/19/98 1:37:28	5002.2742	10.37	10.252	10.508	9.819
9/19/98 1:47:28	5012.2742	10.367	10.252	10.508	9.819
9/19/98 1:57:28	5022.2742	10.364	10.251	10.508	9.818
9/19/98 2:07:28	5032.2742	10.367	10.252	10.508	9.818
9/19/98 2:17:28	5042.2742	10.364	10.251	10.508	9.816
9/19/98 2:27:28	5052.2742	10.361	10.251	10.505	9.815
9/19/98 2:37:28	5062.2742	10.364	10.249	10.508	9.816
9/19/98 2:47:28	5072.2742	10.361	10.249	10.508	9.815
9/19/98 2:57:28	5082.2742	10.358	10.248	10.505	9.813
9/19/98 3:07:28	5092.2742	10.358	10.248	10.505	9.813
9/19/98 3:17:28	5102.2742	10.358	10.246	10.505	9.813
9/19/98 3:27:28	5112.2742	10.361	10.248	10.507	9.812
9/19/98 3:37:28	5122.2742	10.358	10.246	10.505	9.812
9/19/98 3:47:28	5132.2742	10.358	10.246	10.505	9.812
9/19/98 3:57:28	5142.2742	10.358	10.246	10.504	9.812
9/19/98 4:07:28	5152.2742	10.355	10.246	10.502	9.809
9/19/98 4:17:28	5162.2742	10.361	10.245	10.508	9.812
9/19/98 4:27:28	5172.2742	10.37	10.249	10.513	9.815
9/19/98 4:37:28	5182.2742	10.361	10.248	10.504	9.807
9/19/98 4:47:28	5192.2742	10.367	10.246	10.508	9.81
9/19/98 4:57:28	5202.2742	10.364	10.245	10.507	9.807
9/19/98 5:07:28	5212.2742	10.361	10.244	10.505	9.807
9/19/98 5:17:28	5222.2742	10.361	10.244	10.505	9.806
9/19/98 5:27:28	5232.2742	10.358	10.244	10.505	9.806
9/19/98 5:37:28	5242.2742	10.358	10.245	10.505	9.806
9/19/98 5:47:28	5252.2742	10.361	10.246	10.505	9.804
9/19/98 5:57:28	5262.2742	10.355	10.244	10.502	9.806
9/19/98 6:07:28	5272.2742	10.355	10.242	10.507	9.806
9/19/98 6:17:28	5282.2742	10.358	10.242	10.504	9.804
9/19/98 6:27:28	5292.2742	10.358	10.242	10.507	9.806

9/19/98 6:37:28	5302.2742	10.361	10.241	10.508	9.807
9/19/98 6:47:28	5312.2742	10.358	10.242	10.504	9.803
9/19/98 6:57:28	5322.2742	10.358	10.242	10.505	9.804
9/19/98 7:07:28	5332.2742	10.361	10.242	10.507	9.804
9/19/98 7:17:28	5342.2742	10.367	10.242	10.51	9.806
9/19/98 7:27:28	5352.2742	10.375	10.246	10.508	9.803
9/19/98 7:37:28	5362.2742	10.393	10.251	10.511	9.802
9/19/98 7:47:28	5372.2742	10.398	10.252	10.513	9.803
9/19/98 7:57:28	5382.2742	10.401	10.252	10.508	9.799
9/19/98 8:07:28	5392.2742	10.41	10.251	10.508	9.797
9/19/98 8:17:28	5402.2742	10.413	10.249	10.508	9.796
9/19/98 8:27:28	5412.2742	10.418	10.251	10.507	9.794
9/19/98 8:37:28	5422.2742	10.424	10.251	10.507	9.794
9/19/98 8:47:28	5432.2742	10.418	10.248	10.505	9.793
9/19/98 8:57:28	5442.2742	10.427	10.248	10.505	9.793
9/19/98 9:07:28	5452.2742	10.436	10.248	10.508	9.793
9/19/98 9:17:28	5462.2742	10.43	10.246	10.505	9.791
9/19/98 9:27:28	5472.2742	10.427	10.246	10.504	9.79
9/19/98 9:37:28	5482.2742	10.433	10.246	10.504	9.791
9/19/98 9:47:28	5492.2742	10.436	10.246	10.505	9.79
9/19/98 9:57:28	5502.2742	10.424	10.245	10.505	9.789
9/19/98 10:07:28	5512.2742	10.424	10.241	10.502	9.79
9/19/98 10:17:28	5522.2742	10.418	10.242	10.5	9.789
9/19/98 10:27:28	5532.2742	10.421	10.241	10.501	9.789
9/19/98 10:37:28	5542.2742	10.415	10.239	10.5	9.787
9/19/98 10:47:28	5552.2742	10.401	10.238	10.498	9.786
9/19/98 10:57:28	5562.2742	10.407	10.238	10.5	9.787
9/19/98 11:07:28	5572.2742	10.401	10.236	10.501	9.786
9/19/98 11:17:28	5582.2742	10.378	10.235	10.498	9.786
9/19/98 11:27:28	5592.2742	10.39	10.235	10.495	9.783
9/19/98 11:37:28	5602.2742	10.401	10.236	10.498	9.783
9/19/98 11:47:28	5612.2742	10.372	10.231	10.494	9.78
9/19/98 11:57:28	5622.2742	10.378	10.232	10.492	9.78
9/19/98 12:07:28	5632.2742	10.384	10.233	10.495	9.781
9/19/98 12:17:28	5642.2742	10.344	10.22	10.491	9.777
9/19/98 12:27:28	5652.2742	10.358	10.225	10.491	9.777
9/19/98 12:37:28	5662.2742	10.355	10.231	10.494	9.78
9/19/98 12:47:28	5672.2742	10.349	10.226	10.498	9.777
9/19/98 12:57:28	5682.2742	10.347	10.225	10.494	9.777
9/19/98 13:07:28	5692.2742	10.347	10.223	10.492	9.775
9/19/98 13:17:28	5702.2742	10.338	10.223	10.494	9.777
9/19/98 13:27:28	5712.2742	10.338	10.226	10.497	9.778
9/19/98 13:37:28	5722.2742	10.352	10.229	10.497	9.775
9/19/98 13:47:28	5732.2742	10.338	10.226	10.495	9.778
9/19/98 13:57:28	5742.2742	10.332	10.218	10.492	9.774
9/19/98 14:07:28	5752.2742	10.347	10.222	10.491	9.775
9/19/98 14:17:28	5762.2742	10.341	10.225	10.492	9.775
9/19/98 14:27:28	5772.2742	10.344	10.22	10.495	9.778
9/19/98 14:37:28	5782.2742	10.341	10.222	10.495	9.774
9/19/98 14:47:28	5792.2742	10.349	10.223	10.491	9.773
9/19/98 14:57:28	5802.2742	10.341	10.218	10.494	9.777

9/19/98 15:07:28	5812.2742	10.335	10.22	10.494	9.774
9/19/98 15:17:28	5822.2742	10.324	10.22	10.492	9.775
9/19/98 15:27:28	5832.2742	10.329	10.222	10.495	9.775
9/19/98 15:37:28	5842.2742	10.341	10.223	10.495	9.775
9/19/98 15:47:28	5852.2742	10.324	10.218	10.494	9.774
9/19/98 15:57:28	5862.2742	10.329	10.218	10.495	9.774
9/19/98 16:07:28	5872.2742	10.332	10.22	10.495	9.774
9/19/98 16:17:28	5882.2742	10.327	10.219	10.498	9.775
9/19/98 16:27:28	5892.2742	10.318	10.213	10.495	9.777
9/19/98 16:37:28	5902.2742	10.329	10.216	10.494	9.777
9/19/98 16:47:28	5912.2742	10.315	10.218	10.501	9.778
9/19/98 16:57:28	5922.2742	10.327	10.22	10.501	9.778
9/19/98 17:07:28	5932.2742	10.315	10.213	10.5	9.78
9/19/98 17:17:28	5942.2742	10.321	10.219	10.514	9.778
9/19/98 17:27:28	5952.2742	10.304	10.215	10.505	9.781
9/19/98 17:37:28	5962.2742	10.304	10.21	10.502	9.781
9/19/98 17:47:28	5972.2742	10.295	10.212	10.504	9.778
9/19/98 17:57:28	5982.2742	10.286	10.212	10.504	9.781
9/19/98 18:07:28	5992.2742	10.298	10.213	10.502	9.78
9/19/98 18:17:28	6002.2742	10.306	10.215	10.504	9.781
9/19/98 18:27:28	6012.2742	10.309	10.213	10.504	9.778
9/19/98 18:37:28	6022.2742	10.318	10.215	10.501	9.778
9/19/98 18:47:28	6032.2742	10.315	10.213	10.504	9.781
9/19/98 18:57:28	6042.2742	10.309	10.212	10.501	9.778
9/19/98 19:07:28	6052.2742	10.309	10.212	10.501	9.78
9/19/98 19:17:28	6062.2742	10.306	10.21	10.497	9.778
9/19/98 19:27:28	6072.2742	10.306	10.212	10.498	9.777
9/19/98 19:37:28	6082.2742	10.306	10.212	10.498	9.778
9/19/98 19:47:28	6092.2742	10.315	10.213	10.5	9.78
9/19/98 19:57:28	6102.2742	10.318	10.215	10.501	9.78
9/19/98 20:07:28	6112.2742	10.321	10.215	10.5	9.781
9/19/98 20:17:28	6122.2742	10.327	10.216	10.502	9.78
9/19/98 20:27:28	6132.2742	10.324	10.216	10.502	9.78
9/19/98 20:37:28	6142.2742	10.332	10.219	10.504	9.781
9/19/98 20:47:28	6152.2742	10.338	10.22	10.507	9.783
9/19/98 20:57:28	6162.2742	10.344	10.22	10.507	9.783
9/19/98 21:07:28	6172.2742	10.361	10.226	10.511	9.786
9/19/98 21:17:28	6182.2742	10.361	10.223	10.511	9.783
9/19/98 21:27:28	6192.2742	10.361	10.223	10.511	9.781
9/19/98 21:37:28	6202.2742	10.355	10.222	10.508	9.781
9/19/98 21:47:28	6212.2742	10.358	10.225	10.51	9.781
9/19/98 21:57:28	6222.2742	10.358	10.225	10.51	9.78
9/19/98 22:07:28	6232.2742	10.358	10.223	10.508	9.78
9/19/98 22:17:28	6242.2742	10.355	10.225	10.508	9.78
9/19/98 22:27:28	6252.2742	10.352	10.225	10.508	9.778
9/19/98 22:37:28	6262.2742	10.358	10.225	10.508	9.778
9/19/98 22:47:28	6272.2742	10.355	10.225	10.507	9.78
9/19/98 22:57:28	6282.2742	10.352	10.225	10.507	9.778
9/19/98 23:07:28	6292.2742	10.352	10.225	10.504	9.777
9/19/98 23:17:28	6302.2742	10.347	10.225	10.504	9.775
9/19/98 23:27:28	6312.2742	10.344	10.225	10.501	9.775

9/19/98 23:37:28	6322.2742	10.347	10.225	10.501	9.775
9/19/98 23:47:28	6332.2742	10.349	10.223	10.505	9.777
9/19/98 23:57:28	6342.2742	10.352	10.225	10.501	9.774
9/20/98 0:07:28	6352.2742	10.352	10.225	10.507	9.777
9/20/98 0:17:28	6362.2742	10.349	10.223	10.502	9.774
9/20/98 0:27:28	6372.2742	10.347	10.226	10.5	9.771
9/20/98 0:37:28	6382.2742	10.349	10.225	10.501	9.773
9/20/98 0:47:28	6392.2742	10.352	10.222	10.501	9.771
9/20/98 0:57:28	6402.2742	10.347	10.225	10.501	9.771
9/20/98 1:07:28	6412.2742	10.352	10.228	10.501	9.771
9/20/98 1:17:28	6422.2742	10.349	10.225	10.498	9.77
9/20/98 1:27:28	6432.2742	10.349	10.225	10.5	9.771
9/20/98 1:37:28	6442.2742	10.347	10.225	10.497	9.768
9/20/98 1:47:28	6452.2742	10.349	10.223	10.498	9.77
9/20/98 1:57:28	6462.2742	10.347	10.223	10.497	9.768
9/20/98 2:07:28	6472.2742	10.347	10.223	10.497	9.768
9/20/98 2:17:28	6482.2742	10.347	10.223	10.497	9.767
9/20/98 2:27:28	6492.2742	10.349	10.222	10.498	9.768
9/20/98 2:37:28	6502.2742	10.347	10.219	10.495	9.767
9/20/98 2:47:28	6512.2742	10.344	10.22	10.495	9.767
9/20/98 2:57:28	6522.2742	10.344	10.22	10.495	9.767
9/20/98 3:07:28	6532.2742	10.344	10.219	10.494	9.765
9/20/98 3:17:28	6542.2742	10.347	10.22	10.494	9.765
9/20/98 3:27:28	6552.2742	10.344	10.219	10.495	9.767
9/20/98 3:37:28	6562.2742	10.344	10.218	10.494	9.764
9/20/98 3:47:28	6572.2742	10.341	10.218	10.486	9.762
9/20/98 3:57:28	6582.2742	10.344	10.216	10.495	9.765
9/20/98 4:07:28	6592.2742	10.344	10.215	10.495	9.764
9/20/98 4:17:28	6602.2742	10.341	10.216	10.497	9.765
9/20/98 4:27:28	6612.2742	10.341	10.216	10.494	9.762
9/20/98 4:37:28	6622.2742	10.341	10.215	10.494	9.761
9/20/98 4:47:28	6632.2742	10.344	10.218	10.494	9.761
9/20/98 4:57:28	6642.2742	10.344	10.216	10.495	9.762
9/20/98 5:07:28	6652.2742	10.347	10.216	10.497	9.762
9/20/98 5:17:28	6662.2742	10.349	10.218	10.498	9.762
9/20/98 5:27:28	6672.2742	10.349	10.216	10.498	9.764
9/20/98 5:37:28	6682.2742	10.347	10.216	10.495	9.761
9/20/98 5:47:28	6692.2742	10.347	10.215	10.497	9.761
9/20/98 5:57:28	6702.2742	10.344	10.215	10.494	9.761
9/20/98 6:07:28	6712.2742	10.344	10.216	10.492	9.759
9/20/98 6:17:28	6722.2742	10.344	10.215	10.494	9.759
9/20/98 6:27:28	6732.2742	10.347	10.213	10.492	9.759
9/20/98 6:37:28	6742.2742	10.347	10.212	10.494	9.759
9/20/98 6:47:28	6752.2742	10.344	10.213	10.492	9.758
9/20/98 6:57:28	6762.2742	10.347	10.212	10.494	9.758
9/20/98 7:07:28	6772.2742	10.349	10.213	10.495	9.758
9/20/98 7:17:28	6782.2742	10.349	10.212	10.495	9.759
9/20/98 7:27:28	6792.2742	10.349	10.213	10.495	9.758
9/20/98 7:37:28	6802.2742	10.355	10.213	10.498	9.759
9/20/98 7:47:28	6812.2742	10.355	10.216	10.492	9.757
9/20/98 7:57:28	6822.2742	10.358	10.216	10.494	9.757

9/20/98 8:07:28	6832.2742	10.367	10.215	10.492	9.755
9/20/98 8:17:28	6842.2742	10.372	10.219	10.494	9.754
9/20/98 8:27:28	6852.2742	10.381	10.216	10.494	9.752
9/20/98 8:37:28	6862.2742	10.375	10.213	10.489	9.748
9/20/98 8:47:28	6872.2742	10.361	10.212	10.489	9.751
9/20/98 8:57:28	6882.2742	10.384	10.218	10.494	9.752
9/20/98 9:07:28	6892.2742	10.401	10.218	10.494	9.752
9/20/98 9:17:28	6902.2742	10.372	10.203	10.486	9.748
9/20/98 9:27:28	6912.2742	10.364	10.209	10.492	9.752
9/20/98 9:37:28	6922.2742	10.361	10.206	10.488	9.749
9/20/98 9:47:28	6932.2742	10.381	10.215	10.494	9.752
9/20/98 9:57:28	6942.2742	10.367	10.196	10.479	9.742
9/20/98 10:07:28	6952.2742	10.37	10.205	10.488	9.749
9/20/98 10:17:28	6962.2742	10.344	10.199	10.482	9.741
9/20/98 10:27:28	6972.2742	10.341	10.202	10.485	9.745
9/20/98 10:37:28	6982.2742	10.375	10.22	10.497	9.751
9/20/98 10:47:28	6992.2742	10.395	10.21	10.484	9.739
9/20/98 10:57:28	7002.2742	10.41	10.215	10.489	9.744
9/20/98 11:07:28	7012.2742	10.415	10.212	10.484	9.739
9/20/98 11:17:28	7022.2742	10.398	10.206	10.482	9.738
9/20/98 11:27:28	7032.2742	10.372	10.21	10.486	9.745
9/20/98 11:37:28	7042.2742	10.415	10.216	10.485	9.742
9/20/98 11:47:28	7052.2742	10.407	10.207	10.481	9.738
9/20/98 11:57:28	7062.2742	10.404	10.215	10.485	9.744
9/20/98 12:07:28	7072.2742	10.364	10.184	10.468	9.73
9/20/98 12:17:28	7082.2742	10.421	10.209	10.478	9.735
9/20/98 12:27:28	7092.2742	10.421	10.207	10.481	9.738
9/20/98 12:37:28	7102.2742	10.418	10.207	10.478	9.735
9/20/98 12:47:28	7112.2742	10.324	10.173	10.46	9.728
9/20/98 12:57:28	7122.2742	10.335	10.194	10.478	9.735
9/20/98 13:07:28	7132.2742	10.312	10.184	10.468	9.73
9/20/98 13:17:28	7142.2742	10.315	10.181	10.468	9.73
9/20/98 13:27:28	7152.2742	10.292	10.189	10.473	9.733
9/20/98 13:37:28	7162.2742	10.41	10.213	10.488	9.741
9/20/98 13:47:28	7172.2742	10.295	10.183	10.47	9.732
9/20/98 13:57:28	7182.2742	10.329	10.205	10.484	9.741
9/20/98 14:07:28	7192.2742	10.393	10.197	10.478	9.733
9/20/98 14:17:28	7202.2742	10.381	10.189	10.475	9.732
9/20/98 14:27:28	7212.2742	10.321	10.179	10.465	9.729
9/20/98 14:37:28	7222.2742	10.352	10.189	10.473	9.73
9/20/98 14:47:28	7232.2742	10.344	10.163	10.457	9.722
9/20/98 14:57:28	7242.2742	10.358	10.19	10.482	9.735
9/20/98 15:07:28	7252.2742	10.312	10.161	10.459	9.726
9/20/98 15:17:28	7262.2742	10.372	10.2	10.491	9.742
9/20/98 15:27:28	7272.2742	10.375	10.193	10.484	9.738
9/20/98 15:37:28	7282.2742	10.349	10.19	10.484	9.739
9/20/98 15:47:28	7292.2742	10.355	10.19	10.488	9.741
9/20/98 15:57:28	7302.2742	10.372	10.19	10.485	9.738
9/20/98 16:07:28	7312.2742	10.344	10.19	10.489	9.744
9/20/98 16:17:28	7322.2742	10.318	10.18	10.488	9.744
9/20/98 16:27:28	7332.2742	10.312	10.194	10.497	9.748

9/20/98 16:37:28	7342.2742	10.258	10.173	10.484	9.744
9/20/98 16:47:28	7352.2742	10.361	10.196	10.492	9.745
9/20/98 16:57:28	7362.2742	10.278	10.173	10.485	9.745
9/20/98 17:07:28	7372.2742	10.283	10.184	10.489	9.746
9/20/98 17:17:28	7382.2742	10.283	10.18	10.491	9.748
9/20/98 17:27:28	7392.2742	10.298	10.183	10.489	9.746
9/20/98 17:37:28	7402.2742	10.283	10.18	10.485	9.745
9/20/98 17:47:28	7412.2742	10.292	10.184	10.491	9.748
9/20/98 17:57:28	7422.2742	10.301	10.186	10.491	9.748
9/20/98 18:07:28	7432.2742	10.306	10.186	10.491	9.746
9/20/98 18:17:28	7442.2742	10.312	10.187	10.494	9.751
9/20/98 18:27:28	7452.2742	10.327	10.189	10.504	9.755
9/20/98 18:37:28	7462.2742	10.306	10.186	10.491	9.746
9/20/98 18:47:28	7472.2742	10.306	10.187	10.497	9.752
9/20/98 18:57:28	7482.2742	10.315	10.19	10.497	9.752
9/20/98 19:07:28	7492.2742	10.318	10.19	10.494	9.751
9/20/98 19:17:28	7502.2742	10.312	10.189	10.492	9.748
9/20/98 19:27:28	7512.2742	10.321	10.19	10.497	9.751
9/20/98 19:37:28	7522.2742	10.318	10.19	10.491	9.746
9/20/98 19:47:28	7532.2742	10.321	10.192	10.495	9.751
9/20/98 19:57:28	7542.2742	10.372	10.213	10.514	9.762
9/20/98 20:07:28	7552.2742	10.347	10.2	10.497	9.749
9/20/98 20:17:28	7562.2742	10.349	10.199	10.497	9.749
9/20/98 20:27:28	7572.2742	10.344	10.196	10.5	9.749
9/20/98 20:37:28	7582.2742	10.335	10.193	10.498	9.751
9/20/98 20:47:28	7592.2742	10.364	10.205	10.516	9.764
9/20/98 20:57:28	7602.2742	10.349	10.202	10.507	9.757
9/20/98 21:07:28	7612.2742	10.347	10.199	10.508	9.761
9/20/98 21:17:28	7622.2742	10.344	10.199	10.511	9.762
9/20/98 21:27:28	7632.2742	10.358	10.207	10.516	9.762
9/20/98 21:37:28	7642.2742	10.355	10.206	10.51	9.761
9/20/98 21:47:28	7652.2742	10.344	10.206	10.507	9.758
9/20/98 21:57:28	7662.2742	10.338	10.203	10.504	9.757
9/20/98 22:07:28	7672.2742	10.332	10.2	10.502	9.755
9/20/98 22:17:28	7682.2742	10.329	10.202	10.501	9.755
9/20/98 22:27:28	7692.2742	10.327	10.2	10.497	9.752
9/20/98 22:37:28	7702.2742	10.329	10.203	10.498	9.752
9/20/98 22:47:28	7712.2742	10.329	10.202	10.498	9.754
9/20/98 22:57:28	7722.2742	10.329	10.202	10.5	9.754
9/20/98 23:07:28	7732.2742	10.332	10.203	10.497	9.752
9/20/98 23:17:28	7742.2742	10.335	10.203	10.501	9.754
9/20/98 23:27:28	7752.2742	10.332	10.202	10.5	9.754
9/20/98 23:37:28	7762.2742	10.341	10.206	10.501	9.754
9/20/98 23:47:28	7772.2742	10.335	10.205	10.498	9.754
9/20/98 23:57:28	7782.2742	10.341	10.206	10.502	9.754
9/21/98 0:07:28	7792.2742	10.341	10.206	10.5	9.752
9/21/98 0:17:28	7802.2742	10.347	10.206	10.504	9.757
9/21/98 0:27:28	7812.2742	10.344	10.207	10.504	9.755
9/21/98 0:37:28	7822.2742	10.344	10.207	10.501	9.754
9/21/98 0:47:28	7832.2742	10.344	10.207	10.502	9.754
9/21/98 0:57:28	7842.2742	10.349	10.207	10.507	9.757

9/21/98 1:07:28	7852.2742	10.352	10.21	10.508	9.759
9/21/98 1:17:28	7862.2742	10.349	10.21	10.505	9.757
9/21/98 1:27:28	7872.2742	10.355	10.21	10.51	9.759
9/21/98 1:37:28	7882.2742	10.358	10.213	10.51	9.758
9/21/98 1:47:28	7892.2742	10.355	10.212	10.508	9.758
9/21/98 1:57:28	7902.2742	10.358	10.215	10.505	9.757
9/21/98 2:07:28	7912.2742	10.352	10.212	10.502	9.752
9/21/98 2:17:28	7922.2742	10.347	10.212	10.501	9.751
9/21/98 2:27:28	7932.2742	10.349	10.21	10.502	9.752
9/21/98 2:37:28	7942.2742	10.352	10.21	10.505	9.755
9/21/98 2:47:28	7952.2742	10.347	10.212	10.501	9.751
9/21/98 2:57:28	7962.2742	10.352	10.213	10.505	9.754
9/21/98 3:07:28	7972.2742	10.349	10.213	10.502	9.754
9/21/98 3:17:28	7982.2742	10.349	10.213	10.501	9.752
9/21/98 3:27:28	7992.2742	10.347	10.212	10.5	9.751
9/21/98 3:37:28	8002.2742	10.352	10.213	10.501	9.751
9/21/98 3:47:28	8012.2742	10.349	10.213	10.501	9.751
9/21/98 3:57:28	8022.2742	10.347	10.21	10.501	9.752
9/21/98 4:07:28	8032.2742	10.347	10.209	10.5	9.751
9/21/98 4:17:28	8042.2742	10.347	10.21	10.501	9.751
9/21/98 4:27:28	8052.2742	10.347	10.21	10.498	9.751
9/21/98 4:37:28	8062.2742	10.344	10.209	10.5	9.751
9/21/98 4:47:28	8072.2742	10.349	10.213	10.501	9.749
9/21/98 4:57:28	8082.2742	10.349	10.213	10.502	9.751
9/21/98 5:07:28	8092.2742	10.352	10.212	10.502	9.751
9/21/98 5:17:28	8102.2742	10.352	10.21	10.501	9.749
9/21/98 5:27:28	8112.2742	10.349	10.21	10.502	9.751
9/21/98 5:37:28	8122.2742	10.347	10.209	10.501	9.751
9/21/98 5:47:28	8132.2742	10.347	10.209	10.501	9.751
9/21/98 5:57:28	8142.2742	10.347	10.209	10.501	9.751
9/21/98 6:07:28	8152.2742	10.347	10.209	10.5	9.749
9/21/98 6:17:28	8162.2742	10.347	10.209	10.5	9.748
9/21/98 6:27:28	8172.2742	10.344	10.209	10.5	9.749
9/21/98 6:37:28	8182.2742	10.347	10.209	10.501	9.749
9/21/98 6:47:28	8192.2742	10.349	10.209	10.5	9.749
9/21/98 6:57:28	8202.2742	10.349	10.21	10.501	9.751
9/21/98 7:07:28	8212.2742	10.352	10.212	10.502	9.754
9/21/98 7:17:28	8222.2742	10.355	10.212	10.505	9.751
9/21/98 7:27:28	8232.2742	10.367	10.215	10.504	9.749
9/21/98 7:37:28	8242.2742	10.37	10.218	10.502	9.749
9/21/98 7:47:28	8252.2742	10.37	10.216	10.504	9.751
9/21/98 7:57:28	8262.2742	10.364	10.213	10.501	9.748
9/21/98 8:07:28	8272.2742	10.367	10.212	10.504	9.749
9/21/98 8:17:28	8282.2742	10.364	10.212	10.502	9.748
9/21/98 8:27:28	8292.2742	10.367	10.212	10.504	9.749
9/21/98 8:37:28	8302.2742	10.364	10.212	10.504	9.748
9/21/98 8:47:28	8312.2742	10.367	10.212	10.502	9.748
9/21/98 8:57:28	8322.2742	10.364	10.212	10.501	9.746
9/21/98 9:07:28	8332.2742	10.367	10.213	10.501	9.745
9/21/98 9:17:28	8342.2742	10.37	10.213	10.501	9.746
9/21/98 9:27:28	8352.2742	10.37	10.213	10.5	9.744

9/21/98 9:37:28	8362.2742	10.375	10.212	10.501	9.745
9/21/98 9:47:28	8372.2742	10.375	10.212	10.501	9.746
9/21/98 9:57:28	8382.2742	10.381	10.212	10.501	9.745
9/21/98 10:07:28	8392.2742	10.378	10.207	10.498	9.742
9/21/98 10:17:28	8402.2742	10.37	10.206	10.495	9.742

WELL 200 STEP TEST WATER LEVEL DATA

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 200 STEP TEST WL DATA					
FILE NAME : 200STEP.XLS					
		PUMPING	OBSERVATION	OBSERVATION	OBSERVATION
	ELAPSED	WELL 200	WELL 602	WELL 603	WELL 195
DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
TEST STARTED AT 10 GPM					
9/10/98 10:46:45	0.00	9.615	10.34	10.66	9.894
9/10/98 10:46:51	0.10	9.689	10.339	10.66	9.894
9/10/98 10:46:57	0.20	9.772	10.34	10.665	9.896
9/10/98 10:47:04	0.32	9.89	10.339	10.676	9.896
9/10/98 10:47:11	0.43	9.985	10.339	10.687	9.897
9/10/98 10:47:19	0.56	10.059	10.339	10.699	9.9
9/10/98 10:47:27	0.69	10.094	10.337	10.712	9.903
9/10/98 10:47:35	0.83	10.16	10.339	10.722	9.907
9/10/98 10:47:44	0.98	10.174	10.34	10.732	9.91
9/10/98 10:47:53	1.14	10.197	10.34	10.74	9.916
9/10/98 10:48:03	1.31	10.237	10.341	10.75	9.92
9/10/98 10:48:14	1.48	10.249	10.341	10.758	9.925
9/10/98 10:48:25	1.67	10.246	10.343	10.767	9.931
9/10/98 10:48:37	1.87	10.232	10.343	10.773	9.936
9/10/98 10:48:50	2.08	10.237	10.343	10.777	9.941
9/10/98 10:49:03	2.30	10.217	10.344	10.782	9.945
9/10/98 10:49:17	2.54	10.246	10.344	10.789	9.949
9/10/98 10:49:32	2.79	10.257	10.346	10.796	9.955
9/10/98 10:49:48	3.05	10.275	10.347	10.805	9.958
9/10/98 10:50:05	3.33	10.272	10.347	10.809	9.961
9/10/98 10:50:23	3.63	10.28	10.346	10.814	9.964
9/10/98 10:50:42	3.94	10.3	10.347	10.82	9.97
9/10/98 10:51:02	4.28	10.309	10.346	10.824	9.973
9/10/98 10:51:23	4.63	10.315	10.344	10.828	9.978
9/10/98 10:51:45	5.00	10.318	10.346	10.836	9.983
9/10/98 10:52:09	5.40	10.343	10.344	10.841	9.987
9/10/98 10:52:34	5.82	10.352	10.346	10.847	9.99
9/10/98 10:53:01	6.26	10.366	10.347	10.854	9.996
9/10/98 10:53:29	6.73	10.375	10.349	10.86	10
9/10/98 10:53:59	7.23	10.392	10.352	10.868	10.005
9/10/98 10:54:31	7.76	10.381	10.354	10.873	10.009
9/10/98 10:55:04	8.32	10.409	10.356	10.875	10.013
9/10/98 10:55:40	8.91	10.404	10.354	10.885	10.018
9/10/98 10:56:17	9.54	10.409	10.359	10.888	10.022
9/10/98 10:56:57	10.20	10.435	10.321	10.902	10.032
9/10/98 10:57:40	10.91	10.452	10.366	10.898	10.031
9/10/98 10:58:24	11.65	10.441	10.367	10.905	10.035
9/10/98 10:59:12	12.44	10.447	10.375	10.913	10.038
9/10/98 11:00:02	13.28	10.464	10.375	10.916	10.041
9/10/98 11:00:55	14.17	10.452	10.375	10.917	10.044
9/10/98 11:01:51	15.11	10.47	10.389	10.932	10.052
9/10/98 11:02:51	16.10	10.475	10.391	10.93	10.051
9/10/98 11:03:51	17.10	10.487	10.398	10.937	10.057
9/10/98 11:04:51	18.10	10.473	10.403	10.942	10.058

9/10/98 11:05:51	19.10	10.484	10.398	10.937	10.055
9/10/98 11:06:51	20.10	10.475	10.386	10.933	10.054
9/10/98 11:07:51	21.10	10.498	10.386	10.934	10.057
9/10/98 11:08:51	22.10	10.481	10.388	10.939	10.058
9/10/98 11:09:51	23.10	10.493	10.389	10.942	10.063
9/10/98 11:10:51	24.10	10.475	10.391	10.943	10.064
9/10/98 11:11:51	25.10	10.493	10.393	10.949	10.067
9/10/98 11:12:51	26.10	10.504	10.396	10.952	10.068
9/10/98 11:13:51	27.10	10.493	10.399	10.955	10.07
9/10/98 11:14:51	28.10	10.51	10.402	10.956	10.074
9/10/98 11:15:51	29.10	10.493	10.405	10.959	10.077
9/10/98 11:16:51	30.10	10.501	10.406	10.961	10.077
9/10/98 11:17:51	31.10	10.516	10.406	10.962	10.079
9/10/98 11:18:51	32.10	10.51	10.408	10.964	10.08
9/10/98 11:19:51	33.10	10.521	10.411	10.966	10.083
9/10/98 11:20:51	34.10	10.513	10.415	10.968	10.084
9/10/98 11:21:51	35.10	10.518	10.418	10.969	10.084
9/10/98 11:22:51	36.10	10.539	10.424	10.971	10.087
9/10/98 11:23:51	37.10	10.498	10.425	10.969	10.089
9/10/98 11:24:51	38.10	10.53	10.428	10.974	10.092
9/10/98 11:25:51	39.10	10.518	10.441	10.978	10.093
9/10/98 11:26:51	40.10	10.518	10.431	10.974	10.092
9/10/98 11:27:51	41.10	10.541	10.434	10.977	10.093
9/10/98 11:28:51	42.10	10.527	10.437	10.98	10.096
9/10/98 11:29:51	43.10	10.527	10.451	10.99	10.105
9/10/98 11:30:51	44.10	10.544	10.463	10.993	10.106
9/10/98 11:31:51	45.10	10.559	10.457	10.987	10.1
9/10/98 11:32:51	46.10	10.544	10.438	10.974	10.093
9/10/98 11:33:51	47.10	10.539	10.434	10.972	10.095
9/10/98 11:34:51	48.10	10.524	10.437	10.968	10.097
9/10/98 11:35:51	49.10	10.541	10.464	10.996	10.109
9/10/98 11:36:51	50.10	10.553	10.476	10.998	10.113
9/10/98 11:37:51	51.10	10.544	10.477	10.997	10.11
9/10/98 11:38:51	52.10	10.547	10.454	10.984	10.102
9/10/98 11:39:51	53.10	10.536	10.445	10.98	10.102
9/10/98 11:40:51	54.10	10.547	10.453	10.985	10.108
9/10/98 11:41:51	55.10	10.539	10.457	10.99	10.108
9/10/98 11:42:51	56.10	10.561	10.46	10.988	10.109
9/10/98 11:43:51	57.10	10.55	10.455	10.987	10.108
FLOW INCREASED TO 25 GPM					
9/10/98 11:44:51	58.10	10.553	10.463	10.993	10.112
9/10/98 11:45:51	59.10	11.445	10.473	11.073	10.126
9/10/98 11:46:51	60.10	11.804	10.467	11.157	10.161
9/10/98 11:47:51	61.10	11.97	10.464	11.217	10.199
9/10/98 11:48:51	62.10	12.102	10.473	11.271	10.229
9/10/98 11:49:51	63.10	12.182	10.479	11.313	10.26
9/10/98 11:50:51	64.10	12.266	10.486	11.352	10.292
9/10/98 11:51:51	65.10	12.326	10.484	11.377	10.308
9/10/98 11:52:51	66.10	12.38	10.486	11.403	10.324
9/10/98 11:53:51	67.10	12.42	10.492	11.428	10.341
9/10/98 11:54:51	68.10	12.478	10.5	11.452	10.36

9/10/98 11:55:51	69.10	12.518	10.5	11.467	10.366
9/10/98 11:56:51	70.10	12.547	10.489	11.479	10.379
9/10/98 11:57:51	71.10	12.584	10.486	11.49	10.392
9/10/98 11:58:51	72.10	12.601	10.496	11.512	10.402
9/10/98 11:59:51	73.10	12.627	10.493	11.522	10.412
9/10/98 12:00:51	74.10	12.644	10.499	11.535	10.422
9/10/98 12:01:51	75.10	12.67	10.5	11.547	10.43
9/10/98 12:02:51	76.10	12.69	10.504	11.556	10.435
9/10/98 12:03:51	77.10	12.696	10.503	11.567	10.441
9/10/98 12:04:51	78.10	12.704	10.504	11.583	10.448
9/10/98 12:05:51	79.10	12.716	10.509	11.58	10.454
9/10/98 12:06:51	80.10	12.722	10.509	11.585	10.457
9/10/98 12:07:51	81.10	12.727	10.51	11.591	10.463
9/10/98 12:08:51	82.10	12.733	10.512	11.599	10.469
9/10/98 12:09:51	83.10	12.739	10.515	11.605	10.47
9/10/98 12:10:51	84.10	12.756	10.519	11.612	10.479
9/10/98 12:11:51	85.10	12.767	10.52	11.614	10.485
9/10/98 12:12:51	86.10	12.765	10.522	11.623	10.483
9/10/98 12:13:51	87.10	12.776	10.53	11.625	10.489
9/10/98 12:14:51	88.10	12.779	10.529	11.631	10.492
9/10/98 12:15:51	89.10	12.799	10.53	11.636	10.493
9/10/98 12:16:51	90.10	12.796	10.529	11.637	10.499
9/10/98 12:17:51	91.10	12.805	10.535	11.646	10.502
9/10/98 12:18:51	92.10	12.805	10.536	11.649	10.505
9/10/98 12:19:51	93.10	12.822	10.535	11.649	10.505
9/10/98 12:20:51	94.10	12.819	10.536	11.652	10.508
9/10/98 12:21:51	95.10	12.816	10.542	11.657	10.512
9/10/98 12:22:51	96.10	12.828	10.542	11.662	10.514
9/10/98 12:23:51	97.10	12.839	10.548	11.666	10.52
9/10/98 12:24:51	98.10	12.836	10.552	11.671	10.521
9/10/98 12:25:51	99.10	12.851	10.551	11.671	10.524
9/10/98 12:26:51	100.10	12.842	10.559	11.675	10.525
9/10/98 12:27:51	101.10	12.848	10.554	11.675	10.522
9/10/98 12:28:51	102.10	12.853	10.552	11.675	10.527
9/10/98 12:29:51	103.10	12.853	10.552	11.676	10.527
9/10/98 12:30:51	104.10	12.856	10.562	11.685	10.533
9/10/98 12:31:51	105.10	12.871	10.556	11.681	10.53
9/10/98 12:32:51	106.10	12.859	10.559	11.684	10.534
9/10/98 12:33:51	107.10	12.862	10.561	11.685	10.535
9/10/98 12:34:51	108.10	12.856	10.565	11.691	10.535
9/10/98 12:35:51	109.10	12.876	10.577	11.695	10.54
9/10/98 12:36:51	110.10	12.876	10.575	11.695	10.54
9/10/98 12:37:51	111.10	12.879	10.574	11.692	10.54
9/10/98 12:38:51	112.10	12.868	10.567	11.694	10.54
9/10/98 12:39:51	113.10	12.879	10.567	11.692	10.546
9/10/98 12:40:51	114.10	12.874	10.569	11.7	10.544
9/10/98 12:41:51	115.10	12.885	10.575	11.701	10.551
9/10/98 12:42:51	116.10	12.874	10.577	11.698	10.551
9/10/98 12:43:51	117.10	12.871	10.578	11.708	10.549
FLOW INCREASED TO 40 GPM					
9/10/98 12:44:51	118.10	12.874	10.58	11.704	10.55

	9/10/98 12:45:51	119.10	13.519	10.581	11.746	10.556
	9/10/98 12:46:51	120.10	13.94	10.581	11.817	10.585
	9/10/98 12:47:51	121.10	14.19	10.585	11.879	10.617
	9/10/98 12:48:51	122.10	14.327	10.582	11.924	10.646
	9/10/98 12:49:51	123.10	14.422	10.587	11.961	10.673
	9/10/98 12:50:51	124.10	14.491	10.59	11.996	10.692
	9/10/98 12:51:51	125.10	14.536	10.592	12.02	10.711
	9/10/98 12:52:51	126.10	14.591	10.597	12.044	10.727
	9/10/98 12:53:51	127.10	14.62	10.594	12.057	10.741
	9/10/98 12:54:51	128.10	14.643	10.6	12.073	10.756
	9/10/98 12:55:51	129.10	14.66	10.6	12.084	10.762
	9/10/98 12:56:51	130.10	14.677	10.6	12.097	10.768
	9/10/98 12:57:51	131.10	14.694	10.6	12.105	10.776
	9/10/98 12:58:51	132.10	14.703	10.6	12.116	10.789
	9/10/98 12:59:51	133.10	14.717	10.604	12.123	10.792
	9/10/98 13:00:51	134.10	14.737	10.603	12.13	10.798
	9/10/98 13:01:51	135.10	14.743	10.604	12.14	10.805
	9/10/98 13:02:51	136.10	14.751	10.603	12.145	10.81
	9/10/98 13:03:51	137.10	14.774	10.607	12.146	10.817
	9/10/98 13:04:51	138.10	14.78	10.607	12.156	10.821
	9/10/98 13:05:51	139.10	14.774	10.608	12.159	10.826
	9/10/98 13:06:51	140.10	14.78	10.61	12.165	10.827
	9/10/98 13:07:51	141.10	14.786	10.611	12.168	10.83
	9/10/98 13:08:51	142.10	14.797	10.613	12.172	10.836
	9/10/98 13:09:51	143.10	14.806	10.61	12.178	10.84
	9/10/98 13:10:51	144.10	14.817	10.608	12.181	10.843
	9/10/98 13:11:51	145.10	14.826	10.608	12.185	10.847
	9/10/98 13:12:51	146.10	14.832	10.608	12.19	10.849
	9/10/98 13:13:51	147.10	14.823	10.608	12.193	10.855
	9/10/98 13:14:51	148.10	14.84	10.61	12.198	10.857
	9/10/98 13:15:51	149.10	14.852	10.611	12.203	10.859
	9/10/98 13:16:51	150.10	14.863	10.613	12.209	10.86
	9/10/98 13:17:51	151.10	14.671	10.616	12.21	10.866
	9/10/98 13:18:51	152.10	14.39	10.617	12.152	10.847
	9/10/98 13:19:51	153.10	14.651	10.616	12.166	10.843
	9/10/98 13:20:51	154.10	14.774	10.618	12.185	10.85
	9/10/98 13:21:51	155.10	14.835	10.618	12.198	10.857
	9/10/98 13:22:51	156.10	14.886	10.618	12.213	10.865
	9/10/98 13:23:51	157.10	14.892	10.621	12.222	10.875
	9/10/98 13:24:51	158.10	14.912	10.621	12.23	10.881
	9/10/98 13:25:51	159.10	14.932	10.626	12.232	10.884
	9/10/98 13:26:51	160.10	14.944	10.621	12.241	10.886
	9/10/98 13:27:51	161.10	14.941	10.624	12.245	10.895
	9/10/98 13:28:51	162.10	14.949	10.623	12.249	10.894
	9/10/98 13:29:51	163.10	14.955	10.623	12.252	10.897
	9/10/98 13:30:51	164.10	14.961	10.624	12.254	10.902
	9/10/98 13:31:51	165.10	14.961	10.624	12.257	10.907
	9/10/98 13:32:51	166.10	14.969	10.624	12.258	10.905
	9/10/98 13:33:51	167.10	14.972	10.627	12.264	10.911
	9/10/98 13:34:51	168.10	14.972	10.629	12.268	10.91
	9/10/98 13:35:51	169.10	14.981	10.631	12.271	10.915

	9/10/98 13:36:51	170.10	14.992	10.63	12.273	10.918
	9/10/98 13:37:51	171.10	14.992	10.633	12.278	10.921
	9/10/98 13:38:51	172.10	14.995	10.636	12.281	10.926
	9/10/98 13:39:51	173.10	14.995	10.636	12.284	10.927
	9/10/98 13:40:51	174.10	15.007	10.636	12.29	10.93
	9/10/98 13:41:51	175.10	15.001	10.637	12.296	10.933
	9/10/98 13:42:51	176.10	15.004	10.636	12.294	10.933
	9/10/98 13:43:51	177.10	15.015	10.637	12.293	10.937
FLOW INCREASED TO 55 GPM						
	9/10/98 13:44:51	178.10	15.009	10.64	12.296	10.939
	9/10/98 13:45:51	179.10	15.895	10.64	12.351	10.947
	9/10/98 13:46:51	180.10	16.626	10.64	12.446	10.984
	9/10/98 13:47:51	181.10	16.895	10.637	12.511	11.027
	9/10/98 13:48:51	182.10	17.035	10.64	12.565	11.062
	9/10/98 13:49:51	183.10	17.119	10.64	12.594	11.091
	9/10/98 13:50:51	184.10	17.173	10.644	12.626	11.116
	9/10/98 13:51:51	185.10	17.187	10.64	12.643	11.129
	9/10/98 13:52:51	186.10	17.222	10.642	12.659	11.146
	9/10/98 13:53:51	187.10	17.245	10.642	12.671	11.162
	9/10/98 13:54:51	188.10	17.25	10.64	12.686	11.169
	9/10/98 13:55:51	189.10	17.268	10.642	12.694	11.179
	9/10/98 13:56:51	190.10	17.288	10.647	12.703	11.192
	9/10/98 13:57:51	191.10	17.29	10.647	12.71	11.194
	9/10/98 13:58:51	192.10	17.302	10.647	12.718	11.198
	9/10/98 13:59:51	193.10	17.299	10.649	12.723	11.203
	9/10/98 14:00:51	194.10	17.313	10.649	12.728	11.207
	9/10/98 14:01:51	195.10	17.319	10.649	12.732	11.214
	9/10/98 14:02:51	196.10	17.319	10.652	12.738	11.216
	9/10/98 14:03:51	197.10	17.362	10.653	12.745	11.221
	9/10/98 14:04:51	198.10	17.402	10.65	12.753	11.226
	9/10/98 14:05:51	199.10	17.425	10.652	12.764	11.239
	9/10/98 14:06:51	200.10	17.428	10.656	12.77	11.243
	9/10/98 14:07:51	201.10	17.422	10.65	12.776	11.246
	9/10/98 14:08:51	202.10	17.414	10.652	12.786	11.249
	9/10/98 14:09:51	203.10	17.419	10.652	12.79	11.252
	9/10/98 14:10:51	204.10	17.428	10.655	12.795	11.258
	9/10/98 14:11:51	205.10	17.431	10.655	12.799	11.261
	9/10/98 14:12:51	206.10	17.439	10.655	12.803	11.264
	9/10/98 14:13:51	207.10	17.439	10.656	12.87	11.271
	9/10/98 14:14:51	208.10	17.434	10.653	12.812	11.272
	9/10/98 14:15:51	209.10	17.448	10.652	12.817	11.275
	9/10/98 14:16:51	210.10	17.428	10.652	12.819	11.281
	9/10/98 14:17:51	211.10	17.428	10.657	12.824	11.281
	9/10/98 14:18:51	212.10	17.439	10.656	12.828	11.284
	9/10/98 14:19:51	213.10	17.448	10.656	12.833	11.287
	9/10/98 14:20:51	214.10	17.448	10.655	12.833	11.295
	9/10/98 14:21:51	215.10	17.459	10.653	12.837	11.295
	9/10/98 14:22:51	216.10	17.459	10.656	12.846	11.298
	9/10/98 14:23:51	217.10	17.471	10.655	12.849	11.303
	9/10/98 14:24:51	218.10	17.454	10.655	12.854	11.304
	9/10/98 14:25:51	219.10	17.471	10.655	12.854	11.306

	9/10/98 14:26:51	220.10	17.468	10.656	12.862	11.31
	9/10/98 14:27:51	221.10	17.465	10.657	12.863	11.314
	9/10/98 14:28:51	222.10	17.497	10.657	12.867	11.32
	9/10/98 14:29:51	223.10	17.488	10.656	12.87	11.319
	9/10/98 14:30:51	224.10	17.494	10.656	12.876	11.319
	9/10/98 14:31:51	225.10	17.497	10.657	12.878	11.326
	9/10/98 14:32:51	226.10	17.505	10.657	12.882	11.323
	9/10/98 14:33:51	227.10	17.508	10.657	12.894	11.329
	9/10/98 14:34:51	228.10	17.505	10.656	12.891	11.333
	9/10/98 14:35:51	229.10	17.497	10.656	12.892	11.335
	9/10/98 14:36:51	230.10	17.505	10.659	12.896	11.339
	9/10/98 14:37:51	231.10	17.508	10.659	12.898	11.34
	9/10/98 14:38:51	232.10	17.5	10.66	12.902	11.342
	9/10/98 14:39:51	233.10	17.511	10.663	12.904	11.346
	9/10/98 14:40:51	234.10	17.514	10.66	12.908	11.349
	9/10/98 14:41:51	235.10	17.52	10.66	12.904	11.349
	9/10/98 14:42:51	236.10	17.514	10.662	12.915	11.356
	9/10/98 14:43:51	237.10	17.514	10.668	12.93	11.358
	9/10/98 14:44:51	238.10	17.522	10.663	12.921	11.364
	9/10/98 14:45:51	239.10	17.528	10.665	12.923	11.364
	9/10/98 14:46:51	240.10	17.528	10.665	12.928	11.366

WELL 201 AQUIFER TEST DATA ANALYSES

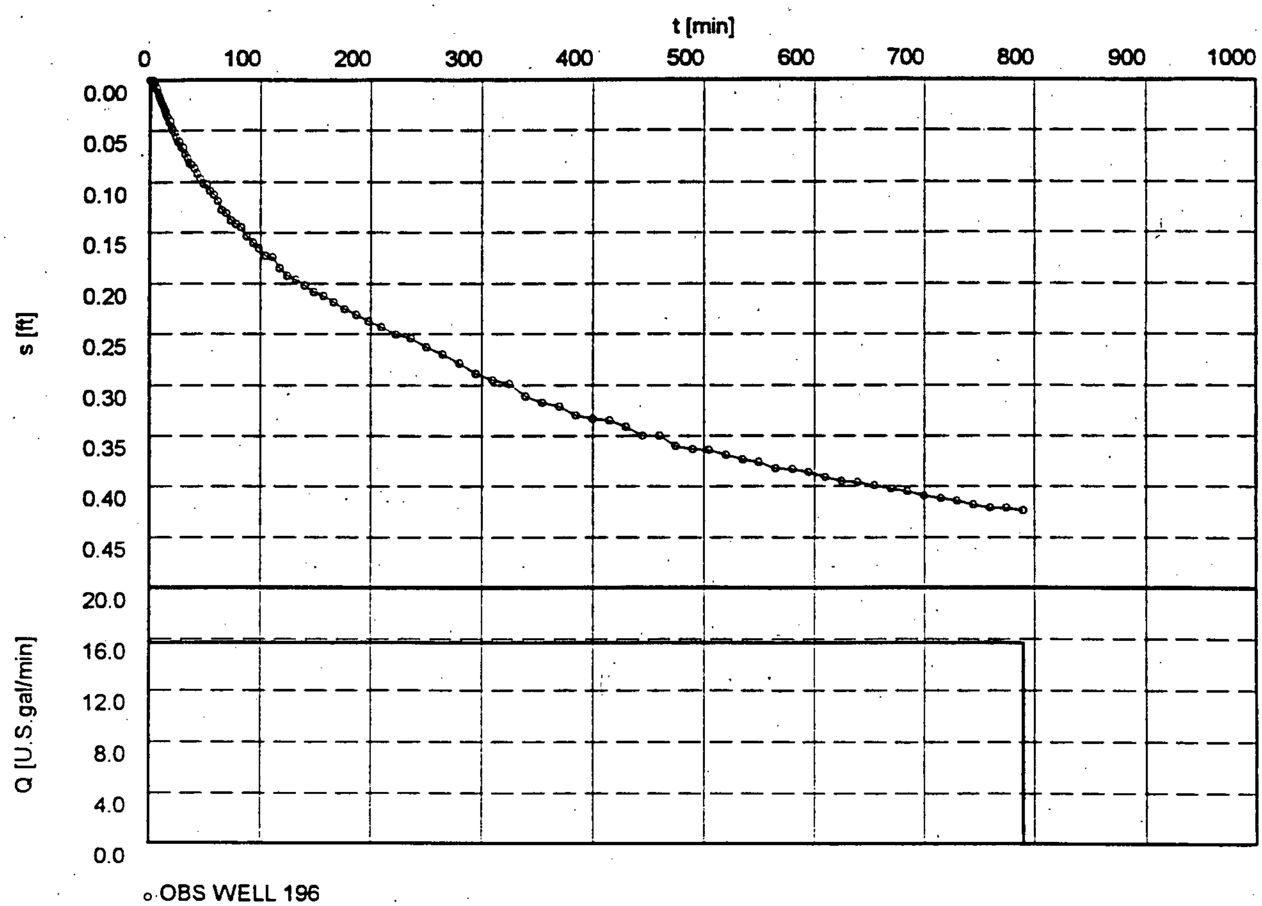
(INCLUDES ANALYSES OF DATA COLLECTED FROM WELLS 196 & 201)

OBSERVATION WELL 196 DRAWDOWN DATA ANALYSES

WELL 201 AQ TEST 1

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 28.10.1998

Pumping Test No. WELL 201 AQ TEST 1	Test conducted on: 8/31 - 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	

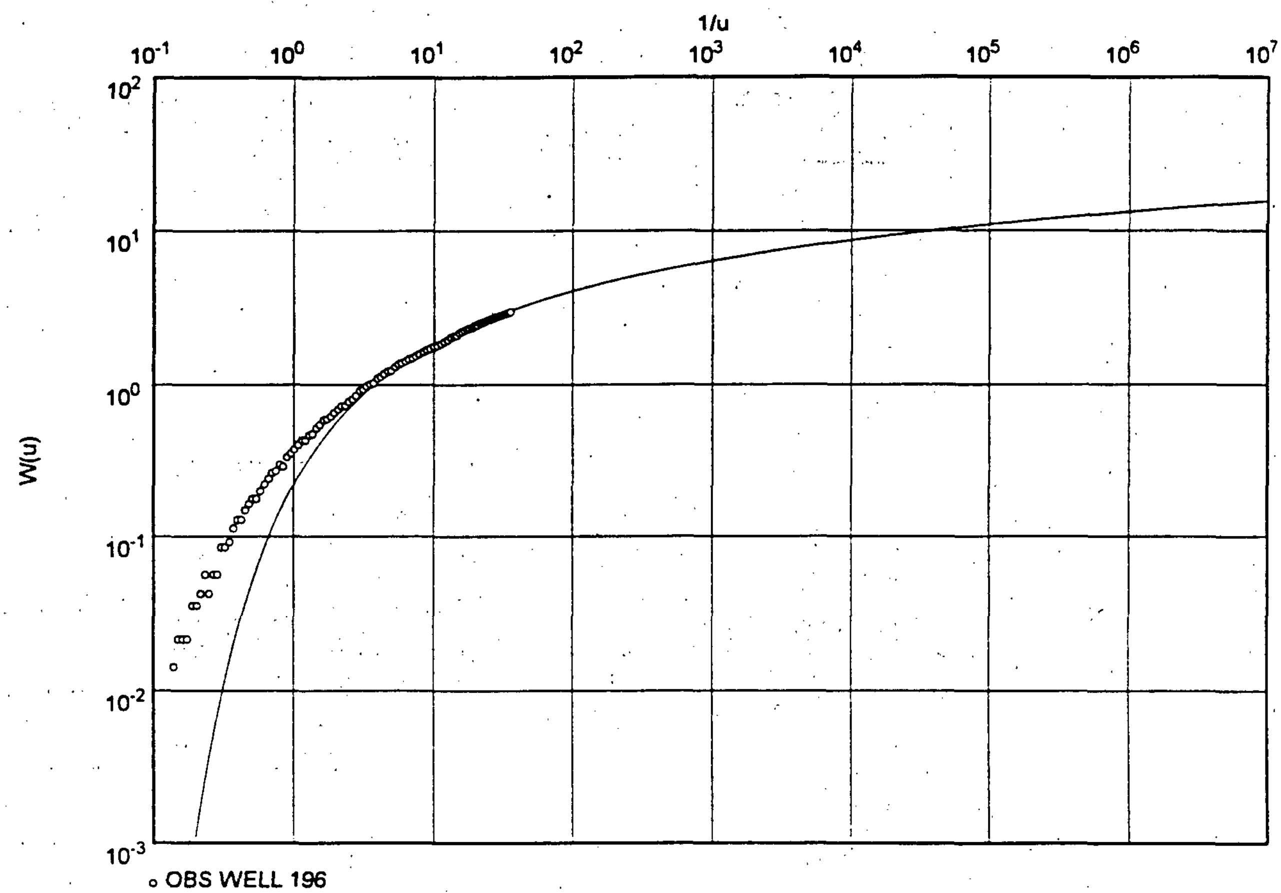


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Theis analysis method
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 28.10.1998

Pumping Test No. WELL 201 AQ TEST 1	Test conducted on: 8/31 - 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	



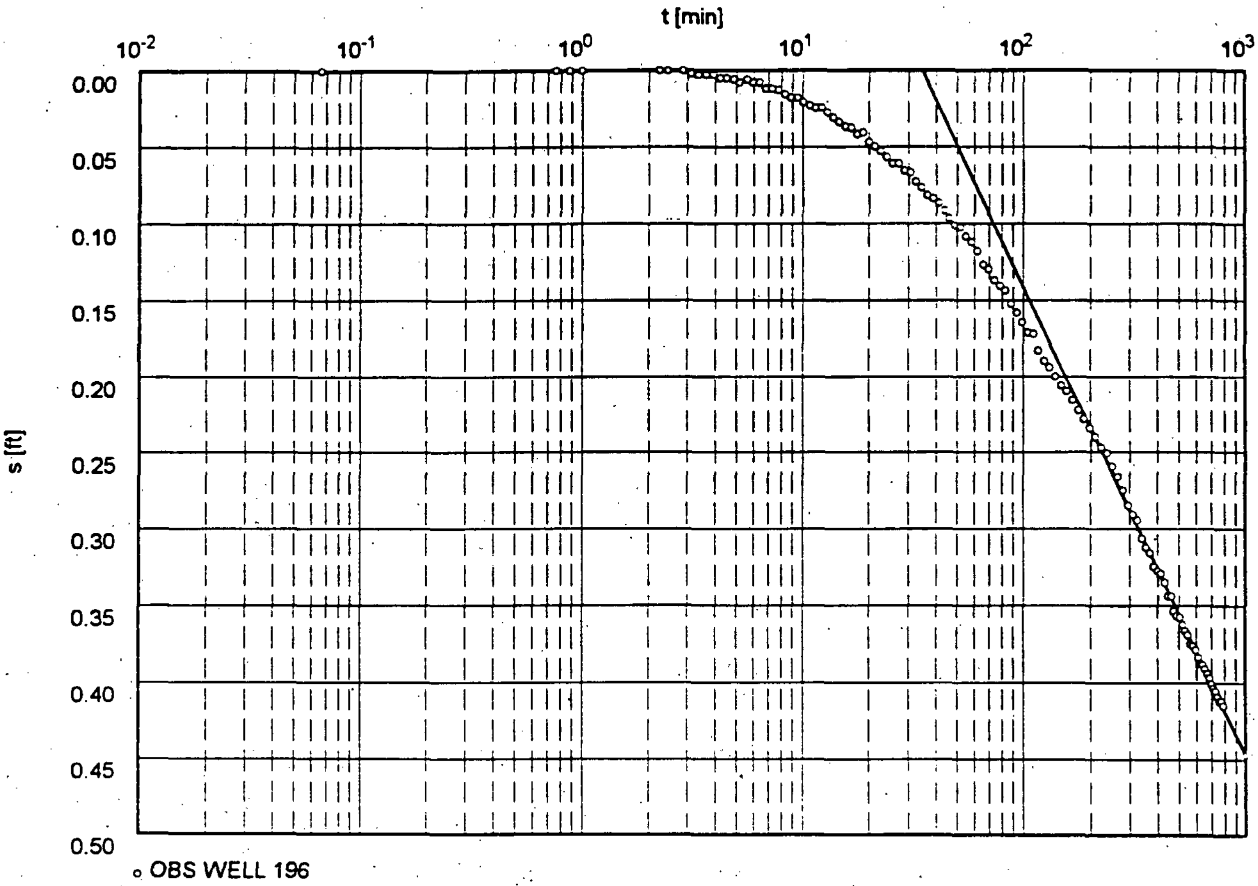
Transmissivity [ft²/min]: 1.18×10^{0}

Hydraulic conductivity [ft/min]: 1.17×10^{-1} = 168.5 FT/D

Aquifer thickness [ft]: 10.10

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP · Date: 28.10.1998

Pumping Test No. WELL 201 AQ TEST 1	Test conducted on: 8/31 - 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	



Transmissivity [ft²/min]: 1.25×10^{0}

Hydraulic conductivity [ft/min]: 1.23×10^{-1} = 177.1 ft/d

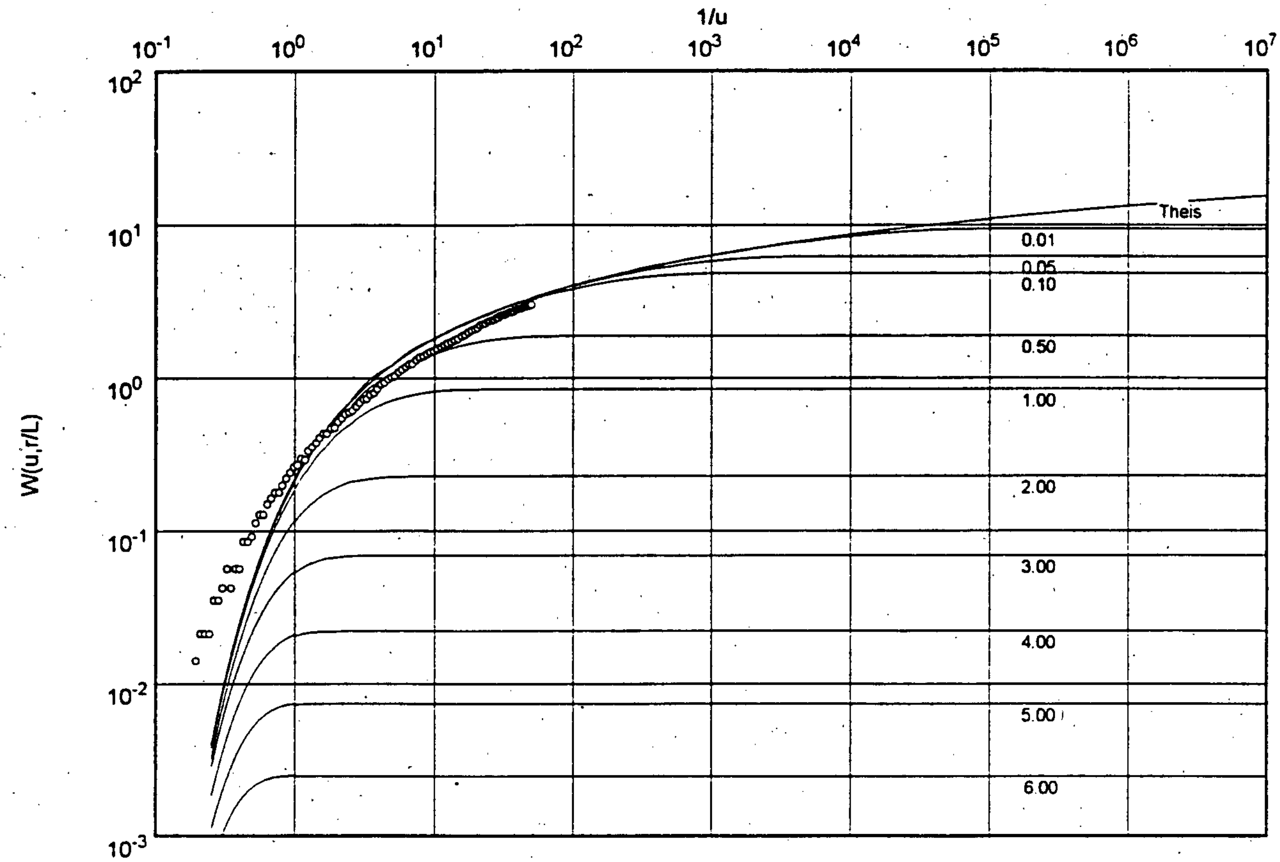
Aquifer thickness [ft]: 10.10

2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

HANTUSH's method
Leaky aquifer, no aquitard storage

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 28.10.1998

Pumping Test No. WELL 201 AQ TEST 1	Test conducted on: 8/31 - 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	



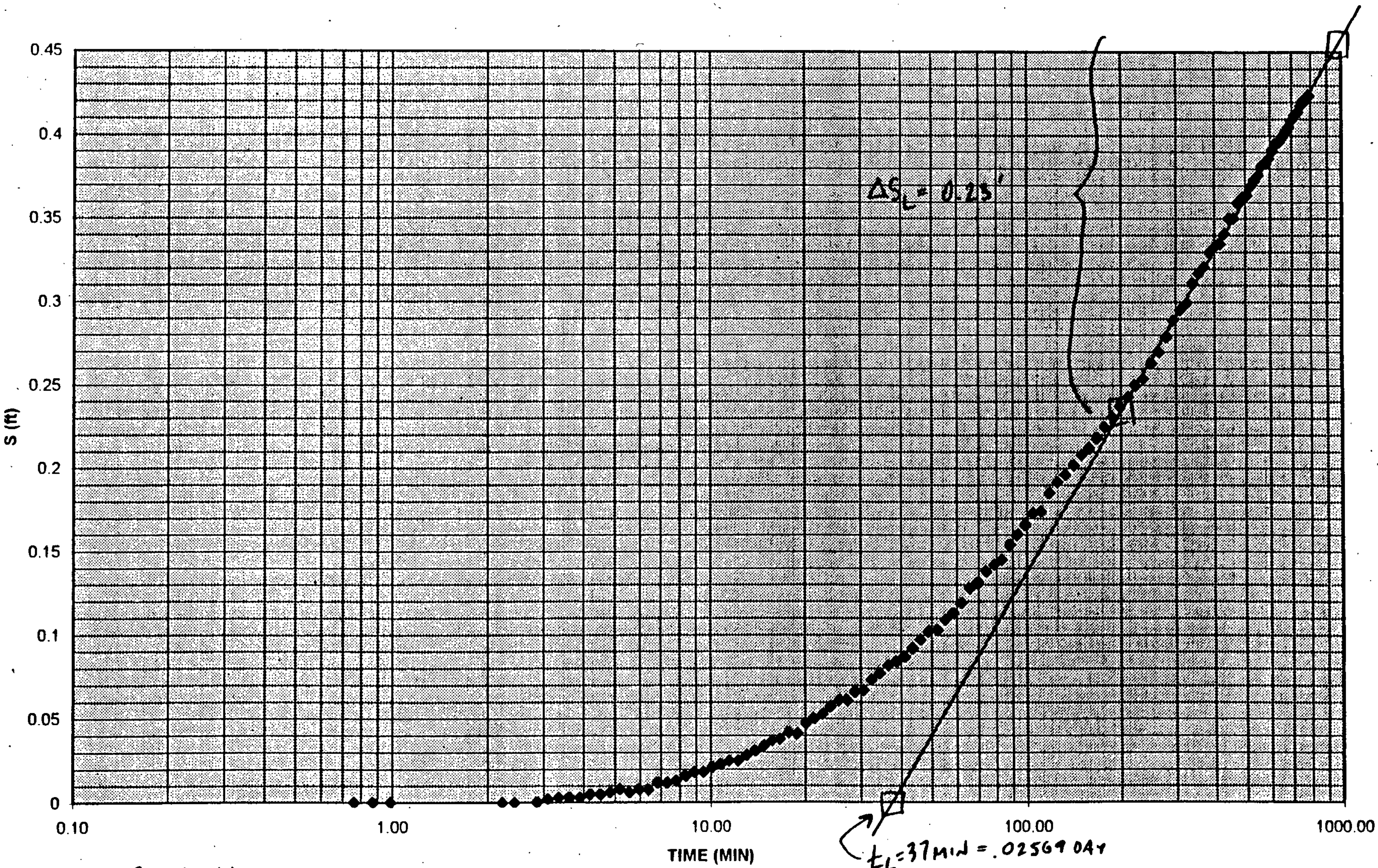
o OBS WELL 196

Transmissivity [ft²/min]: 1.18×10^{0}

Hydraulic conductivity [ft/min]: 1.17×10^{-1} =168.5 FT/D

Aquifer thickness [ft]: 10.10

WELL 196 - AQ TEST 1 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833 \left(\frac{15.7\ \text{GAL/MIN}}{0.23'}\right) 192.5 = 2408.6\ \text{FT}^2/\text{DAY}$$

$$S_y = 2.246\ \frac{(2408.6\ \text{FT}^2/\text{D})(.02569\ \text{D})}{(49.9\ \text{FT})^2}$$

$$K = \frac{2408.6\ \text{FT}^2/\text{DAY}}{10.1\ \text{FT}} = \underline{238.5\ \text{FT/DAY}}$$

(OUTSIDE RANGE)

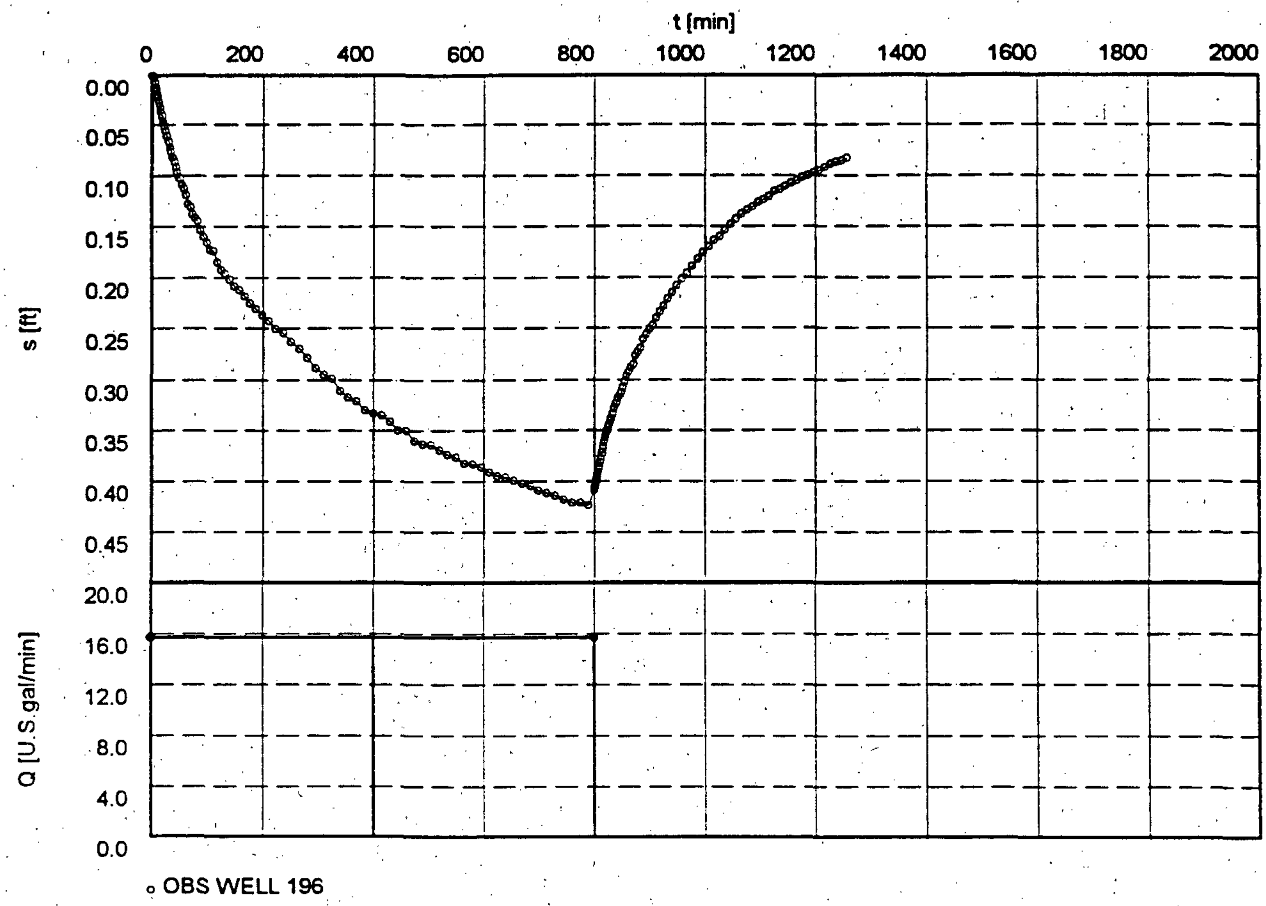
$$\underline{S_y = 0.056}$$

OBSERVATION WELL 196 RECOVERY DATA ANALYSES

WELL 201 AQ TEST 1

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 28.10.1998

Pumping Test No. 201 AQ REC TEST 1	Test conducted on: 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	

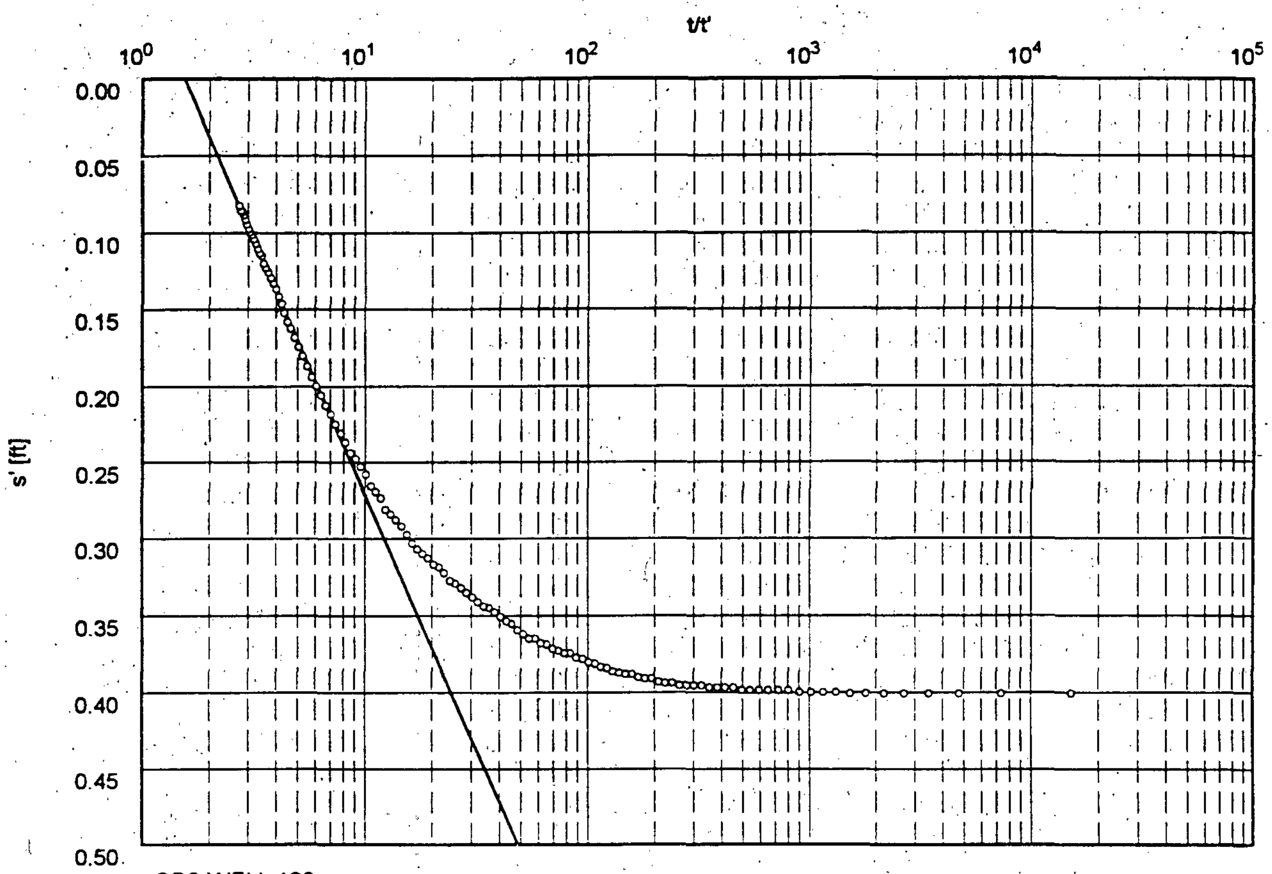


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Recovery method after
THEIS & JACOB
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 28.10.1998

Pumping Test No. 201 AQ REC TEST 1	Test conducted on: 9/1/98
OBS WELL 196	
Discharge 15.70 U.S.gal/min	
	Pumping test duration: 799.78 min



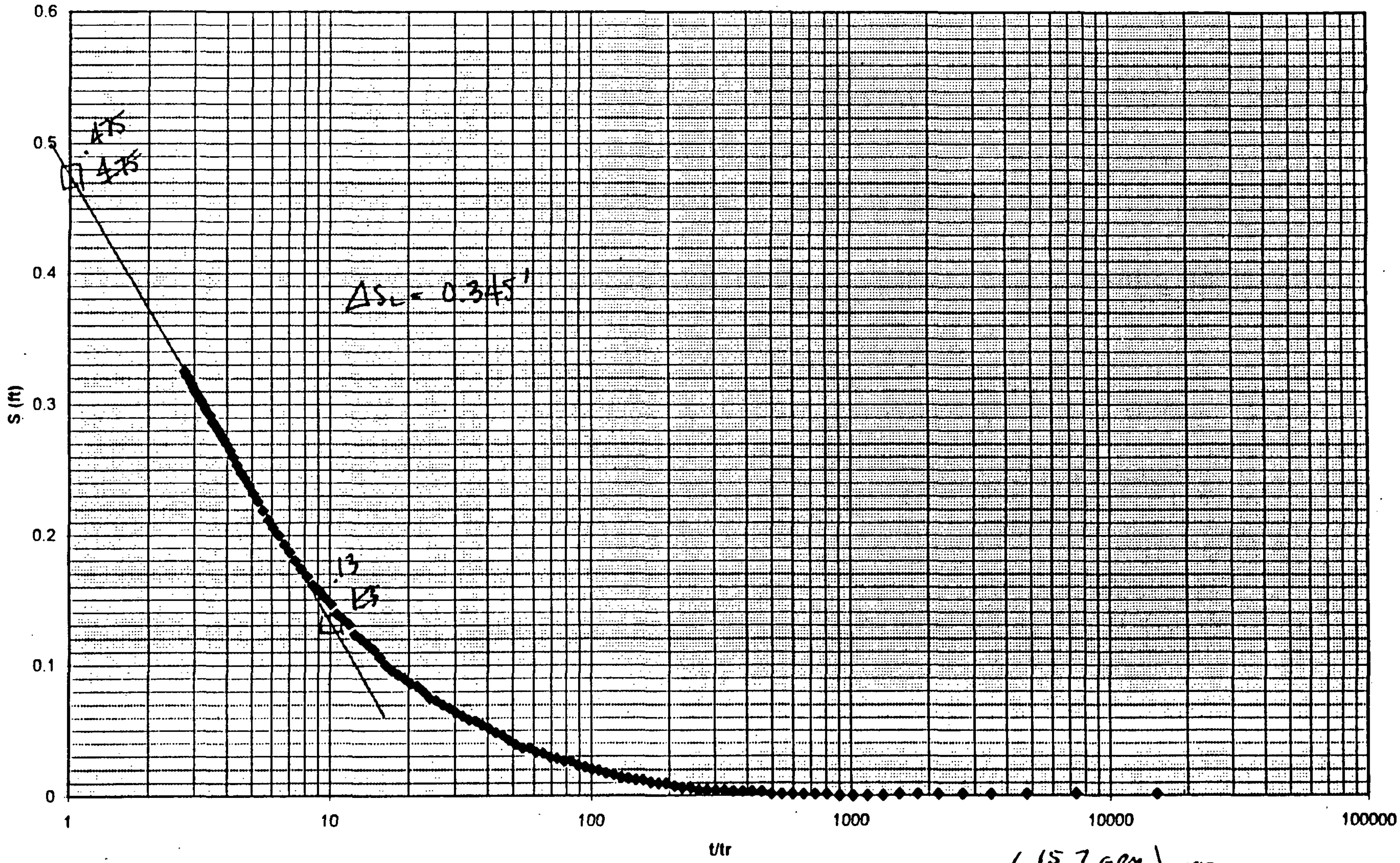
∘ OBS WELL 196

Transmissivity [ft²/min]: 1.15×10^{0}

Hydraulic conductivity [ft/min]: 1.14×10^{-1} = 164.2 ft/D

Aquifer thickness [ft]: 10.10

WELL 196 - AQ REC TEST 1 DATA
NEUMAN SEMI-LOG METHOD



$$T_L = 0.1833 \left(\frac{15.7 \text{ GPM}}{0.345'} \right) 192.5 = \frac{1605.7 \text{ FT}^2/\text{D}}{10.1 \text{ FT}}$$

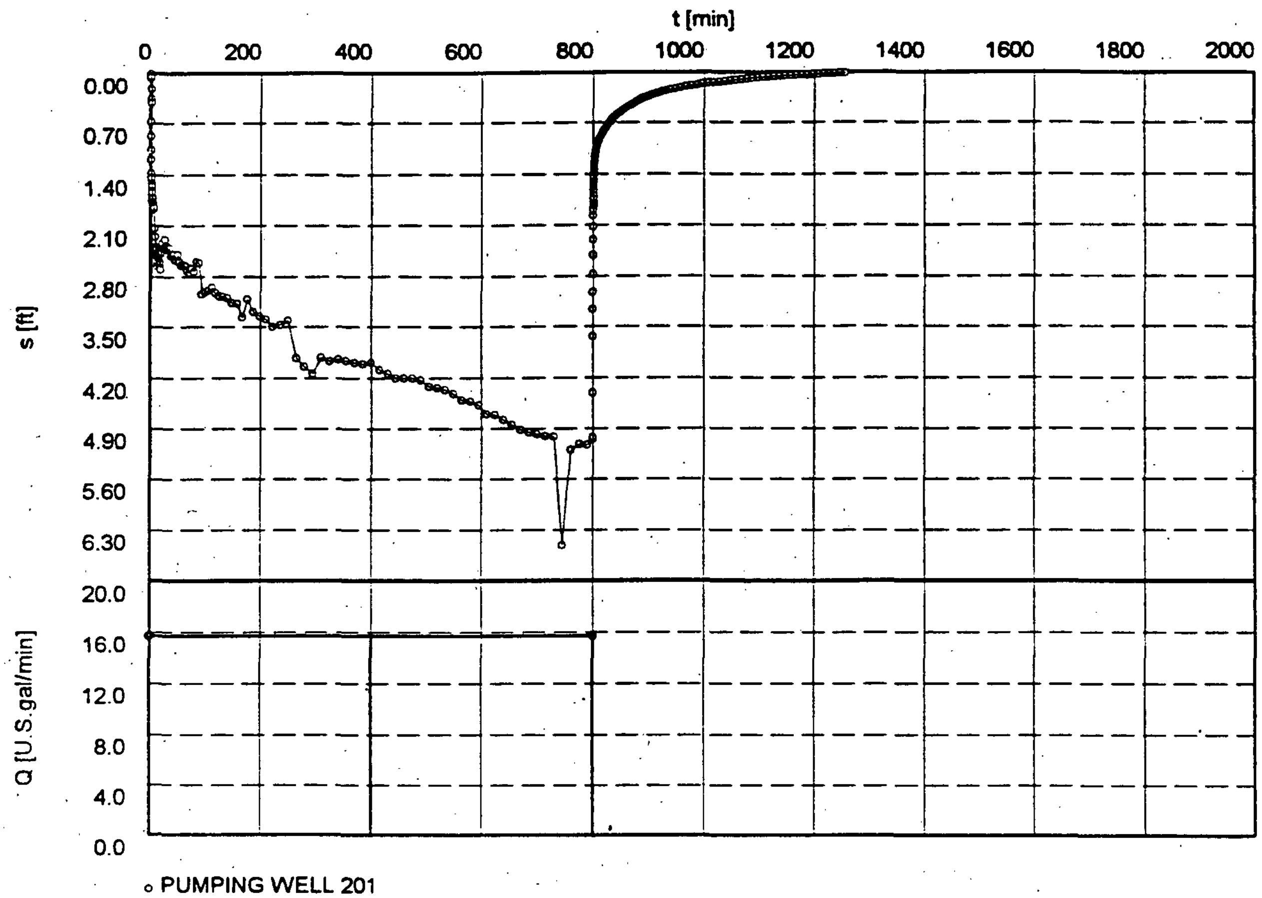
$K_L =$ ~~158~~ 159.0 FT/D

PUMPING WELL 201 RECOVERY DATA ANALYSES

WELL 201 AQ TEST 1

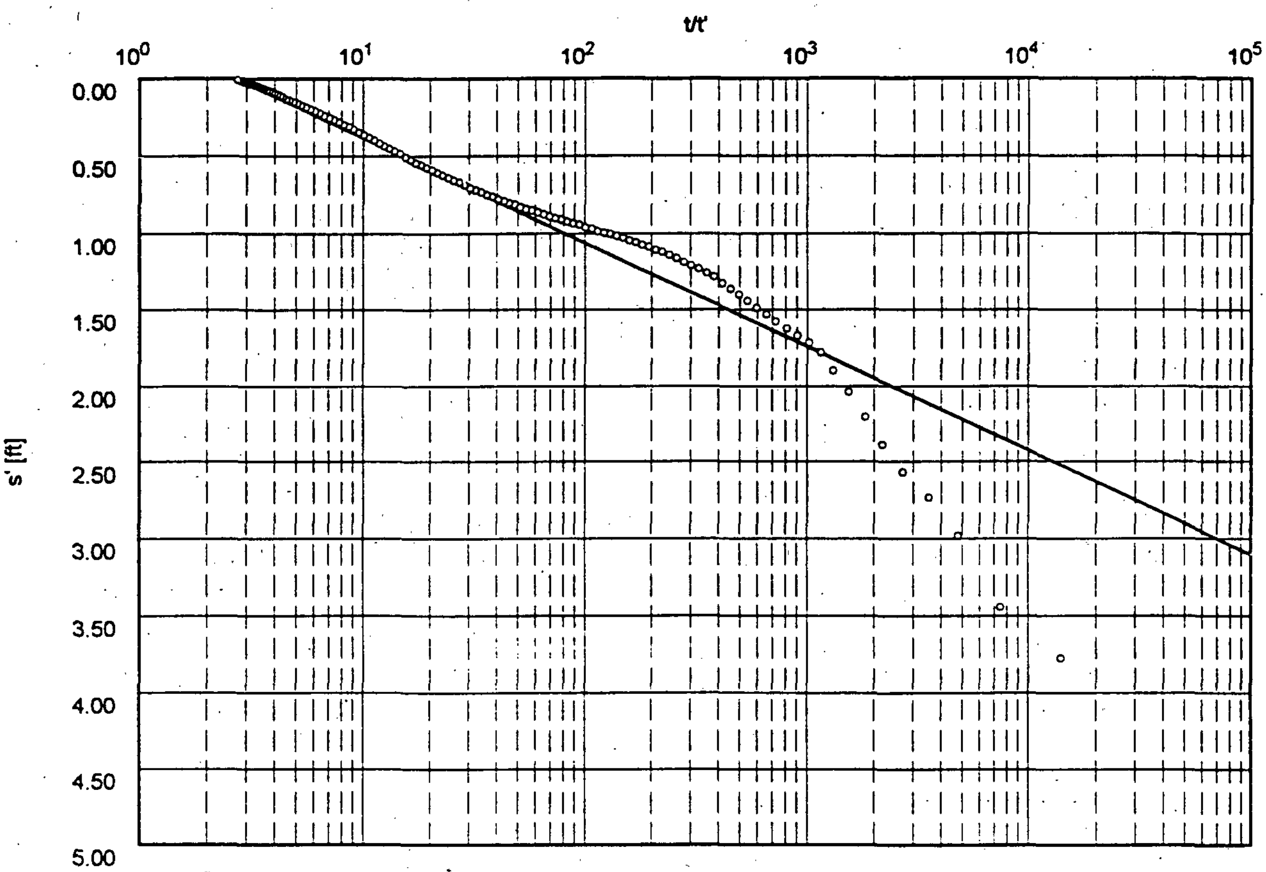
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 28.10.1998

Pumping Test No. 201 AQ REC TEST 1	Test conducted on: 9/1/98
PUMPING WELL 201	
Discharge 15.70 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 28.10.1998

Pumping Test No. 201 AQ REC TEST 1	Test conducted on: 9/1/98
PUMPING WELL 201	
Discharge 15.70 U.S.gal/min	
	Pumping test duration: 799.78 min



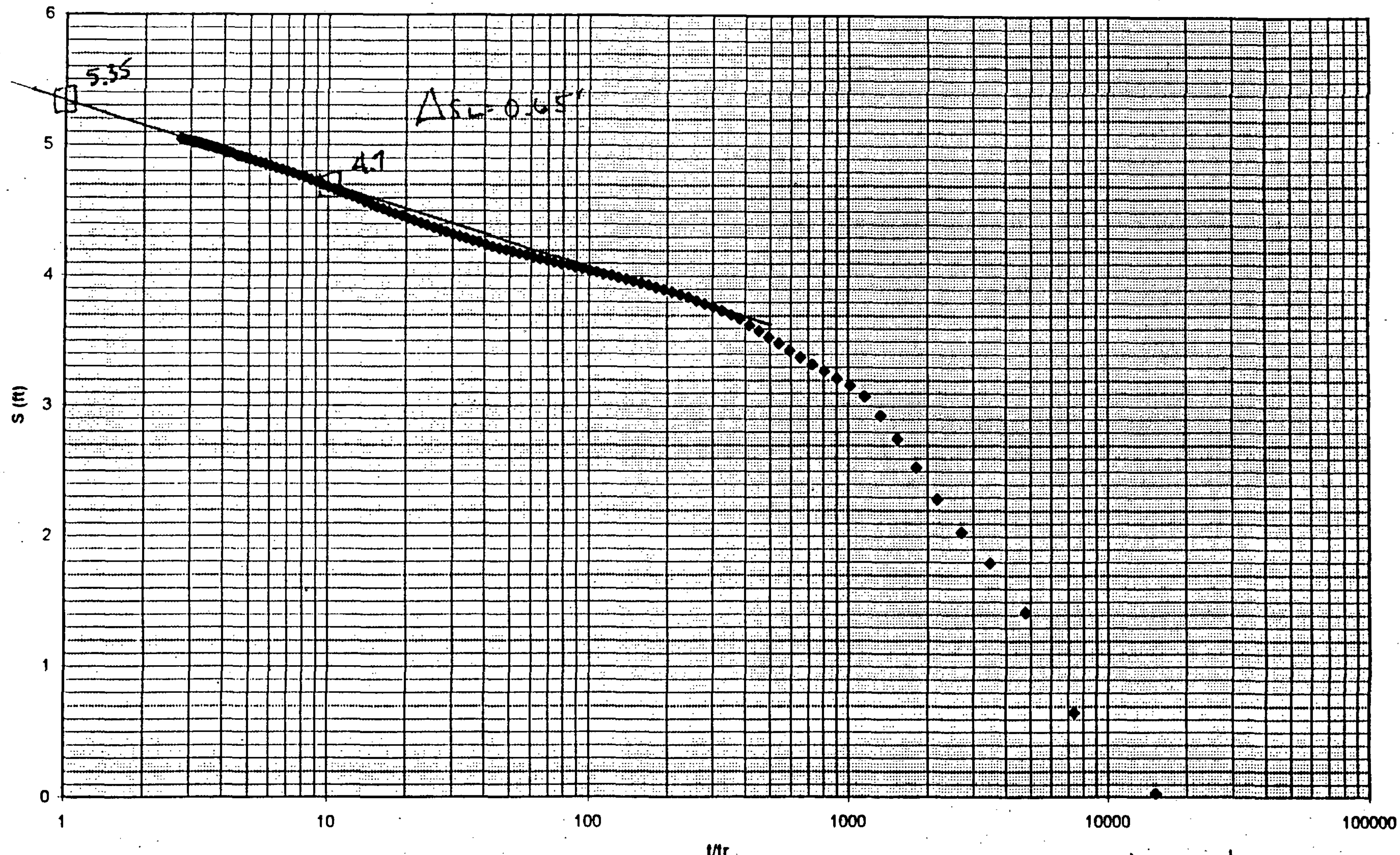
o PUMPING WELL 201

Transmissivity [ft²/min]: 5.64×10^{-1}

Hydraulic conductivity [ft/min]: 5.58×10^{-2} = 80.4 ft/d

Aquifer thickness [ft]: 10.10

WELL 201 - AQ REC TEST 1 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833\left(\frac{15.7\text{ GPM}}{0.65'}\right)(192.5) = \frac{852.3\text{ ft}^2/\text{D}}{10.1}$

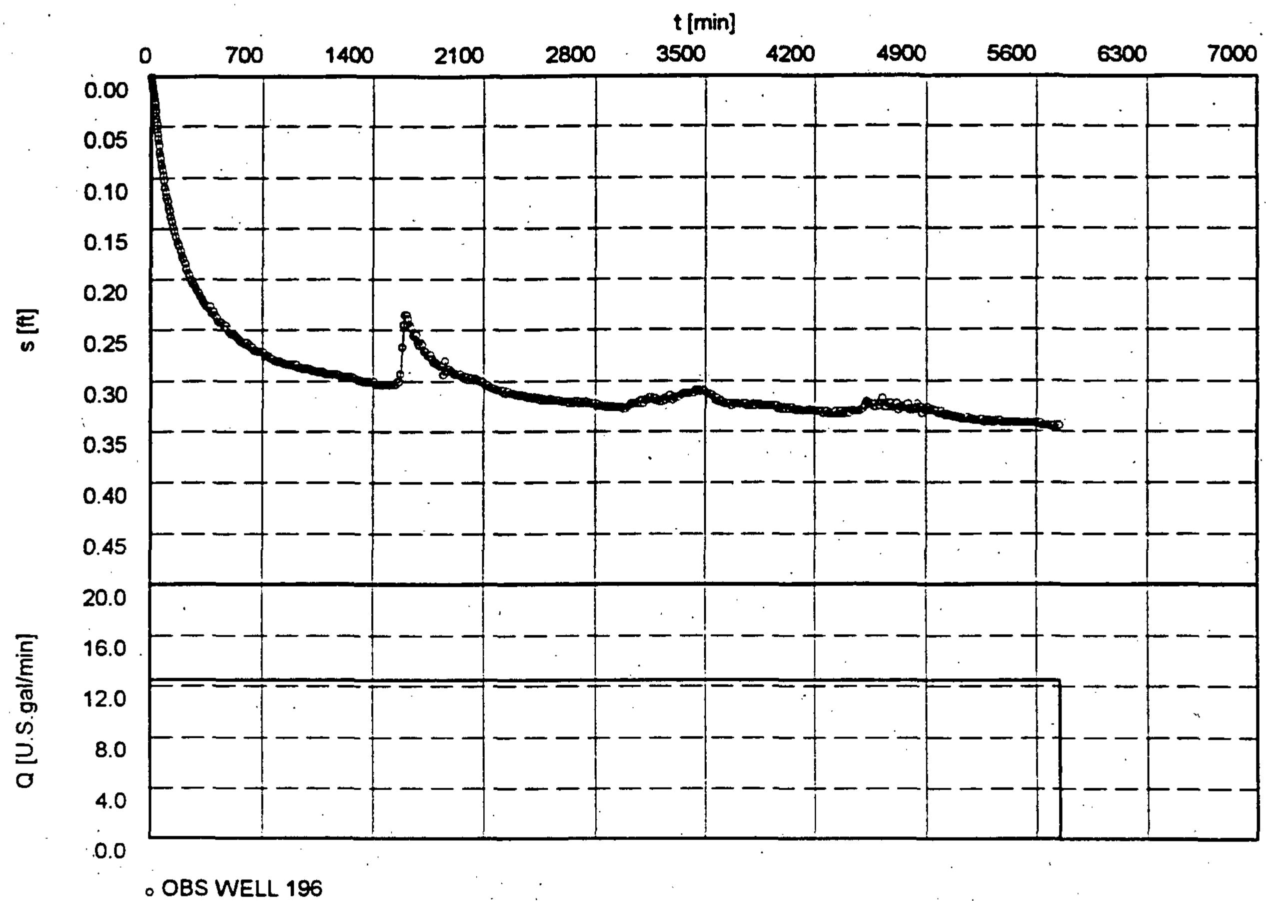
$K_L = 84.4\text{ ft/D}$

OBSERVATION WELL 196 DRAWDOWN DATA ANALYSES

WELL 201 AQ TEST 2

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP · Date: 22.10.1998

Pumping Test No. WELL 201 AQ TEST 2	Test conducted on: 9/1 - 9/5/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	

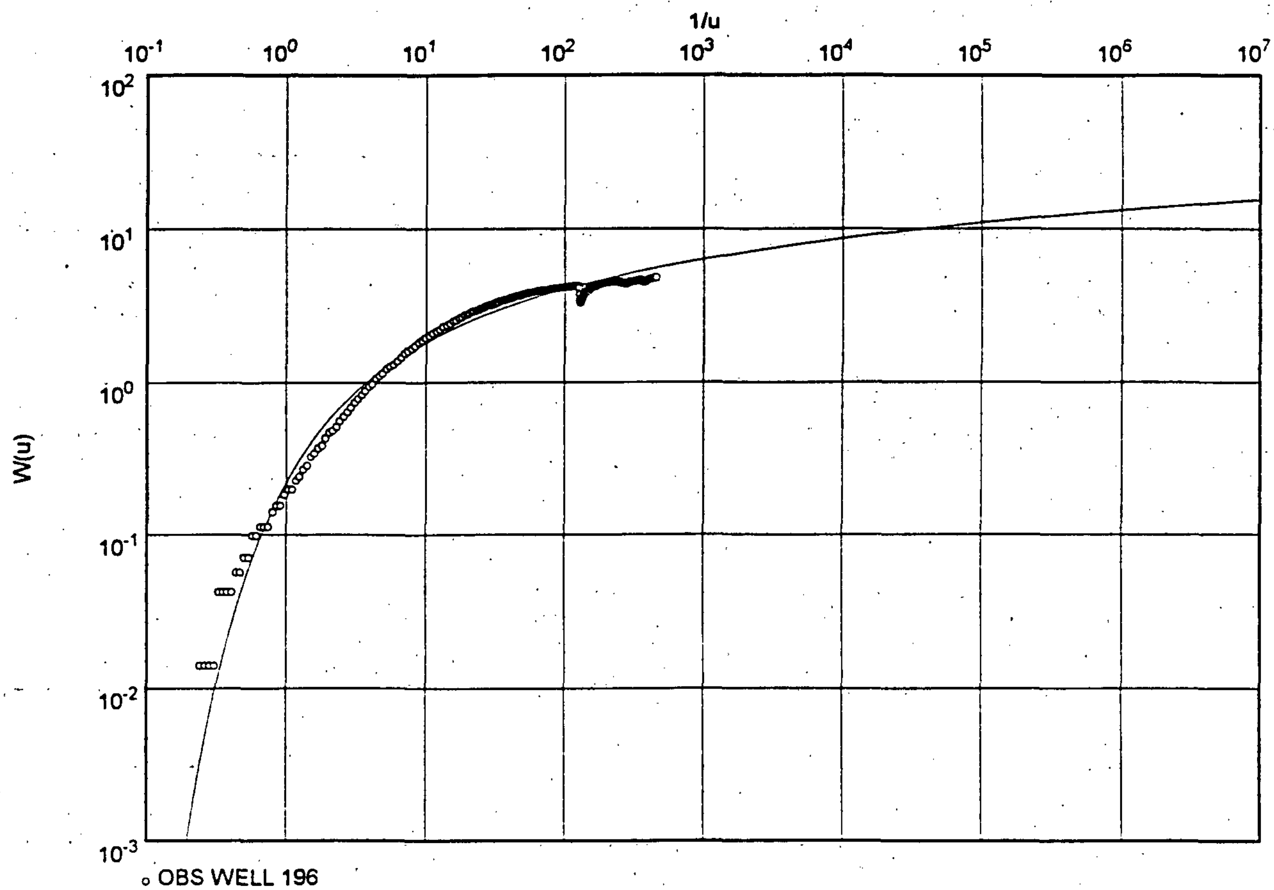


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Theis analysis method
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 22.10.1998

Pumping Test No. WELL 201 AQ TEST 2	Test conducted on: 9/1 - 9/5/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	



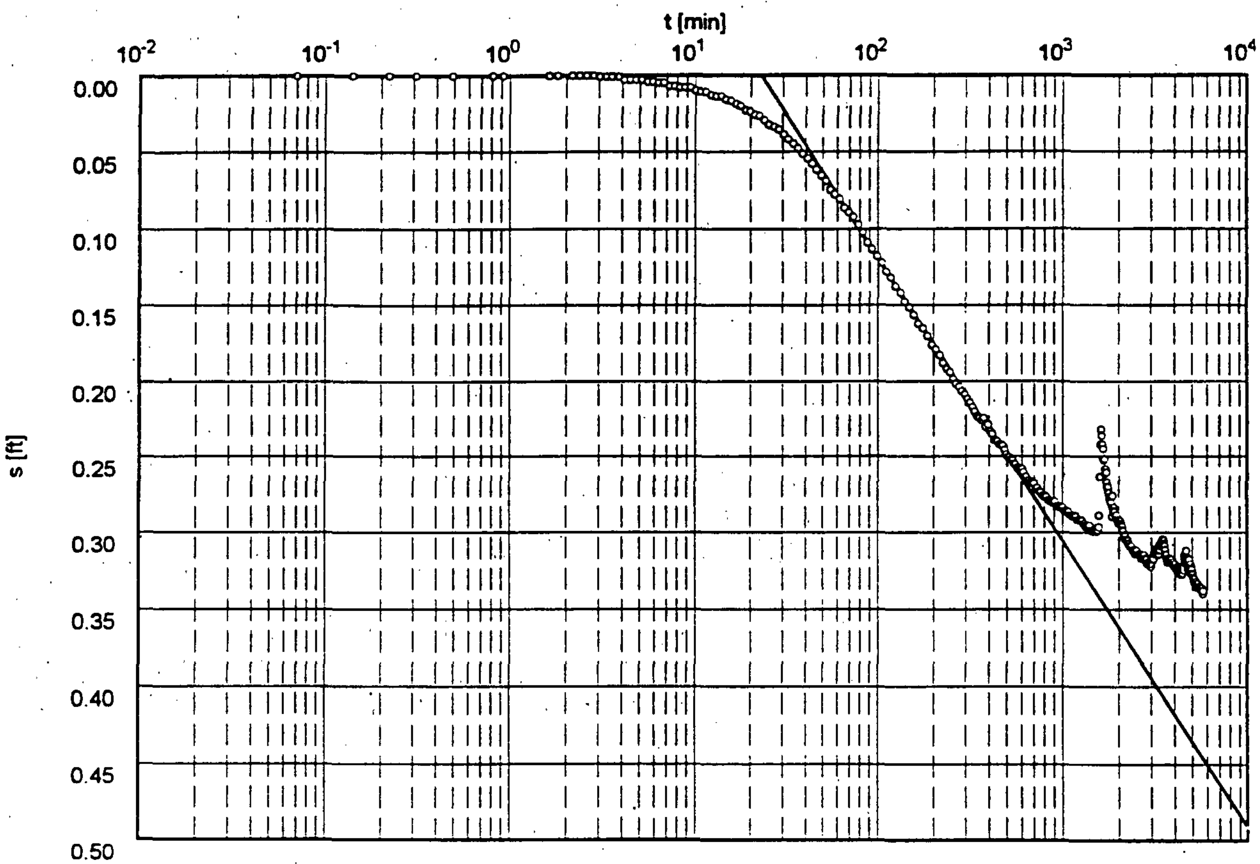
Transmissivity [ft²/min]: 1.87×10^{0}

Hydraulic conductivity [ft/min]: 1.85×10^{-1} = 266.4 FT/D

Aquifer thickness [ft]: 10.10

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP Date: 22.10.1998

Pumping Test No. WELL 201 AQ TEST 2	Test conducted on: 9/1 - 9/5/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	



∘ OBS WELL 196

Transmissivity [ft²/min]: 1.64×10^{0}

Hydraulic conductivity [ft/min]: 1.62×10^{-1} = 233.3 FT/D

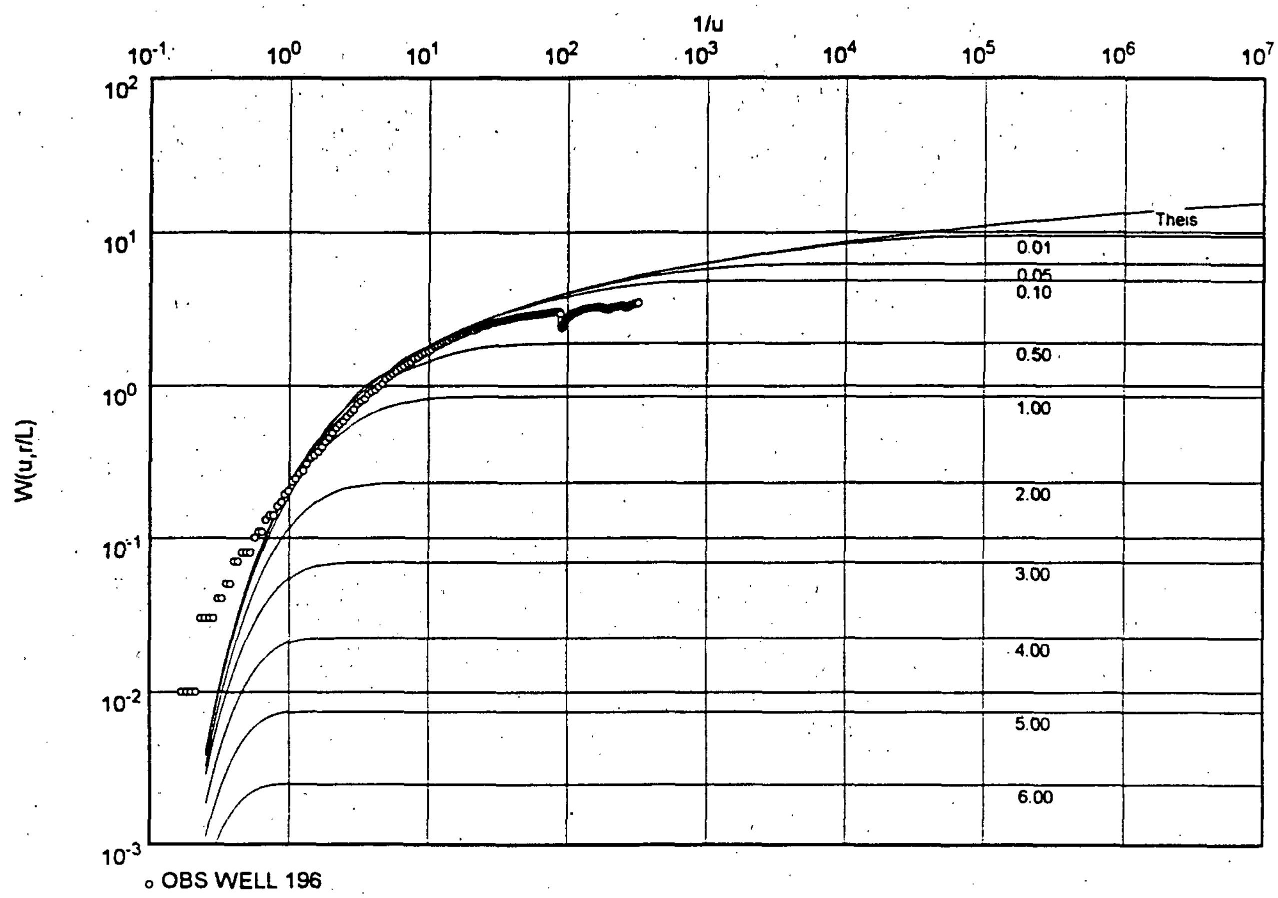
Aquifer thickness [ft]: 10.10

MACTEC-ERS
2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Pumping test analysis
HANTUSH's method
Leaky aquifer, no aquitard storage

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 22.10.1998

Pumping Test No. WELL 201 AQ TEST 2	Test conducted on: 9/1 - 9/5/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	

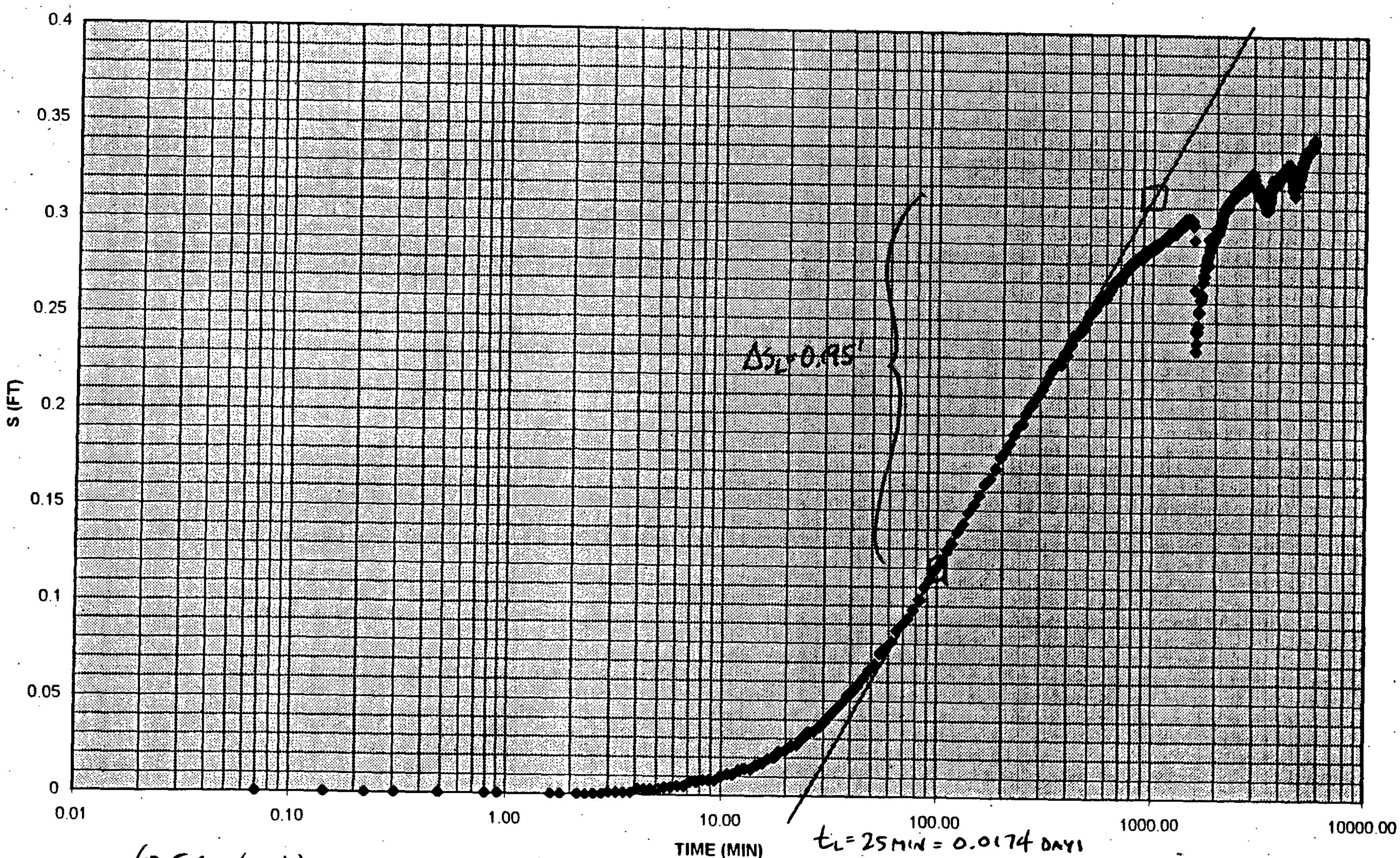


Transmissivity [ft²/min]: 1.32×10^{0}

Hydraulic conductivity [ft/min]: 1.31×10^{-1} = 188.6 FT/D

Aquifer thickness [ft]: 10.10

WELL 196 - AQ TEST 2 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833\left(\frac{12.5\ \text{GAL/MIN}}{0.195\ \text{FT}}\right)192.5 = 2261.9\ \text{FT}^2/\text{DAY}$$

$$S_Y = 2.246\ \frac{(2261.9\ \text{FT}^2/\text{D})(.0174\ \text{D})}{(49.9\ \text{FT})^2}$$

$$K = \frac{2261.9\ \text{FT}^2/\text{DAY}}{10.1\ \text{FT}} = 223.9\ \text{FT/DAY}$$

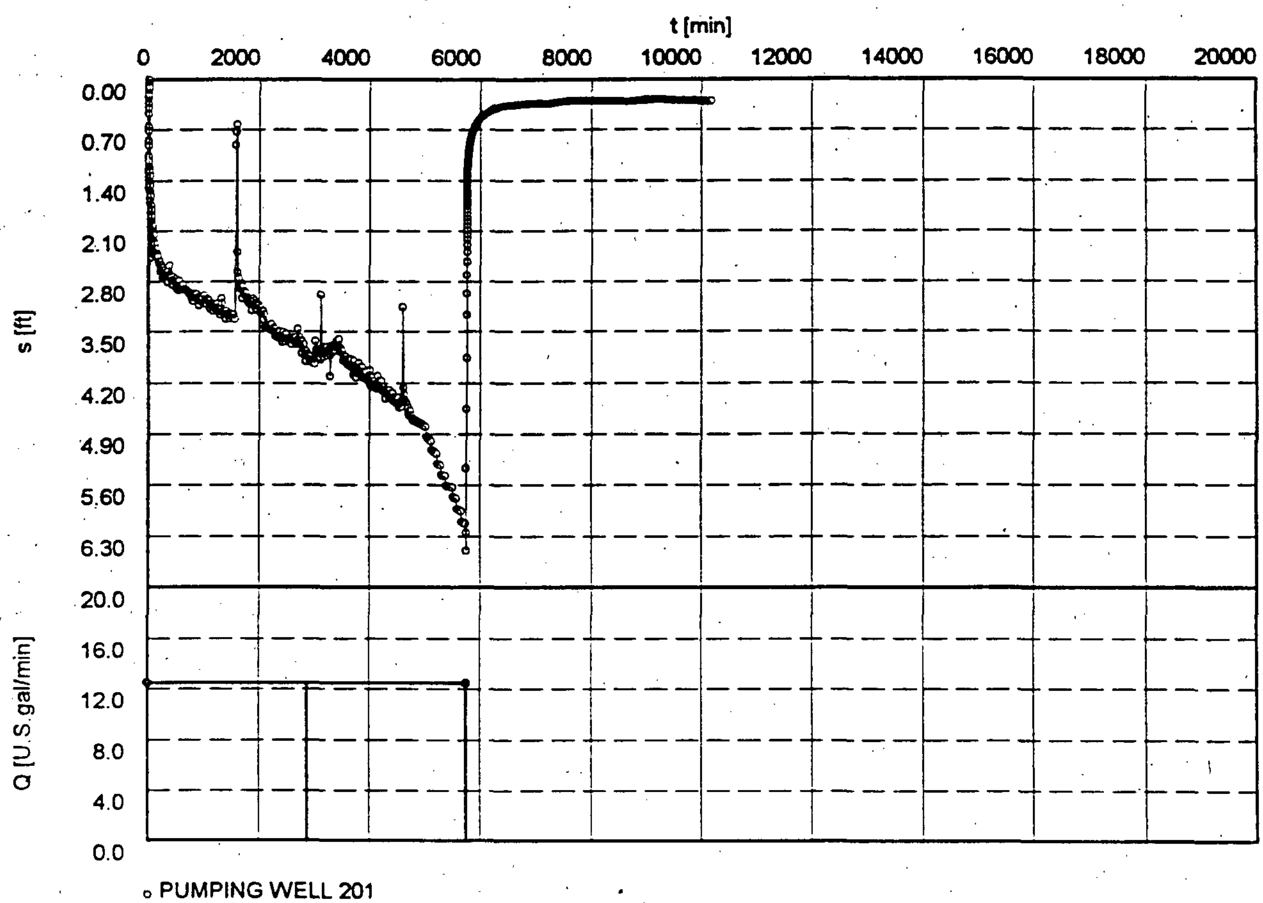
$$S_Y = 0.036$$

OBSERVATION WELL 196 RECOVERY DATA ANALYSES

WELL 201 AQ TEST 2

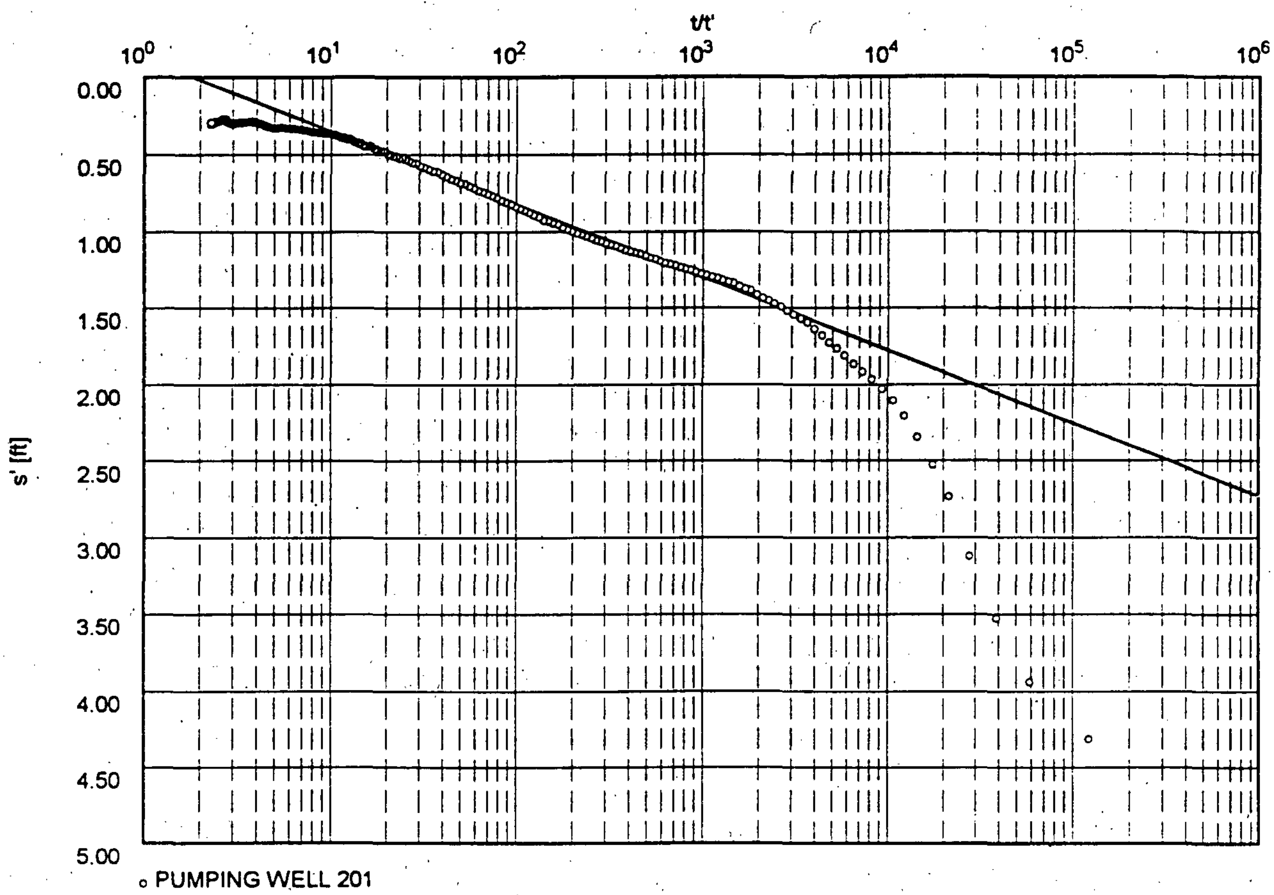
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 22.10.1998

Pumping Test No. WELL 201 REC TEST 2	Test conducted on: 9/5 - 9/8/98
PUMPING WELL 201	
Discharge 12.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP · Date: 22.10.1998

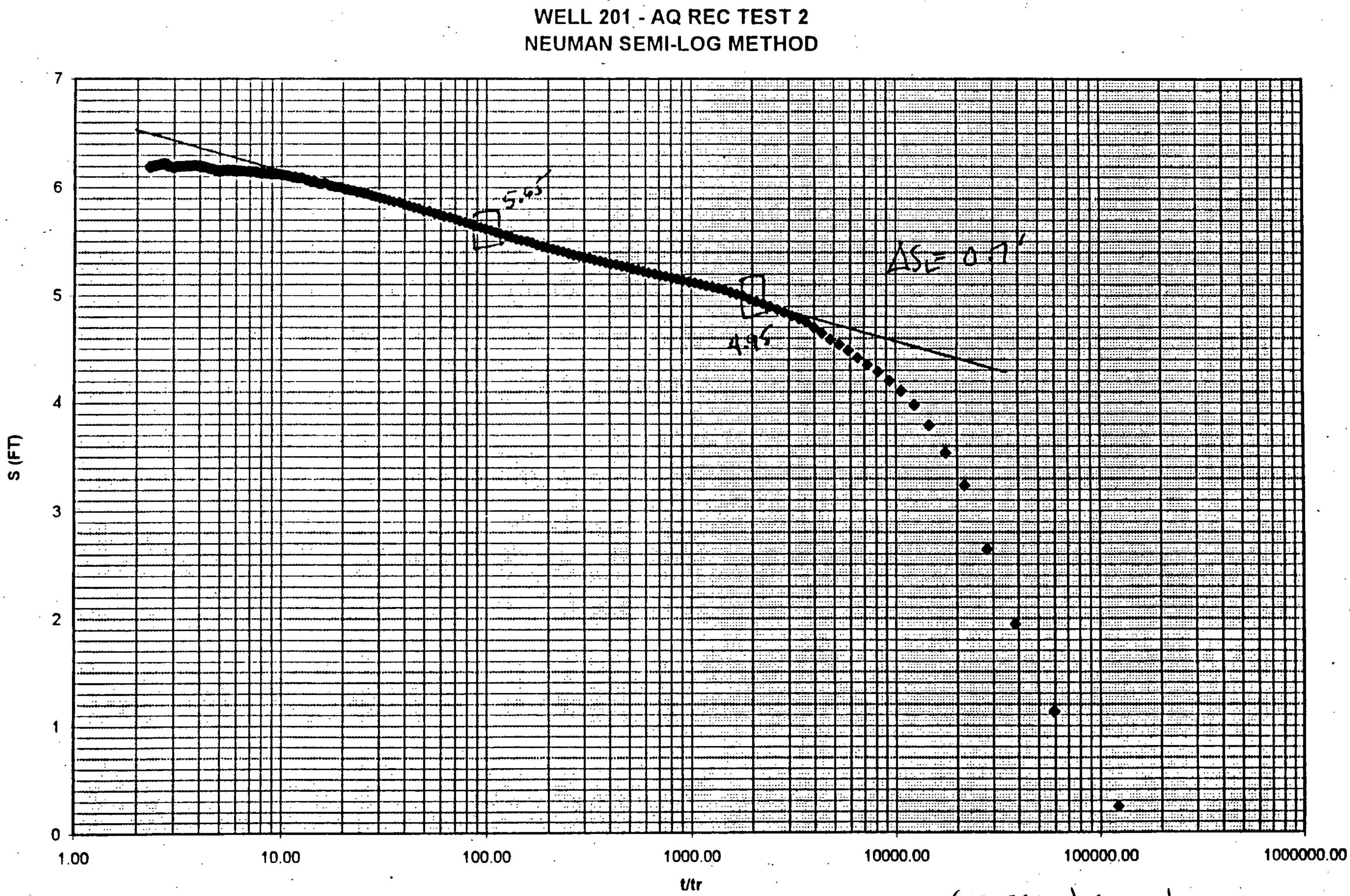
Pumping Test No. WELL 201 REC TEST 2	Test conducted on: 9/5 - 9/8/98
PUMPING WELL 201	
Discharge 12.50 U.S.gal/min	
	Pumping test duration: 5760.08 min



Transmissivity [ft²/min]: 6.42×10^{-1}

Hydraulic conductivity [ft/min]: 6.36×10^{-2} = 91.6 FT/D

Aquifer thickness [ft]: 10.10



$T_L = 0.1833 \left(\frac{12.5\ GPM}{0.7'}\right)(192.5) = \frac{630.1\ ft^2/D}{10.1'}$

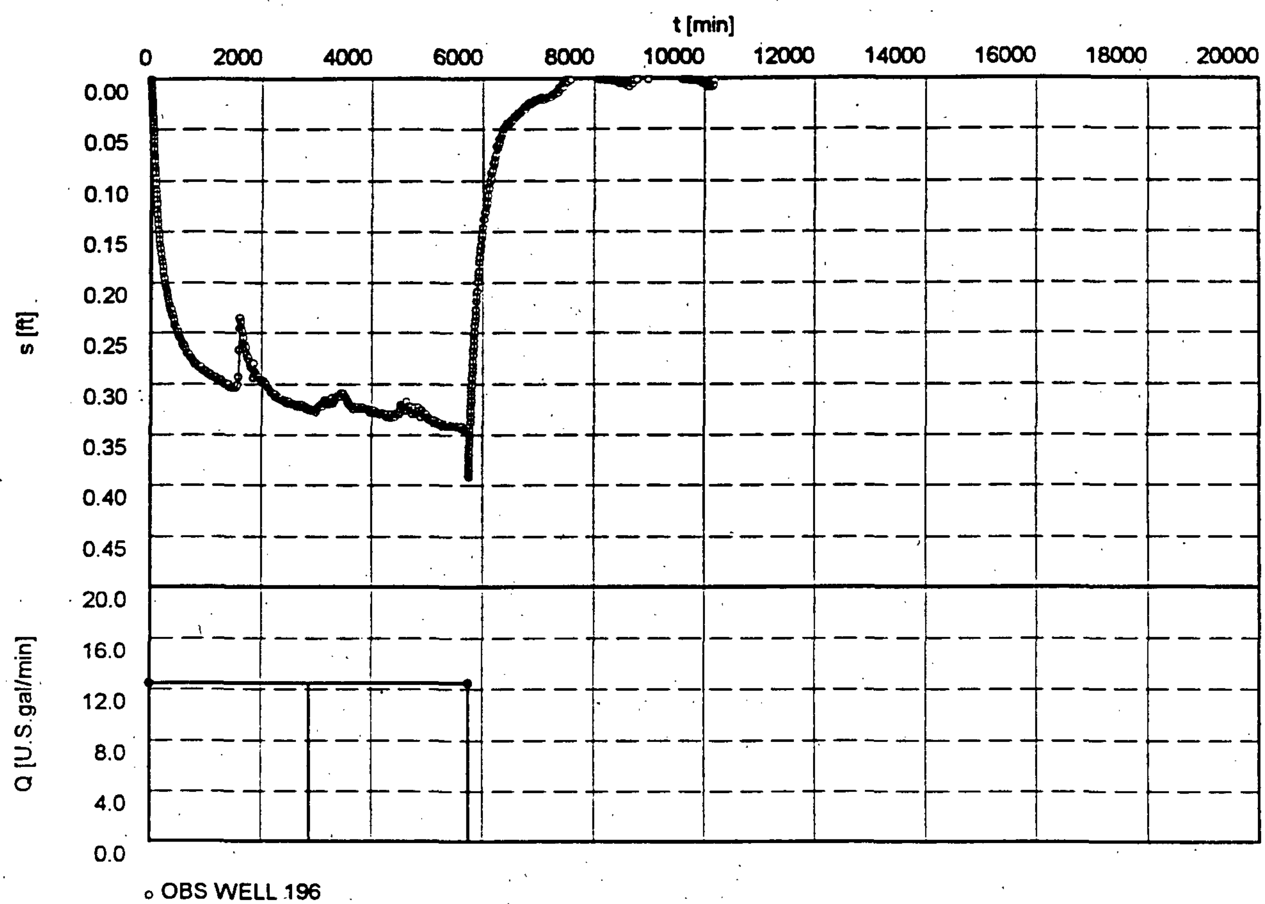
$K_L = 62.4\ ft/D$

PUMPING WELL 201 RECOVERY DATA ANALYSES

WELL 201 AQ TEST 2

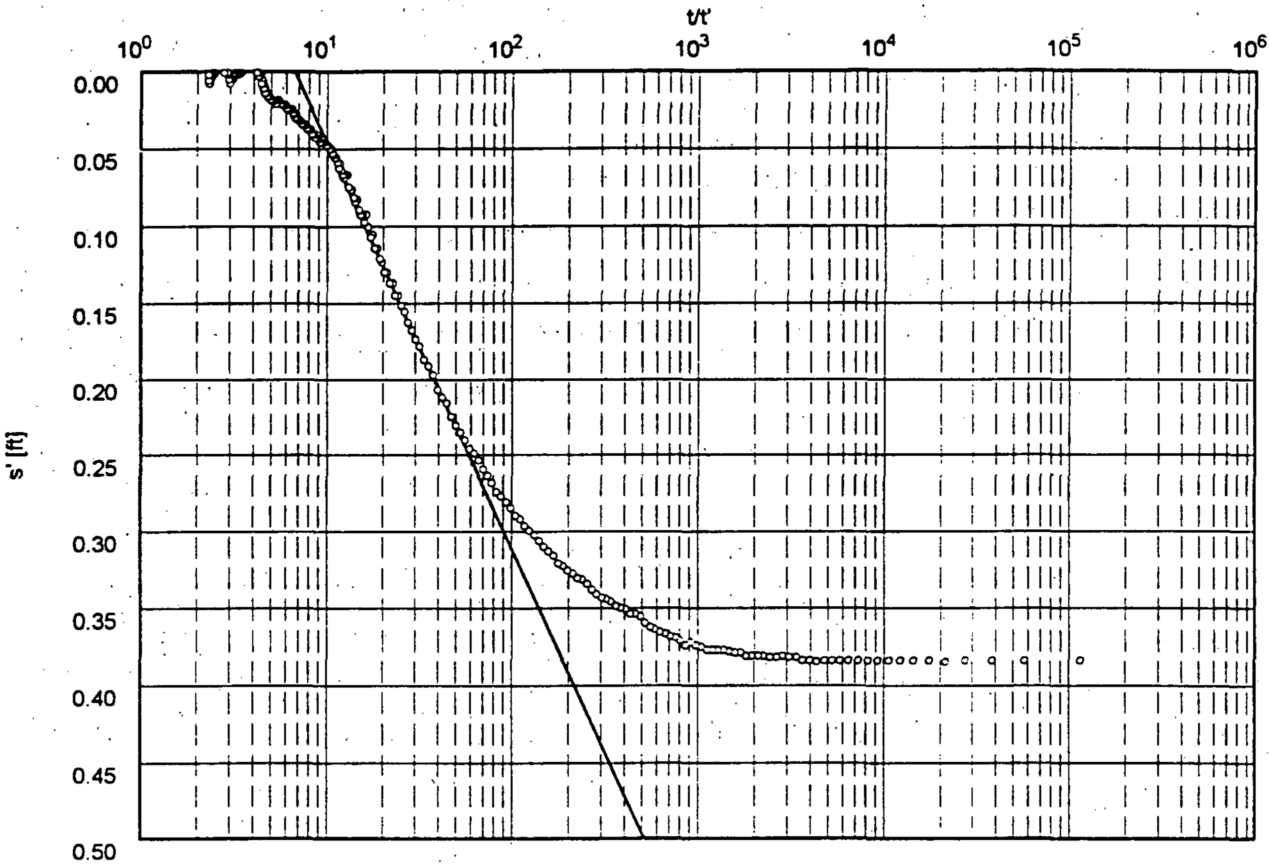
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP Date: 22.10.1998

Pumping Test No. WELL 200 REC TEST 2	Test conducted on: 9/5 - 9/8/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	



MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 22.10.1998

Pumping Test No. WELL 200 REC TEST 2	Test conducted on: 9/5 - 9/8/98
OBS WELL 196	
Discharge 12.50 U.S.gal/min	
	Pumping test duration: 5760.08 min



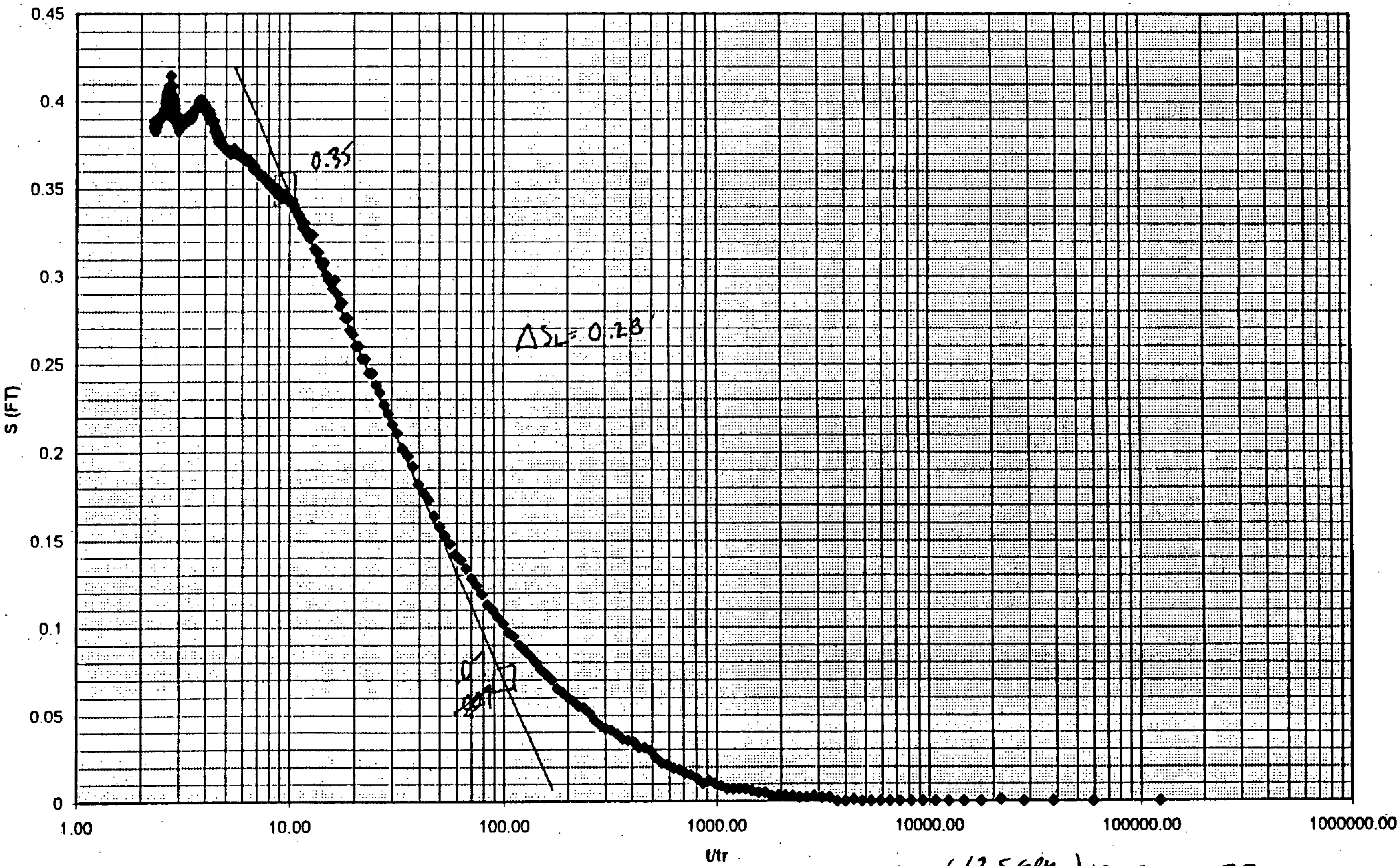
o OBS WELL 196

Transmissivity [ft²/min]: 1.15×10^0

Hydraulic conductivity [ft/min]: 1.14×10^{-1} = 164.2 ft/d

Aquifer thickness [ft]: 10.10

WELL 196 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



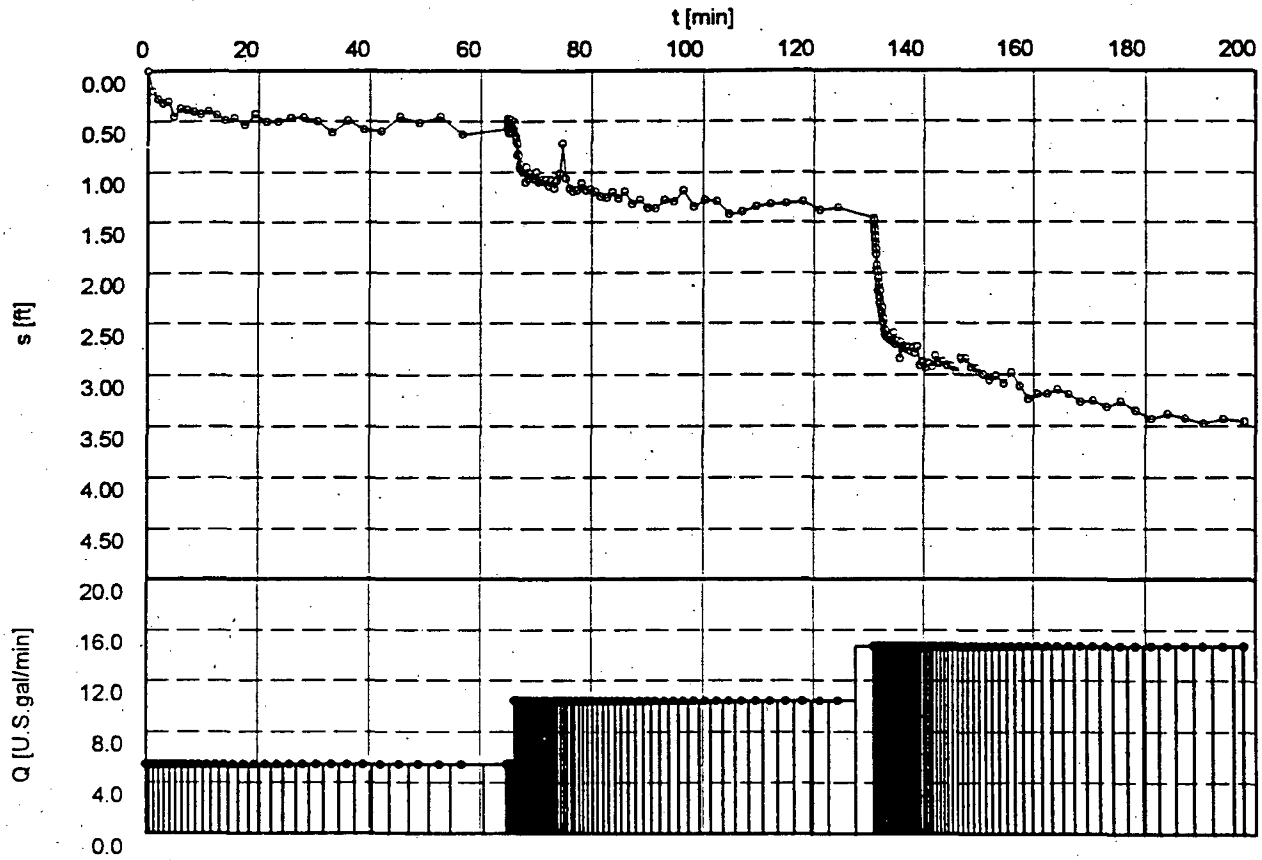
$$T_L = 0.1833\left(\frac{12.5\ \text{GPM}}{0.28\ \text{FT}}\right)192.5 = \frac{1575.2\ \text{FT}^2/\text{D}}{10.1'}$$

$\underline{K_L = 156\ \text{FT/D}}$

PUMPING WELL 201 STEP TEST ANALYSIS

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP / Date: 21.10.1998

Pumping Test No. WELL 201 STEP TEST 2	Test conducted on: 9/8/98
WELL 201	
Discharge 10.25 U.S.gal/min	



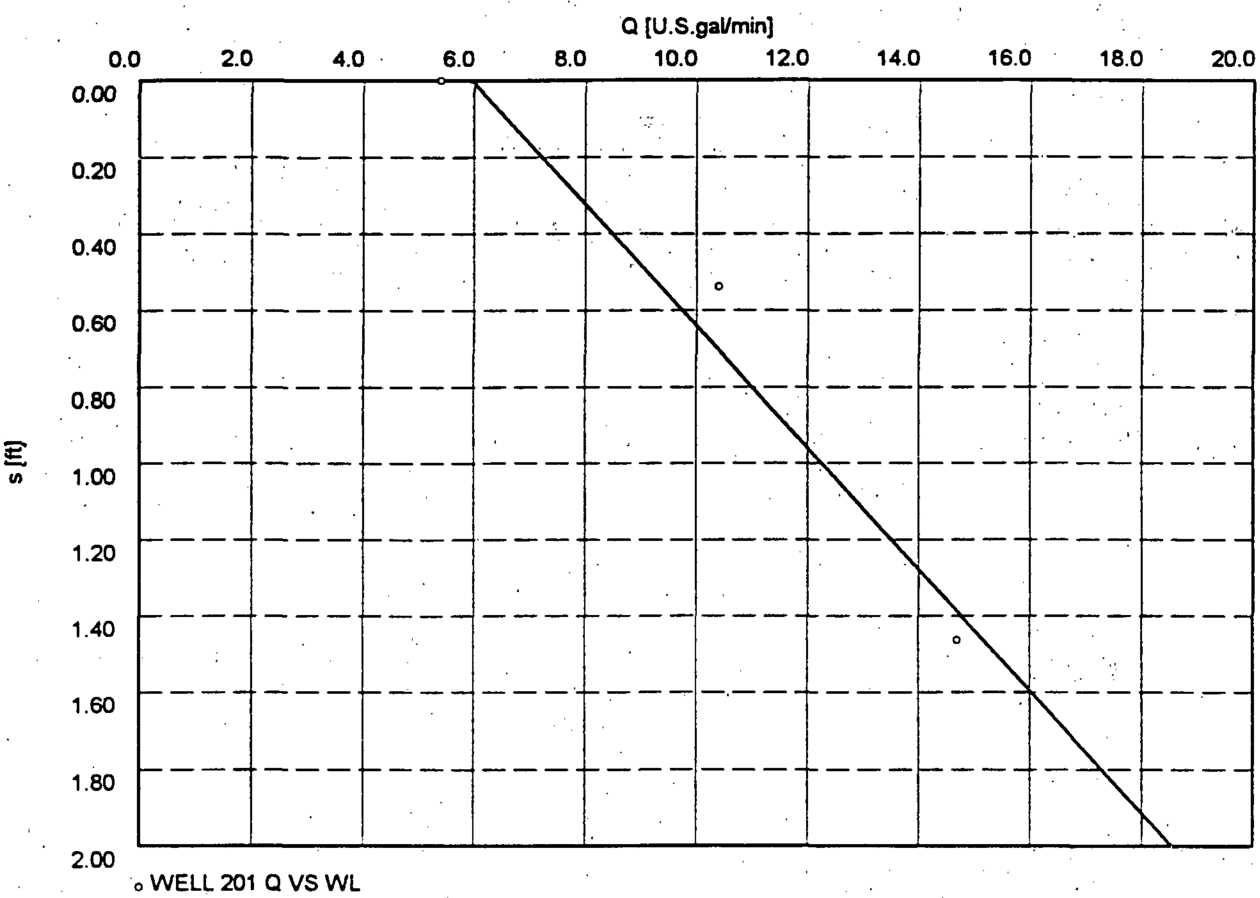
o WELL 201

2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Well performance test
Determination of specific capacity

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 21.10.1998

Pumping Test No. WELL 201 STEP TEST 2	Test conducted on: 9/8/98
WELL 201	



specific capacity C [ft³/min]: 8.41×10^{-1}

WELL 201 AQUIFER TEST 1 WATER LEVEL DATA

(WELLS 201, 208, & 196)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 201 AQUIFER TEST 1 WL DATA			AVG Q = 15.7 GPM		
FILE NAME : 201TEST1.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 201	WELL 208	WELL 196
	DATE /TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED					
	8/31/98 11:30:10	0	13.87	13.49	13.813
	8/31/98 11:30:14	0.0663	13.904	13.491	13.813
	8/31/98 11:30:19	0.1367	13.913	13.491	13.812
	8/31/98 11:30:23	0.2112	13.933	13.491	13.812
	8/31/98 11:30:28	0.2902	13.604	13.491	13.812
	8/31/98 11:30:33	0.3738	13.687	13.487	13.812
	8/31/98 11:30:38	0.4623	13.919	13.493	13.812
	8/31/98 11:30:44	0.5562	13.91	13.491	13.812
	8/31/98 11:30:50	0.6555	14.079	13.491	13.812
	8/31/98 11:30:56	0.7608	14.219	13.491	13.813
	8/31/98 11:31:03	0.8723	14.28	13.493	13.813
	8/31/98 11:31:10	0.9905	14.543	13.491	13.813
	8/31/98 11:31:17	1.1157	14.744	13.493	13.812
	8/31/98 11:31:25	1.2482	14.93	13.493	13.812
	8/31/98 11:31:34	1.3887	15.064	13.491	13.812
	8/31/98 11:31:43	1.5375	15.248	13.491	13.812
	8/31/98 11:31:52	1.695	15.305	13.491	13.812
	8/31/98 11:32:02	1.8618	15.391	13.487	13.812
	8/31/98 11:32:13	2.0387	15.422	13.487	13.812
	8/31/98 11:32:24	2.226	15.491	13.49	13.813
	8/31/98 11:32:36	2.4243	15.551	13.49	13.813
	8/31/98 11:32:48	2.6345	15.514	13.49	13.812
	8/31/98 11:33:02	2.8572	15.631	13.487	13.813
	8/31/98 11:33:16	3.093	15.646	13.487	13.815
	8/31/98 11:33:31	3.3428	15.643	13.49	13.816
	8/31/98 11:33:47	3.6075	15.591	13.489	13.816
	8/31/98 11:34:04	3.8878	15.64	13.489	13.816
	8/31/98 11:34:21	4.1847	15.66	13.49	13.818
	8/31/98 11:34:40	4.4992	15.697	13.486	13.818
	8/31/98 11:35:00	4.8323	15.737	13.49	13.819
	8/31/98 11:35:21	5.1852	15.734	13.487	13.821
	8/31/98 11:35:44	5.559	15.737	13.486	13.819
	8/31/98 11:36:08	5.955	15.714	13.489	13.821
	8/31/98 11:36:33	6.3743	15.72	13.489	13.821
	8/31/98 11:36:59	6.8187	16.009	13.487	13.825
	8/31/98 11:37:28	7.2893	16.121	13.489	13.825
	8/31/98 11:37:58	7.7878	16.124	13.487	13.826
	8/31/98 11:38:29	8.3158	16.296	13.49	13.829
	8/31/98 11:39:03	8.8752	16.31	13.487	13.831
	8/31/98 11:39:38	9.4677	16.258	13.487	13.831
	8/31/98 11:40:16	10.0952	16.29	13.489	13.834
	8/31/98 11:40:56	10.76	16.384	13.49	13.836
	8/31/98 11:41:38	11.4642	16.479	13.487	13.838

	8/31/98 11:42:23	12.21	16.527	13.489	13.838	
	8/31/98 11:43:10	13	16.341	13.487	13.841	
	8/31/98 11:44:01	13.8368	16.396	13.486	13.844	
	8/31/98 11:44:54	14.7233	16.513	13.487	13.847	
	8/31/98 11:45:50	15.6623	16.338	13.489	13.85	
	8/31/98 11:46:50	16.657	16.476	13.49	13.851	
	8/31/98 11:47:53	17.7107	16.568	13.491	13.855	
	8/31/98 11:49:00	18.8267	16.341	13.487	13.854	
	8/31/98 11:50:11	20.0088	16.275	13.491	13.86	
	8/31/98 11:51:26	21.261	16.218	13.49	13.863	
	8/31/98 11:52:46	22.5875	16.287	13.491	13.866	
	8/31/98 11:54:10	23.9925	16.27	13.49	13.87	
	8/31/98 11:55:39	25.4808	16.164	13.493	13.874	
	8/31/98 11:57:14	27.0573	16.29	13.491	13.874	
	8/31/98 11:58:54	28.7272	16.253	13.491	13.879	
	8/31/98 12:00:40	30.496	16.278	13.487	13.88	
	8/31/98 12:02:33	32.3697	16.304	13.49	13.886	
	8/31/98 12:04:32	34.3543	16.284	13.491	13.89	
	8/31/98 12:06:38	36.4567	16.39	13.49	13.895	
	8/31/98 12:08:51	38.6835	16.373	13.487	13.897	
	8/31/98 12:11:13	41.0423	16.364	13.49	13.9	
	8/31/98 12:13:43	43.541	16.436	13.484	13.905	
	8/31/98 12:16:22	46.1877	16.439	13.49	13.91	
	8/31/98 12:19:10	48.9912	16.367	13.491	13.915	
	8/31/98 12:22:08	51.9608	16.464	13.484	13.916	
	8/31/98 12:25:17	55.1065	16.519	13.487	13.922	
	8/31/98 12:28:37	58.4385	16.51	13.486	13.926	
	8/31/98 12:32:08	61.968	16.525	13.487	13.932	
	8/31/98 12:35:53	65.7065	16.585	13.49	13.941	
	8/31/98 12:39:50	69.6667	16.619	13.487	13.944	
	8/31/98 12:44:02	73.8615	16.562	13.491	13.951	
	8/31/98 12:48:29	78.3048	16.596	13.489	13.955	
	8/31/98 12:53:11	83.0115	16.464	13.49	13.958	
	8/31/98 12:58:10	87.997	16.487	13.491	13.967	
	8/31/98 13:03:27	93.2778	16.908	13.496	13.973	
	8/31/98 13:09:03	98.8717	16.88	13.494	13.979	
	8/31/98 13:14:58	104.797	16.854	13.497	13.986	
	8/31/98 13:21:15	111.0733	16.822	13.493	13.987	
	8/31/98 13:27:54	117.7217	16.888	13.499	13.998	
	8/31/98 13:34:56	124.7638	16.931	13.505	14.005	
	8/31/98 13:42:24	132.2233	16.945	13.499	14.009	
	8/31/98 13:50:18	140.1248	16.96	13.503	14.015	
	8/31/98 13:58:40	148.4945	17.031	13.5	14.021	
	8/31/98 14:07:32	157.3602	17.037	13.507	14.025	
	8/31/98 14:16:55	166.7512	17.234	13.507	14.031	
	8/31/98 14:26:52	176.6987	16.98	13.506	14.038	
	8/31/98 14:37:24	187.2355	17.151	13.51	14.044	
	8/31/98 14:48:34	198.3967	17.217	13.512	14.05	
	8/31/98 15:00:24	210.2193	17.257	13.513	14.056	
	8/31/98 15:12:55	222.7425	17.366	13.516	14.063	
	8/31/98 15:26:11	236.0077	17.337	13.515	14.067	

	8/31/98 15:40:14	250.0588	17.28	13.515	14.076	
	8/31/98 15:55:07	264.9427	17.795	13.523	14.083	
	8/31/98 16:10:07	279.9427	17.91	13.531	14.092	
	8/31/98 16:25:07	294.9427	18.01	13.538	14.102	
	8/31/98 16:40:07	309.9427	17.79	13.538	14.108	
	8/31/98 16:55:07	324.9427	17.844	13.544	14.112	
	8/31/98 17:10:07	339.9427	17.815	13.526	14.124	
	8/31/98 17:25:07	354.9427	17.835	13.567	14.13	
	8/31/98 17:40:07	369.9427	17.858	13.576	14.134	
	8/31/98 17:55:07	384.9427	17.881	13.57	14.143	
	8/31/98 18:10:07	399.9427	17.858	13.588	14.146	
	8/31/98 18:25:07	414.9427	17.959	13.595	14.148	
	8/31/98 18:40:07	429.9427	18.01	13.596	14.154	
	8/31/98 18:55:07	444.9427	18.076	13.604	14.163	
	8/31/98 19:10:07	459.9427	18.076	13.605	14.163	
	8/31/98 19:25:07	474.9427	18.07	13.621	14.173	
	8/31/98 19:40:07	489.9427	18.099	13.63	14.176	
	8/31/98 19:55:07	504.9427	18.19	13.628	14.177	
	8/31/98 20:10:07	519.9427	18.202	13.628	14.182	
	8/31/98 20:25:07	534.9427	18.233	13.631	14.186	
	8/31/98 20:40:07	549.9427	18.282	13.63	14.189	
	8/31/98 20:55:07	564.9427	18.371	13.63	14.195	
	8/31/98 21:10:07	579.9427	18.388	13.631	14.196	
	8/31/98 21:25:07	594.9427	18.442	13.634	14.199	
	8/31/98 21:40:07	609.9427	18.562	13.633	14.204	
	8/31/98 21:55:07	624.9427	18.571	13.631	14.208	
	8/31/98 22:10:07	639.9427	18.648	13.634	14.209	
	8/31/98 22:25:07	654.9427	18.714	13.636	14.212	
	8/31/98 22:40:07	669.9427	18.791	13.636	14.215	
	8/31/98 22:55:07	684.9427	18.823	13.637	14.218	
	8/31/98 23:10:07	699.9427	18.848	13.637	14.222	
	8/31/98 23:25:07	714.9427	18.871	13.637	14.225	
	8/31/98 23:40:07	729.9427	18.886	13.638	14.227	
	8/31/98 23:55:07	744.9427	20.382	13.638	14.231	
	9/1/98 0:10:07	759.9427	19.066	13.641	14.234	
	9/1/98 0:25:07	774.9427	18.992	13.644	14.234	
	9/1/98 0:40:07	789.9427	18.997	13.64	14.237	
PUMP STOPPED						
	9/1/98 0:49:57	799.783	18.923	13.631	14.221	
	9/1/98 0:50:00	799.8356	18.897	13.631	14.222	
	9/1/98 0:50:03	799.8915	18.273	13.631	14.222	
	9/1/98 0:50:07	799.9506	17.506	13.631	14.222	
	9/1/98 0:50:10	800.0133	17.131	13.631	14.222	
	9/1/98 0:50:14	800.0796	16.891	13.631	14.222	
	9/1/98 0:50:19	800.15	16.639	13.631	14.222	
	9/1/98 0:50:23	800.2245	16.39	13.631	14.222	
	9/1/98 0:50:28	800.3035	16.173	13.631	14.222	
	9/1/98 0:50:33	800.3871	15.995	13.631	14.221	
	9/1/98 0:50:38	800.4756	15.846	13.631	14.221	
	9/1/98 0:50:44	800.5695	15.766	13.631	14.221	
	9/1/98 0:50:50	800.6688	15.709	13.631	14.221	

	9/1/98 0:50:56	800.7741	15.654	13.631	14.22	
	9/1/98 0:51:03	800.8856	15.6	13.631	14.22	
	9/1/98 0:51:10	801.0038	15.546	13.63	14.22	
	9/1/98 0:51:17	801.129	15.494	13.63	14.22	
	9/1/98 0:51:25	801.2615	15.44	13.63	14.22	
	9/1/98 0:51:34	801.402	15.391	13.63	14.22	
	9/1/98 0:51:43	801.5508	15.342	13.63	14.218	
	9/1/98 0:51:52	801.7083	15.299	13.63	14.218	
	9/1/98 0:52:02	801.8751	15.253	13.63	14.218	
	9/1/98 0:52:13	802.052	15.222	13.63	14.218	
	9/1/98 0:52:24	802.2393	15.19	13.63	14.217	
	9/1/98 0:52:36	802.4376	15.162	13.63	14.217	
	9/1/98 0:52:48	802.6478	15.139	13.631	14.217	
	9/1/98 0:53:02	802.8705	15.113	13.631	14.217	
	9/1/98 0:53:16	803.1063	15.087	13.634	14.215	
	9/1/98 0:53:31	803.3561	15.064	13.634	14.215	
	9/1/98 0:53:47	803.6208	15.047	13.634	14.214	
	9/1/98 0:54:04	803.9011	15.027	13.636	14.212	
	9/1/98 0:54:21	804.198	15.01	13.636	14.212	
	9/1/98 0:54:40	804.5125	14.993	13.636	14.211	
	9/1/98 0:55:00	804.8456	14.979	13.637	14.209	
	9/1/98 0:55:21	805.1985	14.961	13.637	14.209	
	9/1/98 0:55:44	805.5723	14.947	13.639	14.208	
	9/1/98 0:56:08	805.9683	14.933	13.639	14.207	
	9/1/98 0:56:33	806.3876	14.921	13.637	14.205	
	9/1/98 0:56:59	806.832	14.91	13.637	14.204	
	9/1/98 0:57:28	807.3026	14.895	13.639	14.202	
	9/1/98 0:57:58	807.8011	14.884	13.639	14.201	
	9/1/98 0:58:29	808.3291	14.867	13.637	14.199	
	9/1/98 0:59:03	808.8885	14.855	13.639	14.198	
	9/1/98 0:59:38	809.481	14.841	13.637	14.195	
	9/1/98 1:00:16	810.1085	14.83	13.639	14.195	
	9/1/98 1:00:56	810.7733	14.818	13.639	14.193	
	9/1/98 1:01:38	811.4775	14.804	13.637	14.192	
	9/1/98 1:02:23	812.2233	14.792	13.639	14.189	
	9/1/98 1:03:10	813.0133	14.775	13.637	14.188	
	9/1/98 1:04:01	813.8501	14.764	13.637	14.185	
	9/1/98 1:04:54	814.7366	14.752	13.639	14.185	
	9/1/98 1:05:50	815.6756	14.738	13.639	14.182	
	9/1/98 1:06:50	816.6703	14.724	13.639	14.179	
	9/1/98 1:07:53	817.724	14.712	13.639	14.175	
	9/1/98 1:09:00	818.84	14.698	13.639	14.173	
	9/1/98 1:10:11	820.0221	14.684	13.639	14.17	
	9/1/98 1:11:26	821.2743	14.666	13.637	14.167	
	9/1/98 1:12:46	822.6008	14.652	13.637	14.164	
	9/1/98 1:14:10	824.0058	14.635	13.637	14.163	
	9/1/98 1:15:39	825.4941	14.621	13.637	14.16	
	9/1/98 1:17:14	827.0706	14.606	13.636	14.157	
	9/1/98 1:18:54	828.7405	14.586	13.636	14.154	
	9/1/98 1:20:40	830.5093	14.569	13.636	14.151	
	9/1/98 1:22:33	832.383	14.552	13.636	14.148	

	9/1/98 1:24:32	834.3676	14.535	13.636	14.146	
	9/1/98 1:26:38	836.47	14.517	13.634	14.141	
	9/1/98 1:28:51	838.6968	14.5	13.634	14.137	
	9/1/98 1:31:13	841.0556	14.483	13.633	14.135	
	9/1/98 1:33:43	843.5543	14.463	13.634	14.131	
	9/1/98 1:36:22	846.201	14.446	13.634	14.128	
	9/1/98 1:39:10	849.0045	14.432	13.636	14.125	
	9/1/98 1:42:08	851.9741	14.411	13.633	14.121	
	9/1/98 1:45:17	855.1198	14.394	13.633	14.115	
	9/1/98 1:48:37	858.4518	14.371	13.63	14.109	
	9/1/98 1:52:08	861.9813	14.354	13.63	14.105	
	9/1/98 1:55:53	865.7198	14.334	13.63	14.101	
	9/1/98 1:59:50	869.68	14.317	13.63	14.098	
	9/1/98 2:04:02	873.8748	14.3	13.627	14.09	
	9/1/98 2:08:29	878.3181	14.277	13.626	14.086	
	9/1/98 2:13:11	883.0248	14.26	13.626	14.082	
	9/1/98 2:18:10	888.0103	14.243	13.626	14.074	
	9/1/98 2:23:27	893.2911	14.225	13.624	14.069	
	9/1/98 2:29:03	898.885	14.205	13.626	14.064	
	9/1/98 2:34:58	904.8103	14.188	13.624	14.06	
	9/1/98 2:41:15	911.0866	14.171	13.623	14.053	
	9/1/98 2:47:54	917.735	14.157	13.624	14.047	
	9/1/98 2:54:56	924.7771	14.139	13.624	14.041	
	9/1/98 3:02:24	932.2366	14.125	13.623	14.034	
	9/1/98 3:10:18	940.1381	14.111	13.621	14.028	
	9/1/98 3:18:40	948.5078	14.096	13.62	14.021	
	9/1/98 3:27:32	957.3735	14.082	13.617	14.015	
	9/1/98 3:36:55	966.7645	14.068	13.614	14.009	
	9/1/98 3:46:52	976.712	14.056	13.613	14.002	
	9/1/98 3:56:52	986.712	14.045	13.613	13.995	
	9/1/98 4:06:52	996.712	14.031	13.611	13.989	
	9/1/98 4:16:52	1006.712	14.022	13.608	13.983	
	9/1/98 4:26:52	1016.712	14.011	13.607	13.977	
	9/1/98 4:36:52	1026.712	14.005	13.604	13.973	
	9/1/98 4:46:52	1036.712	13.99	13.602	13.967	
	9/1/98 4:56:52	1046.712	13.982	13.598	13.961	
	9/1/98 5:06:52	1056.712	13.973	13.592	13.956	
	9/1/98 5:16:52	1066.712	13.965	13.589	13.951	
	9/1/98 5:26:52	1076.712	13.959	13.588	13.947	
	9/1/98 5:36:52	1086.712	13.95	13.583	13.944	
	9/1/98 5:46:52	1096.712	13.945	13.583	13.94	
	9/1/98 5:56:52	1106.712	13.936	13.582	13.937	
	9/1/98 6:06:52	1116.712	13.933	13.581	13.934	
	9/1/98 6:16:52	1126.712	13.927	13.581	13.929	
	9/1/98 6:26:52	1136.712	13.922	13.581	13.927	
	9/1/98 6:36:52	1146.712	13.916	13.578	13.924	
	9/1/98 6:46:52	1156.712	13.913	13.579	13.921	
	9/1/98 6:56:52	1166.712	13.907	13.576	13.918	
	9/1/98 7:06:52	1176.712	13.902	13.575	13.915	
	9/1/98 7:16:52	1186.712	13.902	13.576	13.913	
	9/1/98 7:26:52	1196.712	13.896	13.576	13.911	

	9/1/98 7:36:52	1206.712	13.893	13.576	13.908	
	9/1/98 7:46:52	1216.712	13.89	13.576	13.905	
	9/1/98 7:56:52	1226.712	13.887	13.576	13.902	
	9/1/98 8:06:52	1236.712	13.884	13.575	13.9	
	9/1/98 8:16:52	1246.712	13.882	13.573	13.899	
	9/1/98 8:26:52	1256.712	13.879	13.567	13.896	

WELL 201 AQUIFER TEST 2 WATER LEVEL DATA

(WELLS 201, 208, & 196)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 201 AQUIFER TEST 2 WL DATA				AVG Q = 12.5 GPM	
FILE NAME : 201TEST2.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 201	WELL 208	WELL 196
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED					
	9/1/98 8:45:14	0	13.96	13.563	13.85
	9/1/98 8:45:19	0.0704	14.006	13.561	13.85
	9/1/98 8:45:23	0.1449	14.034	13.563	13.85
	9/1/98 8:45:28	0.2239	14.046	13.561	13.85
	9/1/98 8:45:33	0.3075	14.097	13.561	13.85
	9/1/98 8:45:38	0.396	14.086	13.563	13.848
	9/1/98 8:45:44	0.4899	14.063	13.561	13.85
	9/1/98 8:45:50	0.5892	14.203	13.56	13.848
	9/1/98 8:45:56	0.6945	14.172	13.561	13.848
	9/1/98 8:46:03	0.806	14.292	13.561	13.85
	9/1/98 8:46:10	0.9242	14.358	13.561	13.85
	9/1/98 8:46:17	1.0494	14.441	13.561	13.848
	9/1/98 8:46:25	1.1819	14.61	13.561	13.848
	9/1/98 8:46:34	1.3224	14.676	13.56	13.848
	9/1/98 8:46:43	1.4712	14.808	13.563	13.848
	9/1/98 8:46:52	1.6287	14.874	13.563	13.85
	9/1/98 8:47:02	1.7955	15.017	13.561	13.85
	9/1/98 8:47:13	1.9724	15.088	13.561	13.848
	9/1/98 8:47:24	2.1597	15.203	13.561	13.85
	9/1/98 8:47:36	2.358	15.234	13.563	13.85
	9/1/98 8:47:48	2.5682	15.323	13.563	13.85
	9/1/98 8:48:02	2.7909	15.306	13.56	13.85
	9/1/98 8:48:16	3.0267	15.249	13.56	13.851
	9/1/98 8:48:31	3.2765	15.189	13.56	13.851
	9/1/98 8:48:47	3.5412	15.166	13.561	13.851
	9/1/98 8:49:04	3.8215	15.363	13.563	13.851
	9/1/98 8:49:21	4.1184	15.355	13.56	13.853
	9/1/98 8:49:40	4.4329	15.469	13.56	13.853
	9/1/98 8:50:00	4.766	15.395	13.561	13.853
	9/1/98 8:50:21	5.1189	15.26	13.56	13.853
	9/1/98 8:50:44	5.4927	15.223	13.56	13.854
	9/1/98 8:51:08	5.8887	15.226	13.563	13.854
	9/1/98 8:51:33	6.308	15.171	13.561	13.855
	9/1/98 8:51:59	6.7524	15.177	13.563	13.855
	9/1/98 8:52:28	7.223	15.177	13.563	13.857
	9/1/98 8:52:58	7.7215	15.197	13.563	13.857
	9/1/98 8:53:29	8.2495	15.249	13.561	13.858
	9/1/98 8:54:03	8.8089	15.2	13.56	13.858
	9/1/98 8:54:38	9.4014	15.24	13.561	13.858
	9/1/98 8:55:16	10.0289	15.252	13.563	13.86
	9/1/98 8:55:56	10.6937	15.197	13.56	13.861
	9/1/98 8:56:38	11.3979	15.22	13.56	13.861
	9/1/98 8:57:23	12.1437	15.234	13.56	13.863
	9/1/98 8:58:10	12.9337	15.266	13.561	13.864

	9/1/98 8:59:01	13.7705	15.237	13.56	13.864
	9/1/98 8:59:54	14.657	15.297	13.563	13.866
	9/1/98 9:00:50	15.596	15.226	13.56	13.867
	9/1/98 9:01:50	16.5907	15.234	13.56	13.869
	9/1/98 9:02:53	17.6444	15.289	13.561	13.87
	9/1/98 9:04:00	18.7604	15.392	13.561	13.873
	9/1/98 9:05:11	19.9425	15.421	13.561	13.874
	9/1/98 9:06:26	21.1947	15.575	13.563	13.876
	9/1/98 9:07:46	22.5212	15.67	13.564	13.877
	9/1/98 9:09:10	23.9262	15.544	13.56	13.88
	9/1/98 9:10:39	25.4145	15.504	13.561	13.883
	9/1/98 9:12:14	26.991	15.535	13.56	13.884
	9/1/98 9:13:54	28.6609	15.61	13.564	13.886
	9/1/98 9:15:40	30.4297	15.569	13.564	13.889
	9/1/98 9:17:33	32.3034	15.899	13.561	13.892
	9/1/98 9:19:32	34.288	16.008	13.563	13.895
	9/1/98 9:21:38	36.3904	15.81	13.561	13.898
	9/1/98 9:23:51	38.6172	15.738	13.563	13.902
	9/1/98 9:26:13	40.976	15.704	13.564	13.905
	9/1/98 9:28:43	43.4747	15.758	13.561	13.908
	9/1/98 9:31:22	46.1214	16.426	13.563	13.912
	9/1/98 9:34:10	48.9249	15.896	13.564	13.916
	9/1/98 9:37:08	51.8945	15.85	13.566	13.919
	9/1/98 9:40:17	55.0402	15.996	13.566	13.925
	9/1/98 9:43:37	58.3722	15.956	13.567	13.928
	9/1/98 9:47:08	61.9017	16.01	13.564	13.931
	9/1/98 9:50:53	65.6402	16.005	13.566	13.937
	9/1/98 9:54:50	69.6004	16.013	13.569	13.94
	9/1/98 9:59:02	73.7952	15.982	13.567	13.943
	9/1/98 10:03:29	78.2385	16.385	13.566	13.948
	9/1/98 10:08:11	82.9452	16.208	13.566	13.953
	9/1/98 10:13:10	87.9307	16.111	13.57	13.96
	9/1/98 10:18:27	93.2115	16.214	13.573	13.964
	9/1/98 10:24:03	98.8054	16.222	13.573	13.969
	9/1/98 10:29:58	104.7307	16.308	13.576	13.973
	9/1/98 10:36:15	111.007	16.234	13.575	13.979
	9/1/98 10:42:54	117.6554	16.363	13.572	13.983
	9/1/98 10:49:56	124.6975	16.351	13.576	13.989
	9/1/98 10:57:24	132.157	16.311	13.576	13.993
	9/1/98 11:05:18	140.0585	16.368	13.575	13.999
	9/1/98 11:13:40	148.4282	16.388	13.577	14.003
	9/1/98 11:22:32	157.2939	16.391	13.572	14.008
	9/1/98 11:31:55	166.6849	16.411	13.572	14.014
	9/1/98 11:41:52	176.6324	16.494	13.572	14.017
	9/1/98 11:51:52	186.6324	16.494	13.57	14.022
	9/1/98 12:01:52	196.6324	16.483	13.572	14.028
	9/1/98 12:11:52	206.6324	16.62	13.57	14.031
	9/1/98 12:21:52	216.6324	16.563	13.569	14.035
	9/1/98 12:31:52	226.6324	16.526	13.567	14.04
	9/1/98 12:41:52	236.6324	16.609	13.57	14.044
	9/1/98 12:51:52	246.6324	16.566	13.564	14.046

	9/1/98 13:01:52	256.6324	16.706	13.572	14.051
	9/1/98 13:11:52	266.6324	16.614	13.569	14.054
	9/1/98 13:21:52	276.6324	16.623	13.569	14.056
	9/1/98 13:31:52	286.6324	16.597	13.566	14.059
	9/1/98 13:41:52	296.6324	16.695	13.567	14.061
	9/1/98 13:51:52	306.6324	16.635	13.567	14.064
	9/1/98 14:01:52	316.6324	16.715	13.566	14.067
	9/1/98 14:11:52	326.6324	16.723	13.57	14.07
	9/1/98 14:21:52	336.6324	16.743	13.566	14.073
	9/1/98 14:31:52	346.6324	16.769	13.563	14.076
	9/1/98 14:41:52	356.6324	16.666	13.566	14.077
	9/1/98 14:51:52	366.6324	16.597	13.569	14.079
	9/1/98 15:01:52	376.6324	16.534	13.56	14.077
	9/1/98 15:11:52	386.6324	16.649	13.566	14.083
	9/1/98 15:21:52	396.6324	16.666	13.559	14.082
	9/1/98 15:31:52	406.6324	16.729	13.567	14.086
	9/1/98 15:41:52	416.6324	16.726	13.564	14.088
	9/1/98 15:51:52	426.6324	16.695	13.564	14.092
	9/1/98 16:01:52	436.6324	16.798	13.566	14.092
	9/1/98 16:11:52	446.6324	16.749	13.569	14.093
	9/1/98 16:21:52	456.6324	16.695	13.57	14.095
	9/1/98 16:31:52	466.6324	16.755	13.566	14.095
	9/1/98 16:41:52	476.6324	16.72	13.566	14.096
	9/1/98 16:51:52	486.6324	16.726	13.569	14.099
	9/1/98 17:01:52	496.6324	16.758	13.569	14.102
	9/1/98 17:11:52	506.6324	16.806	13.572	14.104
	9/1/98 17:21:52	516.6324	16.855	13.579	14.104
	9/1/98 17:31:52	526.6324	16.766	13.577	14.105
	9/1/98 17:41:52	536.6324	16.886	13.582	14.106
	9/1/98 17:51:52	546.6324	16.852	13.58	14.108
	9/1/98 18:01:52	556.6324	16.858	13.582	14.109
	9/1/98 18:11:52	566.6324	16.752	13.582	14.111
	9/1/98 18:21:52	576.6324	16.826	13.585	14.112
	9/1/98 18:31:52	586.6324	16.818	13.585	14.112
	9/1/98 18:41:52	596.6324	16.812	13.585	14.114
	9/1/98 18:51:52	606.6324	16.812	13.585	14.112
	9/1/98 19:01:52	616.6324	16.858	13.586	14.114
	9/1/98 19:11:52	626.6324	16.872	13.589	14.117
	9/1/98 19:21:52	636.6324	16.803	13.591	14.117
	9/1/98 19:31:52	646.6324	16.852	13.593	14.12
	9/1/98 19:41:52	656.6324	16.852	13.593	14.12
	9/1/98 19:51:52	666.6324	16.884	13.593	14.121
	9/1/98 20:01:52	676.6324	16.875	13.595	14.121
	9/1/98 20:11:52	686.6324	16.892	13.599	14.121
	9/1/98 20:21:52	696.6324	16.869	13.599	14.122
	9/1/98 20:31:52	706.6324	16.875	13.602	14.122
	9/1/98 20:41:52	716.6324	16.889	13.607	14.125
	9/1/98 20:51:52	726.6324	16.927	13.608	14.125
	9/1/98 21:01:52	736.6324	16.912	13.611	14.125
	9/1/98 21:11:52	746.6324	16.929	13.612	14.127
	9/1/98 21:21:52	756.6324	16.955	13.615	14.128

	9/1/98 21:31:52	766.6324	16.969	13.617	14.128
	9/1/98 21:41:52	776.6324	16.969	13.621	14.13
	9/1/98 21:51:52	786.6324	17.007	13.621	14.13
	9/1/98 22:01:52	796.6324	16.929	13.623	14.131
	9/1/98 22:11:52	806.6324	17.035	13.623	14.13
	9/1/98 22:21:52	816.6324	16.944	13.623	14.131
	9/1/98 22:31:52	826.6324	16.989	13.624	14.131
	9/1/98 22:41:52	836.6324	16.924	13.624	14.133
	9/1/98 22:51:52	846.6324	16.924	13.624	14.133
	9/1/98 23:01:52	856.6324	16.967	13.626	14.134
	9/1/98 23:11:52	866.6324	16.947	13.626	14.134
	9/1/98 23:21:52	876.6324	16.938	13.627	14.134
	9/1/98 23:31:52	886.6324	17.007	13.626	14.134
	9/1/98 23:41:52	896.6324	16.978	13.627	14.135
	9/1/98 23:51:52	906.6324	17.027	13.627	14.134
	9/2/98 0:01:52	916.6324	17.093	13.626	14.134
	9/2/98 0:11:52	926.6324	17.012	13.624	14.137
	9/2/98 0:21:52	936.6324	17.032	13.624	14.137
	9/2/98 0:31:52	946.6324	17.015	13.624	14.137
	9/2/98 0:41:52	956.6324	17.038	13.624	14.138
	9/2/98 0:51:52	966.6324	17.004	13.626	14.138
	9/2/98 1:01:52	976.6324	17.021	13.627	14.137
	9/2/98 1:11:52	986.6324	16.987	13.627	14.138
	9/2/98 1:21:52	996.6324	17.061	13.626	14.138
	9/2/98 1:31:52	1006.6324	17.061	13.627	14.138
	9/2/98 1:41:52	1016.6324	16.952	13.627	14.14
	9/2/98 1:51:52	1026.6324	17.001	13.627	14.14
	9/2/98 2:01:52	1036.6324	17.07	13.627	14.14
	9/2/98 2:11:52	1046.6324	17.061	13.626	14.141
	9/2/98 2:21:52	1056.6324	17.072	13.628	14.141
	9/2/98 2:31:52	1066.6324	16.998	13.63	14.141
	9/2/98 2:41:52	1076.6324	17.018	13.628	14.14
	9/2/98 2:51:52	1086.6324	17.047	13.627	14.141
	9/2/98 3:01:52	1096.6324	17.024	13.628	14.143
	9/2/98 3:11:52	1106.6324	17.095	13.63	14.143
	9/2/98 3:21:52	1116.6324	17.138	13.631	14.143
	9/2/98 3:31:52	1126.6324	17.144	13.63	14.143
	9/2/98 3:41:52	1136.6324	17.064	13.633	14.144
	9/2/98 3:51:52	1146.6324	17.098	13.633	14.143
	9/2/98 4:01:52	1156.6324	17.113	13.631	14.143
	9/2/98 4:11:52	1166.6324	17.17	13.631	14.144
	9/2/98 4:21:52	1176.6324	17.095	13.63	14.143
	9/2/98 4:31:52	1186.6324	17.09	13.631	14.144
	9/2/98 4:41:52	1196.6324	17.11	13.633	14.146
	9/2/98 4:51:52	1206.6324	17.144	13.631	14.146
	9/2/98 5:01:52	1216.6324	17.09	13.633	14.146
	9/2/98 5:11:52	1226.6324	17.075	13.633	14.146
	9/2/98 5:21:52	1236.6324	17.144	13.631	14.146
	9/2/98 5:31:52	1246.6324	17.067	13.633	14.146
	9/2/98 5:41:52	1256.6324	17.118	13.631	14.146
	9/2/98 5:51:52	1266.6324	17.124	13.633	14.146

	9/2/98 6:01:52	1276.6324	17.173	13.633	14.147
	9/2/98 6:11:52	1286.6324	17.135	13.633	14.147
	9/2/98 6:21:52	1296.6324	17.224	13.636	14.149
	9/2/98 6:31:52	1306.6324	17.184	13.639	14.149
	9/2/98 6:41:52	1316.6324	16.998	13.64	14.149
	9/2/98 6:51:52	1326.6324	17.144	13.642	14.15
	9/2/98 7:01:52	1336.6324	17.064	13.644	14.151
	9/2/98 7:11:52	1346.6324	17.181	13.646	14.15
	9/2/98 7:21:52	1356.6324	17.184	13.647	14.151
	9/2/98 7:31:52	1366.6324	17.17	13.647	14.151
	9/2/98 7:41:52	1376.6324	17.236	13.649	14.15
	9/2/98 7:51:52	1386.6324	17.21	13.65	14.151
	9/2/98 8:01:52	1396.6324	17.224	13.646	14.151
	9/2/98 8:11:52	1406.6324	17.284	13.65	14.15
	9/2/98 8:21:52	1416.6324	17.176	13.65	14.153
	9/2/98 8:31:52	1426.6324	17.221	13.652	14.153
	9/2/98 8:41:52	1436.6324	17.207	13.655	14.153
	9/2/98 8:51:52	1446.6324	17.244	13.652	14.154
	9/2/98 9:01:52	1456.6324	17.241	13.652	14.153
	9/2/98 9:11:52	1466.6324	17.279	13.652	14.154
	9/2/98 9:21:52	1476.6324	17.238	13.646	14.153
	9/2/98 9:31:52	1486.6324	17.25	13.646	14.153
	9/2/98 9:41:52	1496.6324	17.21	13.644	14.153
	9/2/98 9:51:52	1506.6324	17.216	13.65	14.154
	9/2/98 10:01:52	1516.6324	17.253	13.647	14.154
	9/2/98 10:11:52	1526.6324	17.216	13.647	14.153
	9/2/98 10:21:52	1536.6324	17.264	13.644	14.154
	9/2/98 10:31:52	1546.6324	17.224	13.644	14.153
	9/2/98 10:41:52	1556.6324	17.284	13.64	14.151
	9/2/98 10:51:52	1566.6324	17.287	13.637	14.151
	9/2/98 11:01:52	1576.6324	14.871	13.642	14.143
	9/2/98 11:11:52	1586.6324	14.69	13.64	14.117
	9/2/98 11:21:52	1596.6324	14.584	13.634	14.095
	9/2/98 11:31:52	1606.6324	16.354	13.63	14.085
	9/2/98 11:41:52	1616.6324	16.626	13.624	14.085
	9/2/98 11:51:52	1626.6324	16.698	13.62	14.089
	9/2/98 12:01:52	1636.6324	16.712	13.623	14.095
	9/2/98 12:11:52	1646.6324	16.801	13.611	14.098
	9/2/98 12:21:52	1656.6324	16.823	13.614	14.105
	9/2/98 12:31:52	1666.6324	16.849	13.612	14.106
	9/2/98 12:41:52	1676.6324	16.835	13.604	14.105
	9/2/98 12:51:52	1686.6324	16.869	13.601	14.112
	9/2/98 13:01:52	1696.6324	16.998	13.601	14.115
	9/2/98 13:11:52	1706.6324	16.826	13.601	14.112
	9/2/98 13:21:52	1716.6324	16.909	13.598	14.114
	9/2/98 13:31:52	1726.6324	16.901	13.601	14.121
	9/2/98 13:41:52	1736.6324	16.929	13.599	14.121
	9/2/98 13:51:52	1746.6324	16.949	13.604	14.124
	9/2/98 14:01:52	1756.6324	16.924	13.599	14.125
	9/2/98 14:11:52	1766.6324	16.921	13.593	14.124
	9/2/98 14:21:52	1776.6324	16.975	13.598	14.128

	9/2/98 14:31:52	1786.6324	17.007	13.598	14.131
	9/2/98 14:41:52	1796.6324	17.021	13.593	14.131
	9/2/98 14:51:52	1806.6324	17.047	13.598	14.133
	9/2/98 15:01:52	1816.6324	17.067	13.599	14.134
	9/2/98 15:11:52	1826.6324	17.001	13.598	14.135
	9/2/98 15:21:52	1836.6324	17.021	13.598	14.135
	9/2/98 15:31:52	1846.6324	17.055	13.607	14.144
	9/2/98 15:41:52	1856.6324	17.093	13.589	14.13
	9/2/98 15:51:52	1866.6324	17.104	13.602	14.138
	9/2/98 16:01:52	1876.6324	17.161	13.598	14.14
	9/2/98 16:11:52	1886.6324	17.03	13.596	14.138
	9/2/98 16:21:52	1896.6324	16.998	13.598	14.14
	9/2/98 16:31:52	1906.6324	17.098	13.598	14.141
	9/2/98 16:41:52	1916.6324	17.024	13.596	14.143
	9/2/98 16:51:52	1926.6324	17.087	13.598	14.143
	9/2/98 17:01:52	1936.6324	17.058	13.598	14.143
	9/2/98 17:11:52	1946.6324	17.121	13.598	14.143
	9/2/98 17:21:52	1956.6324	17.161	13.596	14.143
	9/2/98 17:31:52	1966.6324	17.153	13.598	14.146
	9/2/98 17:41:52	1976.6324	17.072	13.598	14.146
	9/2/98 17:51:52	1986.6324	17.11	13.598	14.146
	9/2/98 18:01:52	1996.6324	17.098	13.601	14.146
	9/2/98 18:11:52	2006.6324	17.184	13.601	14.149
	9/2/98 18:21:52	2016.6324	17.181	13.605	14.147
	9/2/98 18:31:52	2026.6324	17.118	13.608	14.147
	9/2/98 18:41:52	2036.6324	17.207	13.609	14.149
	9/2/98 18:51:52	2046.6324	17.233	13.611	14.147
	9/2/98 19:01:52	2056.6324	17.196	13.611	14.149
	9/2/98 19:11:52	2066.6324	17.161	13.611	14.149
	9/2/98 19:21:52	2076.6324	17.301	13.612	14.15
	9/2/98 19:31:52	2086.6324	17.181	13.615	14.151
	9/2/98 19:41:52	2096.6324	17.221	13.617	14.151
	9/2/98 19:51:52	2106.6324	17.39	13.618	14.153
	9/2/98 20:01:52	2116.6324	17.376	13.623	14.153
	9/2/98 20:11:52	2126.6324	17.399	13.626	14.154
	9/2/98 20:21:52	2136.6324	17.413	13.628	14.156
	9/2/98 20:31:52	2146.6324	17.393	13.63	14.156
	9/2/98 20:41:52	2156.6324	17.39	13.631	14.157
	9/2/98 20:51:52	2166.6324	17.393	13.634	14.157
	9/2/98 21:01:52	2176.6324	17.384	13.636	14.159
	9/2/98 21:11:52	2186.6324	17.382	13.639	14.159
	9/2/98 21:21:52	2196.6324	17.399	13.64	14.159
	9/2/98 21:31:52	2206.6324	17.436	13.643	14.159
	9/2/98 21:41:52	2216.6324	17.35	13.643	14.16
	9/2/98 21:51:52	2226.6324	17.425	13.643	14.159
	9/2/98 22:01:52	2236.6324	17.362	13.644	14.162
	9/2/98 22:11:52	2246.6324	17.419	13.646	14.16
	9/2/98 22:21:52	2256.6324	17.447	13.646	14.16
	9/2/98 22:31:52	2266.6324	17.407	13.649	14.162
	9/2/98 22:41:52	2276.6324	17.416	13.65	14.162
	9/2/98 22:51:52	2286.6324	17.516	13.65	14.162

	9/2/98 23:01:52	2296.6324	17.465	13.653	14.163
	9/2/98 23:11:52	2306.6324	17.482	13.655	14.164
	9/2/98 23:21:52	2316.6324	17.473	13.653	14.164
	9/2/98 23:31:52	2326.6324	17.533	13.658	14.164
	9/2/98 23:41:52	2336.6324	17.525	13.66	14.164
	9/2/98 23:51:52	2346.6324	17.485	13.66	14.164
	9/3/98 0:01:52	2356.6324	17.545	13.66	14.164
	9/3/98 0:11:52	2366.6324	17.496	13.66	14.166
	9/3/98 0:21:52	2376.6324	17.456	13.662	14.166
	9/3/98 0:31:52	2386.6324	17.539	13.662	14.166
	9/3/98 0:41:52	2396.6324	17.496	13.662	14.166
	9/3/98 0:51:52	2406.6324	17.599	13.662	14.167
	9/3/98 1:01:52	2416.6324	17.605	13.662	14.166
	9/3/98 1:11:52	2426.6324	17.548	13.663	14.167
	9/3/98 1:21:52	2436.6324	17.467	13.662	14.166
	9/3/98 1:31:52	2446.6324	17.536	13.662	14.167
	9/3/98 1:41:52	2456.6324	17.508	13.663	14.169
	9/3/98 1:51:52	2466.6324	17.596	13.663	14.167
	9/3/98 2:01:52	2476.6324	17.536	13.663	14.169
	9/3/98 2:11:52	2486.6324	17.488	13.665	14.169
	9/3/98 2:21:52	2496.6324	17.556	13.663	14.169
	9/3/98 2:31:52	2506.6324	17.553	13.663	14.169
	9/3/98 2:41:52	2516.6324	17.576	13.663	14.167
	9/3/98 2:51:52	2526.6324	17.573	13.663	14.169
	9/3/98 3:01:52	2536.6324	17.562	13.663	14.169
	9/3/98 3:11:52	2546.6324	17.562	13.662	14.169
	9/3/98 3:21:52	2556.6324	17.542	13.66	14.169
	9/3/98 3:31:52	2566.6324	17.553	13.662	14.169
	9/3/98 3:41:52	2576.6324	17.588	13.66	14.169
	9/3/98 3:51:52	2586.6324	17.633	13.663	14.17
	9/3/98 4:01:52	2596.6324	17.559	13.662	14.17
	9/3/98 4:11:52	2606.6324	17.582	13.665	14.17
	9/3/98 4:21:52	2616.6324	17.579	13.663	14.17
	9/3/98 4:31:52	2626.6324	17.596	13.665	14.17
	9/3/98 4:41:52	2636.6324	17.533	13.665	14.172
	9/3/98 4:51:52	2646.6324	17.591	13.665	14.17
	9/3/98 5:01:52	2656.6324	17.608	13.663	14.172
	9/3/98 5:11:52	2666.6324	17.533	13.662	14.17
	9/3/98 5:21:52	2676.6324	17.636	13.662	14.17
	9/3/98 5:31:52	2686.6324	17.605	13.662	14.17
	9/3/98 5:41:52	2696.6324	17.562	13.662	14.172
	9/3/98 5:51:52	2706.6324	17.422	13.662	14.17
	9/3/98 6:01:52	2716.6324	17.562	13.665	14.172
	9/3/98 6:11:52	2726.6324	17.596	13.665	14.17
	9/3/98 6:21:52	2736.6324	17.539	13.665	14.17
	9/3/98 6:31:52	2746.6324	17.633	13.665	14.17
	9/3/98 6:41:52	2756.6324	17.576	13.669	14.172
	9/3/98 6:51:52	2766.6324	17.648	13.671	14.172
	9/3/98 7:01:52	2776.6324	17.759	13.672	14.172
	9/3/98 7:11:52	2786.6324	17.593	13.674	14.173
	9/3/98 7:21:52	2796.6324	17.659	13.674	14.172

	9/3/98 7:31:52	2806.6324	17.636	13.674	14.175
	9/3/98 7:41:52	2816.6324	17.714	13.676	14.173
	9/3/98 7:51:52	2826.6324	17.777	13.678	14.175
	9/3/98 8:01:52	2836.6324	17.728	13.679	14.175
	9/3/98 8:11:52	2846.6324	17.86	13.681	14.175
	9/3/98 8:21:52	2856.6324	17.728	13.679	14.175
	9/3/98 8:31:52	2866.6324	17.768	13.678	14.176
	9/3/98 8:41:52	2876.6324	17.777	13.679	14.175
	9/3/98 8:51:52	2886.6324	17.771	13.678	14.176
	9/3/98 9:01:52	2896.6324	17.822	13.679	14.176
	9/3/98 9:11:52	2906.6324	17.865	13.678	14.175
	9/3/98 9:21:52	2916.6324	17.799	13.676	14.176
	9/3/98 9:31:52	2926.6324	17.86	13.675	14.176
	9/3/98 9:41:52	2936.6324	17.868	13.676	14.176
	9/3/98 9:51:52	2946.6324	17.848	13.672	14.176
	9/3/98 10:01:52	2956.6324	17.851	13.669	14.176
	9/3/98 10:11:52	2966.6324	17.84	13.671	14.176
	9/3/98 10:21:52	2976.6324	17.86	13.671	14.178
	9/3/98 10:31:52	2986.6324	17.891	13.672	14.178
	9/3/98 10:41:52	2996.6324	17.877	13.671	14.178
	9/3/98 10:51:52	3006.6324	17.897	13.666	14.176
	9/3/98 11:01:52	3016.6324	17.585	13.666	14.175
	9/3/98 11:11:52	3026.6324	17.708	13.662	14.172
	9/3/98 11:21:52	3036.6324	17.745	13.662	14.173
	9/3/98 11:31:52	3046.6324	17.705	13.662	14.172
	9/3/98 11:41:52	3056.6324	17.728	13.655	14.172
	9/3/98 11:51:52	3066.6324	17.788	13.659	14.172
	9/3/98 12:01:52	3076.6324	17.791	13.653	14.17
	9/3/98 12:11:52	3086.6324	17.802	13.65	14.172
	9/3/98 12:21:52	3096.6324	17.825	13.646	14.169
	9/3/98 12:31:52	3106.6324	17.845	13.647	14.172
	9/3/98 12:41:52	3116.6324	17.817	13.646	14.169
	9/3/98 12:51:52	3126.6324	16.944	13.644	14.169
	9/3/98 13:01:52	3136.6324	17.708	13.639	14.167
	9/3/98 13:11:52	3146.6324	17.699	13.64	14.166
	9/3/98 13:21:52	3156.6324	17.671	13.634	14.166
	9/3/98 13:31:52	3166.6324	17.757	13.636	14.167
	9/3/98 13:41:52	3176.6324	17.779	13.637	14.169
	9/3/98 13:51:52	3186.6324	17.799	13.63	14.167
	9/3/98 14:01:52	3196.6324	17.757	13.634	14.169
	9/3/98 14:11:52	3206.6324	17.711	13.633	14.17
	9/3/98 14:21:52	3216.6324	17.785	13.631	14.17
	9/3/98 14:31:52	3226.6324	17.665	13.634	14.17
	9/3/98 14:41:52	3236.6324	17.711	13.63	14.167
	9/3/98 14:51:52	3246.6324	17.725	13.63	14.169
	9/3/98 15:01:52	3256.6324	17.757	13.624	14.166
	9/3/98 15:11:52	3266.6324	17.699	13.624	14.167
	9/3/98 15:21:52	3276.6324	17.682	13.62	14.164
	9/3/98 15:31:52	3286.6324	18.068	13.623	14.167
	9/3/98 15:41:52	3296.6324	17.771	13.62	14.169
	9/3/98 15:51:52	3306.6324	17.651	13.62	14.167

	9/3/98 16:01:52	3316.6324	17.734	13.617	14.166
	9/3/98 16:11:52	3326.6324	17.682	13.618	14.166
	9/3/98 16:21:52	3336.6324	17.671	13.615	14.166
	9/3/98 16:31:52	3346.6324	17.671	13.617	14.164
	9/3/98 16:41:52	3356.6324	17.731	13.614	14.163
	9/3/98 16:51:52	3366.6324	17.708	13.617	14.162
	9/3/98 17:01:52	3376.6324	17.659	13.617	14.162
	9/3/98 17:11:52	3386.6324	17.648	13.617	14.163
	9/3/98 17:21:52	3396.6324	17.654	13.618	14.162
	9/3/98 17:31:52	3406.6324	17.588	13.617	14.162
	9/3/98 17:41:52	3416.6324	17.642	13.617	14.162
	9/3/98 17:51:52	3426.6324	17.619	13.621	14.162
	9/3/98 18:01:52	3436.6324	17.656	13.62	14.159
	9/3/98 18:11:52	3446.6324	17.562	13.618	14.16
	9/3/98 18:21:52	3456.6324	17.725	13.618	14.159
	9/3/98 18:31:52	3466.6324	17.688	13.618	14.16
	9/3/98 18:41:52	3476.6324	17.714	13.621	14.16
	9/3/98 18:51:52	3486.6324	17.682	13.621	14.159
	9/3/98 19:01:52	3496.6324	17.728	13.621	14.16
	9/3/98 19:11:52	3506.6324	17.722	13.621	14.162
	9/3/98 19:21:52	3516.6324	17.857	13.623	14.162
	9/3/98 19:31:52	3526.6324	17.785	13.626	14.163
	9/3/98 19:41:52	3536.6324	17.817	13.626	14.164
	9/3/98 19:51:52	3546.6324	17.84	13.628	14.164
	9/3/98 20:01:52	3556.6324	17.84	13.631	14.166
	9/3/98 20:11:52	3566.6324	17.819	13.634	14.169
	9/3/98 20:21:52	3576.6324	17.799	13.634	14.167
	9/3/98 20:31:52	3586.6324	17.848	13.637	14.17
	9/3/98 20:41:52	3596.6324	17.837	13.643	14.169
	9/3/98 20:51:52	3606.6324	17.902	13.646	14.17
	9/3/98 21:01:52	3616.6324	17.865	13.647	14.172
	9/3/98 21:11:52	3626.6324	17.894	13.649	14.172
	9/3/98 21:21:52	3636.6324	17.923	13.652	14.172
	9/3/98 21:31:52	3646.6324	17.908	13.655	14.172
	9/3/98 21:41:52	3656.6324	17.937	13.656	14.172
	9/3/98 21:51:52	3666.6324	17.92	13.66	14.175
	9/3/98 22:01:52	3676.6324	17.834	13.66	14.172
	9/3/98 22:11:52	3686.6324	17.931	13.66	14.172
	9/3/98 22:21:52	3696.6324	17.905	13.662	14.172
	9/3/98 22:31:52	3706.6324	18.048	13.663	14.172
	9/3/98 22:41:52	3716.6324	17.854	13.665	14.173
	9/3/98 22:51:52	3726.6324	17.94	13.665	14.173
	9/3/98 23:01:52	3736.6324	17.92	13.666	14.173
	9/3/98 23:11:52	3746.6324	18.06	13.666	14.173
	9/3/98 23:21:52	3756.6324	18.08	13.668	14.172
	9/3/98 23:31:52	3766.6324	17.994	13.668	14.175
	9/3/98 23:41:52	3776.6324	17.971	13.668	14.175
	9/3/98 23:51:52	3786.6324	17.945	13.669	14.175
	9/4/98 0:01:52	3796.6324	17.934	13.671	14.175
	9/4/98 0:11:52	3806.6324	17.923	13.671	14.173
	9/4/98 0:21:52	3816.6324	17.888	13.672	14.175

	9/4/98 0:31:52	3826.6324	17.96	13.671	14.173
	9/4/98 0:41:52	3836.6324	17.943	13.669	14.173
	9/4/98 0:51:52	3846.6324	18.043	13.669	14.173
	9/4/98 1:01:52	3856.6324	17.997	13.668	14.175
	9/4/98 1:11:52	3866.6324	18.086	13.668	14.175
	9/4/98 1:21:52	3876.6324	17.943	13.671	14.175
	9/4/98 1:31:52	3886.6324	18.011	13.669	14.175
	9/4/98 1:41:52	3896.6324	18.083	13.669	14.175
	9/4/98 1:51:52	3906.6324	18.066	13.669	14.175
	9/4/98 2:01:52	3916.6324	18.037	13.671	14.175
	9/4/98 2:11:52	3926.6324	18.1	13.669	14.175
	9/4/98 2:21:52	3936.6324	18.008	13.669	14.175
	9/4/98 2:31:52	3946.6324	18.008	13.669	14.175
	9/4/98 2:41:52	3956.6324	18.109	13.671	14.175
	9/4/98 2:51:52	3966.6324	18.077	13.671	14.178
	9/4/98 3:01:52	3976.6324	18.117	13.674	14.176
	9/4/98 3:11:52	3986.6324	18.131	13.675	14.178
	9/4/98 3:21:52	3996.6324	18.14	13.675	14.176
	9/4/98 3:31:52	4006.6324	17.983	13.674	14.176
	9/4/98 3:41:52	4016.6324	18.12	13.675	14.178
	9/4/98 3:51:52	4026.6324	18.197	13.676	14.176
	9/4/98 4:01:52	4036.6324	18.086	13.675	14.178
	9/4/98 4:11:52	4046.6324	18.151	13.675	14.176
	9/4/98 4:21:52	4056.6324	18.192	13.675	14.176
	9/4/98 4:31:52	4066.6324	18.206	13.675	14.178
	9/4/98 4:41:52	4076.6324	18.146	13.675	14.179
	9/4/98 4:51:52	4086.6324	18.137	13.676	14.179
	9/4/98 5:01:52	4096.6324	18.2	13.675	14.178
	9/4/98 5:11:52	4106.6324	18.174	13.676	14.179
	9/4/98 5:21:52	4116.6324	18.234	13.678	14.179
	9/4/98 5:31:52	4126.6324	18.177	13.676	14.18
	9/4/98 5:41:52	4136.6324	18.194	13.676	14.179
	9/4/98 5:51:52	4146.6324	18.063	13.676	14.179
	9/4/98 6:01:52	4156.6324	18.232	13.678	14.179
	9/4/98 6:11:52	4166.6324	18.177	13.676	14.178
	9/4/98 6:21:52	4176.6324	18.154	13.678	14.179
	9/4/98 6:31:52	4186.6324	18.131	13.679	14.179
	9/4/98 6:41:52	4196.6324	18.243	13.679	14.179
	9/4/98 6:51:52	4206.6324	18.14	13.681	14.18
	9/4/98 7:01:52	4216.6324	18.131	13.684	14.179
	9/4/98 7:11:52	4226.6324	18.217	13.685	14.18
	9/4/98 7:21:52	4236.6324	18.266	13.688	14.18
	9/4/98 7:31:52	4246.6324	18.249	13.687	14.18
	9/4/98 7:41:52	4256.6324	18.217	13.688	14.182
	9/4/98 7:51:52	4266.6324	18.252	13.69	14.18
	9/4/98 8:01:52	4276.6324	18.249	13.691	14.18
	9/4/98 8:11:52	4286.6324	18.317	13.694	14.182
	9/4/98 8:21:52	4296.6324	18.372	13.692	14.182
	9/4/98 8:31:52	4306.6324	18.274	13.694	14.183
	9/4/98 8:41:52	4316.6324	18.254	13.692	14.183
	9/4/98 8:51:52	4326.6324	18.266	13.692	14.182

	9/4/98 9:01:52	4336.6324	18.329	13.691	14.18
	9/4/98 9:11:52	4346.6324	18.36	13.692	14.183
	9/4/98 9:21:52	4356.6324	18.266	13.692	14.182
	9/4/98 9:31:52	4366.6324	18.257	13.691	14.18
	9/4/98 9:41:52	4376.6324	18.3	13.69	14.182
	9/4/98 9:51:52	4386.6324	18.335	13.687	14.183
	9/4/98 10:01:52	4396.6324	18.335	13.688	14.182
	9/4/98 10:11:52	4406.6324	18.366	13.687	14.18
	9/4/98 10:21:52	4416.6324	18.398	13.685	14.18
	9/4/98 10:31:52	4426.6324	18.306	13.685	14.182
	9/4/98 10:41:52	4436.6324	18.38	13.681	14.179
	9/4/98 10:51:52	4446.6324	18.355	13.681	14.18
	9/4/98 11:01:52	4456.6324	18.4	13.679	14.18
	9/4/98 11:11:52	4466.6324	18.375	13.679	14.18
	9/4/98 11:21:52	4476.6324	18.438	13.676	14.179
	9/4/98 11:31:52	4486.6324	18.42	13.674	14.18
	9/4/98 11:41:52	4496.6324	18.38	13.674	14.178
	9/4/98 11:51:52	4506.6324	18.406	13.665	14.178
	9/4/98 12:01:52	4516.6324	18.4	13.663	14.175
	9/4/98 12:11:52	4526.6324	18.366	13.66	14.17
	9/4/98 12:21:52	4536.6324	18.498	13.656	14.172
	9/4/98 12:31:52	4546.6324	18.423	13.653	14.173
	9/4/98 12:41:52	4556.6324	18.492	13.652	14.173
	9/4/98 12:51:52	4566.6324	18.44	13.655	14.175
	9/4/98 13:01:52	4576.6324	18.492	13.644	14.173
	9/4/98 13:11:52	4586.6324	18.395	13.65	14.176
	9/4/98 13:21:52	4596.6324	18.409	13.644	14.173
	9/4/98 13:31:52	4606.6324	17.124	13.65	14.175
	9/4/98 13:41:52	4616.6324	18.226	13.643	14.17
	9/4/98 13:51:52	4626.6324	18.312	13.637	14.167
	9/4/98 14:01:52	4636.6324	18.4	13.642	14.175
	9/4/98 14:11:52	4646.6324	18.403	13.639	14.176
	9/4/98 14:21:52	4656.6324	18.415	13.636	14.172
	9/4/98 14:31:52	4666.6324	18.418	13.631	14.173
	9/4/98 14:41:52	4676.6324	18.446	13.634	14.172
	9/4/98 14:51:52	4686.6324	18.463	13.636	14.176
	9/4/98 15:01:52	4696.6324	18.561	13.634	14.176
	9/4/98 15:11:52	4706.6324	18.495	13.63	14.175
	9/4/98 15:21:52	4716.6324	18.601	13.627	14.172
	9/4/98 15:31:52	4726.6324	18.581	13.637	14.179
	9/4/98 15:41:52	4736.6324	18.541	13.633	14.176
	9/4/98 15:51:52	4746.6324	18.621	13.63	14.176
	9/4/98 16:01:52	4756.6324	18.612	13.631	14.175
	9/4/98 16:11:52	4766.6324	18.655	13.63	14.176
	9/4/98 16:21:52	4776.6324	18.644	13.628	14.175
	9/4/98 16:31:52	4786.6324	18.672	13.628	14.173
	9/4/98 16:41:52	4796.6324	18.684	13.631	14.179
	9/4/98 16:51:52	4806.6324	18.678	13.631	14.178
	9/4/98 17:01:52	4816.6324	18.681	13.631	14.179
	9/4/98 17:11:52	4826.6324	18.669	13.628	14.178
	9/4/98 17:21:52	4836.6324	18.681	13.628	14.178

	9/4/98 17:31:52	4846.6324	18.675	13.624	14.173
	9/4/98 17:41:52	4856.6324	18.689	13.626	14.176
	9/4/98 17:51:52	4866.6324	18.692	13.63	14.176
	9/4/98 18:01:52	4876.6324	18.707	13.633	14.182
	9/4/98 18:11:52	4886.6324	18.689	13.636	14.178
	9/4/98 18:21:52	4896.6324	18.718	13.636	14.179
	9/4/98 18:31:52	4906.6324	18.712	13.633	14.176
	9/4/98 18:41:52	4916.6324	18.721	13.634	14.179
	9/4/98 18:51:52	4926.6324	18.727	13.636	14.179
	9/4/98 19:01:52	4936.6324	18.727	13.634	14.178
	9/4/98 19:11:52	4946.6324	18.718	13.634	14.179
	9/4/98 19:21:52	4956.6324	18.735	13.636	14.18
	9/4/98 19:31:52	4966.6324	18.738	13.639	14.18
	9/4/98 19:41:52	4976.6324	18.744	13.643	14.182
	9/4/98 19:51:52	4986.6324	18.747	13.643	14.182
	9/4/98 20:01:52	4996.6324	18.752	13.644	14.18
	9/4/98 20:11:52	5006.6324	18.764	13.647	14.183
	9/4/98 20:21:52	5016.6324	18.764	13.649	14.182
	9/4/98 20:31:52	5026.6324	18.895	13.653	14.185
	9/4/98 20:41:52	5036.6324	18.893	13.656	14.183
	9/4/98 20:51:52	5046.6324	18.907	13.659	14.183
	9/4/98 21:01:52	5056.6324	18.913	13.663	14.185
	9/4/98 21:11:52	5066.6324	18.921	13.666	14.185
	9/4/98 21:21:52	5076.6324	18.93	13.666	14.186
	9/4/98 21:31:52	5086.6324	18.933	13.669	14.185
	9/4/98 21:41:52	5096.6324	18.947	13.672	14.186
	9/4/98 21:51:52	5106.6324	18.953	13.674	14.186
	9/4/98 22:01:52	5116.6324	18.955	13.681	14.186
	9/4/98 22:11:52	5126.6324	18.967	13.681	14.188
	9/4/98 22:21:52	5136.6324	19.081	13.682	14.188
	9/4/98 22:31:52	5146.6324	19.09	13.684	14.188
	9/4/98 22:41:52	5156.6324	19.093	13.685	14.188
	9/4/98 22:51:52	5166.6324	19.096	13.684	14.186
	9/4/98 23:01:52	5176.6324	19.101	13.684	14.188
	9/4/98 23:11:52	5186.6324	19.107	13.682	14.188
	9/4/98 23:21:52	5196.6324	19.119	13.684	14.188
	9/4/98 23:31:52	5206.6324	19.121	13.688	14.189
	9/4/98 23:41:52	5216.6324	19.127	13.691	14.189
	9/4/98 23:51:52	5226.6324	19.136	13.692	14.189
	9/5/98 0:01:52	5236.6324	19.267	13.692	14.189
	9/5/98 0:11:52	5246.6324	19.273	13.695	14.189
	9/5/98 0:21:52	5256.6324	19.276	13.694	14.188
	9/5/98 0:31:52	5266.6324	19.276	13.694	14.191
	9/5/98 0:41:52	5276.6324	19.284	13.694	14.191
	9/5/98 0:51:52	5286.6324	19.284	13.694	14.189
	9/5/98 1:01:52	5296.6324	19.29	13.694	14.189
	9/5/98 1:11:52	5306.6324	19.413	13.692	14.189
	9/5/98 1:21:52	5316.6324	19.422	13.691	14.191
	9/5/98 1:31:52	5326.6324	19.428	13.692	14.191
	9/5/98 1:41:52	5336.6324	19.43	13.691	14.191
	9/5/98 1:51:52	5346.6324	19.433	13.691	14.189

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	9/5/98 2:11:52	5366.6324	19.436	13.687	14.189
	9/5/98 2:21:52	5376.6324	19.433	13.687	14.189
	9/5/98 2:31:52	5386.6324	19.559	13.69	14.192
	9/5/98 2:41:52	5396.6324	19.568	13.69	14.191
	9/5/98 2:51:52	5406.6324	19.571	13.69	14.191
	9/5/98 3:01:52	5416.6324	19.573	13.688	14.191
	9/5/98 3:11:52	5426.6324	19.568	13.688	14.191
	9/5/98 3:21:52	5436.6324	19.571	13.69	14.191
	9/5/98 3:31:52	5446.6324	19.573	13.69	14.191
	9/5/98 3:41:52	5456.6324	19.576	13.69	14.191
	9/5/98 3:51:52	5466.6324	19.579	13.69	14.191
	9/5/98 4:01:52	5476.6324	19.582	13.69	14.191
	9/5/98 4:11:52	5486.6324	19.591	13.69	14.191
	9/5/98 4:21:52	5496.6324	19.593	13.691	14.192
	9/5/98 4:31:52	5506.6324	19.593	13.69	14.192
	9/5/98 4:41:52	5516.6324	19.716	13.688	14.192
	9/5/98 4:51:52	5526.6324	19.722	13.688	14.192
	9/5/98 5:01:52	5536.6324	19.722	13.688	14.192
	9/5/98 5:11:52	5546.6324	19.725	13.688	14.192
	9/5/98 5:21:52	5556.6324	19.734	13.687	14.192
	9/5/98 5:31:52	5566.6324	19.742	13.688	14.192
	9/5/98 5:41:52	5576.6324	19.739	13.69	14.192
	9/5/98 5:51:52	5586.6324	19.88	13.69	14.192
	9/5/98 6:01:52	5596.6324	19.885	13.688	14.192
	9/5/98 6:11:52	5606.6324	19.885	13.688	14.192
	9/5/98 6:21:52	5616.6324	19.894	13.691	14.192
	9/5/98 6:31:52	5626.6324	19.894	13.692	14.192
	9/5/98 6:41:52	5636.6324	19.902	13.692	14.194
	9/5/98 6:51:52	5646.6324	19.905	13.694	14.194
	9/5/98 7:01:52	5656.6324	19.911	13.694	14.194
	9/5/98 7:11:52	5666.6324	19.914	13.695	14.194
	9/5/98 7:21:52	5676.6324	20.06	13.695	14.194
	9/5/98 7:31:52	5686.6324	20.06	13.692	14.195
	9/5/98 7:41:52	5696.6324	20.068	13.694	14.195
	9/5/98 7:51:52	5706.6324	20.077	13.695	14.195
	9/5/98 8:01:52	5716.6324	20.074	13.697	14.194
	9/5/98 8:11:52	5726.6324	20.083	13.706	14.196
	9/5/98 8:21:52	5736.6324	20.085	13.703	14.194
	9/5/98 8:31:52	5746.6324	20.088	13.697	14.194
PUMP STOPPED					
	9/5/98 8:44:51	5760.083	20.456	13.7	14.241
	9/5/98 8:44:54	5760.13	20.21	13.701	14.241
	9/5/98 8:44:57	5760.1799	19.329	13.7	14.241
	9/5/98 8:45:00	5760.2325	18.513	13.701	14.241
	9/5/98 8:45:03	5760.2884	17.815	13.7	14.241
	9/5/98 8:45:07	5760.3475	17.222	13.7	14.242
	9/5/98 8:45:10	5760.4102	16.922	13.7	14.241
	9/5/98 8:45:14	5760.4765	16.67	13.7	14.241
	9/5/98 8:45:19	5760.5469	16.481	13.7	14.241
	9/5/98 8:45:23	5760.6214	16.349	13.7	14.241

	9/5/98 8:45:28	5760.7004	16.252	13.7	14.241
	9/5/98 8:45:33	5760.784	16.169	13.7	14.241
	9/5/98 8:45:38	5760.8725	16.106	13.7	14.241
	9/5/98 8:45:44	5760.9664	16.043	13.7	14.241
	9/5/98 8:45:50	5761.0657	15.974	13.7	14.241
	9/5/98 8:45:56	5761.171	15.917	13.699	14.241
	9/5/98 8:46:03	5761.2825	15.871	13.7	14.241
	9/5/98 8:46:10	5761.4007	15.811	13.7	14.242
	9/5/98 8:46:17	5761.5259	15.762	13.701	14.241
	9/5/98 8:46:25	5761.6584	15.711	13.701	14.241
	9/5/98 8:46:34	5761.7989	15.679	13.7	14.239
	9/5/98 8:46:43	5761.9477	15.648	13.7	14.239
	9/5/98 8:46:52	5762.1052	15.619	13.7	14.238
	9/5/98 8:47:02	5762.272	15.588	13.7	14.239
	9/5/98 8:47:13	5762.4489	15.562	13.7	14.239
	9/5/98 8:47:24	5762.6362	15.536	13.7	14.238
	9/5/98 8:47:36	5762.8345	15.516	13.7	14.238
	9/5/98 8:47:48	5763.0447	15.493	13.7	14.238
	9/5/98 8:48:02	5763.2674	15.459	13.701	14.238
	9/5/98 8:48:16	5763.5032	15.447	13.7	14.236
	9/5/98 8:48:31	5763.753	15.43	13.7	14.236
	9/5/98 8:48:47	5764.0177	15.407	13.7	14.235
	9/5/98 8:49:04	5764.298	15.393	13.7	14.234
	9/5/98 8:49:21	5764.5949	15.379	13.7	14.234
	9/5/98 8:49:40	5764.9094	15.367	13.7	14.234
	9/5/98 8:50:00	5765.2425	15.356	13.701	14.234
	9/5/98 8:50:21	5765.5954	15.341	13.703	14.232
	9/5/98 8:50:44	5765.9692	15.33	13.704	14.231
	9/5/98 8:51:08	5766.3652	15.316	13.706	14.229
	9/5/98 8:51:33	5766.7845	15.304	13.706	14.231
	9/5/98 8:51:59	5767.2289	15.293	13.707	14.228
	9/5/98 8:52:28	5767.6995	15.281	13.706	14.226
	9/5/98 8:52:58	5768.198	15.27	13.706	14.225
	9/5/98 8:53:29	5768.726	15.258	13.706	14.223
	9/5/98 8:54:03	5769.2854	15.247	13.707	14.222
	9/5/98 8:54:38	5769.8779	15.235	13.706	14.22
	9/5/98 8:55:16	5770.5054	15.221	13.706	14.219
	9/5/98 8:55:56	5771.1702	15.21	13.704	14.216
	9/5/98 8:56:38	5771.8744	15.195	13.703	14.212
	9/5/98 8:57:23	5772.6202	15.184	13.7	14.21
	9/5/98 8:58:10	5773.4102	15.172	13.7	14.21
	9/5/98 8:59:01	5774.247	15.164	13.697	14.207
	9/5/98 8:59:54	5775.1335	15.152	13.699	14.206
	9/5/98 9:00:50	5776.0725	15.138	13.699	14.205
	9/5/98 9:01:50	5777.0672	15.127	13.697	14.202
	9/5/98 9:02:53	5778.1209	15.115	13.699	14.2
	9/5/98 9:04:00	5779.2369	15.104	13.699	14.199
	9/5/98 9:05:11	5780.419	15.092	13.699	14.197
	9/5/98 9:06:26	5781.6712	15.081	13.7	14.194
	9/5/98 9:07:46	5782.9977	15.069	13.699	14.19
	9/5/98 9:09:10	5784.4027	15.052	13.699	14.187

9/5/98 9:10:39	5785.891	15.041	13.699	14.186
9/5/98 9:12:14	5787.4675	15.029	13.7	14.183
9/5/98 9:13:54	5789.1374	15.015	13.699	14.181
9/5/98 9:15:40	5790.9062	15.003	13.699	14.178
9/5/98 9:17:33	5792.7799	14.989	13.699	14.176
9/5/98 9:19:32	5794.7645	14.966	13.696	14.171
9/5/98 9:21:38	5796.8669	14.955	13.697	14.168
9/5/98 9:23:51	5799.0937	14.943	13.696	14.165
9/5/98 9:26:13	5801.4525	14.937	13.697	14.161
9/5/98 9:28:43	5803.9512	14.915	13.694	14.157
9/5/98 9:31:22	5806.5979	14.9	13.696	14.154
9/5/98 9:34:10	5809.4014	14.883	13.694	14.151
9/5/98 9:37:08	5812.371	14.869	13.691	14.146
9/5/98 9:40:17	5815.5167	14.854	13.693	14.144
9/5/98 9:43:37	5818.8487	14.84	13.691	14.139
9/5/98 9:47:08	5822.3782	14.823	13.69	14.135
9/5/98 9:50:53	5826.1167	14.809	13.688	14.131
9/5/98 9:54:50	5830.0769	14.794	13.693	14.128
9/5/98 9:59:02	5834.2717	14.777	13.693	14.122
9/5/98 10:03:29	5838.715	14.763	13.688	14.117
9/5/98 10:08:11	5843.4217	14.748	13.69	14.113
9/5/98 10:13:10	5848.4072	14.734	13.687	14.107
9/5/98 10:18:27	5853.688	14.723	13.685	14.102
9/5/98 10:24:03	5859.2819	14.705	13.683	14.099
9/5/98 10:29:58	5865.2072	14.694	13.683	14.093
9/5/98 10:36:15	5871.4835	14.677	13.68	14.088
9/5/98 10:42:54	5878.1319	14.671	13.68	14.083
9/5/98 10:49:56	5885.174	14.651	13.675	14.077
9/5/98 10:57:24	5892.6335	14.642	13.672	14.068
9/5/98 11:05:18	5900.535	14.625	13.668	14.064
9/5/98 11:13:40	5908.9047	14.614	13.668	14.059
9/5/98 11:22:32	5917.7704	14.594	13.659	14.049
9/5/98 11:31:55	5927.1614	14.591	13.659	14.043
9/5/98 11:41:52	5937.1089	14.577	13.653	14.039
9/5/98 11:51:52	5947.1089	14.562	13.648	14.03
9/5/98 12:01:52	5957.1089	14.554	13.643	14.025
9/5/98 12:11:52	5967.1089	14.537	13.636	14.019
9/5/98 12:21:52	5977.1089	14.531	13.63	14.014
9/5/98 12:31:52	5987.1089	14.516	13.627	14.007
9/5/98 12:41:52	5997.1089	14.511	13.626	14.003
9/5/98 12:51:52	6007.1089	14.496	13.618	13.996
9/5/98 13:01:52	6017.1089	14.499	13.62	13.996
9/5/98 13:11:52	6027.1089	14.485	13.614	13.988
9/5/98 13:21:52	6037.1089	14.485	13.616	13.988
9/5/98 13:31:52	6047.1089	14.473	13.605	13.981
9/5/98 13:41:52	6057.1089	14.473	13.611	13.981
9/5/98 13:51:52	6067.1089	14.456	13.601	13.974
9/5/98 14:01:52	6077.1089	14.453	13.601	13.972
9/5/98 14:11:52	6087.1089	14.451	13.597	13.965
9/5/98 14:21:52	6097.1089	14.445	13.592	13.965
9/5/98 14:31:52	6107.1089	14.436	13.588	13.956

	9/5/98 14:41:52	6117.1089	14.439	13.591	13.958
	9/5/98 14:51:52	6127.1089	14.425	13.584	13.951
	9/5/98 15:01:52	6137.1089	14.416	13.576	13.943
	9/5/98 15:11:52	6147.1089	14.422	13.582	13.948
	9/5/98 15:21:52	6157.1089	14.419	13.581	13.943
	9/5/98 15:31:52	6167.1089	14.419	13.579	13.943
	9/5/98 15:41:52	6177.1089	14.41	13.578	13.94
	9/5/98 15:51:52	6187.1089	14.393	13.568	13.933
	9/5/98 16:01:52	6197.1089	14.402	13.572	13.935
	9/5/98 16:11:52	6207.1089	14.399	13.569	13.932
	9/5/98 16:21:52	6217.1089	14.388	13.56	13.927
	9/5/98 16:31:52	6227.1089	14.39	13.563	13.927
	9/5/98 16:41:52	6237.1089	14.382	13.562	13.925
	9/5/98 16:51:52	6247.1089	14.37	13.553	13.917
	9/5/98 17:01:52	6257.1089	14.362	13.552	13.917
	9/5/98 17:11:52	6267.1089	14.373	13.556	13.919
	9/5/98 17:21:52	6277.1089	14.37	13.554	13.917
	9/5/98 17:31:52	6287.1089	14.368	13.556	13.914
	9/5/98 17:41:52	6297.1089	14.356	13.55	13.91
	9/5/98 17:51:52	6307.1089	14.362	13.554	13.913
	9/5/98 18:01:52	6317.1089	14.362	13.554	13.909
	9/5/98 18:11:52	6327.1089	14.356	13.552	13.906
	9/5/98 18:21:52	6337.1089	14.35	13.552	13.906
	9/5/98 18:31:52	6347.1089	14.35	13.552	13.904
	9/5/98 18:41:52	6357.1089	14.347	13.552	13.903
	9/5/98 18:51:52	6367.1089	14.339	13.55	13.9
	9/5/98 19:01:52	6377.1089	14.342	13.552	13.9
	9/5/98 19:11:52	6387.1089	14.339	13.552	13.898
	9/5/98 19:21:52	6397.1089	14.336	13.553	13.898
	9/5/98 19:31:52	6407.1089	14.336	13.556	13.898
	9/5/98 19:41:52	6417.1089	14.33	13.557	13.896
	9/5/98 19:51:52	6427.1089	14.333	13.557	13.896
	9/5/98 20:01:52	6437.1089	14.33	13.56	13.894
	9/5/98 20:11:52	6447.1089	14.333	13.563	13.896
	9/5/98 20:21:52	6457.1089	14.333	13.568	13.894
	9/5/98 20:31:52	6467.1089	14.33	13.572	13.896
	9/5/98 20:41:52	6477.1089	14.327	13.573	13.894
	9/5/98 20:51:52	6487.1089	14.333	13.578	13.894
	9/5/98 21:01:52	6497.1089	14.33	13.579	13.891
	9/5/98 21:11:52	6507.1089	14.327	13.581	13.893
	9/5/98 21:21:52	6517.1089	14.327	13.582	13.893
	9/5/98 21:31:52	6527.1089	14.327	13.582	13.891
	9/5/98 21:41:52	6537.1089	14.325	13.584	13.891
	9/5/98 21:51:52	6547.1089	14.325	13.585	13.891
	9/5/98 22:01:52	6557.1089	14.322	13.584	13.888
	9/5/98 22:11:52	6567.1089	14.319	13.585	13.888
	9/5/98 22:21:52	6577.1089	14.322	13.588	13.887
	9/5/98 22:31:52	6587.1089	14.319	13.586	13.888
	9/5/98 22:41:52	6597.1089	14.322	13.586	13.888
	9/5/98 22:51:52	6607.1089	14.322	13.586	13.887
	9/5/98 23:01:52	6617.1089	14.319	13.584	13.885

	9/5/98 23:11:52	6627.1089	14.319	13.585	13.885
	9/5/98 23:21:52	6637.1089	14.316	13.585	13.884
	9/5/98 23:31:52	6647.1089	14.313	13.585	13.885
	9/5/98 23:41:52	6657.1089	14.313	13.585	13.884
	9/5/98 23:51:52	6667.1089	14.31	13.585	13.884
	9/6/98 0:01:52	6677.1089	14.31	13.585	13.884
	9/6/98 0:11:52	6687.1089	14.31	13.585	13.882
	9/6/98 0:21:52	6697.1089	14.31	13.584	13.882
	9/6/98 0:31:52	6707.1089	14.31	13.584	13.881
	9/6/98 0:41:52	6717.1089	14.307	13.582	13.881
	9/6/98 0:51:52	6727.1089	14.31	13.584	13.881
	9/6/98 1:01:52	6737.1089	14.304	13.581	13.88
	9/6/98 1:11:52	6747.1089	14.307	13.581	13.878
	9/6/98 1:21:52	6757.1089	14.307	13.579	13.878
	9/6/98 1:31:52	6767.1089	14.307	13.578	13.88
	9/6/98 1:41:52	6777.1089	14.304	13.576	13.878
	9/6/98 1:51:52	6787.1089	14.304	13.576	13.878
	9/6/98 2:01:52	6797.1089	14.304	13.576	13.877
	9/6/98 2:11:52	6807.1089	14.302	13.573	13.875
	9/6/98 2:21:52	6817.1089	14.302	13.575	13.875
	9/6/98 2:31:52	6827.1089	14.302	13.572	13.874
	9/6/98 2:41:52	6837.1089	14.299	13.572	13.875
	9/6/98 2:51:52	6847.1089	14.299	13.569	13.875
	9/6/98 3:01:52	6857.1089	14.302	13.57	13.875
	9/6/98 3:11:52	6867.1089	14.302	13.57	13.875
	9/6/98 3:21:52	6877.1089	14.299	13.569	13.874
	9/6/98 3:31:52	6887.1089	14.302	13.568	13.874
	9/6/98 3:41:52	6897.1089	14.299	13.568	13.874
	9/6/98 3:51:52	6907.1089	14.302	13.568	13.872
	9/6/98 4:01:52	6917.1089	14.299	13.568	13.872
	9/6/98 4:11:52	6927.1089	14.299	13.568	13.872
	9/6/98 4:21:52	6937.1089	14.299	13.566	13.871
	9/6/98 4:31:52	6947.1089	14.296	13.566	13.872
	9/6/98 4:41:52	6957.1089	14.296	13.565	13.872
	9/6/98 4:51:52	6967.1089	14.296	13.565	13.872
	9/6/98 5:01:52	6977.1089	14.296	13.565	13.871
	9/6/98 5:11:52	6987.1089	14.296	13.563	13.871
	9/6/98 5:21:52	6997.1089	14.293	13.565	13.871
	9/6/98 5:31:52	7007.1089	14.296	13.565	13.871
	9/6/98 5:41:52	7017.1089	14.293	13.563	13.871
	9/6/98 5:51:52	7027.1089	14.293	13.565	13.869
	9/6/98 6:01:52	7037.1089	14.293	13.563	13.869
	9/6/98 6:11:52	7047.1089	14.29	13.563	13.868
	9/6/98 6:21:52	7057.1089	14.293	13.563	13.869
	9/6/98 6:31:52	7067.1089	14.29	13.563	13.869
	9/6/98 6:41:52	7077.1089	14.293	13.565	13.869
	9/6/98 6:51:52	7087.1089	14.296	13.568	13.869
	9/6/98 7:01:52	7097.1089	14.296	13.568	13.871
	9/6/98 7:11:52	7107.1089	14.296	13.569	13.871
	9/6/98 7:21:52	7117.1089	14.296	13.57	13.869
	9/6/98 7:31:52	7127.1089	14.296	13.568	13.869

	9/6/98 7:41:52	7137.1089	14.296	13.569	13.869
	9/6/98 7:51:52	7147.1089	14.299	13.568	13.869
	9/6/98 8:01:52	7157.1089	14.299	13.57	13.869
	9/6/98 8:11:52	7167.1089	14.299	13.569	13.869
	9/6/98 8:21:52	7177.1089	14.302	13.57	13.869
	9/6/98 8:31:52	7187.1089	14.299	13.569	13.869
	9/6/98 8:41:52	7197.1089	14.299	13.569	13.868
	9/6/98 8:51:52	7207.1089	14.299	13.568	13.868
	9/6/98 9:01:52	7217.1089	14.302	13.568	13.868
	9/6/98 9:11:52	7227.1089	14.299	13.566	13.868
	9/6/98 9:21:52	7237.1089	14.296	13.568	13.866
	9/6/98 9:31:52	7247.1089	14.299	13.566	13.866
	9/6/98 9:41:52	7257.1089	14.296	13.565	13.866
	9/6/98 9:51:52	7267.1089	14.296	13.563	13.866
	9/6/98 10:01:52	7277.1089	14.293	13.562	13.865
	9/6/98 10:11:52	7287.1089	14.293	13.56	13.866
	9/6/98 10:21:52	7297.1089	14.29	13.554	13.864
	9/6/98 10:31:52	7307.1089	14.293	13.556	13.864
	9/6/98 10:41:52	7317.1089	14.287	13.553	13.864
	9/6/98 10:51:52	7327.1089	14.284	13.55	13.864
	9/6/98 11:01:52	7337.1089	14.284	13.55	13.862
	9/6/98 11:11:52	7347.1089	14.284	13.549	13.861
	9/6/98 11:21:52	7357.1089	14.287	13.549	13.864
	9/6/98 11:31:52	7367.1089	14.282	13.544	13.859
	9/6/98 11:41:52	7377.1089	14.284	13.54	13.859
	9/6/98 11:51:52	7387.1089	14.279	13.537	13.858
	9/6/98 12:01:52	7397.1089	14.282	13.536	13.861
	9/6/98 12:11:52	7407.1089	14.279	13.533	13.858
	9/6/98 12:21:52	7417.1089	14.279	13.531	13.856
	9/6/98 12:31:52	7427.1089	14.276	13.525	13.855
	9/6/98 12:41:52	7437.1089	14.279	13.527	13.858
	9/6/98 12:51:52	7447.1089	14.279	13.525	13.858
	9/6/98 13:01:52	7457.1089	14.27	13.518	13.852
	9/6/98 13:11:52	7467.1089	14.273	13.522	13.852
	9/6/98 13:21:52	7477.1089	14.273	13.518	13.852
	9/6/98 13:31:52	7487.1089	14.27	13.512	13.851
	9/6/98 13:41:52	7497.1089	14.273	13.515	13.852
	9/6/98 13:51:52	7507.1089	14.273	13.517	13.853
	9/6/98 14:01:52	7517.1089	14.27	13.511	13.851
	9/6/98 14:11:52	7527.1089	14.264	13.509	13.853
	9/6/98 14:21:52	7537.1089	14.264	13.506	13.848
	9/6/98 14:31:52	7547.1089	14.264	13.505	13.848
	9/6/98 14:41:52	7557.1089	14.267	13.505	13.848
	9/6/98 14:51:52	7567.1089	14.262	13.499	13.846
	9/6/98 15:01:52	7577.1089	14.267	13.505	13.851
	9/6/98 15:11:52	7587.1089	14.264	13.501	13.848
	9/6/98 15:21:52	7597.1089	14.264	13.499	13.846
	9/6/98 15:31:52	7607.1089	14.264	13.496	13.846
	9/6/98 15:41:52	7617.1089	14.259	13.492	13.845
	9/6/98 15:51:52	7627.1089	14.264	13.496	13.846
	9/6/98 16:01:52	7637.1089	14.264	13.493	13.848

	9/6/98 16:11:52	7647.1089	14.259	13.49	13.846
	9/6/98 16:21:52	7657.1089	14.259	13.492	13.845
	9/6/98 16:31:52	7667.1089	14.262	13.492	13.845
	9/6/98 16:41:52	7677.1089	14.259	13.492	13.843
	9/6/98 16:51:52	7687.1089	14.259	13.49	13.845
	9/6/98 17:01:52	7697.1089	14.253	13.492	13.842
	9/6/98 17:11:52	7707.1089	14.256	13.492	13.845
	9/6/98 17:21:52	7717.1089	14.253	13.489	13.842
	9/6/98 17:31:52	7727.1089	14.253	13.49	13.843
	9/6/98 17:41:52	7737.1089	14.256	13.487	13.843
	9/6/98 17:51:52	7747.1089	14.256	13.49	13.842
	9/6/98 18:01:52	7757.1089	14.259	13.49	13.842
	9/6/98 18:11:52	7767.1089	14.25	13.486	13.84
	9/6/98 18:21:52	7777.1089	14.25	13.486	13.84
	9/6/98 18:31:52	7787.1089	14.25	13.487	13.842
	9/6/98 18:41:52	7797.1089	14.253	13.489	13.842
	9/6/98 18:51:52	7807.1089	14.25	13.487	13.84
	9/6/98 19:01:52	7817.1089	14.25	13.489	13.842
	9/6/98 19:11:52	7827.1089	14.247	13.487	13.84
	9/6/98 19:21:52	7837.1089	14.247	13.492	13.84
	9/6/98 19:31:52	7847.1089	14.25	13.493	13.842
	9/6/98 19:41:52	7857.1089	14.25	13.496	13.842
	9/6/98 19:51:52	7867.1089	14.25	13.499	13.843
	9/6/98 20:01:52	7877.1089	14.25	13.502	13.843
	9/6/98 20:11:52	7887.1089	14.253	13.506	13.845
	9/6/98 20:21:52	7897.1089	14.256	13.509	13.845
	9/6/98 20:31:52	7907.1089	14.253	13.512	13.845
	9/6/98 20:41:52	7917.1089	14.253	13.515	13.846
	9/6/98 20:51:52	7927.1089	14.256	13.514	13.845
	9/6/98 21:01:52	7937.1089	14.253	13.517	13.845
	9/6/98 21:11:52	7947.1089	14.253	13.518	13.846
	9/6/98 21:21:52	7957.1089	14.256	13.518	13.846
	9/6/98 21:31:52	7967.1089	14.256	13.521	13.846
	9/6/98 21:41:52	7977.1089	14.256	13.521	13.845
	9/6/98 21:51:52	7987.1089	14.256	13.521	13.846
	9/6/98 22:01:52	7997.1089	14.256	13.522	13.846
	9/6/98 22:11:52	8007.1089	14.256	13.524	13.845
	9/6/98 22:21:52	8017.1089	14.256	13.524	13.846
	9/6/98 22:31:52	8027.1089	14.253	13.525	13.846
	9/6/98 22:41:52	8037.1089	14.259	13.528	13.848
	9/6/98 22:51:52	8047.1089	14.259	13.531	13.848
	9/6/98 23:01:52	8057.1089	14.259	13.533	13.849
	9/6/98 23:11:52	8067.1089	14.259	13.534	13.849
	9/6/98 23:21:52	8077.1089	14.259	13.534	13.849
	9/6/98 23:31:52	8087.1089	14.259	13.537	13.849
	9/6/98 23:41:52	8097.1089	14.256	13.537	13.851
	9/6/98 23:51:52	8107.1089	14.259	13.54	13.851
	9/7/98 0:01:52	8117.1089	14.256	13.537	13.849
	9/7/98 0:11:52	8127.1089	14.253	13.537	13.849
	9/7/98 0:21:52	8137.1089	14.256	13.54	13.849
	9/7/98 0:31:52	8147.1089	14.259	13.538	13.851

	9/7/98 0:41:52	8157.1089	14.256	13.54	13.851
	9/7/98 0:51:52	8167.1089	14.256	13.538	13.849
	9/7/98 1:01:52	8177.1089	14.256	13.54	13.849
	9/7/98 1:11:52	8187.1089	14.256	13.54	13.851
	9/7/98 1:21:52	8197.1089	14.259	13.541	13.851
	9/7/98 1:31:52	8207.1089	14.259	13.543	13.852
	9/7/98 1:41:52	8217.1089	14.262	13.543	13.851
	9/7/98 1:51:52	8227.1089	14.259	13.541	13.849
	9/7/98 2:01:52	8237.1089	14.259	13.541	13.851
	9/7/98 2:11:52	8247.1089	14.259	13.543	13.852
	9/7/98 2:21:52	8257.1089	14.259	13.544	13.852
	9/7/98 2:31:52	8267.1089	14.259	13.544	13.852
	9/7/98 2:41:52	8277.1089	14.259	13.543	13.852
	9/7/98 2:51:52	8287.1089	14.259	13.544	13.852
	9/7/98 3:01:52	8297.1089	14.259	13.543	13.852
	9/7/98 3:11:52	8307.1089	14.256	13.544	13.852
	9/7/98 3:21:52	8317.1089	14.259	13.544	13.852
	9/7/98 3:31:52	8327.1089	14.256	13.543	13.852
	9/7/98 3:41:52	8337.1089	14.259	13.541	13.851
	9/7/98 3:51:52	8347.1089	14.262	13.543	13.852
	9/7/98 4:01:52	8357.1089	14.259	13.541	13.852
	9/7/98 4:11:52	8367.1089	14.259	13.541	13.852
	9/7/98 4:21:52	8377.1089	14.262	13.541	13.852
	9/7/98 4:31:52	8387.1089	14.259	13.54	13.852
	9/7/98 4:41:52	8397.1089	14.262	13.543	13.853
	9/7/98 4:51:52	8407.1089	14.259	13.541	13.853
	9/7/98 5:01:52	8417.1089	14.262	13.54	13.852
	9/7/98 5:11:52	8427.1089	14.262	13.541	13.853
	9/7/98 5:21:52	8437.1089	14.262	13.54	13.852
	9/7/98 5:31:52	8447.1089	14.262	13.54	13.853
	9/7/98 5:41:52	8457.1089	14.264	13.541	13.855
	9/7/98 5:51:52	8467.1089	14.262	13.541	13.853
	9/7/98 6:01:52	8477.1089	14.262	13.54	13.853
	9/7/98 6:11:52	8487.1089	14.259	13.538	13.853
	9/7/98 6:21:52	8497.1089	14.259	13.54	13.853
	9/7/98 6:31:52	8507.1089	14.259	13.54	13.853
	9/7/98 6:41:52	8517.1089	14.262	13.54	13.855
	9/7/98 6:51:52	8527.1089	14.259	13.54	13.855
	9/7/98 7:01:52	8537.1089	14.262	13.538	13.855
	9/7/98 7:11:52	8547.1089	14.262	13.538	13.855
	9/7/98 7:21:52	8557.1089	14.264	13.541	13.855
	9/7/98 7:31:52	8567.1089	14.267	13.543	13.856
	9/7/98 7:41:52	8577.1089	14.267	13.544	13.855
	9/7/98 7:51:52	8587.1089	14.27	13.544	13.856
	9/7/98 8:01:52	8597.1089	14.27	13.546	13.856
	9/7/98 8:11:52	8607.1089	14.27	13.546	13.855
	9/7/98 8:21:52	8617.1089	14.27	13.544	13.856
	9/7/98 8:31:52	8627.1089	14.27	13.546	13.856
	9/7/98 8:41:52	8637.1089	14.27	13.546	13.856
	9/7/98 8:51:52	8647.1089	14.273	13.546	13.858
	9/7/98 9:01:52	8657.1089	14.27	13.543	13.855

	9/7/98 9:11:52	8667.1089	14.27	13.541	13.853
	9/7/98 9:21:52	8677.1089	14.27	13.541	13.855
	9/7/98 9:31:52	8687.1089	14.27	13.54	13.853
	9/7/98 9:41:52	8697.1089	14.27	13.538	13.853
	9/7/98 9:51:52	8707.1089	14.27	13.538	13.853
	9/7/98 10:01:52	8717.1089	14.27	13.537	13.855
	9/7/98 10:11:52	8727.1089	14.267	13.533	13.852
	9/7/98 10:21:52	8737.1089	14.267	13.531	13.851
	9/7/98 10:31:52	8747.1089	14.262	13.528	13.849
	9/7/98 10:41:52	8757.1089	14.264	13.527	13.848
	9/7/98 10:51:52	8767.1089	14.262	13.522	13.849
	9/7/98 11:01:52	8777.1089	14.264	13.524	13.848
	9/7/98 11:11:52	8787.1089	14.264	13.521	13.851
	9/7/98 11:21:52	8797.1089	14.264	13.521	13.849
	9/7/98 11:31:52	8807.1089	14.264	13.517	13.848
	9/7/98 11:41:52	8817.1089	14.259	13.511	13.845
	9/7/98 11:51:52	8827.1089	14.256	13.509	13.845
	9/7/98 12:01:52	8837.1089	14.259	13.508	13.843
	9/7/98 12:11:52	8847.1089	14.262	13.508	13.845
	9/7/98 12:21:52	8857.1089	14.256	13.503	13.84
	9/7/98 12:31:52	8867.1089	14.256	13.499	13.843
	9/7/98 12:41:52	8877.1089	14.253	13.496	13.843
	9/7/98 12:51:52	8887.1089	14.259	13.502	13.843
	9/7/98 13:01:52	8897.1089	14.253	13.493	13.839
	9/7/98 13:11:52	8907.1089	14.253	13.495	13.842
	9/7/98 13:21:52	8917.1089	14.256	13.495	13.843
	9/7/98 13:31:52	8927.1089	14.253	13.493	13.842
	9/7/98 13:41:52	8937.1089	14.25	13.493	13.842
	9/7/98 13:51:52	8947.1089	14.253	13.49	13.84
	9/7/98 14:01:52	8957.1089	14.25	13.486	13.839
	9/7/98 14:11:52	8967.1089	14.233	13.473	13.832
	9/7/98 14:21:52	8977.1089	14.256	13.495	13.851
	9/7/98 14:31:52	8987.1089	14.256	13.492	13.845
	9/7/98 14:41:52	8997.1089	14.253	13.486	13.837
	9/7/98 14:51:52	9007.1089	14.233	13.474	13.837
	9/7/98 15:01:52	9017.1089	14.244	13.474	13.832
	9/7/98 15:11:52	9027.1089	14.239	13.479	13.84
	9/7/98 15:21:52	9037.1089	14.239	13.47	13.826
	9/7/98 15:31:52	9047.1089	14.25	13.48	13.842
	9/7/98 15:41:52	9057.1089	14.241	13.476	13.836
	9/7/98 15:51:52	9067.1089	14.239	13.47	13.835
	9/7/98 16:01:52	9077.1089	14.241	13.47	13.835
	9/7/98 16:11:52	9087.1089	14.244	13.47	13.836
	9/7/98 16:21:52	9097.1089	14.239	13.466	13.832
	9/7/98 16:31:52	9107.1089	14.241	13.469	13.835
	9/7/98 16:41:52	9117.1089	14.236	13.467	13.835
	9/7/98 16:51:52	9127.1089	14.236	13.467	13.835
	9/7/98 17:01:52	9137.1089	14.239	13.466	13.832
	9/7/98 17:11:52	9147.1089	14.239	13.467	13.835
	9/7/98 17:21:52	9157.1089	14.233	13.466	13.833
	9/7/98 17:31:52	9167.1089	14.23	13.464	13.833

	9/7/98 17:41:52	9177.1089	14.233	13.467	13.836
	9/7/98 17:51:52	9187.1089	14.241	13.471	13.837
	9/7/98 18:01:52	9197.1089	14.239	13.471	13.835
	9/7/98 18:11:52	9207.1089	14.236	13.47	13.835
	9/7/98 18:21:52	9217.1089	14.239	13.473	13.835
	9/7/98 18:31:52	9227.1089	14.236	13.471	13.835
	9/7/98 18:41:52	9237.1089	14.236	13.47	13.835
	9/7/98 18:51:52	9247.1089	14.233	13.473	13.835
	9/7/98 19:01:52	9257.1089	14.236	13.473	13.836
	9/7/98 19:11:52	9267.1089	14.233	13.476	13.835
	9/7/98 19:21:52	9277.1089	14.233	13.477	13.836
	9/7/98 19:31:52	9287.1089	14.233	13.479	13.836
	9/7/98 19:41:52	9297.1089	14.233	13.48	13.836
	9/7/98 19:51:52	9307.1089	14.236	13.485	13.839
	9/7/98 20:01:52	9317.1089	14.236	13.487	13.837
	9/7/98 20:11:52	9327.1089	14.239	13.49	13.84
	9/7/98 20:21:52	9337.1089	14.236	13.493	13.839
	9/7/98 20:31:52	9347.1089	14.239	13.493	13.84
	9/7/98 20:41:52	9357.1089	14.241	13.496	13.84
	9/7/98 20:51:52	9367.1089	14.241	13.499	13.84
	9/7/98 21:01:52	9377.1089	14.241	13.499	13.842
	9/7/98 21:11:52	9387.1089	14.241	13.502	13.842
	9/7/98 21:21:52	9397.1089	14.244	13.505	13.842
	9/7/98 21:31:52	9407.1089	14.244	13.511	13.845
	9/7/98 21:41:52	9417.1089	14.244	13.514	13.845
	9/7/98 21:51:52	9427.1089	14.247	13.517	13.846
	9/7/98 22:01:52	9437.1089	14.247	13.52	13.846
	9/7/98 22:11:52	9447.1089	14.25	13.522	13.846
	9/7/98 22:21:52	9457.1089	14.247	13.522	13.846
	9/7/98 22:31:52	9467.1089	14.247	13.522	13.846
	9/7/98 22:41:52	9477.1089	14.247	13.522	13.848
	9/7/98 22:51:52	9487.1089	14.244	13.524	13.846
	9/7/98 23:01:52	9497.1089	14.247	13.524	13.848
	9/7/98 23:11:52	9507.1089	14.247	13.524	13.848
	9/7/98 23:21:52	9517.1089	14.25	13.527	13.848
	9/7/98 23:31:52	9527.1089	14.25	13.53	13.848
	9/7/98 23:41:52	9537.1089	14.25	13.53	13.849
	9/7/98 23:51:52	9547.1089	14.25	13.528	13.849
	9/8/98 0:01:52	9557.1089	14.25	13.528	13.849
	9/8/98 0:11:52	9567.1089	14.25	13.531	13.849
	9/8/98 0:21:52	9577.1089	14.25	13.531	13.849
	9/8/98 0:31:52	9587.1089	14.247	13.533	13.849
	9/8/98 0:41:52	9597.1089	14.25	13.534	13.849
	9/8/98 0:51:52	9607.1089	14.25	13.533	13.851
	9/8/98 1:01:52	9617.1089	14.25	13.534	13.849
	9/8/98 1:11:52	9627.1089	14.25	13.536	13.851
	9/8/98 1:21:52	9637.1089	14.253	13.536	13.851
	9/8/98 1:31:52	9647.1089	14.253	13.536	13.851
	9/8/98 1:41:52	9657.1089	14.253	13.534	13.849
	9/8/98 1:51:52	9667.1089	14.25	13.534	13.849
	9/8/98 2:01:52	9677.1089	14.253	13.533	13.851

	9/8/98 2:11:52	9687.1089	14.253	13.533	13.849
	9/8/98 2:21:52	9697.1089	14.253	13.533	13.851
	9/8/98 2:31:52	9707.1089	14.253	13.534	13.851
	9/8/98 2:41:52	9717.1089	14.253	13.534	13.851
	9/8/98 2:51:52	9727.1089	14.253	13.534	13.851
	9/8/98 3:01:52	9737.1089	14.25	13.533	13.851
	9/8/98 3:11:52	9747.1089	14.253	13.534	13.852
	9/8/98 3:21:52	9757.1089	14.253	13.534	13.852
	9/8/98 3:31:52	9767.1089	14.253	13.534	13.851
	9/8/98 3:41:52	9777.1089	14.256	13.534	13.852
	9/8/98 3:51:52	9787.1089	14.253	13.534	13.852
	9/8/98 4:01:52	9797.1089	14.253	13.536	13.852
	9/8/98 4:11:52	9807.1089	14.253	13.534	13.852
	9/8/98 4:21:52	9817.1089	14.253	13.536	13.852
	9/8/98 4:31:52	9827.1089	14.253	13.536	13.852
	9/8/98 4:41:52	9837.1089	14.253	13.536	13.852
	9/8/98 4:51:52	9847.1089	14.253	13.537	13.852
	9/8/98 5:01:52	9857.1089	14.253	13.536	13.852
	9/8/98 5:11:52	9867.1089	14.256	13.536	13.852
	9/8/98 5:21:52	9877.1089	14.253	13.534	13.852
	9/8/98 5:31:52	9887.1089	14.253	13.534	13.852
	9/8/98 5:41:52	9897.1089	14.253	13.533	13.852
	9/8/98 5:51:52	9907.1089	14.259	13.536	13.852
	9/8/98 6:01:52	9917.1089	14.253	13.534	13.853
	9/8/98 6:11:52	9927.1089	14.256	13.534	13.853
	9/8/98 6:21:52	9937.1089	14.256	13.534	13.853
	9/8/98 6:31:52	9947.1089	14.259	13.534	13.853
	9/8/98 6:41:52	9957.1089	14.259	13.536	13.855
	9/8/98 6:51:52	9967.1089	14.259	13.537	13.855
	9/8/98 7:01:52	9977.1089	14.259	13.537	13.855
	9/8/98 7:11:52	9987.1089	14.259	13.534	13.853
	9/8/98 7:21:52	9997.1089	14.259	13.537	13.855
	9/8/98 7:31:52	10007.1089	14.262	13.537	13.855
	9/8/98 7:41:52	10017.1089	14.264	13.537	13.855
	9/8/98 7:51:52	10027.1089	14.264	13.54	13.855
	9/8/98 8:01:52	10037.1089	14.267	13.54	13.856
	9/8/98 8:11:52	10047.1089	14.262	13.538	13.855
	9/8/98 8:21:52	10057.1089	14.27	13.544	13.858
	9/8/98 8:31:52	10067.1089	14.264	13.541	13.856
	9/8/98 8:41:52	10077.1089	14.264	13.54	13.856
	9/8/98 8:51:52	10087.1089	14.267	13.543	13.856
	9/8/98 9:01:52	10097.1089	14.267	13.538	13.856
	9/8/98 9:11:52	10107.1089	14.267	13.54	13.855
	9/8/98 9:21:52	10117.1089	14.267	13.537	13.855
	9/8/98 9:31:52	10127.1089	14.273	13.541	13.858
	9/8/98 9:41:52	10137.1089	14.27	13.54	13.856
	9/8/98 9:51:52	10147.1089	14.264	13.537	13.858
	9/8/98 10:01:52	10157.1089	14.262	13.537	13.853
	9/8/98 10:11:52	10167.1089	14.264	13.534	13.855
	9/8/98 10:21:52	10177.1089	14.27	13.538	13.856
	9/8/98 10:31:52	10187.1089	14.259	13.527	13.852

WELL 201 STEP TEST 2 WATER LEVEL DATA

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 201 STEP TEST 2 WL DATA					
FILE NAME : 201STEP2.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 201	WELL 208	WELL 196
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
TEST STARTED AT 5 GPM					
	9/8/98 10:50:00	0	13.89	13.53	13.86
	9/8/98 10:50:01	0.0218	13.896	13.531	13.862
	9/8/98 10:50:02	0.0437	13.896	13.531	13.862
	9/8/98 10:50:03	0.0655	13.899	13.531	13.862
	9/8/98 10:50:05	0.0873	13.896	13.533	13.862
	9/8/98 10:50:06	0.1092	14.268	13.533	13.862
	9/8/98 10:50:07	0.131	13.795	13.533	13.862
	9/8/98 10:50:09	0.1528	14.059	13.533	13.862
	9/8/98 10:50:10	0.1747	13.844	13.534	13.863
	9/8/98 10:50:11	0.1965	14.007	13.531	13.862
	9/8/98 10:50:13	0.2183	13.861	13.533	13.862
	9/8/98 10:50:14	0.2402	13.973	13.533	13.862
	9/8/98 10:50:15	0.262	13.916	13.533	13.863
	9/8/98 10:50:17	0.2838	13.87	13.533	13.862
	9/8/98 10:50:18	0.3057	13.956	13.531	13.862
	9/8/98 10:50:19	0.3275	13.899	13.536	13.862
	9/8/98 10:50:20	0.3493	13.944	13.534	13.862
	9/8/98 10:50:22	0.3712	13.904	13.534	13.86
	9/8/98 10:50:23	0.393	13.936	13.531	13.862
	9/8/98 10:50:24	0.4148	13.91	13.531	13.862
	9/8/98 10:50:26	0.4367	13.91	13.533	13.862
	9/8/98 10:50:27	0.4588	13.933	13.53	13.862
	9/8/98 10:50:28	0.4823	13.913	13.533	13.862
	9/8/98 10:50:30	0.5072	13.924	13.531	13.86
	9/8/98 10:50:32	0.5335	13.916	13.533	13.862
	9/8/98 10:50:33	0.5615	14.053	13.534	13.86
	9/8/98 10:50:35	0.5912	13.927	13.531	13.86
	9/8/98 10:50:37	0.6225	13.881	13.53	13.862
	9/8/98 10:50:39	0.6557	13.942	13.531	13.862
	9/8/98 10:50:41	0.6908	13.927	13.531	13.86
	9/8/98 10:50:43	0.7282	13.904	13.533	13.86
	9/8/98 10:50:46	0.7677	13.93	13.534	13.862
	9/8/98 10:50:48	0.8095	13.893	13.531	13.862
	9/8/98 10:50:51	0.8538	13.858	13.533	13.86
	9/8/98 10:50:54	0.9008	13.881	13.533	13.86
	9/8/98 10:50:57	0.9507	13.904	13.53	13.86
	9/8/98 10:51:00	1.0033	13.916	13.531	13.86
	9/8/98 10:51:03	1.0592	13.93	13.533	13.862
	9/8/98 10:51:07	1.1183	13.916	13.533	13.862
	9/8/98 10:51:10	1.181	13.907	13.531	13.862
	9/8/98 10:51:14	1.2473	13.924	13.531	13.863
	9/8/98 10:51:19	1.3177	13.858	13.533	13.863
	9/8/98 10:51:23	1.3922	14.085	13.531	13.862
	9/8/98 10:51:28	1.4712	12.89	13.53	13.862

	9/8/98 10:51:33	1.5548	13.858	13.529	13.862
	9/8/98 10:51:38	1.6433	13.844	13.531	13.862
	9/8/98 10:51:44	1.7372	13.89	13.533	13.862
	9/8/98 10:51:50	1.8365	13.89	13.53	13.86
	9/8/98 10:51:56	1.9418	14.597	13.531	13.86
	9/8/98 10:52:03	2.0533	13.922	13.534	13.86
	9/8/98 10:52:10	2.1715	13.884	13.531	13.86
	9/8/98 10:52:17	2.2967	13.873	13.53	13.86
	9/8/98 10:52:25	2.4292	13.861	13.531	13.86
	9/8/98 10:52:34	2.5697	14.95	13.533	13.86
	9/8/98 10:52:43	2.7185	13.879	13.53	13.862
	9/8/98 10:52:52	2.876	13.95	13.531	13.862
	9/8/98 10:53:02	3.0428	13.881	13.533	13.862
	9/8/98 10:53:13	3.2197	13.876	13.533	13.862
	9/8/98 10:53:24	3.407	13.876	13.533	13.862
	9/8/98 10:53:36	3.6053	13.876	13.53	13.863
	9/8/98 10:53:48	3.8155	13.873	13.533	13.862
	9/8/98 10:54:02	4.0382	13.864	13.531	13.86
	9/8/98 10:54:16	4.274	13.87	13.533	13.863
	9/8/98 10:54:31	4.5238	13.87	13.531	13.863
	9/8/98 10:54:47	4.7885	13.87	13.53	13.86
	9/8/98 10:55:04	5.0688	13.87	13.531	13.862
	9/8/98 10:55:21	5.3657	13.959	13.531	13.86
	9/8/98 10:55:40	5.6802	13.933	13.533	13.863
	9/8/98 10:56:00	6.0133	13.91	13.533	13.863
	9/8/98 10:56:21	6.3662	14.076	13.531	13.862
	9/8/98 10:56:44	6.74	13.916	13.531	13.862
	9/8/98 10:57:08	7.136	14.967	13.533	13.863
	9/8/98 10:57:33	7.5553	13.89	13.531	13.862
	9/8/98 10:57:59	7.9997	13.873	13.531	13.86
	9/8/98 10:58:28	8.4703	13.873	13.531	13.86
	9/8/98 10:58:58	8.9688	13.873	13.533	13.863
	9/8/98 10:59:29	9.4968	15.371	13.533	13.862
	9/8/98 11:00:03	10.0562	13.899	13.533	13.862
	9/8/98 11:00:38	10.6487	13.896	13.53	13.863
	9/8/98 11:01:16	11.2762	13.896	13.531	13.863
	9/8/98 11:01:56	11.941	13.893	13.531	13.863
	9/8/98 11:02:38	12.6452	13.879	13.533	13.86
	9/8/98 11:03:23	13.391	13.913	13.53	13.86
	9/8/98 11:04:10	14.181	13.876	13.531	13.86
	9/8/98 11:05:01	15.0178	14.079	13.53	13.862
	9/8/98 11:05:54	15.9043	14.154	13.533	13.863
	9/8/98 11:06:50	16.8433	14.199	13.531	13.862
	9/8/98 11:07:50	17.838	14.179	13.531	13.862
	9/8/98 11:08:53	18.8917	14.328	13.529	13.863
	9/8/98 11:10:00	20.0077	14.251	13.526	13.862
	9/8/98 11:11:11	21.1898	14.259	13.527	13.865
	9/8/98 11:12:26	22.442	14.282	13.53	13.866
	9/8/98 11:13:46	23.7685	14.305	13.53	13.866
	9/8/98 11:15:10	25.1735	14.271	13.531	13.868
	9/8/98 11:16:39	26.6618	14.314	13.529	13.868

	9/8/98 11:18:14	28.2383	14.365	13.529	13.868
	9/8/98 11:19:54	29.9082	14.345	13.529	13.87
	9/8/98 11:21:40	31.677	14.414	13.527	13.869
	9/8/98 11:23:33	33.5507	14.302	13.53	13.87
	9/8/98 11:25:32	35.5353	14.383	13.521	13.87
	9/8/98 11:27:38	37.6377	14.383	13.527	13.872
	9/8/98 11:29:51	39.8645	14.345	13.521	13.869
	9/8/98 11:32:13	42.2233	14.337	13.52	13.872
	9/8/98 11:34:43	44.722	14.371	13.523	13.876
	9/8/98 11:37:22	47.3687	14.489	13.531	13.884
	9/8/98 11:40:10	50.1722	14.368	13.52	13.878
	9/8/98 11:43:08	53.1418	14.454	13.523	13.881
	9/8/98 11:46:17	56.2875	14.477	13.524	13.884
	9/8/98 11:49:37	59.6195	14.331	13.524	13.885
	9/8/98 11:53:08	63.149	14.394	13.523	13.888
	9/8/98 11:56:53	66.8875	14.328	13.526	13.888
	9/8/98 12:00:50	70.8477	14.509	13.523	13.889
FLOW INCREASED TO 10 GPM					
	9/8/98 12:09:00	0	14.45	13.53	13.885
	9/8/98 12:09:01	0.0218	14.427	13.53	13.887
	9/8/98 12:09:02	0.0437	14.35	13.529	13.887
	9/8/98 12:09:03	0.0655	14.384	13.531	13.887
	9/8/98 12:09:05	0.0873	14.367	13.53	13.887
	9/8/98 12:09:06	0.1092	14.398	13.531	13.887
	9/8/98 12:09:07	0.131	14.393	13.529	13.887
	9/8/98 12:09:09	0.1528	14.398	13.53	13.887
	9/8/98 12:09:10	0.1747	14.496	13.531	13.887
	9/8/98 12:09:11	0.1965	14.436	13.531	13.887
	9/8/98 12:09:13	0.2183	14.467	13.531	13.887
	9/8/98 12:09:14	0.2402	14.413	13.533	13.887
	9/8/98 12:09:15	0.262	14.467	13.533	13.887
	9/8/98 12:09:17	0.2838	14.424	13.529	13.887
	9/8/98 12:09:18	0.3057	14.398	13.531	13.887
	9/8/98 12:09:19	0.3275	14.398	13.53	13.887
	9/8/98 12:09:20	0.3493	14.416	13.533	13.887
	9/8/98 12:09:22	0.3712	14.47	13.529	13.887
	9/8/98 12:09:23	0.393	14.459	13.533	13.887
	9/8/98 12:09:24	0.4148	14.398	13.531	13.887
	9/8/98 12:09:26	0.4367	14.43	13.527	13.887
	9/8/98 12:09:27	0.4588	14.45	13.531	13.887
	9/8/98 12:09:28	0.4823	14.421	13.529	13.887
	9/8/98 12:09:30	0.5072	14.413	13.531	13.887
	9/8/98 12:09:32	0.5335	14.476	13.53	13.887
	9/8/98 12:09:33	0.5615	14.416	13.53	13.887
	9/8/98 12:09:35	0.5912	14.444	13.531	13.887
	9/8/98 12:09:37	0.6225	14.473	13.53	13.887
	9/8/98 12:09:39	0.6557	14.416	13.527	13.887
	9/8/98 12:09:41	0.6908	14.364	13.527	13.885
	9/8/98 12:09:43	0.7282	14.418	13.527	13.885
	9/8/98 12:09:46	0.7677	14.387	13.53	13.887
	9/8/98 12:09:48	0.8095	14.453	13.527	13.887

	9/8/98 12:09:51	0.8538	14.479	13.527	13.887
	9/8/98 12:09:54	0.9008	14.393	13.527	13.887
	9/8/98 12:09:57	0.9507	14.493	13.527	13.887
	9/8/98 12:10:00	1.0033	14.433	13.53	13.887
	9/8/98 12:10:03	1.0592	14.447	13.526	13.887
	9/8/98 12:10:07	1.1183	14.39	13.526	13.885
	9/8/98 12:10:10	1.181	14.464	13.529	13.885
	9/8/98 12:10:14	1.2473	14.381	13.529	13.885
	9/8/98 12:10:19	1.3177	14.51	13.526	13.885
	9/8/98 12:10:23	1.3922	14.404	13.527	13.885
	9/8/98 12:10:28	1.4712	14.416	13.523	13.885
	9/8/98 12:10:33	1.5548	14.53	13.524	13.885
	9/8/98 12:10:38	1.6433	14.553	13.529	13.885
	9/8/98 12:10:44	1.7372	14.582	13.527	13.885
	9/8/98 12:10:50	1.8365	14.713	13.527	13.885
	9/8/98 12:10:56	1.9418	14.599	13.523	13.885
	9/8/98 12:11:03	2.0533	14.696	13.524	13.885
	9/8/98 12:11:10	2.1715	14.713	13.524	13.885
	9/8/98 12:11:17	2.2967	14.839	13.524	13.887
	9/8/98 12:11:25	2.4292	14.794	13.529	13.887
	9/8/98 12:11:34	2.5697	14.854	13.526	13.887
	9/8/98 12:11:43	2.7185	14.88	13.529	13.885
	9/8/98 12:11:52	2.876	14.868	13.526	13.885
	9/8/98 12:12:02	3.0428	14.857	13.527	13.885
	9/8/98 12:12:13	3.2197	14.854	13.526	13.885
	9/8/98 12:12:24	3.407	14.98	13.526	13.885
	9/8/98 12:12:36	3.6053	14.831	13.524	13.885
	9/8/98 12:12:48	3.8155	14.951	13.526	13.885
	9/8/98 12:13:02	4.0382	14.891	13.524	13.885
	9/8/98 12:13:16	4.274	14.925	13.523	13.885
	9/8/98 12:13:31	4.5238	14.925	13.524	13.887
	9/8/98 12:13:47	4.7885	14.934	13.521	13.885
	9/8/98 12:14:04	5.0688	14.954	13.523	13.885
	9/8/98 12:14:21	5.3657	14.877	13.523	13.885
	9/8/98 12:14:40	5.6802	14.977	13.52	13.885
	9/8/98 12:15:00	6.0133	14.963	13.521	13.885
	9/8/98 12:15:21	6.3662	14.957	13.523	13.885
	9/8/98 12:15:44	6.74	14.971	13.523	13.887
	9/8/98 12:16:08	7.136	14.957	13.521	13.887
	9/8/98 12:16:33	7.5553	15.02	13.521	13.887
	9/8/98 12:16:59	7.9997	14.963	13.521	13.888
	9/8/98 12:17:28	8.4703	15.04	13.523	13.89
	9/8/98 12:17:58	8.9688	14.968	13.523	13.89
	9/8/98 12:18:29	9.4968	14.894	13.523	13.89
	9/8/98 12:19:03	10.0562	14.593	13.52	13.89
	9/8/98 12:19:38	10.6487	14.94	13.526	13.89
	9/8/98 12:20:16	11.2762	15.04	13.521	13.89
	9/8/98 12:20:56	11.941	15.074	13.524	13.893
	9/8/98 12:21:38	12.6452	15.063	13.524	13.893
	9/8/98 12:22:23	13.391	14.994	13.524	13.893
	9/8/98 12:23:10	14.181	15.063	13.524	13.894

	9/8/98 12:24:01	15.0178	15.049	13.518	13.894
	9/8/98 12:24:54	15.9043	15.071	13.523	13.894
	9/8/98 12:25:50	16.8433	15.126	13.527	13.898
	9/8/98 12:26:50	17.838	15.14	13.524	13.897
	9/8/98 12:27:53	18.8917	15.08	13.523	13.898
	9/8/98 12:29:00	20.0077	15.146	13.527	13.901
	9/8/98 12:30:11	21.1898	15.077	13.527	13.903
	9/8/98 12:31:26	22.442	15.2	13.524	13.904
	9/8/98 12:32:46	23.7685	15.157	13.526	13.904
	9/8/98 12:34:10	25.1735	15.24	13.524	13.906
	9/8/98 12:35:39	26.6618	15.243	13.52	13.906
	9/8/98 12:37:14	28.2383	15.155	13.524	13.907
	9/8/98 12:38:54	29.9082	15.172	13.523	13.909
	9/8/98 12:40:40	31.677	15.06	13.52	13.91
	9/8/98 12:42:33	33.5507	15.223	13.524	13.914
	9/8/98 12:44:32	35.5353	15.155	13.515	13.913
	9/8/98 12:46:38	37.6377	15.169	13.521	13.916
	9/8/98 12:48:51	39.8645	15.301	13.524	13.922
	9/8/98 12:51:13	42.2233	15.278	13.52	13.92
	9/8/98 12:53:43	44.722	15.223	13.526	13.925
	9/8/98 12:56:22	47.3687	15.203	13.527	13.929
	9/8/98 12:59:10	50.1722	15.192	13.504	13.914
	9/8/98 13:02:08	53.1418	15.175	13.513	13.923
	9/8/98 13:05:17	56.2875	15.266	13.537	13.942
	9/8/98 13:08:37	59.6195	15.24	13.517	13.93
FLOW INCREASED TO 15 GPM					
	9/8/98 13:15:00	0	15.33	13.53	13.922
	9/8/98 13:15:01	0.0218	15.321	13.531	13.922
	9/8/98 13:15:02	0.0437	15.373	13.53	13.922
	9/8/98 13:15:03	0.0655	15.379	13.529	13.922
	9/8/98 13:15:05	0.0873	15.364	13.531	13.923
	9/8/98 13:15:06	0.1092	15.33	13.529	13.922
	9/8/98 13:15:07	0.131	15.321	13.53	13.923
	9/8/98 13:15:09	0.1528	15.339	13.531	13.923
	9/8/98 13:15:10	0.1747	15.356	13.529	13.923
	9/8/98 13:15:11	0.1965	15.407	13.531	13.922
	9/8/98 13:15:13	0.2183	15.47	13.53	13.923
	9/8/98 13:15:14	0.2402	15.433	13.53	13.923
	9/8/98 13:15:15	0.262	15.447	13.531	13.923
	9/8/98 13:15:17	0.2838	15.499	13.533	13.923
	9/8/98 13:15:18	0.3057	15.459	13.533	13.923
	9/8/98 13:15:19	0.3275	15.533	13.533	13.923
	9/8/98 13:15:20	0.3493	15.571	13.531	13.924
	9/8/98 13:15:22	0.3712	15.525	13.531	13.924
	9/8/98 13:15:23	0.393	15.599	13.531	13.924
	9/8/98 13:15:24	0.4148	15.642	13.53	13.924
	9/8/98 13:15:26	0.4367	15.636	13.53	13.924
	9/8/98 13:15:27	0.4588	15.691	13.531	13.924
	9/8/98 13:15:28	0.4823	15.668	13.533	13.924
	9/8/98 13:15:30	0.5072	15.668	13.531	13.924
	9/8/98 13:15:32	0.5335	15.639	13.531	13.924

	9/8/98 13:15:33	0.5615	15.705	13.531	13.924
	9/8/98 13:15:35	0.5912	15.834	13.531	13.924
	9/8/98 13:15:37	0.6225	15.828	13.533	13.924
	9/8/98 13:15:39	0.6557	15.8	13.534	13.926
	9/8/98 13:15:41	0.6908	15.863	13.531	13.923
	9/8/98 13:15:43	0.7282	15.854	13.531	13.924
	9/8/98 13:15:46	0.7677	15.86	13.533	13.924
	9/8/98 13:15:48	0.8095	15.94	13.534	13.924
	9/8/98 13:15:51	0.8538	15.917	13.531	13.923
	9/8/98 13:15:54	0.9008	16.054	13.531	13.923
	9/8/98 13:15:57	0.9507	16.003	13.53	13.922
	9/8/98 13:16:00	1.0033	15.986	13.53	13.922
	9/8/98 13:16:03	1.0592	16.069	13.53	13.923
	9/8/98 13:16:07	1.1183	16.032	13.527	13.923
	9/8/98 13:16:10	1.181	16.12	13.531	13.923
	9/8/98 13:16:14	1.2473	16.178	13.531	13.923
	9/8/98 13:16:19	1.3177	16.057	13.531	13.924
	9/8/98 13:16:23	1.3922	16.18	13.533	13.926
	9/8/98 13:16:28	1.4712	16.22	13.531	13.924
	9/8/98 13:16:33	1.5548	16.263	13.531	13.924
	9/8/98 13:16:38	1.6433	16.223	13.53	13.924
	9/8/98 13:16:44	1.7372	16.309	13.53	13.924
	9/8/98 13:16:50	1.8365	16.366	13.531	13.926
	9/8/98 13:16:56	1.9418	16.329	13.533	13.926
	9/8/98 13:17:03	2.0533	16.438	13.533	13.929
	9/8/98 13:17:10	2.1715	16.487	13.533	13.926
	9/8/98 13:17:17	2.2967	16.444	13.534	13.929
	9/8/98 13:17:25	2.4292	16.51	13.53	13.926
	9/8/98 13:17:34	2.5697	16.51	13.531	13.926
	9/8/98 13:17:43	2.7185	16.512	13.53	13.926
	9/8/98 13:17:52	2.876	16.533	13.53	13.926
	9/8/98 13:18:02	3.0428	16.51	13.531	13.926
	9/8/98 13:18:13	3.2197	16.541	13.531	13.926
	9/8/98 13:18:24	3.407	16.555	13.53	13.927
	9/8/98 13:18:36	3.6053	16.547	13.53	13.929
	9/8/98 13:18:48	3.8155	16.47	13.529	13.927
	9/8/98 13:19:02	4.0382	16.584	13.534	13.929
	9/8/98 13:19:16	4.274	16.558	13.536	13.929
	9/8/98 13:19:31	4.5238	16.547	13.537	13.93
	9/8/98 13:19:47	4.7885	16.721	13.536	13.933
	9/8/98 13:20:04	5.0688	16.561	13.531	13.932
	9/8/98 13:20:21	5.3657	16.601	13.53	13.932
	9/8/98 13:20:40	5.6802	16.618	13.533	13.932
	9/8/98 13:21:00	6.0133	16.633	13.531	13.932
	9/8/98 13:21:21	6.3662	16.613	13.533	13.933
	9/8/98 13:21:44	6.74	16.65	13.534	13.933
	9/8/98 13:22:08	7.136	16.618	13.531	13.935
	9/8/98 13:22:33	7.5553	16.67	13.533	13.935
	9/8/98 13:22:59	7.9997	16.604	13.536	13.936
	9/8/98 13:23:28	8.4703	16.787	13.536	13.935
	9/8/98 13:23:58	8.9688	16.756	13.539	13.938

	9/8/98 13:24:29	9.4968	16.816	13.536	13.939
	9/8/98 13:25:03	10.0562	16.773	13.536	13.938
	9/8/98 13:25:38	10.6487	16.802	13.536	13.938
	9/8/98 13:26:16	11.2762	16.696	13.533	13.939
	9/8/98 13:26:56	11.941	16.762	13.537	13.943
	9/8/98 13:27:38	12.6452	16.75	13.536	13.945
	9/8/98 13:28:23	13.391	16.79	13.536	13.946
	9/8/98 13:29:10	14.181	16.796	13.537	13.948
	9/8/98 13:30:01	15.0178	16.853	13.537	13.949
	9/8/98 13:30:54	15.9043	16.721	13.54	13.952
	9/8/98 13:31:50	16.8433	16.719	13.537	13.954
	9/8/98 13:32:50	17.838	16.81	13.54	13.952
	9/8/98 13:33:53	18.8917	16.822	13.543	13.952
	9/8/98 13:35:00	20.0077	16.876	13.539	13.955
	9/8/98 13:36:11	21.1898	16.933	13.54	13.956
	9/8/98 13:37:26	22.442	16.89	13.537	13.955
	9/8/98 13:38:46	23.7685	16.965	13.54	13.959
	9/8/98 13:40:10	25.1735	16.856	13.547	13.965
	9/8/98 13:41:39	26.6618	16.993	13.54	13.961
	9/8/98 13:43:14	28.2383	17.116	13.537	13.962
	9/8/98 13:44:54	29.9082	17.065	13.54	13.965
	9/8/98 13:46:40	31.677	17.065	13.539	13.967
	9/8/98 13:48:33	33.5507	17.025	13.54	13.969
	9/8/98 13:50:32	35.5353	17.068	13.54	13.971
	9/8/98 13:52:38	37.6377	17.142	13.542	13.977
	9/8/98 13:54:51	39.8645	17.128	13.543	13.978
	9/8/98 13:57:13	42.2233	17.191	13.545	13.981
	9/8/98 13:59:43	44.722	17.134	13.543	13.984
	9/8/98 14:02:22	47.3687	17.225	13.555	13.991
	9/8/98 14:05:10	50.1722	17.305	13.547	13.993
	9/8/98 14:08:08	53.1418	17.257	13.543	13.99
	9/8/98 14:11:17	56.2875	17.3	13.55	13.997
	9/8/98 14:14:37	59.6195	17.348	13.545	13.998
	9/8/98 14:18:08	63.149	17.308	13.537	13.998
	9/8/98 14:21:53	66.8875	17.331	13.542	14.009

WELL 202 AQUIFER TEST DATA ANALYSES

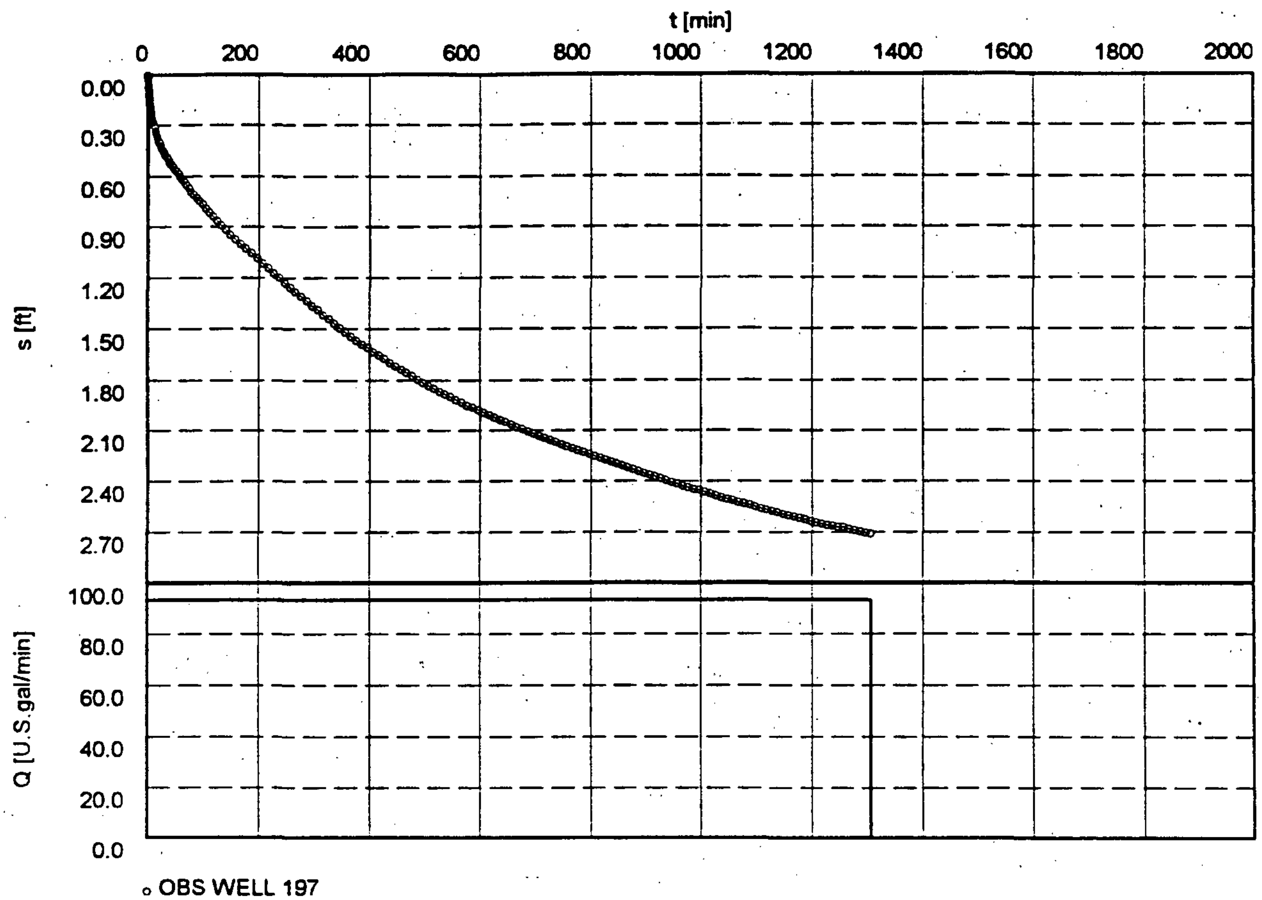
(INCLUDES ANALYSES OF DATA COLLECTED FROM WELLS 197, 675, & 202)

OBSERVATION WELL 197 DRAWDOWN DATA ANALYSES

WELL 202 AQ TEST 1

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 1	Test conducted on: 8/13 - 8/14/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	

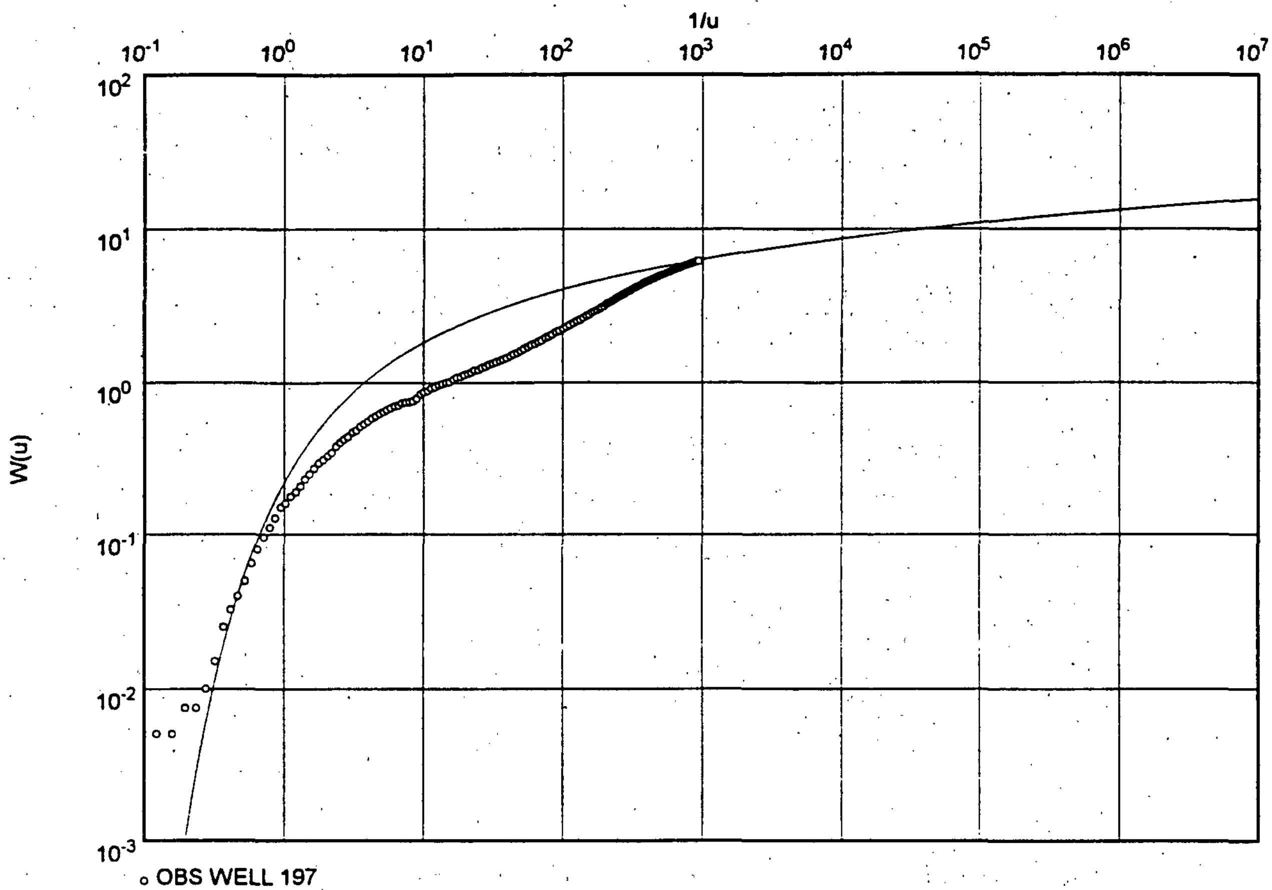


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Theis analysis method
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 1	Test conducted on: 8/13 - 8/14/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	



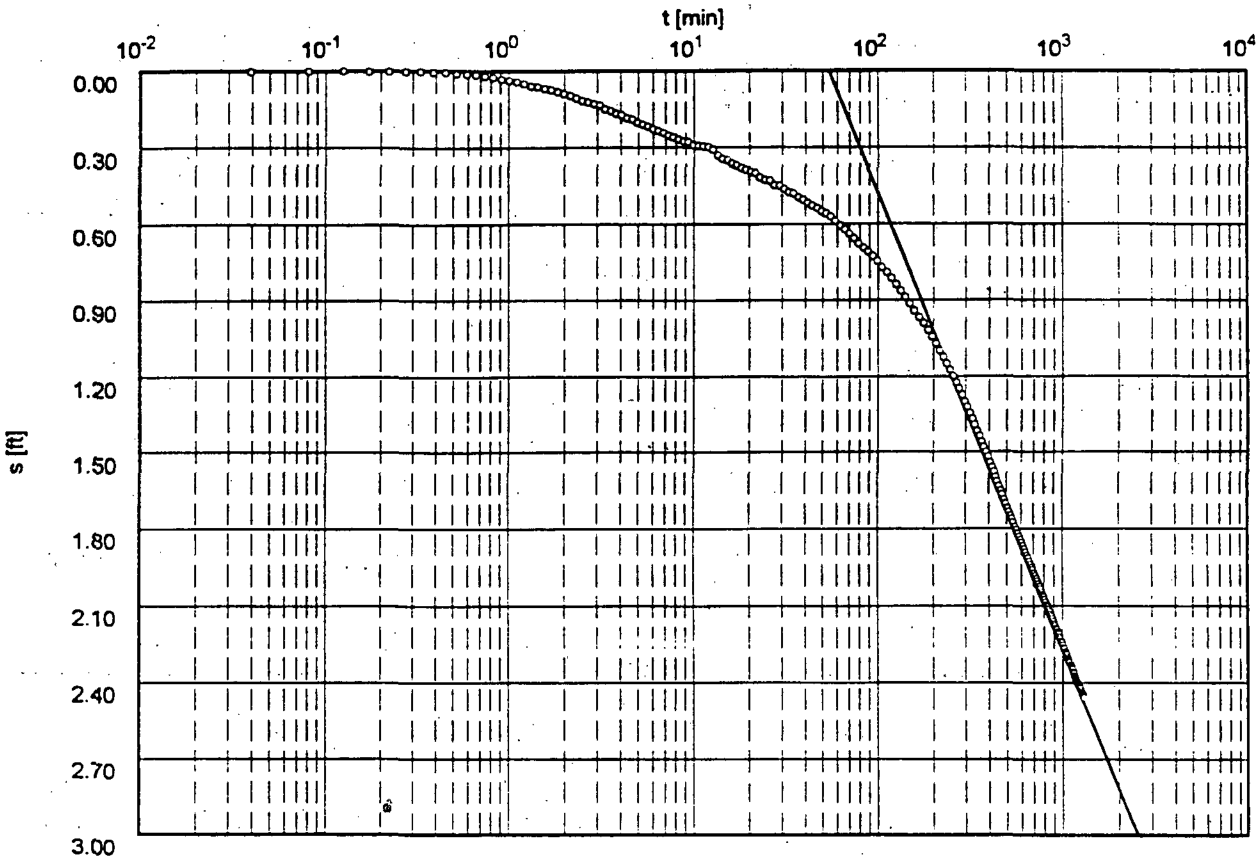
Transmissivity [ft²/min]: 2.49×10^{0}

Hydraulic conductivity [ft/min]: 1.71×10^{-1} = 246.2 FT/D

Aquifer thickness [ft]: 14.50

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 1	Test conducted on: 8/13 - 8/14/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	



o OBS WELL 197

Transmissivity [ft²/min]: 1.27×10^{0}

Hydraulic conductivity [ft/min]: 8.78×10^{-2} = (126.4 FT/d)

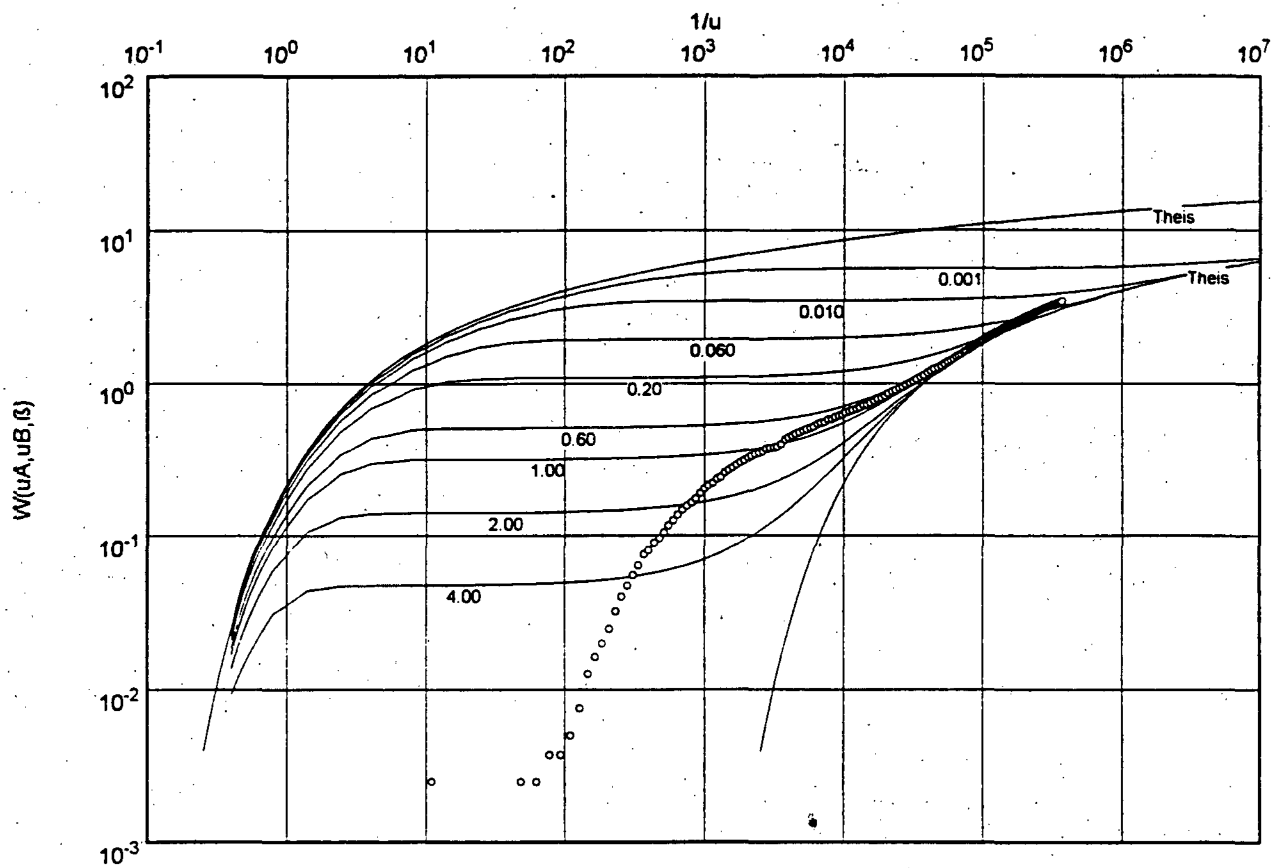
Aquifer thickness [ft]: 14.50

MACTEC-ERS
2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Pumping test analysis
NEUMAN's method
Unconfined aquifer with
delayed watertable response

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 1	Test conducted on: 8/13 - 8/14/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	



o OBS WELL 197

Transmissivity [ft²/min]: 1.25×10^{0}

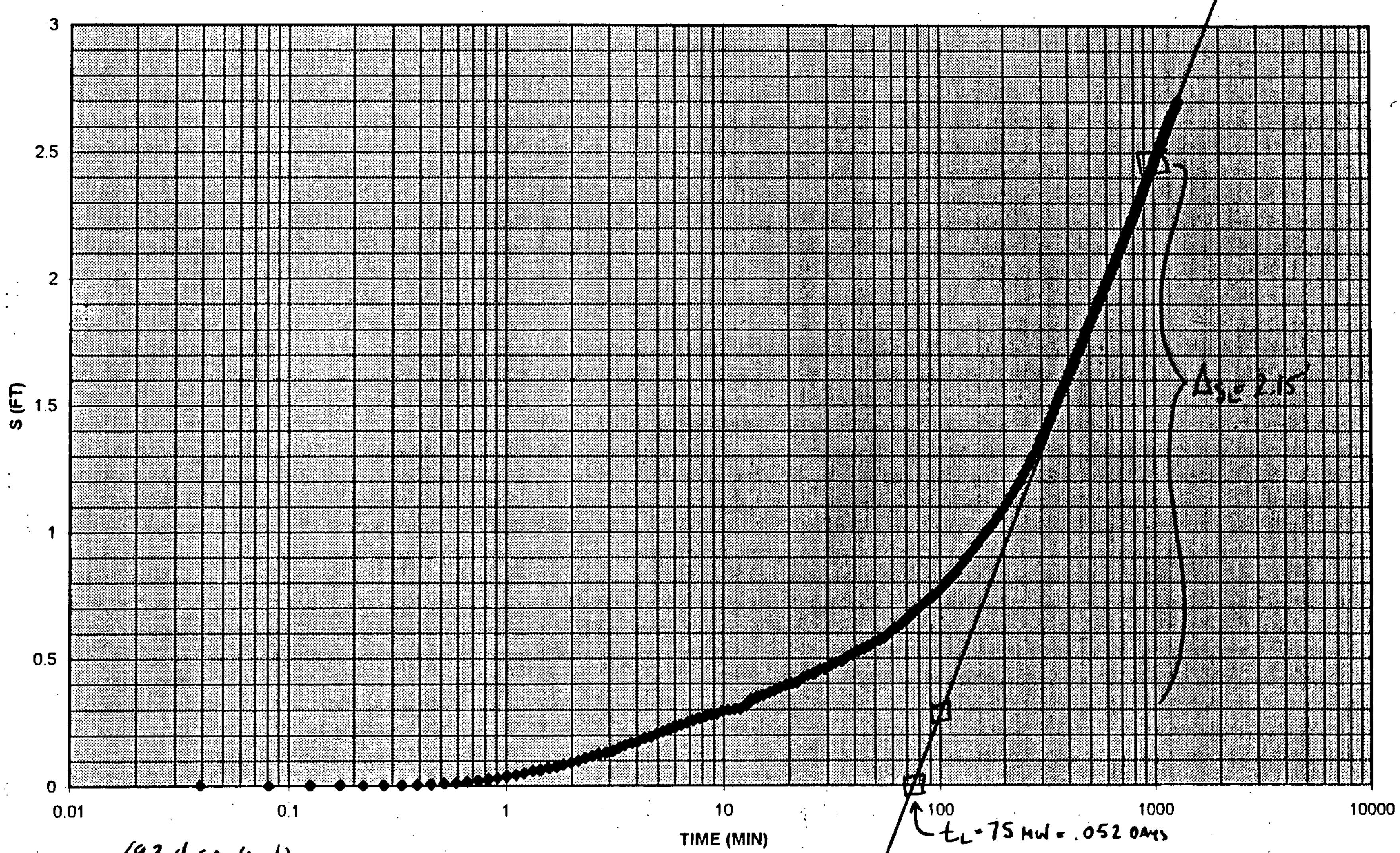
Hydraulic conductivity [ft/min]: 8.62×10^{-2} = 124.1 FT/D

Aquifer thickness [ft]: 14.50

Storativity: 6.59×10^{-6}

Specific yield: 6.59×10^{-2}

WELL 197 - AQ TEST 1 s DATA
NEUMAN SEMI-LOG METHOD



$$T = 0.1833 \left(\frac{93.4 \text{ GAL/MIN}}{2.15 \text{ FT}}\right) 192.5 = 1532.9 \text{ FT}^2/\text{DAY}$$

$$K = \frac{1532.9 \text{ FT}^2/\text{DAY}}{14.5 \text{ FT}} = \underline{105.7 \text{ FT/DAY}}$$

(WITHIN RANGE)

$$S_Y = 2.246 \frac{(1532.9 \text{ FT}^2/\text{D})(0.052 \text{ D})}{(51.9 \text{ FT})^2}$$

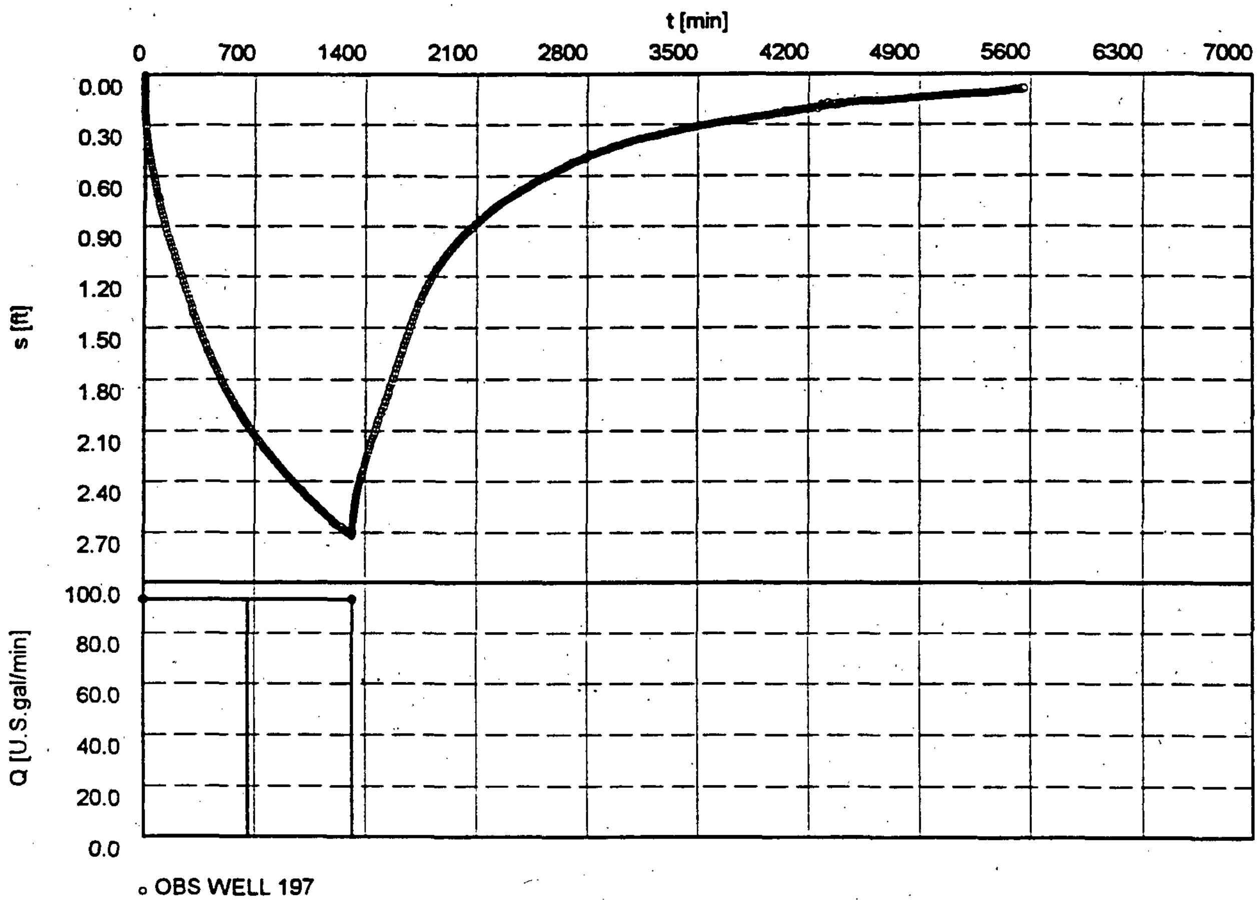
$$\underline{S_Y = 0.066}$$

OBSERVATION WELL 197 RECOVERY DATA ANALYSES

WELL 202 AQ TEST 1

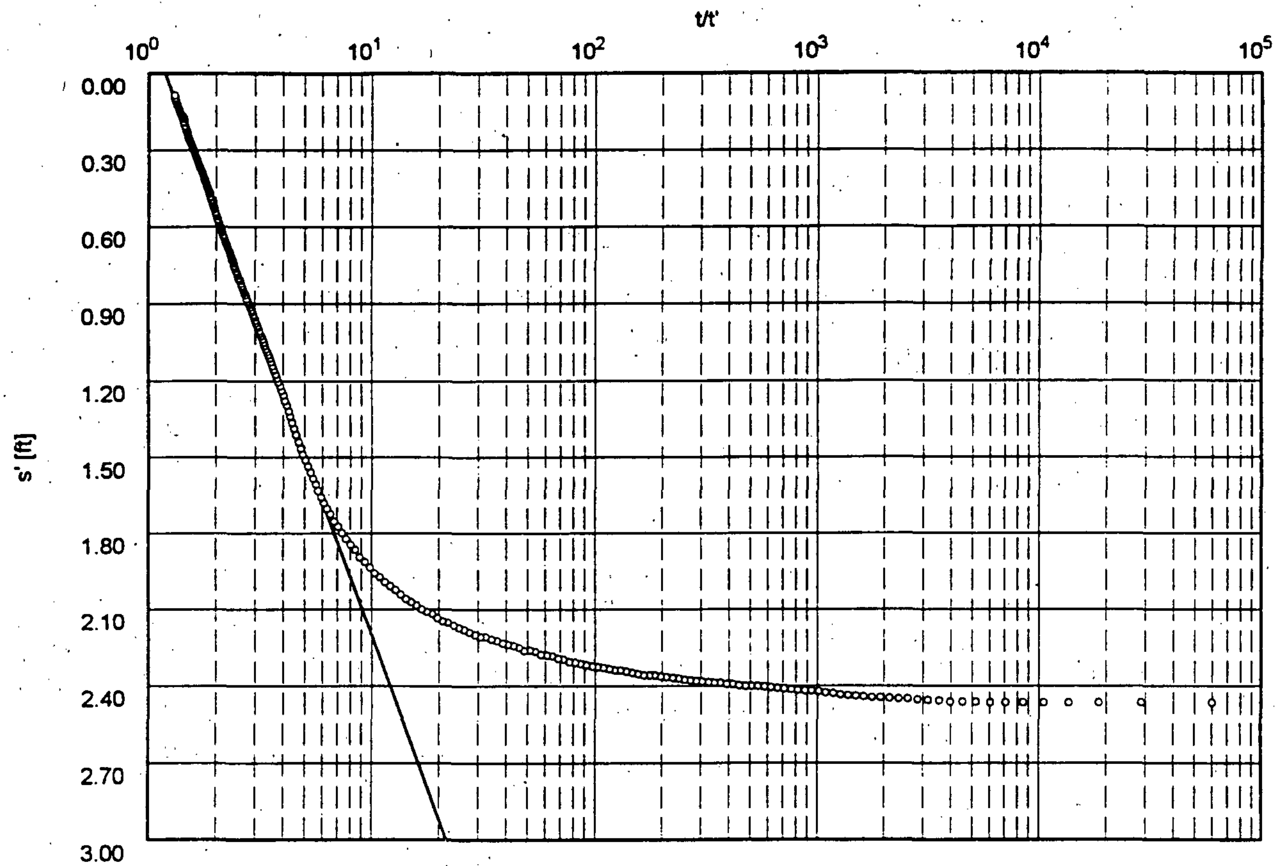
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1	
		Project: UGW - NEW RIFLE	
		Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 1	Test conducted on: 8/14 - 8/17/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	



2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE	
		Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 1	Test conducted on: 8/14 - 8/17/98
OBS WELL 197	
Discharge 93.40 U.S.gal/min	
	Pumping test duration: 1319.90 min



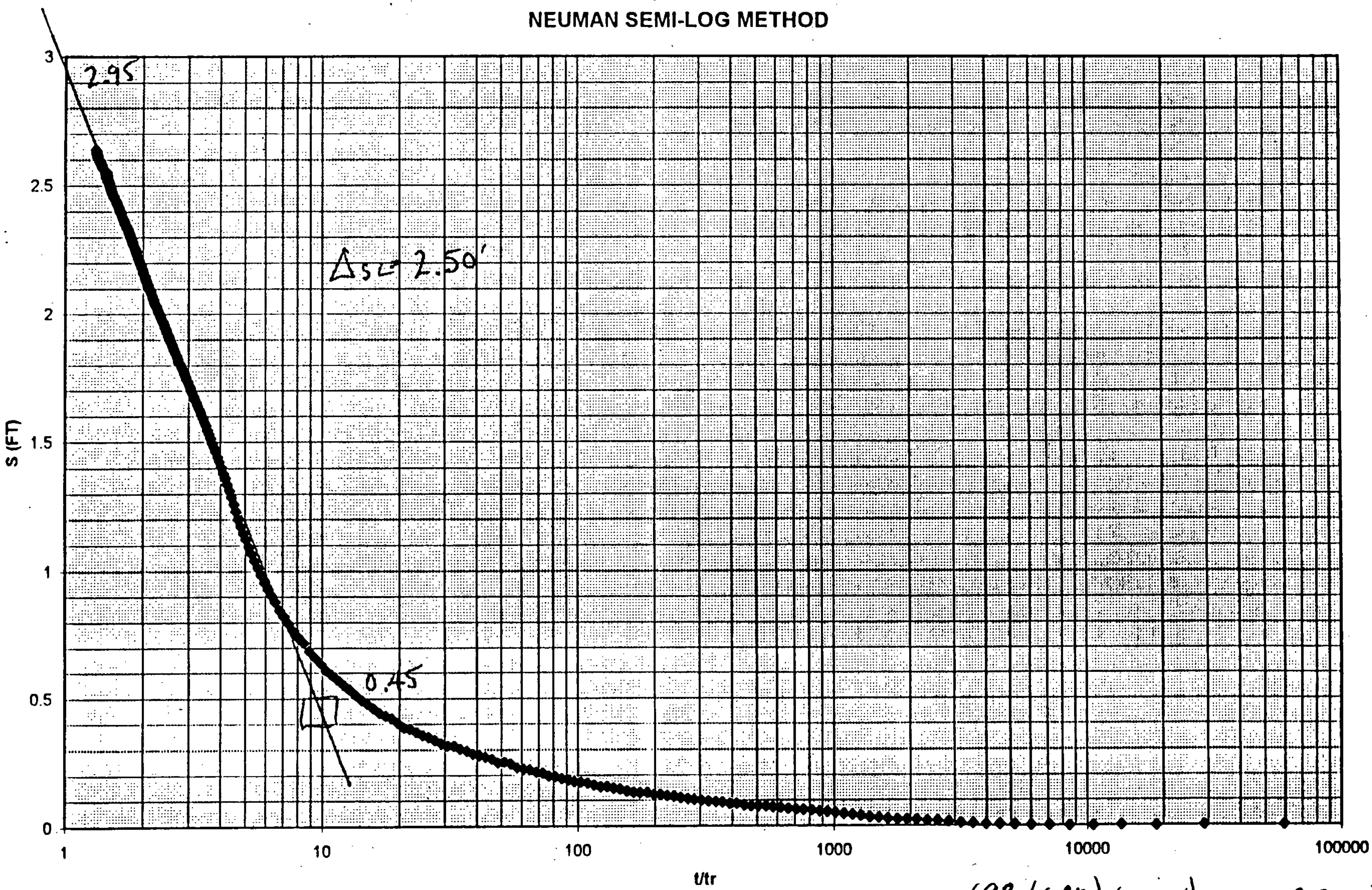
o OBS WELL 197

Transmissivity [ft²/min]: 9.61×10^{-1}

Hydraulic conductivity [ft/min]: 6.67×10^{-2} = 96.0 FT/D

Aquifer thickness [ft]: 14.40

WELL 197 - AQ REC TEST 1 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833 \left(\frac{93.4\text{ GPM}}{2.5'}\right)(192.5) = \frac{1318.3\text{ FT}^2/\text{D}}{14.5'}$

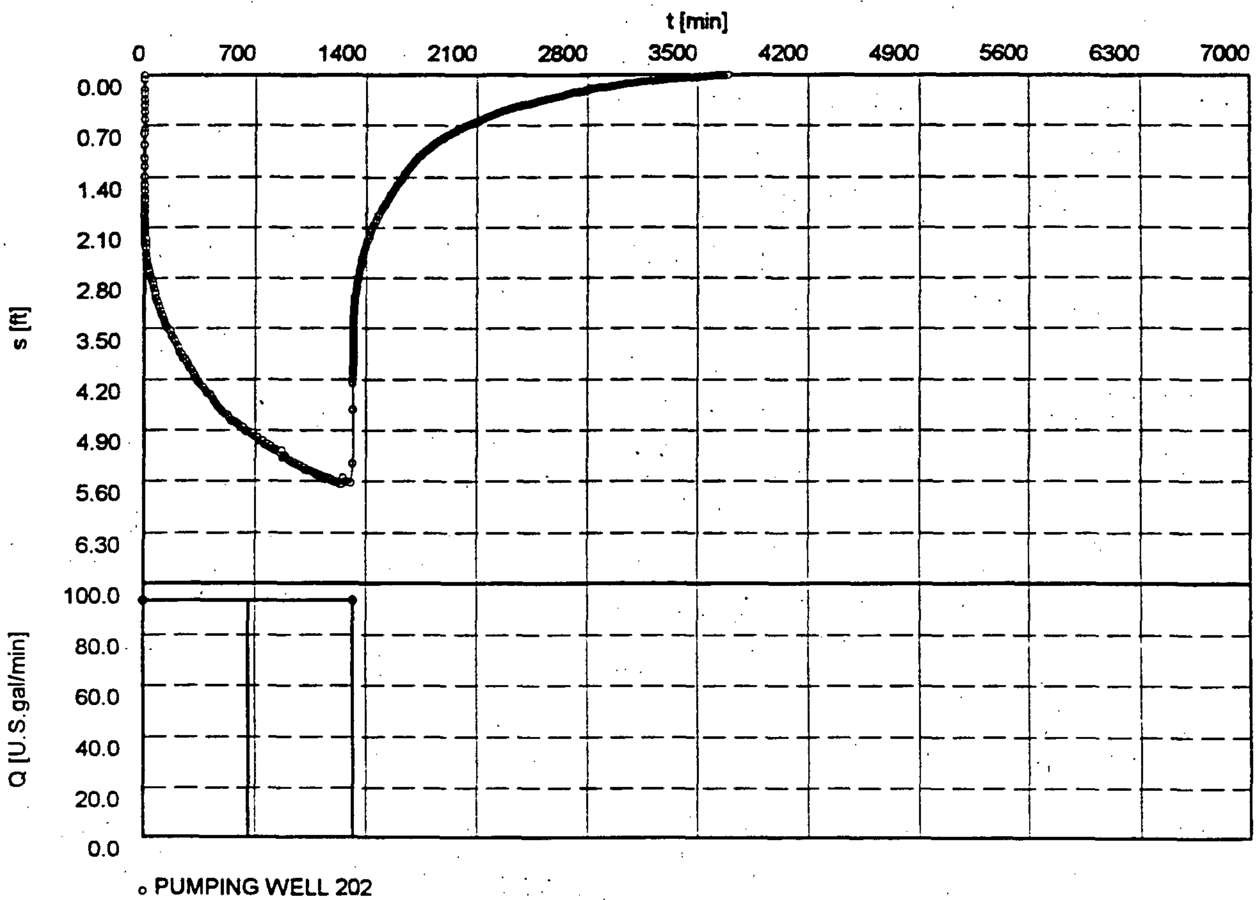
$K_L = \underline{90.9\text{ FT/D}}$

PUMPING WELL 202 RECOVERY DATA ANALYSES

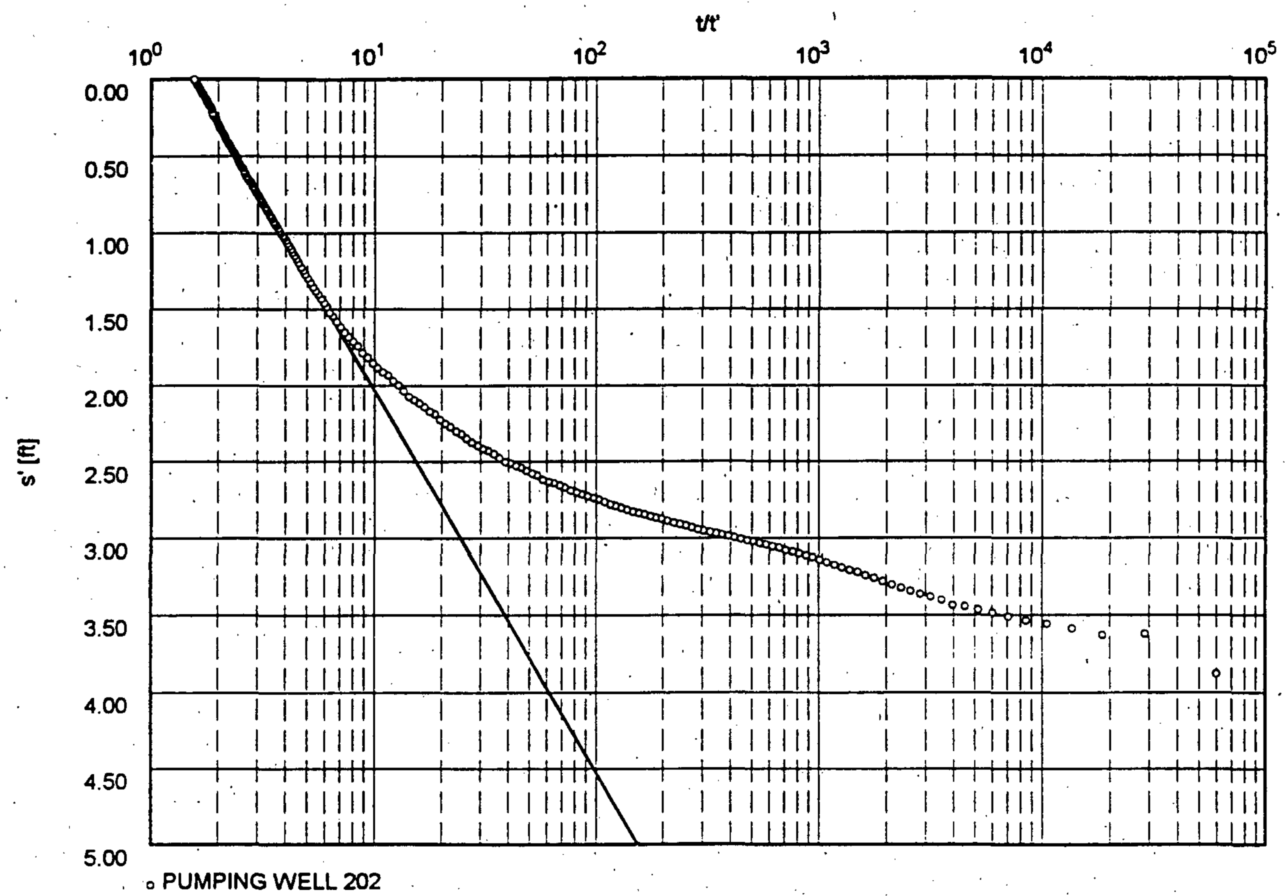
WELL 202 AQ TEST 1

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP | Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 1	Test conducted on: 8/14 - 8/17/98
PUMPING WELL 202	
Discharge 93.40 U.S.gal/min	



2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE	
		Evaluated by: KP	Date: 23.10.1998
Pumping Test No. WELL 202 AQ REC TEST 1	Test conducted on: 8/14 - 8/17/98		
PUMPING WELL 202			
Discharge 93.40 U.S.gal/min			
	Pumping test duration: 1319.90 min		

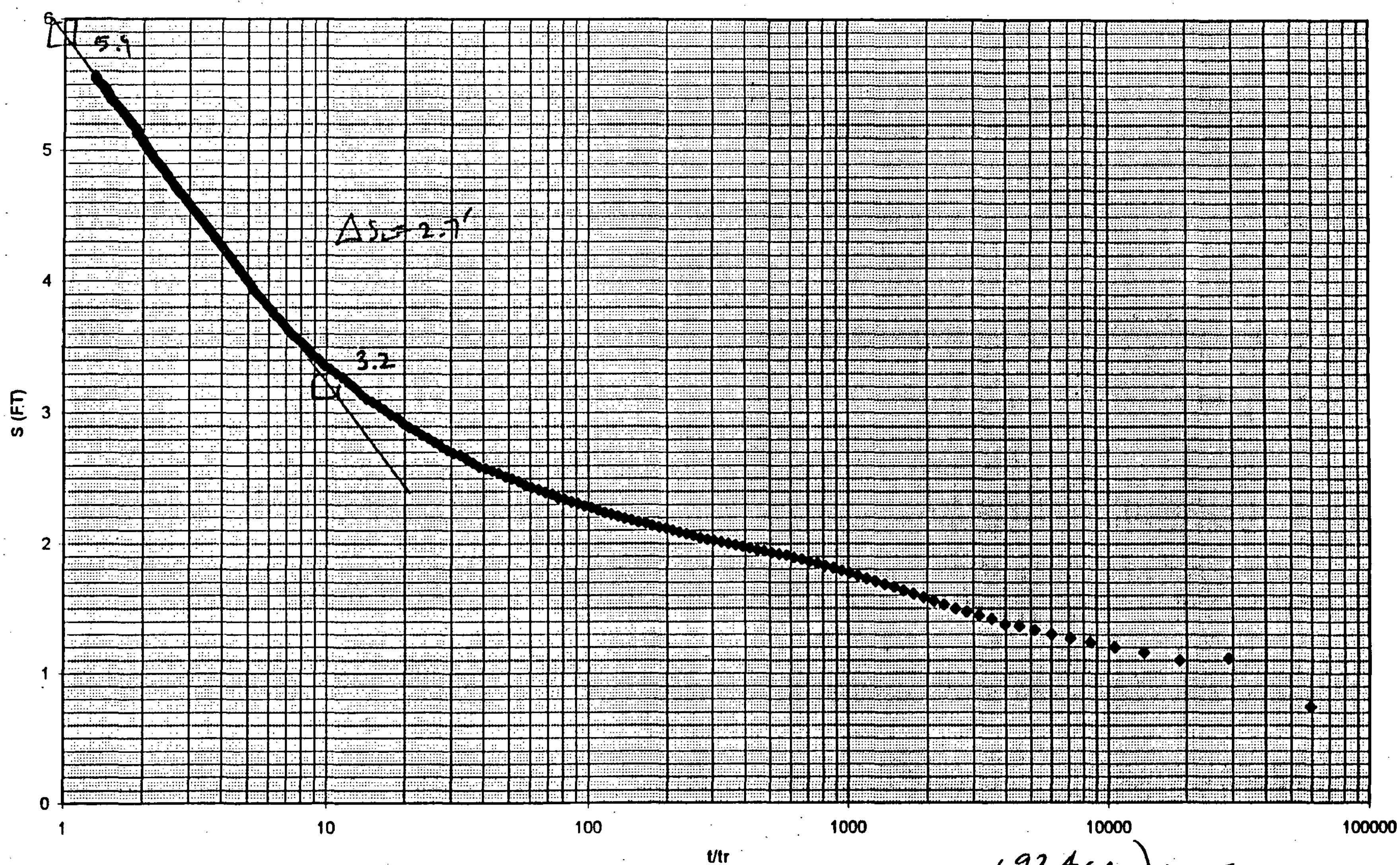


Transmissivity [ft²/min]: 9.16×10^{-1}

Hydraulic conductivity [ft/min]: 6.32×10^{-2} = 91.0 FT/D

Aquifer thickness [ft]: 14.50

WELL 202 - AQ REC TEST 1 DATA
NEUMAN SEMI-LOG METHOD



$$T_L = 0.1833 \left(\frac{93.4 \text{ GPM}}{2.7'} \right) 192.5 = \frac{1220.6 \text{ FT}^2/\text{D}}{14.5'}$$

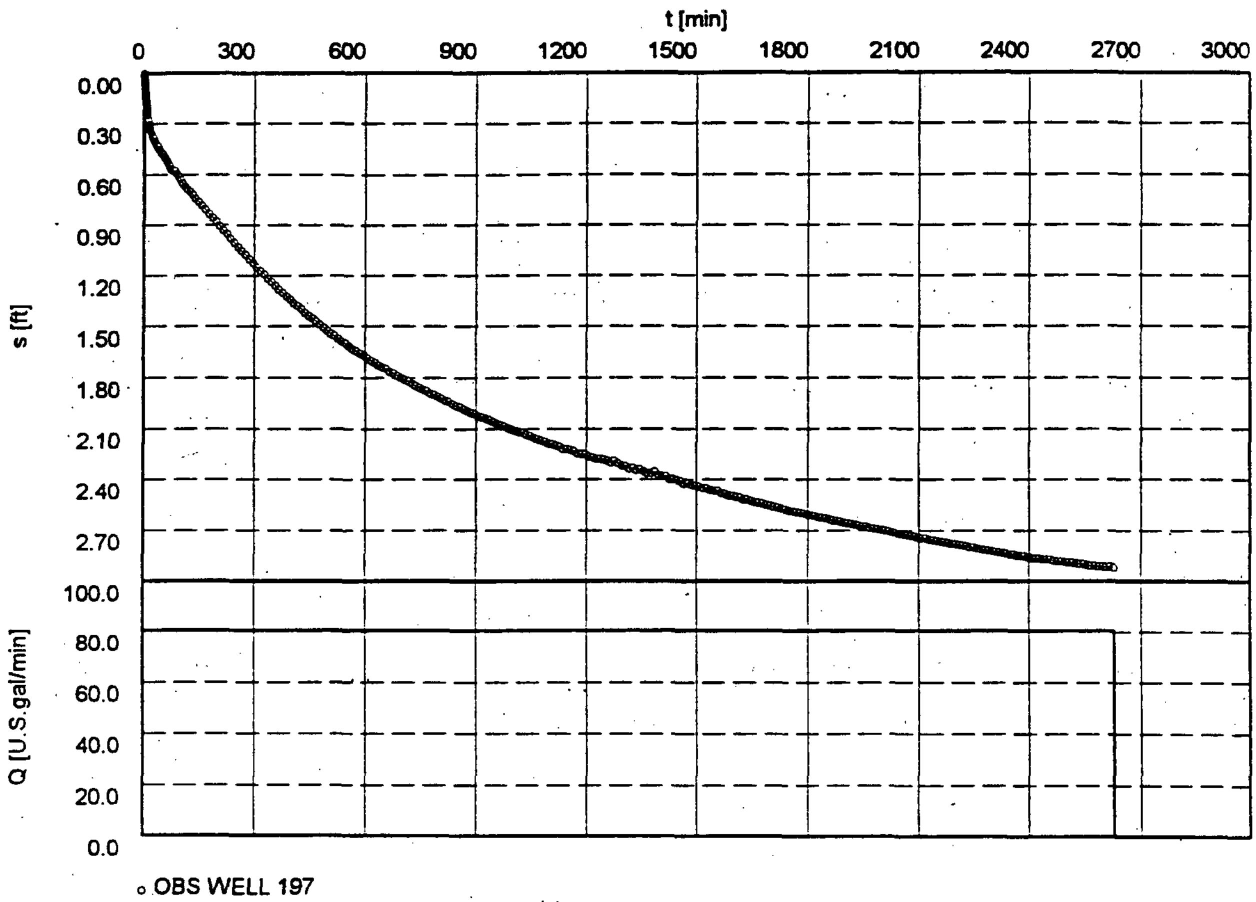
$$K_L = \frac{1220.6}{14.5} = 84.2 \text{ FT/D}$$

OBSERVATION WELL 197 DRAWDOWN DATA ANALYSES

WELL 202 AQ TEST 2

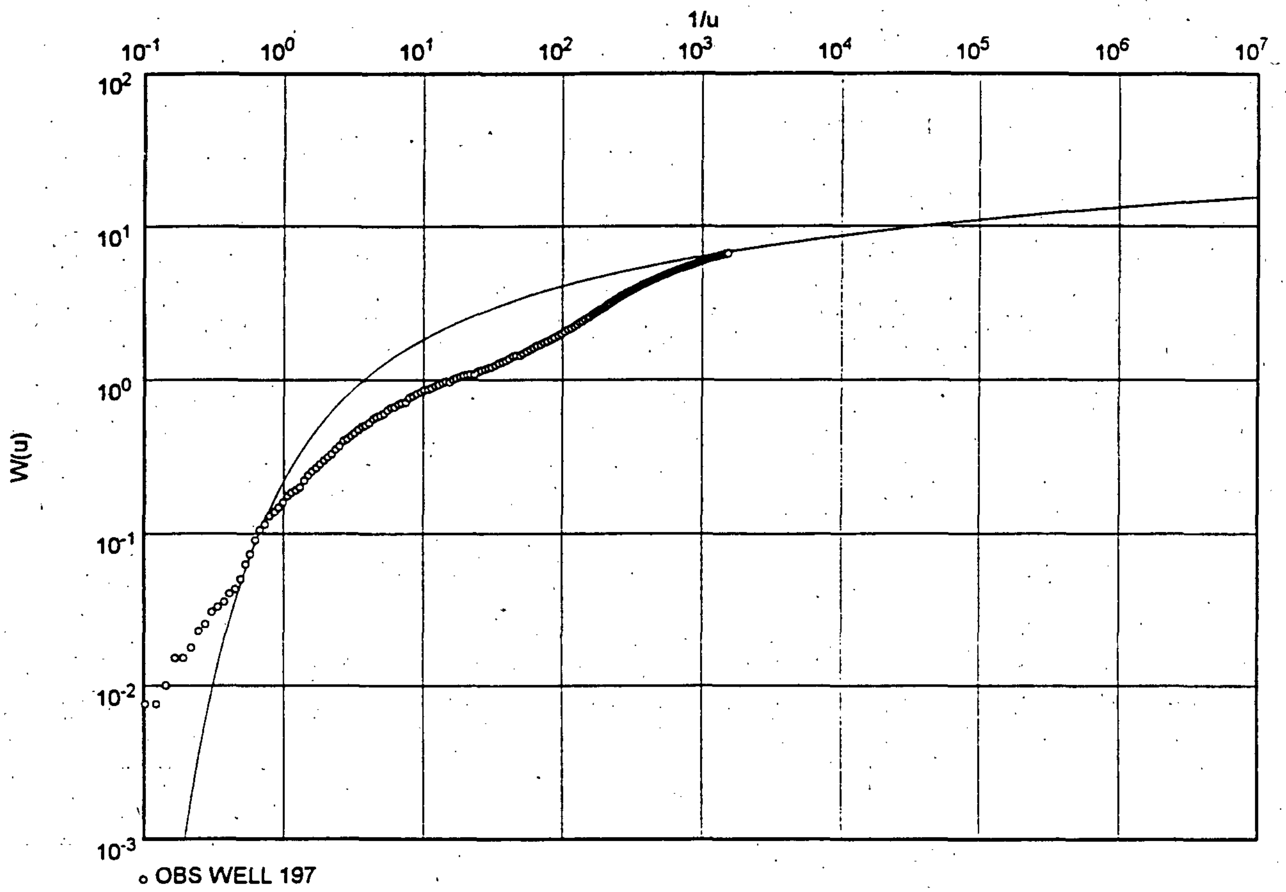
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQ TEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 197	
Discharge 80.50 U.S.gal/min	



2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Theis analysis method Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 197	
Discharge 80.50 U.S.gal/min	



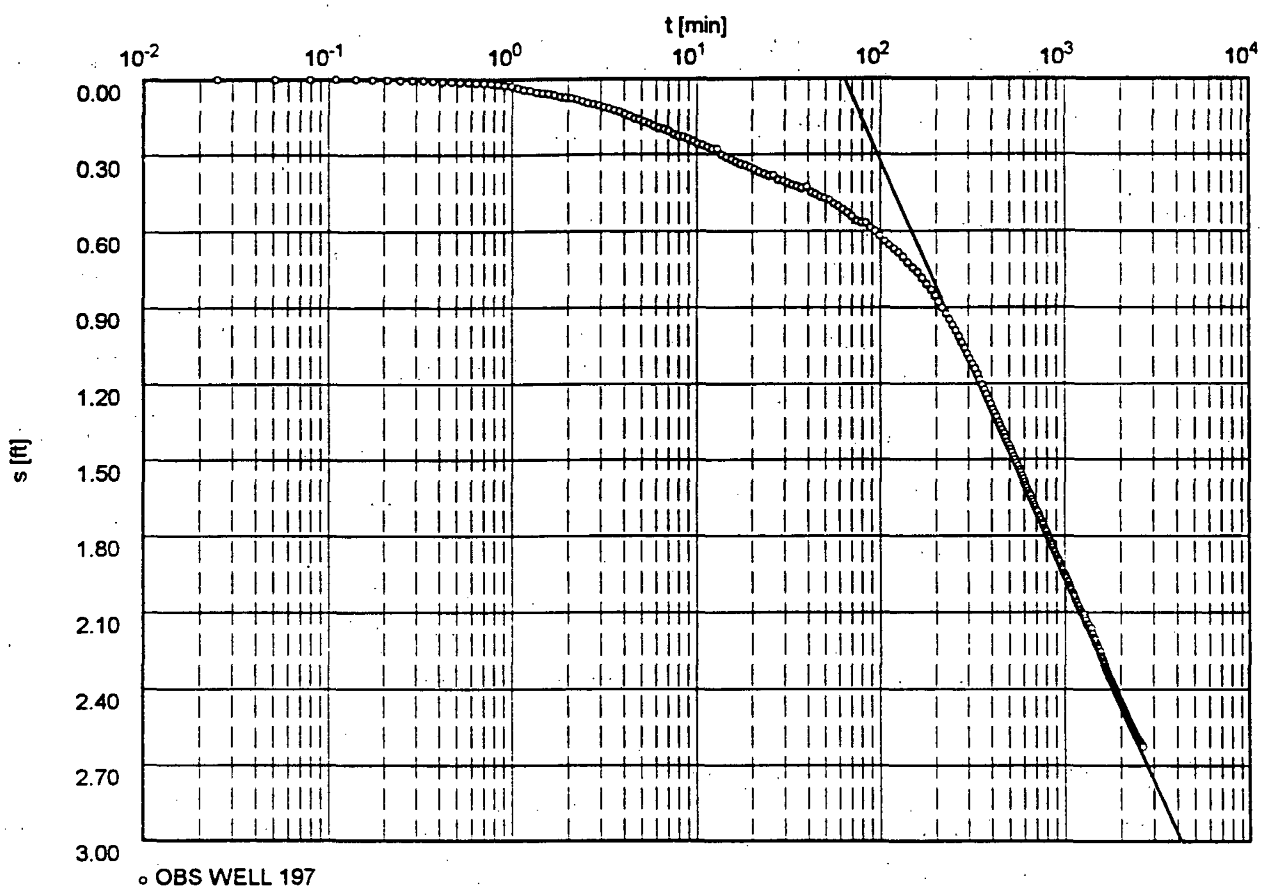
Transmissivity [ft²/min]: 2.15×10^{0}

Hydraulic conductivity [ft/min]: 1.48×10^{-1} = 213.1 FT/D

Aquifer thickness [ft]: 14.50

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 197	
Discharge 80.50 U.S.gal/min	



Transmissivity [ft²/min]: 1.19×10^{0}

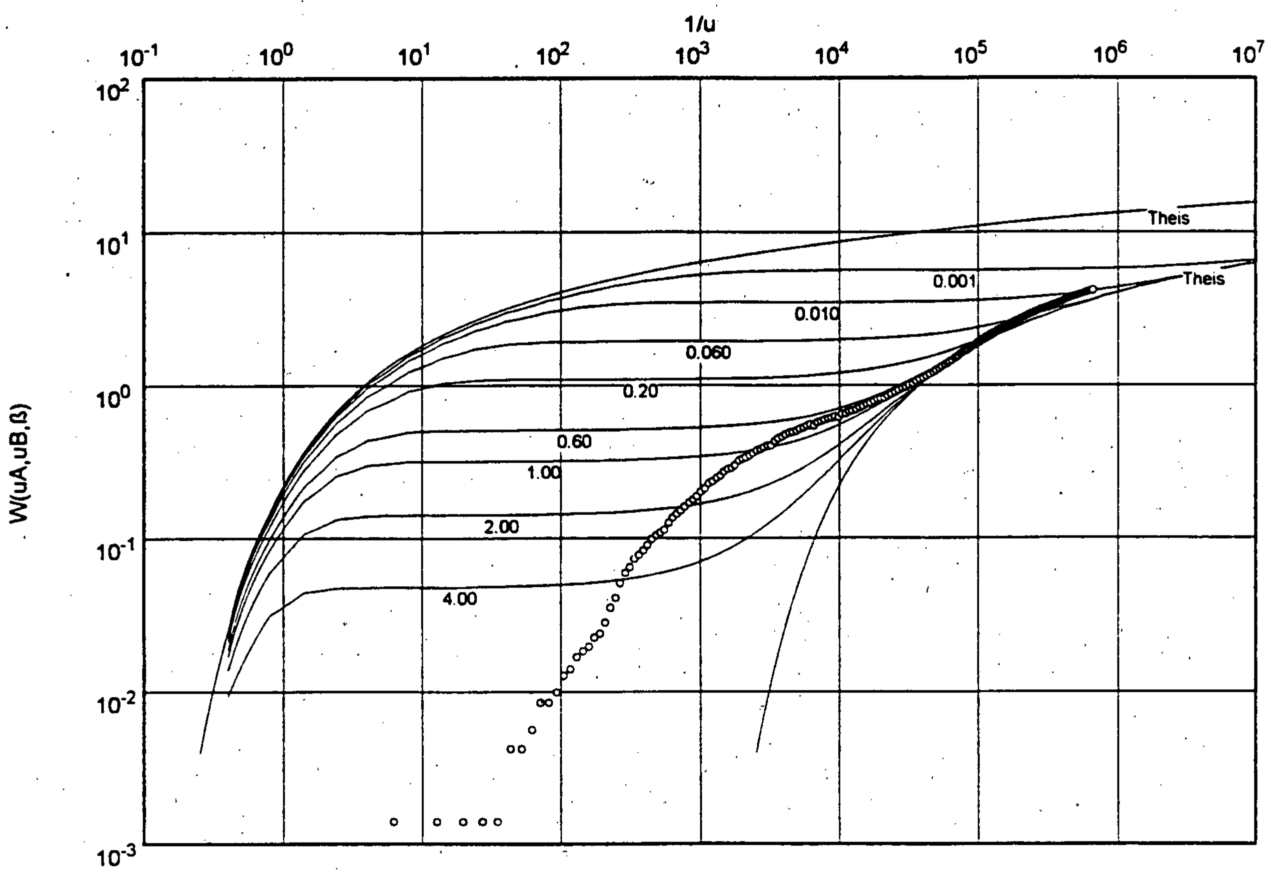
Hydraulic conductivity [ft/min]: 8.25×10^{-2} = 118.8 FT/D

Aquifer thickness [ft]: 14.50

2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

NEUMAN's method
Unconfined aquifer with
delayed watertable response

Project: UGW - NEW RIFLE		
Evaluated by: KP		Date: 23.10.1998
Pumping Test No. WELL 202 AQ TEST 2		Test conducted on: 8/17 - 8/19/98
OBS WELL 197		
Discharge 80.50 U.S.gal/min		



o OBS WELL 197

Transmissivity [ft²/min]: 1.20×10^{0}

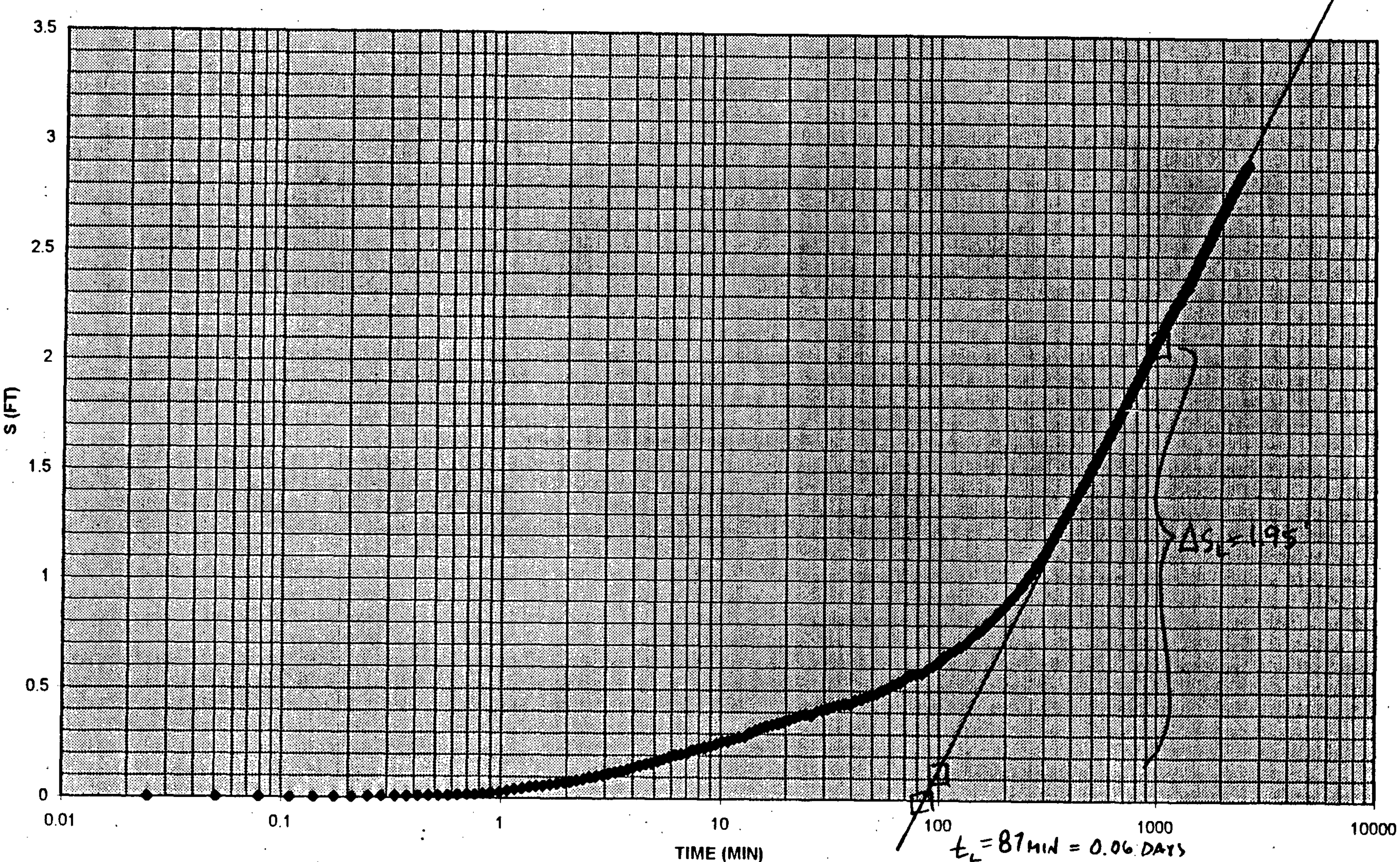
Hydraulic conductivity [ft/min]: 8.34×10^{-2} = 120.1 FT/D

Aquifer thickness [ft]: 14.50

Storativity: 7.15×10^{-6}

Specific yield: 7.15×10^{-2}

WELL 197 - AQ TEST 2 s DATA
NEUMAN SEMI-LOG METHOD



$T = 0.1833 \left(\frac{80.5 \text{ GAL/MIN}}{1.95 \text{ FT}} \right) 192.5 = 1456.6 \text{ FT}^2/\text{DAY}$

$K = \frac{1456.6 \text{ FT}^2/\text{DAY}}{14.5 \text{ FT}} = 100.5 \text{ FT/DAY}$

$S_y = 2.246 \frac{(1456.6 \text{ FT}^2/\text{D})(0.06 \text{ D})}{(51.9 \text{ FT})^2}$

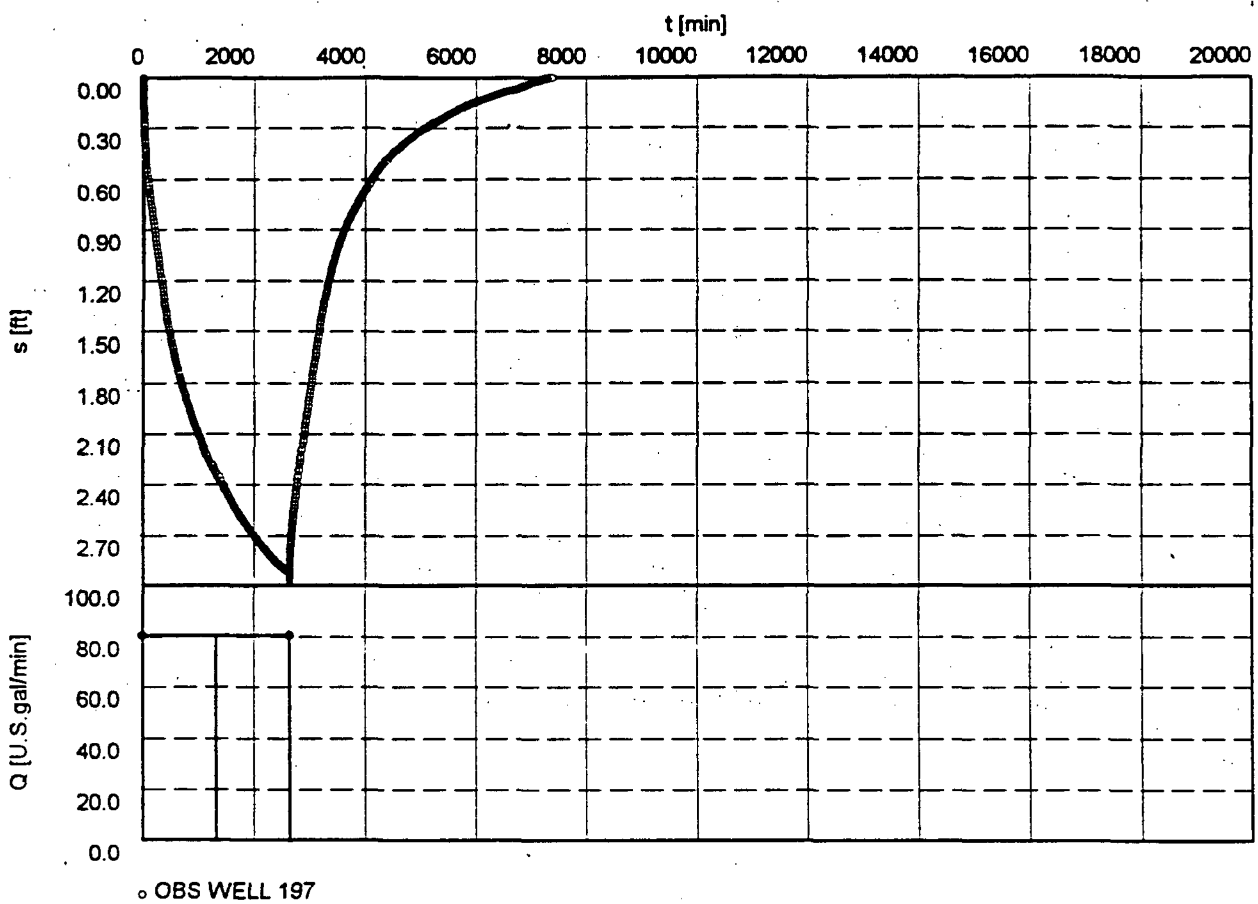
$S_y = 0.073$

OBSERVATION WELL 197 RECOVERY DATA ANALYSES

WELL 202 AQ TEST 2

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 2	Test conducted on: 8/19 - 8/25/98
OBS WELL 197	
Discharge 80.50 U.S.gal/min	

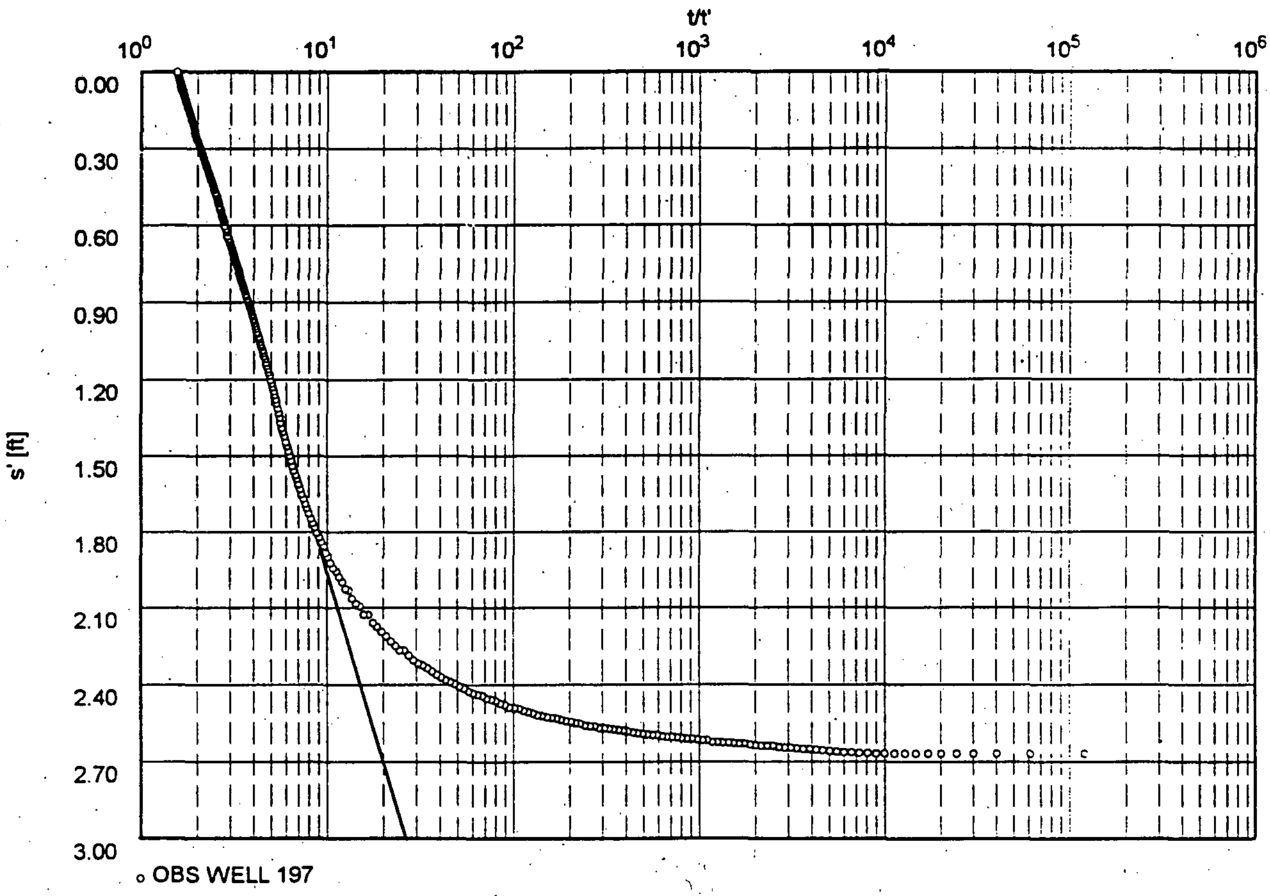


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Recovery method after
THEIS & JACOB
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 2	Test conducted on: 8/19 - 8/25/98
OBS WELL 197	
Discharge 80.50 U.S.gal/min	
	Pumping test duration: 2639.89 min

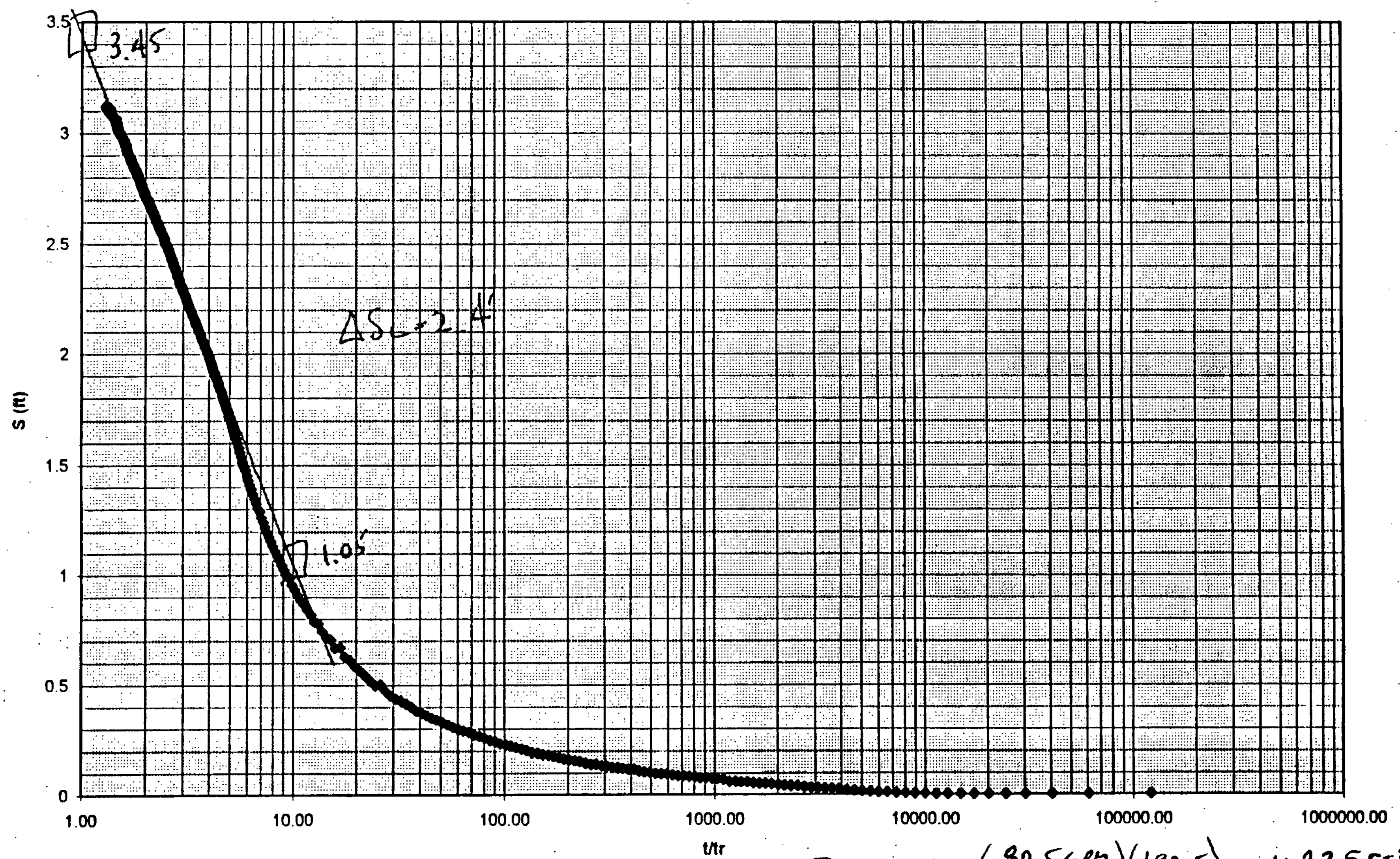


Transmissivity [ft²/min]: 7.96×10^{-1}

Hydraulic conductivity [ft/min]: 5.49×10^{-2} = 79.1 FT/D

Aquifer thickness [ft]: 14.50

WELL 197 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833\left(\frac{80.5 \text{ GPM}}{2.4'}\right)(192.5) = \frac{1183.5 \text{ FT}^2/\text{D}}{14.5'}$

$K_L = 81.6$ FT/D

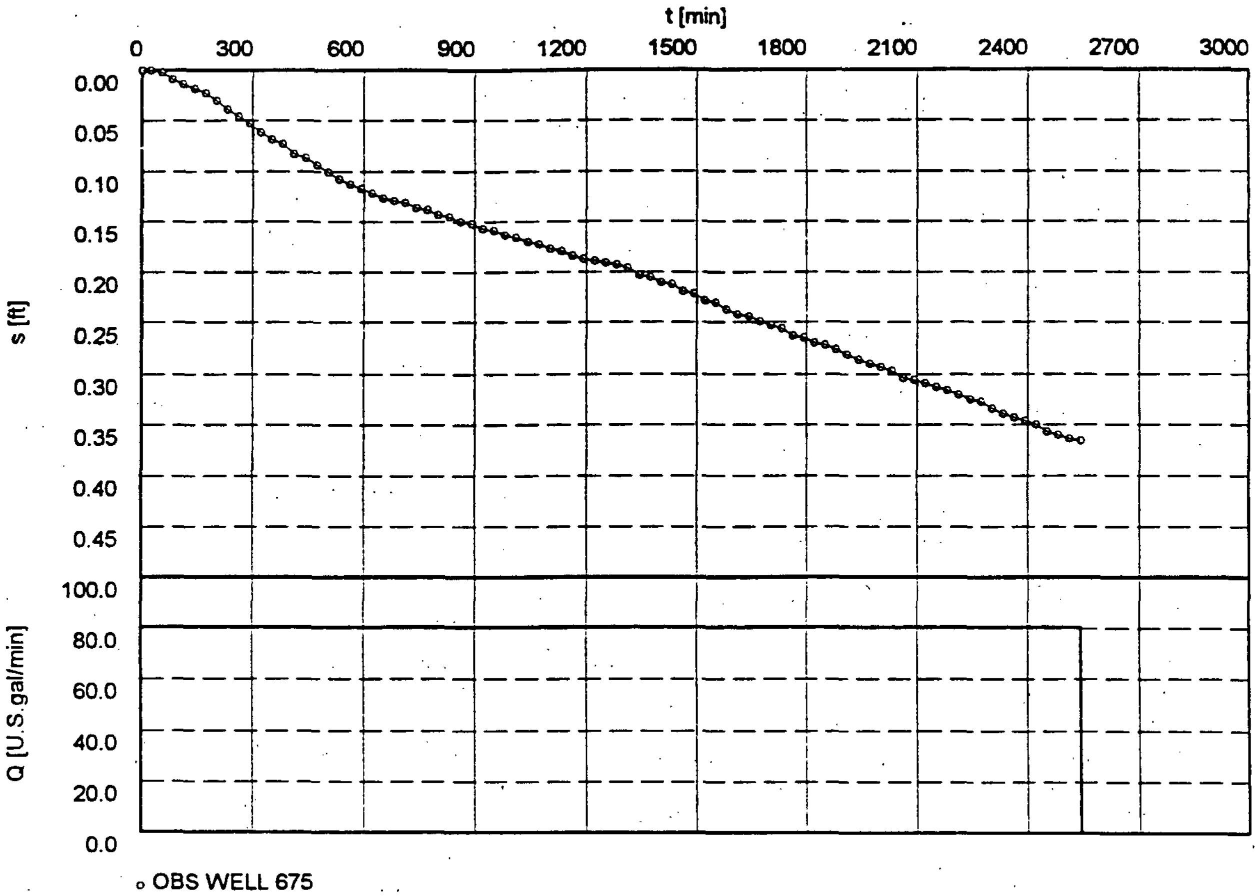
OBSERVATION WELL 675 DRAWDOWN DATA ANALYSES

WELL 202 AQ TEST 2

MACTEC-ERS
2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Pumping test analysis
Time-Drawdown plot
with discharge

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 23.10.1998
Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	

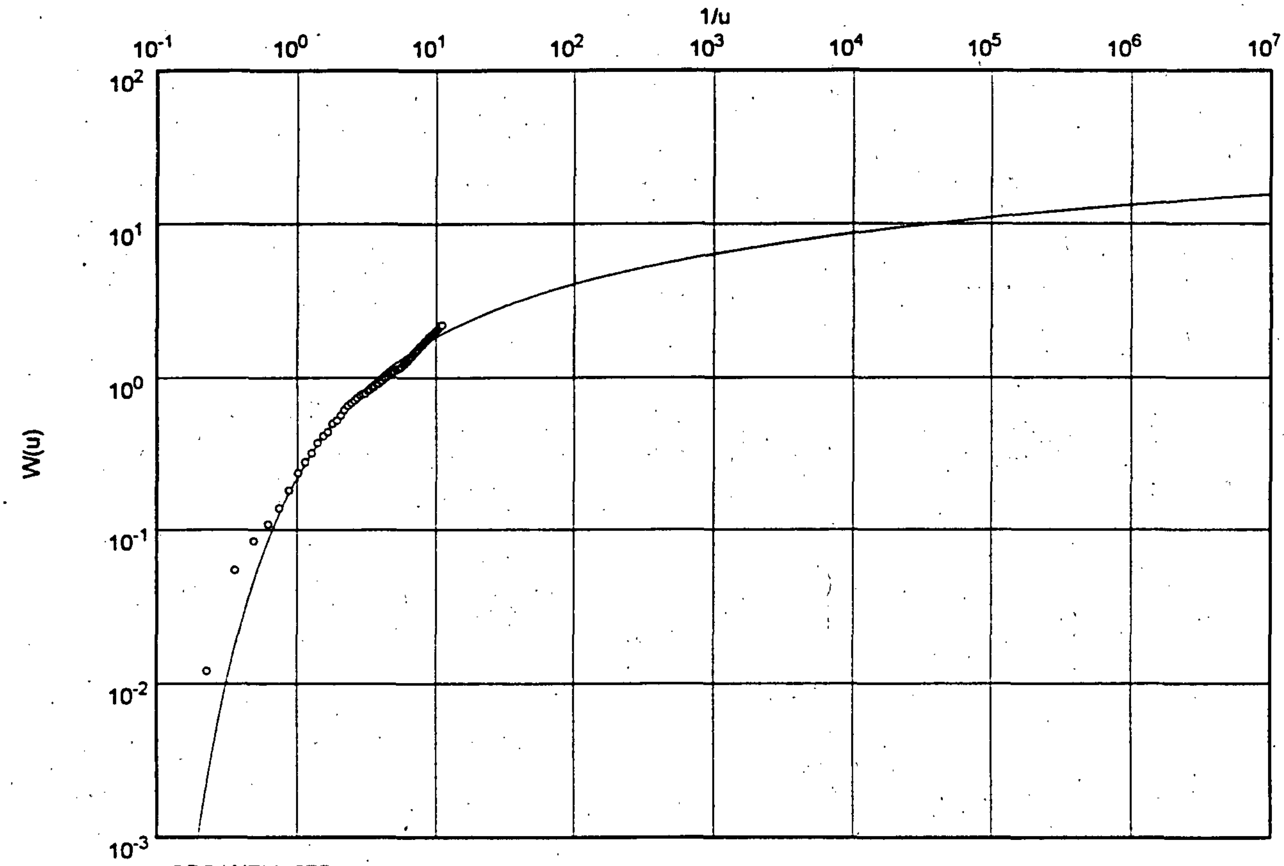


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Theis analysis method
Unconfined aquifer

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	



∘ OBS WELL 675

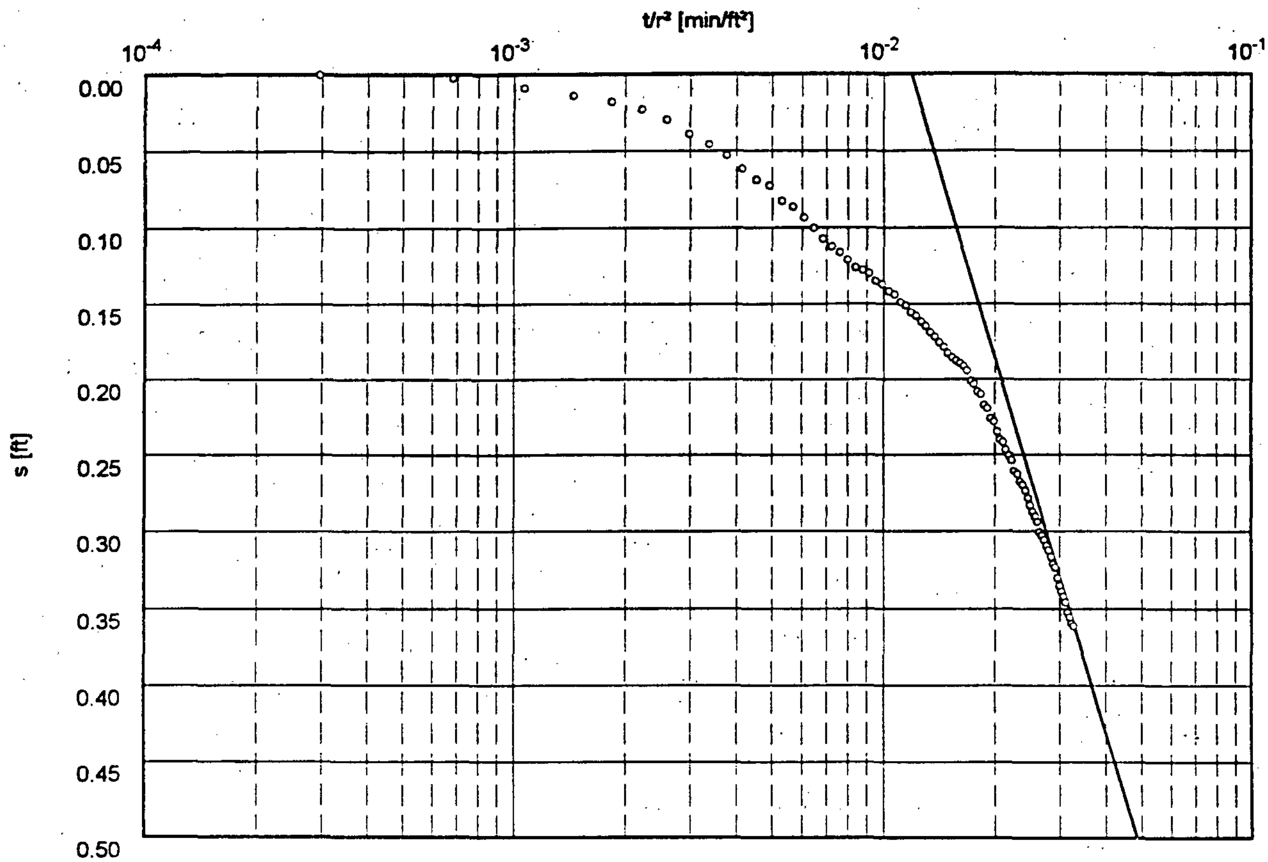
Transmissivity [ft²/min]: 5.15×10^{0}

Hydraulic conductivity [ft/min]: 3.55×10^{-1} = 511.2 FT/D

Aquifer thickness [ft]: 14.50

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	



○ OBS WELL 675

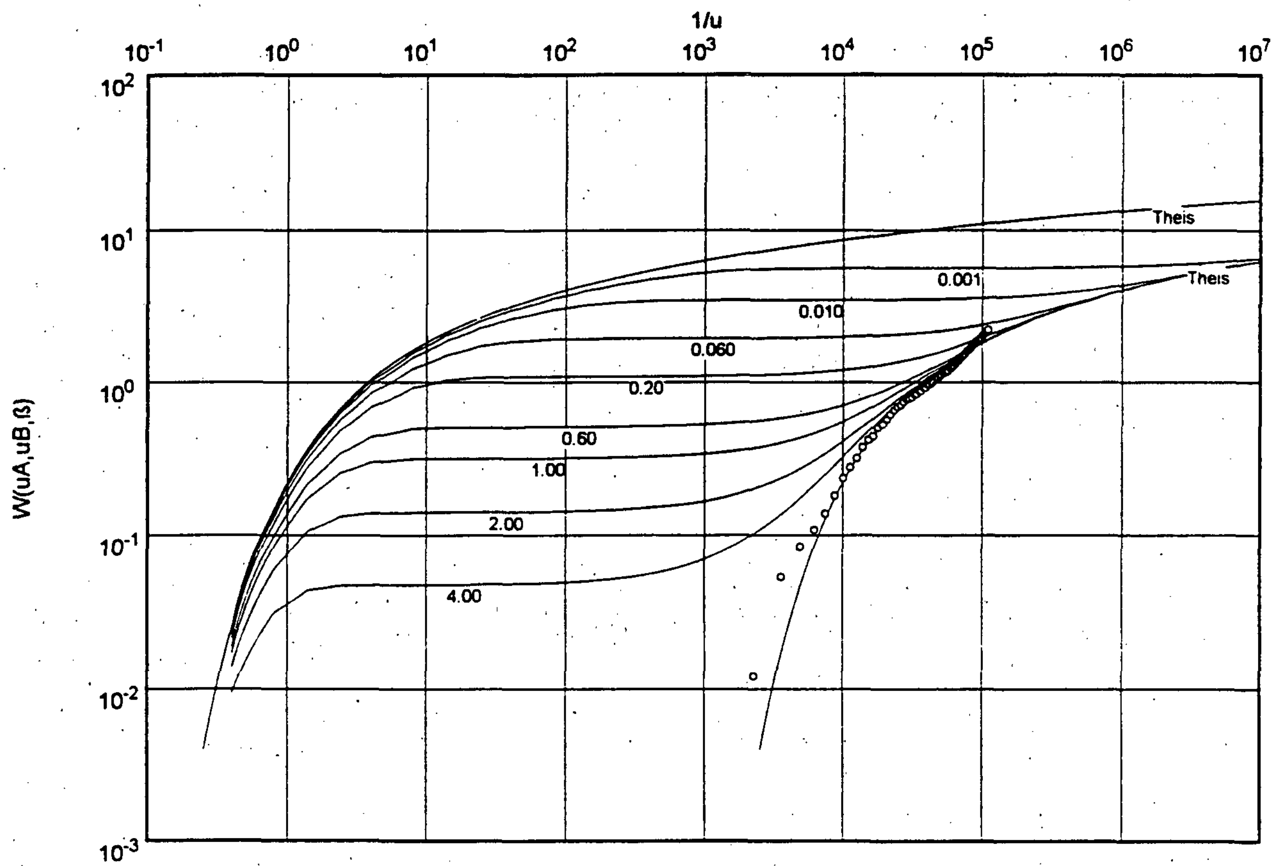
Transmissivity [ft²/min]: 2.41×10^{0}

Hydraulic conductivity [ft/min]: 1.66×10^{-1} = 239.0 ft/d

Aquifer thickness [ft]: 14.50

2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	NEUMAN's method Unconfined aquifer with delayed watertable response	Project: UGW - NEW RIFLE Evaluated by: KP · Date: 23.10.1998

Pumping Test No. WELL 202 AQ TEST 2	Test conducted on: 8/17 - 8/19/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	



o OBS WELL 675

Transmissivity [ft²/min]: 5.15×10^{0}

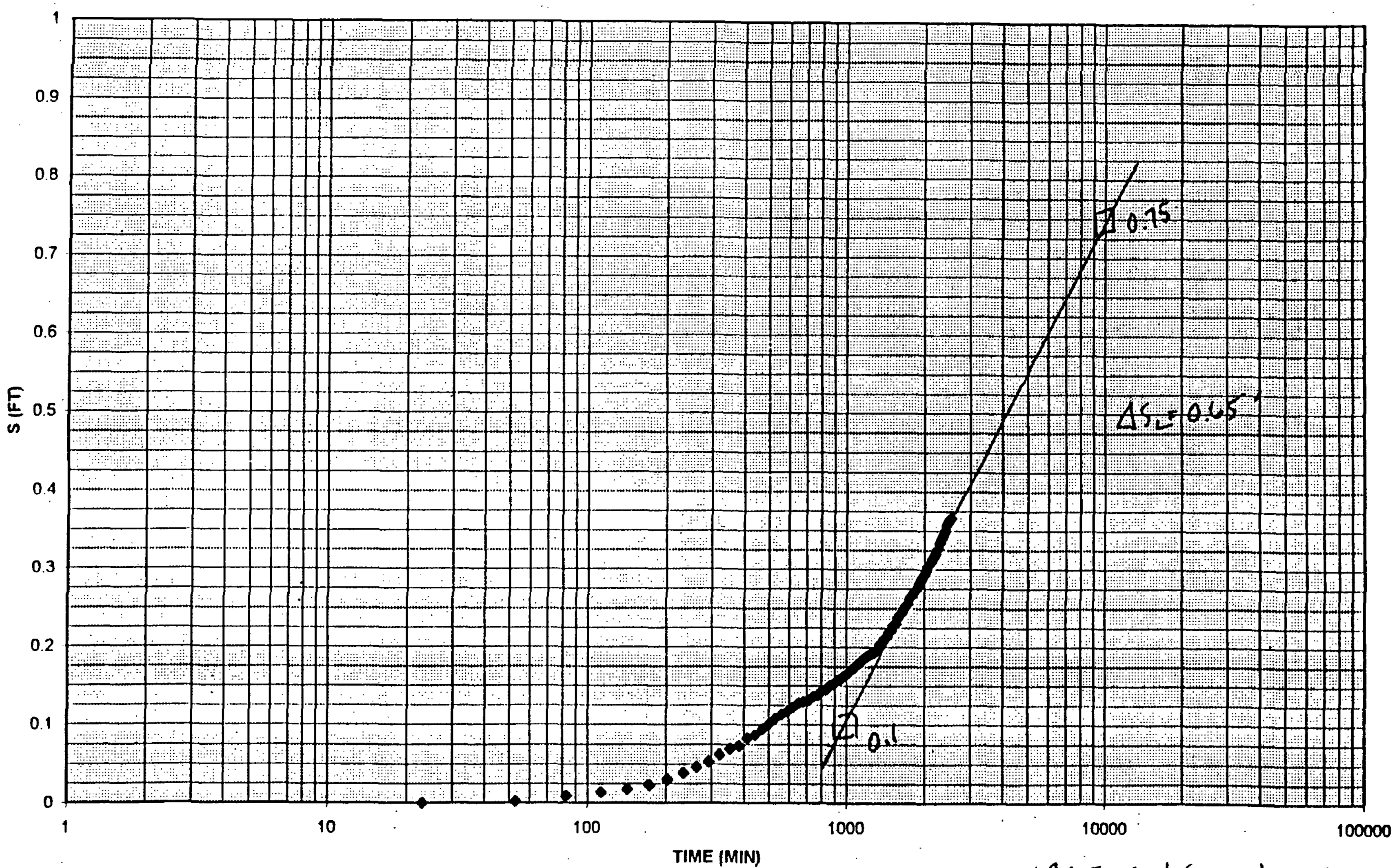
Hydraulic conductivity [ft/min]: 3.55×10^{-1} = 511.2 FT/D

Aquifer thickness [ft]: 14.50

Storativity: 6.09×10^{-6}

Specific yield: 6.09×10^{-2}

WELL 675 - AQ TEST 2 DATA
NEUMAN SEMI-LOG METHOD



$T_L = 0.1833 \left(\frac{80.5\ GPM}{0.65'}\right)(192.5) = \frac{4369.9\ Ft^2/D}{14.5'}$

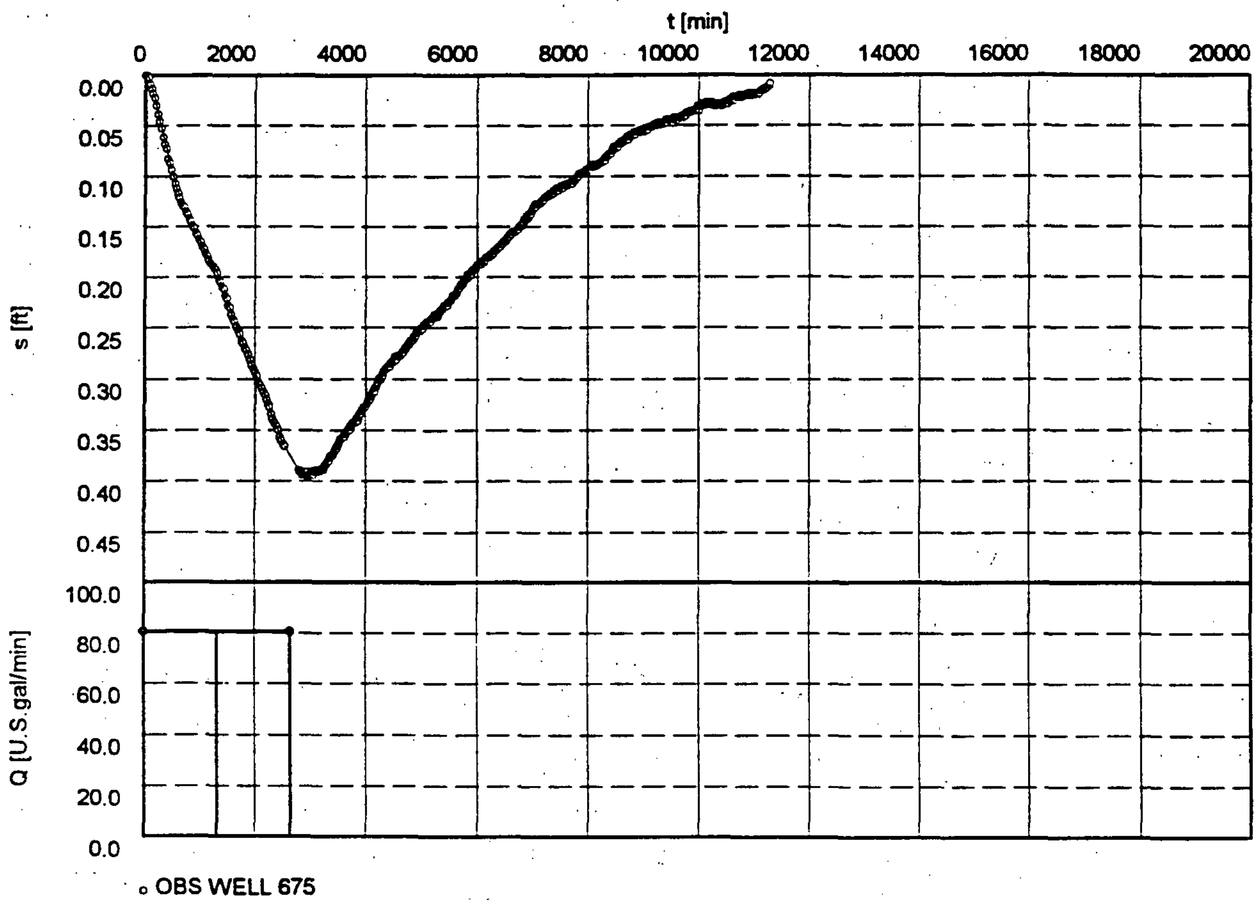
$K_L = \underline{301.4\ Ft/D}$

OBSERVATION WELL 675 RECOVERY DATA ANALYSES

WELL 202 AQ TEST 2

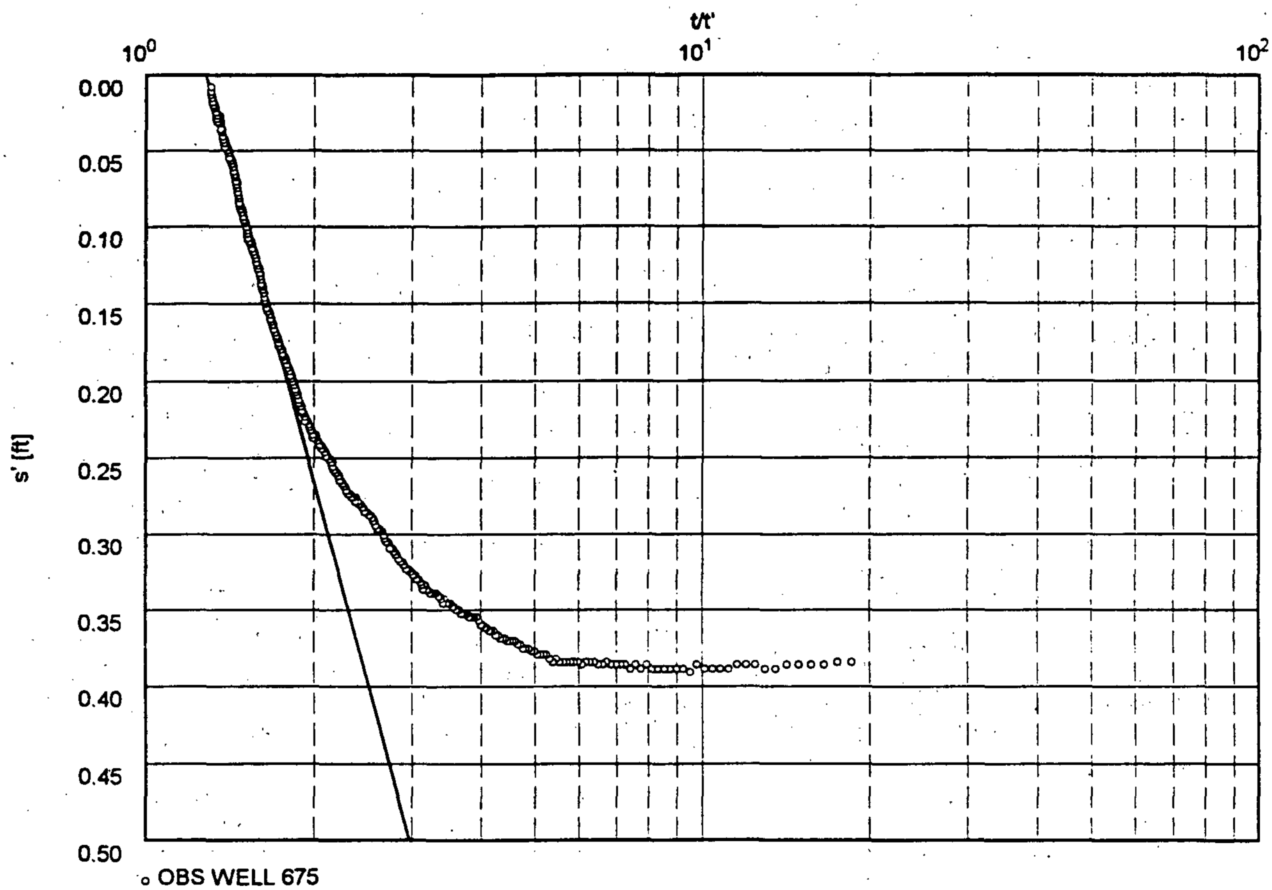
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 2	Test conducted on: 8/19 - 8/25/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	



2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. WELL 202 AQ REC TEST 2	Test conducted on: 8/19 - 8/25/98
OBS WELL 675	
Discharge 80.50 U.S.gal/min	
	Pumping test duration: 2640.00 min

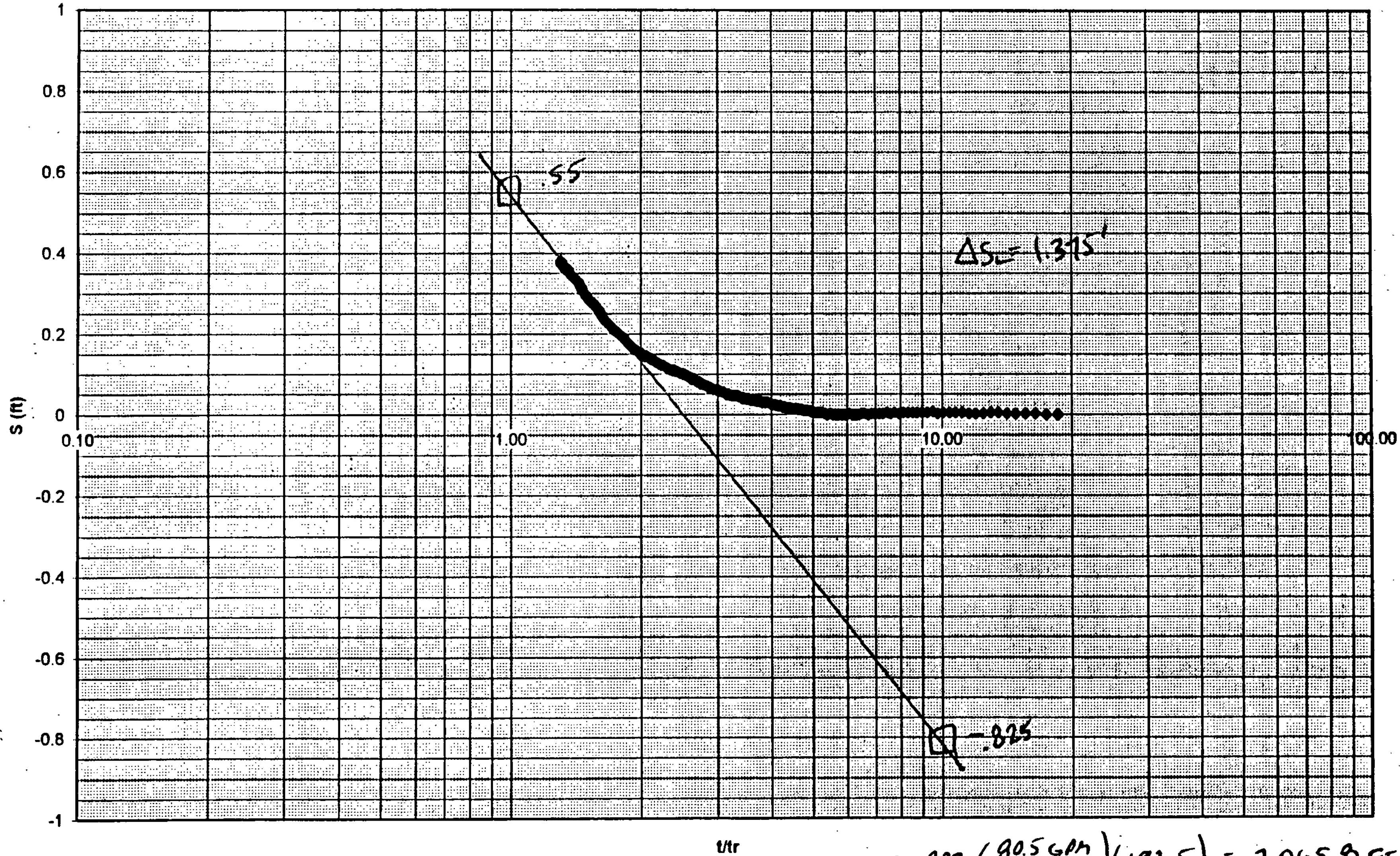


Transmissivity [ft²/min]: 1.44×10^{0}

Hydraulic conductivity [ft/min]: 9.95×10^{-2} = 143.3 FT/D

Aquifer thickness [ft]: 14.50

WELL 675 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



$$T_L = 0.1833\left(\frac{80.5\text{ GPM}}{1.375'}\right)(192.5) = \frac{2065.8\text{ FT}^2/\text{D}}{14.5'}$$

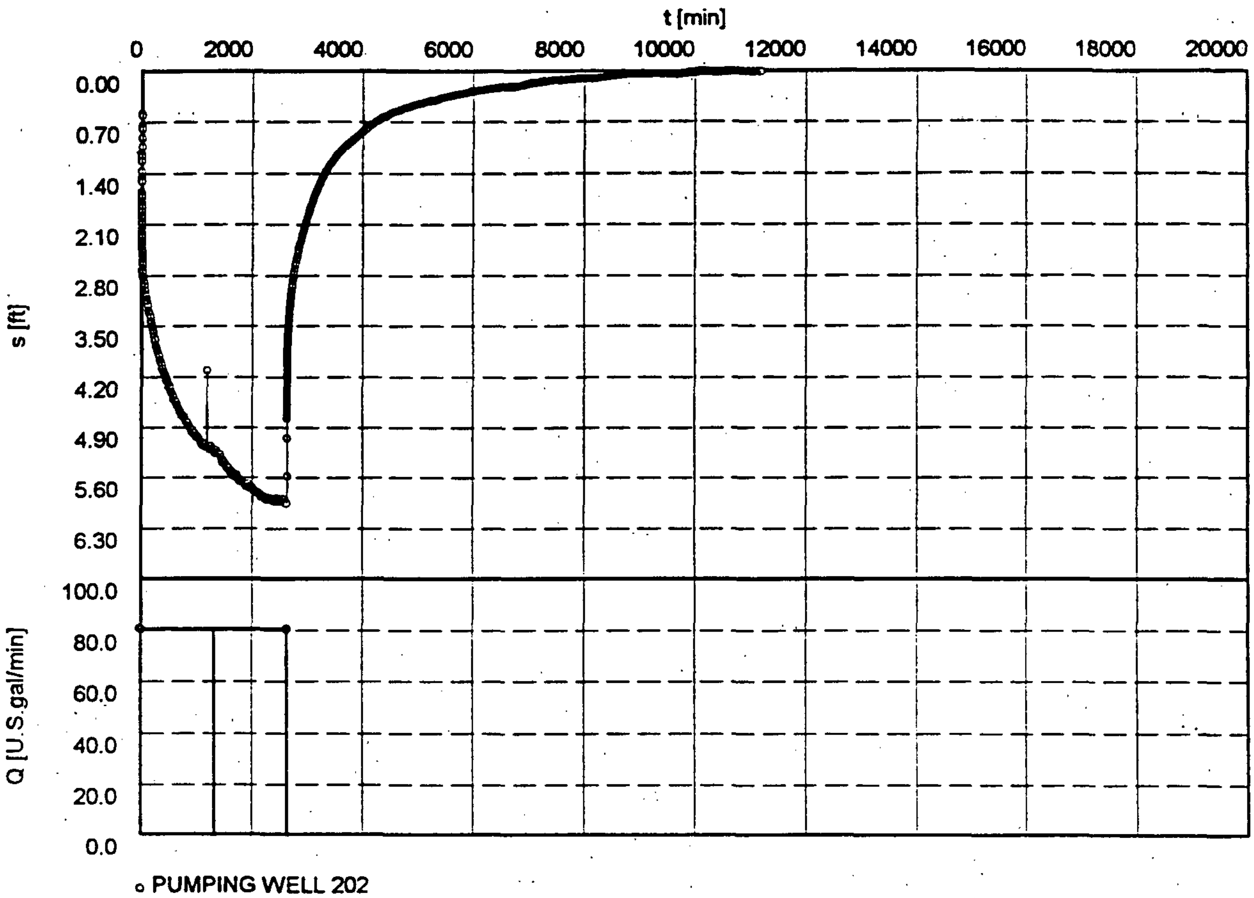
$K_L = \underline{142.5\text{ FT/D}}$

PUMPING WELL 202 RECOVERY DATA ANALYSES

WELL 202 AQ TEST 2

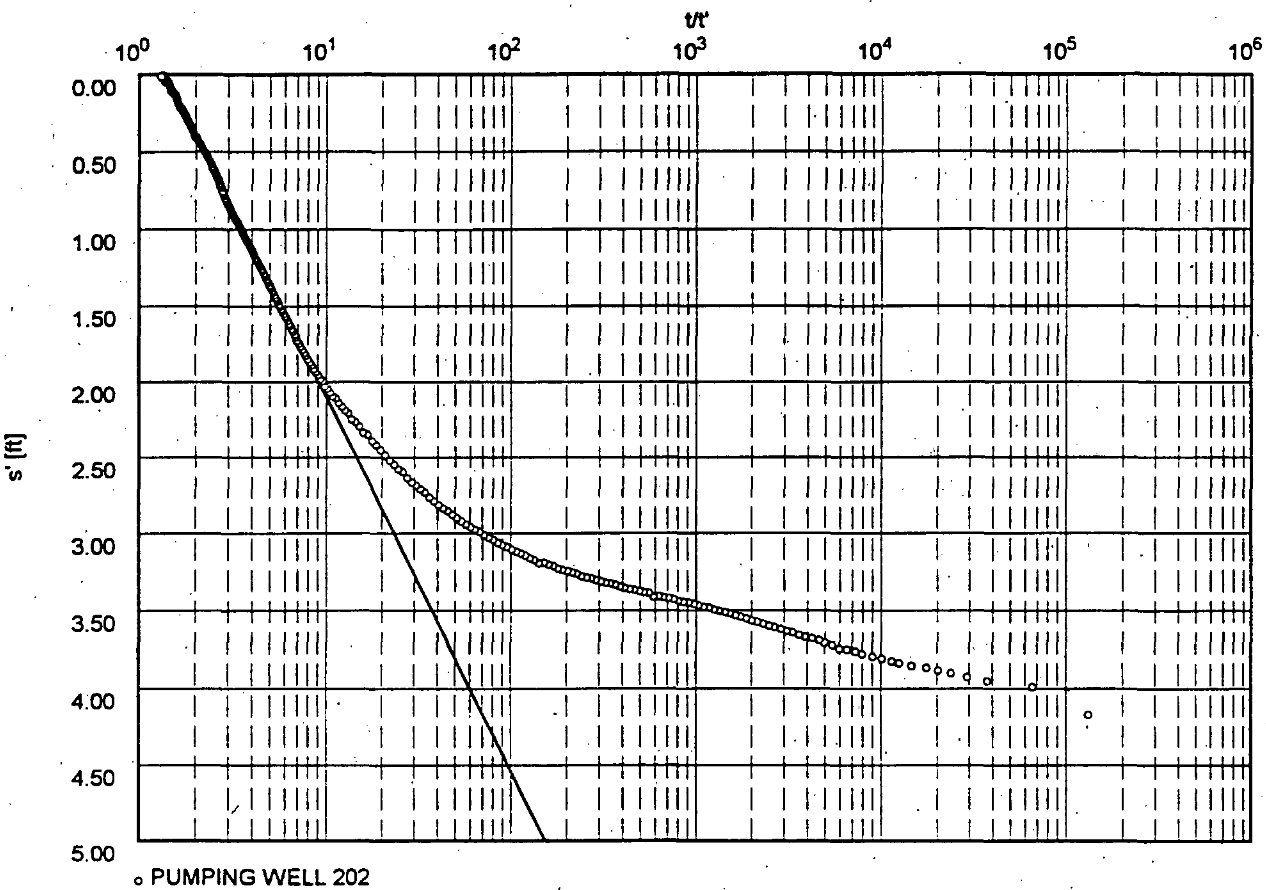
MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	Project: UGW - NEW RIFLE Evaluated by: KP Date: 23.10.1998

Pumping Test No. 202 AQ REC TEST 2	Test conducted on: 8/17 - 8/25/98
PUMPING WELL 202	
Discharge 80.50 U.S.gal/min	



2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Recovery method after THEIS & JACOB Unconfined aquifer	Project: UGW - NEW RIFLE Evaluated by: KP — Date: 23.10.1998

Pumping Test No. 202 AQ REC TEST 2	Test conducted on: 8/17 - 8/25/98
PUMPING WELL 202	
Discharge 80.50 U.S.gal/min	
	Pumping test duration: 2639.89 min

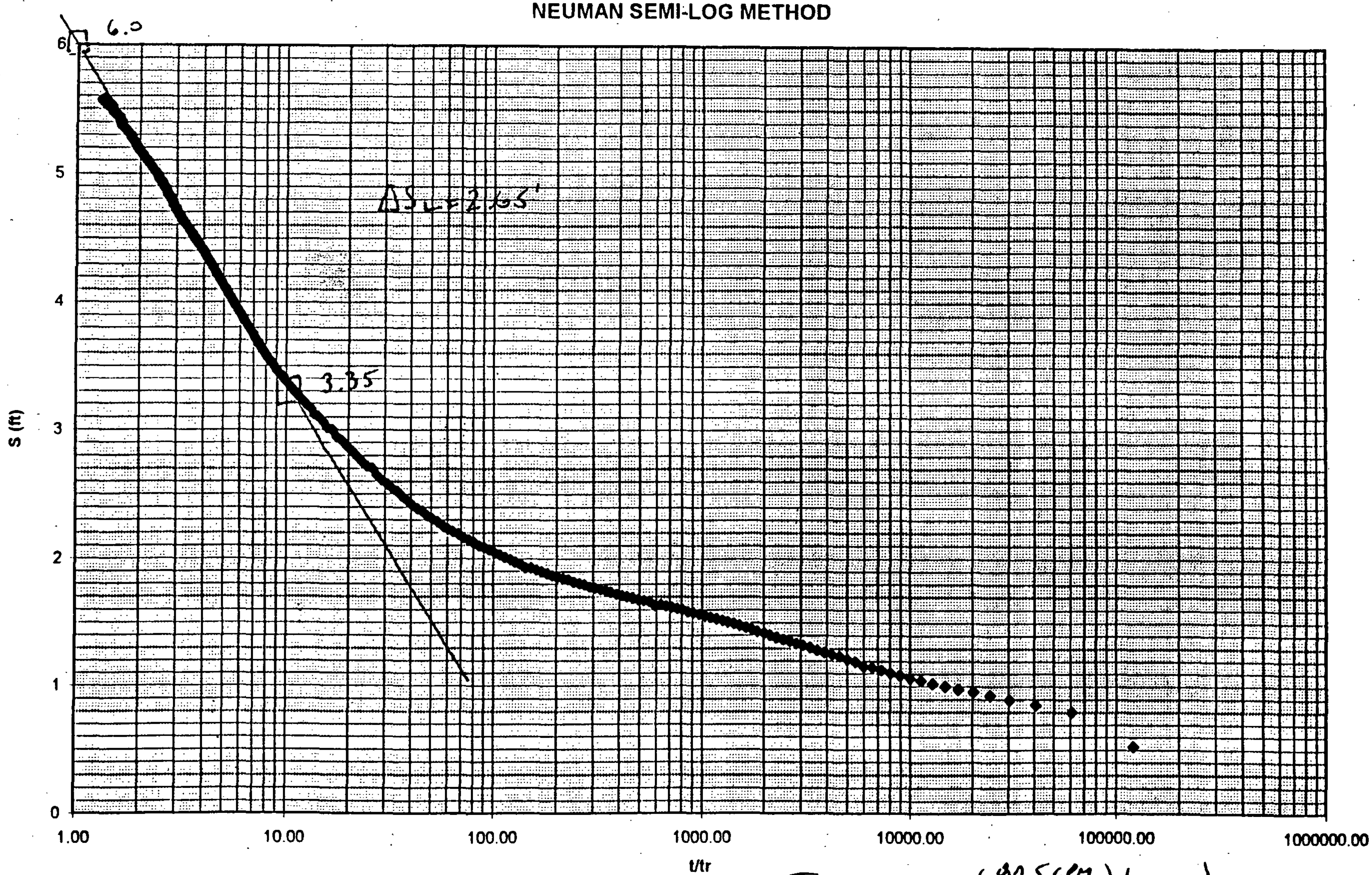


Transmissivity [ft²/min]: 8.08×10^{-1}

Hydraulic conductivity [ft/min]: 5.57×10^{-2} = 80.2 FT/D

Aquifer thickness [ft]: 14.50

WELL 202 - AQ REC TEST 2 DATA
NEUMAN SEMI-LOG METHOD



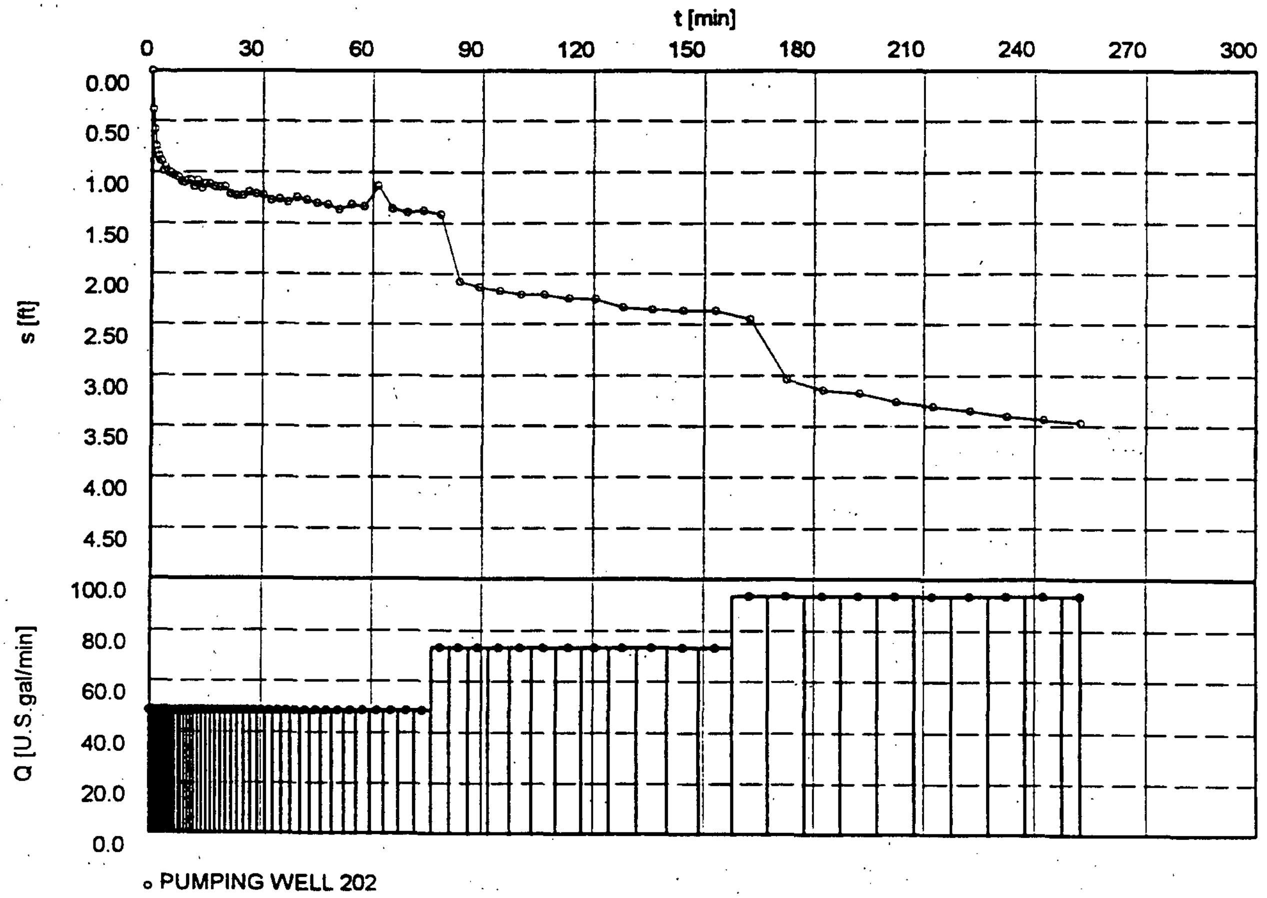
$T_L = 0.1833 \left(\frac{80.5\ GPM}{2.65'} \right)(192.5) = \frac{1071.9\ FT^2/D}{14.5'}$

$K_L = \underline{73.9\ FT/D}$

PUMPING WELL 202 STEP TEST ANALYSIS

MACTEC-ERS 2597 B 3/4 RD GRAND JUNCTION, COLO ph.(970)248-6000	Pumping test analysis Time-Drawdown plot with discharge	AQTEST CALC SET, Page 1 Project: UGW - NEW RIFLE Evaluated by: KP Date: 22.10.1998

Pumping Test No. WELL 202 STEP TEST	Test conducted on: 8/12/98
PUMPING WELL 202	
Discharge 73.30 U.S.gal/min	

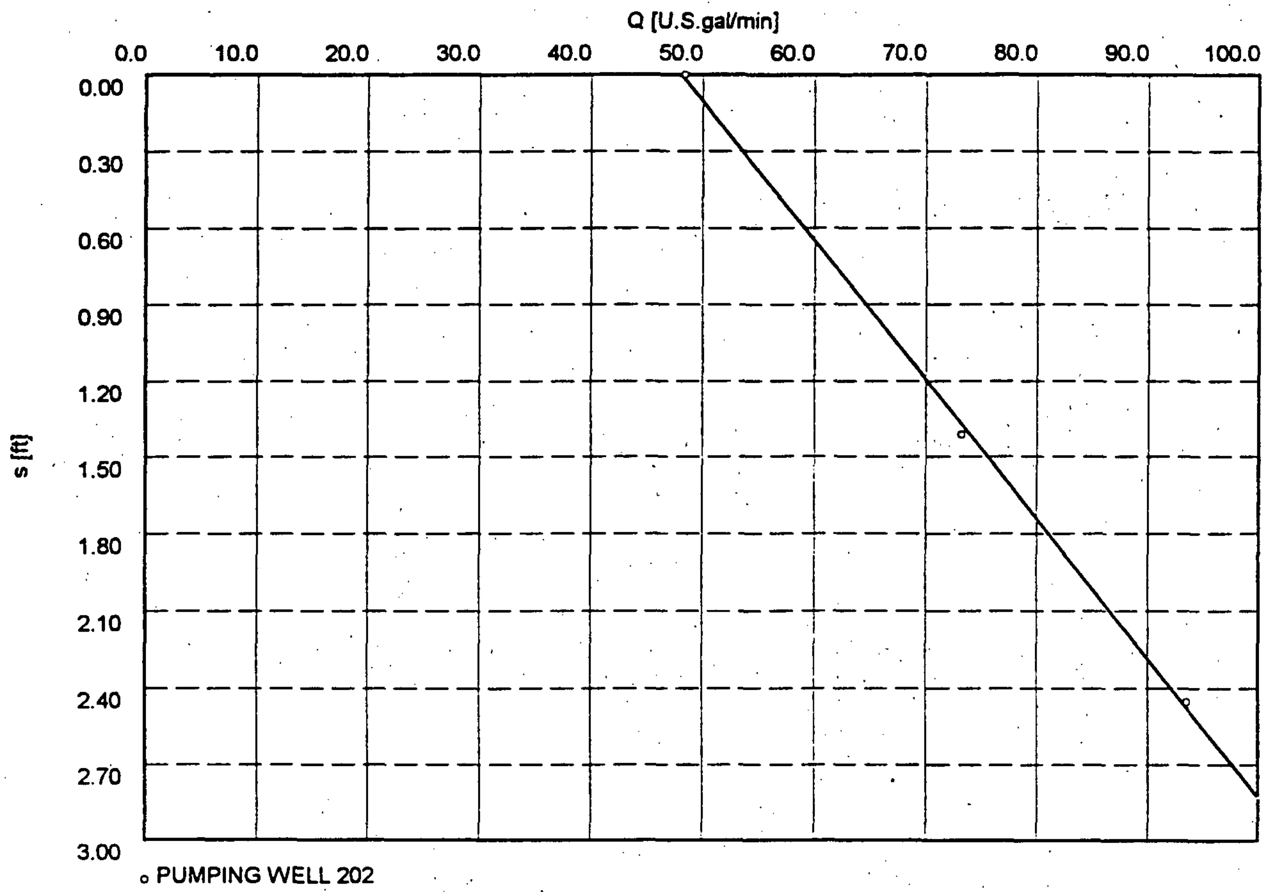


2597 B 3/4 RD
GRAND JUNCTION, COLO
ph.(970)248-6000

Well performance test
Determination of specific capacity

Project: UGW - NEW RIFLE	
Evaluated by: KP	Date: 22.10.1998

Pumping Test No. WELL 202 STEP TEST	Test conducted on: 8/12/98
PUMPING WELL 202	



specific capacity C [ft²/min]: 2.45×10^{0}

WELL 202 AQUIFER TEST 1 WATER LEVEL DATA

(WELLS 202, 677, & 197)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 202 AQUIFER TEST 1 WL DATA			AVG Q = 93.4 GPM		
FILE NAME : 202TEST1.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 202	WELL 677	WELL 197
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED					
	8/13/98 15:30:07	0	8.676	8.287	9.75
	8/13/98 15:30:10	0.0395	8.739	8.287	9.752
	8/13/98 15:30:12	0.0813	8.882	8.287	9.75
	8/13/98 15:30:15	0.1256	8.928	8.286	9.75
	8/13/98 15:30:18	0.1726	9.017	8.287	9.752
	8/13/98 15:30:21	0.2225	9.098	8.287	9.752
	8/13/98 15:30:24	0.2751	9.192	8.287	9.753
	8/13/98 15:30:27	0.331	9.298	8.287	9.753
	8/13/98 15:30:31	0.3901	9.436	8.289	9.754
	8/13/98 15:30:34	0.4528	9.491	8.289	9.756
	8/13/98 15:30:38	0.5191	9.634	8.29	9.76
	8/13/98 15:30:43	0.5895	9.821	8.291	9.763
	8/13/98 15:30:47	0.664	9.93	8.296	9.766
	8/13/98 15:30:52	0.743	10.068	8.302	9.77
	8/13/98 15:30:57	0.8266	10.165	8.306	9.776
	8/13/98 15:31:02	0.9151	10.188	8.313	9.782
	8/13/98 15:31:08	1.009	10.265	8.319	9.788
	8/13/98 15:31:14	1.1083	10.343	8.328	9.794
	8/13/98 15:31:20	1.2136	10.377	8.337	9.801
	8/13/98 15:31:27	1.3251	10.409	8.347	9.81
	8/13/98 15:31:34	1.4433	10.472	8.358	9.814
	8/13/98 15:31:41	1.5685	10.492	8.366	9.821
	8/13/98 15:31:49	1.701	10.538	8.373	9.826
	8/13/98 15:31:58	1.8415	10.57	8.382	9.833
	8/13/98 15:32:07	1.9903	10.601	8.393	9.842
	8/13/98 15:32:16	2.1478	10.644	8.405	9.85
	8/13/98 15:32:26	2.3146	10.676	8.416	9.859
	8/13/98 15:32:37	2.4915	10.736	8.428	9.868
	8/13/98 15:32:48	2.6788	10.727	8.44	9.874
	8/13/98 15:33:00	2.8771	10.75	8.45	9.881
	8/13/98 15:33:12	3.0873	10.788	8.462	9.888
	8/13/98 15:33:26	3.31	10.831	8.478	9.901
	8/13/98 15:33:40	3.5458	10.848	8.498	9.911
	8/13/98 15:33:55	3.7956	10.865	8.511	9.919
	8/13/98 15:34:11	4.0603	10.891	8.527	9.926
	8/13/98 15:34:28	4.3406	10.917	8.541	9.937
	8/13/98 15:34:45	4.6375	10.92	8.55	9.943
	8/13/98 15:35:04	4.952	10.96	8.568	9.955
	8/13/98 15:35:24	5.2851	10.986	8.584	9.964
	8/13/98 15:35:45	5.638	11.006	8.595	9.972
	8/13/98 15:36:08	6.0118	10.991	8.607	9.982
	8/13/98 15:36:32	6.4078	11.023	8.621	9.99
	8/13/98 15:36:57	6.8271	11.026	8.637	9.998

	8/13/98 15:37:23	7.2715	11.054	8.65	10.007
	8/13/98 15:37:52	7.7421	11.04	8.658	10.014
	8/13/98 15:38:22	8.2406	11.017	8.674	10.022
	8/13/98 15:38:53	8.7686	10.934	8.682	10.029
	8/13/98 15:39:27	9.328	10.934	8.684	10.033
	8/13/98 15:40:02	9.9205	10.931	8.704	10.045
	8/13/98 15:40:40	10.548	10.928	8.707	10.048
	8/13/98 15:41:20	11.2128	10.994	8.713	10.051
	8/13/98 15:42:02	11.917	11.06	8.717	10.054
	8/13/98 15:42:47	12.6628	11.143	8.728	10.065
	8/13/98 15:43:34	13.4528	11.163	8.758	10.088
	8/13/98 15:44:25	14.2896	11.221	8.775	10.099
	8/13/98 15:45:18	15.1761	11.215	8.78	10.106
	8/13/98 15:46:14	16.1151	11.204	8.794	10.117
	8/13/98 15:47:14	17.1098	11.221	8.81	10.125
	8/13/98 15:48:17	18.1635	11.261	8.825	10.136
	8/13/98 15:49:24	19.2795	11.284	8.829	10.144
	8/13/98 15:50:35	20.4616	11.27	8.839	10.151
	8/13/98 15:51:50	21.7138	11.287	8.847	10.158
	8/13/98 15:53:10	23.0403	11.318	8.87	10.174
	8/13/98 15:54:34	24.4453	11.333	8.89	10.186
	8/13/98 15:56:03	25.9336	11.333	8.898	10.189
	8/13/98 15:57:38	27.5101	11.35	8.916	10.205
	8/13/98 15:59:18	29.18	11.356	8.932	10.21
	8/13/98 16:01:04	30.9488	11.381	8.953	10.223
	8/13/98 16:02:57	32.8225	11.399	8.969	10.234
	8/13/98 16:04:56	34.8071	11.436	8.988	10.241
	8/13/98 16:07:02	36.9095	11.442	9.001	10.255
	8/13/98 16:09:15	39.1363	11.456	9.025	10.267
	8/13/98 16:11:37	41.4951	11.456	9.046	10.279
	8/13/98 16:14:07	43.9938	11.482	9.065	10.289
	8/13/98 16:16:46	46.6405	11.519	9.091	10.3
	8/13/98 16:19:34	49.444	11.516	9.113	10.313
	8/13/98 16:22:32	52.4136	11.531	9.129	10.322
	8/13/98 16:25:41	55.5593	11.568	9.148	10.335
	8/13/98 16:29:01	58.8913	11.614	9.178	10.354
	8/13/98 16:32:32	62.4208	11.622	9.209	10.371
	8/13/98 16:36:17	66.1593	11.654	9.239	10.386
	8/13/98 16:40:14	70.1195	11.694	9.271	10.405
	8/13/98 16:44:26	74.3143	11.757	9.303	10.425
	8/13/98 16:48:53	78.7576	11.76	9.342	10.445
	8/13/98 16:53:35	83.4643	11.8	9.379	10.463
	8/13/98 16:58:34	88.4498	11.815	9.413	10.48
	8/13/98 17:03:51	93.7306	11.866	9.448	10.499
	8/13/98 17:09:27	99.3245	11.881	9.488	10.518
	8/13/98 17:15:22	105.2498	11.932	9.533	10.543
	8/13/98 17:21:39	111.5261	11.975	9.578	10.566
	8/13/98 17:28:18	118.1745	12.007	9.621	10.589
	8/13/98 17:35:20	125.2166	12.053	9.666	10.617
	8/13/98 17:42:48	132.6761	12.09	9.714	10.643
	8/13/98 17:50:42	140.5776	12.127	9.762	10.67

	8/13/98 17:59:04	148.9473	12.17	9.803	10.698
	8/13/98 18:07:56	157.813	12.202	9.838	10.727
	8/13/98 18:17:19	167.204	12.219	9.877	10.753
	8/13/98 18:27:16	177.1515	12.279	9.922	10.779
	8/13/98 18:37:16	187.1515	12.322	9.961	10.807
	8/13/98 18:47:16	197.1515	12.351	10.003	10.836
	8/13/98 18:57:16	207.1515	12.408	10.043	10.865
	8/13/98 19:07:16	217.1515	12.446	10.086	10.894
	8/13/98 19:17:16	227.1515	12.503	10.127	10.922
	8/13/98 19:27:16	237.1515	12.532	10.168	10.949
	8/13/98 19:37:16	247.1515	12.583	10.21	10.978
	8/13/98 19:47:16	257.1515	12.595	10.255	11.006
	8/13/98 19:57:16	267.1515	12.632	10.295	11.033
	8/13/98 20:07:16	277.1515	12.686	10.335	11.059
	8/13/98 20:17:16	287.1515	12.724	10.371	11.087
	8/13/98 20:27:16	297.1515	12.741	10.407	11.115
	8/13/98 20:37:16	307.1515	12.787	10.441	11.139
	8/13/98 20:47:16	317.1515	12.815	10.474	11.167
	8/13/98 20:57:16	327.1515	12.861	10.506	11.193
	8/13/98 21:07:16	337.1515	12.893	10.535	11.218
	8/13/98 21:17:16	347.1515	12.922	10.564	11.244
	8/13/98 21:27:16	357.1515	12.945	10.588	11.268
	8/13/98 21:37:16	367.1515	12.976	10.609	11.292
	8/13/98 21:47:16	377.1515	12.985	10.628	11.316
	8/13/98 21:57:16	387.1515	13.025	10.643	11.338
	8/13/98 22:07:16	397.1515	13.062	10.654	11.358
	8/13/98 22:17:16	407.1515	13.071	10.662	11.383
	8/13/98 22:27:16	417.1515	13.082	10.667	11.405
	8/13/98 22:37:16	427.1515	13.111	10.67	11.424
	8/13/98 22:47:16	437.1515	13.151	10.675	11.447
	8/13/98 22:57:16	447.1515	13.185	10.676	11.467
	8/13/98 23:07:16	457.1515	13.223	10.678	11.487
	8/13/98 23:17:16	467.1515	13.246	10.678	11.506
	8/13/98 23:27:16	477.1515	13.277	10.676	11.525
	8/13/98 23:37:16	487.1515	13.289	10.676	11.546
	8/13/98 23:47:16	497.1515	13.323	10.676	11.564
	8/13/98 23:57:16	507.1515	13.346	10.676	11.583
	8/14/98 0:07:16	517.1515	13.352	10.678	11.601
	8/14/98 0:17:16	527.1515	13.363	10.678	11.618
	8/14/98 0:27:16	537.1515	13.4	10.675	11.634
	8/14/98 0:37:16	547.1515	13.441	10.673	11.651
	8/14/98 0:47:16	557.1515	13.449	10.67	11.667
	8/14/98 0:57:16	567.1515	13.449	10.672	11.683
	8/14/98 1:07:16	577.1515	13.469	10.672	11.701
	8/14/98 1:17:16	587.1515	13.475	10.67	11.714
	8/14/98 1:27:16	597.1515	13.504	10.666	11.73
	8/14/98 1:37:16	607.1515	13.512	10.666	11.744
	8/14/98 1:47:16	617.1515	13.532	10.662	11.759
	8/14/98 1:57:16	627.1515	13.544	10.659	11.773
	8/14/98 2:07:16	637.1515	13.59	10.662	11.789
	8/14/98 2:17:16	647.1515	13.587	10.667	11.802

	8/14/98 2:27:16	657.1515	13.593	10.663	11.814
	8/14/98 2:37:16	667.1515	13.613	10.662	11.83
	8/14/98 2:47:16	677.1515	13.63	10.663	11.843
	8/14/98 2:57:16	687.1515	13.621	10.662	11.857
	8/14/98 3:07:16	697.1515	13.667	10.662	11.868
	8/14/98 3:17:16	707.1515	13.673	10.662	11.882
	8/14/98 3:27:16	717.1515	13.681	10.663	11.895
	8/14/98 3:37:16	727.1515	13.724	10.659	11.907
	8/14/98 3:47:16	737.1515	13.727	10.659	11.918
	8/14/98 3:57:16	747.1515	13.727	10.659	11.931
	8/14/98 4:07:16	757.1515	13.782	10.66	11.943
	8/14/98 4:17:16	767.1515	13.765	10.659	11.955
	8/14/98 4:27:16	777.1515	13.77	10.657	11.968
	8/14/98 4:37:16	787.1515	13.802	10.657	11.979
	8/14/98 4:47:16	797.1515	13.799	10.656	11.99
	8/14/98 4:57:16	807.1515	13.83	10.653	12.001
	8/14/98 5:07:16	817.1515	13.833	10.653	12.014
	8/14/98 5:17:16	827.1515	13.862	10.65	12.024
	8/14/98 5:27:16	837.1515	13.859	10.649	12.035
	8/14/98 5:37:16	847.1515	13.868	10.65	12.046
	8/14/98 5:47:16	857.1515	13.896	10.649	12.059
	8/14/98 5:57:16	867.1515	13.862	11.251	12.069
	8/14/98 6:07:16	877.1515	13.954	11.247	12.079
	8/14/98 6:17:16	887.1515	13.931	11.246	12.091
	8/14/98 6:27:16	897.1515	13.957	11.244	12.103
	8/14/98 6:37:16	907.1515	13.982	11.247	12.114
	8/14/98 6:47:16	917.1515	13.988	11.246	12.123
	8/14/98 6:57:16	927.1515	14	11.244	12.135
	8/14/98 7:07:16	937.1515	14.023	11.243	12.143
	8/14/98 7:17:16	947.1515	14.023	11.241	12.155
	8/14/98 7:27:16	957.1515	14.028	11.24	12.165
	8/14/98 7:37:16	967.1515	14.048	11.238	12.177
	8/14/98 7:47:16	977.1515	14.057	11.241	12.185
	8/14/98 7:57:16	987.1515	14.057	11.237	12.196
	8/14/98 8:07:16	997.1515	14.086	11.235	12.203
	8/14/98 8:17:16	1007.1515	14.091	11.23	12.214
	8/14/98 8:27:16	1017.1515	14.123	11.231	12.226
	8/14/98 8:37:16	1027.1515	14.114	11.225	12.235
	8/14/98 8:47:16	1037.1515	14.131	11.225	12.245
	8/14/98 8:57:16	1047.1515	14.129	11.218	12.254
	8/14/98 9:07:16	1057.1515	14.143	11.212	12.262
	8/14/98 9:17:16	1067.1515	14.152	11.208	12.274
	8/14/98 9:27:16	1077.1515	14.166	11.401	12.281
	8/14/98 9:37:16	1087.1515	14.189	11.392	12.29
	8/14/98 9:47:16	1097.1515	14.177	11.389	12.299
	8/14/98 9:57:16	1107.1515	14.2	11.384	12.31
	8/14/98 10:07:16	1117.1515	14.189	11.375	12.317
	8/14/98 10:17:16	1127.1515	14.212	11.369	12.325
	8/14/98 10:27:16	1137.1515	14.243	11.359	12.332
	8/14/98 10:37:16	1147.1515	14.223	11.356	12.344
	8/14/98 10:47:16	1157.1515	14.232	11.5	12.351

	8/14/98 10:57:16	1167.1515	14.246	11.506	12.361
	8/14/98 11:07:16	1177.1515	14.246	11.503	12.368
	8/14/98 11:17:16	1187.1515	14.269	11.497	12.377
	8/14/98 11:27:16	1197.1515	14.275	11.492	12.386
	8/14/98 11:37:16	1207.1515	14.286	11.482	12.393
	8/14/98 11:47:16	1217.1515	14.286	11.477	12.402
	8/14/98 11:57:16	1227.1515	14.286	11.468	12.409
	8/14/98 12:07:16	1237.1515	14.315	11.437	12.412
	8/14/98 12:17:16	1247.1515	14.315	11.434	12.42
	8/14/98 12:27:16	1257.1515	14.229	11.433	12.42
	8/14/98 12:37:16	1267.1515	14.278	11.495	12.432
	8/14/98 12:47:16	1277.1515	14.283	11.501	12.441
	8/14/98 12:57:16	1287.1515	14.289	11.497	12.449
	8/14/98 13:07:16	1297.1515	14.289	11.492	12.455
	8/14/98 13:17:16	1307.1515	14.301	11.481	12.464
PUMP STOPPED					
	8/14/98 13:29:59	1319.9	14.031	11.553	12.473
	8/14/98 13:30:00	1319.9222	13.289	11.553	12.474
	8/14/98 13:30:01	1319.9457	12.919	11.551	12.474
	8/14/98 13:30:03	1319.9705	12.931	11.553	12.473
	8/14/98 13:30:04	1319.9969	12.868	11.551	12.474
	8/14/98 13:30:06	1320.0249	12.83	11.551	12.473
	8/14/98 13:30:08	1320.0545	12.796	11.551	12.473
	8/14/98 13:30:10	1320.0859	12.764	11.551	12.471
	8/14/98 13:30:12	1320.119	12.73	11.55	12.471
	8/14/98 13:30:14	1320.1542	12.701	11.55	12.47
	8/14/98 13:30:16	1320.1915	12.67	11.549	12.468
	8/14/98 13:30:18	1320.231	12.658	11.549	12.468
	8/14/98 13:30:21	1320.2729	12.612	11.549	12.464
	8/14/98 13:30:24	1320.3172	12.584	11.549	12.461
	8/14/98 13:30:26	1320.3642	12.558	11.549	12.458
	8/14/98 13:30:29	1320.414	12.532	11.549	12.454
	8/14/98 13:30:33	1320.4667	12.503	11.55	12.453
	8/14/98 13:30:36	1320.5225	12.475	11.55	12.45
	8/14/98 13:30:39	1320.5817	12.449	11.551	12.448
	8/14/98 13:30:43	1320.6444	12.42	11.551	12.447
	8/14/98 13:30:47	1320.7107	12.394	11.551	12.445
	8/14/98 13:30:51	1320.781	12.369	11.551	12.442
	8/14/98 13:30:56	1320.8555	12.348	11.551	12.439
	8/14/98 13:31:01	1320.9345	12.326	11.551	12.434
	8/14/98 13:31:06	1321.0182	12.303	11.549	12.429
	8/14/98 13:31:11	1321.1067	12.28	11.546	12.425
	8/14/98 13:31:17	1321.2005	12.26	11.543	12.421
	8/14/98 13:31:22	1321.2999	12.24	11.543	12.418
	8/14/98 13:31:29	1321.4052	12.222	11.543	12.416
	8/14/98 13:31:36	1321.5167	12.205	11.543	12.412
	8/14/98 13:31:43	1321.6349	12.188	11.541	12.409
	8/14/98 13:31:50	1321.76	12.176	11.543	12.408
	8/14/98 13:31:58	1321.8925	12.156	11.543	12.405
	8/14/98 13:32:06	1322.033	12.142	11.543	12.402
	8/14/98 13:32:15	1322.1819	12.125	11.543	12.399

	8/14/98 13:32:25	1322.3394	12.116	11.546	12.396
	8/14/98 13:32:35	1322.5062	12.102	11.547	12.396
	8/14/98 13:32:45	1322.683	12.093	11.55	12.395
	8/14/98 13:32:57	1322.8704	12.082	11.551	12.393
	8/14/98 13:33:09	1323.0687	12.067	11.551	12.387
	8/14/98 13:33:21	1323.2789	12.056	11.551	12.386
	8/14/98 13:33:35	1323.5015	12.045	11.551	12.38
	8/14/98 13:33:49	1323.7374	12.033	11.553	12.379
	8/14/98 13:34:04	1323.9872	12.022	11.554	12.376
	8/14/98 13:34:20	1324.2519	12.01	11.554	12.373
	8/14/98 13:34:36	1324.5322	11.999	11.551	12.371
	8/14/98 13:34:54	1324.829	11.987	11.551	12.367
	8/14/98 13:35:13	1325.1435	11.97	11.547	12.363
	8/14/98 13:35:33	1325.4767	11.956	11.543	12.357
	8/14/98 13:35:54	1325.8295	11.947	11.541	12.355
	8/14/98 13:36:17	1326.2034	11.93	11.537	12.351
	8/14/98 13:36:40	1326.5994	11.915	11.537	12.35
	8/14/98 13:37:06	1327.0187	11.904	11.535	12.342
	8/14/98 13:37:32	1327.463	11.893	11.541	12.342
	8/14/98 13:38:01	1327.9337	11.875	11.54	12.341
	8/14/98 13:38:30	1328.4322	11.867	11.541	12.336
	8/14/98 13:39:02	1328.9602	11.852	11.54	12.329
	8/14/98 13:39:36	1329.5195	11.838	11.541	12.325
	8/14/98 13:40:11	1330.112	11.821	11.538	12.319
	8/14/98 13:40:49	1330.7395	11.806	11.54	12.318
	8/14/98 13:41:29	1331.4044	11.795	11.585	12.313
	8/14/98 13:42:11	1332.1085	11.775	11.575	12.305
	8/14/98 13:42:56	1332.8544	11.755	11.576	12.302
	8/14/98 13:43:43	1333.6444	11.743	11.582	12.3
	8/14/98 13:44:33	1334.4812	11.726	11.585	12.293
	8/14/98 13:45:27	1335.3677	11.712	11.583	12.287
	8/14/98 13:46:23	1336.3067	11.692	11.576	12.28
	8/14/98 13:47:23	1337.3014	11.68	11.588	12.277
	8/14/98 13:48:26	1338.355	11.654	11.573	12.265
	8/14/98 13:49:33	1339.471	11.637	11.575	12.262
	8/14/98 13:50:44	1340.6532	11.617	11.573	12.252
	8/14/98 13:51:59	1341.9054	11.603	11.582	12.249
	8/14/98 13:53:18	1343.2319	11.586	11.586	12.244
	8/14/98 13:54:43	1344.6369	11.554	11.563	12.228
	8/14/98 13:56:12	1346.1252	11.534	11.563	12.222
	8/14/98 13:57:47	1347.7017	11.517	11.576	12.225
	8/14/98 13:59:27	1349.3715	11.491	11.569	12.21
	8/14/98 14:01:13	1351.1404	11.471	11.567	12.203
	8/14/98 14:03:05	1353.014	11.454	11.567	12.197
	8/14/98 14:05:04	1354.9987	11.442	11.579	12.191
	8/14/98 14:07:11	1357.101	11.411	11.567	12.178
	8/14/98 14:09:24	1359.3279	11.379	11.566	12.17
	8/14/98 14:11:46	1361.6867	11.353	11.562	12.159
	8/14/98 14:14:16	1364.1854	11.339	11.573	12.159
	8/14/98 14:16:54	1366.832	11.313	11.576	12.149
	8/14/98 14:19:43	1369.6355	11.287	11.575	12.138

	8/14/98 14:22:41	1372.6052	11.256	11.57	12.125
	8/14/98 14:25:50	1375.7509	11.221	11.556	12.117
	8/14/98 14:29:09	1379.0829	11.198	11.544	12.106
	8/14/98 14:32:41	1382.6124	11.164	11.527	12.093
	8/14/98 14:36:26	1386.3509	11.138	11.537	12.087
	8/14/98 14:40:23	1390.311	11.107	11.544	12.071
	8/14/98 14:44:35	1394.5059	11.064	11.537	12.052
	8/14/98 14:49:01	1398.9492	11.044	11.549	12.042
	8/14/98 14:53:44	1403.6559	11.009	11.55	12.03
	8/14/98 14:58:43	1408.6414	10.978	11.544	12.013
	8/14/98 15:04:00	1413.9222	10.952	11.549	11.996
	8/14/98 15:09:35	1419.516	10.926	11.549	11.982
	8/14/98 15:15:31	1425.4414	10.886	11.541	11.962
	8/14/98 15:21:48	1431.7177	10.84	11.524	11.94
	8/14/98 15:28:26	1438.366	10.803	11.521	11.922
	8/14/98 15:35:29	1445.4082	10.762	11.509	11.903
	8/14/98 15:42:57	1452.8677	10.734	11.501	11.882
	8/14/98 15:50:51	1460.7692	10.699	11.493	11.864
	8/14/98 15:59:13	1469.1389	10.668	11.47	11.837
	8/14/98 16:08:05	1478.0045	10.622	11.432	11.811
	8/14/98 16:17:28	1487.3955	10.59	11.405	11.788
	8/14/98 16:27:25	1497.343	10.536	11.344	11.755
	8/14/98 16:37:25	1507.343	10.501	11.3	11.73
	8/14/98 16:47:25	1517.343	10.467	11.251	11.704
	8/14/98 16:57:25	1527.343	10.435	11.204	11.678
	8/14/98 17:07:25	1537.343	10.398	11.149	11.65
	8/14/98 17:17:25	1547.343	10.358	11.084	11.626
	8/14/98 17:27:25	1557.343	10.318	11.02	11.592
	8/14/98 17:37:25	1567.343	10.292	10.962	11.569
	8/14/98 17:47:25	1577.343	10.252	10.854	11.543
	8/14/98 17:57:25	1587.343	10.223	10.744	11.517
	8/14/98 18:07:25	1597.343	10.189	10.657	11.488
	8/14/98 18:17:25	1607.343	10.157	10.575	11.46
	8/14/98 18:27:25	1617.343	10.131	10.522	11.433
	8/14/98 18:37:25	1627.343	10.103	10.476	11.405
	8/14/98 18:47:25	1637.343	10.071	10.439	11.379
	8/14/98 18:57:25	1647.343	10.039	10.392	11.35
	8/14/98 19:07:25	1657.343	10.011	10.338	11.325
	8/14/98 19:17:25	1667.343	9.982	10.299	11.299
	8/14/98 19:27:25	1677.343	9.959	10.264	11.272
	8/14/98 19:37:25	1687.343	9.928	10.225	11.241
	8/14/98 19:47:25	1697.343	9.902	10.179	11.213
	8/14/98 19:57:25	1707.343	9.879	10.135	11.186
	8/14/98 20:07:25	1717.343	9.853	10.096	11.16
	8/14/98 20:17:25	1727.343	9.833	10.058	11.135
	8/14/98 20:27:25	1737.343	9.81	10.019	11.11
	8/14/98 20:37:25	1747.343	9.793	9.985	11.092
	8/14/98 20:47:25	1757.343	9.77	9.952	11.068
	8/14/98 20:57:25	1767.343	9.752	9.924	11.048
	8/14/98 21:07:25	1777.343	9.738	9.898	11.029
	8/14/98 21:17:25	1787.343	9.718	9.872	11.01

	8/14/98 21:27:25	1797.343	9.701	9.846	10.994
	8/14/98 21:37:25	1807.343	9.684	9.821	10.977
	8/14/98 21:47:25	1817.343	9.666	9.795	10.958
	8/14/98 21:57:25	1827.343	9.649	9.773	10.942
	8/14/98 22:07:25	1837.343	9.635	9.751	10.926
	8/14/98 22:17:25	1847.343	9.615	9.728	10.909
	8/14/98 22:27:25	1857.343	9.6	9.708	10.896
	8/14/98 22:37:25	1867.343	9.586	9.688	10.883
	8/14/98 22:47:25	1877.343	9.572	9.67	10.87
	8/14/98 22:57:25	1887.343	9.56	9.65	10.856
	8/14/98 23:07:25	1897.343	9.546	9.629	10.843
	8/14/98 23:17:25	1907.343	9.532	9.611	10.83
	8/14/98 23:27:25	1917.343	9.517	9.595	10.817
	8/14/98 23:37:25	1927.343	9.506	9.577	10.806
	8/14/98 23:47:25	1937.343	9.494	9.561	10.795
	8/14/98 23:57:25	1947.343	9.483	9.544	10.782
	8/15/98 0:07:25	1957.343	9.471	9.529	10.772
	8/15/98 0:17:25	1967.343	9.46	9.515	10.761
	8/15/98 0:27:25	1977.343	9.448	9.5	10.75
	8/15/98 0:37:25	1987.343	9.437	9.484	10.737
	8/15/98 0:47:25	1997.343	9.425	9.471	10.729
	8/15/98 0:57:25	2007.343	9.414	9.458	10.717
	8/15/98 1:07:25	2017.343	9.402	9.446	10.708
	8/15/98 1:17:25	2027.343	9.394	9.432	10.698
	8/15/98 1:27:25	2037.343	9.379	9.419	10.687
	8/15/98 1:37:25	2047.343	9.371	9.409	10.681
	8/15/98 1:47:25	2057.343	9.365	9.398	10.672
	8/15/98 1:57:25	2067.343	9.357	9.388	10.663
	8/15/98 2:07:25	2077.343	9.354	9.379	10.661
	8/15/98 2:17:25	2087.343	9.342	9.368	10.647
	8/15/98 2:27:25	2097.343	9.331	9.359	10.637
	8/15/98 2:37:25	2107.343	9.325	9.347	10.631
	8/15/98 2:47:25	2117.343	9.308	9.336	10.621
	8/15/98 2:57:25	2127.343	9.302	9.326	10.614
	8/15/98 3:07:25	2137.343	9.293	9.317	10.607
	8/15/98 3:17:25	2147.343	9.285	9.307	10.598
	8/15/98 3:27:25	2157.343	9.27	9.294	10.588
	8/15/98 3:37:25	2167.343	9.265	9.286	10.582
	8/15/98 3:47:25	2177.343	9.256	9.276	10.575
	8/15/98 3:57:25	2187.343	9.247	9.269	10.566
	8/15/98 4:07:25	2197.343	9.239	9.259	10.559
	8/15/98 4:17:25	2207.343	9.233	9.249	10.552
	8/15/98 4:27:25	2217.343	9.222	9.241	10.546
	8/15/98 4:37:25	2227.343	9.21	9.23	10.537
	8/15/98 4:47:25	2237.343	9.202	9.222	10.528
	8/15/98 4:57:25	2247.343	9.196	9.215	10.524
	8/15/98 5:07:25	2257.343	9.187	9.204	10.514
	8/15/98 5:17:25	2267.343	9.181	9.196	10.51
	8/15/98 5:27:25	2277.343	9.17	9.186	10.501
	8/15/98 5:37:25	2287.343	9.167	9.179	10.498
	8/15/98 5:47:25	2297.343	9.161	9.172	10.491

	8/15/98 5:57:25	2307.343	9.153	9.166	10.486
	8/15/98 6:07:25	2317.343	9.147	9.16	10.479
	8/15/98 6:17:25	2327.343	9.141	9.153	10.473
	8/15/98 6:27:25	2337.343	9.136	9.145	10.467
	8/15/98 6:37:25	2347.343	9.13	9.138	10.463
	8/15/98 6:47:25	2357.343	9.121	9.129	10.456
	8/15/98 6:57:25	2367.343	9.118	9.125	10.452
	8/15/98 7:07:25	2377.343	9.113	9.119	10.444
	8/15/98 7:17:25	2387.343	9.104	9.112	10.438
	8/15/98 7:27:25	2397.343	9.104	9.109	10.436
	8/15/98 7:37:25	2407.343	9.098	9.102	10.43
	8/15/98 7:47:25	2417.343	9.092	9.097	10.424
	8/15/98 7:57:25	2427.343	9.09	9.093	10.418
	8/15/98 8:07:25	2437.343	9.081	9.086	10.414
	8/15/98 8:17:25	2447.343	9.075	9.079	10.408
	8/15/98 8:27:25	2457.343	9.07	9.071	10.402
	8/15/98 8:37:25	2467.343	9.061	9.066	10.398
	8/15/98 8:47:25	2477.343	9.052	9.054	10.388
	8/15/98 8:57:25	2487.343	9.049	9.051	10.386
	8/15/98 9:07:25	2497.343	9.041	9.045	10.38
	8/15/98 9:17:25	2507.343	9.038	9.041	10.376
	8/15/98 9:27:25	2517.343	9.029	9.032	10.37
	8/15/98 9:37:25	2527.343	9.029	9.029	10.366
	8/15/98 9:47:25	2537.343	9.021	9.02	10.359
	8/15/98 9:57:25	2547.343	9.015	9.018	10.356
	8/15/98 10:07:25	2557.343	9.012	9.013	10.35
	8/15/98 10:17:25	2567.343	9.006	9.004	10.346
	8/15/98 10:27:25	2577.343	9.001	8.999	10.341
	8/15/98 10:37:25	2587.343	8.998	8.997	10.337
	8/15/98 10:47:25	2597.343	8.995	8.994	10.334
	8/15/98 10:57:25	2607.343	8.983	8.981	10.325
	8/15/98 11:07:25	2617.343	8.981	8.975	10.321
	8/15/98 11:17:25	2627.343	8.975	8.973	10.318
	8/15/98 11:27:25	2637.343	8.972	8.968	10.314
	8/15/98 11:37:25	2647.343	8.969	8.962	10.311
	8/15/98 11:47:25	2657.343	8.96	8.958	10.305
	8/15/98 11:57:25	2667.343	8.952	8.951	10.295
	8/15/98 12:07:25	2677.343	8.946	8.945	10.293
	8/15/98 12:17:25	2687.343	8.943	8.935	10.29
	8/15/98 12:27:25	2697.343	8.935	8.932	10.283
	8/15/98 12:37:25	2707.343	8.926	8.919	10.277
	8/15/98 12:47:25	2717.343	8.923	8.92	10.276
	8/15/98 12:57:25	2727.343	8.926	8.922	10.273
	8/15/98 13:07:25	2737.343	8.92	8.913	10.267
	8/15/98 13:17:25	2747.343	8.917	8.906	10.263
	8/15/98 13:27:25	2757.343	8.917	8.91	10.26
	8/15/98 13:37:25	2767.343	8.917	8.91	10.258
	8/15/98 13:47:25	2777.343	8.917	8.906	10.257
	8/15/98 13:57:25	2787.343	8.897	8.89	10.245
	8/15/98 14:07:25	2797.343	8.906	8.897	10.248
	8/15/98 14:17:25	2807.343	8.9	8.891	10.242

	8/15/98 14:27:25	2817.343	8.874	8.862	10.228
	8/15/98 14:37:25	2827.343	8.874	8.859	10.228
	8/15/98 14:47:25	2837.343	8.872	8.862	10.232
	8/15/98 14:57:25	2847.343	8.866	8.858	10.227
	8/15/98 15:07:25	2857.343	8.86	8.852	10.222
	8/15/98 15:17:25	2867.343	8.857	8.848	10.221
	8/15/98 15:27:25	2877.343	8.851	8.845	10.215
	8/15/98 15:37:25	2887.343	8.851	8.843	10.212
	8/15/98 15:47:25	2897.343	8.851	8.839	10.209
	8/15/98 15:57:25	2907.343	8.851	8.836	10.206
	8/15/98 16:07:25	2917.343	8.851	8.834	10.203
	8/15/98 16:17:25	2927.343	8.849	8.833	10.2
	8/15/98 16:27:25	2937.343	8.846	8.83	10.195
	8/15/98 16:37:25	2947.343	8.843	8.827	10.192
	8/15/98 16:47:25	2957.343	8.834	8.817	10.186
	8/15/98 16:57:25	2967.343	8.834	8.816	10.186
	8/15/98 17:07:25	2977.343	8.831	8.814	10.183
	8/15/98 17:17:25	2987.343	8.826	8.807	10.179
	8/15/98 17:27:25	2997.343	8.82	8.804	10.176
	8/15/98 17:37:25	3007.343	8.814	8.801	10.173
	8/15/98 17:47:25	3017.343	8.82	8.802	10.173
	8/15/98 17:57:25	3027.343	8.811	8.794	10.166
	8/15/98 18:07:25	3037.343	8.808	8.789	10.163
	8/15/98 18:17:25	3047.343	8.803	8.788	10.161
	8/15/98 18:27:25	3057.343	8.803	8.786	10.158
	8/15/98 18:37:25	3067.343	8.803	8.785	10.157
	8/15/98 18:47:25	3077.343	8.8	8.782	10.152
	8/15/98 18:57:25	3087.343	8.8	8.779	10.152
	8/15/98 19:07:25	3097.343	8.794	8.776	10.147
	8/15/98 19:17:25	3107.343	8.791	8.772	10.145
	8/15/98 19:27:25	3117.343	8.785	8.768	10.141
	8/15/98 19:37:25	3127.343	8.78	8.763	10.141
	8/15/98 19:47:25	3137.343	8.783	8.76	10.137
	8/15/98 19:57:25	3147.343	8.777	8.759	10.138
	8/15/98 20:07:25	3157.343	8.774	8.754	10.134
	8/15/98 20:17:25	3167.343	8.771	8.753	10.131
	8/15/98 20:27:25	3177.343	8.771	8.752	10.129
	8/15/98 20:37:25	3187.343	8.768	8.749	10.129
	8/15/98 20:47:25	3197.343	8.765	8.747	10.125
	8/15/98 20:57:25	3207.343	8.765	8.743	10.125
	8/15/98 21:07:25	3217.343	8.771	8.747	10.125
	8/15/98 21:17:25	3227.343	8.765	8.743	10.121
	8/15/98 21:27:25	3237.343	8.762	8.741	10.119
	8/15/98 21:37:25	3247.343	8.762	8.74	10.119
	8/15/98 21:47:25	3257.343	8.757	8.736	10.113
	8/15/98 21:57:25	3267.343	8.754	8.733	10.11
	8/15/98 22:07:25	3277.343	8.754	8.733	10.11
	8/15/98 22:17:25	3287.343	8.751	8.73	10.109
	8/15/98 22:27:25	3297.343	8.751	8.727	10.105
	8/15/98 22:37:25	3307.343	8.745	8.724	10.103
	8/15/98 22:47:25	3317.343	8.742	8.721	10.1

	8/15/98 22:57:25	3327.343	8.739	8.72	10.099
	8/15/98 23:07:25	3337.343	8.739	8.717	10.096
	8/15/98 23:17:25	3347.343	8.737	8.714	10.094
	8/15/98 23:27:25	3357.343	8.734	8.714	10.093
	8/15/98 23:37:25	3367.343	8.737	8.712	10.092
	8/15/98 23:47:25	3377.343	8.728	8.708	10.089
	8/15/98 23:57:25	3387.343	8.731	8.708	10.087
	8/16/98 0:07:25	3397.343	8.731	8.705	10.084
	8/16/98 0:17:25	3407.343	8.728	8.702	10.083
	8/16/98 0:27:25	3417.343	8.725	8.702	10.081
	8/16/98 0:37:25	3427.343	8.722	8.698	10.077
	8/16/98 0:47:25	3437.343	8.719	8.698	10.076
	8/16/98 0:57:25	3447.343	8.719	8.696	10.074
	8/16/98 1:07:25	3457.343	8.717	8.692	10.073
	8/16/98 1:17:25	3467.343	8.717	8.691	10.07
	8/16/98 1:27:25	3477.343	8.714	8.688	10.068
	8/16/98 1:37:25	3487.343	8.711	8.686	10.067
	8/16/98 1:47:25	3497.343	8.708	8.683	10.064
	8/16/98 1:57:25	3507.343	8.708	8.682	10.062
	8/16/98 2:07:25	3517.343	8.705	8.68	10.061
	8/16/98 2:17:25	3527.343	8.702	8.677	10.058
	8/16/98 2:27:25	3537.343	8.699	8.675	10.055
	8/16/98 2:37:25	3547.343	8.699	8.675	10.055
	8/16/98 2:47:25	3557.343	8.696	8.672	10.052
	8/16/98 2:57:25	3567.343	8.694	8.67	10.051
	8/16/98 3:07:25	3577.343	8.694	8.669	10.051
	8/16/98 3:17:25	3587.343	8.691	8.667	10.048
	8/16/98 3:27:25	3597.343	8.688	8.664	10.045
	8/16/98 3:37:25	3607.343	8.688	8.663	10.045
	8/16/98 3:47:25	3617.343	8.682	8.66	10.042
	8/16/98 3:57:25	3627.343	8.685	8.659	10.041
	8/16/98 4:07:25	3637.343	8.685	8.659	10.039
	8/16/98 4:17:25	3647.343	8.679	8.654	10.038
	8/16/98 4:27:25	3657.343	8.679	8.654	10.036
	8/16/98 4:37:25	3667.343	8.676	8.651	10.035
	8/16/98 4:47:25	3677.343	8.676	8.65	10.033
	8/16/98 4:57:25	3687.343	8.676	8.648	10.032
	8/16/98 5:07:25	3697.343	8.676	8.648	10.032
	8/16/98 5:17:25	3707.343	8.673	8.645	10.028
	8/16/98 5:27:25	3717.343	8.671	8.644	10.028
	8/16/98 5:37:25	3727.343	8.671	8.645	10.029
	8/16/98 5:47:25	3737.343	8.668	8.643	10.025
	8/16/98 5:57:25	3747.343	8.668	8.641	10.025
	8/16/98 6:07:25	3757.343	8.668	8.638	10.022
	8/16/98 6:17:25	3767.343	8.668	8.638	10.022
	8/16/98 6:27:25	3777.343	8.665	8.637	10.023
	8/16/98 6:37:25	3787.343	8.662	8.635	10.02
	8/16/98 6:47:25	3797.343	8.665	8.637	10.02
	8/16/98 6:57:25	3807.343	8.665	8.635	10.019
	8/16/98 7:07:25	3817.343	8.662	8.634	10.016
	8/16/98 7:17:25	3827.343	8.662	8.634	10.013

	8/16/98 7:27:25	3837.343	8.662	8.634	10.013
	8/16/98 7:37:25	3847.343	8.659	8.631	10.01
	8/16/98 7:47:25	3857.343	8.656	8.625	10.007
	8/16/98 7:57:25	3867.343	8.656	8.629	10.007
	8/16/98 8:07:25	3877.343	8.653	8.628	10.009
	8/16/98 8:17:25	3887.343	8.659	8.632	10.009
	8/16/98 8:27:25	3897.343	8.659	8.628	10.009
	8/16/98 8:37:25	3907.343	8.653	8.627	10.003
	8/16/98 8:47:25	3917.343	8.653	8.627	10.002
	8/16/98 8:57:25	3927.343	8.653	8.622	10
	8/16/98 9:07:25	3937.343	8.651	8.621	9.999
	8/16/98 9:17:25	3947.343	8.651	8.618	9.996
	8/16/98 9:27:25	3957.343	8.648	8.619	9.997
	8/16/98 9:37:25	3967.343	8.645	8.616	9.994
	8/16/98 9:47:25	3977.343	8.645	8.619	9.993
	8/16/98 9:57:25	3987.343	8.645	8.615	9.99
	8/16/98 10:07:25	3997.343	8.63	8.6	9.983
	8/16/98 10:17:25	4007.343	8.633	8.605	9.984
	8/16/98 10:27:25	4017.343	8.636	8.611	9.986
	8/16/98 10:37:25	4027.343	8.628	8.608	9.983
	8/16/98 10:47:25	4037.343	8.63	8.603	9.981
	8/16/98 10:57:25	4047.343	8.63	8.603	9.983
	8/16/98 11:07:25	4057.343	8.622	8.59	9.971
	8/16/98 11:17:25	4067.343	8.628	8.603	9.98
	8/16/98 11:27:25	4077.343	8.628	8.593	9.971
	8/16/98 11:37:25	4087.343	8.625	8.599	9.978
	8/16/98 11:47:25	4097.343	8.616	8.592	9.972
	8/16/98 11:57:25	4107.343	8.622	8.596	9.972
	8/16/98 12:07:25	4117.343	8.616	8.592	9.971
	8/16/98 12:17:25	4127.343	8.619	8.593	9.967
	8/16/98 12:27:25	4137.343	8.61	8.584	9.964
	8/16/98 12:37:25	4147.343	8.613	8.586	9.965
	8/16/98 12:47:25	4157.343	8.599	8.574	9.961
	8/16/98 12:57:25	4167.343	8.61	8.584	9.962
	8/16/98 13:07:25	4177.343	8.605	8.58	9.958
	8/16/98 13:17:25	4187.343	8.602	8.574	9.958
	8/16/98 13:27:25	4197.343	8.602	8.577	9.961
	8/16/98 13:37:25	4207.343	8.593	8.568	9.957
	8/16/98 13:47:25	4217.343	8.59	8.563	9.955
	8/16/98 13:57:25	4227.343	8.587	8.564	9.954
	8/16/98 14:07:25	4237.343	8.587	8.564	9.951
	8/16/98 14:17:25	4247.343	8.59	8.564	9.949
	8/16/98 14:27:25	4257.343	8.585	8.561	9.949
	8/16/98 14:37:25	4267.343	8.599	8.574	9.957
	8/16/98 14:47:25	4277.343	8.593	8.564	9.945
	8/16/98 14:57:25	4287.343	8.579	8.544	9.933
	8/16/98 15:07:25	4297.343	8.582	8.552	9.941
	8/16/98 15:17:25	4307.343	8.579	8.55	9.941
	8/16/98 15:27:25	4317.343	8.579	8.551	9.941
	8/16/98 15:37:25	4327.343	8.573	8.534	9.922
	8/16/98 15:47:25	4337.343	8.576	8.548	9.935

	8/16/98 15:57:25	4347.343	8.576	8.544	9.93
	8/16/98 16:07:25	4357.343	8.582	8.548	9.936
	8/16/98 16:17:25	4367.343	8.57	8.544	9.935
	8/16/98 16:27:25	4377.343	8.573	8.542	9.929
	8/16/98 16:37:25	4387.343	8.585	8.558	9.941
	8/16/98 16:47:25	4397.343	8.579	8.552	9.929
	8/16/98 16:57:25	4407.343	8.564	8.538	9.922
	8/16/98 17:07:25	4417.343	8.573	8.541	9.926
	8/16/98 17:17:25	4427.343	8.57	8.539	9.926
	8/16/98 17:27:25	4437.343	8.567	8.542	9.927
	8/16/98 17:37:25	4447.343	8.564	8.536	9.923
	8/16/98 17:47:25	4457.343	8.556	8.528	9.92
	8/16/98 17:57:25	4467.343	8.553	8.526	9.917
	8/16/98 18:07:25	4477.343	8.553	8.529	9.919
	8/16/98 18:17:25	4487.343	8.55	8.525	9.919
	8/16/98 18:27:25	4497.343	8.556	8.529	9.92
	8/16/98 18:37:25	4507.343	8.559	8.528	9.917
	8/16/98 18:47:25	4517.343	8.553	8.525	9.917
	8/16/98 18:57:25	4527.343	8.55	8.52	9.914
	8/16/98 19:07:25	4537.343	8.55	8.52	9.914
	8/16/98 19:17:25	4547.343	8.547	8.519	9.913
	8/16/98 19:27:25	4557.343	8.55	8.52	9.912
	8/16/98 19:37:25	4567.343	8.544	8.518	9.913
	8/16/98 19:47:25	4577.343	8.544	8.518	9.912
	8/16/98 19:57:25	4587.343	8.544	8.516	9.91
	8/16/98 20:07:25	4597.343	8.544	8.516	9.912
	8/16/98 20:17:25	4607.343	8.547	8.518	9.912
	8/16/98 20:27:25	4617.343	8.547	8.516	9.913
	8/16/98 20:37:25	4627.343	8.541	8.515	9.91
	8/16/98 20:47:25	4637.343	8.544	8.515	9.91
	8/16/98 20:57:25	4647.343	8.544	8.516	9.91
	8/16/98 21:07:25	4657.343	8.547	8.518	9.912
	8/16/98 21:17:25	4667.343	8.547	8.516	9.91
	8/16/98 21:27:25	4677.343	8.541	8.513	9.907
	8/16/98 21:37:25	4687.343	8.541	8.513	9.907
	8/16/98 21:47:25	4697.343	8.541	8.513	9.907
	8/16/98 21:57:25	4707.343	8.541	8.512	9.907
	8/16/98 22:07:25	4717.343	8.539	8.51	9.904
	8/16/98 22:17:25	4727.343	8.539	8.509	9.906
	8/16/98 22:27:25	4737.343	8.539	8.509	9.904
	8/16/98 22:37:25	4747.343	8.536	8.506	9.903
	8/16/98 22:47:25	4757.343	8.536	8.506	9.901
	8/16/98 22:57:25	4767.343	8.533	8.506	9.9
	8/16/98 23:07:25	4777.343	8.536	8.507	9.901
	8/16/98 23:17:25	4787.343	8.536	8.507	9.9
	8/16/98 23:27:25	4797.343	8.536	8.506	9.9
	8/16/98 23:37:25	4807.343	8.536	8.507	9.898
	8/16/98 23:47:25	4817.343	8.536	8.507	9.9
	8/16/98 23:57:25	4827.343	8.533	8.504	9.896
	8/17/98 0:07:25	4837.343	8.53	8.503	9.894
	8/17/98 0:17:25	4847.343	8.527	8.502	9.891

	8/17/98 0:27:25	4857.343	8.53	8.502	9.894
	8/17/98 0:37:25	4867.343	8.53	8.502	9.894
	8/17/98 0:47:25	4877.343	8.533	8.502	9.893
	8/17/98 0:57:25	4887.343	8.53	8.502	9.893
	8/17/98 1:07:25	4897.343	8.527	8.499	9.89
	8/17/98 1:17:25	4907.343	8.527	8.499	9.891
	8/17/98 1:27:25	4917.343	8.521	8.497	9.888
	8/17/98 1:37:25	4927.343	8.521	8.496	9.888
	8/17/98 1:47:25	4937.343	8.521	8.496	9.888
	8/17/98 1:57:25	4947.343	8.527	8.496	9.89
	8/17/98 2:07:25	4957.343	8.521	8.493	9.887
	8/17/98 2:17:25	4967.343	8.521	8.494	9.885
	8/17/98 2:27:25	4977.343	8.518	8.491	9.884
	8/17/98 2:37:25	4987.343	8.516	8.49	9.885
	8/17/98 2:47:25	4997.343	8.521	8.49	9.884
	8/17/98 2:57:25	5007.343	8.518	8.488	9.881
	8/17/98 3:07:25	5017.343	8.516	8.487	9.881
	8/17/98 3:17:25	5027.343	8.516	8.486	9.881
	8/17/98 3:27:25	5037.343	8.513	8.484	9.88
	8/17/98 3:37:25	5047.343	8.516	8.486	9.88
	8/17/98 3:47:25	5057.343	8.513	8.484	9.878
	8/17/98 3:57:25	5067.343	8.513	8.483	9.877
	8/17/98 4:07:25	5077.343	8.513	8.483	9.877
	8/17/98 4:17:25	5087.343	8.513	8.484	9.88
	8/17/98 4:27:25	5097.343	8.507	8.481	9.877
	8/17/98 4:37:25	5107.343	8.513	8.481	9.877
	8/17/98 4:47:25	5117.343	8.51	8.48	9.875
	8/17/98 4:57:25	5127.343	8.51	8.48	9.875
	8/17/98 5:07:25	5137.343	8.507	8.478	9.874
	8/17/98 5:17:25	5147.343	8.51	8.478	9.874
	8/17/98 5:27:25	5157.343	8.504	8.478	9.871
	8/17/98 5:37:25	5167.343	8.51	8.48	9.874
	8/17/98 5:47:25	5177.343	8.507	8.478	9.871
	8/17/98 5:57:25	5187.343	8.504	8.477	9.871
	8/17/98 6:07:25	5197.343	8.504	8.477	9.872
	8/17/98 6:17:25	5207.343	8.504	8.477	9.871
	8/17/98 6:27:25	5217.343	8.507	8.477	9.872
	8/17/98 6:37:25	5227.343	8.507	8.475	9.871
	8/17/98 6:47:25	5237.343	8.507	8.477	9.869
	8/17/98 6:57:25	5247.343	8.51	8.477	9.869
	8/17/98 7:07:25	5257.343	8.507	8.477	9.869
	8/17/98 7:17:25	5267.343	8.507	8.478	9.868
	8/17/98 7:27:25	5277.343	8.507	8.477	9.867
	8/17/98 7:37:25	5287.343	8.51	8.477	9.868
	8/17/98 7:47:25	5297.343	8.507	8.477	9.865
	8/17/98 7:57:25	5307.343	8.501	8.471	9.864
	8/17/98 8:07:25	5317.343	8.51	8.48	9.867
	8/17/98 8:17:25	5327.343	8.507	8.478	9.865
	8/17/98 8:27:25	5337.343	8.507	8.477	9.862
	8/17/98 8:37:25	5347.343	8.504	8.473	9.862
	8/17/98 8:47:25	5357.343	8.501	8.473	9.861

	8/17/98 8:57:25	5367.343	8.498	8.47	9.858
	8/17/98 9:07:25	5377.343	8.501	8.47	9.858
	8/17/98 9:17:25	5387.343	8.498	8.47	9.858
	8/17/98 9:27:25	5397.343	8.498	8.47	9.856
	8/17/98 9:37:25	5407.343	8.498	8.468	9.855
	8/17/98 9:47:25	5417.343	8.496	8.467	9.853
	8/17/98 9:57:25	5427.343	8.496	8.467	9.855
	8/17/98 10:07:25	5437.343	8.496	8.465	9.853
	8/17/98 10:17:25	5447.343	8.493	8.462	9.852
	8/17/98 10:27:25	5457.343	8.49	8.461	9.848
	8/17/98 10:37:25	5467.343	8.493	8.462	9.852
	8/17/98 10:47:25	5477.343	8.49	8.462	9.848
	8/17/98 10:57:25	5487.343	8.484	8.455	9.846
	8/17/98 11:07:25	5497.343	8.487	8.461	9.846
	8/17/98 11:17:25	5507.343	8.484	8.455	9.842
	8/17/98 11:27:25	5517.343	8.487	8.458	9.846
	8/17/98 11:37:25	5527.343	8.487	8.459	9.843
	8/17/98 11:47:25	5537.343	8.473	8.443	9.837
	8/17/98 11:57:25	5547.343	8.481	8.458	9.845
	8/17/98 12:07:25	5557.343	8.467	8.441	9.836

WELL 202 AQUIFER TEST 2 WATER LEVEL DATA

(WELLS 202, 677, & 197)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 202 AQUIFER TEST 2 WL DATA			AVG Q = 80.5 GPM		
FILE NAME : 202TEST2.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 202	WELL 677	WELL 197
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
PUMP STARTED					
	8/17/98 16:00:04	0.00	8.886	8.514	9.917
	8/17/98 16:00:06	0.02	8.906	8.514	9.918
	8/17/98 16:00:08	0.05	9.049	8.514	9.918
	8/17/98 16:00:09	0.08	9.092	8.514	9.918
	8/17/98 16:00:11	0.11	9.216	8.514	9.918
	8/17/98 16:00:13	0.14	9.224	8.514	9.918
	8/17/98 16:00:15	0.17	9.222	8.514	9.92
	8/17/98 16:00:17	0.21	9.342	8.514	9.92
	8/17/98 16:00:19	0.25	9.434	8.514	9.921
	8/17/98 16:00:22	0.29	9.448	8.516	9.923
	8/17/98 16:00:24	0.33	9.471	8.516	9.923
	8/17/98 16:00:27	0.37	9.534	8.516	9.924
	8/17/98 16:00:30	0.42	9.678	8.517	9.926
	8/17/98 16:00:33	0.47	9.761	8.516	9.927
	8/17/98 16:00:36	0.52	9.804	8.516	9.929
	8/17/98 16:00:39	0.58	9.818	8.516	9.93
	8/17/98 16:00:43	0.64	9.962	8.516	9.931
	8/17/98 16:00:46	0.70	9.999	8.516	9.933
	8/17/98 16:00:50	0.77	10.034	8.517	9.934
	8/17/98 16:00:55	0.84	10.088	8.519	9.937
	8/17/98 16:00:59	0.91	10.134	8.52	9.942
	8/17/98 16:01:04	0.99	10.174	8.525	9.946
	8/17/98 16:01:09	1.07	10.168	8.53	9.953
	8/17/98 16:01:14	1.16	10.237	8.536	9.959
	8/17/98 16:01:20	1.25	10.237	8.541	9.963
	8/17/98 16:01:26	1.35	10.286	8.545	9.969
	8/17/98 16:01:32	1.46	10.323	8.549	9.972
	8/17/98 16:01:39	1.57	10.318	8.555	9.976
	8/17/98 16:01:46	1.69	10.364	8.564	9.981
	8/17/98 16:01:53	1.81	10.369	8.57	9.987
	8/17/98 16:02:01	1.95	10.401	8.577	9.991
	8/17/98 16:02:10	2.09	10.458	8.584	9.994
	8/17/98 16:02:19	2.24	10.487	8.59	9.997
	8/17/98 16:02:28	2.39	10.521	8.597	10.006
	8/17/98 16:02:38	2.56	10.51	8.607	10.013
	8/17/98 16:02:49	2.74	10.527	8.612	10.019
	8/17/98 16:03:00	2.92	10.55	8.618	10.024
	8/17/98 16:03:12	3.12	10.613	8.626	10.03
	8/17/98 16:03:24	3.33	10.585	8.634	10.037
	8/17/98 16:03:38	3.56	10.633	8.641	10.043
	8/17/98 16:03:52	3.79	10.636	8.65	10.049
	8/17/98 16:04:07	4.04	10.648	8.663	10.059

	8/17/98 16:04:23	4.31	10.671	8.673	10.066
	8/17/98 16:04:40	4.59	10.711	8.684	10.077
	8/17/98 16:04:57	4.88	10.728	8.692	10.082
	8/17/98 16:05:16	5.20	10.751	8.702	10.09
	8/17/98 16:05:36	5.53	10.748	8.719	10.097
	8/17/98 16:05:57	5.88	10.762	8.731	10.107
	8/17/98 16:06:20	6.26	10.814	8.743	10.116
	8/17/98 16:06:44	6.65	10.788	8.75	10.12
	8/17/98 16:07:09	7.07	10.828	8.76	10.127
	8/17/98 16:07:35	7.52	10.851	8.779	10.141
	8/17/98 16:08:04	7.99	10.883	8.791	10.148
	8/17/98 16:08:34	8.49	10.84	8.801	10.152
	8/17/98 16:09:05	9.01	10.874	8.812	10.159
	8/17/98 16:09:39	9.57	10.854	8.825	10.17
	8/17/98 16:10:14	10.17	10.909	8.837	10.18
	8/17/98 16:10:52	10.79	10.889	8.85	10.184
	8/17/98 16:11:32	11.46	10.952	8.865	10.193
	8/17/98 16:12:14	12.16	10.949	8.872	10.2
	8/17/98 16:12:59	12.91	10.903	8.878	10.201
	8/17/98 16:13:46	13.70	10.937	8.904	10.222
	8/17/98 16:14:37	14.54	10.955	8.92	10.233
	8/17/98 16:15:30	15.42	10.998	8.936	10.242
	8/17/98 16:16:26	16.36	11.018	8.943	10.251
	8/17/98 16:17:26	17.36	11.052	8.953	10.26
	8/17/98 16:18:29	18.41	11.044	8.961	10.265
	8/17/98 16:19:36	19.53	11.012	8.971	10.271
	8/17/98 16:20:47	20.71	11.026	8.993	10.281
	8/17/98 16:22:02	21.96	11.046	9.004	10.29
	8/17/98 16:23:22	23.29	11.078	9.019	10.299
	8/17/98 16:24:46	24.69	11.064	9.03	10.307
	8/17/98 16:26:15	26.18	11.127	9.029	10.302
	8/17/98 16:27:50	27.76	11.107	9.054	10.321
	8/17/98 16:29:30	29.43	11.127	9.061	10.326
	8/17/98 16:31:16	31.19	11.153	9.078	10.334
	8/17/98 16:33:09	33.07	11.161	9.091	10.342
	8/17/98 16:35:08	35.05	11.138	9.102	10.348
	8/17/98 16:37:14	37.16	11.161	9.118	10.354
	8/17/98 16:39:27	39.38	11.161	9.106	10.351
	8/17/98 16:41:49	41.74	11.204	9.141	10.371
	8/17/98 16:44:19	44.24	11.21	9.154	10.379
	8/17/98 16:46:58	46.89	11.198	9.171	10.389
	8/17/98 16:49:46	49.69	11.239	9.183	10.395
	8/17/98 16:52:44	52.66	11.201	9.197	10.403
	8/17/98 16:55:53	55.81	11.244	9.218	10.418
	8/17/98 16:59:13	59.14	11.302	9.241	10.429
	8/17/98 17:02:44	62.67	11.328	9.266	10.442
	8/17/98 17:06:29	66.41	11.313	9.285	10.454
	8/17/98 17:10:26	70.37	11.353	9.32	10.47
	8/17/98 17:14:38	74.56	11.371	9.35	10.489
	8/17/98 17:19:05	79.00	11.396	9.367	10.495
	8/17/98 17:23:47	83.71	11.382	9.376	10.496

	8/17/98 17:28:46	88.70	11.422	9.408	10.516
	8/17/98 17:34:03	93.98	11.442	9.436	10.531
	8/17/98 17:39:39	99.57	11.457	9.466	10.55
	8/17/98 17:45:34	105.50	11.48	9.513	10.572
	8/17/98 17:51:51	111.77	11.52	9.546	10.589
	8/17/98 17:58:30	118.42	11.583	9.574	10.604
	8/17/98 18:05:32	125.46	11.589	9.604	10.62
	8/17/98 18:13:00	132.92	11.623	9.629	10.638
	8/17/98 18:20:54	140.82	11.637	9.674	10.662
	8/17/98 18:29:16	149.19	11.64	9.709	10.683
	8/17/98 18:38:08	158.06	11.672	9.742	10.702
	8/17/98 18:47:31	167.45	11.735	9.779	10.728
	8/17/98 18:57:28	177.40	11.755	9.814	10.752
	8/17/98 19:07:28	187.40	11.798	9.853	10.776
	8/17/98 19:17:28	197.40	11.841	9.885	10.799
	8/17/98 19:27:28	207.40	11.887	9.921	10.826
	8/17/98 19:37:28	217.40	11.941	9.956	10.85
	8/17/98 19:47:28	227.40	11.941	9.991	10.875
	8/17/98 19:57:28	237.40	11.999	10.026	10.9
	8/17/98 20:07:28	247.40	11.984	10.059	10.924
	8/17/98 20:17:28	257.40	12.082	10.094	10.949
	8/17/98 20:27:28	267.40	12.096	10.129	10.972
	8/17/98 20:37:28	277.40	12.131	10.168	10.997
	8/17/98 20:47:28	287.40	12.165	10.207	11.02
	8/17/98 20:57:28	297.40	12.176	10.239	11.045
	8/17/98 21:07:28	307.40	12.202	10.265	11.067
	8/17/98 21:17:28	317.40	12.214	10.295	11.09
	8/17/98 21:27:28	327.40	12.271	10.324	11.11
	8/17/98 21:37:28	337.40	12.297	10.354	11.135
	8/17/98 21:47:28	347.40	12.3	10.383	11.155
	8/17/98 21:57:28	357.40	12.337	10.411	11.178
	8/17/98 22:07:28	367.40	12.389	10.44	11.199
	8/17/98 22:17:28	377.40	12.389	10.466	11.22
	8/17/98 22:27:28	387.40	12.429	10.489	11.241
	8/17/98 22:37:28	397.40	12.435	10.511	11.261
	8/17/98 22:47:28	407.40	12.455	10.533	11.283
	8/17/98 22:57:28	417.40	12.469	10.555	11.299
	8/17/98 23:07:28	427.40	12.501	10.572	11.318
	8/17/98 23:17:28	437.40	12.544	10.592	11.338
	8/17/98 23:27:28	447.40	12.532	10.61	11.357
	8/17/98 23:37:28	457.40	12.552	10.627	11.374
	8/17/98 23:47:28	467.40	12.572	10.645	11.39
	8/17/98 23:57:28	477.40	12.627	10.661	11.409
	8/18/98 0:07:28	487.40	12.61	10.677	11.428
	8/18/98 0:17:28	497.40	12.624	10.694	11.444
	8/18/98 0:27:28	507.40	12.655	10.707	11.46
	8/18/98 0:37:28	517.40	12.664	10.719	11.473
	8/18/98 0:47:28	527.40	12.707	10.735	11.49
	8/18/98 0:57:28	537.40	12.718	10.748	11.505
	8/18/98 1:07:28	547.40	12.724	10.761	11.519
	8/18/98 1:17:28	557.40	12.75	10.775	11.535

	8/18/98 1:27:28	567.40	12.762	10.788	11.55
	8/18/98 1:37:28	577.40	12.805	10.802	11.563
	8/18/98 1:47:28	587.40	12.787	10.815	11.576
	8/18/98 1:57:28	597.40	12.822	10.828	11.59
	8/18/98 2:07:28	607.40	12.839	10.841	11.606
	8/18/98 2:17:28	617.40	12.856	10.852	11.618
	8/18/98 2:27:28	627.40	12.85	10.867	11.63
	8/18/98 2:37:28	637.40	12.885	10.879	11.644
	8/18/98 2:47:28	647.40	12.896	10.89	11.656
	8/18/98 2:57:28	657.40	12.902	10.903	11.666
	8/18/98 3:07:28	667.40	12.925	10.916	11.682
	8/18/98 3:17:28	677.40	12.945	10.928	11.693
	8/18/98 3:27:28	687.40	12.977	10.942	11.705
	8/18/98 3:37:28	697.40	12.968	10.956	11.717
	8/18/98 3:47:28	707.40	12.988	10.969	11.728
	8/18/98 3:57:28	717.40	13.025	10.983	11.738
	8/18/98 4:07:28	727.40	13.017	10.993	11.753
	8/18/98 4:17:28	737.40	13.04	11.008	11.762
	8/18/98 4:27:28	747.40	13.04	11.019	11.775
	8/18/98 4:37:28	757.40	13.051	11.031	11.785
	8/18/98 4:47:28	767.40	13.051	11.041	11.795
	8/18/98 4:57:28	777.40	13.077	11.053	11.808
	8/18/98 5:07:28	787.40	13.086	11.063	11.817
	8/18/98 5:17:28	797.40	13.114	11.075	11.828
	8/18/98 5:27:28	807.40	13.12	11.083	11.84
	8/18/98 5:37:28	817.40	13.123	11.092	11.85
	8/18/98 5:47:28	827.40	13.131	11.099	11.859
	8/18/98 5:57:28	837.40	13.169	11.146	11.869
	8/18/98 6:07:28	847.40	13.169	11.159	11.879
	8/18/98 6:17:28	857.40	13.169	11.171	11.889
	8/18/98 6:27:28	867.40	13.194	11.181	11.899
	8/18/98 6:37:28	877.40	13.206	11.192	11.91
	8/18/98 6:47:28	887.40	13.232	11.204	11.921
	8/18/98 6:57:28	897.40	13.249	11.216	11.931
	8/18/98 7:07:28	907.40	13.235	11.226	11.94
	8/18/98 7:17:28	917.40	13.266	11.236	11.949
	8/18/98 7:27:28	927.40	13.266	11.245	11.956
	8/18/98 7:37:28	937.40	13.281	11.256	11.965
	8/18/98 7:47:28	947.40	13.292	11.266	11.975
	8/18/98 7:57:28	957.40	13.278	11.275	11.985
	8/18/98 8:07:28	967.40	13.312	11.285	11.994
	8/18/98 8:17:28	977.40	13.318	11.295	12.002
	8/18/98 8:27:28	987.40	13.324	11.306	12.013
	8/18/98 8:37:28	997.40	13.344	11.317	12.02
	8/18/98 8:47:28	1007.40	13.338	11.323	12.027
	8/18/98 8:57:28	1017.40	13.329	11.335	12.034
	8/18/98 9:07:28	1027.40	13.349	11.343	12.04
	8/18/98 9:17:28	1037.40	13.358	11.352	12.052
	8/18/98 9:27:28	1047.40	13.375	11.359	12.059
	8/18/98 9:37:28	1057.40	13.387	11.371	12.071
	8/18/98 9:47:28	1067.40	13.392	11.38	12.076

	8/18/98 9:57:28	1077.40	13.421	11.39	12.085
	8/18/98 10:07:28	1087.40	13.398	11.4	12.094
	8/18/98 10:17:28	1097.40	13.444	11.415	12.105
	8/18/98 10:27:28	1107.40	13.421	11.415	12.107
	8/18/98 10:37:28	1117.40	13.427	11.429	12.116
	8/18/98 10:47:28	1127.40	13.444	11.438	12.121
	8/18/98 10:57:28	1137.40	13.461	11.458	12.139
	8/18/98 11:07:28	1147.40	13.441	11.458	12.136
	8/18/98 11:17:28	1157.40	13.464	11.462	12.143
	8/18/98 11:27:28	1167.40	13.473	11.474	12.15
	8/18/98 11:37:28	1177.40	12.412	11.492	12.163
	8/18/98 11:47:28	1187.40	13.464	11.492	12.168
	8/18/98 11:57:28	1197.40	13.473	11.473	12.168
	8/18/98 12:07:28	1207.40	13.475	11.486	12.181
	8/18/98 12:17:28	1217.40	13.473	11.484	12.187
	8/18/98 12:27:28	1227.40	13.507	11.496	12.194
	8/18/98 12:37:28	1237.40	13.481	11.477	12.195
	8/18/98 12:47:28	1247.40	13.458	11.47	12.2
	8/18/98 12:57:28	1257.40	13.464	11.461	12.204
	8/18/98 13:07:28	1267.40	13.507	11.476	12.216
	8/18/98 13:17:28	1277.40	13.493	11.449	12.206
	8/18/98 13:27:28	1287.40	13.501	11.458	12.221
	8/18/98 13:37:28	1297.40	13.518	11.471	12.236
	8/18/98 13:47:28	1307.40	13.51	11.46	12.235
	8/18/98 13:57:28	1317.40	13.564	11.48	12.256
	8/18/98 14:07:28	1327.40	13.53	11.455	12.248
	8/18/98 14:17:28	1337.40	13.533	11.467	12.261
	8/18/98 14:27:28	1347.40	13.513	11.457	12.255
	8/18/98 14:37:28	1357.40	13.516	11.461	12.271
	8/18/98 14:47:28	1367.40	13.541	11.464	12.281
	8/18/98 14:57:28	1377.40	13.564	11.458	12.282
	8/18/98 15:07:28	1387.40	13.57	11.436	12.271
	8/18/98 15:17:28	1397.40	13.57	11.476	12.293
	8/18/98 15:27:28	1407.40	13.573	11.478	12.297
	8/18/98 15:37:28	1417.40	13.587	11.474	12.297
	8/18/98 15:47:28	1427.40	13.579	11.49	12.314
	8/18/98 15:57:28	1437.40	13.61	11.481	12.316
	8/18/98 16:07:28	1447.40	13.647	11.47	12.32
	8/18/98 16:17:28	1457.40	13.665	11.477	12.326
	8/18/98 16:27:28	1467.40	13.693	11.496	12.342
	8/18/98 16:37:28	1477.40	13.659	11.478	12.339
	8/18/98 16:47:28	1487.40	13.688	11.486	12.348
	8/18/98 16:57:28	1497.40	13.688	11.481	12.354
	8/18/98 17:07:28	1507.40	13.711	11.483	12.358
	8/18/98 17:17:28	1517.40	13.708	11.494	12.369
	8/18/98 17:27:28	1527.40	13.736	11.494	12.368
	8/18/98 17:37:28	1537.40	13.756	11.496	12.38
	8/18/98 17:47:28	1547.40	13.751	11.499	12.385
	8/18/98 17:57:28	1557.40	13.754	11.499	12.383
	8/18/98 18:07:28	1567.40	13.779	11.497	12.4
	8/18/98 18:17:28	1577.40	13.765	11.507	12.404

	8/18/98 18:27:28	1587.40	13.799	11.509	12.412
	8/18/98 18:37:28	1597.40	13.808	11.505	12.414
	8/18/98 18:47:28	1607.40	13.828	11.507	12.422
	8/18/98 18:57:28	1617.40	13.802	11.506	12.427
	8/18/98 19:07:28	1627.40	13.857	11.509	12.435
	8/18/98 19:17:28	1637.40	13.822	11.507	12.438
	8/18/98 19:27:28	1647.40	13.84	11.507	12.445
	8/18/98 19:37:28	1657.40	13.851	11.509	12.451
	8/18/98 19:47:28	1667.40	13.868	11.509	12.454
	8/18/98 19:57:28	1677.40	13.848	11.509	12.461
	8/18/98 20:07:28	1687.40	13.885	11.509	12.467
	8/18/98 20:17:28	1697.40	13.865	11.509	12.471
	8/18/98 20:27:28	1707.40	13.854	11.51	12.477
	8/18/98 20:37:28	1717.40	13.897	11.51	12.483
	8/18/98 20:47:28	1727.40	13.874	11.51	12.488
	8/18/98 20:57:28	1737.40	13.9	11.51	12.494
	8/18/98 21:07:28	1747.40	13.917	11.512	12.5
	8/18/98 21:17:28	1757.40	13.937	11.512	12.503
	8/18/98 21:27:28	1767.40	13.92	11.513	12.509
	8/18/98 21:37:28	1777.40	13.926	11.513	12.513
	8/18/98 21:47:28	1787.40	13.957	11.513	12.517
	8/18/98 21:57:28	1797.40	13.96	11.513	12.522
	8/18/98 22:07:28	1807.40	13.937	11.513	12.529
	8/18/98 22:17:28	1817.40	13.96	11.513	12.532
	8/18/98 22:27:28	1827.40	13.951	11.516	12.538
	8/18/98 22:37:28	1837.40	13.963	11.516	12.542
	8/18/98 22:47:28	1847.40	13.974	11.516	12.548
	8/18/98 22:57:28	1857.40	13.994	11.515	12.551
	8/18/98 23:07:28	1867.40	14.003	11.516	12.557
	8/18/98 23:17:28	1877.40	13.994	11.516	12.561
	8/18/98 23:27:28	1887.40	14.017	11.516	12.565
	8/18/98 23:37:28	1897.40	14.02	11.516	12.571
	8/18/98 23:47:28	1907.40	14.017	11.516	12.575
	8/18/98 23:57:28	1917.40	14.006	11.516	12.58
	8/19/98 0:07:28	1927.40	13.989	11.518	12.584
	8/19/98 0:17:28	1937.40	14.02	11.518	12.587
	8/19/98 0:27:28	1947.40	14.017	11.518	12.594
	8/19/98 0:37:28	1957.40	14.029	11.518	12.597
	8/19/98 0:47:28	1967.40	14.043	11.518	12.602
	8/19/98 0:57:28	1977.40	14.037	11.519	12.606
	8/19/98 1:07:28	1987.40	14.017	11.518	12.61
	8/19/98 1:17:28	1997.40	14.049	11.518	12.615
	8/19/98 1:27:28	2007.40	14.075	11.518	12.618
	8/19/98 1:37:28	2017.40	14.046	11.519	12.622
	8/19/98 1:47:28	2027.40	14.083	11.518	12.628
	8/19/98 1:57:28	2037.40	14.072	11.519	12.632
	8/19/98 2:07:28	2047.40	14.089	11.519	12.636
	8/19/98 2:17:28	2057.40	14.078	11.518	12.641
	8/19/98 2:27:28	2067.40	14.098	11.518	12.645
	8/19/98 2:37:28	2077.40	14.095	11.519	12.648
	8/19/98 2:47:28	2087.40	14.095	11.519	12.654

	8/19/98 2:57:28	2097.40	14.106	11.519	12.658
	8/19/98 3:07:28	2107.40	14.109	11.519	12.662
	8/19/98 3:17:28	2117.40	14.126	11.518	12.665
	8/19/98 3:27:28	2127.40	14.115	11.519	12.67
	8/19/98 3:37:28	2137.40	14.112	11.519	12.674
	8/19/98 3:47:28	2147.40	14.146	11.519	12.677
	8/19/98 3:57:28	2157.40	14.166	11.519	12.683
	8/19/98 4:07:28	2167.40	14.126	11.519	12.686
	8/19/98 4:17:28	2177.40	14.141	11.519	12.691
	8/19/98 4:27:28	2187.40	14.161	11.519	12.696
	8/19/98 4:37:28	2197.40	14.158	11.521	12.699
	8/19/98 4:47:28	2207.40	14.149	11.521	12.703
	8/19/98 4:57:28	2217.40	14.155	11.521	12.707
	8/19/98 5:07:28	2227.40	14.161	11.521	12.71
	8/19/98 5:17:28	2237.40	14.184	11.521	12.715
	8/19/98 5:27:28	2247.40	14.209	11.521	12.718
	8/19/98 5:37:28	2257.40	14.186	11.521	12.723
	8/19/98 5:47:28	2267.40	14.166	11.522	12.728
	8/19/98 5:57:28	2277.40	14.181	11.521	12.731
	8/19/98 6:07:28	2287.40	14.198	11.522	12.735
	8/19/98 6:17:28	2297.40	14.169	11.522	12.739
	8/19/98 6:27:28	2307.40	14.189	11.522	12.742
	8/19/98 6:37:28	2317.40	14.192	11.522	12.745
	8/19/98 6:47:28	2327.40	14.181	11.522	12.75
	8/19/98 6:57:28	2337.40	14.198	11.525	12.754
	8/19/98 7:07:28	2347.40	14.218	11.525	12.758
	8/19/98 7:17:28	2357.40	14.209	11.525	12.76
	8/19/98 7:27:28	2367.40	14.195	11.526	12.764
	8/19/98 7:37:28	2377.40	14.221	11.528	12.768
	8/19/98 7:47:28	2387.40	14.209	11.528	12.771
	8/19/98 7:57:28	2397.40	14.207	11.529	12.776
	8/19/98 8:07:28	2407.40	14.229	11.529	12.779
	8/19/98 8:17:28	2417.40	14.204	11.529	12.783
	8/19/98 8:27:28	2427.40	14.192	11.531	12.784
	8/19/98 8:37:28	2437.40	14.204	11.532	12.787
	8/19/98 8:47:28	2447.40	14.181	11.532	12.79
	8/19/98 8:57:28	2457.40	14.198	11.531	12.79
	8/19/98 9:07:28	2467.40	14.212	11.535	12.796
	8/19/98 9:17:28	2477.40	14.229	11.535	12.799
	8/19/98 9:27:28	2487.40	14.229	11.534	12.8
	8/19/98 9:37:28	2497.40	14.209	11.532	12.803
	8/19/98 9:47:28	2507.40	14.207	11.531	12.806
	8/19/98 9:57:28	2517.40	14.207	11.534	12.809
	8/19/98 10:07:28	2527.40	14.218	11.532	12.81
	8/19/98 10:17:28	2537.40	14.215	11.532	12.815
	8/19/98 10:27:28	2547.40	14.229	11.531	12.816
	8/19/98 10:37:28	2557.40	14.186	11.534	12.821
	8/19/98 10:47:28	2567.40	14.209	11.537	12.825
	8/19/98 10:57:28	2577.40	14.227	11.537	12.826
	8/19/98 11:07:28	2587.40	14.229	11.539	12.829
	8/19/98 11:17:28	2597.40	14.209	11.537	12.829

	8/19/98 11:27:28	2607.40	14.229	11.539	12.835
	8/19/98 11:37:28	2617.40	14.235	11.532	12.831
	8/19/98 11:47:28	2627.40	14.258	11.534	12.838
PUMP STOPPED					
	8/19/98 11:59:57	2639.89	13.877	11.55	12.895
	8/19/98 11:59:58	2639.91	13.35	11.55	12.893
	8/19/98 12:00:00	2639.93	13.077	11.549	12.893
	8/19/98 12:00:01	2639.96	13.023	11.55	12.893
	8/19/98 12:00:02	2639.98	12.983	11.55	12.893
	8/19/98 12:00:04	2640.00	12.948	11.55	12.893
	8/19/98 12:00:05	2640.02	12.92	11.549	12.893
	8/19/98 12:00:06	2640.04	12.9	11.549	12.893
	8/19/98 12:00:08	2640.07	12.877	11.549	12.892
	8/19/98 12:00:09	2640.10	12.857	11.549	12.892
	8/19/98 12:00:11	2640.12	12.834	11.55	12.892
	8/19/98 12:00:13	2640.15	12.814	11.55	12.89
	8/19/98 12:00:15	2640.18	12.794	11.55	12.89
	8/19/98 12:00:17	2640.22	12.771	11.55	12.889
	8/19/98 12:00:19	2640.25	12.748	11.549	12.887
	8/19/98 12:00:21	2640.29	12.728	11.549	12.884
	8/19/98 12:00:23	2640.33	12.722	11.549	12.884
	8/19/98 12:00:26	2640.37	12.687	11.547	12.882
	8/19/98 12:00:29	2640.42	12.665	11.547	12.879
	8/19/98 12:00:31	2640.46	12.644	11.547	12.876
	8/19/98 12:00:34	2640.51	12.627	11.547	12.874
	8/19/98 12:00:38	2640.57	12.61	11.546	12.87
	8/19/98 12:00:41	2640.62	12.593	11.546	12.868
	8/19/98 12:00:44	2640.68	12.57	11.546	12.867
	8/19/98 12:00:48	2640.74	12.556	11.547	12.864
	8/19/98 12:00:52	2640.81	12.538	11.547	12.863
	8/19/98 12:00:56	2640.88	12.524	11.547	12.86
	8/19/98 12:01:01	2640.95	12.51	11.547	12.855
	8/19/98 12:01:06	2641.03	12.495	11.547	12.855
	8/19/98 12:01:11	2641.12	12.475	11.547	12.853
	8/19/98 12:01:16	2641.21	12.461	11.547	12.851
	8/19/98 12:01:22	2641.30	12.447	11.546	12.847
	8/19/98 12:01:27	2641.40	12.429	11.547	12.844
	8/19/98 12:01:34	2641.50	12.418	11.547	12.844
	8/19/98 12:01:41	2641.62	12.401	11.547	12.841
	8/19/98 12:01:48	2641.73	12.386	11.549	12.838
	8/19/98 12:01:55	2641.86	12.375	11.549	12.837
	8/19/98 12:02:03	2641.99	12.363	11.547	12.835
	8/19/98 12:02:11	2642.13	12.349	11.546	12.834
	8/19/98 12:02:20	2642.28	12.338	11.546	12.826
	8/19/98 12:02:30	2642.44	12.326	11.546	12.824
	8/19/98 12:02:40	2642.60	12.312	11.546	12.821
	8/19/98 12:02:50	2642.78	12.3	11.547	12.819
	8/19/98 12:03:02	2642.97	12.292	11.547	12.818
	8/19/98 12:03:14	2643.17	12.28	11.547	12.815
	8/19/98 12:03:26	2643.38	12.269	11.549	12.812
	8/19/98 12:03:40	2643.60	12.26	11.549	12.81

	8/19/98 12:03:54	2643.84	12.252	11.55	12.81
	8/19/98 12:04:09	2644.09	12.24	11.547	12.805
	8/19/98 12:04:25	2644.35	12.246	11.547	12.8
	8/19/98 12:04:41	2644.63	12.214	11.547	12.799
	8/19/98 12:04:59	2644.93	12.206	11.549	12.797
	8/19/98 12:05:18	2645.24	12.197	11.55	12.793
	8/19/98 12:05:38	2645.58	12.186	11.551	12.79
	8/19/98 12:05:59	2645.93	12.177	11.553	12.786
	8/19/98 12:06:22	2646.30	12.166	11.547	12.78
	8/19/98 12:06:45	2646.70	12.154	11.549	12.779
	8/19/98 12:07:11	2647.12	12.14	11.547	12.774
	8/19/98 12:07:37	2647.56	12.128	11.551	12.773
	8/19/98 12:08:06	2648.03	12.12	11.551	12.77
	8/19/98 12:08:35	2648.53	12.108	11.551	12.766
	8/19/98 12:09:07	2649.06	12.1	11.553	12.764
	8/19/98 12:09:41	2649.62	12.082	11.549	12.757
	8/19/98 12:10:16	2650.21	12.074	11.551	12.755
	8/19/98 12:10:54	2650.84	12.062	11.549	12.752
	8/19/98 12:11:34	2651.50	12.042	11.544	12.742
	8/19/98 12:12:16	2652.21	12.031	11.549	12.739
	8/19/98 12:13:01	2652.95	12.019	11.547	12.735
	8/19/98 12:13:48	2653.74	12.008	11.553	12.732
	8/19/98 12:14:38	2654.58	11.994	11.547	12.725
	8/19/98 12:15:32	2655.47	11.976	11.547	12.719
	8/19/98 12:16:28	2656.41	11.965	11.549	12.715
	8/19/98 12:17:28	2657.40	11.948	11.549	12.712
	8/19/98 12:18:31	2658.45	11.951	11.547	12.705
	8/19/98 12:19:38	2659.57	11.922	11.554	12.702
	8/19/98 12:20:49	2660.75	11.907	11.551	12.694
	8/19/98 12:22:04	2662.00	11.887	11.549	12.687
	8/19/98 12:23:23	2663.33	11.87	11.551	12.68
	8/19/98 12:24:48	2664.74	11.85	11.55	12.673
	8/19/98 12:26:17	2666.22	11.833	11.551	12.667
	8/19/98 12:27:52	2667.80	11.813	11.55	12.664
	8/19/98 12:29:32	2669.47	11.793	11.547	12.652
	8/19/98 12:31:18	2671.24	11.778	11.554	12.648
	8/19/98 12:33:10	2673.11	11.753	11.543	12.635
	8/19/98 12:35:09	2675.10	11.733	11.544	12.628
	8/19/98 12:37:16	2677.20	11.715	11.553	12.622
	8/19/98 12:39:29	2679.43	11.687	11.544	12.61
	8/19/98 12:41:51	2681.79	11.667	11.547	12.603
	8/19/98 12:44:21	2684.28	11.647	11.551	12.596
	8/19/98 12:46:59	2686.93	11.624	11.553	12.587
	8/19/98 12:49:48	2689.73	11.595	11.547	12.575
	8/19/98 12:52:46	2692.70	11.569	11.55	12.565
	8/19/98 12:55:55	2695.85	11.546	11.553	12.555
	8/19/98 12:59:14	2699.18	11.512	11.547	12.545
	8/19/98 13:02:46	2702.71	11.489	11.551	12.535
	8/19/98 13:06:31	2706.45	11.463	11.554	12.522
	8/19/98 13:10:28	2710.41	11.429	11.553	12.512
	8/19/98 13:14:40	2714.60	11.397	11.549	12.494

	8/19/98 13:19:06	2719.05	11.357	11.543	12.48
	8/19/98 13:23:49	2723.75	11.331	11.549	12.467
	8/19/98 13:28:48	2728.74	11.299	11.551	12.458
	8/19/98 13:34:05	2734.02	11.268	11.551	12.442
	8/19/98 13:39:40	2739.61	11.233	11.547	12.423
	8/19/98 13:45:36	2745.54	11.179	11.527	12.396
	8/19/98 13:51:53	2751.82	11.162	11.554	12.397
	8/19/98 13:58:31	2758.46	11.125	11.551	12.377
	8/19/98 14:05:34	2765.51	11.087	11.544	12.354
	8/19/98 14:13:02	2772.97	11.044	11.544	12.33
	8/19/98 14:20:56	2780.87	11.004	11.535	12.311
	8/19/98 14:29:18	2789.24	10.961	11.533	12.285
	8/19/98 14:38:10	2798.10	10.932	11.54	12.268
	8/19/98 14:47:33	2807.49	10.878	11.512	12.227
	8/19/98 14:57:30	2817.44	10.863	11.547	12.229
	8/19/98 15:07:30	2827.44	10.815	11.514	12.19
	8/19/98 15:17:30	2837.44	10.78	11.504	12.177
	8/19/98 15:27:30	2847.44	10.757	11.495	12.153
	8/19/98 15:37:30	2857.44	10.709	11.454	12.114
	8/19/98 15:47:30	2867.44	10.688	11.45	12.108
	8/19/98 15:57:30	2877.44	10.657	11.416	12.075
	8/19/98 16:07:30	2887.44	10.628	11.392	12.053
	8/19/98 16:17:30	2897.44	10.591	11.352	12.026
	8/19/98 16:27:30	2907.44	10.579	11.334	12.01
	8/19/98 16:37:30	2917.44	10.545	11.289	11.986
	8/19/98 16:47:30	2927.44	10.516	11.254	11.959
	8/19/98 16:57:30	2937.44	10.496	11.217	11.939
	8/19/98 17:07:30	2947.44	10.456	11.167	11.908
	8/19/98 17:17:30	2957.44	10.442	11.132	11.891
	8/19/98 17:27:30	2967.44	10.416	11.088	11.87
	8/19/98 17:37:30	2977.44	10.39	11.042	11.849
	8/19/98 17:47:30	2987.44	10.364	10.992	11.825
	8/19/98 17:57:30	2997.44	10.336	10.94	11.802
	8/19/98 18:07:30	3007.44	10.316	10.896	11.782
	8/19/98 18:17:30	3017.44	10.29	10.844	11.76
	8/19/98 18:27:30	3027.44	10.264	10.779	11.737
	8/19/98 18:37:30	3037.44	10.241	10.703	11.717
	8/19/98 18:47:30	3047.44	10.218	10.633	11.695
	8/19/98 18:57:30	3057.44	10.192	10.577	11.673
	8/19/98 19:07:30	3067.44	10.172	10.529	11.651
	8/19/98 19:17:30	3077.44	10.149	10.482	11.631
	8/19/98 19:27:30	3087.44	10.123	10.439	11.606
	8/19/98 19:37:30	3097.44	10.103	10.408	11.589
	8/19/98 19:47:30	3107.44	10.08	10.381	11.567
	8/19/98 19:57:30	3117.44	10.057	10.353	11.548
	8/19/98 20:07:30	3127.44	10.037	10.324	11.525
	8/19/98 20:17:30	3137.44	10.02	10.298	11.503
	8/19/98 20:27:30	3147.44	9.997	10.267	11.483
	8/19/98 20:37:30	3157.44	9.98	10.235	11.461
	8/19/98 20:47:30	3167.44	9.963	10.208	11.442
	8/19/98 20:57:30	3177.44	9.945	10.18	11.419

	8/19/98 21:07:30	3187.44	9.925	10.155	11.399
	8/19/98 21:17:30	3197.44	9.911	10.134	11.38
	8/19/98 21:27:30	3207.44	9.894	10.105	11.358
	8/19/98 21:37:30	3217.44	9.877	10.077	11.336
	8/19/98 21:47:30	3227.44	9.856	10.046	11.316
	8/19/98 21:57:30	3237.44	9.842	10.022	11.296
	8/19/98 22:07:30	3247.44	9.825	9.994	11.275
	8/19/98 22:17:30	3257.44	9.808	9.968	11.257
	8/19/98 22:27:30	3267.44	9.79	9.942	11.239
	8/19/98 22:37:30	3277.44	9.776	9.917	11.222
	8/19/98 22:47:30	3287.44	9.762	9.897	11.206
	8/19/98 22:57:30	3297.44	9.747	9.872	11.188
	8/19/98 23:07:30	3307.44	9.736	9.855	11.174
	8/19/98 23:17:30	3317.44	9.719	9.83	11.155
	8/19/98 23:27:30	3327.44	9.704	9.813	11.142
	8/19/98 23:37:30	3337.44	9.693	9.794	11.127
	8/19/98 23:47:30	3347.44	9.679	9.778	11.114
	8/19/98 23:57:30	3357.44	9.664	9.759	11.1
	8/20/98 0:07:30	3367.44	9.65	9.741	11.085
	8/20/98 0:17:30	3377.44	9.638	9.725	11.072
	8/20/98 0:27:30	3387.44	9.624	9.706	11.059
	8/20/98 0:37:30	3397.44	9.615	9.692	11.049
	8/20/98 0:47:30	3407.44	9.604	9.679	11.036
	8/20/98 0:57:30	3417.44	9.59	9.661	11.023
	8/20/98 1:07:30	3427.44	9.581	9.648	11.013
	8/20/98 1:17:30	3437.44	9.57	9.632	11.001
	8/20/98 1:27:30	3447.44	9.558	9.621	10.991
	8/20/98 1:37:30	3457.44	9.547	9.602	10.978
	8/20/98 1:47:30	3467.44	9.538	9.592	10.971
	8/20/98 1:57:30	3477.44	9.527	9.579	10.959
	8/20/98 2:07:30	3487.44	9.518	9.564	10.948
	8/20/98 2:17:30	3497.44	9.506	9.55	10.937
	8/20/98 2:27:30	3507.44	9.495	9.538	10.927
	8/20/98 2:37:30	3517.44	9.483	9.525	10.917
	8/20/98 2:47:30	3527.44	9.475	9.512	10.907
	8/20/98 2:57:30	3537.44	9.466	9.5	10.898
	8/20/98 3:07:30	3547.44	9.458	9.488	10.889
	8/20/98 3:17:30	3557.44	9.446	9.475	10.879
	8/20/98 3:27:30	3567.44	9.44	9.465	10.872
	8/20/98 3:37:30	3577.44	9.432	9.455	10.865
	8/20/98 3:47:30	3587.44	9.423	9.443	10.856
	8/20/98 3:57:30	3597.44	9.415	9.433	10.847
	8/20/98 4:07:30	3607.44	9.406	9.423	10.84
	8/20/98 4:17:30	3617.44	9.395	9.413	10.833
	8/20/98 4:27:30	3627.44	9.389	9.403	10.823
	8/20/98 4:37:30	3637.44	9.383	9.395	10.815
	8/20/98 4:47:30	3647.44	9.372	9.382	10.805
	8/20/98 4:57:30	3657.44	9.363	9.374	10.799
	8/20/98 5:07:30	3667.44	9.357	9.365	10.792
	8/20/98 5:17:30	3677.44	9.349	9.356	10.785
	8/20/98 5:27:30	3687.44	9.34	9.348	10.778

	8/20/98 5:37:30	3697.44	9.334	9.339	10.77
	8/20/98 5:47:30	3707.44	9.326	9.33	10.765
	8/20/98 5:57:30	3717.44	9.317	9.32	10.756
	8/20/98 6:07:30	3727.44	9.311	9.313	10.75
	8/20/98 6:17:30	3737.44	9.303	9.305	10.743
	8/20/98 6:27:30	3747.44	9.297	9.297	10.737
	8/20/98 6:37:30	3757.44	9.288	9.291	10.73
	8/20/98 6:47:30	3767.44	9.285	9.284	10.724
	8/20/98 6:57:30	3777.44	9.28	9.276	10.717
	8/20/98 7:07:30	3787.44	9.277	9.271	10.712
	8/20/98 7:17:30	3797.44	9.268	9.262	10.704
	8/20/98 7:27:30	3807.44	9.265	9.256	10.699
	8/20/98 7:37:30	3817.44	9.257	9.247	10.694
	8/20/98 7:47:30	3827.44	9.248	9.241	10.686
	8/20/98 7:57:30	3837.44	9.242	9.236	10.682
	8/20/98 8:07:30	3847.44	9.24	9.23	10.675
	8/20/98 8:17:30	3857.44	9.228	9.223	10.669
	8/20/98 8:27:30	3867.44	9.225	9.215	10.663
	8/20/98 8:37:30	3877.44	9.219	9.207	10.657
	8/20/98 8:47:30	3887.44	9.211	9.202	10.649
	8/20/98 8:57:30	3897.44	9.205	9.196	10.644
	8/20/98 9:07:30	3907.44	9.197	9.189	10.638
	8/20/98 9:17:30	3917.44	9.191	9.18	10.631
	8/20/98 9:27:30	3927.44	9.185	9.173	10.625
	8/20/98 9:37:30	3937.44	9.179	9.169	10.621
	8/20/98 9:47:30	3947.44	9.171	9.16	10.614
	8/20/98 9:57:30	3957.44	9.168	9.154	10.611
	8/20/98 10:07:30	3967.44	9.165	9.151	10.605
	8/20/98 10:17:30	3977.44	9.156	9.143	10.598
	8/20/98 10:27:30	3987.44	9.151	9.14	10.593
	8/20/98 10:37:30	3997.44	9.136	9.125	10.585
	8/20/98 10:47:30	4007.44	9.136	9.127	10.585
	8/20/98 10:57:30	4017.44	9.122	9.111	10.575
	8/20/98 11:07:30	4027.44	9.131	9.116	10.573
	8/20/98 11:17:30	4037.44	9.122	9.114	10.575
	8/20/98 11:27:30	4047.44	9.105	9.093	10.56
	8/20/98 11:37:30	4057.44	9.099	9.089	10.554
	8/20/98 11:47:30	4067.44	9.09	9.077	10.547
	8/20/98 11:57:30	4077.44	9.09	9.077	10.547
	8/20/98 12:07:30	4087.44	9.076	9.066	10.534
	8/20/98 12:17:30	4097.44	9.07	9.061	10.532
	8/20/98 12:27:30	4107.44	9.076	9.069	10.537
	8/20/98 12:37:30	4117.44	9.053	9.041	10.518
	8/20/98 12:47:30	4127.44	9.05	9.039	10.515
	8/20/98 12:57:30	4137.44	9.05	9.038	10.515
	8/20/98 13:07:30	4147.44	9.044	9.031	10.506
	8/20/98 13:17:30	4157.44	9.039	9.023	10.502
	8/20/98 13:27:30	4167.44	9.047	9.031	10.503
	8/20/98 13:37:30	4177.44	9.044	9.028	10.5
	8/20/98 13:47:30	4187.44	9.03	9.01	10.49
	8/20/98 13:57:30	4197.44	9.024	9.005	10.485

	8/20/98 14:07:30	4207.44	9.013	8.993	10.479
	8/20/98 14:17:30	4217.44	9.007	8.987	10.471
	8/20/98 14:27:30	4227.44	9.007	8.993	10.473
	8/20/98 14:37:30	4237.44	8.996	8.977	10.464
	8/20/98 14:47:30	4247.44	9.001	8.986	10.466
	8/20/98 14:57:30	4257.44	8.993	8.975	10.458
	8/20/98 15:07:30	4267.44	8.993	8.971	10.454
	8/20/98 15:17:30	4277.44	8.984	8.962	10.445
	8/20/98 15:27:30	4287.44	8.978	8.957	10.442
	8/20/98 15:37:30	4297.44	8.973	8.954	10.44
	8/20/98 15:47:30	4307.44	8.973	8.949	10.435
	8/20/98 15:57:30	4317.44	8.967	8.949	10.432
	8/20/98 16:07:30	4327.44	8.961	8.939	10.428
	8/20/98 16:17:30	4337.44	8.955	8.935	10.424
	8/20/98 16:27:30	4347.44	8.95	8.926	10.415
	8/20/98 16:37:30	4357.44	8.938	8.919	10.413
	8/20/98 16:47:30	4367.44	8.941	8.922	10.41
	8/20/98 16:57:30	4377.44	8.935	8.916	10.406
	8/20/98 17:07:30	4387.44	8.941	8.914	10.406
	8/20/98 17:17:30	4397.44	8.93	8.909	10.402
	8/20/98 17:27:30	4407.44	8.924	8.904	10.4
	8/20/98 17:37:30	4417.44	8.932	8.907	10.4
	8/20/98 17:47:30	4427.44	8.921	8.898	10.39
	8/20/98 17:57:30	4437.44	8.921	8.896	10.389
	8/20/98 18:07:30	4447.44	8.915	8.891	10.386
	8/20/98 18:17:30	4457.44	8.912	8.885	10.384
	8/20/98 18:27:30	4467.44	8.898	8.877	10.379
	8/20/98 18:37:30	4477.44	8.898	8.874	10.37
	8/20/98 18:47:30	4487.44	8.895	8.869	10.368
	8/20/98 18:57:30	4497.44	8.892	8.866	10.365
	8/20/98 19:07:30	4507.44	8.887	8.858	10.361
	8/20/98 19:17:30	4517.44	8.887	8.858	10.358
	8/20/98 19:27:30	4527.44	8.878	8.851	10.354
	8/20/98 19:37:30	4537.44	8.875	8.848	10.352
	8/20/98 19:47:30	4547.44	8.869	8.845	10.351
	8/20/98 19:57:30	4557.44	8.866	8.842	10.348
	8/20/98 20:07:30	4567.44	8.866	8.839	10.345
	8/20/98 20:17:30	4577.44	8.861	8.836	10.344
	8/20/98 20:27:30	4587.44	8.861	8.833	10.341
	8/20/98 20:37:30	4597.44	8.858	8.829	10.339
	8/20/98 20:47:30	4607.44	8.855	8.826	10.336
	8/20/98 20:57:30	4617.44	8.855	8.823	10.332
	8/20/98 21:07:30	4627.44	8.849	8.821	10.331
	8/20/98 21:17:30	4637.44	8.849	8.817	10.328
	8/20/98 21:27:30	4647.44	8.846	8.819	10.326
	8/20/98 21:37:30	4657.44	8.841	8.814	10.323
	8/20/98 21:47:30	4667.44	8.841	8.811	10.319
	8/20/98 21:57:30	4677.44	8.838	8.808	10.316
	8/20/98 22:07:30	4687.44	8.835	8.805	10.315
	8/20/98 22:17:30	4697.44	8.835	8.803	10.31
	8/20/98 22:27:30	4707.44	8.829	8.8	10.307

	8/20/98 22:37:30	4717.44	8.826	8.795	10.305
	8/20/98 22:47:30	4727.44	8.823	8.794	10.303
	8/20/98 22:57:30	4737.44	8.818	8.791	10.3
	8/20/98 23:07:30	4747.44	8.818	8.788	10.296
	8/20/98 23:17:30	4757.44	8.815	8.785	10.293
	8/20/98 23:27:30	4767.44	8.812	8.784	10.291
	8/20/98 23:37:30	4777.44	8.809	8.779	10.289
	8/20/98 23:47:30	4787.44	8.809	8.779	10.289
	8/20/98 23:57:30	4797.44	8.806	8.775	10.284
	8/21/98 0:07:30	4807.44	8.803	8.772	10.281
	8/21/98 0:17:30	4817.44	8.803	8.771	10.278
	8/21/98 0:27:30	4827.44	8.8	8.768	10.278
	8/21/98 0:37:30	4837.44	8.798	8.765	10.274
	8/21/98 0:47:30	4847.44	8.795	8.763	10.271
	8/21/98 0:57:30	4857.44	8.795	8.76	10.268
	8/21/98 1:07:30	4867.44	8.792	8.757	10.267
	8/21/98 1:17:30	4877.44	8.789	8.755	10.264
	8/21/98 1:27:30	4887.44	8.786	8.752	10.261
	8/21/98 1:37:30	4897.44	8.78	8.75	10.258
	8/21/98 1:47:30	4907.44	8.778	8.746	10.255
	8/21/98 1:57:30	4917.44	8.775	8.744	10.254
	8/21/98 2:07:30	4927.44	8.772	8.741	10.251
	8/21/98 2:17:30	4937.44	8.769	8.739	10.246
	8/21/98 2:27:30	4947.44	8.766	8.734	10.244
	8/21/98 2:37:30	4957.44	8.766	8.733	10.244
	8/21/98 2:47:30	4967.44	8.763	8.73	10.241
	8/21/98 2:57:30	4977.44	8.763	8.728	10.239
	8/21/98 3:07:30	4987.44	8.76	8.727	10.238
	8/21/98 3:17:30	4997.44	8.757	8.724	10.235
	8/21/98 3:27:30	5007.44	8.757	8.724	10.233
	8/21/98 3:37:30	5017.44	8.755	8.72	10.23
	8/21/98 3:47:30	5027.44	8.752	8.718	10.229
	8/21/98 3:57:30	5037.44	8.752	8.717	10.228
	8/21/98 4:07:30	5047.44	8.749	8.715	10.225
	8/21/98 4:17:30	5057.44	8.746	8.712	10.22
	8/21/98 4:27:30	5067.44	8.749	8.712	10.22
	8/21/98 4:37:30	5077.44	8.746	8.711	10.219
	8/21/98 4:47:30	5087.44	8.743	8.707	10.217
	8/21/98 4:57:30	5097.44	8.737	8.705	10.215
	8/21/98 5:07:30	5107.44	8.734	8.702	10.212
	8/21/98 5:17:30	5117.44	8.737	8.704	10.215
	8/21/98 5:27:30	5127.44	8.74	8.704	10.215
	8/21/98 5:37:30	5137.44	8.734	8.699	10.21
	8/21/98 5:47:30	5147.44	8.729	8.695	10.204
	8/21/98 5:57:30	5157.44	8.732	8.695	10.206
	8/21/98 6:07:30	5167.44	8.726	8.691	10.203
	8/21/98 6:17:30	5177.44	8.72	8.686	10.197
	8/21/98 6:27:30	5187.44	8.717	8.685	10.197
	8/21/98 6:37:30	5197.44	8.72	8.686	10.197
	8/21/98 6:47:30	5207.44	8.714	8.68	10.193
	8/21/98 6:57:30	5217.44	8.712	8.678	10.19

	8/21/98 7:07:30	5227.44	8.709	8.676	10.187
	8/21/98 7:17:30	5237.44	8.714	8.679	10.193
	8/21/98 7:27:30	5247.44	8.712	8.678	10.19
	8/21/98 7:37:30	5257.44	8.714	8.676	10.188
	8/21/98 7:47:30	5267.44	8.712	8.676	10.188
	8/21/98 7:57:30	5277.44	8.709	8.675	10.184
	8/21/98 8:07:30	5287.44	8.709	8.672	10.183
	8/21/98 8:17:30	5297.44	8.706	8.67	10.18
	8/21/98 8:27:30	5307.44	8.706	8.669	10.178
	8/21/98 8:37:30	5317.44	8.703	8.669	10.175
	8/21/98 8:47:30	5327.44	8.703	8.666	10.175
	8/21/98 8:57:30	5337.44	8.703	8.664	10.174
	8/21/98 9:07:30	5347.44	8.703	8.667	10.171
	8/21/98 9:17:30	5357.44	8.706	8.669	10.171
	8/21/98 9:27:30	5367.44	8.694	8.656	10.167
	8/21/98 9:37:30	5377.44	8.691	8.656	10.165
	8/21/98 9:47:30	5387.44	8.691	8.654	10.164
	8/21/98 9:57:30	5397.44	8.683	8.65	10.161
	8/21/98 10:07:30	5407.44	8.683	8.648	10.159
	8/21/98 10:17:30	5417.44	8.683	8.648	10.158
	8/21/98 10:27:30	5427.44	8.677	8.643	10.155
	8/21/98 10:37:30	5437.44	8.674	8.641	10.155
	8/21/98 10:47:30	5447.44	8.674	8.64	10.152
	8/21/98 10:57:30	5457.44	8.674	8.638	10.149
	8/21/98 11:07:30	5467.44	8.671	8.635	10.146
	8/21/98 11:17:30	5477.44	8.668	8.632	10.145
	8/21/98 11:27:30	5487.44	8.666	8.631	10.145
	8/21/98 11:37:30	5497.44	8.666	8.631	10.142
	8/21/98 11:47:30	5507.44	8.663	8.628	10.14
	8/21/98 11:57:30	5517.44	8.66	8.624	10.138
	8/21/98 12:07:30	5527.44	8.657	8.622	10.135
	8/21/98 12:17:30	5537.44	8.654	8.619	10.133
	8/21/98 12:27:30	5547.44	8.651	8.618	10.133
	8/21/98 12:37:30	5557.44	8.651	8.618	10.13
	8/21/98 12:47:30	5567.44	8.651	8.615	10.129
	8/21/98 12:57:30	5577.44	8.648	8.612	10.126
	8/21/98 13:07:30	5587.44	8.646	8.611	10.125
	8/21/98 13:17:30	5597.44	8.643	8.609	10.123
	8/21/98 13:27:30	5607.44	8.64	8.606	10.122
	8/21/98 13:37:30	5617.44	8.64	8.606	10.122
	8/21/98 13:47:30	5627.44	8.64	8.605	10.117
	8/21/98 13:57:30	5637.44	8.64	8.605	10.116
	8/21/98 14:07:30	5647.44	8.634	8.601	10.113
	8/21/98 14:17:30	5657.44	8.631	8.598	10.113
	8/21/98 14:27:30	5667.44	8.631	8.596	10.11
	8/21/98 14:37:30	5677.44	8.631	8.596	10.109
	8/21/98 14:47:30	5687.44	8.628	8.593	10.107
	8/21/98 14:57:30	5697.44	8.628	8.592	10.104
	8/21/98 15:07:30	5707.44	8.625	8.589	10.103
	8/21/98 15:17:30	5717.44	8.625	8.59	10.101
	8/21/98 15:27:30	5727.44	8.623	8.586	10.098

	8/21/98 15:37:30	5737.44	8.623	8.583	10.097
	8/21/98 15:47:30	5747.44	8.617	8.582	10.094
	8/21/98 15:57:30	5757.44	8.617	8.582	10.095
	8/21/98 16:07:30	5767.44	8.614	8.579	10.093
	8/21/98 16:17:30	5777.44	8.617	8.579	10.093
	8/21/98 16:27:30	5787.44	8.614	8.577	10.091
	8/21/98 16:37:30	5797.44	8.614	8.577	10.09
	8/21/98 16:47:30	5807.44	8.611	8.574	10.087
	8/21/98 16:57:30	5817.44	8.608	8.571	10.084
	8/21/98 17:07:30	5827.44	8.608	8.571	10.084
	8/21/98 17:17:30	5837.44	8.605	8.57	10.081
	8/21/98 17:27:30	5847.44	8.608	8.567	10.082
	8/21/98 17:37:30	5857.44	8.605	8.564	10.08
	8/21/98 17:47:30	5867.44	8.605	8.566	10.081
	8/21/98 17:57:30	5877.44	8.597	8.56	10.074
	8/21/98 18:07:30	5887.44	8.597	8.56	10.075
	8/21/98 18:17:30	5897.44	8.602	8.564	10.077
	8/21/98 18:27:30	5907.44	8.6	8.56	10.074
	8/21/98 18:37:30	5917.44	8.597	8.56	10.072
	8/21/98 18:47:30	5927.44	8.591	8.554	10.068
	8/21/98 18:57:30	5937.44	8.591	8.553	10.069
	8/21/98 19:07:30	5947.44	8.585	8.55	10.068
	8/21/98 19:17:30	5957.44	8.582	8.547	10.064
	8/21/98 19:27:30	5967.44	8.577	8.544	10.065
	8/21/98 19:37:30	5977.44	8.579	8.544	10.064
	8/21/98 19:47:30	5987.44	8.579	8.542	10.062
	8/21/98 19:57:30	5997.44	8.577	8.542	10.059
	8/21/98 20:07:30	6007.44	8.577	8.541	10.061
	8/21/98 20:17:30	6017.44	8.571	8.537	10.058
	8/21/98 20:27:30	6027.44	8.579	8.539	10.061
	8/21/98 20:37:30	6037.44	8.574	8.537	10.058
	8/21/98 20:47:30	6047.44	8.579	8.538	10.061
	8/21/98 20:57:30	6057.44	8.574	8.535	10.056
	8/21/98 21:07:30	6067.44	8.574	8.537	10.055
	8/21/98 21:17:30	6077.44	8.571	8.532	10.052
	8/21/98 21:27:30	6087.44	8.568	8.532	10.052
	8/21/98 21:37:30	6097.44	8.568	8.532	10.05
	8/21/98 21:47:30	6107.44	8.565	8.531	10.049
	8/21/98 21:57:30	6117.44	8.568	8.529	10.048
	8/21/98 22:07:30	6127.44	8.568	8.529	10.049
	8/21/98 22:17:30	6137.44	8.565	8.526	10.046
	8/21/98 22:27:30	6147.44	8.562	8.526	10.045
	8/21/98 22:37:30	6157.44	8.562	8.526	10.045
	8/21/98 22:47:30	6167.44	8.562	8.525	10.043
	8/21/98 22:57:30	6177.44	8.562	8.523	10.04
	8/21/98 23:07:30	6187.44	8.562	8.522	10.043
	8/21/98 23:17:30	6197.44	8.562	8.522	10.04
	8/21/98 23:27:30	6207.44	8.557	8.521	10.039
	8/21/98 23:37:30	6217.44	8.557	8.521	10.039
	8/21/98 23:47:30	6227.44	8.557	8.521	10.037
	8/21/98 23:57:30	6237.44	8.554	8.519	10.036

	8/22/98 0:07:30	6247.44	8.554	8.519	10.035
	8/22/98 0:17:30	6257.44	8.551	8.515	10.032
	8/22/98 0:27:30	6267.44	8.551	8.515	10.032
	8/22/98 0:37:30	6277.44	8.548	8.513	10.032
	8/22/98 0:47:30	6287.44	8.551	8.513	10.032
	8/22/98 0:57:30	6297.44	8.548	8.51	10.029
	8/22/98 1:07:30	6307.44	8.548	8.51	10.027
	8/22/98 1:17:30	6317.44	8.545	8.509	10.027
	8/22/98 1:27:30	6327.44	8.545	8.509	10.026
	8/22/98 1:37:30	6337.44	8.542	8.506	10.023
	8/22/98 1:47:30	6347.44	8.542	8.505	10.021
	8/22/98 1:57:30	6357.44	8.539	8.505	10.021
	8/22/98 2:07:30	6367.44	8.542	8.505	10.021
	8/22/98 2:17:30	6377.44	8.539	8.503	10.02
	8/22/98 2:27:30	6387.44	8.536	8.5	10.019
	8/22/98 2:37:30	6397.44	8.536	8.5	10.019
	8/22/98 2:47:30	6407.44	8.536	8.499	10.017
	8/22/98 2:57:30	6417.44	8.534	8.499	10.016
	8/22/98 3:07:30	6427.44	8.534	8.499	10.016
	8/22/98 3:17:30	6437.44	8.531	8.496	10.013
	8/22/98 3:27:30	6447.44	8.534	8.496	10.011
	8/22/98 3:37:30	6457.44	8.536	8.496	10.013
	8/22/98 3:47:30	6467.44	8.534	8.493	10.011
	8/22/98 3:57:30	6477.44	8.528	8.491	10.008
	8/22/98 4:07:30	6487.44	8.525	8.49	10.007
	8/22/98 4:17:30	6497.44	8.531	8.49	10.007
	8/22/98 4:27:30	6507.44	8.528	8.489	10.005
	8/22/98 4:37:30	6517.44	8.525	8.489	10.004
	8/22/98 4:47:30	6527.44	8.528	8.489	10.005
	8/22/98 4:57:30	6537.44	8.525	8.486	10.001
	8/22/98 5:07:30	6547.44	8.522	8.484	10.001
	8/22/98 5:17:30	6557.44	8.522	8.484	10.001
	8/22/98 5:27:30	6567.44	8.525	8.484	10.001
	8/22/98 5:37:30	6577.44	8.519	8.481	9.998
	8/22/98 5:47:30	6587.44	8.516	8.481	9.997
	8/22/98 5:57:30	6597.44	8.513	8.477	9.995
	8/22/98 6:07:30	6607.44	8.516	8.477	9.995
	8/22/98 6:17:30	6617.44	8.516	8.477	9.995
	8/22/98 6:27:30	6627.44	8.516	8.476	9.994
	8/22/98 6:37:30	6637.44	8.516	8.476	9.994
	8/22/98 6:47:30	6647.44	8.516	8.476	9.994
	8/22/98 6:57:30	6657.44	8.519	8.478	9.994
	8/22/98 7:07:30	6667.44	8.519	8.477	9.992
	8/22/98 7:17:30	6677.44	8.516	8.477	9.992
	8/22/98 7:27:30	6687.44	8.519	8.478	9.992
	8/22/98 7:37:30	6697.44	8.516	8.477	9.99
	8/22/98 7:47:30	6707.44	8.519	8.478	9.991
	8/22/98 7:57:30	6717.44	8.519	8.477	9.991
	8/22/98 8:07:30	6727.44	8.513	8.473	9.988
	8/22/98 8:17:30	6737.44	8.516	8.476	9.988
	8/22/98 8:27:30	6747.44	8.508	8.468	9.985

	8/22/98 8:37:30	6757.44	8.505	8.468	9.984
	8/22/98 8:47:30	6767.44	8.516	8.477	9.987
	8/22/98 8:57:30	6777.44	8.511	8.471	9.982
	8/22/98 9:07:30	6787.44	8.513	8.473	9.982
	8/22/98 9:17:30	6797.44	8.511	8.471	9.981
	8/22/98 9:27:30	6807.44	8.508	8.467	9.976
	8/22/98 9:37:30	6817.44	8.508	8.471	9.976
	8/22/98 9:47:30	6827.44	8.505	8.464	9.975
	8/22/98 9:57:30	6837.44	8.505	8.465	9.978
	8/22/98 10:07:30	6847.44	8.505	8.467	9.975
	8/22/98 10:17:30	6857.44	8.502	8.462	9.971
	8/22/98 10:27:30	6867.44	8.505	8.464	9.972
	8/22/98 10:37:30	6877.44	8.496	8.458	9.969
	8/22/98 10:47:30	6887.44	8.493	8.455	9.966
	8/22/98 10:57:30	6897.44	8.493	8.458	9.966
	8/22/98 11:07:30	6907.44	8.493	8.46	9.963
	8/22/98 11:17:30	6917.44	8.493	8.458	9.963
	8/22/98 11:27:30	6927.44	8.488	8.451	9.96
	8/22/98 11:37:30	6937.44	8.491	8.451	9.962
	8/22/98 11:47:30	6947.44	8.485	8.449	9.959
	8/22/98 11:57:30	6957.44	8.488	8.451	9.958
	8/22/98 12:07:30	6967.44	8.485	8.451	9.958
	8/22/98 12:17:30	6977.44	8.476	8.438	9.952
	8/22/98 12:27:30	6987.44	8.482	8.445	9.953
	8/22/98 12:37:30	6997.44	8.476	8.442	9.952
	8/22/98 12:47:30	7007.44	8.476	8.441	9.95
	8/22/98 12:57:30	7017.44	8.476	8.439	9.95
	8/22/98 13:07:30	7027.44	8.47	8.436	9.947
	8/22/98 13:17:30	7037.44	8.468	8.43	9.946
	8/22/98 13:27:30	7047.44	8.468	8.435	9.946
	8/22/98 13:37:30	7057.44	8.462	8.429	9.945
	8/22/98 13:47:30	7067.44	8.465	8.429	9.943
	8/22/98 13:57:30	7077.44	8.465	8.43	9.942
	8/22/98 14:07:30	7087.44	8.465	8.428	9.942
	8/22/98 14:17:30	7097.44	8.468	8.429	9.942
	8/22/98 14:27:30	7107.44	8.462	8.425	9.942
	8/22/98 14:37:30	7117.44	8.468	8.43	9.942
	8/22/98 14:47:30	7127.44	8.462	8.426	9.94
	8/22/98 14:57:30	7137.44	8.456	8.42	9.934
	8/22/98 15:07:30	7147.44	8.459	8.422	9.936
	8/22/98 15:17:30	7157.44	8.456	8.417	9.934
	8/22/98 15:27:30	7167.44	8.456	8.419	9.94
	8/22/98 15:37:30	7177.44	8.447	8.41	9.931
	8/22/98 15:47:30	7187.44	8.456	8.42	9.934
	8/22/98 15:57:30	7197.44	8.45	8.414	9.929
	8/22/98 16:07:30	7207.44	8.447	8.412	9.929
	8/22/98 16:17:30	7217.44	8.445	8.404	9.924
	8/22/98 16:27:30	7227.44	8.447	8.41	9.926
	8/22/98 16:37:30	7237.44	8.439	8.398	9.921
	8/22/98 16:47:30	7247.44	8.447	8.41	9.926
	8/22/98 16:57:30	7257.44	8.433	8.4	9.924

	8/22/98 17:07:30	7267.44	8.439	8.401	9.924
	8/22/98 17:17:30	7277.44	8.436	8.401	9.923
	8/22/98 17:27:30	7287.44	8.45	8.412	9.929
	8/22/98 17:37:30	7297.44	8.439	8.401	9.923
	8/22/98 17:47:30	7307.44	8.439	8.397	9.917
	8/22/98 17:57:30	7317.44	8.447	8.406	9.924
	8/22/98 18:07:30	7327.44	8.442	8.4	9.92
	8/22/98 18:17:30	7337.44	8.439	8.4	9.92
	8/22/98 18:27:30	7347.44	8.442	8.401	9.921
	8/22/98 18:37:30	7357.44	8.439	8.397	9.92
	8/22/98 18:47:30	7367.44	8.439	8.398	9.918
	8/22/98 18:57:30	7377.44	8.433	8.394	9.917
	8/22/98 19:07:30	7387.44	8.433	8.396	9.917
	8/22/98 19:17:30	7397.44	8.43	8.391	9.913
	8/22/98 19:27:30	7407.44	8.425	8.387	9.913
	8/22/98 19:37:30	7417.44	8.425	8.39	9.913
	8/22/98 19:47:30	7427.44	8.427	8.39	9.915
	8/22/98 19:57:30	7437.44	8.425	8.388	9.914
	8/22/98 20:07:30	7447.44	8.425	8.388	9.915
	8/22/98 20:17:30	7457.44	8.425	8.387	9.914
	8/22/98 20:27:30	7467.44	8.425	8.388	9.914
	8/22/98 20:37:30	7477.44	8.425	8.387	9.914
	8/22/98 20:47:30	7487.44	8.425	8.387	9.913
	8/22/98 20:57:30	7497.44	8.427	8.387	9.914
	8/22/98 21:07:30	7507.44	8.425	8.387	9.913
	8/22/98 21:17:30	7517.44	8.427	8.388	9.914
	8/22/98 21:27:30	7527.44	8.427	8.388	9.913
	8/22/98 21:37:30	7537.44	8.427	8.388	9.914
	8/22/98 21:47:30	7547.44	8.43	8.388	9.913
	8/22/98 21:57:30	7557.44	8.425	8.387	9.913
	8/22/98 22:07:30	7567.44	8.427	8.388	9.911
	8/22/98 22:17:30	7577.44	8.425	8.385	9.91
	8/22/98 22:27:30	7587.44	8.425	8.387	9.907
	8/22/98 22:37:30	7597.44	8.422	8.385	9.908
	8/22/98 22:47:30	7607.44	8.425	8.385	9.908
	8/22/98 22:57:30	7617.44	8.425	8.384	9.907
	8/22/98 23:07:30	7627.44	8.422	8.382	9.904
	8/22/98 23:17:30	7637.44	8.422	8.382	9.905
	8/22/98 23:27:30	7647.44	8.422	8.382	9.905
	8/22/98 23:37:30	7657.44	8.425	8.382	9.905
	8/22/98 23:47:30	7667.44	8.422	8.381	9.902
	8/22/98 23:57:30	7677.44	8.422	8.382	9.902
	8/23/98 0:07:30	7687.44	8.422	8.384	9.905
	8/23/98 0:17:30	7697.44	8.422	8.384	9.904
	8/23/98 0:27:30	7707.44	8.419	8.381	9.902
	8/23/98 0:37:30	7717.44	8.419	8.381	9.901
	8/23/98 0:47:30	7727.44	8.419	8.382	9.901
	8/23/98 0:57:30	7737.44	8.422	8.38	9.9
	8/23/98 1:07:30	7747.44	8.422	8.381	9.9
	8/23/98 1:17:30	7757.44	8.419	8.38	9.898
	8/23/98 1:27:30	7767.44	8.419	8.381	9.898

	8/23/98 1:37:30	7777.44	8.416	8.378	9.897
	8/23/98 1:47:30	7787.44	8.416	8.377	9.895
	8/23/98 1:57:30	7797.44	8.413	8.377	9.895
	8/23/98 2:07:30	7807.44	8.413	8.377	9.895
	8/23/98 2:17:30	7817.44	8.41	8.372	9.894
	8/23/98 2:27:30	7827.44	8.41	8.374	9.892
	8/23/98 2:37:30	7837.44	8.413	8.374	9.892
	8/23/98 2:47:30	7847.44	8.413	8.374	9.892
	8/23/98 2:57:30	7857.44	8.41	8.372	9.891
	8/23/98 3:07:30	7867.44	8.413	8.374	9.892
	8/23/98 3:17:30	7877.44	8.413	8.372	9.891
	8/23/98 3:27:30	7887.44	8.41	8.371	9.889
	8/23/98 3:37:30	7897.44	8.407	8.369	9.888
	8/23/98 3:47:30	7907.44	8.407	8.369	9.888
	8/23/98 3:57:30	7917.44	8.407	8.368	9.886
	8/23/98 4:07:30	7927.44	8.407	8.368	9.888
	8/23/98 4:17:30	7937.44	8.407	8.368	9.886
	8/23/98 4:27:30	7947.44	8.404	8.366	9.885
	8/23/98 4:37:30	7957.44	8.404	8.366	9.884
	8/23/98 4:47:30	7967.44	8.402	8.364	9.884
	8/23/98 4:57:30	7977.44	8.404	8.366	9.885
	8/23/98 5:07:30	7987.44	8.402	8.365	9.884
	8/23/98 5:17:30	7997.44	8.402	8.364	9.884
	8/23/98 5:27:30	8007.44	8.404	8.365	9.886
	8/23/98 5:37:30	8017.44	8.402	8.364	9.884
	8/23/98 5:47:30	8027.44	8.402	8.364	9.884
	8/23/98 5:57:30	8037.44	8.399	8.362	9.882
	8/23/98 6:07:30	8047.44	8.402	8.362	9.882
	8/23/98 6:17:30	8057.44	8.404	8.362	9.882
	8/23/98 6:27:30	8067.44	8.402	8.362	9.882
	8/23/98 6:37:30	8077.44	8.402	8.362	9.881
	8/23/98 6:47:30	8087.44	8.402	8.364	9.884
	8/23/98 6:57:30	8097.44	8.404	8.362	9.882
	8/23/98 7:07:30	8107.44	8.404	8.362	9.884
	8/23/98 7:17:30	8117.44	8.402	8.361	9.881
	8/23/98 7:27:30	8127.44	8.402	8.361	9.881
	8/23/98 7:37:30	8137.44	8.413	8.368	9.882
	8/23/98 7:47:30	8147.44	8.41	8.368	9.882
	8/23/98 7:57:30	8157.44	8.41	8.366	9.881
	8/23/98 8:07:30	8167.44	8.41	8.366	9.879
	8/23/98 8:17:30	8177.44	8.407	8.365	9.878
	8/23/98 8:27:30	8187.44	8.41	8.366	9.879
	8/23/98 8:37:30	8197.44	8.407	8.365	9.878
	8/23/98 8:47:30	8207.44	8.407	8.365	9.878
	8/23/98 8:57:30	8217.44	8.404	8.364	9.876
	8/23/98 9:07:30	8227.44	8.402	8.364	9.875
	8/23/98 9:17:30	8237.44	8.404	8.362	9.875
	8/23/98 9:27:30	8247.44	8.399	8.356	9.87
	8/23/98 9:37:30	8257.44	8.399	8.358	9.87
	8/23/98 9:47:30	8267.44	8.399	8.361	9.87
	8/23/98 9:57:30	8277.44	8.396	8.358	9.869

	8/23/98 10:07:30	8287.44	8.393	8.355	9.868
	8/23/98 10:17:30	8297.44	8.396	8.353	9.869
	8/23/98 10:27:30	8307.44	8.393	8.355	9.868
	8/23/98 10:37:30	8317.44	8.396	8.356	9.866
	8/23/98 10:47:30	8327.44	8.39	8.353	9.866
	8/23/98 10:57:30	8337.44	8.39	8.35	9.862
	8/23/98 11:07:30	8347.44	8.39	8.353	9.862
	8/23/98 11:17:30	8357.44	8.393	8.353	9.863
	8/23/98 11:27:30	8367.44	8.39	8.352	9.86
	8/23/98 11:37:30	8377.44	8.387	8.346	9.857
	8/23/98 11:47:30	8387.44	8.384	8.345	9.855
	8/23/98 11:57:30	8397.44	8.379	8.34	9.855
	8/23/98 12:07:30	8407.44	8.384	8.346	9.856
	8/23/98 12:17:30	8417.44	8.376	8.336	9.85
	8/23/98 12:27:30	8427.44	8.376	8.337	9.853
	8/23/98 12:37:30	8437.44	8.376	8.342	9.857
	8/23/98 12:47:30	8447.44	8.376	8.339	9.852
	8/23/98 12:57:30	8457.44	8.373	8.336	9.852
	8/23/98 13:07:30	8467.44	8.373	8.337	9.853
	8/23/98 13:17:30	8477.44	8.364	8.326	9.846
	8/23/98 13:27:30	8487.44	8.37	8.332	9.841
	8/23/98 13:37:30	8497.44	8.367	8.329	9.846
	8/23/98 13:47:30	8507.44	8.364	8.33	9.846
	8/23/98 13:57:30	8517.44	8.364	8.326	9.843
	8/23/98 14:07:30	8527.44	8.367	8.327	9.847
	8/23/98 14:17:30	8537.44	8.364	8.327	9.847
	8/23/98 14:27:30	8547.44	8.367	8.326	9.844
	8/23/98 14:37:30	8557.44	8.367	8.329	9.841
	8/23/98 14:47:30	8567.44	8.361	8.319	9.839
	8/23/98 14:57:30	8577.44	8.367	8.327	9.841
	8/23/98 15:07:30	8587.44	8.361	8.321	9.841
	8/23/98 15:17:30	8597.44	8.347	8.301	9.825
	8/23/98 15:27:30	8607.44	8.361	8.321	9.837
	8/23/98 15:37:30	8617.44	8.358	8.321	9.837
	8/23/98 15:47:30	8627.44	8.361	8.323	9.837
	8/23/98 15:57:30	8637.44	8.361	8.324	9.839
	8/23/98 16:07:30	8647.44	8.356	8.319	9.837
	8/23/98 16:17:30	8657.44	8.356	8.314	9.833
	8/23/98 16:27:30	8667.44	8.356	8.314	9.836
	8/23/98 16:37:30	8677.44	8.35	8.308	9.831
	8/23/98 16:47:30	8687.44	8.358	8.316	9.833
	8/23/98 16:57:30	8697.44	8.353	8.313	9.831
	8/23/98 17:07:30	8707.44	8.353	8.31	9.83
	8/23/98 17:17:30	8717.44	8.353	8.313	9.83
	8/23/98 17:27:30	8727.44	8.35	8.308	9.83
	8/23/98 17:37:30	8737.44	8.353	8.31	9.831
	8/23/98 17:47:30	8747.44	8.35	8.31	9.831
	8/23/98 17:57:30	8757.44	8.35	8.311	9.828
	8/23/98 18:07:30	8767.44	8.35	8.311	9.83
	8/23/98 18:17:30	8777.44	8.341	8.3	9.824
	8/23/98 18:27:30	8787.44	8.347	8.307	9.828

	8/23/98 18:37:30	8797.44	8.338	8.297	9.824
	8/23/98 18:47:30	8807.44	8.344	8.305	9.828
	8/23/98 18:57:30	8817.44	8.344	8.303	9.824
	8/23/98 19:07:30	8827.44	8.338	8.3	9.825
	8/23/98 19:17:30	8837.44	8.338	8.298	9.824
	8/23/98 19:27:30	8847.44	8.338	8.3	9.825
	8/23/98 19:37:30	8857.44	8.341	8.3	9.827
	8/23/98 19:47:30	8867.44	8.338	8.301	9.825
	8/23/98 19:57:30	8877.44	8.338	8.3	9.825
	8/23/98 20:07:30	8887.44	8.341	8.3	9.827
	8/23/98 20:17:30	8897.44	8.338	8.3	9.827
	8/23/98 20:27:30	8907.44	8.341	8.301	9.825
	8/23/98 20:37:30	8917.44	8.338	8.3	9.825
	8/23/98 20:47:30	8927.44	8.341	8.301	9.827
	8/23/98 20:57:30	8937.44	8.341	8.303	9.828
	8/23/98 21:07:30	8947.44	8.341	8.301	9.828
	8/23/98 21:17:30	8957.44	8.344	8.303	9.828
	8/23/98 21:27:30	8967.44	8.344	8.304	9.827
	8/23/98 21:37:30	8977.44	8.347	8.305	9.83
	8/23/98 21:47:30	8987.44	8.347	8.305	9.83
	8/23/98 21:57:30	8997.44	8.347	8.305	9.83
	8/23/98 22:07:30	9007.44	8.344	8.304	9.827
	8/23/98 22:17:30	9017.44	8.344	8.305	9.827
	8/23/98 22:27:30	9027.44	8.344	8.303	9.827
	8/23/98 22:37:30	9037.44	8.344	8.301	9.824
	8/23/98 22:47:30	9047.44	8.341	8.3	9.824
	8/23/98 22:57:30	9057.44	8.344	8.303	9.824
	8/23/98 23:07:30	9067.44	8.341	8.303	9.824
	8/23/98 23:17:30	9077.44	8.338	8.301	9.823
	8/23/98 23:27:30	9087.44	8.344	8.301	9.824
	8/23/98 23:37:30	9097.44	8.341	8.301	9.823
	8/23/98 23:47:30	9107.44	8.341	8.3	9.821
	8/23/98 23:57:30	9117.44	8.338	8.3	9.82
	8/24/98 0:07:30	9127.44	8.338	8.298	9.818
	8/24/98 0:17:30	9137.44	8.338	8.3	9.821
	8/24/98 0:27:30	9147.44	8.338	8.298	9.82
	8/24/98 0:37:30	9157.44	8.341	8.301	9.823
	8/24/98 0:47:30	9167.44	8.338	8.3	9.82
	8/24/98 0:57:30	9177.44	8.336	8.297	9.818
	8/24/98 1:07:30	9187.44	8.341	8.3	9.821
	8/24/98 1:17:30	9197.44	8.344	8.3	9.82
	8/24/98 1:27:30	9207.44	8.336	8.298	9.818
	8/24/98 1:37:30	9217.44	8.338	8.298	9.818
	8/24/98 1:47:30	9227.44	8.338	8.297	9.817
	8/24/98 1:57:30	9237.44	8.338	8.297	9.818
	8/24/98 2:07:30	9247.44	8.336	8.295	9.817
	8/24/98 2:17:30	9257.44	8.336	8.295	9.817
	8/24/98 2:27:30	9267.44	8.336	8.295	9.817
	8/24/98 2:37:30	9277.44	8.336	8.295	9.818
	8/24/98 2:47:30	9287.44	8.336	8.295	9.817
	8/24/98 2:57:30	9297.44	8.338	8.295	9.818

	8/24/98 3:07:30	9307.44	8.338	8.298	9.818
	8/24/98 3:17:30	9317.44	8.338	8.298	9.82
	8/24/98 3:27:30	9327.44	8.338	8.297	9.817
	8/24/98 3:37:30	9337.44	8.336	8.295	9.817
	8/24/98 3:47:30	9347.44	8.338	8.297	9.818
	8/24/98 3:57:30	9357.44	8.336	8.297	9.817
	8/24/98 4:07:30	9367.44	8.336	8.297	9.817
	8/24/98 4:17:30	9377.44	8.338	8.295	9.815
	8/24/98 4:27:30	9387.44	8.336	8.295	9.815
	8/24/98 4:37:30	9397.44	8.338	8.297	9.817
	8/24/98 4:47:30	9407.44	8.333	8.294	9.814
	8/24/98 4:57:30	9417.44	8.336	8.295	9.817
	8/24/98 5:07:30	9427.44	8.336	8.294	9.815
	8/24/98 5:17:30	9437.44	8.338	8.295	9.817
	8/24/98 5:27:30	9447.44	8.336	8.297	9.815
	8/24/98 5:37:30	9457.44	8.336	8.295	9.815
	8/24/98 5:47:30	9467.44	8.338	8.297	9.818
	8/24/98 5:57:30	9477.44	8.336	8.295	9.815
	8/24/98 6:07:30	9487.44	8.338	8.295	9.815
	8/24/98 6:17:30	9497.44	8.338	8.297	9.817
	8/24/98 6:27:30	9507.44	8.338	8.297	9.814
	8/24/98 6:37:30	9517.44	8.338	8.297	9.815
	8/24/98 6:47:30	9527.44	8.338	8.297	9.818
	8/24/98 6:57:30	9537.44	8.338	8.297	9.814
	8/24/98 7:07:30	9547.44	8.344	8.3	9.818
	8/24/98 7:17:30	9557.44	8.341	8.301	9.818
	8/24/98 7:27:30	9567.44	8.341	8.3	9.817
	8/24/98 7:37:30	9577.44	8.341	8.301	9.817
	8/24/98 7:47:30	9587.44	8.344	8.301	9.817
	8/24/98 7:57:30	9597.44	8.338	8.301	9.815
	8/24/98 8:07:30	9607.44	8.344	8.301	9.815
	8/24/98 8:17:30	9617.44	8.347	8.303	9.815
	8/24/98 8:27:30	9627.44	8.344	8.3	9.815
	8/24/98 8:37:30	9637.44	8.344	8.301	9.814
	8/24/98 8:47:30	9647.44	8.347	8.304	9.814
	8/24/98 8:57:30	9657.44	8.344	8.301	9.811
	8/24/98 9:07:30	9667.44	8.347	8.303	9.812
	8/24/98 9:17:30	9677.44	8.344	8.303	9.81
	8/24/98 9:27:30	9687.44	8.338	8.297	9.81
	8/24/98 9:37:30	9697.44	8.338	8.297	9.81
	8/24/98 9:47:30	9707.44	8.35	8.307	9.815
	8/24/98 9:57:30	9717.44	8.341	8.297	9.807
	8/24/98 10:07:30	9727.44	8.333	8.292	9.808
	8/24/98 10:17:30	9737.44	8.341	8.301	9.812
	8/24/98 10:27:30	9747.44	8.347	8.303	9.81
	8/24/98 10:37:30	9757.44	8.338	8.297	9.808
	8/24/98 10:47:30	9767.44	8.338	8.295	9.807
	8/24/98 10:57:30	9777.44	8.341	8.298	9.805
	8/24/98 11:07:30	9787.44	8.33	8.294	9.805
	8/24/98 11:17:30	9797.44	8.338	8.297	9.805
	8/24/98 11:27:30	9807.44	8.338	8.298	9.805

	8/24/98 11:37:30	9817.44	8.338	8.3	9.805
	8/24/98 11:47:30	9827.44	8.333	8.291	9.801
	8/24/98 11:57:30	9837.44	8.33	8.291	9.798
	8/24/98 12:07:30	9847.44	8.324	8.284	9.796
	8/24/98 12:17:30	9857.44	8.333	8.292	9.801
	8/24/98 12:27:30	9867.44	8.327	8.288	9.799
	8/24/98 12:37:30	9877.44	8.327	8.288	9.796
	8/24/98 12:47:30	9887.44	8.327	8.292	9.799
	8/24/98 12:57:30	9897.44	8.327	8.288	9.799
	8/24/98 13:07:30	9907.44	8.318	8.273	9.791
	8/24/98 13:17:30	9917.44	8.324	8.289	9.801
	8/24/98 13:27:30	9927.44	8.327	8.287	9.798
	8/24/98 13:37:30	9937.44	8.318	8.279	9.795
	8/24/98 13:47:30	9947.44	8.327	8.285	9.801
	8/24/98 13:57:30	9957.44	8.336	8.295	9.798
	8/24/98 14:07:30	9967.44	8.327	8.281	9.791
	8/24/98 14:17:30	9977.44	8.318	8.279	9.795
	8/24/98 14:27:30	9987.44	8.321	8.282	9.792
	8/24/98 14:37:30	9997.44	8.315	8.269	9.788
	8/24/98 14:47:30	10007.44	8.315	8.278	9.794
	8/24/98 14:57:30	10017.44	8.318	8.273	9.786
	8/24/98 15:07:30	10027.44	8.313	8.268	9.782
	8/24/98 15:17:30	10037.44	8.324	8.281	9.794
	8/24/98 15:27:30	10047.44	8.304	8.265	9.785
	8/24/98 15:37:30	10057.44	8.304	8.26	9.782
	8/24/98 15:47:30	10067.44	8.307	8.269	9.788
	8/24/98 15:57:30	10077.44	8.318	8.276	9.789
	8/24/98 16:07:30	10087.44	8.304	8.26	9.779
	8/24/98 16:17:30	10097.44	8.304	8.262	9.78
	8/24/98 16:27:30	10107.44	8.304	8.266	9.786
	8/24/98 16:37:30	10117.44	8.307	8.266	9.786
	8/24/98 16:47:30	10127.44	8.315	8.278	9.792
	8/24/98 16:57:30	10137.44	8.304	8.26	9.78
	8/24/98 17:07:30	10147.44	8.31	8.271	9.789
	8/24/98 17:17:30	10157.44	8.304	8.265	9.783
	8/24/98 17:27:30	10167.44	8.304	8.263	9.785
	8/24/98 17:37:30	10177.44	8.304	8.262	9.785
	8/24/98 17:47:30	10187.44	8.307	8.266	9.789
	8/24/98 17:57:30	10197.44	8.307	8.265	9.786
	8/24/98 18:07:30	10207.44	8.304	8.265	9.786
	8/24/98 18:17:30	10217.44	8.304	8.265	9.783
	8/24/98 18:27:30	10227.44	8.307	8.266	9.788
	8/24/98 18:37:30	10237.44	8.313	8.269	9.791
	8/24/98 18:47:30	10247.44	8.315	8.272	9.796
	8/24/98 18:57:30	10257.44	8.307	8.266	9.795
	8/24/98 19:07:30	10267.44	8.298	8.263	9.791
	8/24/98 19:17:30	10277.44	8.307	8.271	9.795
	8/24/98 19:27:30	10287.44	8.31	8.272	9.794
	8/24/98 19:37:30	10297.44	8.307	8.268	9.791
	8/24/98 19:47:30	10307.44	8.313	8.273	9.796
	8/24/98 19:57:30	10317.44	8.313	8.272	9.792

	8/24/98 20:07:30	10327.44	8.313	8.273	9.794
	8/24/98 20:17:30	10337.44	8.318	8.275	9.794
	8/24/98 20:27:30	10347.44	8.318	8.273	9.794
	8/24/98 20:37:30	10357.44	8.318	8.276	9.796
	8/24/98 20:47:30	10367.44	8.324	8.281	9.801
	8/24/98 20:57:30	10377.44	8.321	8.281	9.799
	8/24/98 21:07:30	10387.44	8.318	8.281	9.799
	8/24/98 21:17:30	10397.44	8.321	8.284	9.801
	8/24/98 21:27:30	10407.44	8.318	8.282	9.798
	8/24/98 21:37:30	10417.44	8.321	8.282	9.799
	8/24/98 21:47:30	10427.44	8.321	8.282	9.798
	8/24/98 21:57:30	10437.44	8.315	8.278	9.794
	8/24/98 22:07:30	10447.44	8.31	8.272	9.789
	8/24/98 22:17:30	10457.44	8.313	8.273	9.792
	8/24/98 22:27:30	10467.44	8.315	8.276	9.794
	8/24/98 22:37:30	10477.44	8.313	8.273	9.789
	8/24/98 22:47:30	10487.44	8.315	8.272	9.789
	8/24/98 22:57:30	10497.44	8.313	8.271	9.789
	8/24/98 23:07:30	10507.44	8.313	8.273	9.791
	8/24/98 23:17:30	10517.44	8.315	8.275	9.789
	8/24/98 23:27:30	10527.44	8.313	8.273	9.791
	8/24/98 23:37:30	10537.44	8.313	8.273	9.791
	8/24/98 23:47:30	10547.44	8.31	8.271	9.788
	8/24/98 23:57:30	10557.44	8.307	8.269	9.786
	8/25/98 0:07:30	10567.44	8.307	8.268	9.786
	8/25/98 0:17:30	10577.44	8.304	8.268	9.786
	8/25/98 0:27:30	10587.44	8.304	8.266	9.785
	8/25/98 0:37:30	10597.44	8.307	8.263	9.785
	8/25/98 0:47:30	10607.44	8.304	8.262	9.783
	8/25/98 0:57:30	10617.44	8.307	8.263	9.783
	8/25/98 1:07:30	10627.44	8.307	8.265	9.783
	8/25/98 1:17:30	10637.44	8.307	8.265	9.785
	8/25/98 1:27:30	10647.44	8.304	8.265	9.783
	8/25/98 1:37:30	10657.44	8.304	8.265	9.783
	8/25/98 1:47:30	10667.44	8.307	8.265	9.783
	8/25/98 1:57:30	10677.44	8.304	8.263	9.783
	8/25/98 2:07:30	10687.44	8.307	8.263	9.782
	8/25/98 2:17:30	10697.44	8.304	8.263	9.783
	8/25/98 2:27:30	10707.44	8.307	8.263	9.783
	8/25/98 2:37:30	10717.44	8.307	8.266	9.785
	8/25/98 2:47:30	10727.44	8.307	8.266	9.783
	8/25/98 2:57:30	10737.44	8.307	8.266	9.785
	8/25/98 3:07:30	10747.44	8.31	8.268	9.786
	8/25/98 3:17:30	10757.44	8.307	8.266	9.783
	8/25/98 3:27:30	10767.44	8.307	8.265	9.783
	8/25/98 3:37:30	10777.44	8.304	8.265	9.782
	8/25/98 3:47:30	10787.44	8.307	8.265	9.783
	8/25/98 3:57:30	10797.44	8.304	8.265	9.783
	8/25/98 4:07:30	10807.44	8.31	8.266	9.783
	8/25/98 4:17:30	10817.44	8.313	8.268	9.785
	8/25/98 4:27:30	10827.44	8.307	8.265	9.782

	8/25/98 4:37:30	10837.44	8.307	8.266	9.782
	8/25/98 4:47:30	10847.44	8.307	8.263	9.78
	8/25/98 4:57:30	10857.44	8.307	8.265	9.78
	8/25/98 5:07:30	10867.44	8.307	8.265	9.782
	8/25/98 5:17:30	10877.44	8.307	8.265	9.78
	8/25/98 5:27:30	10887.44	8.307	8.263	9.78
	8/25/98 5:37:30	10897.44	8.307	8.263	9.78
	8/25/98 5:47:30	10907.44	8.307	8.266	9.782
	8/25/98 5:57:30	10917.44	8.307	8.265	9.78
	8/25/98 6:07:30	10927.44	8.307	8.265	9.78
	8/25/98 6:17:30	10937.44	8.307	8.265	9.78
	8/25/98 6:27:30	10947.44	8.31	8.266	9.783
	8/25/98 6:37:30	10957.44	8.31	8.268	9.783
	8/25/98 6:47:30	10967.44	8.31	8.268	9.783
	8/25/98 6:57:30	10977.44	8.313	8.268	9.783
	8/25/98 7:07:30	10987.44	8.31	8.266	9.782
	8/25/98 7:17:30	10997.44	8.313	8.268	9.782
	8/25/98 7:27:30	11007.44	8.313	8.268	9.782
	8/25/98 7:37:30	11017.44	8.31	8.269	9.783
	8/25/98 7:47:30	11027.44	8.307	8.265	9.778
	8/25/98 7:57:30	11037.44	8.315	8.271	9.782
	8/25/98 8:07:30	11047.44	8.31	8.265	9.779
	8/25/98 8:17:30	11057.44	8.31	8.266	9.78
	8/25/98 8:27:30	11067.44	8.313	8.269	9.78
	8/25/98 8:37:30	11077.44	8.307	8.266	9.779
	8/25/98 8:47:30	11087.44	8.313	8.269	9.779
	8/25/98 8:57:30	11097.44	8.307	8.263	9.778
	8/25/98 9:07:30	11107.44	8.307	8.263	9.776
	8/25/98 9:17:30	11117.44	8.31	8.266	9.776
	8/25/98 9:27:30	11127.44	8.307	8.265	9.778
	8/25/98 9:37:30	11137.44	8.31	8.265	9.775
	8/25/98 9:47:30	11147.44	8.31	8.269	9.778
	8/25/98 9:57:30	11157.44	8.318	8.269	9.779
	8/25/98 10:07:30	11167.44	8.31	8.266	9.776
	8/25/98 10:17:30	11177.44	8.313	8.263	9.775
	8/25/98 10:27:30	11187.44	8.313	8.263	9.773

WELL 202 AQUIFER TEST 2 WATER LEVEL DATA

(WELL 675)

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 202 AQUIFER TEST 2 WL DATA				AVG Q = 80.5 GPM	
FILE NAME : 675TEST2.XLS					
			BACKGROUND		
		ELAPSED	WELL 675		
	DATE / TIME	TIME (min)	WL (ft btoc)		
PUMP STARTED					
	8/17/98 16:23:02	22.97	11.091		
	8/17/98 16:53:02	52.97	11.093		
	8/17/98 17:23:02	82.97	11.1		
	8/17/98 17:53:02	112.97	11.105		
	8/17/98 18:23:02	142.97	11.109		
	8/17/98 18:53:02	172.97	11.114		
	8/17/98 19:23:02	202.97	11.121		
	8/17/98 19:53:02	232.97	11.13		
	8/17/98 20:23:02	262.97	11.137		
	8/17/98 20:53:02	292.97	11.144		
	8/17/98 21:23:02	322.97	11.153		
	8/17/98 21:53:02	352.97	11.16		
	8/17/98 22:23:02	382.97	11.164		
	8/17/98 22:53:02	412.97	11.174		
	8/17/98 23:23:02	442.97	11.178		
	8/17/98 23:53:02	472.97	11.185		
	8/18/98 0:23:02	502.97	11.192		
	8/18/98 0:53:02	532.97	11.199		
	8/18/98 1:23:02	562.97	11.204		
	8/18/98 1:53:02	592.97	11.208		
	8/18/98 2:23:02	622.97	11.213		
	8/18/98 2:53:02	652.97	11.218		
	8/18/98 3:23:02	682.97	11.22		
	8/18/98 3:53:02	712.97	11.222		
	8/18/98 4:23:02	742.97	11.227		
	8/18/98 4:53:02	772.97	11.229		
	8/18/98 5:23:02	802.97	11.234		
	8/18/98 5:53:02	832.97	11.236		
	8/18/98 6:23:02	862.97	11.241		
	8/18/98 6:53:02	892.97	11.243		
	8/18/98 7:23:02	922.97	11.248		
	8/18/98 7:53:02	952.97	11.25		
	8/18/98 8:23:02	982.97	11.254		
	8/18/98 8:53:02	1012.97	11.257		
	8/18/98 9:23:02	1042.97	11.261		
	8/18/98 9:53:02	1072.97	11.264		
	8/18/98 10:23:02	1102.97	11.268		
	8/18/98 10:53:02	1132.97	11.271		
	8/18/98 11:23:02	1162.97	11.275		
	8/18/98 11:53:02	1192.97	11.278		
	8/18/98 12:23:02	1222.97	11.28		
	8/18/98 12:53:02	1252.97	11.282		
	8/18/98 13:23:02	1282.97	11.284		
	8/18/98 13:53:02	1312.97	11.287		

	8/18/98 14:23:02	1342.97	11.294		
	8/18/98 14:53:02	1372.97	11.296		
	8/18/98 15:23:02	1402.97	11.301		
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	8/18/98 16:23:02	1462.97	11.31		
	8/18/98 16:53:02	1492.97	11.312		
	8/18/98 17:23:02	1522.97	11.319		
	8/18/98 17:53:02	1552.97	11.321		
	8/18/98 18:23:02	1582.97	11.328		
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	8/18/98 19:23:02	1642.97	11.335		
	8/18/98 19:53:02	1672.97	11.34		
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	8/18/98 20:53:02	1732.97	11.347		
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	8/18/98 21:53:02	1792.97	11.356		
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	8/18/98 22:53:02	1852.97	11.363		
	8/18/98 23:23:02	1882.97	11.367		
	8/18/98 23:53:02	1912.97	11.372		
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	8/19/98 1:53:02	2032.97	11.388		
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	8/19/98 2:53:02	2092.97	11.397		
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	8/19/98 3:53:02	2152.97	11.404		
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	8/19/98 4:53:02	2212.97	11.411		
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	8/19/98 5:53:02	2272.97	11.418		
	8/19/98 6:23:02	2302.97	11.425		
	8/19/98 6:53:02	2332.97	11.43		
	8/19/98 7:23:02	2362.97	11.434		
	8/19/98 7:53:02	2392.97	11.437		
	8/19/98 8:23:02	2422.97	11.441		
	8/19/98 8:53:02	2452.97	11.448		
	8/19/98 9:23:02	2482.97	11.451		
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	8/19/98 17:00:00	2939.93	11.482		
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	8/19/98 18:20:00	3019.93	11.482		
	8/19/98 18:30:00	3029.93	11.485		
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	8/24/98 5:40:00	9459.93	11.136		
	8/24/98 5:50:00	9469.93	11.136		
	8/24/98 6:00:00	9479.93	11.136		
	8/24/98 6:10:00	9489.93	11.136		
	8/24/98 6:20:00	9499.93	11.136		

	8/24/98 6:30:00	9509.93	11.136		
	8/24/98 6:40:00	9519.93	11.136		
	8/24/98 6:50:00	9529.93	11.139		
	8/24/98 7:00:00	9539.93	11.136		
	8/24/98 7:10:00	9549.93	11.134		
	8/24/98 7:20:00	9559.93	11.136		
	8/24/98 7:30:00	9569.93	11.136		
	8/24/98 7:40:00	9579.93	11.136		
	8/24/98 7:50:00	9589.93	11.136		
	8/24/98 8:00:00	9599.93	11.136		
	8/24/98 8:10:00	9609.93	11.134		
	8/24/98 8:20:00	9619.93	11.136		
	8/24/98 8:30:00	9629.93	11.134		
	8/24/98 8:40:00	9639.93	11.134		
	8/24/98 8:50:00	9649.93	11.134		
	8/24/98 9:00:00	9659.93	11.134		
	8/24/98 9:10:00	9669.93	11.134		
	8/24/98 9:20:00	9679.93	11.132		
	8/24/98 9:30:00	9689.93	11.132		
	8/24/98 9:40:00	9699.93	11.132		
	8/24/98 9:50:00	9709.93	11.132		
	8/24/98 10:00:00	9719.93	11.134		
	8/24/98 10:10:00	9729.93	11.132		
	8/24/98 10:20:00	9739.93	11.132		
	8/24/98 10:30:00	9749.93	11.132		
	8/24/98 10:40:00	9759.93	11.132		
	8/24/98 10:50:00	9769.93	11.132		
	8/24/98 11:00:00	9779.93	11.129		
	8/24/98 11:10:00	9789.93	11.129		
	8/24/98 11:20:00	9799.93	11.129		
	8/24/98 11:30:00	9809.93	11.129		
	8/24/98 11:40:00	9819.93	11.129		
	8/24/98 11:50:00	9829.93	11.129		
	8/24/98 12:00:00	9839.93	11.129		
	8/24/98 12:10:00	9849.93	11.129		
	8/24/98 12:20:00	9859.93	11.127		
	8/24/98 12:30:00	9869.93	11.127		
	8/24/98 12:40:00	9879.93	11.127		
	8/24/98 12:50:00	9889.93	11.127		
	8/24/98 13:00:00	9899.93	11.127		
	8/24/98 13:10:00	9909.93	11.127		
	8/24/98 13:20:00	9919.93	11.127		
	8/24/98 13:30:00	9929.93	11.127		
	8/24/98 13:40:00	9939.93	11.127		
	8/24/98 13:50:00	9949.93	11.125		
	8/24/98 14:00:00	9959.93	11.125		
	8/24/98 14:10:00	9969.93	11.125		
	8/24/98 14:20:00	9979.93	11.125		
	8/24/98 14:30:00	9989.93	11.122		
	8/24/98 14:40:00	9999.93	11.125		
	8/24/98 14:50:00	10009.93	11.127		

	8/24/98 15:00:00	10019.93	11.122		
	8/24/98 15:10:00	10029.93	11.122		
	8/24/98 15:20:00	10039.93	11.122		
	8/24/98 15:30:00	10049.93	11.122		
	8/24/98 15:40:00	10059.93	11.12		
	8/24/98 15:50:00	10069.93	11.122		
	8/24/98 16:00:00	10079.93	11.122		
	8/24/98 16:10:00	10089.93	11.12		
	8/24/98 16:20:00	10099.93	11.12		
	8/24/98 16:30:00	10109.93	11.12		
	8/24/98 16:40:00	10119.93	11.12		
	8/24/98 16:50:00	10129.93	11.12		
	8/24/98 17:00:00	10139.93	11.118		
	8/24/98 17:10:00	10149.93	11.12		
	8/24/98 17:20:00	10159.93	11.12		
	8/24/98 17:30:00	10169.93	11.12		
	8/24/98 17:40:00	10179.93	11.118		
	8/24/98 17:50:00	10189.93	11.118		
	8/24/98 18:00:00	10199.93	11.12		
	8/24/98 18:10:00	10209.93	11.118		
	8/24/98 18:20:00	10219.93	11.118		
	8/24/98 18:30:00	10229.93	11.118		
	8/24/98 18:40:00	10239.93	11.12		
	8/24/98 18:50:00	10249.93	11.12		
	8/24/98 19:00:00	10259.93	11.122		
	8/24/98 19:10:00	10269.93	11.122		
	8/24/98 19:20:00	10279.93	11.12		
	8/24/98 19:30:00	10289.93	11.122		
	8/24/98 19:40:00	10299.93	11.12		
	8/24/98 19:50:00	10309.93	11.12		
	8/24/98 20:00:00	10319.93	11.12		
	8/24/98 20:10:00	10329.93	11.12		
	8/24/98 20:20:00	10339.93	11.12		
	8/24/98 20:30:00	10349.93	11.12		
	8/24/98 20:40:00	10359.93	11.12		
	8/24/98 20:50:00	10369.93	11.122		
	8/24/98 21:00:00	10379.93	11.122		
	8/24/98 21:10:00	10389.93	11.122		
	8/24/98 21:20:00	10399.93	11.122		
	8/24/98 21:30:00	10409.93	11.122		
	8/24/98 21:40:00	10419.93	11.122		
	8/24/98 21:50:00	10429.93	11.122		
	8/24/98 22:00:00	10439.93	11.122		
	8/24/98 22:10:00	10449.93	11.12		
	8/24/98 22:20:00	10459.93	11.118		
	8/24/98 22:30:00	10469.93	11.12		
	8/24/98 22:40:00	10479.93	11.118		
	8/24/98 22:50:00	10489.93	11.118		
	8/24/98 23:00:00	10499.93	11.118		
	8/24/98 23:10:00	10509.93	11.118		
	8/24/98 23:20:00	10519.93	11.118		

	8/24/98 23:30:00	10529.93	11.118		
	8/24/98 23:40:00	10539.93	11.12		
	8/24/98 23:50:00	10549.93	11.116		
	8/25/98 0:00:00	10559.93	11.118		
	8/25/98 0:10:00	10569.93	11.118		
	8/25/98 0:20:00	10579.93	11.118		
	8/25/98 0:30:00	10589.93	11.116		
	8/25/98 0:40:00	10599.93	11.116		
	8/25/98 0:50:00	10609.93	11.116		
	8/25/98 1:00:00	10619.93	11.113		
	8/25/98 1:10:00	10629.93	11.113		
	8/25/98 1:20:00	10639.93	11.116		
	8/25/98 1:30:00	10649.93	11.116		
	8/25/98 1:40:00	10659.93	11.113		
	8/25/98 1:50:00	10669.93	11.113		
	8/25/98 2:00:00	10679.93	11.113		
	8/25/98 2:10:00	10689.93	11.113		
	8/25/98 2:20:00	10699.93	11.113		
	8/25/98 2:30:00	10709.93	11.113		
	8/25/98 2:40:00	10719.93	11.111		
	8/25/98 2:50:00	10729.93	11.113		
	8/25/98 3:00:00	10739.93	11.113		
	8/25/98 3:10:00	10749.93	11.111		
	8/25/98 3:20:00	10759.93	11.113		
	8/25/98 3:30:00	10769.93	11.113		
	8/25/98 3:40:00	10779.93	11.111		
	8/25/98 3:50:00	10789.93	11.113		
	8/25/98 4:00:00	10799.93	11.111		
	8/25/98 4:10:00	10809.93	11.111		
	8/25/98 4:20:00	10819.93	11.111		
	8/25/98 4:30:00	10829.93	11.111		
	8/25/98 4:40:00	10839.93	11.111		
	8/25/98 4:50:00	10849.93	11.111		
	8/25/98 5:00:00	10859.93	11.111		
	8/25/98 5:10:00	10869.93	11.111		
	8/25/98 5:20:00	10879.93	11.111		
	8/25/98 5:30:00	10889.93	11.109		
	8/25/98 5:40:00	10899.93	11.111		
	8/25/98 5:50:00	10909.93	11.111		
	8/25/98 6:00:00	10919.93	11.111		
	8/25/98 6:10:00	10929.93	11.109		
	8/25/98 6:20:00	10939.93	11.111		
	8/25/98 6:30:00	10949.93	11.111		
	8/25/98 6:40:00	10959.93	11.111		
	8/25/98 6:50:00	10969.93	11.111		
	8/25/98 7:00:00	10979.93	11.111		
	8/25/98 7:10:00	10989.93	11.111		
	8/25/98 7:20:00	10999.93	11.111		
	8/25/98 7:30:00	11009.93	11.111		
	8/25/98 7:40:00	11019.93	11.109		
	8/25/98 7:50:00	11029.93	11.109		

	8/25/98 8:00:00	11039.93	11.109		
	8/25/98 8:10:00	11049.93	11.109		
	8/25/98 8:20:00	11059.93	11.109		
	8/25/98 8:30:00	11069.93	11.109		
	8/25/98 8:40:00	11079.93	11.109		
	8/25/98 8:50:00	11089.93	11.109		
	8/25/98 9:00:00	11099.93	11.109		
	8/25/98 9:10:00	11109.93	11.109		
	8/25/98 9:20:00	11119.93	11.106		
	8/25/98 9:30:00	11129.93	11.106		
	8/25/98 9:40:00	11139.93	11.106		
	8/25/98 9:50:00	11149.93	11.106		
	8/25/98 10:00:00	11159.93	11.106		
	8/25/98 10:10:00	11169.93	11.106		
	8/25/98 10:20:00	11179.93	11.104		
	8/25/98 10:30:00	11189.93	11.106		

WELL 202 STEP TEST WATER LEVEL DATA

NEW RIFLE AQUIFER TEST CALCULATION SET NO. U0042800					
WELL 202 STEP TEST WL DATA					
FILE NAME : 202STEP.XLS					
			PUMPING	OBSERVATION	OBSERVATION
		ELAPSED	WELL 202	WELL 677	WELL 197
	DATE / TIME	TIME (min)	WL (ft btoc)	WL (ft btoc)	WL (ft btoc)
TEST STARTED AT 50 GPM					
	8/12/98 10:54:49	0	8.606	8.169	9.676
	8/12/98 10:55:08	0.3145	8.99	8.17	9.68
	8/12/98 10:55:28	0.6476	9.186	8.177	9.687
	8/12/98 10:55:49	1.0005	9.349	8.189	9.7
	8/12/98 10:56:12	1.3743	9.404	8.207	9.713
	8/12/98 10:56:36	1.7703	9.45	8.225	9.726
	8/12/98 10:57:01	2.1896	9.493	8.237	9.737
	8/12/98 10:57:27	2.634	9.501	8.25	9.745
	8/12/98 10:57:56	3.1046	9.599	8.269	9.758
	8/12/98 10:58:26	3.6031	9.556	8.285	9.767
	8/12/98 10:58:57	4.1311	9.593	8.298	9.776
	8/12/98 10:59:31	4.6905	9.622	8.313	9.782
	8/12/98 11:00:06	5.283	9.613	8.333	9.793
	8/12/98 11:00:44	5.9105	9.639	8.348	9.802
	8/12/98 11:01:24	6.5753	9.648	8.361	9.809
	8/12/98 11:02:06	7.2795	9.656	8,371	9.813
	8/12/98 11:02:51	8.0253	9.702	8.387	9.822
	8/12/98 11:03:38	8.8153	9.708	8.394	9.829
	8/12/98 11:04:29	9.6521	9.693	8.407	9.832
	8/12/98 11:05:22	10.5386	9.688	8.423	9.841
	8/12/98 11:06:18	11.4776	9.754	8.435	9.848
	8/12/98 11:07:18	12.4723	9.691	8.448	9.856
	8/12/98 11:08:21	13.526	9.774	8.457	9.86
	8/12/98 11:09:28	14.642	9.719	8.465	9.866
	8/12/98 11:10:39	15.8241	9.731	8.481	9.876
	8/12/98 11:11:54	17.0763	9.754	8.493	9.885
	8/12/98 11:13:14	18.4028	9.762	8.502	9.89
	8/12/98 11:14:38	19.8078	9.751	8.512	9.898
	8/12/98 11:16:07	21.2961	9.825	8.526	9.906
	8/12/98 11:17:42	22.8726	9.843	8.531	9.911
	8/12/98 11:19:22	24.5425	9.84	8.541	9.919
	8/12/98 11:21:08	26.3113	9.805	8.558	9.93
	8/12/98 11:23:01	28.185	9.823	8.566	9.935
	8/12/98 11:25:00	30.1696	9.834	8.574	9.941
	8/12/98 11:27:06	32.272	9.886	8.589	9.954
	8/12/98 11:29:19	34.4988	9.871	8.596	9.96
	8/12/98 11:31:41	36.8576	9.906	8.608	9.966
	8/12/98 11:34:11	39.3563	9.857	8.619	9.975
	8/12/98 11:36:50	42.003	9.877	8.625	9.98
	8/12/98 11:39:38	44.8065	9.909	8.643	9.993
	8/12/98 11:42:36	47.7761	9.926	8.648	9.999
	8/12/98 11:45:45	50.9218	9.975	8.664	10.011
	8/12/98 11:49:05	54.2538	9.926	8.675	10.02
	8/12/98 11:52:36	57.7833	9.943	8.691	10.027

	8/12/98 11:56:21	61.5218	9.742	8.656	9.999
	8/12/98 12:00:18	65.482	9.96	8.702	10.033
	8/12/98 12:04:30	69.6768	9.998	8.718	10.047
	8/12/98 12:08:57	74.1201	9.98	8.741	10.063
FLOW INCREASED TO 75 GPM					
	8/12/98 12:13:39	78.8268	10.018	8.755	10.072
	8/12/98 12:18:38	83.8123	10.681	8.814	10.123
	8/12/98 12:23:55	89.0931	10.735	8.855	10.158
	8/12/98 12:29:31	94.687	10.772	8.895	10.181
	8/12/98 12:35:26	100.6123	10.81	8.925	10.198
	8/12/98 12:41:43	106.8886	10.812	8.957	10.216
	8/12/98 12:48:22	113.537	10.853	8.983	10.233
	8/12/98 12:55:24	120.5791	10.856	9.022	10.256
	8/12/98 13:02:52	128.0386	10.942	9.06	10.278
	8/12/98 13:10:46	135.9401	10.967	9.095	10.298
	8/12/98 13:19:08	144.3098	10.973	9.128	10.319
	8/12/98 13:28:00	153.1755	10.973	9.124	10.301
FLOW INCREASED TO 95 GPM					
	8/12/98 13:37:23	162.5665	11.059	9.195	10.359
	8/12/98 13:47:20	172.514	11.642	9.262	10.407
	8/12/98 13:57:20	182.514	11.751	9.336	10.464
	8/12/98 14:07:20	192.514	11.782	9.388	10.494
	8/12/98 14:17:20	202.514	11.865	9.448	10.528
	8/12/98 14:27:20	212.514	11.911	9.515	10.57
	8/12/98 14:37:20	222.514	11.957	9.548	10.586
	8/12/98 14:47:20	232.514	12.012	9.637	10.631
	8/12/98 14:57:20	242.514	12.043	9.667	10.645
	8/12/98 15:07:20	252.514	12.075	9.696	10.666

URFL000440

Technical Task Cover Sheet

Discipline Hydrogeology **Number of Sheets** 8

Project:
UMTRA Groundwater

Site:
Old and New Rifle

Subject:
Potential Evaporation Estimates for Old and New Rifle

Sources of Data:

National Oceanic and Atmospheric Administration; Rifle, Colorado, Weather Station; database accessed through www.crh.noaa.gov/pub/cli/rifle.html and www.ncdc.noaa.gov/ol/climate/online/coop-precip.html

Thornthwaite, C. W., and J. R. Mather, 1957. Instructions and Tables for Computing Potential Evaporation and the Water Balance, Climatology, 10(3).

Task Order No. MAC99-05 **File Index No.** GWRFL13.1

Proj. No. 331404002 **Calc. No.** U0044700 **Supersedes Calc. No.**

Calculated by	Date	Checked by	Date	Approved by	Date	DOE Concurrence (if required)	Date
K. Pill	1/31/98	K. Karp	2/4/99	Roberta Bn	2/5/99		

mactec-ers
U.S. Department of Energy Grand Junction O

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Recharge/Runoff Estimates for Old Rifle

A document by Thornthwaite and Mather (1957) was used to estimate the potential evaporation and ultimately determine the potential volume of water available for recharge at the Old Rifle site from precipitation. The monthly values assigned to the site based on this publication are contained in Table 1–1.

The first row of data in Table 1–1, mean monthly air temperature (°F), was obtained from the NOAA data base. This information was used to obtain the associated heat index for each month from Table 1 (Section I) from the publication. The average annual heat index (40.68) in conjunction with the mean monthly air temperature was in turn used to determine the unadjusted potential evaporation (in inches) for each month using Table 3 in Section II of Thornthwaite and Mather.

The next step involved determining the monthly correction factor necessary to calculate the adjusted potential evaporation. These correction factors are based on the sites location (approximately 39 °N, 107 °W) and using Table 6 in Section III. Once the correction factors were obtained, they were multiplied by the unadjusted potential evaporation to calculate the adjusted potential evaporation.

The next row of data on Table 1–1, the monthly precipitation (in) was also obtained from the NOAA data base. This data was in turn used to determine the final row of data, the volume of water available for recharge and runoff at the Old Rifle site. This data serves as a starting point for the modeling effort and water balance calculation in determining the volume of water available for alluvial aquifer recharge from site precipitation.

Table 1–1. Potential Evaporation and Associated Available Recharge/Runoff for Rifle, Colorado

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Monthly Air Temperature, F	22.6	29.9	38.6	47.6	56.2	64.6	70.8	68.9	60.4	49.1	36.3	25.8	47.6
Heat Index	0.00	0.00	0.62	2.30	4.47	7.02	9.13	8.47	5.70	2.64	0.33	0.00	40.68
Unadjusted Potential Evaporation, in.	0.00	0.00	0.02	0.05	0.08	0.11	0.14	0.13	0.10	0.06	0.01	0.00	
Monthly Correction Factors	25.20	24.90	30.90	33.30	37.20	37.50	38.10	35.40	31.20	28.80	24.90	24.30	
Adjusted Potential Evaporation, in	0.00	0.00	0.62	1.67	2.98	4.13	5.33	4.60	3.12	1.73	0.25	0.00	
Monthly Precipitation, in	0.83	0.71	0.88	0.94	0.95	0.70	1.00	1.08	1.05	1.13	0.83	0.91	11.01
Precipitation - Adj. Potential Evap., in	0.83	0.71	0.26	-0.73	-2.03	-3.43	-4.33	-3.52	-2.07	-0.60	0.58	0.91	
Available for Recharge and Runoff, in.	0.83	0.71	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.581	0.91	3.29

Rainfall and Temperature Data Obtained from NOAA

All other data generated following Thornthwaite and Mather 1957

TABLE 1

MONTHLY VALUES OF i CORRESPONDING TO MONTHLY MEAN TEMPERATURES (°F)

T°F	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
32	.00	.00	.00	.01	.01	.01	.02	.02	.03	.03
33	.04	.04	.05	.05	.06	.06	.07	.08	.09	.09
34	.10	.10	.11	.12	.13	.14	.15	.16	.17	.18
35	.19	.20	.21	.22	.23	.24	.25	.26	.27	.28
36	.29	.30	.32	.33	.34	.35	.36	.37	.39	.40
37	.41	.42	.43	.44	.46	.47	.48	.50	.51	.52
38	.54	.55	.56	.58	.59	.60	.62	.63	.65	.66
39	.68	.70	.71	.73	.74	.76	.77	.79	.80	.82
40	.83	.85	.86	.88	.90	.91	.93	.95	.96	.98
41	1.00	1.01	1.03	1.05	1.07	1.08	1.10	1.12	1.14	1.16
42	1.17	1.19	1.21	1.23	1.24	1.26	1.28	1.30	1.32	1.33
43	1.35	1.37	1.39	1.41	1.43	1.45	1.47	1.49	1.50	1.52
44	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72
45	1.74	1.76	1.78	1.80	1.82	1.85	1.87	1.89	1.91	1.93
46	1.95	1.97	2.00	2.02	2.04	2.06	2.08	2.10	2.13	2.15
47	2.17	2.19	2.21	2.23	2.26	2.28	2.30	2.32	2.34	2.37
48	2.39	2.41	2.43	2.46	2.48	2.50	2.53	2.55	2.57	2.60
49	2.62	2.64	2.67	2.69	2.71	2.74	2.76	2.79	2.81	2.84
50	2.86	2.89	2.91	2.93	2.96	2.98	3.01	3.03	3.06	3.08
51	3.11	3.13	3.16	3.18	3.21	3.23	3.25	3.28	3.30	3.33
52	3.35	3.38	3.40	3.43	3.45	3.48	3.50	3.53	3.55	3.58
53	3.60	3.63	3.65	3.68	3.71	3.73	3.76	3.79	3.81	3.84
54	3.87	3.89	3.92	3.95	3.97	4.00	4.03	4.06	4.08	4.11
55	4.14	4.16	4.19	4.22	4.25	4.27	4.30	4.33	4.35	4.38
56	4.41	4.44	4.47	4.50	4.52	4.55	4.57	4.60	4.63	4.66
57	4.69	4.72	4.75	4.77	4.80	4.83	4.86	4.89	4.92	4.95
58	4.98	5.01	5.04	5.07	5.10	5.13	5.16	5.19	5.22	5.25
59	5.28	5.31	5.34	5.37	5.40	5.43	5.46	5.49	5.52	5.55
60	5.58	5.61	5.64	5.67	5.70	5.73	5.76	5.79	5.82	5.85
61	5.88	5.91	5.94	5.97	6.00	6.03	6.06	6.10	6.13	6.16
62	6.19	6.22	6.25	6.28	6.31	6.34	6.38	6.41	6.44	6.47
63	6.50	6.53	6.56	6.59	6.62	6.66	6.69	6.72	6.75	6.79
64	6.82	6.85	6.88	6.92	6.95	6.98	7.02	7.05	7.08	7.12
65	7.15	7.18	7.22	7.25	7.28	7.32	7.35	7.38	7.42	7.45
66	7.48	7.52	7.55	7.58	7.62	7.65	7.68	7.72	7.75	7.78
67	7.82	7.85	7.89	7.92	7.95	7.99	8.02	8.05	8.09	8.12
68	8.16	8.19	8.23	8.26	8.30	8.33	8.37	8.40	8.44	8.47
69	8.51	8.54	8.57	8.61	8.64	8.68	8.71	8.75	8.78	8.82
70	8.85	8.89	8.92	8.96	8.99	9.03	9.06	9.10	9.13	9.17
71	9.20	9.24	9.27	9.31	9.34	9.38	9.42	9.45	9.49	9.53
72	9.57	9.60	9.64	9.67	9.71	9.75	9.78	9.82	9.85	9.89
73	9.93	9.97	10.01	10.04	10.08	10.12	10.15	10.19	10.22	10.26
74	10.30	10.34	10.37	10.41	10.45	10.48	10.52	10.56	10.60	10.64
75	10.67	10.71	10.75	10.78	10.82	10.86	10.89	10.93	10.97	11.01
76	11.05	11.09	11.13	11.17	11.20	11.24	11.28	11.31	11.35	11.39

MONTHLY VALUES OF i CORRESPONDING TO MONTHLY MEAN TEMPERATURES (°F)
(CONTINUED)

T°F	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
77	11.43	11.47	11.51	11.54	11.58	11.62	11.66	11.70	11.74	11.78
78	11.82	11.85	11.89	11.93	11.97	12.01	12.05	12.09	12.13	12.17
79	12.21	12.25	12.29	12.33	12.37	12.41	12.45	12.49	12.53	12.57
80	12.61	12.65	12.69	12.73	12.77	12.81	12.85	12.89	12.93	12.97
81	13.01	13.05	13.09	13.13	13.17	13.21	13.25	13.29	13.33	13.37
82	13.41	13.45	13.49	13.53	13.57	13.61	13.65	13.69	13.73	13.77
83	13.81	13.85	13.89	13.94	13.98	14.02	14.06	14.10	14.14	14.18
84	14.22	14.26	14.31	14.35	14.39	14.43	14.47	14.52	14.56	14.60
85	14.64	14.69	14.73	14.77	14.81	14.85	14.90	14.94	14.98	15.02
86	15.07	15.11	15.15	15.19	15.23	15.28	15.32	15.36	15.40	15.45
87	15.49	15.53	15.58	15.62	15.66	15.71	15.75	15.79	15.84	15.88
88	15.92	15.97	16.01	16.05	16.10	16.14	16.18	16.23	16.27	16.31
89	16.36	16.40	16.44	16.49	16.53	16.57	16.62	16.66	16.70	16.75
90	16.79	16.83	16.88	16.92	16.96	17.01	17.05	17.09	17.14	17.18
91	17.23	17.27	17.32	17.36	17.41	17.45	17.49	17.54	17.58	17.63
92	17.67	17.72	17.76	17.81	17.85	17.89	17.94	17.98	18.03	18.07
93	18.12	18.16	18.21	18.25	18.30	18.34	18.39	18.43	18.48	18.52
94	18.57	18.62	18.66	18.71	18.75	18.80	18.84	18.89	18.93	18.98
95	19.03	19.07	19.12	19.16	19.21	19.25	19.30	19.34	19.39	19.44
96	19.48	19.53	19.58	19.62	19.67	19.71	19.76	19.81	19.86	19.90
97	19.95	20.00	20.04	20.09	20.14	20.18	20.23	20.28	20.32	20.37
98	20.42	20.46	20.51	20.56	20.60	20.65	20.70	20.74	20.79	20.84
99	20.88	20.93	20.98	21.03	21.08	21.13	21.17	21.22	21.27	21.32
100	21.36	21.41	21.46	21.51	21.56	21.60	21.65	21.70	21.75	21.79
101	21.84	21.89	21.94	21.99	22.03	22.08	22.13	22.18	22.23	22.28
102	22.33	22.38	22.42	22.47	22.52	22.57	22.62	22.67	22.71	22.76
103	22.81	22.86	22.91	22.96	23.00	23.05	23.10	23.15	23.20	23.25
104	23.30									

TABLE 3

VALUES OF UNADJUSTED DAILY POTENTIAL EVAPOTRANSPIRATION (IN.)
FOR DIFFERENT MEAN TEMPERATURES (°F) AND I VALUES

T°F	I 25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0	52.5
32.0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32.5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
33.0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
33.5	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
34.0	.01	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00
34.5	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
35.0	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00
35.5	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
36.0	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01
36.5	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01
37.0	.02	.02	.02	.02	.02	.02	.02	.02	.01	.01	.01	.01
37.5	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
38.0	.03	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02	.01
38.5	.03	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
39.0	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02
39.5	.04	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02	.02
40.0	.04	.04	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02
40.5	.04	.04	.03	.03	.03	.03	.02	.02	.02	.02	.02	.02
41.0	.04	.04	.04	.03	.03	.03	.03	.03	.02	.02	.02	.02
41.5	.04	.04	.04	.04	.03	.03	.03	.03	.03	.02	.02	.02
42.0	.04	.04	.04	.04	.04	.03	.03	.03	.03	.02	.02	.02
42.5	.05	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.02
43.0	.05	.05	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03
43.5	.05	.05	.04	.04	.04	.04	.04	.04	.03	.03	.03	.03
44.0	.05	.05	.05	.04	.04	.04	.04	.04	.04	.03	.03	.03
44.5	.06	.05	.05	.04	.04	.04	.04	.04	.04	.04	.03	.03
45.0	.06	.06	.05	.05	.04	.04	.04	.04	.04	.04	.04	.03
45.5	.06	.06	.05	.05	.05	.04	.04	.04	.04	.04	.04	.04
46.0	.06	.06	.06	.05	.05	.05	.04	.04	.04	.04	.04	.04
46.5	.06	.06	.06	.05	.05	.05	.05	.04	.04	.04	.04	.04
47.0	.06	.06	.06	.06	.05	.05	.05	.05	.04	.04	.04	.04
47.5	.06	.06	.06	.06	.06	.05	.05	.05	.05	.04	.04	.04
48.0	.07	.06	.06	.06	.06	.06	.05	.05	.05	.05	.05	.04
48.5	.07	.07	.06	.06	.06	.06	.06	.05	.05	.05	.05	.04
49.0	.07	.07	.06	.06	.06	.06	.06	.06	.05	.05	.05	.05
49.5	.07	.07	.07	.06	.06	.06	.06	.06	.06	.05	.05	.05
50.0	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06	.05	.05
50.5	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06	.05
51.0	.08	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06
51.5	.08	.08	.07	.07	.07	.07	.06	.06	.06	.06	.06	.06
52.0	.08	.08	.07	.07	.07	.07	.07	.06	.06	.06	.06	.06
52.5	.08	.08	.08	.07	.07	.07	.07	.07	.06	.06	.06	.06
53.0	.09	.08	.08	.07	.07	.07	.07	.07	.07	.06	.06	.06
53.5	.09	.09	.08	.08	.07	.07	.07	.07	.07	.07	.07	.06
54.0	.09	.09	.08	.08	.08	.07	.07	.07	.07	.07	.07	.06
54.5	.09	.09	.09	.08	.08	.08	.07	.07	.07	.07	.07	.07
55.0	.09	.09	.09	.08	.08	.08	.08	.07	.07	.07	.07	.07
55.5	.09	.09	.09	.09	.08	.08	.08	.08	.07	.07	.07	.07

T°F	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5	45.0	47.5	50.0	52.5
56.0	.09	.09	.09	.09	.09	.08	.08	.08	.08	.07	.07	.07
56.5	.10	.09	.09	.09	.09	.09	.08	.08	.08	.08	.08	.07
57.0	.10	.10	.09	.09	.09	.09	.09	.08	.08	.08	.08	.07
57.5	.10	.10	.09	.09	.09	.09	.09	.09	.09	.08	.08	.08
58.0	.10	.10	.10	.09	.09	.09	.09	.09	.09	.08	.08	.08
58.5	.11	.10	.10	.10	.09	.09	.09	.09	.09	.09	.09	.08
59.0	.11	.10	.10	.10	.10	.09	.09	.09	.09	.09	.09	.08
59.5	.11	.11	.10	.10	.10	.10	.09	.09	.09	.09	.09	.09
60.0	.11	.11	.11	.10	.10	.10	.10	.09	.09	.09	.09	.09
60.5	.11	.11	.11	.11	.10	.10	.10	.10	.09	.09	.09	.09
61.0	.11	.11	.11	.11	.11	.10	.10	.10	.10	.09	.09	.09
61.5	.12	.11	.11	.11	.11	.11	.10	.10	.10	.10	.10	.09
62.0	.12	.11	.11	.11	.11	.11	.11	.10	.10	.10	.10	.10
62.5	.12	.12	.11	.11	.11	.11	.11	.11	.10	.10	.10	.10
63.0	.12	.12	.11	.11	.11	.11	.11	.11	.11	.10	.10	.10
63.5	.12	.12	.12	.12	.11	.11	.11	.11	.11	.11	.11	.10
64.0	.13	.12	.12	.12	.12	.11	.11	.11	.11	.11	.11	.11
64.5	.13	.12	.12	.12	.12	.12	.11	.11	.11	.11	.11	.11
65.0	.13	.13	.12	.12	.12	.12	.12	.11	.11	.11	.11	.11
65.5	.13	.13	.13	.12	.12	.12	.12	.12	.12	.11	.11	.11
66.0	.13	.13	.13	.13	.13	.12	.12	.12	.12	.12	.12	.11
66.5	.13	.13	.13	.13	.13	.13	.12	.12	.12	.12	.12	.12
67.0	.13	.13	.13	.13	.13	.13	.13	.12	.12	.12	.12	.12
67.5	.14	.13	.13	.13	.13	.13	.13	.13	.13	.12	.12	.12
68.0	.14	.14	.13	.13	.13	.13	.13	.13	.13	.13	.13	.12
68.5	.14	.14	.14	.13	.13	.13	.13	.13	.13	.13	.13	.13
69.0	.14	.14	.14	.14	.14	.13	.13	.13	.13	.13	.13	.13
69.5	.15	.14	.14	.14	.14	.14	.13	.13	.13	.13	.13	.13
70.0	.15	.14	.14	.14	.14	.14	.14	.13	.13	.13	.13	.13
70.5	.15	.15	.14	.14	.14	.14	.14	.14	.14	.14	.14	.13
71.0	.15	.15	.15	.15	.14	.14	.14	.14	.14	.14	.14	.14
71.5	.15	.15	.15	.15	.15	.15	.14	.14	.14	.14	.14	.14
72.0	.15	.15	.15	.15	.15	.15	.15	.15	.14	.14	.14	.14
72.5	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.14
73.0	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15
73.5	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15
74.0	.16	.16	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15
74.5	.16	.16	.16	.16	.16	.16	.15	.15	.15	.15	.15	.15
75.0	.17	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.15
75.5	.17	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16
76.0	.17	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16
76.5	.17	.17	.17	.17	.17	.17	.17	.16	.16	.16	.16	.16
77.0	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17
77.5	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17
78.0	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17
78.5	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17
79.0	.18	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17
79.5	.18	.16	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18
80.0	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18

TABLE 6

MEAN POSSIBLE MONTHLY DURATION OF SUNLIGHT IN THE NORTHERN HEMISPHERE EXPRESSED IN UNITS OF 12 HOURS

Northern Latitudes	J	F	M	A	M	J	J	A	S	O	N	D
0°	31.2	28.2	31.2	30.3	31.2	30.3	31.2	31.2	30.3	31.2	30.3	31.2
1	31.2	28.2	31.2	30.3	31.2	30.3	31.2	31.2	30.3	31.2	30.3	31.2
2	31.2	28.2	31.2	30.3	31.5	30.6	31.2	31.2	30.3	31.2	30.0	30.9
3	30.9	28.2	30.9	30.3	31.5	30.6	31.5	31.2	30.3	31.2	30.0	30.9
4	30.9	27.9	30.9	30.6	31.8	30.9	31.5	31.5	30.3	30.9	30.0	30.6
5	30.6	27.9	30.9	30.6	31.8	30.9	31.8	31.5	30.3	30.9	29.7	30.6
6	30.6	27.9	30.9	30.6	31.8	31.2	31.8	31.5	30.3	30.9	29.7	30.3
7	30.3	27.6	30.9	30.6	32.1	31.2	32.1	31.8	30.3	30.9	29.7	30.3
8	30.3	27.6	30.9	30.9	32.1	31.5	32.1	31.8	30.6	30.6	29.4	30.0
9	30.0	27.6	30.9	30.9	32.4	31.5	32.4	31.8	30.6	30.6	29.4	30.0
10	30.0	27.3	30.9	30.9	32.4	31.8	32.4	32.1	30.6	30.6	29.4	29.7
11	29.7	27.3	30.9	30.9	32.7	31.8	32.7	32.1	30.6	30.6	29.1	29.7
12	29.7	27.3	30.9	31.2	32.7	32.1	33.0	32.1	30.6	30.3	29.1	29.4
13	29.4	27.3	30.9	31.2	33.0	32.1	33.0	32.4	30.6	30.3	28.8	29.4
14	29.4	27.3	30.9	31.2	33.0	32.4	33.3	32.4	30.6	30.3	28.8	29.1
15	29.1	27.3	30.9	31.2	33.3	32.4	33.6	32.4	30.6	30.3	28.5	29.1
16	29.1	27.3	30.9	31.2	33.3	32.7	33.6	32.7	30.6	30.3	28.5	28.8
17	28.8	27.3	30.9	31.5	33.6	32.7	33.9	32.7	30.6	30.0	28.2	28.8
18	28.8	27.0	30.9	31.5	33.6	33.0	33.9	33.0	30.6	30.0	28.2	28.5
19	28.5	27.0	30.9	31.5	33.9	33.0	34.2	33.0	30.6	30.0	27.9	28.5
20	28.5	27.0	30.9	31.5	33.9	33.3	34.2	33.3	30.6	30.0	27.9	28.2
21	28.2	27.0	30.9	31.5	33.9	33.3	34.5	33.3	30.6	30.0	27.6	28.2
22	28.2	26.7	30.9	31.8	34.2	33.6	34.5	33.3	30.6	29.7	27.6	27.9
23	27.9	26.7	30.9	31.8	34.2	33.9	34.8	33.6	30.6	29.7	27.6	27.6
24	27.9	26.7	30.9	31.8	34.5	34.2	34.8	33.6	30.6	29.7	27.3	27.6
25	27.9	26.7	30.9	31.8	34.5	34.2	35.1	33.6	30.6	29.7	27.3	27.3
26	27.6	26.4	30.9	32.1	34.8	34.5	35.1	33.6	30.6	29.7	27.3	27.3
27	27.6	26.4	30.9	32.1	34.8	34.5	35.4	33.9	30.6	29.7	27.0	27.0
28	27.3	26.4	30.9	32.1	35.1	34.8	35.4	33.9	30.9	29.4	27.0	27.0
29	27.3	26.1	30.9	32.1	35.1	34.8	35.7	33.9	30.9	29.4	26.7	26.7
30	27.0	26.1	30.9	32.4	35.4	35.1	36.0	34.2	30.9	29.4	26.7	26.4
31	27.0	26.1	30.9	32.4	35.4	35.1	36.0	34.2	30.9	29.4	26.4	26.4
32	26.7	25.8	30.9	32.4	35.7	35.4	36.3	34.5	30.9	29.4	26.4	26.1
33	26.4	25.8	30.9	32.7	35.7	35.7	36.3	34.5	30.9	29.1	26.1	25.8
34	26.4	25.8	30.9	32.7	36.0	36.0	36.6	34.8	30.9	29.1	26.1	25.8
35	26.1	25.5	30.9	32.7	36.3	36.3	36.9	34.8	30.9	29.1	25.8	25.5
36	26.1	25.5	30.9	33.0	36.3	36.6	37.2	34.8	30.9	29.1	25.8	25.2
37	25.8	25.5	30.9	33.0	36.6	36.9	37.5	35.1	30.9	29.1	25.5	24.9
38	25.5	25.2	30.9	33.0	36.9	37.2	37.5	35.1	31.2	28.8	25.2	24.9
39	25.5	25.2	30.9	33.3	36.9	37.2	37.8	35.4	31.2	28.8	25.2	24.6
40	25.2	24.9	30.9	33.3	37.2	37.5	38.1	35.4	31.2	28.8	24.9	24.3
41	24.9	24.9	30.9	33.3	37.5	37.8	38.1	35.7	31.2	28.8	24.6	24.0
42	24.6	24.6	30.9	33.6	37.8	38.1	38.4	35.7	31.2	28.5	24.6	23.7
43	24.3	24.6	30.6	33.6	37.8	38.4	38.7	36.0	31.2	28.5	24.3	23.1
44	24.3	24.3	30.6	33.6	38.1	38.7	39.0	36.0	31.2	28.5	24.0	22.8
45	24.0	24.3	30.6	33.9	38.4	38.7	39.3	36.3	31.2	28.2	23.7	22.5
46	23.7	24.0	30.6	33.9	38.7	39.0	39.6	36.6	31.2	28.2	23.7	22.2
47	23.1	24.0	30.6	34.2	39.0	39.6	39.9	36.6	31.5	27.9	23.4	21.9
48	22.8	23.7	30.6	34.2	39.3	39.9	40.2	36.9	31.5	27.9	23.1	21.6
49	22.5	23.7	30.6	34.5	39.6	40.2	40.5	37.2	31.5	27.6	22.8	21.3
50	22.2	23.4	30.6	34.5	39.9	40.8	41.1	37.5	31.8	27.6	22.8	21.0

URFL000465

Technical Task Cover Sheet

Discipline Geochemistry **Number of Sheets** 36

Project:
UMTRA Ground Water

Site:
Rifle (Old)

Subject:
Subpile Soil Investigation for the Old Rifle Site

Sources of Data:

(1) Lithologic descriptions of 6 soil borings (4 onsite, 2 background)

(2) Analytical data from 2 sequential extractions of samples from each soil boring

(3) Historical references describing site activities

(4) 1997-1998 ground water analyses for the Old Rifle site

(5) K_d (distribution coefficient) calculations for Old Rifle site soils

Task Order No. MAC 99-05 **File Index No.** GWRFL 13.1

Proj. No. 321404002 **Calc. No.** U0045300 **Supersedes Calc. No.** [Supersedes Calc No.]

Calculated by	Date	Checked by	Date	Approved by	Date
L E Cummins	3/1/99	K. Karp	3/2/99	Roberta C Bo	3/30/99

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U.S. Department of Energy Grand Junction Projects Office

GWRFL 13.01

Problem Statement:

Tailings and contaminated soils from the former Old Rifle uranium processing site have been removed based on cleanup standards for residual radioactive materials. Because the cleanup criteria is based strictly on surface exposure to radioactivity, and because the tailings contained other nonradioactive hazardous constituents, subpile soils require evaluation to assure they are not a continuing source of ground water contamination. The information provided through this evaluation can serve as a starting point for use in more quantitative numerical ground water modeling.

Method of Solution:

Subpile Soil Sampling

Samples of the soils from directly beneath the former tailings piles and former ore storage area were collected, along with samples from two background locations (658 and 292). These samples were subjected to a two-step chemical extraction process; extractants from each step were analyzed. Testing was performed on six samples from six different locations. Figure 1 shows the sample locations. Samples from locations 292 and 658 were taken at approximately the depth of the water table. Samples from 309 (referred to as location T-9 in lithologic logs and laboratory data), 654, and 663 came from below the water table. The sample from location 656 was collected from above the water table. Many of the shallow alluvial samples from the Old Rifle site were composed of large cobbles that were unsuitable for subpile soil testing, accounting for the deviation from the sampling scheme described in the site characterization work plan. Lithologic logs of the soil material were prepared in the field and are attached.

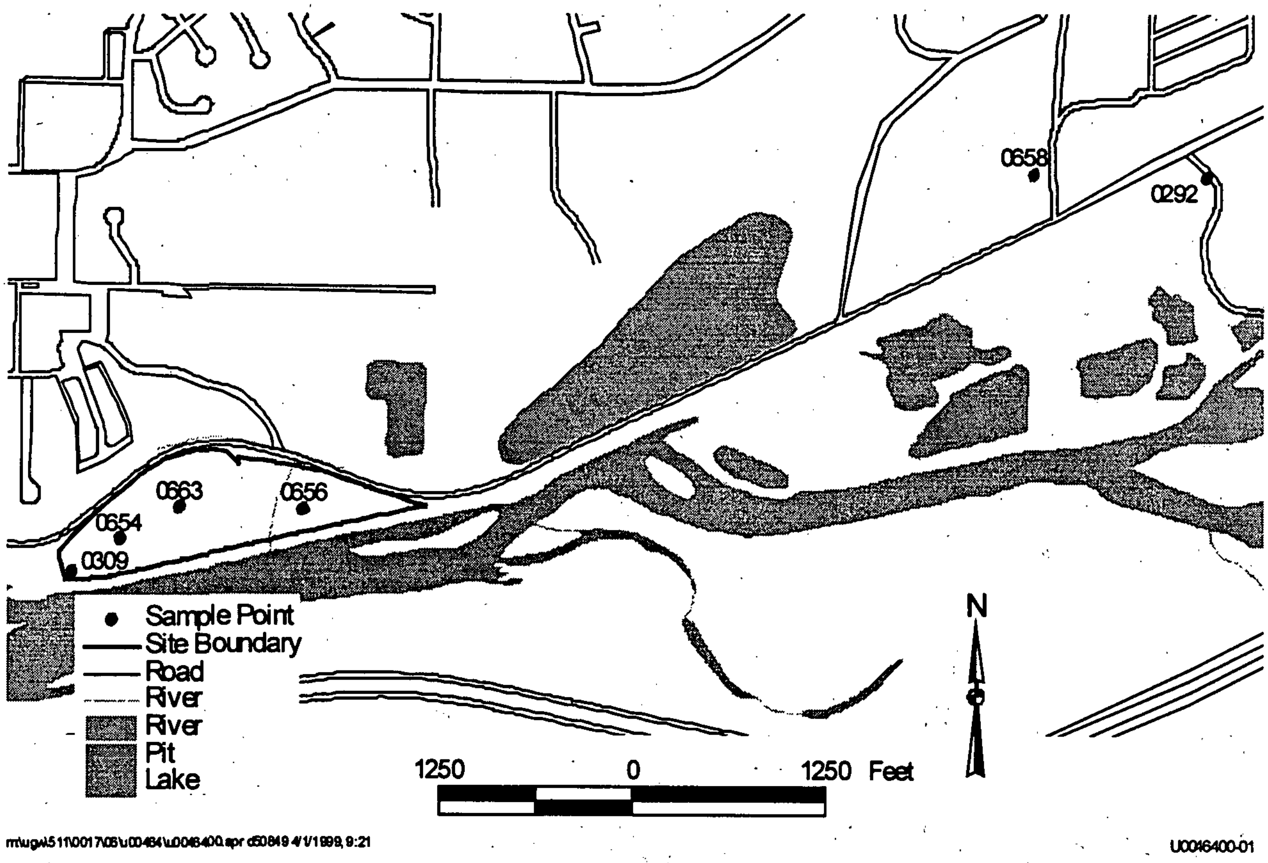


Figure 1. Subpile Soil Sample Locations

Sample Preparation and Chemical Extraction Methods

Samples were air-dried (no oven heat) and sieved to less than 2 millimeters (mm). Two extractions were then performed on a 2-gram sample using (1) a synthetic ground water solution and (2) a 5% nitric acid solution. The synthetic ground water solution is assumed to be representative of the effects of precipitation and ground water movement through the subpile soils. A 5% nitric acid solution will dissolve most amorphous oxides that are likely to contain adsorbed contaminants as well as any more resistant water-soluble constituents. Together these extractants can be expected to remove all leachable contaminants. As desired, 5% nitric acid will not remove contaminants locked in recalcitrant minerals such as apatites or other heavy mineral grains.

A synthetic solution was prepared that simulated ground water at the Old Rifle site, based on groundwater analysis for well 583 (11/05/92; SEE UMTRA data base). The composition of the synthetic ground water is as follows (in mg/L): Na = 171.23, K = 6.73, Ca = 315.68, Mg = 94.71, SO_4 = 1028.7, Cl = 107.42, NO_3 = 113.96, and C (inorganic) = 89.29. The pH was adjusted to about 7 and the measured alkalinity was about 330 mg/L as $CaCO_3$.

The specific steps in the extraction procedure are as follows:

- Two grams of soil (accurately weighed) were divided between two 50-mL centrifuge tubes; each tube was filled to a 50 mL volume with synthetic ground water solution.
- Tubes were placed in an end-over-end rotary shaker for 4 hours.
- Tubes were removed from the shaker and centrifuged for 30 seconds at 3,000 rpm to remove particles less than 2 microns. Supernatant from both tubes was decanted to a 100 mL volumetric flask and filled to volume with synthetic ground water solution.
- Centrifuge tubes were refilled to 50 mL volume with synthetic ground water solution and placed in an end over end rotary shaker for 30 minutes.
- Tubes were removed from the shaker and centrifuged for 30 seconds at 3,000 rpm. Supernatant from both tubes was decanted to another 100 mL volumetric flask and the flask was filled to volume with synthetic ground water solution.
- Contents of the two 100 mL volumetric flasks were combined and filtered through a 0.45 micron filter and the filtered sediment residue was retained. The liquid extract samples were refrigerated for storage prior to submitting for laboratory analysis.
- The same procedure was repeated using the retained sediment samples and a 5% nitric acid solution in place of the synthetic ground water.
- All extracted samples were analyzed for As, Mo, Se, U, and V.

Assumptions:

(1) Samples used for subpile soil testing are representative of the site and contain any residual contaminants likely to be left at the site following cleanup to meet radiologic standards.

(2) Extraction of soils using synthetic ground water followed by a 5% nitric acid solution removed the leachable contamination that is available for release into the ground water system.

Sources of Formulas and References:

U.S. Department of Energy, 1996. *Site Observational Work Plan for the UMTRA Project Site at Grand Junction, Colorado.* DOE/AL/62350-223, Rev. 0.

Kd Calculation set.

Calculation:

Analysis of the extractant resulted in a concentration in μg/L. To get an estimate of the amount of extractable contaminant per mass of soil, the raw values (in μg/L) were converted to mg/kg. The converted values are those reported in the laboratory reports (attached). These values are presented in Table 1 and were obtained as described in the following discussion, using results obtained for arsenic from the synthetic ground water extraction of sample T9-1SPG.

Two grams of sample were leached with a total of 200 mL of synthetic ground water. The resulting extract had a concentration of 2 μg/L arsenic. Thus:

$$\frac{200\,\text{mL}}{2\,\text{g}} \times \frac{2\,\mu\text{g}}{\text{L}} \times \frac{\text{L}}{1{,}000\,\text{mL}} \times \frac{\text{mg}}{1{,}000\,\mu\text{g}} \times \frac{1{,}000\,\text{g}}{\text{kg}} = 0.2\ \text{mg/Kg}$$

Using the same equation, extractable soil concentrations can be calculated for the nitric acid extraction. These values are also presented in Table 1. Summing the ground water and nitric acid extractions for a sample will provide the total amount of leachable contaminants per mass of soil (See Table 1). These values can be used along with ground water data and K_ds (also included in Table 1) calculated for the site to qualitatively evaluate the likelihood that the subpile soils present a continuing contaminant source. Ground water data for the site (1997-1998) are also attached.

Discussion:

The results of the subpile soil investigation for each contaminant are discussed separately below.

Arsenic. The synthetic ground water extraction leached more arsenic from background samples than on-site samples. The total leachable amount of arsenic for on-site samples is probably not significantly different from that of background, considering that the slightly higher value obtained for on-site samples is due to a single high result from one sample. All other samples are comparable to the values obtained for background. The K_d obtained for arsenic is relatively high. Because of that, combined with the fairly low leachable quantities, it would not be anticipated that high levels of arsenic are leaching to the alluvial aquifer from subpile soils compared to background. A look at the ground water data indicate that arsenic at on-site locations is somewhat elevated above background, but are well below the standard of .05 mg/L. If arsenic concentrations in the plume associated with the site have already peaked, it would not be anticipated that residual arsenic contamination in subpile soils would provide a significant source of future ground water contamination. Because the highest concentrations of arsenic associated with the site are downgradient of the site (but also well below standards), it is indeed possible that arsenic concentrations in the alluvial aquifer are on the decline.

Molybdenum. For molybdenum, the total on-site leachable concentration is lower than background concentrations. Therefore, it is not expected that leaching of subpile soils would result in elevated concentrations of molybdenum in ground water. A look at the ground water data substantiate this;

molybdenum concentrations are comparable and low for samples collected on-site and upgradient. The low K_d for molybdenum suggests that if molybdenum was present in elevated concentrations in subpile soils, that it would flush easily from the site. It is highly unlikely that molybdenum will be detected at the site in concentrations significantly elevated from background.

Selenium. The leachate from subpile soil testing was at the detection limit for selenium analysis, therefore, the calculations are not entirely conclusive. It is not possible to determine if subpile soil concentrations are elevated above background, though the low leachate values would seem to imply that any continuing source of selenium should be negligible. The K_d determined for selenium is relatively high (21 L/kg), indicating that selenium should be relatively immobile. Results of these two tests are consistent with one another, but may not be with observations regarding selenium concentrations in ground water. Elevated concentrations of selenium are present in site ground water, up to 9 times the MCL. If ground water is in equilibrium with subpile soil concentrations, soil concentrations would be expected to be quite high, especially with the relatively high K_d, in order to produce the observed ground water concentrations. This inconsistency suggests either that test results are not indicative of selenium behavior under equilibrium conditions or a disequilibrium situation exists for selenium in the site ground water system.

Uranium. Leachable uranium concentrations are significantly higher in subpile soil samples than in background soils. The K_d values obtained for uranium at Old Rifle indicate that uranium is highly mobile as well. Most of the uranium in on-site samples was leached with the synthetic ground water solution. With this information combined, it would be expected that uranium concentrations in ground water should be significantly higher at the Old Rifle site than in background locations. On-site alluvial wells do show a range of concentrations from near background to more than three times background for uranium. [Note that concentrations from some background wells exceed the UMTRA standard of 0.044 mg/L.] Observed concentrations of uranium are consistent with its predicted high mobility. Additionally, because of its low K_d even fairly low subpile soil concentrations can result in degradation of ground water quality to levels above standards. However, because of its high mobility, any continuing source of uranium would be depleted rapidly and the ground water and subpile soils would be expected to flush fairly quickly.

Vanadium. Vanadium is present in the highest leachable concentrations of any of the contaminants studied for the Old Rifle site. Significantly higher concentrations are present in subpile soils than in background soils. Only a small amount of the vanadium leached out in the synthetic ground water solution compared with the nitric acid solution. This suggests that the vanadium is strongly sorbed, a fact which is supported by the high K_d calculated for vanadium. This also indicates that vanadium could present a continuing contaminant source that will flush only gradually over time. Because of the high concentrations of leachable vanadium in subpile soils compared to background, it would be expected that vanadium in site-related ground water should be elevated as well. Ground water from background wells is at the detection limit for vanadium; concentrations are up to two orders of magnitude higher for on-site wells. With such high concentrations of leachable vanadium associated with the site, and with its low mobility, it is likely that vanadium may be the most persistent contaminant associated with the site. There are no UMTRCA standards for vanadium, although EPA has established a risk-based concentration for vanadium in ground water (for residential use) of 0.33 mg/L (EPA 1998). Several on-site wells exceeded this concentration in the most recent round of sampling, although immediately downgradient concentrations were significantly reduced. Perhaps because of its adsorptive properties, vanadium sorbed on to clean particles as soon as it was transported from the zone of high subpile soil contamination.

Conclusions and Recommendations:

Arsenic and molybdenum in subpile soil samples are not significantly elevated above background, based on the results of soil extraction studies. On-site groundwater is not elevated above background concentrations for molybdenum, though concentrations are slightly elevated for arsenic. All concentrations are well below UMTRCA standards. Because highest arsenic concentrations in groundwater are downgradient from the site, arsenic contamination related to site activities may be on the decline.

Uranium is highly mobile with K_d values less than 1. This indicates that even low concentrations of uranium in soil could result in unacceptable concentrations leaching to ground water. However, because of its high mobility, uranium should flush rapidly from the ground water system. Background concentrations of uranium in ground water are elevated above the uranium UMTRA standard. This suggests that an ambient and ongoing source of uranium contamination exists in the vicinity of the Old Rifle site. Because of this, even after site-related contamination is completely removed through natural flushing, uranium concentrations in site ground water may remain above standards because of natural uranium sources in the area.

Interpretation of selenium behavior is ambiguous. If the ground water is in equilibrium with aquifer materials, results of subpile soil and K_d testing for selenium are suspect. If test results are reasonable reliable, then a disequilibrium situation probably exists with respect to selenium. Background levels of selenium in ground water exceed the UMTRA standard of 0.01 mg/L for some locations. This suggests that an alternate concentration limit for selenium may be appropriate for the Old Rifle site because ongoing ambient sources of selenium contamination may exist that are unrelated to site activities.

Vanadium is present in on-site soils in the highest total leachable quantities of any constituent included in this study. It also has the highest calculated K_d for site soils. This indicates that there is a continuing source of ground water contamination that is likely to persist for some time to come if no action is taken to remove this source. There is no ground water standard for vanadium; however concentrations of vanadium in ground water beneath the site do exceed the risk-based level of 0.33 mg/L established by EPA (EPA 1998).

Implications of these results with respect to selection of an appropriate ground water remediation strategy are as follows:

- A natural flushing strategy would probably be appropriate in addressing arsenic, molybdenum, and uranium. These constituents are either highly mobile and will flush readily, or else they are present at such low levels that they are not a major contaminant source. However, results for selenium and vanadium indicate that they will not flush easily. If a natural flushing approach is adopted, it might be necessary to develop alternate concentration limits for selenium and vanadium.

- If an active remediation strategy were selected to speed aquifer cleanup, it should be an approach that will be effective in controlling selenium and vanadium contamination at the site.

Computer Source:

Calculations were made in an Excel spreadsheet.

TABLE 1. SUBPILE SOIL DATA FOR OLD RIFLE SITE

Old Rifle - Subpile Soil Samples - Synthetic Water Extraction

Sample #	Depth	Location	As	Mo	Se	U	V
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
T9-1SPG	18-18.3'	onsite	0.2	0.1	0.2	0.35	0.5
292-1SPG	8-9.5'	bkgd	0.31	0.12	0.2	0.38	0.5
654-1SPG	18-18.2'	onsite	0.27	0.1	0.2	0.17	3.7
656-1SPG	8-9.5'	onsite	0.2	0.18	0.2	12.6	0.5
658-1SPG	3-9'	bkgd	0.26	0.1	0.2	0.1	0.5
663-1SPG	13-13.6'	onsite	0.28	0.12	0.2	0.72	1.9
Average background			0.285	0.11	0.2	0.24	0.5
Average on-site			0.2375	0.125	0.2	3.46	1.65

Old Rifle Subpile Soil Samples - 5% Nitric Acid Extraction

Sample #	Depth	Location	As	Mo	Se	U	V
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
T9-1SPN	18-18.3'	onsite	0.92	0.31	0.2	1.1	2.2
292-1SPN	8-9.5'	bkgd	1.4	0.27	0.2	0.67	4.3
654-1SPN	18-18.2'	onsite	1.1	0.13	0.2	0.28	25.5
656-1SPN	8-9.5'	onsite	1.4	0.25	0.2	8.4	12.8
658-1SPN	3-9'	bkgd	0.99	0.41	0.2	0.27	1.7
663-1SPN	13-13.6'	onsite	2.9	0.32	0.2	1.3	29.2
Average background			1.195	0.34	0.2	0.47	3
Average on-site			1.58	0.2525	0.2	2.77	17.425

Old Rifle Subpile Soil Samples - Average Total Leachable Contaminants

	As	Mo	Se	U	V
Background (mg/kg)	1.48	0.45	0.2	0.71	3.5
On Site (mg/kg)	1.82	0.378	0.2	6.23	19.1
Kd (L/kg)	28	0.1	21	0.1	38

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:33

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/L	0291	05/21/98	0001		U	0.0010	U		#	0.001	-
	mg/L	0292	05/21/98	0001		U	0.0010	U		#	0.001	-
	mg/L	0301	05/20/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0301	05/20/98	0002		O	0.0010	U		#	0.001	-
	mg/L	0302	05/19/98	0001		O	0.0072			#	-	-
	mg/L	0303	05/20/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0304	05/19/98	0001		O	0.0016	B		#	-	-
	mg/L	0305	05/19/98	0001		O	0.0057			#	-	-
	mg/L	0306	05/20/98	0001		O	0.0025	B		#	-	-
	mg/L	0307	05/19/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0308	05/19/98	0001		O	0.0035	B		#	-	-
	mg/L	0309	05/19/98	0001		O	0.0028	B		#	-	-
	mg/L	0310	05/19/98	0001		O	0.0040	B		#	-	-
	mg/L	0590	04/22/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0590	09/17/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0590	05/22/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0597	05/21/98	0001	AL	U	0.0019	B		#	-	-
	mg/L	0598	05/21/98	0001	AL	U	0.0011	B		#	-	-
	mg/L	0599	05/22/98	0001	AL	D	0.0014	B	L	#	-	-
	mg/L	0600	04/22/97	0001	AL	D	0.0085			#	-	-
	mg/L	0600	09/16/97	0001	AL	D	0.0089			#	-	-
	mg/L	0600	05/22/98	0001	AL	D	0.0083			#	-	-
	mg/L	0604	04/22/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0604	09/17/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0604	05/26/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0605	09/16/97	0001	AL	B	0.0010	U		#	0.001	-
	mg/L	0606	09/16/97	0001	AL	B	0.0010	U		#	0.001	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:35

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/L	0606	05/21/98	0001	AL	B	0.0010	U		#	0.001	-
	mg/L	0620	05/26/98	0001	WS	U	0.0010	U		#	0.001	-
	mg/L	0621	09/17/97	0001	WS	U	0.0055		L	#	-	-
	mg/L	0621	05/20/98	0001	WS	U	0.0062		L	#	-	-
	mg/L	0622	09/17/97	0001	WS	U	0.0054			#	-	-
	mg/L	0622	05/26/98	0001	WS	U	0.0064			#	-	-
	mg/L	0623	05/26/98	0001	WS	O	0.0011	B	L	#	-	-
	mg/L	0646	05/20/98	0001	WS	O	0.0080		L	#	-	-
	mg/L	0647	05/20/98	0001	WS	O	0.0080		L	#	-	-
	mg/L	0648	05/19/98	0001	WS	O	0.0085		L	#	-	-
	mg/L	0649	05/19/98	0001	WS	O	0.0112		GL	#	-	-
	mg/L	0654	05/19/98	0001	AL	O	0.0022	B		#	-	-
	mg/L	0655	05/18/98	0001	AL	O	0.0216			#	-	-
	mg/L	0656	05/20/98	0001	AL	O	0.0020	B		#	-	-
	mg/L	0656	05/20/98	0002	AL	O	0.0020	B		#	-	-
	mg/L	0657	05/19/98	0001	AL	O	0.0010	U		#	0.001	-
	mg/L	0658	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0659	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0660	05/22/98	0001	AL	U	0.0034	B		#	-	-
	mg/L	0662	05/20/98	0001	AL	O	0.0014	B		#	-	-
	mg/L	0663	05/18/98	0001	AL	O	0.0143			#	-	-
Molybdenum	mg/L	0291	05/21/98	0001		U	0.0317			#	-	-
	mg/L	0292	05/21/98	0001		U	0.0312			#	-	-
	mg/L	0301	05/20/98	0001		O	0.0154			#	-	-
	mg/L	0301	05/20/98	0002		O	0.0162			#	-	-
	mg/L	0302	05/19/98	0001		O	0.0135			#	-	-
	mg/L	0303	05/20/98	0001		O	0.0128			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:37

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Molybdenum	mg/L	0304	05/19/98	0001		O	0.0184			#	-	-
	mg/L	0305	05/19/98	0001		O	0.0171			#	-	-
	mg/L	0306	05/20/98	0001		O	0.0024	B		#	-	-
	mg/L	0307	05/19/98	0001		O	0.0054	B		#	-	-
	mg/L	0308	05/19/98	0001		O	0.0058	B		#	-	-
	mg/L	0309	05/19/98	0001		O	0.0054	B		#	-	-
	mg/L	0310	05/19/98	0001		O	0.0500			#	-	-
	mg/L	0590	04/22/97	0001	AL	D	0.0175			#	-	-
	mg/L	0590	09/17/97	0001	AL	D	0.0181			#	-	-
	mg/L	0590	05/22/98	0001	AL	D	0.0153			#	-	-
	mg/L	0597	05/21/98	0001	AL	U	0.0101			#	-	-
	mg/L	0598	05/21/98	0001	AL	U	0.0100			#	-	-
	mg/L	0599	05/22/98	0001	AL	D	0.0036	B	L	#	-	-
	mg/L	0600	04/22/97	0001	AL	D	0.0052	B		#	-	-
	mg/L	0600	09/16/97	0001	AL	D	0.0040	B		#	-	-
	mg/L	0600	05/22/98	0001	AL	D	0.0038	B		#	-	-
	mg/L	0604	04/22/97	0001	AL	D	0.0069	B		#	-	-
	mg/L	0604	09/17/97	0001	AL	D	0.0068	B		#	-	-
	mg/L	0604	05/26/98	0001	AL	D	0.0063	B		#	-	-
	mg/L	0605	09/16/97	0001	AL	B	0.0353			#	-	-
	mg/L	0606	09/16/97	0001	AL	B	0.0402			#	-	-
	mg/L	0606	05/21/98	0001	AL	B	0.0272			#	-	-
	mg/L	0620	05/26/98	0001	WS	U	0.0133			#	-	-
	mg/L	0621	09/17/97	0001	WS	U	0.195		L	#	-	-
	mg/L	0621	05/20/98	0001	WS	U	0.218		L	#	-	-
	mg/L	0622	09/17/97	0001	WS	U	0.239			#	-	-
	mg/L	0622	05/26/98	0001	WS	U	0.234			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:38

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Molybdenum	mg/L	0623	05/26/98	0001	WS	O	0.0196		L	#	-	-
	mg/L	0646	05/20/98	0001	WS	O	0.173		L	#	-	-
	mg/L	0647	05/20/98	0001	WS	O	0.0777		L	#	-	-
	mg/L	0648	05/19/98	0001	WS	O	0.408		L	#	-	-
	mg/L	0649	05/19/98	0001	WS	O	0.0880		GL	#	-	-
	mg/L	0654	05/19/98	0001	AL	O	0.0148			#	-	-
	mg/L	0655	05/18/98	0001	AL	O	0.0130			#	-	-
	mg/L	0656	05/20/98	0001	AL	O	0.0115			#	-	-
	mg/L	0656	05/20/98	0002	AL	O	0.0115			#	-	-
	mg/L	0657	05/19/98	0001	AL	O	0.0049	B		#	-	-
	mg/L	0658	05/21/98	0001	AL	U	0.0161			#	-	-
	mg/L	0659	05/21/98	0001	AL	U	0.0171			#	-	-
	mg/L	0660	05/22/98	0001	AL	U	0.0034	B		#	-	-
	mg/L	0662	05/20/98	0001	AL	O	0.0103			#	-	-
	mg/L	0663	05/18/98	0001	AL	O	0.0151			#	-	-
Selenium	mg/L	0291	05/21/98	0001		U	0.0074			#	-	-
	mg/L	0292	05/21/98	0001		U	0.0128			#	-	-
	mg/L	0301	05/20/98	0001		O	0.0022	B		#	-	-
	mg/L	0301	05/20/98	0002		O	0.0025	B		#	-	-
	mg/L	0302	05/19/98	0001		O	0.0350			#	-	-
	mg/L	0303	05/20/98	0001		O	0.0234			#	-	-
	mg/L	0304	05/19/98	0001		O	0.0141			#	-	-
	mg/L	0305	05/19/98	0001		O	0.0929			#	-	-
	mg/L	0306	05/20/98	0001		O	0.0013	B		#	-	-
	mg/L	0307	05/19/98	0001		O	0.0131			#	-	-
	mg/L	0308	05/19/98	0001		O	0.0445			#	-	-
	mg/L	0309	05/19/98	0001		O	0.0010	U		#	0.001	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:40

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Selenium	mg/L	0310	05/19/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0590	04/22/97	0001	AL	D	0.0955			#	-	-
	mg/L	0590	09/17/97	0001	AL	D	0.0503			#	-	-
	mg/L	0590	05/22/98	0001	AL	D	0.0194			#	-	-
	mg/L	0597	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0598	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0599	05/22/98	0001	AL	D	0.0050		L	#	-	-
	mg/L	0600	04/22/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0600	09/16/97	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0600	05/22/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0604	04/22/97	0001	AL	D	0.0123			#	-	-
	mg/L	0604	09/17/97	0001	AL	D	0.0122			#	-	-
	mg/L	0604	05/26/98	0001	AL	D	0.0171			#	-	-
	mg/L	0605	09/16/97	0001	AL	B	0.0072			#	-	-
	mg/L	0606	09/16/97	0001	AL	B	0.0044	B		#	-	-
	mg/L	0606	05/21/98	0001	AL	B	0.0086			#	-	-
	mg/L	0620	05/26/98	0001	WS	U	0.0010	U		#	0.001	-
	mg/L	0621	09/17/97	0001	WS	U	0.0010	U	L	#	0.001	-
	mg/L	0621	05/20/98	0001	WS	U	0.0010	U	L	#	0.001	-
	mg/L	0622	09/17/97	0001	WS	U	0.0010	U		#	0.001	-
	mg/L	0622	05/26/98	0001	WS	U	0.0010	U		#	0.001	-
	mg/L	0623	05/26/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0646	05/20/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0647	05/20/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0648	05/19/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0649	05/19/98	0001	WS	O	0.0017	B	GL	#	-	-
	mg/L	0654	05/19/98	0001	AL	O	0.0181			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:41

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Selenium	mg/L	0655	05/18/98	0001	AL	O	0.0398			#	-	-
	mg/L	0656	05/20/98	0001	AL	O	0.0145			#	-	-
	mg/L	0656	05/20/98	0002	AL	O	0.0144			#	-	-
	mg/L	0657	05/19/98	0001	AL	O	0.0481			#	-	-
	mg/L	0658	05/21/98	0001	AL	U	0.0247			#	-	-
	mg/L	0659	05/21/98	0001	AL	U	0.0243			#	-	-
	mg/L	0660	05/22/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0662	05/20/98	0001	AL	O	0.0346			#	-	-
	mg/L	0663	05/18/98	0001	AL	O	0.0280			#	-	-
Uranium	mg/L	0291	05/21/98	0001		U	0.0500			#	-	-
	mg/L	0292	05/21/98	0001		U	0.0524			#	-	-
	mg/L	0301	05/20/98	0001		O	0.145			#	-	-
	mg/L	0301	05/20/98	0002		O	0.146			#	-	-
	mg/L	0302	05/19/98	0001		O	0.172			#	-	-
	mg/L	0303	05/20/98	0001		O	0.0623			#	-	-
	mg/L	0304	05/19/98	0001		O	0.0833			#	-	-
	mg/L	0305	05/19/98	0001		O	0.0640			#	-	-
	mg/L	0306	05/20/98	0001		O	0.0466			#	-	-
	mg/L	0307	05/19/98	0001		O	0.0376			#	-	-
	mg/L	0308	05/19/98	0001		O	0.0730			#	-	-
	mg/L	0309	05/19/98	0001		O	0.0367			#	-	-
	mg/L	0310	05/19/98	0001		O	0.270			#	-	-
	mg/L	0590	04/22/97	0001	AL	D	0.0869			#	-	-
	mg/L	0590	09/17/97	0001	AL	D	0.0764			#	-	-
	mg/L	0590	05/22/98	0001	AL	D	0.0839			#	-	-
	mg/L	0597	05/21/98	0001	AL	U	0.0443			#	-	-
	mg/L	0598	05/21/98	0001	AL	U	0.0216			#	-	-

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0599	05/22/98	0001	AL	D	0.0390		L	#	-	-
	mg/L	0600	04/22/97	0001	AL	D	0.0082			#	-	-
	mg/L	0600	09/16/97	0001	AL	D	0.0056			#	-	-
	mg/L	0600	05/22/98	0001	AL	D	0.0078			#	-	-
	mg/L	0604	04/22/97	0001	AL	D	0.0190			#	-	-
	mg/L	0604	09/17/97	0001	AL	D	0.0225			#	-	-
	mg/L	0604	05/26/98	0001	AL	D	0.0268			#	-	-
	mg/L	0605	09/16/97	0001	AL	B	0.0469			#	-	-
	mg/L	0606	09/16/97	0001	AL	B	0.0326			#	-	-
	mg/L	0606	05/21/98	0001	AL	B	0.0429			#	-	-
	mg/L	0620	05/26/98	0001	WS	U	0.0244			#	-	-
	mg/L	0621	09/17/97	0001	WS	U	0.0021		L	#	-	-
	mg/L	0621	05/20/98	0001	WS	U	0.0026		L	#	-	-
	mg/L	0622	09/17/97	0001	WS	U	0.0012			#	-	-
	mg/L	0622	05/26/98	0001	WS	U	0.0013			#	-	-
	mg/L	0623	05/26/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0646	05/20/98	0001	WS	O	0.0030		L	#	-	-
	mg/L	0647	05/20/98	0001	WS	O	0.0039		L	#	-	-
	mg/L	0648	05/19/98	0001	WS	O	0.0030		L	#	-	-
	mg/L	0649	05/19/98	0001	WS	O	0.0014		GL	#	-	-
	mg/L	0654	05/19/98	0001	AL	O	0.112			#	-	-
	mg/L	0655	05/18/98	0001	AL	O	0.177			#	-	-
	mg/L	0656	05/20/98	0001	AL	O	0.0668			#	-	-
	mg/L	0656	05/20/98	0002	AL	O	0.0671			#	-	-
	mg/L	0657	05/19/98	0001	AL	O	0.110			#	-	-
	mg/L	0658	05/21/98	0001	AL	U	0.0594			#	-	-
	mg/L	0659	05/21/98	0001	AL	U	0.0587			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:45

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0660	05/22/98	0001	AL	U	0.0055			#	-	-
	mg/L	0662	05/20/98	0001	AL	O	0.0856			#	-	-
	mg/L	0663	05/18/98	0001	AL	O	0.190			#	-	-
Vanadium	mg/L	0291	05/21/98	0001		U	0.0010	U		#	0.001	-
	mg/L	0292	05/21/98	0001		U	0.0010	U		#	0.001	-
	mg/L	0301	05/20/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0301	05/20/98	0002		O	0.0010	U		#	0.001	-
	mg/L	0302	05/19/98	0001		O	0.372			#	-	-
	mg/L	0303	05/20/98	0001		O	0.0598			#	-	-
	mg/L	0304	05/19/98	0001		O	0.0373			#	-	-
	mg/L	0305	05/19/98	0001		O	0.765			#	-	-
	mg/L	0306	05/20/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0307	05/19/98	0001		O	0.0046	B		#	-	-
	mg/L	0308	05/19/98	0001		O	0.0044	B		#	-	-
	mg/L	0309	05/19/98	0001		O	0.0010	U		#	0.001	-
	mg/L	0310	05/19/98	0001		O	0.0142			#	-	-
	mg/L	0590	04/22/97	0001	AL	D	0.0050	U		#	0.005	-
	mg/L	0590	09/17/97	0001	AL	D	0.0100	U		#	0.01	-
	mg/L	0590	05/22/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0597	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0598	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0599	05/22/98	0001	AL	D	0.0042	B	L	#	-	-
	mg/L	0600	04/22/97	0001	AL	D	0.0050	U		#	0.005	-
	mg/L	0600	09/16/97	0001	AL	D	0.0100	U		#	0.01	-
	mg/L	0600	05/22/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0604	04/22/97	0001	AL	D	0.0050	U		#	0.005	-
	mg/L	0604	09/17/97	0001	AL	D	0.0100	U		#	0.01	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:46

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Vanadium	mg/L	0604	05/26/98	0001	AL	D	0.0010	U		#	0.001	-
	mg/L	0605	09/16/97	0001	AL	B	0.0100	U		#	0.01	-
	mg/L	0606	09/16/97	0001	AL	B	0.0100	U		#	0.01	-
	mg/L	0606	05/21/98	0001	AL	B	0.0010	U		#	0.001	-
	mg/L	0620	05/26/98	0001	WS	U	0.0014	B		#	-	-
	mg/L	0621	09/17/97	0001	WS	U	0.0100	U	L	#	0.01	-
	mg/L	0621	05/20/98	0001	WS	U	0.0010	U	L	#	0.001	-
	mg/L	0622	09/17/97	0001	WS	U	0.0100	U		#	0.01	-
	mg/L	0622	05/26/98	0001	WS	U	0.0010	U		#	0.001	-
	mg/L	0623	05/26/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0646	05/20/98	0001	WS	O	0.0010	U	L	#	0.001	-
	mg/L	0647	05/20/98	0001	WS	O	0.0021	B	L	#	-	-
	mg/L	0648	05/19/98	0001	WS	O	0.0065	B	L	#	-	-
	mg/L	0649	05/19/98	0001	WS	O	0.0341		GL	#	-	-
	mg/L	0654	05/19/98	0001	AL	O	0.0561			#	-	-
	mg/L	0655	05/18/98	0001	AL	O	0.595			#	-	-
	mg/L	0656	05/20/98	0001	AL	O	0.105			#	-	-
	mg/L	0656	05/20/98	0002	AL	O	0.106			#	-	-
	mg/L	0657	05/19/98	0001	AL	O	0.0010	U		#	0.001	-
	mg/L	0658	05/21/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0659	05/21/98	0001	AL	U	0.0011	B		#	-	-
	mg/L	0660	05/22/98	0001	AL	U	0.0010	U		#	0.001	-
	mg/L	0662	05/20/98	0001	AL	O	0.0601			#	-	-
	mg/L	0663	05/18/98	0001	AL	O	0.254			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE RFO01, RIFLE (OLD)
REPORT DATE: 9/28/98 8:25:48

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE200 WHERE site_code='RFO01' AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE "*R*" OR data_validation_qualifiers LIKE "*X*") OR IsNull(data_validation_qualifiers)) AND cas in('07440-38-2 ','07439-98-7 ','07782-49-2 ','07440-61-1 ','07440-62-2 ') AND DATE_SAMPLED between #1/1/97# and #12/1/98#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A *TIC is a suspected aldol-condensation product.*
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

MACTEC-ERS
2597 B 3/4 Road
Grand Junction, Colorado 81502

Facility Grand Jct. Operations Site Rifle Project Old Rifle

g/Well No. T-9 Location (N) ______ (E) ______

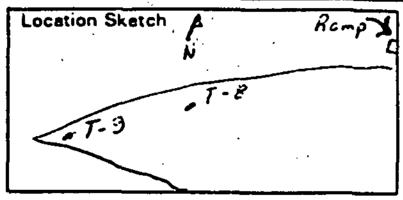
Ground Elev. (Ft.) ______ Bit/Auger Size 7" Retractable Hole Depth (Ft) 23.2

Diameter (inch I. D.) No. of Completions 1

	TYPE	Vol. (cf. gal)	Interval (Ft.)
Blank Casing	Scd. 40 pvc	2"	0 to 16.93
Screen	Diedrich pvc	2"	16.93 to 21.93
Sump/End Cap	Scd. 40 pvc	2"	21.93 to 22.51
Sand Pack	None		to
Sealant	Bentonite chips	Medium 1.5 ft^3	13.0 to 7.0
Grout	None		to

Stick-Up Height (Ft) 0.40 (2.5
Slot Size 0.020

Location Sketch



Locking Cover Installed Y / (N) Padlock No. ______

Drilling Method ODEX B-80 Sampling Method Cyclone / Split barrel

Date Drilled 4-15-98 Date Developed ______ Fluid Level/Date 14.41 (T.O.C) 4-15-98

Sampler(s) L. Spencer Remarks Temporary well Added wellcover & lock 7-20-98

Depth[a] (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0						0-1 Fill, silty sand, yellowish brown (10YR 5/4) 60% fn.gr. sand, 30% silt, 5% subrounded gravel up to 1½ inches long, 5% clay, well graded, slight plasticity moist, roots.
						1-2 Fill, sandy gravel, yellowish brown (10YR 5/4) 70% subrounded gravel to subangular, 25% fn.gr. sand, 5% silt, moist well graded.
10						2-6 Silty sand, same as 0-1 ft. above
15						6-11.5 Gravelly sand, subrounded gravel 30%, fn.gr. sand 65% 5% yellowish brown (10YR 5/4) moist.
20	50-6"		18.0-18.5			11.5-14.0 Silty sand, yellowish brown (10YR 5/4) 60% fn.gr. sand, 30% silt, 5% subrounded gravel up to 1 inch long, 5% clay?, well graded, moist, slight plasticity
23	50-6"		23.0-23.2			14.0-15.0 Silty sand, same as above but very dark gray, (10YR 3/1) no gravel
						15.0-18.0 Gravelly sand, dark grayish brown (10YR 4/2) 60% fn to coarse gr. sand w/ green, yellow, black, red and white mineral staining chips, 35% subrounded gravel up to 1½ inches long, well graded, saturated.
						16.-18.3 → same as above
						18.3-21.0 Wx bedrock, some small subrounded gravels in
						21.0-23.0 → sample grayish brown (10YR 5/2)
						23.0-23.2 Wx bedrock, mudstone, gray (2.5YR 5/) a few fine distinct yellowish brown (10YR 5/4) mottles, slightly fractured, moist.

a - All depths measured from ground level

Completed By [signature] Verified By ______

MACTEC-ERS
597 B 3/4 Road
rand Junction, Colorado 81502

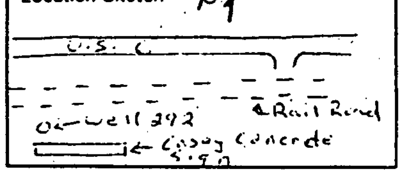
cility DOE Site Old Rifle Project 4GW

/Well No. 292 Location (N) ______ (E) ______

ound Elev. (Ft.) ______ Bit/Auger Size 7" OD excentric Hole Depth (Ft) 18.5'
Diameter (inch I. D.) No. of Completions 1
Stick-Up Height (Ft) 1.86
Slot Size 0.020

	TYPE	Vol. (cf. gal)	Interval (Ft.)
nk Casing	Sed. 40 pvc	2"	0 to 6.78
reen	Vee Wire Wrapped	2"	6.78 to 16.78
Sump/End Cap	Sed. 40 pvc	2"	16.78 to 17.36
nd Pack	Co. Silica	10-20 5.0 ft³	17.36 to 3.0
alant	Bentonite pellets	1/4" 0.25 ft³	3.0 to 1.0
Grout	NA	NA	NA to NA

Location Sketch



cking Cover Installed (Y)/ N Padlock No. 3359
lling Method ODEX B-80 (Mobile) Sampling Method split-spoon + cyclone discharge
Date Drilled 4-6-98 Date Developed 4-6-98 Fluid Level/Date 8.50 ft toc / 4-22-98
ampler(s) K. Karp Remarks upgradient alluvial well - replacement for

epth* (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0				1.0 Bentonite Pellets; 3.0 Med Sand; 5.0		0-11.0' Mostly silty sand, very dark grayish brown (10 YR 3/2). Some organic matter. Minor gravel zone at 1-2'. Poorly graded sand / slight plasticity. Saturated at 5'. Splitspoon sample collected at 8-9½'
10'	27		8-9½			11.0 - 18.5' Mostly gravel and gravelly sand. Dark yellowish brown (10 YR 4/4). Gravel up to 2-inches along primary axis. Probably some cobbles. Split-spoon sample collected at 17-18½ ft. Drilled to 19 ft.
15'				15.0; 15½ Sump		
20'	52		17-18½'	17'; 18½ TD		

a - All depths measured from ground level.

ompleted By [signature] Verified By ______

MACTEC-ERS
2597 B 3/4 Road
Grand Junction, Colorado 81502

Borehole Summary

Facility: Grand Junction Operations Site: Rifle Project: Old Rifle

Well No.: 654 Location (N): ______ (E): ______

Ground Elev. (Ft.): ______ Bit/Auger Size: 7" Retractable Hole Depth (Ft): 33.7

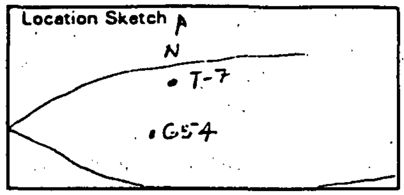
No. of Completions: 1

Stick-Up Height (Ft): 1.70

Slot Size: 0.020

	TYPE	Diameter (inch I. D.) / Vol. (cf. gal)	Interval (Ft.)
Blank Casing	Sed. 40 pvc	2"	0 to 8.16
Screen	Vee Wire Wrapped	2"	8.16 to 33.16
Sump/End Cap	Sed. 40 pvc	2"	33.16 to 33.74
Sand Pack	10-20 Silica / 20-40	11 ft³ / .5 ft³	33.74 to 6.0 / 6.0 to 5.0
Sealant	Bentonite pellets	1/4" / .5 ft³	5.0 to 2.0
Grout	Concrete		2 to 0

Location Sketch



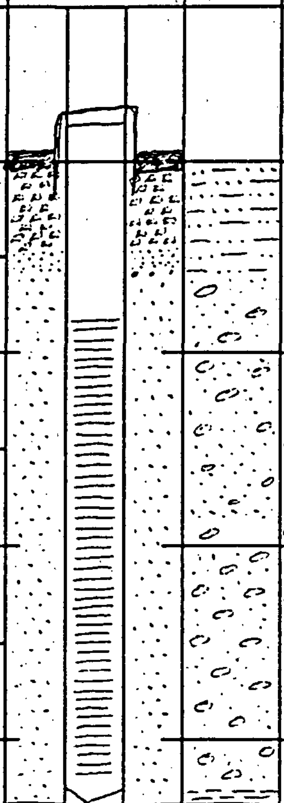
Locking Cover Installed (Y) / N Padlock No.: 3359

Drilling Method: ODEX B-80 Rig Button Hammer Sampling Method: Cyclone / Split barrel

Date Drilled: 4-16-98 Date Developed: 4-16-98 Fluid Level/Date: 14.10 toc / 4-17-98

Sampler(s): L. Spencer Remarks: ______

Required Information:
Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).



Depth[a] (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
0						0-6 Fill, silty sand, yellowish brown, (10YR 5/4) 60% fn.gr. sand, 30% silt, 5% subrounded gravels, 5% clay, well graded, slight plasticity, moist. A few roots
						6-13.0 Gravelly sand, dark brown (10YR 4/3) 60% fn.gr. sand, 35% subrounded gravel up to 3 inches long, 5% silt, well graded, saturated @12 ft.
10						
	50-6"		13.0-13.3			13.0-13.3 Same as above
						13.3-14.0 Same as above
15						14.0-18.0 Sand, fn. to med. gr., dark brown (10YR 4/3) 80% sand, 10% subrounded gravel up to 1 inch, 10% silt, poorly graded, saturated, no plasticity.
	28 19 18		18.0-18.2			18.0-18.2 Sand, same as above - sand only.
20						18.2-18.5 Same as above
						18.5-33.5 Intermittent gravelly sands and sandy gravels.
25						33.5-33.7 Weathered bedrock, mudstone, light yellowish brown (2.5Y 6/4), crumbly, slightly moist - poor sample
30						
33	50-6"		33.5-33.7			

a - All depths measured from ground level.

Completed By: Harold F. Spencer Verified By: ______

MACTEC-ERS
[redacted]597 B 3/4 Road
[redacted]rand Junction, Colorado 81502

Borehole Summary

[redacted]cility Grand Junction Operations Site Rifle Project Old Rifle

[redacted]/Well No. 656 Location (N) ______ (E) ______

[redacted]ound Elev. (Ft.) ______ Bit/Auger Size Diameter (inch I. D.) 7" Retractable Hole Depth (Ft) 22.2

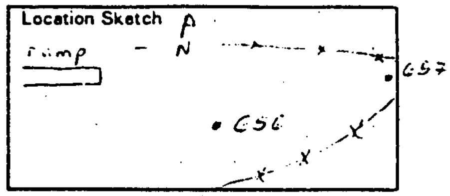
No. of Completions 1

Stick-Up Height (Ft) 2.73

Slot Size 0.020

	TYPE	Vol. (cf. gal)	Interval (Ft.)
[redacted]ank Casing	Scd. 40 pvc	2"	0 to 6.35
[redacted]creen	Veewire wrapped	2"	6.35 to 21.35
Sump/End Cap	Scd. 40 pvc	2" cone	21.35 to 21.93
[redacted]and Pack	Co Silica sand	10-20 8.0 ft³	21.93 to 5.0
[redacted]ealant	Co silica sand / Bentonite pellets	20-40 0.5 ft³ / 1/4" 1.2 ft³	5.0 to 4.0 / 4.0 to 2.0
Grout	Concrete	1.5 ft³	2.0 to 0

Location Sketch

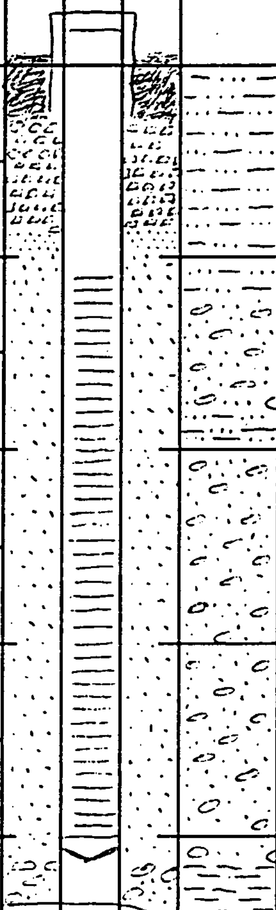


[redacted]cking Cover Installed (Y)/ N Padlock No. 3359

[redacted]illing Method ODEX B-80 Rig Button Hammer Sampling Method Split barrel / Cyclone

Date Drilled 4-8-98 Date Developed 4-8-98 Fluid Level/Date 10.77 ft toc / 4-8-98

[redacted]ampler(s) L. Spencer Remarks ______

Depth* (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						**Required Information:** Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0						0-6.5 Fill, silty sand, dark yellowish brown (10YR 4/4) 60% sand, 30% silt, 5% subrounded gravel up to 1 inch long, 5% clay, well graded, moist, slight plasticity. A few root hairs/roots.
5						6.5-8.1 Gravelly sand, dark yellowish brown (10YR 4/4) 60% sand, fn. gr., 30% subrounded gravel, 5% silt, 5% clay well graded, slight plasticity, moist.
	30 24 22		8.0-9.3			8.1-9.3 Silty sand, dk brown, (10YR 4/3) 90% sand fn. gr., 5% silt, 5% subrounded gravel up to 1 1/2 inches long poorly graded, slight plasticity, moist to 8.8 ft., saturated from 8.8 feet
10	40-6"		13.0-13.1			9.3-10.0 Same as above
						10.0-20.5 Gravelly, sand, dark brown (10YR 4/3) 60% fn. gr sand, 35% subrounded gravel up to 3 in. long, 5% silt, well graded, saturated.
15						20.5-22.2 Weathered bedrock, mudstone, grey (10YR 5/1) with limonite staining, somewhat fractured, @ 22.0 ft. mudstone is weak red (2.5YR 5/2) crumbly, wet.
20						
22	50-6"		22.0-22.2			

a - All depths measured from ground level

[redacted]ompleted By Patrick F. Spencer Verified By ______

MACTEC-ERS
2597 B 3/4 Road
Grand Junction, Colorado 81502

Facility Grand Junction Operations Site Rifle Project Old Rifle

g/Well No. 658 Location (N) ______ (E) ______

Ground Elev. (Ft.) ______ Bit/Auger Size 7" Retractable Hole Depth (Ft) 19.0

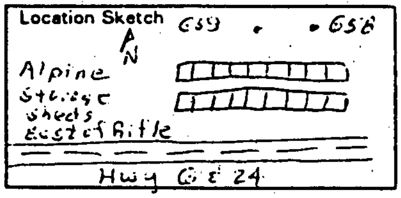
No. of Completions 1

Stick-Up Height (Ft) 2.8

Slot Size 0.020

	TYPE	Diameter (inch I. D.) Vol. (cf. gal)	Interval (Ft.)
Blank Casing	pvc	2"	0 to 2.3
Screen	Vee wire wrapped	2"	2.3 to 17.3
Sump/End Cap	pvc	2"	17.3 to 17.55
Sand Pack	Co. Silica / Co. silica	10-20 3.5ft^3 / 20-40 1.0ft^3	17.55 to 1.6 / 1.6 to 1.2
Sealant	Bentonite pellets	1/4" 0.6ft^3	1.2 to 0.8
Grout	Concrete	1ft^3	0.8 to 0

Location Sketch

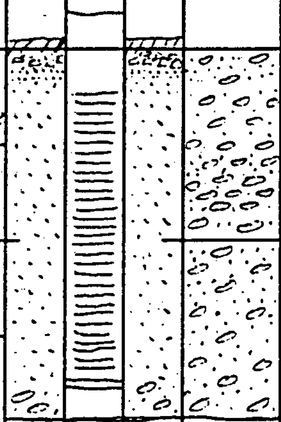


Locking Cover Installed (Y) / N Padlock No. 3359

Drilling Method ODEX Button Hammer B-80 Rig Sampling Method Cyclone

Date Drilled 4-1-98 Date Developed 4-1-98 Fluid Level/Date 5.08 toc / 4-1-98

Sampler(s) L. Spencer Remarks ______

Depth[a] (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0			Cyclone grab sample from 3-6ft. for Kd			0-3 Fill, gravelly sand, dark grayish brown (10YR 4/2) 30 ~~60~~% gravel subrounded up to 2in. long, 60% fn. to med. gr. sand, 5% silt, 5% clay, well graded, moist
						3-9 Sandy gravel, dark grayish brown, (10YR 4/2) 60% gravel subrounded, 3 inches long, 35% fn. gr. sand, 5% silt, saturated, well graded. GW
10						9-19.0 Gravelly sand, dark grayish brown (10YR 4/2) 60% fn. to med. to coarse gr. sand, 35% subrounded gravel up to 3 in. long, well graded, saturated SW
15						Note: Intermittent sands/gravels to total depth.
19						

a - All depths measured from ground level

Completed By [signature] Verified By ______

MACTEC-ERS
597 B 3/4 Road
Grand Junction, Colorado 81502

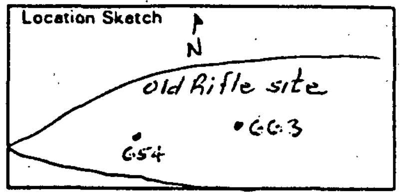
acility Grand Junction Operations Site Rifle Project Old Rifle

/Well No. 663 Location (N) ______ (E) ______

round Elev. (Ft.) ______ Bit/Auger Size 7" Retractable button hammer Diameter (inch I. D.) Hole Depth (Ft) 23.5
No. of Completions 1
Stick-Up Height (Ft) 1.60
Slot Size 0.020

	TYPE	Diameter (inch I. D.)	Vol. (cf. gal)	Interval (Ft.)
ank Casing	Sch. 40 pvc	2"		0 to 7.78
creen	vee Wire Wrapped pvc	2"		7.78 to 22.78
Sump/End Cap	Sch. 40 pvc	2"		22.78 to 23.36
and Pack	Co. Silica	10-20 / 20-40	4 ft³ / .5 ft³	23.36 to 6.0 / 6.0 to 5.0
ealant	Bentonite pellets	1/4"	1.0 ft³	5.0 to 1.0
Grout	Concrete		1.5 ft³	1 to 0

Location Sketch



ocking Cover Installed (Y)/ N Padlock No. 3353
illing Method ODEX B-80 rig Sampling Method Cyclone / Split barrel
Date Drilled 4-17-98 Date Developed 4-17-98 Fluid Level/Date 12.41 toc / 4-17-98
Sampler(s) L. Spencer Remarks ______

Depth* (FT)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0						0-5.0 Fill, silty sand, yellowish brown (10YR 5/4) 60% fn. gr. sand, 30% silt, 5% subrounded gravel up to 1/2 inch long, 5% clay, well graded, slight plasticity, moist. A few roots.
						5.0-13.0 Fill, Gravelly sand, yellowish brown (10YR 5/4) 60% fn. gr. sand, 30% subrounded to subangular gravel up to 1 inch long, 5% silt, 5% clay, well graded, slight plasticity, moist. Note: Wet @ 11.0 ft.
10						
	50-6"		13.0-13.5			13.0-13.5 Sandy gravel, 75% subrounded gravel up to 3 inches long, 25% fn. to med. gr. sand, well graded, saturated
15						13.5-14.0 Same as above
						14.0-18.0 Gravelly sand, dark yellowish brown, (10YR 5/4) 60% fn. to med. gr. sand, 35% subrounded gravel up to 1 1/2 inches long, 5% silt, well graded, saturated.
20						18.0-22.0 Sandy gravel, 75% subrounded gravel up to 1 1/2 inch long, 25% fn. to coarse gr. sand, yellow, black, red, green mineralizing chips in sands, saturated.
23	50-6"		23.0-23.7			22.0-23.5 Weathered bedrock, mudstone, olive (5Y 5/3) crumbly, moist
						23.5-23.7 Wx bedrock, mudstone, light grey (2.5Y 7/0) many, coarse, prominent yellowish brown (10YR 5/4) mottles, crumbly, moist, fractured.

a - All depths measured from ground level.

Completed By David F. Spencer Verified By ______

SAMPLE CROSS REFERENCE V2.05

GRAND JUNCTION OFFICE ANALYTICAL LABORATORY

REQUISITION(S): 16030

CUSTOMER ID	TICKET	LAB ID
RIFLE T9-1SPG	NDB 838	251864
RIFLE 292-1SPG	NDB 839	251865
RIFLE 654-1SPG	NDB 840	251866
RIFLE 656-1SPG	NDB 841	251867
RIFLE 658-1SPG	NDB 842	251868
RIFLE 663-1SPG	NDB 843	251869
RIFLE T9-1SPN	NDB 844	251870
RIFLE 292-1SPN	NDB 845	251871
RIFLE 654-1SPN	NDB 846	251872
RIFLE 656-1SPN	NDB 847	251873
RIFLE 658-1SPN	NDB 848	251874
RIFLE 663-1SPN	NDB 849	251875

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251864

SDG No.: _251864__

Matrix: WATER__

Date Received: _06/08/98

% Solids: __0.0

T9-15PG

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.20	U		P
7439-98-7	Molybdenum	0.10	U		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.35	B		PM
7440-62-2	Vanadium	0.50	U		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251865

SDG No.: _251864__   Matrix: WATER__

Date Received: _06/08/98   % Solids: __0.0

292-15PG

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic___	0.31	B		P_
7439-98-7	Molybdenum	0.12	B		PM
7782-49-2	Selenium__	0.20	U		P_
7440-61-1	Uranium___	0.38	B		PM
7440-62-2	Vanadium__	0.50	U		P_

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251866

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

654-15PG

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.27	B		P
7439-98-7	Molybdenum	0.10	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.17	B		PM
7440-62-2	Vanadium	3.7	B		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251867

456-15PG

SDG No.: _251864__   Matrix: WATER__

Date Received: _06/08/98   % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.20	U		P
7439-98-7	Molybdenum	0.18	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	12.6			PM
7440-62-2	Vanadium	0.50	U		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251868

SPG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

658-1SPG

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.26	B		P
7439-98-7	Molybdenum	0.10	U		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.10	U		PM
7440-62-2	Vanadium	0.50	U		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251869

663-15PG

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.28	B		P
7439-98-7	Molybdenum	0.12	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.72			PM
7440-62-2	Vanadium	1.9	B		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251870

T9-15PN

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.92	B		P
7439-98-7	Molybdenum	0.31	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	1.1			PM
7440-62-2	Vanadium	2.2	B		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251871

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

292-15PN

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	1.4			P
7439-98-7	Molybdenum	0.27	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.67			PM
7440-62-2	Vanadium	4.3	B		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251872

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

654-15AN

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	1.1			P
7439-98-7	Molybdenum	0.13	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.28	B		PM
7440-62-2	Vanadium	25.5			P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251873

656-15PN

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic___	1.4	_		P_
7439-98-7	Molybdenum	0.25	B		PM
7782-49-2	Selenium__	0.20	U		P_
7440-61-1	Uranium___	8.4	_		PM
7440-62-2	Vanadium__	12.8	_		P_

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251874

658-15PN

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.99	B		P
7439-98-7	Molybdenum	0.41	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	0.27	B		PM
7440-62-2	Vanadium	1.7	B		P

Comments:

GJO ANALYTICAL LABORATORY - INORGANIC ANALYSIS REPORT

FORM 1
INORGANIC ANALYSES DATA SHEET

LAB SAMPLE NO.

251875

663-15PN

SDG No.: _251864__ Matrix: WATER__

Date Received: _06/08/98 % Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.9			P
7439-98-7	Molybdenum	0.32	B		PM
7782-49-2	Selenium	0.20	U		P
7440-61-1	Uranium	1.3			PM
7440-62-2	Vanadium	29.2			P

Comments:

URFL000528

Technical Task Cover Sheet

Discipline Geochemistry **Number of Sheets** 9

Project:
UMTRA Ground Water

Site:
Rifle (New)

Subject:
Subpile Soil Investigation for the New Rifle Site

Sources of Data:

(1) Lithologic descriptions of 3 onsite soil borings (location 659 not available)

(2) Analytical data from 2 sequential extractions of samples from each soil boring

(3) Historical references describing site activities

(4) 1998-1999 ground water analyses for the New Rifle site (SEE_UMTRA database)

(5) K_d (distribution coefficient) calculations for New Rifle site soils

RECORD COPY

Task Order No. MAC99-05 File Index No. GWRFL 13.1

Proj. No. 321404002 Calc. No. U005800 Supersedes Calc. No. [Supersedes Calc No.]

Calculated by	Date	Checked by	Date	Approved by	Date
L Cummins	5/17/99	K Karp	5/14/99	Robert C [illegible]	6/1/99

C:\WPWIN6\RFNEWSUB.WP6

mactec-ers

U.S. Department of Energy Grand Junction Projects Office

Problem Statement:

Tailings and contaminated soils from the former New Rifle uranium and vanadium-processing site have been removed based on cleanup standards for residual radioactive materials. Because the cleanup criteria is based strictly on surface exposure to radioactivity, and because the tailings contained other nonradioactive hazardous constituents, subpile soils require evaluation to assure they are not a continuing source of ground water contamination. The information provided through this evaluation can serve as a starting point for use in more quantitative numerical ground water modeling.

Method of Solution:

Subpile Soil Sampling

Samples were collected from borings made at 3 locations (RFN-216, 218, and 225; see Figure 1) directly beneath the former holding ponds for process effluent and at one background location (RFO-659). These samples were subjected to a two-step chemical extraction process; extractants from each step were analyzed. Testing was performed on 8 samples from 4 different locations. Note that while samples are referred to as subpile "soils," the material subjected to testing was not true soil but actually alluvial material. Figure 1 shows the sample locations. The sample collected from location RFN- 225 was taken from depths above the water table. All other samples were collected from below the water table. Many of the shallow alluvial samples from the New Rifle site were composed of large cobbles that were unsuitable for subpile soil testing, accounting for the deviation from the sampling scheme described in the site characterization work plan. Lithologic logs of the alluvial materials were prepared in the field and are attached.

Sample Preparation and Chemical Extraction Methods

Samples were air-dried (no oven heat) and sieved to less than 2 millimeters (mm). Two extractions were then performed on a 2-gram sample using (1) a synthetic ground water solution and (2) a 5 percent nitric acid solution. The synthetic ground water solution is assumed to be representative of the effects of precipitation and ground water movement through the subpile soils. A 5 percent nitric acid solution will dissolve most amorphous oxides that are likely to contain adsorbed contaminants as well as any more resistant water-soluble constituents. Together these extractants can be expected to remove all leachable contaminants. As desired, 5 percent nitric acid will not remove contaminants locked in recalcitrant minerals such as apatites or other heavy mineral grains.

A synthetic solution was prepared that simulated ground water at the New Rifle site, based on groundwater analysis for well 598 from recent sampling events (4/25/97 and 9/18/97; SEE_UMTRA data base). The composition of the synthetic ground water is as follows (in mg/L): Na = 584.41, K = 7.18, Ca = 328.41, Mg = 69.33, SO4 = 1625.92, Cl = 202.56, NO3 = 639.35, and C (inorganic) = 121.43. The pH was adjusted to about 6.5 and the measured alkalinity was about 175 mg/L as $CaCO_3$.

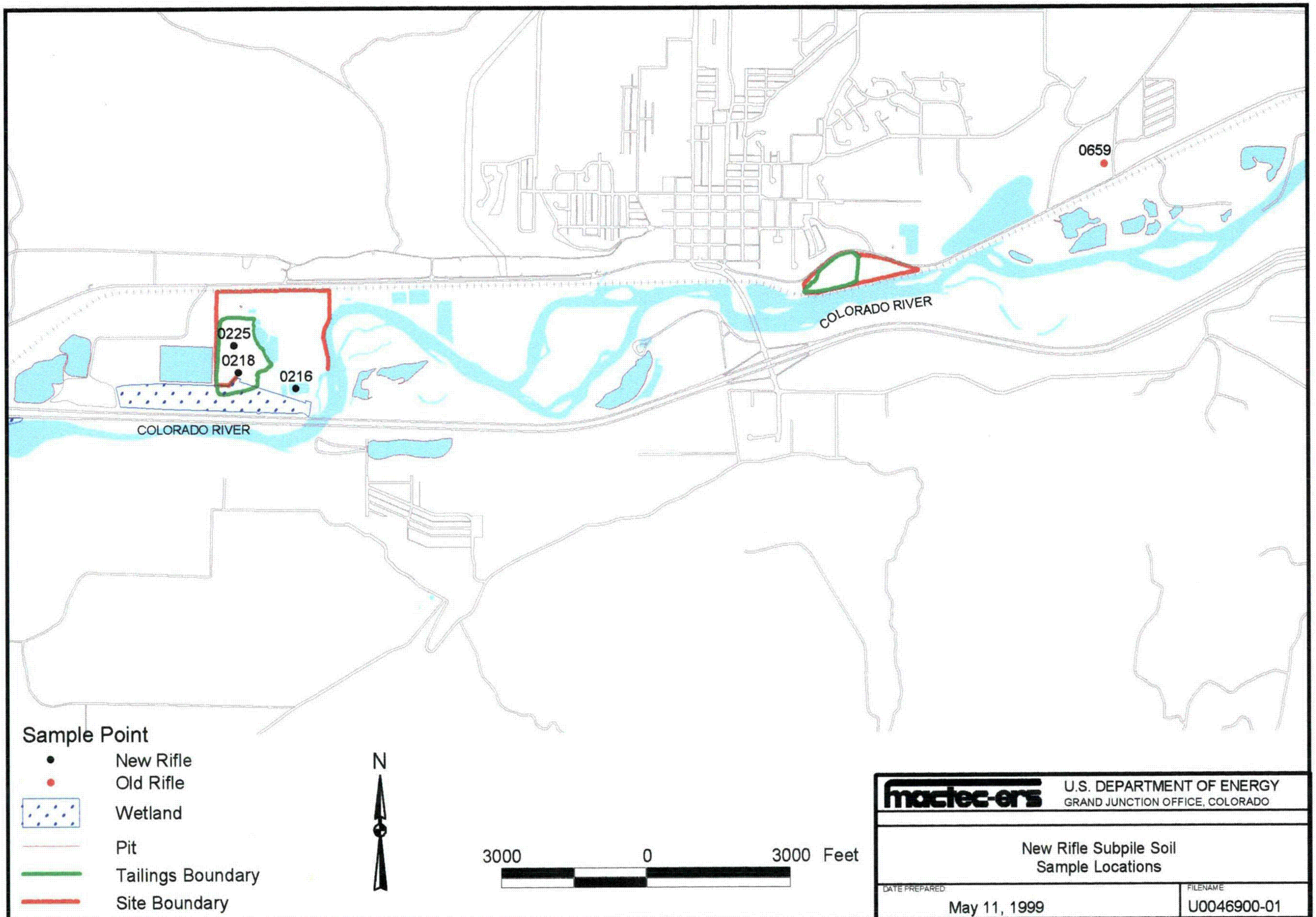


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Figure 1. New Rifle Subpile Soil Sample Locations

The specific steps in the extraction procedure are as follows:

- Two grams of soil (accurately weighed) was divided between two 50-mL centrifuge tubes; each tube was filled to a 50-mL volume with synthetic ground water solution and placed on a stir bar for 4 hours.
- Tubes were removed from the stir bar and centrifuged for 45 minutes at 3,100 rpm to remove particles less than 2 microns. Supernatant from both tubes was decanted to a 100-ml volumetric flask and filled to volume with synthetic ground water solution.
- Centrifuge tubes were refilled to 50-ml volume with synthetic ground water solution and placed on a stir bar for 15 minutes.
- Tubes were removed from the stir bar and centrifuged for 30 minutes at 3,100 rpm. Supernatant from both tubes was decanted to another 100-ml volumetric flask and the flask was filled to volume with synthetic ground water solution.
- Contents of the two 100-mL volumetric flasks were combined and filtered through a 0.45-micron filter and the filtered sediment residue was retained. The liquid extract samples were refrigerated for storage prior to submitting for laboratory analysis.
- The same procedure was repeated using the retained sediment samples and a 5 percent nitric acid solution in place of the synthetic ground water.
- All extracted samples were analyzed for As, Cd, Fe, Mn, Mo, Se, U, and V.

Assumptions:

(1) Samples used for subpile soil testing are representative of the site and contain any residual contaminants likely to be left at the site following cleanup to meet radiologic standards.

(2) Extraction of soils using synthetic ground water followed by a 5 percent nitric acid solution removed the leachable contamination that is available for release into the ground water system.

Sources of Formulas and References:

U.S. Department of Energy, 1996. *Site Observational Work Plan for the UMTRA Project Site at Rifle, Colorado.* DOE/AL/62350-223, Rev. 0.

Kd Calculation set (Calculation No. U0058100)

McLean, J.E. and Bledsoe, B.E., 1992. Behavior of Metals in Soils, EPA Ground Water Issue EPA/540/S-92/018, OSWER Office of Research and Development, October.

Calculation:

Analysis of the extractant resulted in a concentration in µg/L. To get an estimate of the amount of extractable contaminant per mass of soil, the raw values (in µg/L) were converted to mg/kg. The converted values are those reported in the laboratory reports (attached). These values are presented in Table 1 and were calculated as described in the following discussion, using results obtained for arsenic from the synthetic ground water extraction of sample 216@7A-S.

Two grams of sample were leached with a total of 200 mL of synthetic ground water. The resulting extract had a concentration of 1.2 µg/L arsenic. Thus:

$$\frac{200ml}{2g} \times \frac{1.2\mu g}{L} \times \frac{L}{1{,}000ml} \times \frac{mg}{1{,}000\mu g} \times \frac{1{,}000g}{kg} = 0.12mg/Kg$$

Using the same equation, extractable soil concentrations can be calculated for the nitric acid extraction. These values are also presented in Table 1. Summing the ground water and nitric acid extractions for a sample will provide the total amount of leachable contaminants per mass of soil (See Table 1).

Discussion:

Probably the most striking aspect of the results reported in Table 1 is that that samples collected from one location and depth (RFN-216 at 11 feet) were significantly higher in nearly all constituents than the other samples for both extractions. Only iron and manganese concentrations were higher in other samples. Additionally, all constituents displayed higher leachability when subjected to the 5 percent nitric acid solution than when leached with synthetic ground water solution. The consistently lowest concentrations came from the background sample RFO-659; all constituents except Fe and Mn, which are common in most alluvial sediments, were near or below detection.

The results of the subpile soil investigation for each contaminant are discussed separately below. To assist in evaluating the subpile soils as continuing sources of contamination, distribution coefficients (K_ds) previously calculated for selected contaminants in the alluvial aquifer (see Calculation No. U0058100) are also useful. Calculated K_ds are as follows:

Analyte	K_d (mL/g)
Arsenic	5.5
Cadmium	77.1
Molybdenum	0.1
Selenium	2.3
Uranium	0.6
Vanadium	4.9

Table 1. New Rifle Subpile Soil Samples

New Rifle - Subpile Soil Samples											
Synthetic Water Extraction											
Sample #	Depth	Water Table Relationship	Location	As mg/Kg	Cd mg/Kg	Fe mg/Kg	Mn mg/Kg	Mo mg/Kg	Se mg/Kg	U mg/Kg	V mg/Kg
216@7A-S	7'	below	onsite	0.39	0.12	0.5	66.8	1.1	0.2	0.76	7.5
216@7B-S	7'	below	onsite	0.42	0.12	0.5	66	1	0.2	0.72	7.9
216@11A-S	11'	below	onsite	11.8	0.57	0.5	58.3	15.9	0.86	18.8	293
216@11B-S	11'	below	onsite	12	0.6	0.5	59.9	16.7	1	19.4	302
218@13A-S	13'	below	onsite	0.2	0.1	0.5	8.8	1.6	0.2	0.13	3.1
218@13B-S	13'	below	onsite	0.42	0.1	0.5	8.7	1.8	0.2	0.13	3.3
225@0-7.5-S	0-7.5'	above	onsite	0.35	0.1	0.5	20.1	1.5	0.2	0.56	1.1
659@23-S	23'	below	bkgd	0.22	0.1	0.5	1.8	0.1	0.2	0.1	0.1
	Average onsite subpile soil			3.61	0.20	0.25	36.30	4.96	0.31	5.13	77.10
5% Nitric Acid Extraction											
Sample #	Depth	Water Table Relationship	Location	As mg/Kg	Cd mg/Kg	Fe mg/Kg	Mn mg/Kg	Mo mg/Kg	Se mg/Kg	U mg/Kg	V mg/Kg
216@7A-N	7'	below	onsite	2.9	1.5	2350	276	3.4	0.2	1.5	44.3
216@7B-N	7'	below	onsite	2.5	1.1	2310	288	3.2	0.2	1.5	42.7
216@11A-N	11'	below	onsite	161	3.3	2230	141	20.7	2.3	64.5	606
216@11B-N	11'	below	onsite	168	3.4	2080	140	20.4	2.2	64.7	614
218@13A-N	13'	below	onsite	1.7	0.14	1570	183	2.7	0.2	0.62	21.5
218@13B-N	13'	below	onsite	1.5	0.41	1540	298	3	0.2	0.9	24
225@0-7.5-N	0-7.5'	above	onsite	2.4	0.32	4100	254	4.4	0.2	1.1	36.5
659@23-N	23'	below	bkgd	0.82	0.1	933	63.8	0.1	0.2	0.16	1.6
	Average onsite subpile soil			42.60	1.28	2139	205.48	7.23	0.64	16.87	173.81
Average total leachable onsite subpile soil				46.21	1.48	2139	241.78	12.19	0.95	22.00	250.91
(light shading)	Reported value less than required detection limit but greater than or equal to the actual instrument detection limit										
(dark shading)	Analyte not detected - value used in calculations is one-half the detection limit										

Calculation No.: U005800

An EPA publication on the behavior of metals in soils (McLean and Bledsoe, 1992) also provides common ranges of selected metals in soils. These ranges are as follows for contaminants studied in New Rifle subpile soil samples:

Metal	Common Range for Soils (mg/Kg)
Arsenic	1.0 - 50
Cadmium	0.01 - 0.7
Iron	7,000 - 550,000
Manganese	20 - 3,000
Selenium	0.1 - 2

Arsenic: Concentrations of arsenic were low in most samples with the exception of one depth interval at one location (location 216 at 11 feet). For the synthetic ground water leach, all other samples were at or close to the detection limit and all concentrations were within the common range of soil compositions. Amounts of arsenic leached with the nitric acid solution also were within the common range for soils except for location 216 at 11 feet. Borehole 216 is located at the site of a former evaporation pond which received processing wastes; it would be expected that highest contaminant concentrations would be present at this location (this is supported by the fact that all other contaminants analyzed in subpile soils were elevated at this location and depth). Therefore, it appears that arsenic concentrations above the natural range in soils are confined to a single location associated with a former evaporation pond. While soils here could serve as a continuing source of ground water contamination, the very limited extent of this contamination and arsenic's somewhat high K_d (greater than 1 and favoring partioning to soil) would make it unlikely that the soils will contribute any significant amount of arsenic to the ground water.

Cadmium: Concentrations of cadmium were low in most samples with the exception of one depth interval at one location (location 216 at 11 feet). For the synthetic ground water leach, all other samples were below or very near the detection limit. Samples from location 216 at 11 feet were within the common range for soils based on the ground water leach. The nitric acid extraction resulted in somewhat elevated concentrations for samples from both depths at location 216; other samples were all near the detection limit and within the common range for cadmium in soils. The K_d calculated for cadmium was the highest of any of the analytes tested for the New Rifle site. This high K_d, along with the low concentrations of cadmium in the subpile soils, make it highly unlikely that the subpile soils present any significant continuing source of cadmium contamination to ground water.

Iron: Iron was not detected in the synthetic ground water leachate, but was present in the highest concentrations of any analyte in the nitric acid leachate. This is consistent with the highly insoluble nature of iron at pH levels greater than 3 (the synthetic ground water solution had a pH around 6.5, while the 5 percent nitric acid solution had a pH close to 2). However, concentrations extracted with the nitric acid leach were within the common range for soils and may not actually be the result of site-related contamination. Because of the insoluble nature of iron under pH conditions that currently exist at the site and that are likely to continue to exist in the future, subpile soils do not represent a significant source of iron contamination to ground water. A dramatic change in ground water chemistry (e.g., a large drop in pH) could mobilize iron from the subpile soils. However, because of the high natural content of iron in soils, it would be quite difficult to distinguish site-related contamination from background.

Manganese: All concentrations of manganese in subpile soils were within the common range for soils, and were closer to the lower end of the range. Highest concentrations resulting from the synthetic ground water leach were from location 216, which tends to have highest concentrations of all contaminants. Significantly higher concentrations of manganese were removed by the nitric acid leach. No K_ds were calculated for manganese, though a survey of the literature indicates that reported values range from 0.2 to 10,000 mL/g. Because manganese in New Rifle subpile soils is at the low end of the common range for soils, and because soils from below the water table contain very low concentrations of manganese, it is not likely that the soils will provide a significant continuing source of manganese contamination to ground water.

Molybdenum: Concentrations of molybdenum in subpile soils span a fairly narrow range for both the synthetic ground water and nitric acid leaches. All of the results are less than 5 mg/Kg with the exception of location 216 at 11 feet depth. The K_d value determined for molybdenum indicates that it is highly mobile. The relatively low and uniform concentrations of molybdenum in subpile soils may indicate that most of the contamination has already leached from the soils with the exception of isolated pockets. It is therefore unlikely that residual molybdenum contamination at the site will provide a significant, long-lived source of molybdenum contamination to ground water.

Selenium: Selenium was below detection for all samples except one location and depth (location 216 at 11 feet), for both synthetic ground water and nitric acid leach tests. Concentrations obtained from location 216 at 11 feet were also low. Most selenium values are within the common range for soils and those that exceed this range do so only marginally. These data indicate that subpile soils do not represent a significant continuing source of selenium contamination to ground water.

Uranium: With the exception of one location and depth (location 216 at 11 feet) uranium concentrations in subpile soils were quite low for both the synthetic ground water and nitric acid leach (values less than 1.5 mg/Kg). Most samples from below the water table are below or near the detection limit. The K_d calculated for uranium indicates that it is quite mobile. These data indicate that most leachable uranium has probably been removed from the subpile soils and that these soils do not represent long-lived source of uranium contamination to ground water.

Vanadium: One location and depth has vanadium concentrations significantly higher than the others (location 216 at 11 feet) and one has concentrations at or near the detection limit (background location 659) for both extractions. All other sample results are fairly similar for each extraction. The K_d measured for vanadium is fairly high compared to some of the other analytes, indicating limited mobility. As with arsenic, locally elevated concentrations of vanadium in the subpile soils could serve as a continuing source of ground water contamination. However, because of the limited and isolated nature of these areas and the fairly low mobility of vanadium, residual vanadium left in the soil is not anticipated to significantly affect overall water quality at the site.

Conclusions and Recommendations:

Under current site conditions (represented by the synthetic ground water leach), leachable concentrations of most contaminants at the New Rifle site are present in concentrations in subsurface soils at very low levels or at levels within the common range for soils. The sample location and depth with highest concentrations (RFN 216 at 11 feet) is at the site of a former evaporation pond where contaminant concentrations would be expected to be highest. That location is currently in a wetland area. The depth of highest contaminant concentrations could be an organic-rich zone, which would enhance contaminant adsorption. The lithologic log for this location indicates a strong organic odor at the depth from which these samples were collected. Most of the samples from the other locations yielded contaminant concentrations below or near the detection limit when leached with the synthetic ground water solution (with the exception of manganese and molybdenum). Significantly higher amounts of contaminants were extractable with the nitric acid solution, with the exception of selenium. Contaminants with the highest extractable concentrations were iron and manganese, both of which occur in naturally high concentrations in soils. Arsenic, molybdenum, uranium, and vanadium were present locally in high concentrations that could serve as a contaminant source to ground water. However, ground water contamination attributable to leaching of subpile soils is not likely to be significant because of the localized nature of the soil contamination.

Computer Source:

Calculations were made in an Excel spreadsheet.

MACTEC-ERS
2597 B 3/4 Road
Grand Junction, Colorado 81502

Borehole Summary

Page 1 of 1

Facility *Grand Junction Operations* Site *Rifle* Project *New Rifle UGW*

Well No. *216* Location (N) ______ (E) ______

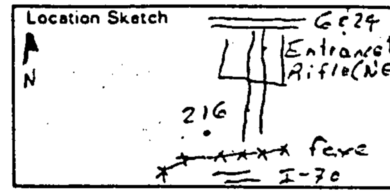
Ground Elev. (Ft.) ______ Bit/Auger Size *7 7/8" Sandvik Hammer* Hole Depth (Ft) *21.5*

No. of Completions *1*

Stick-Up Height (Ft) *3.2*

Slot Size *0.020*

	TYPE	Diameter (inch I. D.) Vol. (cf. gal)	Interval (Ft.)
Blank Casing	*Sch. 40 pvc*	*2"*	*0* to *5.50*
Screen	*VeeWire Wrapped*	*2"*	*5.50* to *20.50*
Sump/End Cap	*Sch. 40 pvc*	*2"*	*20.50* to *21.07*
Sand Pack	*Co. Silica*	*10-20 4.0 ft³; 20-40 0.5 ft³*	*21.07 / 5.0* to *5.0 / 4.0*
Sealant	*Bentonite Pellets*	*1/4" 0.5 ft³*	*4.0* to *1.0*
Grout	*Concrete*	*1.0 ft³*	*1.0* to *0*

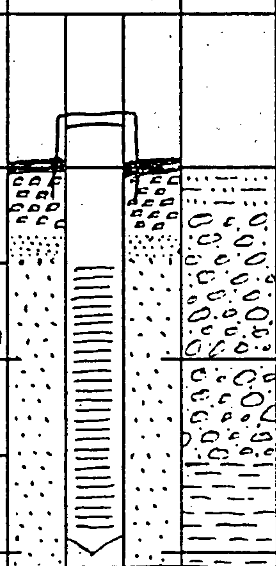


Locking Cover Installed Y / N Padlock No. *3359*

Drilling Method *ODEX Mobile B-80 Rig* Sampling Method *Bailer / Split barrel*

Date Drilled *7-1-98* Date Developed *7-10-98* Fluid Level/Date *2.5 bgl / 7-1-98*

Sampler(s) *L. Spencer* Remarks ______



Depth* (ft)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
0						*0-3 Silty sand, very pale brown (10YR 7/4) 70% very fn. to fn. subangular sand, 25% silt, 5% clay, poorly graded, dry. A few roots. SM*
5						*3-7 Sandy gravel, very dark grayish brown (10YR 3/2) 60% subrounded gravel up to 1½ inches long, 35% fn to med. gr. subrounded to subangular sand, 5% silt, well graded, moist.*
	100-6"		*7.0-7.5'*			
10	*50-3"*		*12.0-12.25'*			*7.0-11 Same as above but with cobbles.*
15						*11.0-16.0 Sandy gravel, black (10YR 2/1) same as above but w/ heavy organic odor, wet. Saturated @ 14 ft.*
17	*50-6"*		*17.0-17.5'*			
20						*16.0-17.5 Bedrock, mudstone, grey (10YR 5/1) with many coarse prominent yellowish brown (10YR 5/4) and a few fine distinct weak red (2.5 YR 5/2) mottles, verticle to horizontal tiny fractures, moist.*
21.5						

a All depths measured from ground level.

Completed By *[signature] L. Spencer* Verified By ______

2597 B 3/4 Road
[redacted]and Junction, Colorado 81502

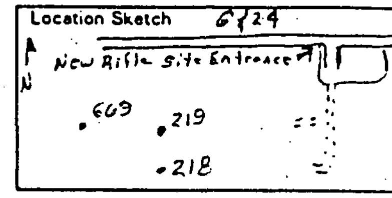
Facility Grand Junction Operations Site Rifle Project New Rifle UGW

[redacted]/Well No. 218 Location (N) ______ (E) ______

[redacted]und Elev. (Ft.) ______ Bit/Auger Size 7 3/8" Sandvik Hammer Hole Depth (Ft) 22.~~0~~15

	TYPE	Diameter (inch I. D.) Vol. (cf. gal)	Interval (Ft.)
Bl[redacted]nk Casing	Scd. 40 pvc	2"	0 to 6.58
S[redacted]een	Vee Wire Wrapped	2"	6.56 to 21.58
Sump/End Cap	Scd. 40 pvc	2"	21.58 to 22.15
Sand Pack	Co Silica	10-20 3.5 ft³; 20-40 0.5 ft³	22.15 to 6.0; 6.0 to 5.0
S[redacted]lant	Bentonite pellets	1/4" 0.5 ft³	5.0 to 2.0
G[redacted]out	Concrete	2.0 ft³	2.0 to 0

No. of Completions 1
Stick-Up Height (Ft) 3.05
Slot Size 0.020



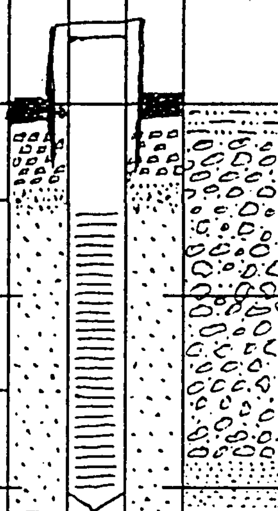
Locking Cover Installed (Y) / N Padlock No. 3359

D[redacted]ing Method ODEX Mobile B-80 Rig Sampling Method Bailer / Split barrel

D[redacted]e Drilled 7-7-98 Date Developed 7-10-98 Fluid Level/Date 9.62 t.o.c / 7-7-98

Sampler(s) L. Spencer Remarks ______

[redacted]pth* [redacted])	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						Required Information: Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
[redacted]						0-3 Fill, clayey silty sand, yellowish brown (10YR 5/4) 50% fn. gr. sand, 30% silt 10% gravel up to 1 inch long, 10% clay, well graded, slight plasticity, dry. A few roots.
						3.0-12 Fill, sandy gravel, grayish brown (10YR 5/2) 70% subrounded to subangular gravel up to 2" long, 30% fn. grained sand. Wet @ 8.0 ft.
10	65-6" 51-6" 39-6"		13.0-14.0			12.0-18 Sandy gravel, dark grayish brown (10YR 4/2) 80% subrounded gravel, 20% fn. to med. subrounded to subangular sand, well graded, wet. Saturated @ 10 ft.
15						18.0-22.0 Bedrock, sandstone, gray (10YR 6/1) fn. gr. quartzose ss w/ tiny black & red mineral grains, crumbly, saturated.
20						
22.~~0~~15	100-1½"		22.0-22.1			



a [redacted]l depths measured from ground level

Completed By Darick L Spencer Verified By ______

MACTEC-ERS
2[redacted]97 B 3/4 Road
G[redacted]and Junction, Colorado 81502

Borehole Summary

Page 1 of 1

F[redacted]ility *Grond Junction Operations* Site *Rifle* Project *New Rifle UGW*

[redacted]/Well No. *225* Location (N) ______ (E) ______

G[redacted]und Elev. (Ft.) ______ Bit/Auger Size *5 11/32" Sandvik Hammer* *~~7 3/8~~" Tri-cone Rotary* Diameter (inch I. D.) Hole Depth (Ft) *40.0*

No. of Completions *1*

Stick-Up Height (Ft) *3.03*

Slot Size *0.020*

	TYPE	Vol. (cf. gal)	Interval (Ft.)
B[redacted]nk Casing	*Sch. 40 pvc*	*4"*	*0* to *29.77*
S[redacted]een	*Vee Wire Wrapped*	*4"*	*29.77* to *39.77*
Sump/End Cap	*Sch 40 pvc*	*4"*	*39.77* to *40.0*
S[redacted]d Pack	*Co. Silica*	*10-20 3.0ft³* / *20-40 0.5ft³*	*40.0 / 28.0* to *28.0 / 26.0*
S[redacted]lant	*Bentonite Pellets 1/4"*	*0.5ft³*	*26.0* to *23.0*
Grout	*30% solids bentonite*	*8.8ft³*	*23.0* to *1.0*

Location Sketch
669
219
225
62yds
N

L[redacted]king Cover Installed (Y) / N Padlock No. *3359*

D[redacted]ing Method *ODEX Mobile B-80 rig* Sampling Method *Bailer / Splitbarrel*

Date Drilled *7-10-98* Date Developed *7-24-98* Fluid Level/Date *14.07/8-14-98*

Sampler(s) *L. Spencer* Remarks *25ft. of 8 5/8" steel casing from ground level*

[redacted]pth[a] (Ft)	Blows/ 6"	PID ppm	Sample No.; Interval	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION
						**Required Information:** Typical name; Munsell color; percentage sand and gravel; sorting (poor to well); grain angularity; induration or plasticity; moisture content (moist to saturated).
[redacted]						*0-3 Fill, clayey silty sand*
						3-5 Fill, gravelly sand
[redacted]						*5-7 Fill, sand*
	50-6"		*7.0-7.5'*			*7-15 Sandy gravel*
[redacted]						*15-16 Clayey sand* *See well 219 for more detail, & well 205 for core lithology.*
[redacted]						*16-21 Sandy gravel*
						21-22 Clayey sand
20						*22-23 Sandy gravel*
						23-40 Bedrock, sandstone (Wasatch)
25						
30						
35						
[redacted]						

a - All depths measured from ground level.

Completed By *David L Spencer* Verified By ______

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 216@7A-S
Ticket ID: NDG 808

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 30, 1998
Lab ID: 255082

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.39	B	mg/kg	11/05/98	AS-5 R05
Cadmium	~0.12	B	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	66.8		mg/kg	11/05/98	AS-5 R05
Molybdenum	1.1		mg/kg	11/11/98	AS-6 R06
Ammonium	3.0		MG/KG	10/12/98	F-6 R07
Nitrate	25800		MG/KG	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	141000		MG/KG	10/19/98	D-3 R13
Uranium	0.76		mg/kg	11/11/98	AS-6 R06
Vanadium	7.5		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 216@7B-S
Ticket ID: NDG 809

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 30, 1998
Lab ID: 255083

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.42	B	mg/kg	11/05/98	AS-5 R05
Cadmium	~0.12	B	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	66.0		mg/kg	11/05/98	AS-5 R05
Molybdenum	1.0		mg/kg	11/11/98	AS-6 R06
Ammonium	~1.3	B	mg/kg	10/12/98	F-6 R07
Nitrate	26200		mg/kg	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	140000		mg/kg	10/19/98	D-3 R13
Uranium	0.72		mg/kg	11/11/98	AS-6 R06
Vanadium	7.9		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 216@11A-S
Ticket ID: NDG 810

Date: November 30, 1998
Lab ID: 255084

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	11.8		mg/kg	11/05/98	AS-5 R05
Cadmium	0.57		mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	58.3		mg/kg	11/05/98	AS-5 R05
Molybdenum	15.9		mg/kg	11/11/98	AS-6 R06
Ammonium	33.9		mg/kg	10/12/98	F-6 R07
Nitrate	26400		mg/kg	10/20/98	D-3 R13
Selenium	0.86		mg/kg	11/05/98	AS-5 R05
Sulfate	139000		MG/KG	10/20/98	D-3 R13
Uranium	18.8		mg/kg	11/11/98	AS-6 R06
Vanadium	293		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS (SECTION II)

Customer ID: 216@11B-S
Ticket ID: NDG 811

Date: November 30, 1998
Lab ID: 255085

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	12.0		mg/kg	11/05/98	AS-5 R05
Cadmium	0.60		mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	59.9		mg/kg	11/05/98	AS-5 R05
Molybdenum	16.7		mg/kg	11/11/98	AS-6 R06
Ammonium	64.8		mg/kg	10/12/98	F-6 R07
Nitrate	26200		mg/kg	10/20/98	D-3 R13
Selenium	1.0		mg/kg	11/05/98	AS-5 R05
Sulfate	141000		MG/KG	10/20/98	D-3 R13
Uranium	19.4		mg/kg	11/11/98	AS-6 R06
Vanadium	302		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 218@13A-S
Ticket ID: NDG 812

Date: November 30, 1998
Lab ID: 255086

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	<0.20	U	mg/kg	11/05/98	AS-5 R05
Cadmium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	8.8		mg/kg	11/05/98	AS-5 R05
Molybdenum	1.6		mg/kg	11/11/98	AS-6 R06
Ammonium	52.8		mg/kg	10/12/98	F-6 R07
Nitrate	26100		mg/kg	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	145000		MG/KG	10/20/98	D-3 R13
Uranium	~0.13	B	mg/kg	11/11/98	AS-6 R06
Vanadium	~3.1	B	mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 218@13B-S
Ticket ID: NDG 813

Date: November 30, 1998
Lab ID: 255087

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.42	B	mg/kg	11/05/98	AS-5 R05
Cadmium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	8.7		mg/kg	11/05/98	AS-5 R05
Molybdenum	1.8		mg/kg	11/11/98	AS-6 R06
Ammonium	70.5		mg/kg	10/12/98	F-6 R07
Nitrate	26100		mg/kg	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	145000		MG/KG	10/20/98	D-3 R13
Uranium	~0.13	B	mg/kg	11/11/98	AS-6 R06
Vanadium	~3.3	B	mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 225@0-7.5-S
Ticket ID: NDG 814

Date: November 30, 1998
Lab ID: 255088

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.35	B	mg/kg	11/05/98	AS-5 R05
Cadmium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	20.1		mg/kg	11/05/98	AS-5 R05
Molybdenum	1.5		mg/kg	11/11/98	AS-6 R06
Ammonium	12.9		mg/kg	10/12/98	F-6 R07
Nitrate	26500		mg/kg	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	149000		MG/KG	10/20/98	D-3 R13
Uranium	0.56		mg/kg	11/11/98	AS-6 R06
Vanadium	~1.1	B	mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION

Customer ID: 659@23-S
Ticket ID: NDG 815

Date: November 30, 1998
Lab ID: 255089

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 25, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.22	B	mg/kg	11/05/98	AS-5 R05
Cadmium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Iron	<0.50	U	mg/kg	11/05/98	AS-5 R05
Manganese	1.8		mg/kg	11/05/98	AS-5 R05
Molybdenum	<0.10	U	mg/kg	11/11/98	AS-6 R06
Ammonium	~1.1	B	mg/kg	10/12/98	F-6 R07
Nitrate	26200		mg/kg	10/20/98	D-3 R13
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Sulfate	144000		MG/KG	10/20/98	D-3 R13
Uranium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Vanadium	<1.0	U	mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS (SECTION I)

Customer ID: 216@7A-N
Ticket ID: NDG 816

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 30, 1998
Lab ID: 255090

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	2.9		mg/kg	11/05/98	AS-5 R05
Cadmium	1.5		mg/kg	11/11/98	AS-6 R06
Iron	2350		mg/kg	11/05/98	AS-5 R05
Manganese	276		mg/kg	11/05/98	AS-5 R05
Molybdenum	3.4		mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	1.5		mg/kg	11/11/98	AS-6 R06
Vanadium	44.3		mg/kg	11/05/98	AS-5 R05

(SECTION I)

ANALYTICAL RESULTS

Customer ID: 216@7B-N
Ticket ID: NDG 817

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 30, 1998
Lab ID: 255091

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	2.5		mg/kg	11/05/98	AS-5 R05
Cadmium	1.1		mg/kg	11/11/98	AS-6 R06
Iron	2310		mg/kg	11/05/98	AS-5 R05
Manganese	288		mg/kg	11/05/98	AS-5 R05
Molybdenum	3.2		mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	1.5		mg/kg	11/11/98	AS-6 R06
Vanadium	42.7		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 216@11A-N
Ticket ID: NDG 818

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 30, 1998
Lab ID: 255092

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	161		mg/kg	11/05/98	AS-5 R05
Cadmium	3.3		mg/kg	11/11/98	AS-6 R06
Iron	2230		mg/kg	11/05/98	AS-5 R05
Manganese	141		mg/kg	11/05/98	AS-5 R05
Molybdenum	20.7		mg/kg	11/11/98	AS-6 R06
Selenium	2.3		mg/kg	11/05/98	AS-5 R05
Uranium	64.5		mg/kg	11/11/98	AS-6 R06
Vanadium	606		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 216@11B-N
Ticket ID: NDG 819

Date: November 30, 1998
Lab ID: 255093

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	168		mg/kg	11/05/98	AS-5 R05
Cadmium	3.4		mg/kg	11/11/98	AS-6 R06
Iron	2080		mg/kg	11/05/98	AS-5 R05
Manganese	140		mg/kg	11/05/98	AS-5 R05
Molybdenum	20.4		mg/kg	11/11/98	AS-6 R06
Selenium	2.2		mg/kg	11/05/98	AS-5 R05
Uranium	64.7		mg/kg	11/11/98	AS-6 R06
Vanadium	614		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 218@13A-N
Ticket ID: NDG 820

Date: November 30, 1998
Lab ID: 255094

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	1.7		mg/kg	11/05/98	AS-5 R05
Cadmium	~0.14	B	mg/kg	11/11/98	AS-6 R06
Iron	1570		mg/kg	11/05/98	AS-5 R05
Manganese	183		mg/kg	11/05/98	AS-5 R05
Molybdenum	2.7		mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	0.62		mg/kg	11/11/98	AS-6 R06
Vanadium	21.5		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 218@13B-N
Ticket ID: NDG 821

Date: November 30, 1998
Lab ID: 255095

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	1.5		mg/kg	11/05/98	AS-5 R05
Cadmium	~0.41	B	mg/kg	11/11/98	AS-6 R06
Iron	1540		mg/kg	11/05/98	AS-5 R05
Manganese	298		mg/kg	11/05/98	AS-5 R05
Molybdenum	3.0		mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	0.90		mg/kg	11/11/98	AS-6 R06
Vanadium	24.0		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 225@0-7.5-N
Ticket ID: NDG 822

Date: November 30, 1998
Lab ID: 255096

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	2.4		mg/kg	11/05/98	AS-5 R05
Cadmium	~0.32	B	mg/kg	11/11/98	AS-6 R06
Iron	4100		mg/kg	11/05/98	AS-5 R05
Manganese	254		mg/kg	11/05/98	AS-5 R05
Molybdenum	4.4		mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	1.1		mg/kg	11/11/98	AS-6 R06
Vanadium	36.5		mg/kg	11/05/98	AS-5 R05

ANALYTICAL RESULTS

SECTION

Customer ID: 659@23-N
Ticket ID: NDG 823

Date: November 30, 1998
Lab ID: 255097

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16269
Date Received: Oct 6, 1998
Date Collected: Sep 29, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	~0.82	B	mg/kg	11/05/98	AS-5 R05
Cadmium	<0.10	U	mg/kg	11/11/98	AS-6 R06
Iron	933		mg/kg	11/05/98	AS-5 R05
Manganese	63.8		mg/kg	11/05/98	AS-5 R05
Molybdenum	<0.10	U	mg/kg	11/11/98	AS-6 R06
Selenium	<0.20	U	mg/kg	11/05/98	AS-5 R05
Uranium	~0.16	B	mg/kg	11/11/98	AS-6 R06
Vanadium	~1.5	B	mg/kg	11/05/98	AS-5 R05

Calculation No.: U0058100

URFL000519

Technical Task Cover Sheet

Discipline Geochemistry **Number of Sheets** 12

Project:

UMTRA Groundwater

Site:

New Rifle

Subject:

Determination of Distribution Coefficients for the New Rifle Site

Sources of Data:

Calculated from results of chemical analyses (attached; report from requisition #16232, vol. 1).

Task Order No. MAC99–05 **File Index No.** GWRFL 13.1

Proj. No. 321404002 **Calc. No.** U0058100 **Supersedes Calc. No.** [Supersedes Calc No.]

Calculated by	Date	Checked by	Date	Approved by	Date
L Cummins	5/17/99	K. Karp	5/14/99	[illegible]	[illegible]

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mactec-ers

U.S. Department of Energy Grand Junction Projects Office

RECORD COPY

Problem Statement:

As contaminated ground water migrates through soils and rocks, some of the contamination transfers between the solid and liquid phases. This phenomenon causes the contamination to travel at a slower rate than the average ground-water velocity. The chemical processes that cause this retardation can include adsorption, absorption, precipitation, diffusion into immobile porosity, transfer to vapor phases, and so on (these collective processes will simply be referred to as "adsorption" in the rest of this discussion). It is generally not possible to differentiate among all of these processes. However, for many aquifer systems, a bulk parameter (the distribution coefficient or K_d) has been used with some success to describe the retardation of contamination. Most numerical ground-water models use the Kd concept in simulations of contaminant transport. Thus a laboratory study was conducted to determine K_d values for the New Rifle site.

Method of Solution:

Laboratory data were collected using ASTM procedure D4646-87 titled "Standard Test Method or 24-h Batch-Type Measurement of Contaminant Sorption by Soils and Sediments." Essentially, the procedure involves placing a sample representative of a site (e.g., soil, sediments, cuttings, core samples) into a solution simulating contaminated water with which the material is likely to come in contact. The solution is agitated for 24 hours and then filtered. The filtered solution is analyzed and compared to the contaminant concentrations of the original solution. The difference between the two is assumed to be adsorbed to the soil. The linear adsorption isotherm distribution coefficient is generally defined as

$$C_{soil} = K_d \times C_{water} \quad \text{which can be rearranged to} \quad K_d = C_{soil}/C_{water}$$

or the ratio of the concentration of the contaminant in soil (or other material of interest) to the concentration of the contaminant in water at equilibrium. Therefore, the higher the K_d, the greater the retardation of a contaminant in groundwater. While one would normally think of a ratio as being dimensionless, because of unit conversions in dealing with different media (mg/L for water and mg/kg for soil, in most instances), the K_d is normally expressed in terms of mL/g or L/kg.

The ASTM procedure is set up so that only the solutions (and no actual soil samples) used in the experiments require analysis. Generally, background samples are used and all contaminant loss in the final solution is attributed to sample adsorption. Use of contaminated samples could potentially underestimate the K_d for contaminants with higher adsorptive properties, as the adsorptive ability of the sample would be reduced by contaminants already present. Because of the difficulty of obtaining sample material suitable for K_d analysis, alluvial samples from downgradient locations were used for analysis for the New Rifle site. Wells from these locations are at the periphery of the alluvial aquifer plume and unlikely to be significantly affected by existing contamination. Additionally, because of their distance from the site, only fairly mobile contaminants (with low K_ds) are likely to have reached these locations and underestimation of readily adsorbed constituents should be minimal.

Both alluvial and Wasatch samples collected during field activities were selected for K_d testing (see sample locations in Figure 1). Some of the samples proposed for K_d testing in the site work plan had

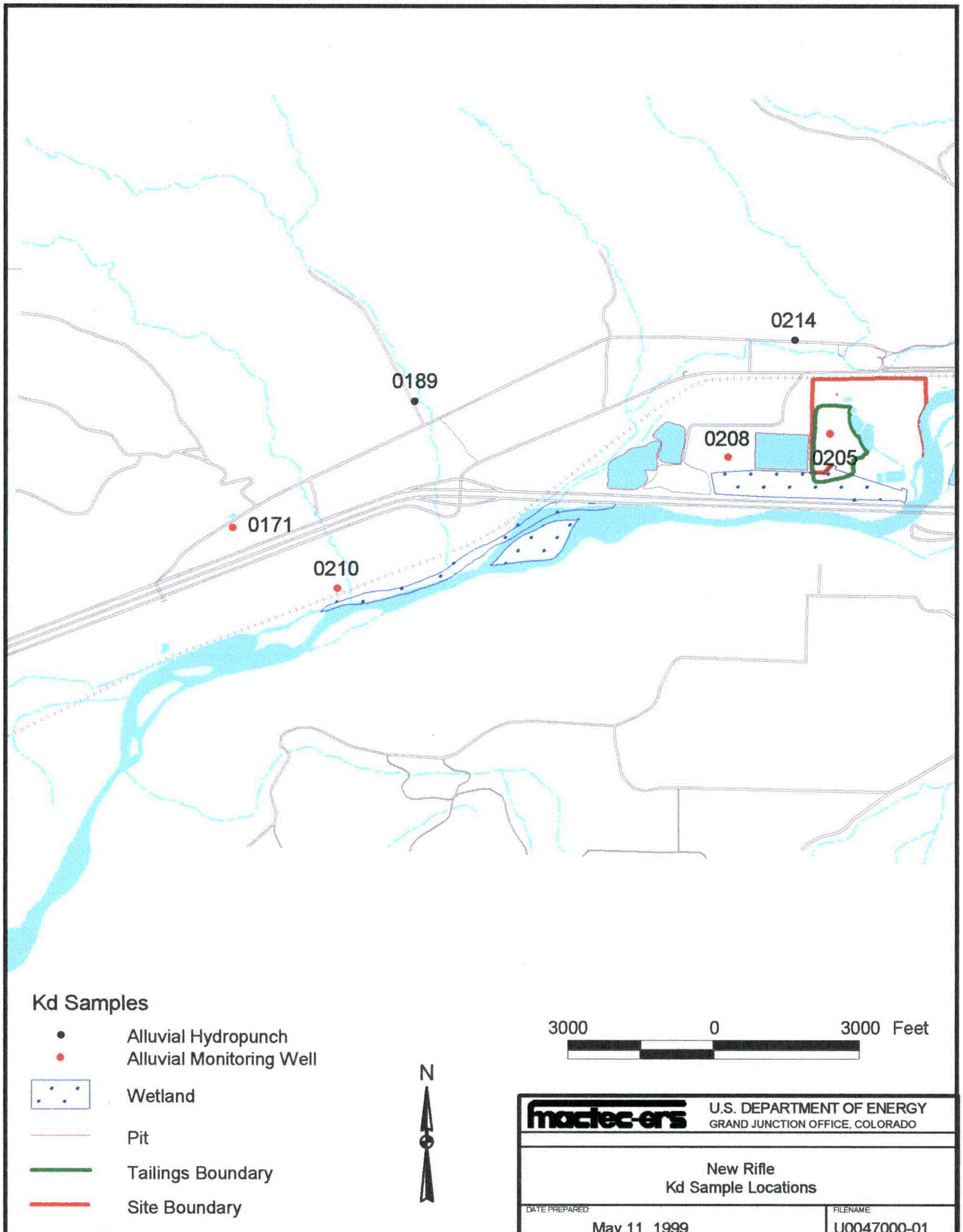

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Figure 1. New Rifle K_d Sample Locations

SINGLE POINT MEASUREMENTS

Sample No.	Well No.	Depth ft	Description	Fluid vol mL	Sed wt g	Target Compositions As mg/L	Cd mg/L	Mo mg/L	Se mg/L	U mg/L	V mg/L
N208	208	27	Bedrock, ss dark gray	100	5	0.2	0.1	5	0.3	0.5	10
N205A	205	50	Bedrk; Gry ss w/sltstn/mdstn layers	100	5	0.2	0.1	5	0.3	0.5	10
N205B	205	34.5	Bedrk; Gry ss w/sltstn/mdstn lenses	100	5	0.2	0.1	5	0.3	0.5	10
N214	214	7-8.2	Qal; Yellowish brn silty loess	100	5	0.2	0.1	5	0.3	0.5	10
N189	189	121	Qal; Yellowish brn loess	100	5	0.2	0.1	5	0.3	0.5	10
SYN1				100		0.2	0.1	5	0.3	0.5	10
N210A-1	210	17	Qal; Yellowish brn sandy gravel	100	5	0.2	0.1	5	0.3	0.5	10
N210A-2	210	15-16	Qal; Yellowish brn gravely sand	100	5	0.2	0.1	5	0.3	0.5	10
N210B-1	210	17	Qal; Yellowish brn sandy gravel	100	5	0.2	0.1	5	0.3	0.5	10
N210B-2	210	15-16	Qal; Yellowish brn gravely sand	100	5	0.2	0.1	5	0.3	0.5	10
N210B-3	210	27	Qal; Yellowish brn sandy gravel	100	5	0.2	0.1	5	0.3	0.5	10
N214A	214	12-12.5	Qal; Yellowish brn silty loess	100	5	0.2	0.1	5	0.3	0.5	10
N210A-3	210	27	Qal; Yellowish brn sandy gravel	100	5.01	0.2	0.1	5	0.3	0.5	10
N171	171	23-28	Qal; Sdy grvl; some pebbles	100	5	0.2	0.1	5	0.3	0.5	10
SYN2				100		0.2	0.1	5	0.3	0.5	

Sample No.	Final Compositions - Reported As mg/L	Cd mg/L	Mo mg/L	Se mg/L	U mg/L	V mg/L
N208	0.0245	0.0255	4.28	0.14	0.482	2.38
N205A	0.079	0.0203	4.42	0.264	0.562	5.21
N205B	0.0802	0.0181	4.37	0.336	0.574	7.14
N214	0.064	0.004	4.35	0.28	0.517	3.93
N189	0.0706	0.0094	4.45	0.266	0.547	5.38
SYN1	0.136	0.0862	4.51	0.352	0.573	9.2
N210A-1	0.106	0.0203	4.68	0.248	0.471	7.35
N210A-2	0.12	0.0221	4.33	0.26	0.439	8.05
N210B-1	0.106	0.0207	4.58	0.242	0.473	7.29
N210B-2	0.122	0.0205	4.56	0.256	0.467	8.13
N210B-3	0.109	0.0182	4.61	0.245	0.46	7.26
N214A	0.0758	0.0041	4.55	0.207	0.441	4.54
N210A-3	0.0988	0.0185	4.38	0.245	0.448	6.75
N171	0.0921	0.0102	4.58	0.237	0.452	6.9
SYN2	0.147	0.0915	4.6	0.289	0.47	9.56
Avg. SYN	0.1415	0.0889	4.555	0.3205	0.522	9.38

Sample No.	Kd Values as measured Kd, As mL/g	Kd, Cd mL/g	d, Mo mL/g	Kd, Se mL/g	Kd, U mL/g	Kd, V mL/g
N208	95.5	49.7	1.3	25.8	1.6	58.8
N205A	15.8	67.5	0.6	4.3	-1.4	16.0
N205B	15.3	78.2	0.8	-0.9	-1.8	6.3
N214	24.2	424.3	0.9	2.9	0.2	27.7
N189	20.1	169.0	0.5	4.1	-0.9	14.9
SYN1						
N210A-1	6.7	67.5	-0.5	5.8	2.1	5.5
N210A-2	3.6	60.4	1.0	4.7	3.8	3.3
N210B-1	6.7	65.8	-0.1	6.5	2.1	5.7
N210B-2	3.2	66.7	0.0	5.0	2.3	3.1
N210B-3	6.0	77.6	-0.2	6.2	2.7	5.8
N214A	17.3	413.4	0.0	11.0	3.7	21.3
N210A-3	8.6	75.9	0.8	6.2	3.3	7.8
N171	10.7	154.2	-0.1	7.0	3.1	7.2

Kd Values - Average for Wasatch Formation

Well No.	Kd, As mL/g	Kd, Cd mL/g	Kd, Mo mL/g	Kd, Se mL/g	Kd, U mL/g	Kd, V mL/g
208	95.5	49.7	1.3	25.8	1.6	58.8
205	15.6	72.9	0.7	1.7	-1.6	11.1
Average	55.5	61.3	1.0	13.7	0.0	35.0

Kd Values--Averaged and Adjusted for Alluvial Aquifer

Well No.	As	Cd	Mo	Se	U	V
214	20.8	418.8	0.5	6.9	1.9	24.5
189	20.1	169.0	0.5	4.1	-0.9	14.9
210	5.8	69.0	0.2	5.7	2.7	5.2
171	10.7	154.2	-0.1	7.0	3.1	7.2
Average=	14.3	202.8	0.3	5.9	1.7	12.9
Adjusted=	5.5	77.1	0.1	2.3	0.6	4.9

Adjusted values = average x 0.38 to correct for amount of <2mm material in the alluvial aquifer

Table 1. Data and Calculations for New Rifle K_d Values – Single Point samples

very limited recovery and sample size was not adequate to perform the analyses because they consisted mainly of very coarse cobbles and other materials for which K_d testing is not appropriate. However, 10 alluvial samples obtained from 4 different locations (171, 189, 210, and 214) were adequate and all were included for K_d testing. Three Wasatch samples collected from one on-site and one off-site core hole (205 and 208) were also analyzed. Sample locations are shown in Figure 1 along with selected alluvial wells discussed in this calculation set. All samples on which testing was performed were noted to be wet or moist in their respective lithologic logs (though no water samples were recovered from location RFN 214); therefore it is assumed that all samples have been in contact with ground water recovered or collected at or below the water table or have been subjected to infiltration of surface water migrating to the water table.

All the samples were air dried at room temperature and sieved to less than 10 mesh (2mm). A riffle splitter is used to separate a sample for oven drying at 105 degrees C to determine moisture content. The difference between the air dried and oven-dried weights was always less than 2 percent and usually less than 1 percent so no correction was made for the water contents of the air-dried samples.

A synthetic solution was prepared that simulated ground water at the New Rifle site, based on groundwater analysis for well 598 from recent sampling events (4/25/97 and 9/18/97; SEE UMTRA data base). The composition of the synthetic ground water is as follows (in mg/L): Na = 584.41, K = 7.18, Ca = 328.41, Mg = 69.33, SO4 = 1625.92, Cl = 202.56, NO3 = 639.35, and C (inorganic) = 121.43. Contaminants of potential concern (COPCs) were added in the following concentrations (in mg/L): As = 0.2, Cd = 0.1, Mo = 5.0, Se = 0.3, U = 0.5, V = 10.0. The pH was adjusted to about 6.5 and the measured alkalinity was about 250 mg/L as $CaCO_3$.

Approximately 5 grams of each sample were measured out and placed in 125-ml Nalge bottles with 100 mL of the synthetic ground water. Samples were rotated end-over-end at 8 rpm for 24 hours. They were then centrifuged at 3000 rpm and filtered through a 0.45 Fm filter. Leachate samples were preserved with 1-percent nitric acid and submitted to the analytical chemistry laboratory for analysis of As, Cd, Mo, Se, U, and V. Samples of spiked synthetic ground water solution (SYN-1 and SYN-2) were also analyzed. The means of the synthetic ground water samples were used as the initial COPC concentrations in subsequent calculations.

Assumptions:

Determination of K_d values by the method described above assumes the following: (1) the 24-hour shake time is sufficient to bring the system to chemical equilibrium, (2) K_d values do not vary within the range of major ion chemistry or pH values present in the ground water, and (3) K_d values do not vary with contaminant concentrations present in the ground water. Further considerations regarding K_d values that must be considered in constructing a transport model include: (4) whether the modeled system is always in chemical equilibrium and (5) whether an adequate portrayal of the areal and vertical distributions of K_d values is manifested in the model domain. Another assumption is (6) that the unconsolidated materials used in the laboratory experiment behave in a manner similar to in situ material. Because downgradient samples were used for K_d testing in this case, it is also assumed (7) that any plume contamination at these locations had no significant effect on the aquifer material and did not affect test results.

If assumption (1) is not true, then K_d is likely to be underestimated and predicted concentrations of contaminants in groundwater would be greater than will actually be observed. Assumptions (2) and (3) are expected to hold reasonably true for the Old Rifle site as nearly all constituents (major ions and contaminants) vary only within one order of magnitude based on data presented in the Site Observational Work Plan (SOWP) for the site (DOE 1996). Assumptions (4) and (5) come into play when determining which value(s) to select for use in the modeling effort. Assumption (6) would tend to bias the experimental K_d to higher values than might actually be observed because the laboratory procedures are performed preferentially on finer materials that are more apt to adsorb contaminants and the procedures also maximize surface area contact of particles with fluids. A calculation was performed to account for actual grain sizes present in the alluvial aquifer. Assumption (7), if not true, could result in an underestimation of the K_d. Contamination adsorbed from the existing plume could reduce the adsorptive properties of the aquifer materials used in the K_d testing. Despite these numerous assumptions, the test is designed primarily for use as a screening or ranking tool and results are adequate to serve this purpose.

Sources of Formulas and References:

ASTM Designation D 4646 - 87 (Reapproved). Standard Test Method for 24-h Batch-Type Measurement of Contaminant Sorption by Soils and Sediments.

DOE, 1996. *Site Observational Work Plan for the UMTRA Project Sites at Rifle, Colorado*, DOE/AL/62350-223
rev. 0.

DOE, 1998. *Work Plan for Characterization Activities at the UMTRA Project New and Old Rifle Sites*, MAC-GWRFL1.8.

Jacobs Engineering Group Inc., 1993, *Adsorption Isotherm Special Study*, Albuquerque, DOE/AL/62350-17F, May.

McLean, J.E. and Bledsoe, B.E., 1992. Behavior of Metals in Soils, EPA Ground Water Issue EPA/540/S-92/018, OSWER Office of Research and Development, October.

Calculation:

The K_d values are calculated by:

$$K_d = \frac{(A-B)V}{(M_s)B} \qquad \text{where}$$

A = initial concentration of the COPC, defined as the mean concentration of the blanks (mg/L)
B = final concentration of the COPC after 24 hr in contact with soil/sediment(mg/L)
V = volume of solution (100 mL in all cases)
M_s= mass of soil used (g)
Kd = distribution coefficient (mL/g)

For example, using sample N208 for uranium:

A = 0.1415
B = 0.0245
V = 100
$M_s = 5$

$$K_d = \frac{(0.1415 - 0.0245) \times 100}{5 \times 0.245}$$

$$K_d = 95.5$$

Note that the K_d is the same as the R_d in the ASTM procedure; this value only represents a true K_d if equilibrium conditions were attained during the test period.

Calculated values for the alluvial aquifer samples were adjusted based on aquifer grain size analysis. As part of an adsorption study performed by Jacobs Engineering Group Inc. (Jacobs 1993), over 400 pounds of material from each of 7 test pits excavated in the alluvial aquifer (totaling over a ton of material) was sorted and analyzed for grain size distribution. The study found that on the average, only 38 percent of aquifer material was contained in the <2mm size fraction and that the majority was gravel and cobble size. Therefore, calculated K_ds for the alluvial aquifer were adjusted by multiplying by 0.38. This assumes that the gravel and cobble sized materials are insignificant in terms of contaminant adsorption.

Discussion:

Alluvial Aquifer

Single-point K_d values were determined for the metals As, Cd, Mo, Se, U and V on 10 samples from 4 wells. Raw data and results are shown in Table 1. By far the least mobile contaminant is cadmium, with single sample K_d values ranging up to 424. Most mobile are molybdenum and uranium with several single sample K_ds calculated as negative values for those contaminants (suggesting that contaminants were actually leached from those samples during the test procedure). K_d values calculated for vanadium and arsenic fall within a similar range and indicate that their movement in the subsurface should be retarded, though to a much lower degree than cadmium. Selenium also has a tendency to be adsorbed. The highest K_d values for alluvial samples came from locations 214 and 189. Descriptions of samples from these wells indicate that they contain loess, a fine-grained material that is more likely to adsorb contaminants than the sands and gravels that make up samples from the other locations.

Results of K_d testing are generally consistent with the observed distribution of contaminants in ground water at the New Rifle site. Elevated concentrations of cadmium and arsenic are limited to the same two on-site wells. The vanadium plume is slightly more extensive but still confined to the immediate vicinity of the site. This limited distribution indicates that these three contaminants are readily adsorbed by alluvial material with migration of contaminated ground water from the centroid of the plume. Selenium, with a lower K_d than vanadium, is correspondingly found in elevated concentrations farther downgradient than vanadium. Molybdenum and uranium, predicted to be the most mobile contaminants, are also the most widespread. Molybdenum is above the UMTRA standard in wells as far downgradient as RFN-195, -200, and 603, though it decreases to below detection at the most downgradient wells (wells RFN-220 and -172). Uranium exceeds the UMTRA standard as far downgradient as well RFN-172. However, interpretation of this as representing site-related contamination is complicated by the fact that background alluvial wells in the vicinity of the Rifle sites have had concentrations of uranium ranging up to 0.6 mg/L. Therefore, some of the uranium detected in New Rifle alluvial wells is attributable to background, making it difficult to establish the downgradient extent of site-related contamination.

The K_ds determined for New Rifle samples for uranium and molybdenum are generally similar to those determined for alluvial samples from the Old Rifle area (see calculation U0041000). However, Old Rifle K_ds for arsenic, selenium, and vanadium were considerably higher than those determined for New Rifle. Lithologic logs for Old Rifle sample locations indicate the presence of organic material, which was not present in New Rifle samples. This may account for the greater adsorption of contaminants during Old Rifle testing. Relative values for K_ds determined for New Rifle are generally what would be expected for the near neutral pH of site waters. Cadmium is readily adsorbed at pH values greater than 6 (McLean and Bledsoe, 1992). The other contaminants tested have maximum adsorption at much lower pH values from 2 to 4, with decreasing degrees of adsorption as pH increases.

Because samples used for New Rifle K_d testing came from wells located at the edge of the contaminant plume, it is possible that K_d values could be underestimated because of adsorption of contaminants from the plume to those alluvial materials. However, ground water samples collected from those locations did not contain elevated concentrations of any contaminants, with the exception of uranium, which is naturally elevated in background ground water. The uncertainty introduced by using the selected locations as opposed to background is probably minimal, particularly given the inherent uncertainty in the test methodology. For a screening level analysis, these results should be adequate.

Nitrate was also included as an analyte for K_d testing, though adsorption is not typically thought to play a role in nitrate fate and transport. Geochemical and biological reactions are believed to be more important in governing the subsurface behavior of nitrate and associated species. Results of K_d calculations support this generalization. K_ds determined from nitrate results are equal to or less than zero, indicating no affinity for nitrate adsorption to soil (see Table 2).

Wasatch Formation

Single-point K_d values were determined for As, Cd, Mo, Se, U and V on 3 samples from 2 wells. Raw data and results are reported in Table 1 for these samples. The relative order of adsorption predicted by

Table 2. Data and calculations for New Rifle K_d Values—Single Point Samples

SINGLE POINT MEASUREMENTS						Target Compositions	Final Compositions		**Kd Values as measured**	
Sample	Well	Depth	Description	Fluid vol	Sed wt	Nitrate	Nitrate		Kd, Nitrate	
No.	No.	ft		mL	g	mg/L	mg/L		mL/g	
N208	208	27	Bedrock, ss dark gray	100	5	700	709		0.2	
N205A	205	50	Bedrk; Gry ss w/sltstn/mdstn layers	100	5	700	711		0.1	
N205B	205	34.5	Bedrk; Gry ss w/sltstn/mdstn lenses	100	5	700	714		0.0	
N214	214	7-8.2	Qal; Yellowish brn silty loess	100	5	700	715		0.0	
N189	189	121	Qal; Yellowish brn loess	100	5	700	721		-0.2	
SYN1				100		700	707			
N210A-1	210	17	Qal; Yellowish brn sandy gravel	100	5	700	729		-0.4	
N210A-2	210	15-16	Qal; Yellowish brn gravely sand	100	5	700	731		-0.4	
N210B-1	210	17	Qal; Yellowish brn sandy gravel	100	5	700	731		-0.4	
N210B-2	210	15-16	Qal; Yellowish brn gravely sand	100	5	700	730		-0.4	
N210B-3	210	27	Qal; Yellowish brn sandy gravel	100	5	700	730		-0.4	
N214A	214	12-12.5	Qal; Yellowish brn silty loess	100	5	700	727		-0.3	
N210A-3	210	27	Qal; Yellowish brn sandy gravel	100	5.01	700	728		-0.4	
N171	171	23-28	Qal; Sdy grvl; some pebbles	100	5	700	716		0.0	
SYN2				100		700	723			
						mean SYN =	715			
								Kd Values--Average for Alluvial Aquifer		
								Well No.	Nitrate	
								214	-0.17	
								189	-0.2	
								210	-0.4	
								171	0.0	
								average =	-0.19	

these results is the same as determined for the alluvial aquifer with the order of adsorption being Cd > As > V > Se > Mo > U. However, the actual K_d values determined for arsenic, selenium and vanadium are considerably higher, even if the unadjusted alluvial values are used for comparison. These differences are not unexpected given the fact that the alluvial aquifer and Wasatch formation contain distinctly different lithologies. Ranges of K_ds reported in the literature for various contaminants commonly range over several orders of magnitude.

The comparison of K_d values with contaminant distribution in ground water is more ambiguous for Wasatch samples. In part, this is because there are fewer data points. All Wasatch wells for vanadium and cadmium and all but one for selenium had concentrations at or below the detection limit. Most arsenic samples also were very low as were those for uranium. Molybdenum was the most widespread contaminant in the Wasatch. However, the Wasatch is naturally elevated in molybdenum, with background concentrations commonly exceeding the UMTRA ground water standard (0.1 mg/L). For the most part, wells with detectable contaminants (other than molybdenum) were located at or very near the site.

Though their interpretation is more ambiguous than K_d values obtained for the alluvial aquifer, Wasatch K_ds are probably adequate for use in order of magnitude, screening level analyses.

Conclusions and Recommendations

The following K_d values (based on conservatively rounding the averages) are recommended for the New Rifle site:

Contaminant	Alluvial K_d (mL/g)	Wasatch K_d (mL/g)
Arsenic	5.5	56
Cadmium	77.1	61
Molybdenum	0.1	1
Selenium	2.3	14
Uranium	0.6	0.1
Vanadium	4.9	35

Results indicate that adsorption is not a factor in the fate and transport of nitrate. It is recommended that geochemical models be investigated to predict behavior of nitrate in the ground water system.

Computer Source: All calculations were made in an Excel spreadsheet.

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ANALYTICAL RESULTS

(SECTION I)

Customer ID: N208
Ticket ID: NDG 601

Date: November 9, 1998
Lab ID: 254546

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
– Arsenic	~24.5	B	ug/L	10/29/98	AS-4 R02
– Cadmium	25.5		ug/L	10/22/98	AS-6 R06
Iron	~6.0	B	ug/L	10/27/98	AS-5 R05
Manganese	202		ug/L	10/27/98	AS-5 R05
– Molybdenum	4280		ug/L	10/23/98	AS-6 R06
Nitrate	709000		ug/L	09/24/98	D-3 R13
– Selenium	140		ug/L	10/22/98	AS-4 R02
Sulfate	1700000		ug/L	09/22/98	D-3 R13
– Uranium	482		ug/L	10/23/98	AS-6 R06
– Vanadium	2380		ug/L	10/27/98	AS-5 R05

ANALYTICAL RESULTS (SECTION I)

Customer ID: N205
Ticket ID: NDG 602

Date: November 9, 1998
Lab ID: 254547

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 199

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	79.0		ug/L	10/29/98	AS-4 R0
Cadmium	20.3		ug/L	10/22/98	AS-6 R06
Iron	~5.0	B	ug/L	10/27/98	AS-5 R0
Manganese	116		ug/L	10/27/98	AS-5 R0
Molybdenum	4420		ug/L	10/23/98	AS-6 R06
Nitrate	711000		ug/L	09/24/98	D-3 R13
Selenium	264		ug/L	10/22/98	AS-4 R0
Sulfate	1580000		ug/L	09/22/98	D-3 R13
Uranium	562		ug/L	10/23/98	AS-6 R06
Vanadium	5210		ug/L	10/27/98	AS-5 R0

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ANALYTICAL RESULTS **(SECTION I)**

Customer ID: N205
Ticket ID: NDG 603

Date: November 9, 1998
Lab ID: 254548

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	80.2		ug/L	10/29/98	AS-4 R02
Cadmium	18.1		ug/L	10/22/98	AS-6 R06
Iron	~6.0	B	ug/L	10/27/98	AS-5 R05
Manganese	17.4		ug/L	10/27/98	AS-5 R05
Molybdenum	4370		ug/L	10/23/98	AS-6 R06
Nitrate	714000		ug/L	09/24/98	D-3 R13
Selenium	336		ug/L	10/22/98	AS-4 R02
Sulfate	1520000		ug/L	09/22/98	D-3 R13
Uranium	574		ug/L	10/23/98	AS-6 R06
Vanadium	7140		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS (SECTION I)

Customer ID: N214
Ticket ID: NDG 604

Date: November 9, 1998
Lab ID: 254549

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	64.0		ug/L	10/29/98	AS-4 R02
Cadmium	~4.0	B	ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	~2.7	B	ug/L	10/27/98	AS-5 R05
Molybdenum	4350		ug/L	10/23/98	AS-6 R06
Nitrate	715000		ug/L	09/24/98	D-3 R13
Selenium	280		ug/L	10/22/98	AS-4 R02
Sulfate	2220000		ug/L	09/22/98	D-3 R13
Uranium	517		ug/L	10/23/98	AS-6 R06
Vanadium	3930		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS **(SECTION I)**

Customer ID: N189
Ticket ID: NDG 607

Date: November 9, 1998
Lab ID: 254552

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	70.6		ug/L	10/29/98	AS-4 R02
Cadmium	9.4		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	202		ug/L	10/27/98	AS-5 R05
Molybdenum	4450		ug/L	10/23/98	AS-6 R06
Nitrate	721000		ug/L	09/24/98	D-3 R13
Selenium	266		ug/L	10/22/98	AS-4 R02
Sulfate	1540000		ug/L	09/22/98	D-3 R13
Uranium	547		ug/L	10/23/98	AS-6 R06
Vanadium	5380		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS (SECTION I)

Customer ID: SYN
Ticket ID: NDG 610

Date: November 9, 1998
Lab ID: 254555

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 16, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD ANALYSIS
Arsenic	136		ug/L	10/29/98	AS-4 R02
Cadmium	86.2		ug/L	10/22/98	AS-6 R0
Iron	<5.0	U	ug/L	10/27/98	AS-5 R0
Manganese	<2.0	U	ug/L	10/27/98	AS-5 R05
Molybdenum	4510		ug/L	10/23/98	AS-6 R06
Nitrate	707000		ug/L	09/24/98	D-3 R13
Selenium	352		ug/L	10/22/98	AS-4 R0
Sulfate	1510000		ug/L	09/22/98	D-3 R13
Uranium	573		ug/L	10/23/98	AS-6 R0
Vanadium	9200		ug/L	10/27/98	AS-5 R0

V1.05

ANALYTICAL RESULTS (SECTION I)

Customer ID: N210A
Ticket ID: NDG 611

Date: November 9, 1998
Lab ID: 254556

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	106		ug/L	10/29/98	AS-4 R02
Cadmium	20.3		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	235		ug/L	10/27/98	AS-5 R05
Molybdenum	4680		ug/L	10/23/98	AS-6 R06
Nitrate	729000		ug/L	09/24/98	D-3 R13
Selenium	248		ug/L	10/22/98	AS-4 R02
Sulfate	1570000		ug/L	09/22/98	D-3 R13
Uranium	471		ug/L	10/23/98	AS-6 R06
Vanadium	7350		ug/L	10/27/98	AS-5 R05

V1.05

ANALYTICAL RESULTS **(SECTION I)**

Customer ID: N210A
Ticket ID: NDG 612

Date: November 9, 1998
Lab ID: 254557

Requestor: STAN MORRISQN
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	120		ug/L	10/29/98	AS-4 R02
Cadmium	22.1		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	610		ug/L	10/27/98	AS-5 R05
Molybdenum	4330		ug/L	10/23/98	AS-6 R06
Nitrate	731000		ug/L	09/24/98	D-3 R13
Selenium	260		ug/L	10/22/98	AS-4 R02
Sulfate	1560000		ug/L	09/22/98	D-3 R13
Uranium	439		ug/L	10/23/98	AS-6 R06
Vanadium	8050		ug/L	10/27/98	AS-5 R05

V1.05

ANALYTICAL RESULTS (SECTION I)

Customer ID: N210B
Ticket ID: NDG 613

Date: November 9, 1998
Lab ID: 254558

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	106		ug/L	10/29/98	AS-4 R02
Cadmium	20.7		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	234		ug/L	10/27/98	AS-5 R05
Molybdenum	4580		ug/L	10/23/98	AS-6 R06
Nitrate	731000		ug/L	09/24/98	D-3 R13
Selenium	242		ug/L	10/22/98	AS-4 R02
Sulfate	1590000		ug/L	09/22/98	D-3 R13
Uranium	473		ug/L	10/23/98	AS-6 R06
Vanadium	7290		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS

(SECTION I)

Customer ID: N210B
Ticket ID: NDG 614

Date: November 9, 1998
Lab ID: 254559

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	122		ug/L	10/29/98	AS-4 R02
Cadmium	20.5		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R0
Manganese	621		ug/L	10/27/98	AS-5 R0
Molybdenum	4560		ug/L	10/23/98	AS-6 R06
Nitrate	730000		ug/L	09/29/98	D-3 R13
Selenium	256		ug/L	10/22/98	AS-4 R0
Sulfate	315000		ug/L	09/22/98	D-3 R13
Uranium	467		ug/L	10/23/98	AS-6 R06
Vanadium	8130		ug/L	10/27/98	AS-5 R0

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ANALYTICAL RESULTS (SECTION I)

Customer ID: N210B
Ticket ID: NDG 615

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 9, 1998
Lab ID: 254560

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	109		ug/L	10/29/98	AS-4 R02
Cadmium	18.2		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	40.7		ug/L	10/27/98	AS-5 R05
Molybdenum	4610		ug/L	10/23/98	AS-6 R06
Nitrate	730000		ug/L	09/29/98	D-3 R13
Selenium	245		ug/L	10/22/98	AS-4 R02
Sulfate	319000		ug/L	09/22/98	D-3 R13
Uranium	460		ug/L	10/23/98	AS-6 R06
Vanadium	7260		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS (SECTION I)

Customer ID: N214
Ticket ID: NDG 616

Date: November 9, 1998
Lab ID: 254561

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 199
Date Collected: Sep 17, 199

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD ANALYSI
Arsenic	75.8		ug/L	10/29/98	AS-4 R0
Cadmium	~4.1	B	ug/L	10/22/98	AS-6 R0
Iron	<5.0	U	ug/L	10/27/98	AS-5 R
Manganese	~3.5	B	ug/L	10/27/98	AS-5 R
Molybdenum	4550		ug/L	10/23/98	AS-6 R0
Nitrate	727000		ug/L	09/29/98	D-3 R1
Selenium	207		ug/L	10/22/98	AS-4 R
Sulfate	537000		ug/L	09/22/98	D-3 R13
Uranium	441		ug/L	10/23/98	AS-6 R0
Vanadium	4540		ug/L	10/27/98	AS-5 R

V1.05

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ANALYTICAL RESULTS (SECTION I)

Customer ID: N210A
Ticket ID: NDG 617

Date: November 9, 1998
Lab ID: 254562

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	98.8		ug/L	10/29/98	AS-4 R02
Cadmium	18.5		ug/L	10/22/98	AS-6 R06
Iron	~7.0	B	ug/L	10/27/98	AS-5 R05
Manganese	38.2		ug/L	10/27/98	AS-5 R05
Molybdenum	4380		ug/L	10/23/98	AS-6 R06
Nitrate	728000		ug/L	09/29/98	D-3 R13
Selenium	245		ug/L	10/22/98	AS-4 R02
Sulfate	318000		ug/L	09/22/98	D-3 R13
Uranium	448		ug/L	10/23/98	AS-6 R06
Vanadium	6750		ug/L	10/27/98	AS-5 R05

V1.05

ANALYTICAL RESULTS (SECTION I)

Customer ID: N171
Ticket ID: NDG 620

Date: November 9, 1998
Lab ID: 254565

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	92.1		ug/L	10/29/98	AS-4 R02
Cadmium	10.2		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	94.3		ug/L	10/27/98	AS-5 R05
Molybdenum	4580		ug/L	10/23/98	AS-6 R06
Nitrate	716000		ug/L	09/29/98	D-3 R13
Selenium	237		ug/L	10/22/98	AS-4 R02
Sulfate	320000	N	ug/L	09/22/98	D-3 R13
Uranium	452		ug/L	10/23/98	AS-6 R06
Vanadium	6900		ug/L	10/27/98	AS-5 R05

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ANALYTICAL RESULTS **(SECTION I)**

Customer ID: SYN
Ticket ID: NDG 621

Requestor: STAN MORRISON
Sample Matrix: FILTERED WATER
Project Number: 331404002

Date: November 9, 1998
Lab ID: 254566

Case: 16232
Date Received: Sep 17, 1998
Date Collected: Sep 17, 1998

ANALYSIS REQUESTED	RESULTS	RESULT QUALI's	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Arsenic	147		ug/L	10/29/98	AS-4 R02
Cadmium	91.5		ug/L	10/22/98	AS-6 R06
Iron	<5.0	U	ug/L	10/27/98	AS-5 R05
Manganese	<2.0	U	ug/L	10/27/98	AS-5 R05
Molybdenum	4600		ug/L	10/23/98	AS-6 R06
Nitrate	723000		ug/L	09/29/98	D-3 R13
Selenium	289		ug/L	10/22/98	AS-4 R02
Sulfate	319000	N	ug/L	09/22/98	D-3 R13
Uranium	470		ug/L	10/23/98	AS-6 R06
Vanadium	9560		ug/L	10/27/98	AS-5 R05

Technical Task Cover Sheet

Discipline Ecology **Number of Sheets** 53

Project:
UMTRA Ground Water

Site:
New Rifle

Subject:
Ecological Risk Assessment

Sources of Data:
Eco Sampling Results (Appendix B)

Task Order No. MAC99-05 **File Index No.** GWRFL13.1

Proj. No. 321404001 **Calc. No.** U0060400 **Supersedes Calc. No.**

Calculated by	Date	Checked by	Date	Approved by	Date
LEC for Celeste Marsh	9/20/99	LE Cummins	9/20/99	[signature]	9/21/99

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Ecological Risk Assessment

1.0 Introduction and Background

Ecological risk assessment (ERA) is a process that evaluates the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to one or more stressors (EPA 1992). A stressor represents any physical, chemical, or biological entity that can induce an adverse ecological response.

1.1 Purpose

The primary purpose of this risk assessment is to identify and characterize adverse effects, if any, on the ecosystems at the New Rifle site and Roaring Fork Gravel Pit Pond due to New Rifle site-related contamination.

Characterization of the ecology of the former millsite at New Rifle and the surrounding areas is needed to complete the assessment of ecological risks associated with site-related contaminated ground water. A defensible ecological risk assessment will support the development of risk-based compliance strategies.

For ecological risks to occur at the New Rifle site and Roaring Fork Gravel Pit Pond, pathways must exist for exposure of biological receptors to biotic and abiotic media contaminated by ground water. Previous screening-level assessments of ecological risks at the site have evaluated contaminants of potential concern (COPCs), potential pathways, receptors, and adverse effects (DOE 1995, 1996).

This ERA is based on relevant components of the U.S. Environmental Protection Agency (EPA) guidance provided in the *Guidelines for Ecological Risk Assessment* (EPA 1998) and the *Framework for Ecological Risk Assessment* (EPA 1992).

1.2 Risk Assessment Methodology

An ERA contains three main components: (1) problem formulation, (2) analysis, and (3) risk characterization. Depending on level of analysis required, concentrations and types of contaminants, and other considerations, an ERA may provide adequate information and be concluded before proceeding through to the risk characterization phase. A tiered approach to the risk assessment process was followed for New Rifle by performing the screening-level Baseline Risk Assessment (BLRA), collection of additional samples, and evaluation of the 1998 data, with the possibility of proceeding to a quantitative risk assessment pending the outcome of the data review. The problem formulation component is discussed in detail in the following section. A risk assessment model for the New Rifle site is shown in Figure 1–1. Following the evaluation of the 1998 ecological data, in the analysis phase, it was determined that proceeding to the risk characterization phase was appropriate (see Section 3.2).

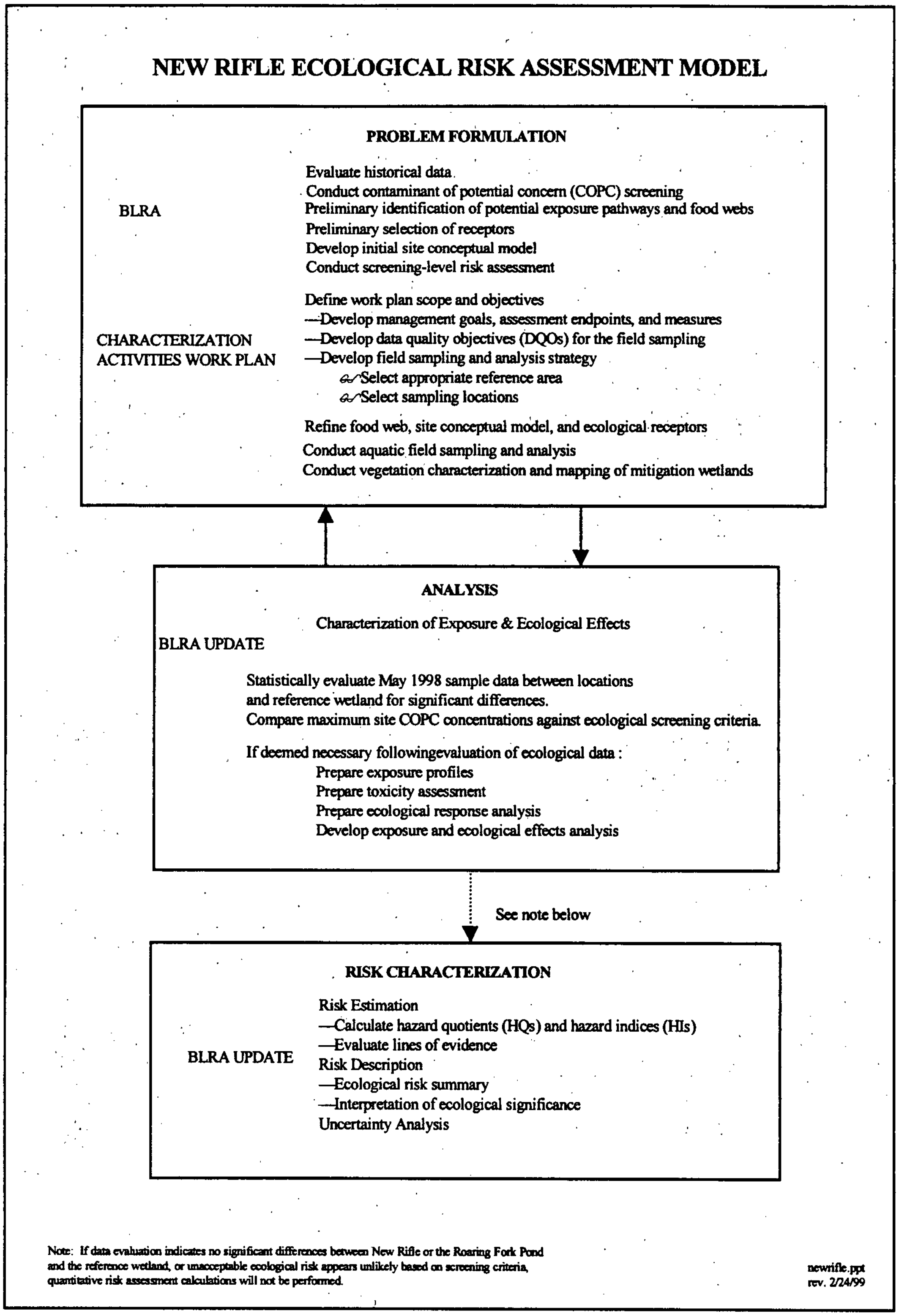

Figure 1–1. New Rifle Ecological Risk Assessment Model

2.0 Problem Formulation

In the problem formulation phase, the need for a risk assessment is identified, and the scope of the problem is defined. Evaluation of available data helps to develop site conceptual models, food webs, risk hypotheses, endpoints, and measures. The principal product from these activities is the analysis plan. The analysis plan may include activities for new data collection as well as how the existing data will be used to complete the risk assessment. The problem formulation phase typically requires the greatest amount of effort, and the success of the risk assessment depends on a thorough and technically defensible planning process.

The problem formulation phase in the risk assessment process for New Rifle was represented, in part, by the BLRA (DOE 1995), which was a screening-level risk assessment. The primary input to this phase is the integration of available information. Historical analytical data for the New Rifle site were reviewed to determine if concentrations of analytes in ground water, surface water and sediment might pose an ecological risk. Other inputs included information gathered on the New Rifle geologic setting, ground water hydrology, geochemistry, and ecological habitat. Principal products of this phase included preliminary COPC screening, and the preparation of a characterization work plan (DOE 1998a). Since the BLRA, additional abiotic and biotic samples have been collected at the New Rifle mitigation wetland (approximately 17.6 hectares [ha]), Roaring Fork Gravel Pit Pond (approximately 6.7 ha), and an upstream reference wetland (One Mile Pond, approximately 11.6 ha), and these data have been incorporated into the risk assessment process. The data evaluation is presented in greater detail in Section 3.1.

2.1 Ecological Contaminants of Potential Concern

Ecological COPCs were defined in the BLRA (screening-level risk assessment) as those constituents that statistically exceeded background concentrations (Table 2–1). Background ground water quality was defined as the quality of ground water that would exist if milling had not taken place. The water quality in alluvial aquifer wells upgradient of the Old Rifle site was considered to be representative of background conditions (DOE 1996). A constituent in the alluvial aquifer was included on the list of ecological COPCs if the on-site concentration statistically exceeded the background concentration at the 0.10 significance level (DOE 1995).

Two categories of surface water were defined in the BLRA for purposes of evaluating ecological risk: Colorado River water and water in ponds near the Rifle sites (DOE 1996). Colorado River COPCs were those constituents with statistically higher concentrations downstream of the millsites than upstream. Water quality in ponds near the Rifle sites (Old Rifle pond and Roaring Fork Gravel Pit Pond) was compared to water quality in a background pond (One Mile Pond, sampling location 580, Figure 2–1). Similarly, ecological COPCs in sediments were determined by comparing upstream sediments with downstream sediments and on-site pond sediments with One Mile Pond sediments.

The surface water and sediment data through 1998 were again reviewed for the BLRA update to serve as a starting point and assist in COPC identification. Sediment data were available for comparison of the 1994 data for Helmer Gulch location 541 and Colorado River location 548 downstream of New Rifle. These data show that all Helmer Gulch detects are greater than or equal to location 548 detects. All detects for wetland location 540 downstream of New Rifle with

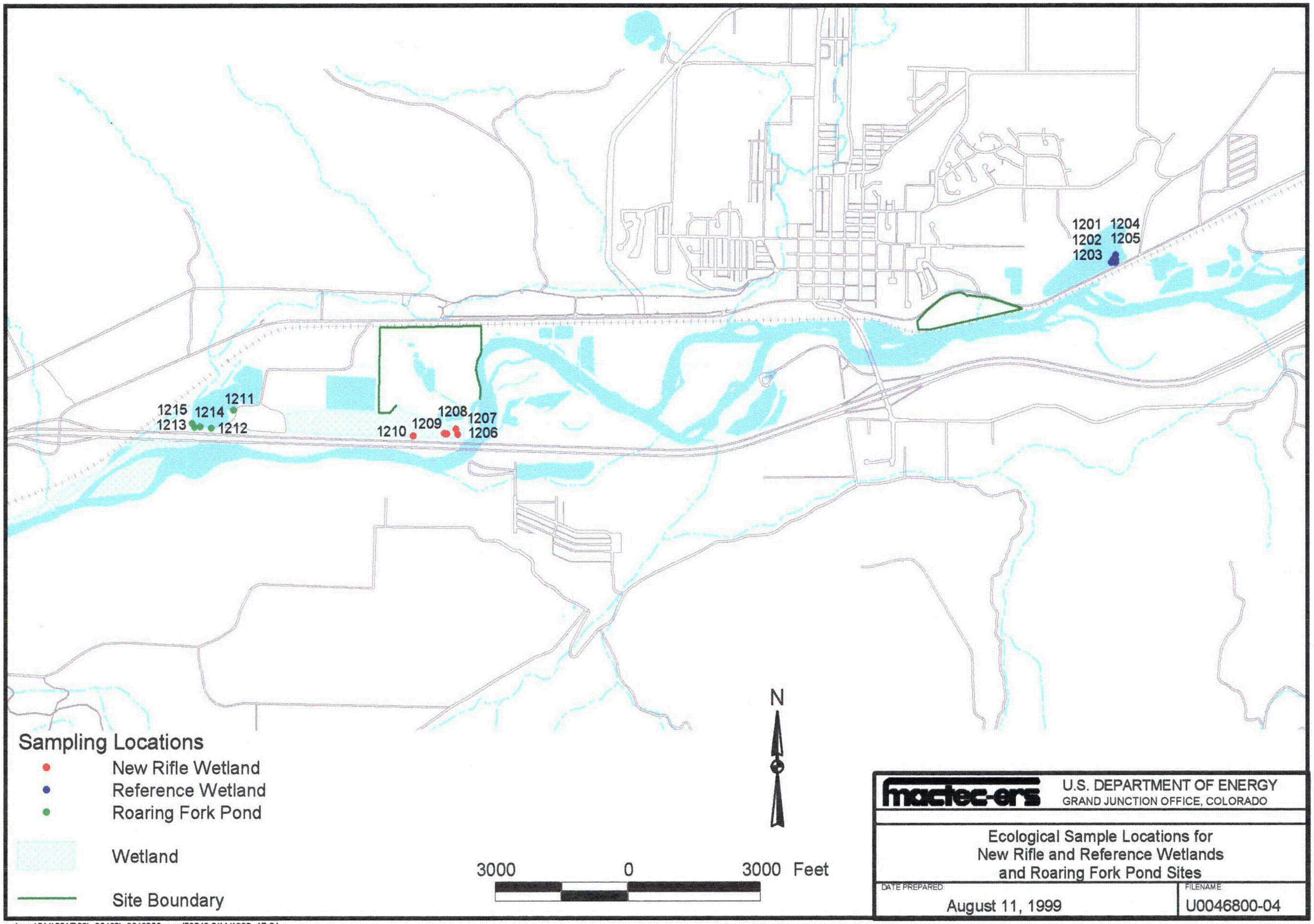

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Figure2–1. Ecological Sample Locations for New Rifle, Reference Wetlands, and Roaring Fork Pond Sites

Table 2–1. Summary of Ecological Contaminants of Potential Concern in Ground Water, Surface Water, and Sediments

Constituents Above Background[a]	New Rifle Ground Water[b]	Colorado River Surface Water	Colorado River and Pond Sediment
Ammonium	X	X	
Arsenic	X		X
Cadmium	X		X
Calcium	X		
Chloride	X		
Fluoride	X		
Iron	X	X	X
Manganese	X		X
Molybdenum	X		X
Nitrate	X		
Phosphate	X		
Potassium	X		
Selenium	X		X
Silica	X		
Sodium	X		
Strontium	X		
Sulfate	X		
Uranium	X		X
Vanadium	X		X
Zinc	X		X

[a]Greater than concentrations in a reference area (e.g., upgradient well, upriver surface water, or upgradient pond) at the 90 percent confidence level.
[b]Because the alluvial aquifer feeds the new mitigation wetland, alluvial aquifer water quality data were used to evaluate potential adverse effects to wetland ecology.

the exceptions of vanadium and zinc are all less than or equal to Helmer Gulch detects. Vanadium (34.6 milligrams per kilogram [mg/kg]) and zinc (44.9 mg/kg) are slightly elevated at wetland location 540 with respect to Helmer Gulch (25.4 mg/kg and 27 mg/kg for vanadium and zinc, respectively). Helmer Gulch is presumed to represent background as it is outside the hydrological influence of New Rifle.

The BLRA (DOE 1996) stated that "contaminated ground water is greatly diluted as it enters the Colorado River" (p. 3-23). Surface water data were reviewed, and for the single sample at downstream wetland location 548 (1991, 1994, 1996, and 1997), and presumed background locations Helmer Gulch location 541 (1994 only), One Mile Pond (location 570 – 1994 through 1998), and location 580 (upstream from Old Rifle – 1996 and 1997). All location 548 detects were less than or equal to locations 541, 570 and 580 for the 1997 through 1998 data.

Since the existing data suggest that site-related contamination is having no impact on Colorado River water and sediment, the focus of the BLRA update was limited to the New Rifle wetland and the Roaring Fork Pond.

For the purposes of this BLRA update, any COPC (exceptions noted herein) observed in columns 2 through 4 in Table 2–1 was assumed to be a COPC in sediment and surface water for the 1998 ecological field sampling. Inclusion of the analytes as COPCs regardless of medium was meant to be conservative; however, calcium, sodium, potassium and magnesium were not analyzed in any medium since they are considered macronutrients. Silica (SiO_2) was also not analyzed in any medium since it is similar to a macronutrient, environmentally ubiquitous as sand and considered generally inert and nontoxic. Only the remaining metals listed in Table 2–1 above were analyzed in biota tissue samples. Anions (fluoride, sulfate, nitrate, phosphate) and ammonium were not analyzed in vegetation tissue due to the likely biotransformation of these chemical species in plant tissue, absence of regulatory-approved, definitive analytical methodology for biota, and a general lack of toxicity data. Furthermore, nitrate and phosphate act as fertilizers for plants. At best, anions and ammonium are addressed in a semi-quantitative manner.

2.2 Ecological Site Conceptual Model

Conceptual models for ecological risk assessments are developed from information about stressors, potential exposure, and predicted effects on an ecological entity (the assessment endpoint). Conceptual models consist of two principal components (EPA 1998):

- A set of risk hypotheses that describe predicted relationships among stressor, exposure, and assessment endpoint response, along with the rationale for their selection.

- A diagram that illustrates the relationships presented in the risk hypotheses.

The following is a risk hypothesis proposed for the New Rifle wetland and Roaring Fork Gravel Pit Pond:

Risk hypothesis: Milling operations at the New Rifle site have resulted in ground water contamination. Hydrogeological information regarding plume migration suggests that contamination will occur at the mitigation wetland that is fed by the underlying aquifer. This may result in contaminant exposure directly or indirectly to wildlife and plant receptors that utilize or are present at the wetland. In addition, the contaminated plume has migrated to the Roaring Fork Gravel Pit Pond, thereby providing a contamination source to both the biotic and abiotic media at that site.

For convenience to the reader, references and discussions pertaining to New Rifle are intended to include the Roaring Fork Gravel Pit Pond unless otherwise noted.

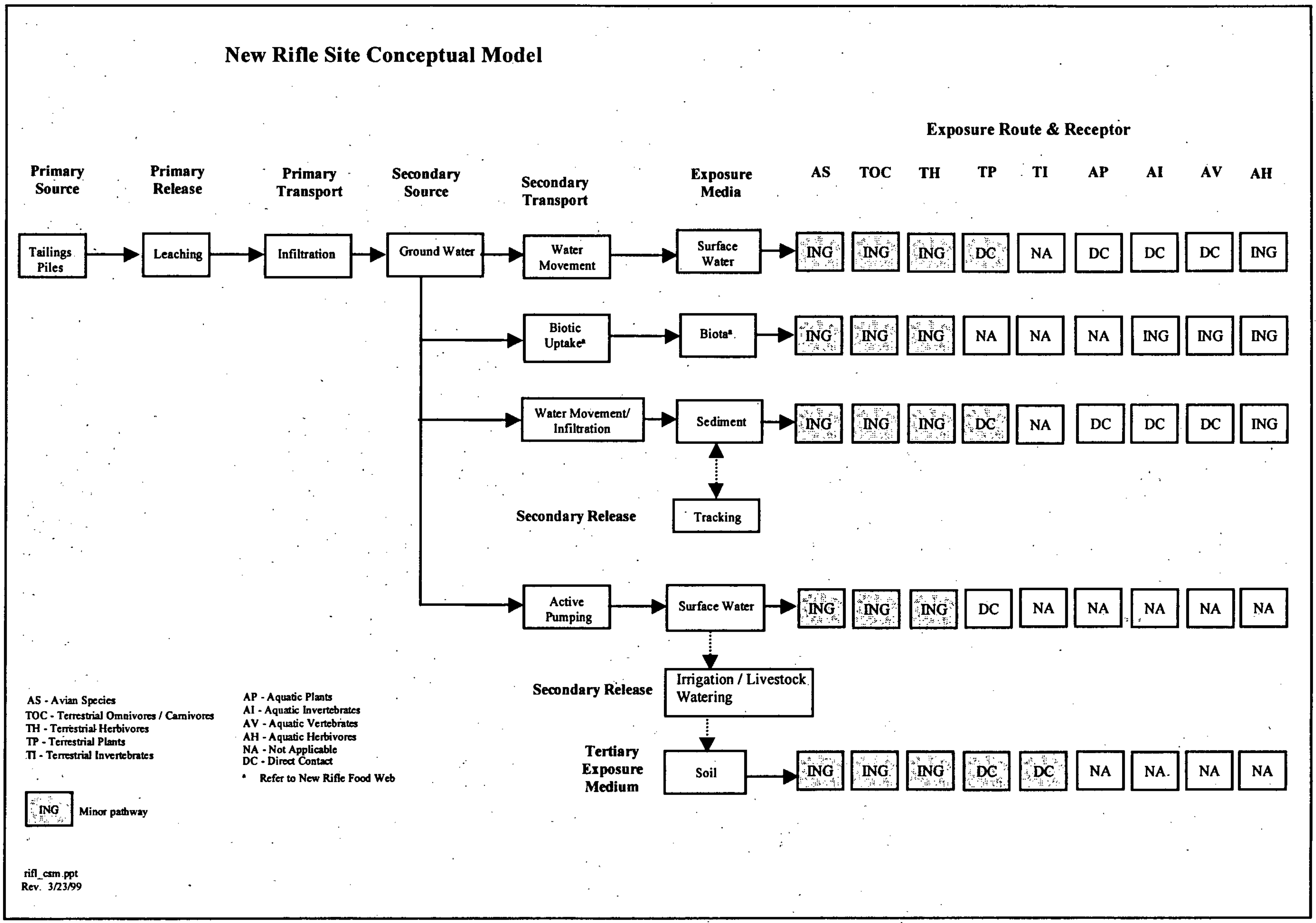
Because the stressors are chemical contaminants, the New Rifle risk hypothesis would be considered a "stressor-initiated" risk hypothesis even though no apparent ecological effects have been observed.

As part of the initial problem formulation in the baseline risk assessment, a generalized site conceptual model was developed for the exposure pathways for New Rifle. That model has since been revised, and now provides greater detail on exposure sources and pathways (Figure 2–2). Exposure pathways are the mechanism by which a contaminant in an environmental medium (i.e., the source) contacts an ecological receptor. A complete exposure pathway includes:

- Contaminant source

- Release mechanism that allows contaminants to become mobile or accessible

- Transport mechanism that moves contaminants away from the release



Figue 2–2. New Rifle Site Conceptual Model

- Ecological receptor
- Route of exposure (e.g., dermal or direct contact, inhalation, or ingestion)

Current Exposure Scenario

The major exposure pathways at the New Rifle wetland (and Roaring Fork Pond) are:

- direct contact with contaminated abiotic media (e.g., plants in contact with contaminated sediment, ground water or surface water);
- ingestion of abiotic media (e.g., ingestion of sediments or surface water by birds or animals); and
- ingestion of contaminated biological media (i.e., ingestion of plants or animals by birds or animals).

The terrestrial ecological habitat at the New Rifle site is limited because the area is generally flat to gently sloping, has no tree cover, and has been overgrown with weedy species. Remedial actions included placing a 6-inch layer of soil over the excavated tailings area and revegetating. The upland areas have been successfully revegetated with tall wheatgrass (*Agropyron elongatum*). Although the depth to ground water is relatively shallow at the millsite, the predominant vegetation includes wheatgrasses and weedy species, which are not likely to have root systems capable of reaching the aquifer. U.S. Highway 6 and railroad tracks bound the northern boundary of the site. The area to the west is privately owned and is associated with the Roaring Fork Gravel Pit operations and other industrial activities. There are sizeable areas in the vicinity covered with gravel, pavement, and rock, as well as some other open fields. The Colorado River forms the eastern boundary. The New Rifle wetland lies to the south of the mill site and is bounded to the south by Interstate 70.

The area is not currently used for livestock grazing and is fenced in part to deter larger wildlife entry; however, wildlife can enter the site through the river corridor or adjacent properties. Since the contaminated tailings have been removed, ingestion of or direct contact with contaminated soils does not represent a complete exposure pathway. The Colorado River represents the primary surface water feature associated with the terrestrial habitat at the site. However, because the focus of this ERA is on the mitigation wetland, and because results of past Colorado River sampling indicate no impacts from site-related contamination, the Colorado River is not further evaluated in this BLRA update.

The aquatic habitat associated with the New Rifle mitigation wetland and the Roaring Fork Gravel Pit Pond represent the areas of greatest potential exposure. Contaminated ground water associated with the former milling operations feeds the sediment and any standing water in the wetland. In addition, the contaminated plume provides much, if not all, of the water used for the gravel pit operations. The gravel pit ponds serve as sources for pumping water for the gravel mining operations. COPCs from the plume may be deposited in sediment at the Roaring Fork Pond or may be present in the surface water at both the New Rifle wetland and Roaring Fork Pond. The COPCs from the plume are likely to contact and interact with the sediment at the mitigation wetland at the aquifer-sediment interface. The sediments may thus act as sinks for COPCs in ground water discharging into the area. Phreatophytes rooted in sediment may uptake contaminants through their root systems. Such species include sandbar willow (*Salix exigua*), cattail (*Typha latifolia*), cottonwood (*Populus fremontii*), common reed (*Phragmites communis*), bulrushes (*scirpus sp.*), tamarisk (*Tamarix ramosissima*), and reed canarygrass (*Phalaris arundinaceae*).

The current mitigation wetland, which is about 17.6 ha (43.6 acres) in size, is in the process of being reconstructed. The reconstruction is focused on the western half of the wetland, and includes significant earth removal, boundary recontouring, and revegetation. This activity was deemed necessary since the existing wetland had not met all of the Section 404 permit requirements under the Clean Water Act. The continual pumping operations at the Roaring Fork Gravel Pit has depressed the water table, making the ground water source insufficient for wetland plants to establish. By removing a significant amount of topsoil to create ponded areas, it is expected that ground water will discharge sufficiently such that standing water will be present, and wetland vegetation types can thrive. Although the wetland does not currently represent a significant aquatic habitat, the anticipated future habitat would likely serve as a wildlife attractant. This situation will be addressed in the following discussion on future hypothetical exposure scenarios.

To the west of the mitigation wetland are the two main Roaring Fork Gravel Pit Ponds. The westernmost pond is rather large (some 6.7 ha) and relatively undisturbed, except for active discharging of operations water and sediment at its eastern mouth. To the north and east of this pond is a smaller operational pond, which is heavily involved in the mining operations, and represents a very disturbed habitat. Some vegetation borders the larger western pond, which likely represents a potential aquatic habitat for a large variety of ecological receptors. Terrestrial receptors such as foxes, coyotes, skunks, raccoons, deer, and rodents are likely to use the ponds for food items and as a drinking water source. Consequently, they are also exposed to potentially contaminated sediments. These terrestrial receptors typically do not spend most of their time in the aquatic areas.

Aquatic receptors living in or near the mitigation wetland and ponds have the potential to ingest contaminated sediment, surface water, and vegetation. These species have the potential for the greatest exposures. Larger herbivores prefer to browse on leafy material; smaller mammals and birds seek plant seeds and roots. Beaver and mule deer (herbivores), and muskrat (an omnivore that feeds chiefly on aquatic plants) forage on the types of vegetation found along the pond banks and at the eastern end of the mitigation wetland. Higher trophic receptors such as coyotes, eagles, and hawks may in turn feed on small mammals or birds that have ingested contaminated food items. Aquatic avian species such as the great blue heron, ducks, geese, and killdeer frequent the nearby Colorado River and represent ecological receptors with the greatest exposure potential. Aquatic invertebrates, amphibians, reptiles, and fish may also be in direct contact with potentially contaminated sediment, surface water, and aquatic vegetation. These receptors can also serve as prey for eagles, herons, and other wildlife.

Since the COPCs are inorganics, the conceptual site model assumes that dermal exposure (i.e., uptake of chemicals across the skin) by birds or mammals will be minimal and not contribute greatly to overall exposure. Contaminant concentrations in air are not likely to be an exposure medium. Thus, the air inhalation and dermal contact pathways are considered minor exposure pathways and are not evaluated.

The dietary pathway can contribute significantly to total exposure even when bioaccumulation factors (BAFs) are between 1 and 10. Site-specific plant tissue concentrations will be used at the New Rifle wetland and reference wetland to estimate dietary exposure (Figure 2–2). Since biotic tissues were not collected at the Roaring Fork Pond, BAFs calculated from the site-specific biotic data at the reference and New Rifle wetlands will be used to derive estimated tissue concentrations. These calculations are discussed in greater detail in Section 3.2.

The contaminants present at the sites in Table 2–1 are more likely to be toxic due to exposure to the source media, such as sediment, soil, and/or surface water ingestion, or direct contact, although cadmium, selenium, and manganese may also bioaccumulate. To provide additional lines of evidence for the risk managers, routine monitoring of the mitigation wetland and Roaring Fork Gravel Pit Pond is recommended.

Only complete exposure pathways are qualitatively and quantitatively evaluated in an ERA. In order to be conservative, the following potential exposure pathways were *considered* for evaluation:

- Surface water–ingestion, direct contact
- Soil–ingestion, direct contact
- Sediment–ingestion, direct contact
- Dietary–ingestion of forage and/or prey as appropriate, by receptor

As mentioned previously, contact with soil does not represent a complete exposure pathway because contaminated tailings and soil have been removed; this pathway was therefore eliminated from further evaluation. The conceptual model was further expanded to include potential ecological effects as a result of exposure to stressors. For the purposes of this BLRA update, the stressors are the COPCs identified in Table 2–1 minus those excluded as discussed in Section 2.1. Also, chloride was inadvertently omitted and is not discussed here. Chloride will be included as a COPC for any further characterization that may be needed. The possible effects from the COPCs listed Table 2–1 are many and complex. Since the receptors are all components of a complex ecosystem, effects to one or more receptors have the potential to cause effects (overt or subtle) to receptors at lower or higher trophic levels. An example of this would be decreased populations of benthic or other aquatic invertebrates which could result in mortality, starvation or reduced reproduction of frogs and amphibians; in turn, these effects might result in loss of prey items for the great blue heron.

Contaminants in ground water could be taken up by plants either through roots in saturated soils (aquatic vegetation), or though extensive root systems (e.g., black greasewood), or through irrigation water. Large-scale irrigation with ground water is not considered a likely pathway because surface water is the main source of irrigation water in the Rifle area. Contaminants may bioaccumulate in various plant parts and exert a wide range of influences, depending on the specific COPC. Plant uptake rates and analyte toxicities vary greatly among species and are affected by factors such as soil characteristics (e.g., pH, redox potential, organic matter), plant sensitivity, input-output balance, and cumulative effects. Foraging wildlife can be indirectly exposed to contaminants in ground water by ingesting plants that have bioaccumulated certain contaminants. The surface water direct contact pathway for aquatic plants was not evaluated quantitatively in this ERA; however, plant phytotoxicity tests were conducted using well water from the mitigation wetland (see BRI 1999). These studies were designed to provide site-specific data, which would provide a measure of effects and reduce the uncertainty for this receptor and pathway. Plants in direct contact with sediment however were included in the ERA.

Impacts to fish from the discharge of contaminated ground water into the Colorado river at the New Rifle site are unlikely due to the large effects of dilution on contaminant levels in the river. More recent surface water data for wetland location 548 downstream of New Rifle (1996-1997) were reviewed to determine if analytes were elevated with respect to background (One Mile Pond location 570 and location 580 upstream of Old Rifle based on 1997-1998 data). These data were compared to historical data to detect differences in concentrations over time. The data suggest that there is no site-related contamination present in the Colorado River surface water and sediment downstream of New Rifle. Based on this evaluation, exposure to wildlife receptors ingesting fish from the Colorado River will not be addressed in this BLRA update. The water depth in the mitigation wetland fluctuates considerably and will not support a fish population; therefore, fish are not considered a receptor at this location since the pathway is incomplete, though they are carried through the risk analysis. Fish could, however, be present in the Roaring Fork Pond. Consequently, the creek chub was considered in the risk assessment.

The direct consumption of contaminated water and the bioaccumulation of COPCs in aquatic fauna (from ingesting lower food chain organisms) are potential exposure pathways at the site. Animals consuming contaminated plants and animals can bioaccumulate some of the COPCs if the amount ingested exceeds the amount eliminated. Bioaccumulation often is a function of the areal extent of contamination versus the areal extent of the animal's feeding range. In small, contaminated areas such as a seep, the feeding range of many animal species will exceed the size of the contaminated area and bioaccumulation may not be a concern. In larger areas such as the mitigation wetland, the home range of some species could be contained in the wetlands and bioaccumulation could be a concern.

Future Hypothetical Exposure Scenario

Following revegetation and reconstruction, the New Rifle mitigation wetland could create a significant ecological habitat within perhaps 3 to 5 years. A viable wetland habitat would provide a food and water source for a variety of wildlife receptors. The wetland vegetation types may well include cattail, willow, bulrush, reeds, and other phreatophytic plant species in a wide distribution over the 17.6-ha site. In an arid environment, such a water source would serve as an attractant, although the Colorado River riparian areas still provide a much greater habitat by virtue of their size. Contaminants in the ground water will discharge into the wetland. In the near term, this could result in an increase in wetland contamination as reconstruction activities produce a larger ground water contribution to the wetland areas. Eventually wetland contaminant concentrations should begin diminishing over time. Contaminant concentrations at the Roaring Fork Ponds may approximate worst-case concentrations that can be expected in the reconstructed mitigation wetlands. Future monitoring will be conducted to evaluate the changing nature of contamination associated with the mitigation wetland.

Continued gravel pit operations are likely for the life expectancy of the mining region, which may be 10 years or more. Since the operations are located on private property, this scenario cannot be accurately predicted. Contaminant concentrations at the ponds are also expected to diminish over time.

There are no ground water wells that are currently pumped to provide irrigation or stock watering. Barring institutional controls, the potential exists for these pathways to occur in the future. Pumping ground water for agricultural or industrial uses would likely impact the wetland by reducing the water table to such a level that desirable vegetation could not thrive. The future land use plans for the New Rifle site have not been developed. Until those plans have been finalized, the potential exists for ground water to be pumped and used for agricultural uses. However, because this water use is unlikely, these exposure routes are not evaluated further here. The Colorado River provides the vast proportion of irrigation water in the Rifle area.

2.3 Ecological Receptors and Food Web

Unlike a human health risk assessment (HHRA), which focuses on only one species, an ERA must address potential risks to numerous species and communities of species. However, an ERA cannot possibly address every species in an ecosystem on an individual basis unless the ecosystem is extraordinarily depauparate. Furthermore, there would be a great deal of redundancy in calculating risk estimates for every wildlife species identified in wildlife lists. Therefore, a subset of receptor categories was selected to represent the species that could occur and be exposed to COPCs at the New Rifle mitigation wetland and Roaring Fork Gravel Pit Pond. These are general categories as shown in the New Rifle food web (Figure 2–3). This simplifies the risk assessment process, since risks to receptor categories are used to represent risk to other species that share a similar position in the food web. For example, risks to the mule deer are intended to also represent risks to other animals, especially strict herbivores. In a like manner, risks to the great blue heron would be used to address potential risks to other aquatic birds.

Because evaluation of site data indicates that quantitative risk estimates are necessary, key receptors have been identified for which risks are quantified. Key ecological receptors are those species or taxa of plants and animals that have been selected as critical components of the ecosystem. The following criteria were considered in selecting key receptors:

- Special Status species (Federally-listed threatened, endangered, candidate, or State of Colorado sensitive species) where protection at the individual level is required;
- Game animals or wildlife that have social or economic value;
- Species that are likely to have high COPC exposure due to life history;
- Species that are present at New Rifle and are part of the food web;
- Species that have significant biological or ecological relevance such as species that are a critical component of the ecosystem, and their loss would alter structure or function of this ecosystem;
- Species that are toxicologically sensitive to the COPCs.

The food web (Figure 2–3) illustrates the significant dietary interactions between New Rifle terrestrial and aquatic receptors. Ideally, sampling for measures of exposure and measures of effects should occur for each specific trophic level and each species to accurately assess possible exposure and effects; however, this was deemed neither practical nor necessary for a screening-level assessment.

The food web also depicts the major trophic level interactions and describes nutrient flow and transfer of matter and energy through these levels. It was developed from the species lists and consideration of the exposure pathways. The food web diagram was used to portray potential routes of COPCs from the ground water to biotic species at various trophic levels, with receptor species being components of this food web. Since the risk assessment is focused on the aquatic habitat, the terrestrial wildlife receptors have been grouped together. This is intended to help simplify the risk assessment.

The terrestrial receptor categories are as follows:

- Terrestrial wildlife–include mule deer, cottontail, some mice and vole species, omnivores, and carnivores
- Vegetation–includes phreatophytes such as black greasewood (*Sarcobatus vermiculatus*) and other plant species
- Terrestrial invertebrates–include soil fauna

The aquatic receptor categories are as follows:

- Avian species–include great blue heron, geese, ducks, and some passerine birds (e.g., red-winged blackbird)
- Herbivores–include muskrat and beaver
- Vertebrates–include amphibians, reptiles, and fish
- Vegetation–includes cattail and bulrush
- Invertebrates–includes benthic invertebrates

Although there are many terrestrial and aquatic receptors at New Rifle, in order to simplify the risk assessment process, only five wildlife species were chosen for quantitative risk estimates for the aquatic ecosystem. Aquatic plants were also evaluated as a receptor. The five wildlife species evaluated include:

- Muskrat
- Mule deer
- Great blue heron
- Benthic invertebrates
- Creek chub (or other fish species)

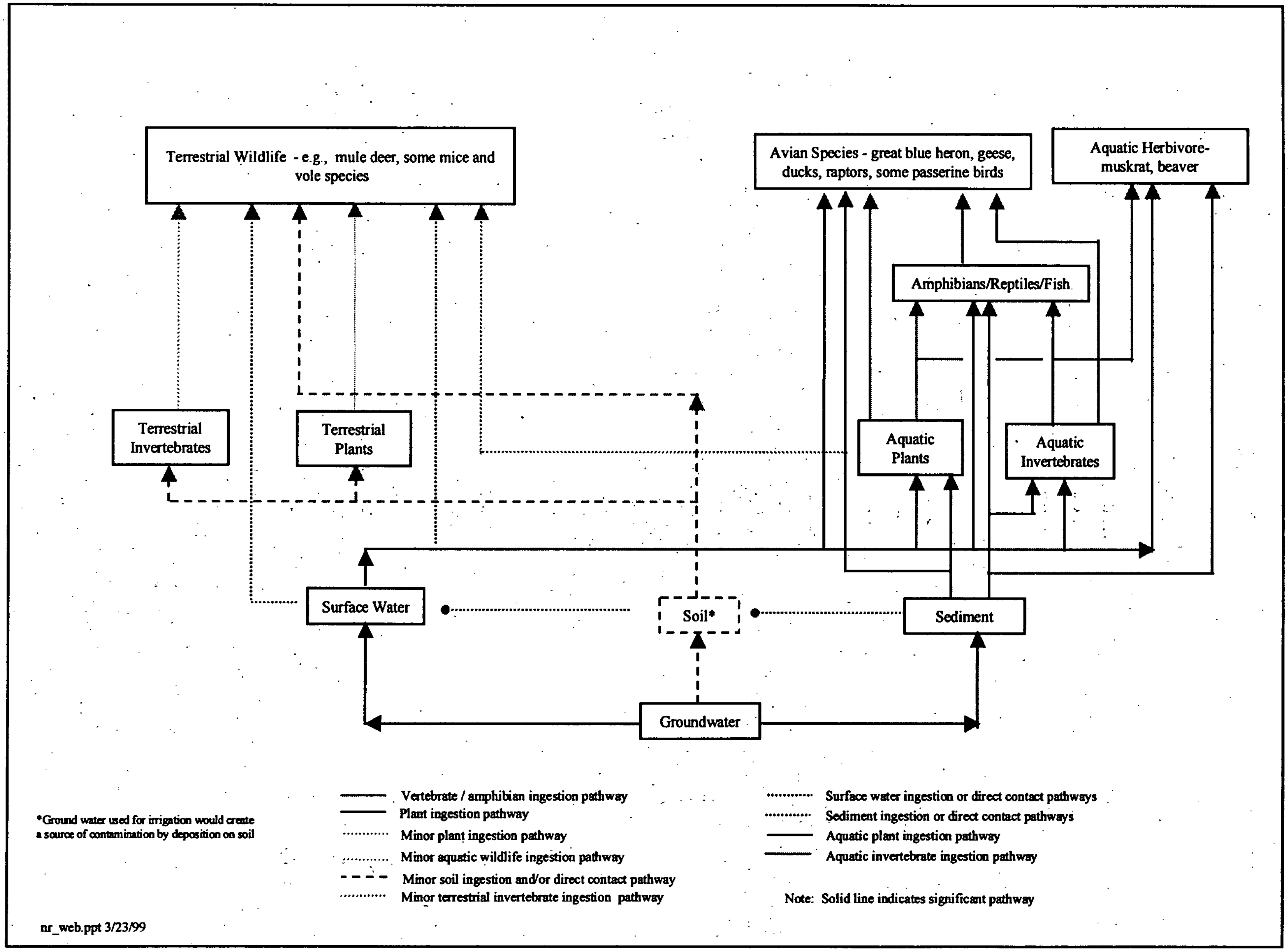


Figure 2–3. Generalized New Rifle Food Web

The food web illustrates both major and minor exposure pathways. Dotted lines indicating minor pathways are associated with the terrestrial ecosystem. Consideration was given to terrestrial receptors since the mule deer was chose as a key receptor; however exposure is expected to be minor since this species would not likely utilize the aquatic system to a great extent.

2.4 Management Goals, Assessment Endpoints and Measures

The EPA defines assessment endpoints as explicit expressions of the actual environmental value that is to be protected, operationally defined by an ecological entity and its attributes (EPA 1998). There are three main criteria used in the selection of endpoints: 1) ecological relevance, 2) susceptibility, and 3) relevance to management goals.

The terrestrial ecological habitat at the New Rifle site consists primarily of open disturbed field. Other than the Roaring Fork Gravel Pit Ponds, the mitigation wetland built in late 1994 provides the only aquatic habitat on the site. There is potential for this wetland to develop into a diverse and sustainable aquatic habitat. At present, the wetland has some cattails, willow, bulrushes, and cottonwoods on the eastern end; however, tamarisk (a nonnative weed species) has become a dominant plant in the wetland. The wetland was created under a Section 404 permit to replace wetlands lost in the remediation of the Old Rifle site. As a result, regulatory compliance in the nature of ensuring that the mitigation wetland is considered a success requires that the wetlands be monitored by the U.S, Army Corps of Engineers. The remainder of the New Rifle site will likely be developed for industrial and commercial purposes. Since water resources can act as wildlife attractants in arid environments, exposure to COPCs by wildlife utilizing the mitigation wetland was seen as not only ecologically relevant but also susceptible. Table 2–2 provides a summary of management goals, endpoints, and measures.

3.0 Analysis Phase

The analysis phase of an ERA consists of two principal components: 1) the characterization of exposure, and 2) the characterization of effects, the principal products of which are summary profiles that describe exposure and the stressor-response relationships. The objective in the analysis phase is to quantify contaminant exposure (i.e., from one or more stressors) and potential ecological effects. This involves evaluating receptor attributes, toxicity, and exposure profiles. The problem formulation and analysis phases of an ERA may be iterative as shown by the bi-directional arrows (Figure 1–1). The results of the analysis phase are utilized in the risk characterization.

Table 2–2. Management Goals, Endpoints and Measures for New Rifle

Management Goal: New Rifle/Roaring Fork Pond	Assessment Endpoint:	Measures of Effects: Routine Monitoring	Measures of Ecosystem and Receptor Characteristics:	Measures of Exposure:
Viable, self-sustaining mitigation wetland that supports a variety of ecological receptors	Marsh bird nesting sites, diverse wetland vegetation species, viable populations of aquatic invertebrates	Field observations for ecological diversity and health	Natural reproduction, growth and mortality rates	COPC concentrations in sediment, surface water, ground water and vegetation tissue
		Water level observations	Abundance and distribution of suitable nesting sites	Nutrient and dissolved oxygen levels in surface water
		Vegetation characterization and mapping	Abundance and distribution of suitable food sources	Extent of wetlands vegetation, water temperature (e.g., a Rapid Bioassessment Protocol for wetlands)
		Benthic invertebrate observations and counts	Water level and vegetation necessary to support wetlands	
Prevention of contamination to ecological receptors that utilize the wetland or Roaring Fork Pond directly or indirectly	Absence of observable population effects or individual effects (T&E)	Field observations for ecological receptors	Natural reproduction, growth and mortality rates	COPC concentrations in sediment, surface water, ground water and vegetation tissue

For this BLRA update, evaluation of the May 1998 analytical data and field observations were the main activities associated with the analysis phase. If statistical evaluations for the New Rifle data showed no significant differences (i.e., COPC concentrations are not elevated relative to the reference area), or if an elevated concentration did not represent a likely ecological risk based on comparison to screening benchmarks, then quantitative risk estimates were not calculated. If the statistical evaluation and benchmark screening of the current data indicated a potential for unacceptable ecological risk, then the remaining four activities under the analysis phase were performed in part (i.e., preparation of exposure profiles, toxicity assessment, ecological response analysis and development of exposure and ecological effects analysis). Refer to Section 3.2 for the conclusions reached in the screening-level portion of the analysis phase.

As part of the exposure profiles, exposure point concentrations (EPCs) for each medium and contaminant retained for quantitative risk analysis were calculated based on the 95 percent upper confidence limit (UCL95) or maximum concentration, whichever was lower. EPCs based on the UCL95 of plant tissue concentrations for each analyte were used to estimate dietary intakes for receptors ingesting vegetation. As mentioned previously, since biotic tissues were not collected at the Roaring Fork Pond, BAFs calculated from the site-specific biotic data at the reference and New Rifle wetlands were used to derive estimated tissue concentrations based on sediment concentrations in the Roaring Fork Pond. Refer to Section 3.2 for the conclusions reached in the screening-level portion of the analysis phase.

3.1 Data Evaluation

This ERA focuses on the results of the 1998 ecological sampling, which was performed to address data gaps in the BLRA. Although the BLRA and characterization work plan presented a list of ecological COPCs, it is necessary to evaluate the newly collected data in order to update the COPC list. The following data evaluation serves as a subsequent rescreening of the data for COPCs in surface water, sediment and vegetation based strictly on the 1998 ecological sampling. Where appropriate, site maxima were compared to ecological screening criteria.

The BLRA conducted in 1995 (DOE 1996) utilized earlier ecological screening criteria. In order to be conservative, this ERA incorporates more current screening criteria where possible. In most cases, the criteria are based on 1996 versions of the Ecotox thresholds, ambient water quality criteria (AWQC), sediment quality criteria (SQC), and other screening benchmarks found in the ORNL program "Bench" (ORNL 1996). Due to the limited number of media-specific (e.g., surface water, sediment, and biota) criteria, ecological screening benchmarks or agricultural standards are provided for comparison. Schedule limitations prevented a more thorough literature review.

This data evaluation and screening process was used to determine whether site concentrations of inorganics were elevated above the reference area data or might pose an unacceptable ecological risk. A conservative screening approach was taken; no assumptions regarding bioavailability, persistence, or mobility were made. Inorganic analytes that are considered macronutrients (i.e., calcium, magnesium, potassium, and sodium) were removed from further evaluation in this BLRA update since toxicity is not expected due to these analytes.

The data sets were separated into three populations based on location, and further subdivided by matrix and vegetation type (where applicable). locations 1201 through 1205 were reference wetland samples, locations 1206 through 1210 included the New Rifle mitigation wetland, and locations 1211 through 1215 identified Roaring Fork Gravel Pit Pond samples.

For each data set, on an analyte-by-analyte basis, duplicate data were incorporated by averaging the original sample with its field duplicate, if available. Non-detect samples were incorporated by assigning ½ the detection limit for each non-detect. A new field, 'ecoval', was calculated for each data record which represented either the result or ½ the result (for a nondetect). No rejected data were included in the calculation of the 'ecoval' field. All statistical testing was performed on the 'ecovals' for each analyte in a data set.

Summary statistics (minimum, maximum, mean, standard deviation, number of samples, number of detects, detection frequency, and the UCL95 on the arithmetic mean) for the New Rifle mitigation wetland, Roaring Fork Gravel Pit Pond, and reference wetland data sets are provided in Table A–1, Appendix A. All analytical results for the ecological sampling are also located in Appendix B.

Statistical Evaluation

In order to discern differences in the two areas potentially affected by milling operations relative to an unimpacted background area (reference wetland), all statistical tests were divided into two categories by analyte and sample medium:

1. Reference wetland versus New Rifle mitigation wetland

2. Reference wetland versus Roaring Fork Gravel Pit Pond

All statistical tests were conducted at an $\alpha = 0.05$ and evaluated for a two-tail distribution.

Evaluation of the means of the analyte populations for the various matrices required a minimum of three samples. In order to run a normality test using the Shapiro-Wilk W-test, a minimum of five data points is required. If the data set exhibited low detection frequency (typically less than 60 percent or did not have at least three detects), no statistical testing was performed.

The Shapiro-Wilk W test was performed separately on the New Rifle mitigation wetland, Roaring Fork Gravel Pit Pond, and reference wetland data sets; if the data were not normal, they were log-transformed and again tested for normality. For the purposes of the statistical discussion, 'site' refers to either the New Rifle mitigation wetland or the Roaring Fork Gravel Pit Pond. If either the reference wetland data or site analyte data did not exhibit normality, the nonparametric Kruskal-Wallis (KW) test was used for those analytes to determine if the means of the site and reference wetland data sets were significantly different. If both data sets were normal or lognormal, a Bartlett's test was performed to test for homogeneity of variance. Non-homogeneous data sets were evaluated with the KW test to determine statistical difference in the means.

The KW test makes no assumptions concerning the underlying nature of the sample data. If the null hypothesis (H_o) is not rejected (i.e., it is accepted), then the site analyte data set was assumed to have the same mean as the reference wetland data set, and the analyte was not considered a COPC. If the alternative hypothesis (H_a) is not rejected (i.e., it is accepted), then the site analyte data set was assumed to *not* have the same mean as the reference wetland data set and the analyte was considered a COPC. The null and alternative hypotheses for the KW test for a two-tailed distribution with an $\alpha = 0.05$, are provided below:

H_o: reference wetland mean = Site mean (on an analyte-by-analyte basis)

H_a: reference area mean $\neq$ Site mean (on an analyte-by-analyte basis)

The W test is considered effective for testing data sets with sample sizes less than 50 (Gilbert 1987). The W test is also applicable to lognormal distributions. For the W test, the null hypothesis, H_o, assumes the population follows a normal (or lognormal) distribution, and the alternative hypothesis, H_a, assumes that the population does not follow a normal (or lognormal) distribution. The null and alternative hypotheses for the W test are provided below:

H_o: The New Rifle wetland (or Roaring Fork Pond) (or reference area) data set (on an analyte-by-analyte basis) is drawn from an underlying normal (or lognormal) population.

H_a: The New Rifle wetland (or Roaring Fork Pond)(or reference area) data set (on an analyte-by-analyte basis) is not drawn from an underlying normal (or lognormal) population.

The Bartlett test was chosen as a test for homogeneity of variance since it was easily translated into a spreadsheet format. Bartlett's test is an analysis of variance test that evaluates the hypothesis that the data sets come from populations with similar variances. The test assumes that each sample set was randomly and independently drawn from a normal (or lognormal) population. The null hypothesis (H_o) assumes that the variances for the two data sets are equal. The alternative hypothesis (H_a) assumes that the variances are not equal. The null and alternative hypotheses for the Bartlett test are provided below:

H_o: reference area variance = New Rifle (or Roaring Fork Pond) variance (on an analyte-by-analyte basis)

$$\sigma^2_{\text{reference area}} = \sigma^2_{\text{site}}$$

H_a: reference area variance ≠ New Rifle (or Roaring Fork Pond) variance (on an analyte-by-analyte basis)

$$\sigma^2_{\text{reference area}} \neq \sigma^2_{\text{site}}$$

If the null hypothesis was not rejected (i.e., it was accepted), then the reference wetland and site data sets were assumed to have homogeneous variances. Homogeneous data sets would have received further evaluation using the Student's t-test, which is more robust than the non-parametric KW test. There were no instances where application of the Student's t-test was appropriate. However, as a conservative measure, where the KW test results indicated no significant differences in the population means *and* the site EPC exceeded the reference EPC, the analyte was still retained as a possible COPC. Removal of such analytes was delayed until the risk characterization and uncertainty analysis. This was done since statistical testing of power was not conducted based on five samples due to schedule constraints. If the alternative hypothesis (H_a) was not rejected (i.e., it was accepted), then the site analyte data set was assumed not to have the same mean as the reference wetland data set, and the analyte was retained as a COPC if the COPC mean > reference area mean. Analytes not carried through the quantitative risk assessment (QRA) included those instances where the site mean was less than the reference mean *and* the site EPC was less than the reference EPC. In addition, where no detections in surface water were observed in either the unfiltered or filtered aliquot, those analytes were also removed from the QRA. A detailed summary of the statistical evaluations for each analyte and matrix for the ecological data is provided in Table A–2, Appendix A. A summary of the analytes included in the QRA are presented on the EPC sheets (Table A–3 in Appendix A).

Sediment

Table A–4, Appendix A, provides a summary of the analytes for which the population means showed significant differences or where statistical testing was not performed due to low detection frequency or for other reasons. Analyte means for arsenic, cadmium, and strontium were significantly different between the New Rifle wetland and the reference area. Molybdenum, nitrate, phosphate, and strontium were not statistically evaluated due to low detection frequency at the reference wetland. Only cadmium and zinc were evaluated for significance in population means between the Roaring Fork Pond and the reference wetland. Ammonia as NH_4, molybdenum, nitrate, phosphate, and selenium were not statistically evaluated since the concentrations were either greatly elevated relative to the reference wetland, or low reference area detection frequency was a factor.

Surface Water

Both filtered and unfiltered surface water data were available for the ecological sampling locations. Table A–5, Appendix A provides a summary of the analytes for which the population means showed significant differences or where statistical testing was not performed due to low detection frequency or for other reasons. Due to the many instances where testing was not performed or population means showed significant differences, for brevity, those analytes will not be mentioned in this text. To be conservative, if an analyte was reatained as a COPC in either a filtered or an unfiltered sample, it was also retained as a COPC for the other sample type, regardless of the outcome of the statistical analysis.

Ground Water

Concentrations of several COPCs are elevated with respect to background wells; however, since ecological receptors are not in direct contact with this medium, and due to schedule constraints, no further evaluation of ground water was conducted for the ERA. The ERA focuses on the media that are potentially contaminated as a result of contact with the contaminated ground water and surface expressions of ground water as surface water. The plant uptake study mentioned previously did use site ground water to evaluate probable worst-case effects on aquatic plants from ground water discharge to the mitigation wetland.

Vegetation

Analytical data for metals in cattail stems and roots were available for both the New Rifle mitigation and reference wetlands. Table A–6, Appendix A, provides a summary of the analytes for which the population means showed significant differences or where statistical testing was not performed due to low detection frequency or for other reasons. Only molybdenum in cattail stems and roots showed significant difference in population means between the reference and New Rifle wetlands. Selenium in cattail stems could not be statistically evaluated since there was only one detect which occurred at the New Rifle wetland.

3.2 Analysis of Exposure and Ecological Effects

Tables A–7a and A–7b, Appendix A, provide a summary of New Rifle wetland and Roaring Fork Pond COPCs by medium and the interpretation of apparent ecological risk when compared to available screening benchmarks. Included on these screening tables are those potential contaminants for which analyte population means showed statistically significant differences or the analyte concentrations were substantially elevated with respect to the reference wetland. Based on this qualitative assessment, the greater majority of potential risk appears to be associated with the Roaring Fork Pond. However, since the alluvial aquifer that feeds the mitigation wetland is associated with the elevated contaminants in Roaring Fork Pond, it is necessary to address potential risk at the mitigation wetland as well.

Based on the number of analytes, which were elevated at either site, it was decided to proceed with the calculation of quantitative risk estimates for six ecological receptors. This was done as a conservative measure, and in the case of the mitigation wetland, to address potential future risks at that location.

Exposure Analysis

This portion of the analysis phase evaluates the interaction of one or more stressors on one or more ecological receptors (or assessment endpoints). The results of the exposure analysis are then combined with the toxicity reference values (TRVs) obtained from the toxicity evaluation to obtain estimates of risk (Section 4.1) in the form of hazard quotients (HQs) and hazard indices (HIs) for each receptor and COPC.

Since biota were not collected at the Roaring Fork Pond, it was necessary to create a second reference wetland risk assessment file (i.e., "ref_rfp") for comparison to the Roaring Fork Pond risks. This allowed for a comparable risk assessment by deriving predicted tissue concentrations for the dietary pathway. The BAFs were calculated from the sediment and vegetation tissue concentrations at both the New Rifle and reference wetlands, and then applied to the Roaring Fork Pond file and its reference comparison file ("ref_rfp"). Since the dietary pathway can contribute significant risks to the overall HIs, this approach allows for contribution of dietary intakes in the absence of tissue data.

Exposure Parameters

The species-specific parameters used to quantitate exposure are described in the following paragraphs; specific values used in the risk calculations are provided in Table A–8, Appendix A. In accordance with EPA guidance, both the central tendency (CT) and reasonable maximum exposure (RME) intakes were estimated for the key receptors. To evaluate the CT exposure intakes, the mean of the available data for each parameter was used. The RME exposure intake, which is more conservative, used the 95th percentile of the available data.

Home Range and Area Use Factor

Home range (HR) is the area that an animal is expected to occupy for feeding, breeding, and any other aspects of life history. The area of each site was divided by the HR for each receptor to obtain an area use factor (AUF). Table A–9, Appendix A presents the data used to obtain the CT and RME home range exposure parameters.

The HR values for the ecological receptors at New Rifle as listed in Table A–9, Appendix A were obtained from the EPA's *Wildlife Exposure Handbook* (EPA 1993).. When the site area is smaller than the HR area, the AUF is less than 1. This reflects the fact that the animal feeds and moves over an area larger than the particular site by integrating exposure over the entire HR. Therefore, overall exposure at the site is reduced. When the site area exceeds the HR, a value of 1 was used in the intake equations (i.e., exposure does not increase above 100 percent). Since all of the AUFs used in the risk estimates were equal to 1, incorporation of this exposure parameter had no effect on the exposure estimates. A summary of RME and CT AUFs by site and receptor is provided in Table A–9 in Appendix A. The average HR was used to obtain a CT AUF, whereas the minimum HR was used to obtain the RME or conservative AUF. An AUF was applied to the ingestion of sediments for aquatic receptors; however, no AUF was applied to surface water intakes in order to be conservative, and because animals may share a common water source, leaving their feeding territories to access drinking water. The areas for the New Rifle wetland, Roaring Fork Pond, and the reference wetland (One Mile Pond) are also provided in Table A–9, Appendix A.

Water Ingestion Rate

The water ingestion rate (WIR) is the daily amount of water ingested, normalized for body weight (liter water/kilogram body weight/day (L water/kg bw/d)). The 95th percentile WIR was used to conservatively estimate RME intakes, whereas the average WIR was used to estimate the CT intakes. Risk estimates for surface water ingestion were obtained by using unfiltered surface water based on EPA AWQC which are for dissolved (filtered) analytes. Unfiltered data were used in calculating surface water ingestion intakes since that is the portion ingested by the wildlife receptors.

Sediment Ingestion Rate

Aquatic animals (muskrat and great blue heron) and the mule deer were assumed to ingest sediment. The sediment ingestion rate (SIR) is the daily amount of sediment ingested and normalized to body weight (kilogram sediment/kilogram body weight/day (kg soil/kg bw/day). The SIR was predicted from the dietary ingestion rate (DIR, see below) (Table A–8, Appendix A) and the sediment fraction in diet (SFD) as follows:

$$SIR = DIR * SFD \quad \text{(Equation 6-4)}$$

The 95th percentile SIR was used to conservatively estimate RME intakes (Table A–8, Appendix A), whereas the average SIR was used to estimate the CT intakes (Table A–8, Appendix A).

Dietary Ingestion Rate

The DIR is the total daily amount of food ingested, normalized to body weight (kilogram diet/kilogram body weight/day [kg diet/kg bw/d]). The 95th percentile DIR was used to conservatively calculate RME intakes, whereas the average DIR was used to estimate the CT intakes. The adjusted DIR (DIR_{adj}) is the dietary ingestion rate minus the sediment component.

Body Weight

Minimum and maximum body weights (BW) were used in allometric equations (EPA 1993) to obtain estimates of DIR and WIR when measured estimates of these parameters are lacking.

Table A–8 in Appendix A summarize the exposure parameters that were used for the key ecological receptors for the RME and CT exposure scenarios for key receptors.

Exposure Intakes

The lower of the values for maximum or the upper 95 percent confidence limits on the arithmetic mean (UCL95) was used to represent the EPC for media in which contaminant concentrations were actually measured. Use of the UCL95 implies that 95 percent of the time, the mean concentration will fall below this value (ASTM 1994). If the UCL95 exceeds the maximum detected value at a site for a particular analyte, the maximum value is the more appropriate statistic from which to represent the EPC. EPCs were estimated by including all detects at their measured values; non-detects were also included at ½ the analyte detection limit.

To estimate EPCs for dietary intakes that were not directly measured, BAFs and bioconcentration factors (BCFs) were used to estimate tissue concentrations from sediment and surface water analyses, respectively. A BAF is simply the tissue concentration divided by the sediment (or soil) concentration, and similarly for BCFs (Equation 3-1a & b).

$$BAF = \frac{C_{tissue}}{C_{sed}} \qquad BCF = \frac{C_{tissue}}{C_{water}}$$

Vegetation tissue concentrations were available for the New Rifle and reference wetland; however, as explained above, vegetation tissue concentrations for dietary intakes for the mule deer and muskrat at the Roaring Fork Pond and the comparison reference wetland had to be estimated as follows:

$$C_{sed} * BAF = C_{tissue} \qquad \text{(Equation 3-2)}$$

Maximum BAFs calculated from either the New Rifle or reference wetlands (Table A–10, Appendix A) were used in the above equation to estimate vegetation tissue concentrations for metals where biota were not collected (i.e., Roaring Fork Pond). The site-specific Roaring Fork Pond sediment concentrations were substituted in the above concentration along with the BAF to obtain the estimated tissue concentration. Estimated EPCs of metals in both stems and roots were obtained in this manner.

Due to low or zero detection frequency (DF), BAFs could not be calculated for either selenium in stems or roots, and arsenic in cattail stems. The maximum reference wetland BAF for arsenic in cattail roots was also used to represent a BAF for arsenic in cattail stems.

BCFs were multiplied by the concentration in water to obtain the tissue concentration of aquatic organisms in the diet of the great blue heron for both the New Rifle wetland and Roaring Fork Pond as follows:

$$C_{water} * BCF = C_{tissue} \qquad \text{(Equation 3-3)}$$

Tissue concentrations in aquatic organisms were calculated using unfiltered surface water and literature-based BCFs (Table A–10, Appendix A).

Daily exposure intakes for each chemical were estimated by multiplying the daily media ingestion rate for a given receptor by the EPC in the same media. In order to estimate dietary intakes for ecological receptors, site-specific vegetation tissue EPCs were multiplied by an appropriate DIR normalized for body weight, and then multiplied by a site-specific AUF. Intakes were calculated for both cattail stems and roots.

Both the CT and RME intake scenarios were calculated for the key receptors. To evaluate the CT exposure scenario, average exposure parameters were used. The RME exposure scenario, which is more conservative, applied the 95th percentile exposure parameters.

The muskrat was assumed to ingest 50 percent cattail stems and 50 percent cattail roots, while the mule deer was assumed to ingest 100 percent cattail stems only.

Great blue herons forage primarily on fish (Butler 1992; Quinney and Smith 1980); however, in some environments rodents make up 24 to 40 percent of the diet (Butler 1992). Fish, frogs, crayfish, and water snakes are consumed by the great blue heron, as are birds and mice. For the purposes of modeling the dietary pathway for the great blue heron, aquatic invertebrates (20 percent), amphibians (20 percent), and fish (60 percent) were assumed to be major prey items. Because of the limited availability of BCFs, the dietary pathway could not be evaluated for most of the contaminants.

Exposure to volatile COPCs by inhalation was not evaluated since the COPCs are inorganics. Fugitive dust was not considered an exposure medium at either the New Rifle wetland or Roaring Fork Pond for the current exposure scenario.

During the exposure analysis process, it is necessary to consider exposure intensity, spatial occurrence, and duration. The primary product from this phase is the preparation of exposure and ecological effects profiles (i.e., stress-response profiles) for each receptor at each study location.

Exposure Equation

Exposure equations similar to those presented for HHRA (EPA 1989b) were used to estimate exposure intakes. The EPCs for each COPC were calculated and used to obtain daily exposure intakes. Intakes were calculated for each medium where analytical data were available. Daily exposure intakes were estimated by multiplying the daily media ingestion rate for a given receptor by the EPC in the same media.

The general surface water intake equation is:

$$Intake_{\,(mg/kg\ bw/day)} = WIR_{\,(L/kg\ bw/day)} * EPC_{\,(mg/L\ water)} \qquad \text{(Equation 3-4)}$$

where

WIR = water ingestion rate
EPC = exposure point concentration

The general sediment intake equation (Equation 3-5a) is:

$$Intake_{(mg/kgbw/d)} = DIR_{(kg/kgbw/d)} * Fraction\ Sediment\ Diet * EPC_{(mg/kg)} * AUF$$

which can be simplified to (Equation 3-5b):

$$Intake\ _{(mg/kg\ bw/day)} = SIR\ _{(mg/kg\ bw/day)} * EPC\ _{(mg/kg)} * AUF$$

where

DIR	=	dietary ingestion rate
SIR	=	sediment ingestion rate
AUF	=	area use factor (unitless)
EPC	=	exposure point concentration

In order to model intakes, aquatic receptors (muskrat, mule deer, and great blue heron) were assumed to ingest sediment.

The general dietary intake equation is:

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} * EPC_{(mg/kg)} * AUF \qquad \text{(Equation 3-6)}$$

where

DIR_{adj}	=	adjusted dietary ingestion rate, (DIR – DIR * SFD), mg/kg bw/day
SFD	=	sediment fraction in diet
EPC	=	exposure point concentration
AUF	=	area use factor (unitless)

Because each of the receptors has different feeding preferences (Appendix A), Equation 3-6 varies for each receptor. This is because the EPC in each dietary component must be estimated for each receptor from the BAF or BCF and appropriate abiotic and biotic media.

The equation for the muskrat dietary intakes at the New Rifle and reference wetlands is as follows (Equation 3-6a):

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} *(0.5 * EPC_{cattail\ stems} + 0.5 *EPC_{cattail\ stems}) * F_{plnt} * AUF$$

where

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day
F_{plnt}	=	fraction plant in diet (unitless)
EPC	=	exposure point concentration for cattail stems and cattail roots, mg/kg (wet-weight)
AUF	=	area use factor (unitless)

The equation for the muskrat dietary intakes at the Roaring Fork Pond and reference area for the Roaring Fork Pond is as follows (Equation 3-6b):

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} *(0.5 * BAF_{cattail\ stems} * EPC_{sed} + 0.5 *BAF_{cattail\ roots} * EPC_{sed}) * F_{plnt} * AUF$$

where

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day
F_{plnt}	=	fraction plant in diet (unitless)
EPC_{sed}	=	exposure point concentration for sediment in mg/kg (wet-weight)
AUF	=	area use factor (unitless)
$BAF_{cattail\ stems}$	=	bioaccumulation factor (maximum) from either New Rifle or reference wetland (unitless)
$BAF_{cattail\ roots}$	=	bioaccumulation factor (maximum) from either New Rifle or reference wetland (unitless)

The dietary intake equation for the mule deer at the New Rifle and reference wetlands is as follows (Equation 3-6c):

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} * EPC_{cattail\ stems} * F_{plnt} * AUF$$

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day
F_{plnt}	=	fraction plant in diet (unitless)
EPC	=	exposure point concentration for cattail stems, mg/kg (wet- weight)
AUF	=	area use factor (unitless)

The dietary intake equation for the mule deer at the Roaring Fork Pond and reference area for the Roaring Fork Pond is as follows (Equation 3-6d):

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} * BAF_{cattail\ stems} *EPC_{sed} * F_{plnt} * AUF$$

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day

F_{plnt}	=	fraction plant in diet (unitless)
EPC_{sed}	=	exposure point concentration for sediment, mg/kg
$BAF_{cattail\ stems}$	=	bioaccumulation factor (maximum) from either New Rifle or reference wetland (unitless)
AUF	=	area use factor (unitless)

The equation for the mule deer dietary intakes at the Roaring Fork Pond and reference area for the Roaring Fork Pond is as follows (Equation 3-6e):

$$Intake_{(mg/kg\ bw/day)} = DIR_{adj} *(0.5 * EPC_{cattail\ stems} + 0.5 *EPC_{cattail\ stems}) * F_{plnt} * AUF$$

where

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day
F_{plnt}	=	fraction plant in diet (unitless)
EPC	=	exposure point concentration for cattail stems and cattail roots, mg/kg (wet-weight)
AUF	=	area use factor (unitless)

The dietary intake equation for the great blue heron at all locations is as follows (Equation 3-6f):

$$Intake_{(mg/kg\ bw/day)} = ((BCF_f * EPC_{sw} * F_f * DIR_{adj}) + (BCF_{fr} * EPC_{sw} * F_{fr} * DIR_{adj}) + (BCF_{inv} * EPC_{sw} * F_{inv} * DIR_{adj}) * AUF)$$

where

DIR_{adj}	=	adjusted dietary ingestion rate, mg/kg bw/day
F_{inv}	=	fraction invertebrates in diet (unitless)
F_{fr}	=	fraction frogs in diet (unitless)
F_f	=	fraction fish in diet (unitless)
EPC_{sw}	=	exposure point concentration for unfiltered surface water, mg/L
AUF	=	area use factor (unitless)
BCF_f	=	bioconcentration factor for fish (unitless)
BCF_{ft}	=	bioconcentration factor for frogs (unitless)
BCF_{inv}	=	bioconcentration factor for invertebrates (unitless)

Table A–11 in Appendix A presents the results of the exposure intake calculations for the New Rifle wetlands and Roaring Fork Pond.

Ecological Effects Analysis

This step of the ERA focuses on the evaluation of ecological effects, such as mortality or changes in community structure, that can occur as a result of elevation of COPCs in the environment. Determining whether effects exist—and if they exist, whether they are due to milling activities—is the basis of the exposure and ecological effects profiles that result from the analysis of ecological effects.

Toxicity Evaluation

The risk assessment typically contains a toxicity assessment, which may be incorporated into the stress-response profiles. For this ERA, the toxicity information is provided in a tabular format, which provides the relevant studies, endpoints, uncertainty factors, and no observed adverse effects level (NOAEL) and lowest observed adverse effects level (LOAEL) TRVs. NOAEL values represent levels which have been demonstrated to produce to adverse effects in receptors for which they were developed. LOAEL values are the lowest exposure levels that have been shown to produce adverse effects of some type. Thus LOAEL exposure values are generally higher than NOAEL values. The toxicity assessment is provided in Tables A–12a and A–12b, Appendix A.

Toxicological data from the scientific literature were reviewed in order to define TRVs. The goal of the literature review was to obtain as many chemical and species-specific TRVs as possible for the risk characterization. The most pertinent studies reviewed for birds, mammals, aquatic plants and invertebrates are summarized in Appendix A. For the most part, the TRVs for aquatic life (i.e., benthic invertebrates, aquatic plants, and fish) are the *Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life and their Uses* (AWQC) and the SQC (EPA 1996) or other appropriate sediment benchmark. For water, the chronic value was used for the NOAEL TRV while the acute AWQC was used for the LOAEL TRV. A comparison was made between the effects range low (ERL) as a NOAEL TRV and the no effects concentration (NEC) for the LOAEL TRV. Due to the lack of available criteria, as a conservative measure, the minimum of either the ERL or NEC was used for the sediment TRV for both the NOAEL and LOAEL.

In order to select the most appropriate value to use as a final TRV, the following criteria were considered:

- Overall strength of the study
- Similarity of the test species to the key receptors
- Magnitude of the total applied uncertainty factors, which is related to the first two items

Tables A–13a and A–13b in Appendix A provide the final TRVs for the New Rifle key receptors.

The following data sources were evaluated for toxicity information:

- Toxline (an on-line database specializing in toxicological data)
- Biosis
- EPA documents
- Other sources including IRIS, HEAST, HSDB, and ATSDR

Selection of the TRVs focused on endpoints or health effects that are likely to adversely affect populations of ecological receptors at the site, as opposed to health effects such as cancer, which occurs on an individual basis. Health effects that potentially impact populations include increased mortality, high rates of morbidity, and reproductive effects. For the purposes of the risk assessment, reproductive effects include developmental effects (i.e., fetotoxicity and embryotoxicity), as well as indices of reproductive success such as reduced litter size. Carcinogenicity and mutagenicity were not used as endpoints for the ERA, as these are effects that alter an individual's chance of survival. If cancer rates were very high, the endpoint for the population would be survival.

The literature was reviewed for chronic NOAELs. Chronic studies, wherein ecological receptors are exposed for entire lifetimes, were considered preferable to studies of shorter duration. Where possible, data from short-term studies (i.e., single dose or less than a week) and dose levels or dietary intakes that resulted in mortality were avoided. If NOAELs were unavailable, the LOAEL or other toxicity value was used. Where data were available, toxicity values for wildlife species likely to be found at New Rifle were used.

Uncertainty factors (UFs; Table A–12c, Appendix A) associated with intertaxon extrapolation, and study endpoint and study duration were incorporated in the final TRV. The uncertainty factors were multiplied as appropriate and used as a denominator to reduce the TRV to reflect a chronic NOAEL value.

Site-by-Site Exposure and Ecological Effects Profiles

The exposure analysis results in exposure intakes for each COPC. Exposure intakes (mg/kg bw/day) were estimated for each receptor as appropriate, and for each COPC for the reference wetland, New Rifle wetland, and the Roaring Fork Pond. Exposure intakes were not calculated for benthic invertebrates and the creek chub, for which exposure was quantified for direct contact pathways only.

The ecological analysis results in site-by-site exposure and ecological effects profiles (sometimes referred to as "stress-response profiles"). Ecological effects profiles per se were not developed for this risk assessment as no field data were collected to address measures of effects. In accordance with the Section 404 requirements for monitoring wetland success, additional monitoring to provide this information is recommended as shown in Table 2–2.

4.0 Risk Characterization

The risk characterization phase of an ERA includes three main activities: 1) risk estimation, 2) risk description, and 3) an uncertainty analysis. If the data indicate a potential for unacceptable ecological risk, then quantitative risk estimates in the form of HQs and HIs are calculated. A risk description, which summarizes the ecological risks and their interpretation, and a qualitative uncertainty analysis, are also performed. The risk characterization weighs the results of the exposure analysis and ecological response analysis to obtain HQs. The HQs are summed as appropriate to obtain HIs.

HIs or HQs exceeding 1 for an ecological receptor may indicate the potential for unacceptable risk. The HQs and HIs from the reference area provide a measure of inherent risk. High levels of naturally occurring inorganics result in high indices of inherent risk. HIs for New Rifle and the Roaring Fork Pond were compared to HIs calculated from the reference wetland. The ratio of the

HIs between sites and the reference area is a measure of the relative risk. This indicates the proportion of risk due to milling-related activities.

4.1 Risk Estimation

The risk estimation step integrates the results of the exposure and ecological analysis phases. Risk estimates may be obtained through several approaches, which include development of HQs, analysis of any biological survey data, and evaluation of the laboratory phytoxicity test results to obtain stress-response or dose-response profiles.

The exposure intakes for the mule deer, muskrat and great blue heron were divided by the literature-based TRVs to obtain an HQ (Equation 4-1):

$$HQ = Exposure\ Intake\ (mg/kg\ bw/day) \div TRV\ (mg/kg\ bw/day)$$

Information that could be used to calculate the dietary ingestion rates for aquatic invertebrates is largely lacking in the literature reviewed. The EPCs for sediment and surface water were compared to the AWQC and the SQC to obtain HQs for aquatic life. The AWQC and SQC are protective of most of the species expected in the aquatic ecosystem and are not species-specific TRVs. Therefore, one risk estimate was made that applies to both the benthic invertebrates and creek chub. Subsequently, risk estimates for both the RME and CT exposure scenarios for these receptors would produce the same results.

The EPC for surface water was divided by the AWQC to obtain an HQ to address exposure by direct contact with surface water for benthic invertebrates and the creek chub (Equation 4-2):

$$HQ = \frac{EPC_{surface\ water}(\mu g/L)}{AWQC(\mu g/L)}$$

The EPC for sediment was divided by the minimum SQC to obtain an HQ to address exposure by direct contact with sediment for benthic invertebrates and the creek chub (Equation 4-3):

$$HQ = \frac{EPC_{sediment}\ (mg/kg)}{SQC\ (mg/kg)}$$

The EPC for sediment was divided by the TRV for aquatic plants to obtain an HQ for each COPC as follows (Equation 4-4):

$$HQ = \frac{EPC_{sediment}\ (mg/kg)}{TRV\ (mg/kg)}$$

In the absence of TRVs specific to aquatic plants, terrestrial toxicity benchmarks were used to obtain risk estimates.

HIs were calculated by summing all of the HQs for a given contaminant as appropriate for each of the exposure pathways as shown below:

$$HI = (HQ_{\text{sediment ingestion}} + HQ_{\text{surface water ingestion}} + HQ_{\text{dietary ingestion.}} + \ldots\ldots HQ_n) \quad \text{(Equation 4-5)}$$

A total HI (HI_{TOTAL}) was calculated by summation of HQs for all inorganic contaminants to facilitate comparison of one site to another. However, since all of the toxicological effects from contaminant exposure are not additive, it is recommended that risk decisions be made on individual HQs and HIs and not the HI_{TOTAL}.

The total HIs are summarized for each receptor below. The total HIs have been grouped by order of magnitude for discussion purposes. HIs based on RME and CT exposure parameters are presented. In addition, a conservative NOAEL-based TRV and a dose at which population-level effects may occur (LOAEL-based TRV) were used to establish the lower and upper bounds on toxicity, respectively. These values define the risk boundaries. There are thus four sets of HI values for each location (NOAEL-RME, NOAEL-CT, LOAEL-RME, and LOAEL-CT). These HIs are totals and summed across all exposure pathways. The HQs are presented in Tables A–14a through A–14d, Appendix A. Figures showing the NOAEL and LOAEL-based HI risks for both the RME and CT exposure scenarios by receptor as compared to the reference wetland are also included in Appendix A.

New Rifle Wetland

RME NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: Mule deer
HI Range 10.1-100: Muskrat, great blue heron, aquatic plants
HI Range 100.1-1000: Creek chub, benthic invertebrates

RME LOAEL HIs
Key Receptors with HI range 0-1: Mule deer, aquatic plants
HI Range 1.1-10: Muskrat, great blue heron
HI Range 10.1-100: Benthic invertebrates, creek chub
HI Range 100.1-1000: None.

CT NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: Mule deer
HI Range 10.1-100: Muskrat, great blue heron
HI Range 100.1-1000: Benthic invertebrates, creek chub

CT LOAEL HIs
Key Receptors with HI range 0-1: Mule deer
HI Range 1.1-10: Muskrat, great blue heron
HI Range 10.1-100: Benthic invertebrates, creek chub
HI Range 100.1-1000: None

Reference Wetland

RME NOAEL HIs

Key Receptors with HI range 0-1: None.
HI Range 1.1-10: Muskrat, mule deer
HI Range 10.1-100: Great blue heron, aquatic plants
HI Range 100.1-1000: Benthic invertebrates, creek chub

RME LOAEL HIs
Key Receptors with HI range 0-1: Mule deer, aquatic plants
HI Range 1.1-10: Muskrat, great blue heron, benthic invertebrates, creek chub
HI Range 10.1-100: None
HI Range 100.1-1000: None

CT NOAEL HIs
Key Receptors with HI range 0-1: Mule deer
HI Range 1.1-10: Muskrat
HI Range 10.1-100: Great blue heron
HI Range 100.1-1000: Benthic invertebrates, creek chub
CT LOAEL HIs
Key Receptors with HI range 0-1: Mule deer
HI Range 1.1-10: Muskrat, great blue heron, benthic invertebrates, creek chub
HI Range 10.1-100: None
HI Range 100.1-1000: None

Roaring Fork Pond

RME NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: None
HI Range 10.1-100: Great blue heron, aquatic plants
HI Range 100.1-1000: Mule deer
HI Range 1000.1-10,000: Muskrat, benthic invertebrates (HI=10.2K), creek chub (HI=10.2K)

RME LOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: Great blue heron, aquatic plants
HI Range 10.1-100: Mule deer
HI Range 100.1-1000: Muskrat, benthic invertebrates (HI=1039), creek chub (HI=1039)

CT NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: None
HI Range 10.1-100: Mule deer, great blue heron
HI Range 100.1-1000: None
HI Range 1000.1-10,000: Muskrat, benthic invertebrates (HI=10.2K), creek chub (HI=10.2K)

CT LOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: Great blue heron
HI Range 10.1-100: Mule deer

HI Range 100.1-1000: Muskrat, benthic invertebrates (HI=1039), creek chub (HI=1039)

Reference Wetland for Roaring Fork Pond

RME NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: None
HI Range 10.1-100: Mule deer, great blue heron, aquatic plants
HI Range 100.1-1000: Benthic invertebrates (HI=1151), creek chub (HI=1151)

RME LOAEL HIs
Key Receptors with HI range 0-1: Aquatic plants
HI Range 1.1-10: Mule deer, great blue heron
HI Range 10.1-100: None
HI Range 100.1-1000: Muskrat, benthic invertebrates, creek chub

CT NOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: None
HI Range 10.1-100: Mule deer, great blue heron
HI Range 100.1-1000: Muskrat (HI=1353), benthic invertebrates (HI=1150), creek chub (HI=1150)

CT LOAEL HIs
Key Receptors with HI range 0-1: None
HI Range 1.1-10: Mule deer, great blue heron
HI Range 10.1-100: None
HI Range 100.1-1000: Muskrat, benthic invertebrates, creek chub

Lines of Evidence. Supporting information that serves to strengthen the conclusions about risk are referred to as lines of evidence (EPA 1997a). In some cases, the lines of evidence based on site data may refute the risk conclusions from literature-based toxicity studies; however, these data are site-specific and therefore less uncertain, and are clearly identified. The lines of evidence available for the BLRA update are limited to cursory field observations. While no evidence of unacceptable ecological risk was apparent during site visits, the vegetation along the banks of the Roaring Fork Pond appeared rather sparse. This could be simply the result of extensive physical disturbance.

4.2 Risk Description

The risk description serves to document the threshold of contaminant levels that may affect the assessment endpoints. The lower bound was based on the literature-derived NOAEL TRVs combined with RME intake estimates. These are typically the most conservative of all estimates. The upper bound was based on potential or observed impacts such as LOAEL-based toxicity values combined with an RME intake estimate. The CT exposure scenario can be used to profile the risk estimates. For the purposes of this limited assessment, discussion will focus on the RME risks, as they are the most conservative.

The RME-NOAEL risks at the New Rifle wetland based on the total HIs are approximately twice as high as the reference wetland for the benthic invertebrates and creek chub. Risks for the great blue heron, mule deer, and aquatic plants are similar between the New Rifle and reference wetland. Risks to the muskrat are elevated above the reference wetland by about a factor of 3.

RME-NOAEL risks at the Roaring Fork Pond are substantially elevated with respect to the reference wetland for benthic invertebrates and the creek chub. Total HIs exceeding 10,000 were observed for these receptors. Risks to mule deer and muskrat are about twice as high at the Roaring Fork Pond compared to the reference wetland. Risks to the mule deer and aquatic plants are similar between locations.

Risk Drivers

A COPC producing an HQ of greater than or equal to 1 is considered a risk driver. The risk drivers for the New Rifle wetland and Roaring Fork Pond are summarized in tables located in Tables A–15a and A–15c; Appendix A. The inherent background risk drivers associated with the reference wetland are also included in Tables A–15b and A–15d, Appendix A.
The most notable RME-NOAEL risk drivers for the New Rifle wetland are:

- Vanadium – Great blue heron – sediment ingestion (HQ=23.1)
- Vanadium – Aquatic plants – sediment direct contact (HQ=16.6)
- Molybdenum – Muskrat – dietary ingestion (HQ=18.6)
- Fluoride – Benthic invertebrates and creek chub – surface water direct contact (HQ=240)
- Vanadium - Benthic invertebrates and creek chub – surface water direct contact (HQ=15.1)

The most notable RME-NOAEL risk drivers for the Roaring Fork Pond are:

- Iron – Muskrat – sediment ingestion (HQ=23.7)
- Sulfate – Muskrat – sediment ingestion (HQ=7.3)
- Vanadium – Great blue heron – sediment ingestion (HQ=22.5)
- Sulfate - Benthic invertebrates and creek chub – sediment direct contact (HQ=22.7)
- Vanadium – Aquatic plants – sediment direct contact (HQ=16.2)
- Cadmium – Muskrat – dietary ingestion (HQ=10.1)
- Iron – Muskrat – dietary ingestion (HQ=1,364)
- Manganese – Muskrat – dietary ingestion (HQ=5.6
- Molybdenum – Muskrat – dietary ingestion (HQ=10.8)

- Vanadium – Muskrat – dietary ingestion (HQ=71.6)
- Iron – Mule deer – dietary ingestion (HQ=35.5)
- Zinc – Mule deer – dietary ingestion (HQ=17.1)
- Manganese – Muskrat – surface water ingestion (HQ=5.1)
- Nitrate – Muskrat – surface water ingestion (HQ=73.4)
- Sulfate – Muskrat – surface water ingestion (HQ=1455)
- Sulfate – Mule deer – surface water ingestion (HQ=34.8)
- Nitrate – Great blue heron – surface water ingestion (HQ=13.4)
- Fluoride – Benthic invertebrates and creek chub – surface water direct contact (HQ=175)
- Sulfate - Benthic invertebrates and creek chub – surface water direct contact (HQ=9,933)
- Uranium - Benthic invertebrates and creek chub – surface water direct contact (HQ=61)

The risk ratio (RR) is a measure of relative risk expressed as a ratio, which compares the site risks as HQs to the reference area risks as HQs. Where the relative risks are presented as the site HIs divided by the HIs for the reference area, an HI ratio (HIR) is likewise obtained.
Tables A–16a and A–16b in Appendix A present the RRs and HIRs based on the RME-NOAEL risks for the New Rifle and Roaring Fork Ponds with respect to their reference areas. The most notable RRs for the New Rifle wetland compared to the reference wetland (i.e., RR ≥2) are as follows:

- Muskrat – Total NOAEL RR for all pathways = 3.1
- Mule deer - Total NOAEL RR for all pathways = 2.6

The most notable RRs (i.e., RR ≥2) for the Roaring Fork Pond compared to the reference wetland (REF_RFP) are as follows:

- Muskrat - Total NOAEL RR for all pathways = 2.0
- Benthic Invertebrates and creek chub - Total NOAEL RR for all pathways = 8.9
- Muskrat and mule deer – NOAEL RRs for surface water ingestion = 10.4
- Great blue heron – NOAEL RR for surface water ingestion = 124
- Benthic invertebrates and creek chub – NOAEL RRs for surface water direct contact = 9.0

4.3 Uncertainty Analysis

Uncertainty analysis (UA) is performed on the assumptions and data that comprise the ERA. The UA highlights areas of the ERA that are uncertain, and the potential impact that this has on the results. This process strengthens the ERA conclusions and aids in the formulation of recommendations for risk management decisions.

The EPA Superfund guidance (EPA 1997) addresses uncertainty in the risk characterization. It is acknowledged that the ERA process is an uncertain one, and the purpose of evaluating risk is not to eliminate risk but to identify uncertainty in the process to the extent possible (EPA 1997). The four major sources of uncertainty which are addressed in the ERA include:

- Uncertainty in the conceptual site model
- Natural variation in field data and soil chemistry
- Uncertainty in the exposure model and parameters
- Uncertainty in the sampling process and analytical methodology
- Uncertainty regarding the TRVs, and lack of values for some COPCs

Uncertainty in the ERA is addressed both qualitatively and quantitatively. There are two general approaches to tracking uncertainty quantitatively. The first is to develop point estimates for each exposure parameter and toxicity value, and to obtain a point estimate for the HQ and HI. By using different sets of exposure parameters (i.e., average (CT) or conservative (RME)) and toxicity values (i.e., NOAEL and LOAEL), the bounds of uncertainty of the risk estimates can be defined. The second approach is to perform a distributional analysis so that a distribution of the risks can be obtained. Such an analysis (e.g., Monte Carlo analysis) was not deemed necessary for this level of risk assessment.

The collection of co-located data at the sampling locations helps to reduce the uncertainty associated with the risk assessment results for the New Rifle wetland. This is also true at the Roaring Fork Pond, except that the lack of site-specific vegetation data increases the uncertainty at this location. Although not extensive, the number of samples collected (i.e., five at each location), should help to establish adequate coverage and reduce overall uncertainty. Uncertainty in the exposure estimates is due primarily to:

- Variability in the exposure parameters, which produce a natural distribution of the variables in the intake equations for each of the receptors;
- Exposure parameters are derived from the literature and were not measured on site;
- TRVs for some COPCs, especially strontium, anions and ammonia
- Uncertainty in the dietary ingestion pathway, which utilized BAFs derived from the New Rifle and reference wetlands to predict dietary concentrations;
- Variation in the concentrations of COPCs in the environment;

- Uncertainty as to whether the most conservative pathways have been addressed and evaluated.

The predicted effect of each of these sources of uncertainty on the risk assessment is as follows:

Variability in the exposure parameters—Because both the average and RME scenarios were quantitatively addressed, this source of uncertainty is expected to have no overall effect on the risk assessment results.

Exposure parameters derived from the literature— This source of uncertainty is expected to have no overall effect on the risk assessment since both RME and CT parameters were used.

Uncertainty in the toxicity reference values— The greatest uncertainty lies with the TRVs for sulfate, nitrate, phosphate, and ammonia. The absence of toxicity values results in underestimation of risks for a number of receptor-analyte combinations. Sediment quality criteria were lacking for ammonia, fluoride, molybdenum, nitrate, phosphate, selenium, strontium, uranium, and vanadium. Freshwater quality criteria were lacking for nitrate, and screening benchmarks from ORNL (ORNL 1996) for strontium and uranium were substituted in the absence of regulatory criteria. These uncertainties are discussed in greater detail in a summary fashion in Tables A–17a and A–17b, Appendix A.

Uncertainty in the dietary ingestion pathway—The use of BAFs derived from the New Rifle and reference wetlands is expected to overestimate risks for the dietary pathway at the Roaring Fork. This is because maximum values for the BAFs were used for all of the metals.

Variation in the concentrations of COPCs in the environment—This uncertainty is not expected to bias the risk assessment towards underestimation of risk since maximum or UCL95 concentrations were used in all exposure scenarios to estimate the EPCs.

Uncertainty as to whether the most conservative pathways have been addressed—The receptors were considered carefully, and typically have high exposure rates due to their life-histories (i.e., aquatic ecosystem inhabitants). The greatest uncertainty is associated with dietary intakes for the great blue heron. It is likely that risks to this receptor have been significantly underestimated because this receptor's preferred diet includes fish, frogs, and invertebrates. The BCFs and BAFs for these food items were largely lacking. The direct contact with sediment pathway was underestimated for benthic invertebrates, fish (i.e., creek chub), and aquatic plants since there were few sediment quality criteria available for comparison.

5.0 Conclusions and Recommendations

Ecological risks are not substantially elevated at the New Rifle wetland relative to the reference wetland based on the HIRs presented above. The risks to strictly aquatic receptors (i.e., muskrat, benthic invertebrates, and creek chub) at the Roaring Fork Pond are considerably elevated with respect to the reference wetland. This is especially of concern for the surface water ingestion and direct contact pathways for these receptors. It is also likely that the risks to the great blue heron are underestimated at the Roaring Fork Pond and New Rifle wetland since uncertainty is high for the dietary ingestion pathway. The potential exists at this location for deleterious ecological effects to occur based on the concentrations of COPCs in sediment and surface water in the ponds. Tables A–17a and A–17b, Appendix A, provide a summary of ecological COPCs for New Rifle wetland and the Roaring Fork Pond based on the 1998 data and the results of the QRA.

Since there are no field-associated lines of evidence to refute or substantiate the risk assessment, monitoring of the revegetated wetland and Roaring Fork Pond is recommended. At a minimum, water quality, wildlife observations, and fish and aquatic invertebrate counts should be included in the monitoring program.

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Appendix A

ERA Summary Tables

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics For New Rifle Wetland - Inorganics in Sediment (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	0.69	5.40	2.06	1.93	3.90	3.90	mg/kg
Arsenic	5	5	100	7.80	10.80	9.21	1.18	10.33	10.33	mg/kg
Cadmium	5	5	100	0.45	0.82	0.61	0.14	0.74	0.74	mg/kg
Fluoride	5	5	100	4.50	7.20	6.09	1.21	7.25	7.20	mg/kg
Iron	5	5	100	10400	16,200	13,240	2,131	15,272	15,272	mg/kg
Manganese	5	5	100	251.0	356.0	309.6	39.90	347.6	347.6	mg/kg
Molybdenum	5	5	100	1.2	2.4	1.5	0.51	2.0	2.0	mg/kg
Nitrate	5	5	100	5.80	133.00	36.88	54.32	88.67	88.67	mg/kg
Percent Solids	5	5	100	78.16	79.94	79.13	0.74	79.84	79.84	%
Selenium	0	5	0	0.13	0.13	0.13	0	NA	0.13	mg/kg
Strontium	5	5	100	137.0	357.0	207.2	89.37	292.4	292.4	mg/kg
Sulfate	5	5	100	55.50	108.00	73.17	20.63	92.84	92.84	mg/kg
Total Phosphorus as PO_4	5	5	100	2.30	4.70	3.52	0.98	4.46	4.46	mg/kg
Uranium	5	5	100	3.20	5	4	0.48	4.27	4.27	mg/kg
Vanadium	5	5	100	24.20	36.90	28.15	5.26	33.17	33.17	mg/kg
Zinc	5	5	100	39.65	53.00	46.67	5.11	51.54	51.54	mg/kg

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Summary Statistics For New Rifle Wetland - Inorganics in Filtered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	0.04	0.62	0.18	0.25	0.4	0.42	mg/L
Arsenic	3	5	60	0.003	0.009	0.006	0.003	0.01	0.01	mg/L
Cadmium	0	5	0	0.001	0.001	0.001	0	NA	0.001	mg/L
Calcium Carbonate	5	5	100	181.0	253.0	219.1	26.00	243.9	243.9	mg/L
Fluoride	5	5	100	0.42	0.67	0.56	0.10	0.65	0.65	mg/L
Hardness	5	5	100	347.0	419.0	384.7	27.63	411.0	411.0	mg/L
Iron	3	5	60	0.01	0.02	0.01	0.01	0.02	0.02	mg/L
Manganese	5	5	100	0.01	0.02	0.01	0.004	0.02	0.02	mg/L
Molybdenum	5	5	100	0.03	0.08	0.06	0.02	0.08	0.08	mg/L
Nitrate	2	5	40	0.05	2.57	0.62	1.10	1.668	1.67	mg/L
Selenium	1	5	20	0.001	0.002	0.001	0.0003	0.001	0.001	mg/L
Strontium	5	5	100	0.80	1.36	1.13	0.21	1.33	1.33	mg/L
Sulfate	5	5	100	91.70	158.0	130.8	24.61	154.3	154.3	mg/L
Total Phosphorus as PO_4	1	5	20	0.02	0.06	0.03	0.02	0.04	0.04	mg/L
Uranium	5	5	100	0.01	0.04	0.03	0.01	0.04	0.04	mg/L
Vanadium	3	5	60	0.003	0.01	0.01	0.003	0.01	0.01	mg/L
Zinc	4	5	80	0.002	0.01	0.004	0.002	0.006	0.01	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics For New Rifle Wetland - Inorganics in Unfiltered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH4	5	5	100	0.064	0.080	0.071	0.006	0.077	0.077	mg/L
Arsenic	5	5	100	0.0042	0.009	0.0063	0.0020	0.008	0.01	mg/L
Cadmium	0	5	0	0.001	0.001	0.001	0	NA	0.0006	mg/L
Calcium Carbonate	5	5	100	222.0	276.0	239.2	22.35	260.5	260.5	mg/L
Fluoride	5	5	100	0.429	0.656	0.54	0.08	0.62	0.62	mg/L
Hardness	5	5	100	379.0	457.0	412.0	30.74	441.3	441.3	mg/L
Iron	4	5	80	0.104	1.49	0.61	0.58	1.17	1.17	mg/L
Manganese	1	5	20	0.008	0.11	0.032	0.044	0.074	0.074	mg/L
Molybdenum	5	5	100	0.03	0.072	0.058	0.016	0.074	0.072	mg/L
Nitrate	0	5	0	0.040	0.071	0.051	0	NA	0.071	mg/L
Selenium	0	5	0	0.0011	0.0011	0.0011	0	NA	0.0011	mg/L
Strontium	5	5	100	0.81	1.38	1.15	0.21	1.35	1.35	mg/L
Sulfate	5	5	100	87.80	151.0	128.0	24.11	151.0	151.0	mg/L
Total Phosphorus as PO4	3	5	60	0.022	0.057	0.038	0.017	0.054	0.054	mg/L
Uranium	5	5	100	0.0094	0.037	0.028	0.011	0.038	0.037	mg/L
Vanadium	0	5	0	0.0028	0.0028	0.0028	0	NA	0.0028	mg/L
Zinc	0	5	0	0.003	0.010	0.0053	0	NA	0.010	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA- Not applicable.
EPC- Exposure point concentration, mg/L

Summary Statistics for the New Rifle Wetland - Metals in Cattail Roots (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units (wet-weight)
Arsenic	4	5	80	0.65	4.90	2.59	1.53	4.05	4.05	mg/kg
Cadmium	5	5	100	0.23	0.51	0.34	0.12	0.45	0.45	mg/kg
Iron	5	5	100	1580	7500	3896	2180	5974	5974	mg/kg
Manganese	5	5	100	105	220	165	45	208	208	mg/kg
Molybdenum	5	5	100	2.0	5.0	2.9	1.2	4.0	4.0	mg/kg
Selenium	0	5	0	0.10	0.25	0.14	0	NA	0.25	mg/kg
Strontium	5	5	100	85.50	143.0	111.3	28.69	138.7	138.7	mg/kg
Uranium	5	5	100	0.63	2.00	1.45	0.51	1.93	1.93	mg/kg
Vanadium	5	5	100	6.50	28.50	14.32	8.31	22.24	22.24	mg/kg
Zinc	5	5	100	15.80	34.30	27.80	7.73	35.17	34.30	mg/kg
Loss on Drying	5	5	100	85.50	90.70	87.70	2.17	89.8	89.77	%

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Summary Statistics for the New Rifle Wetland - Metals in Cattail Stems (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units (wet-weight)
Arsenic	0	5	0	0.42	0.65	0.49	0	NA	0.65	mg/kg
Cadmium	5	5	100	0.08	0.75	0.26	0.3	0.52	0.52	mg/kg
Iron	5	5	100	261.00	779.00	516.60	211.15	717.92	717.92	mg/kg
Manganese	5	5	100	300.0	457.0	372.9	64.8	434.7	434.7	mg/kg
Molybdenum	5	5	100	2.7	8.4	5.1	2.1	7.1	7.1	mg/kg
Selenium	1	5	20	0.40	0.95	0.61	0.23	0.83	0.83	mg/kg
Strontium	5	5	100	141.00	230.00	186.50	37.22	221.98	221.98	mg/kg
Uranium	4	5	80	0.05	0.19	0.12	0.05	0.17	0.17	mg/kg
Vanadium	5	5	100	0.93	2.05	1.48	0.45	1.90	1.90	mg/kg
Zinc	5	5	100	24.50	33.50	28.99	3.30	32.14	32.14	mg/kg
Loss on Drying	5	5	100	86.6	89.0	87.3	1.00	88.3	88.3	%

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics For Roaring Fork Pond - Inorganics in Sediment (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	64.20	114.0	84.36	20.15	103.6	103.6	mg/kg
Arsenic	5	5	100	4.20	7.40	5.90	1.31	7.15	7.15	mg/kg
Cadmium	5	5	100	0.36	0.90	0.54	0.21	0.74	0.74	mg/kg
Fluoride	5	5	100	1.90	4.70	3.08	1.15	4.18	4.18	mg/kg
Iron	5	5	100	10,800	18,600	15,400	2,986	18,247	18,247	mg/kg
Manganese	5	5	100	230.0	458.0	332.1	92.66	420.4	420.4	mg/kg
Molybdenum	5	5	100	1.10	4.50	2.24	1.32	3.50	3.50	mg/kg
Nitrate	5	5	100	71.20	214.0	149.8	58.01	205.2	205.2	mg/kg
Percent Solids	5	5	100	65.61	79.53	72.20	6.27	78.17	78.17	%
Selenium	1	5	20	0.13	0.47	0.20	0.15	0.35	0.35	mg/kg
Strontium	5	5	100	52.8	89.5	63.9	15.98	79.2	79.2	mg/kg
Sulfate	5	5	100	939.5	2,880	1,908	871	2,739	2,739	mg/kg
Total Phosphorus as PO_4	5	5	100	0.98	3.70	2.56	1.06	3.56	3.56	mg/kg
Uranium	5	5	100	3.80	6.25	5.05	0.92	5.93	5.93	mg/kg
Vanadium	5	5	100	27.70	34.50	29.77	2.72	32.36	32.36	mg/kg
Zinc	5	5	100	58.10	103.0	71.64	17.94	88.74	88.74	mg/kg

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Summary Statistics For Roaring Fork Pond - Inorganics in Filtered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	95.40	99.50	97.78	1.60	99.3	99.30	mg/L
Arsenic	5	5	100	0.0036	0.0058	0.0046	0.0011	0.0056	0.0056	mg/L
Cadmium	0	5	0	0.0005	0.0005	0.0005	0	NA	0.0005	mg/L
Calcium Carbonate	5	5	100	919.0	953.0	936.2	14.81	950.3	950.3	mg/L
Fluoride	5	5	100	0.44	0.48	0.45	0.02	0.47	0.47	mg/L
Hardness	5	5	100	1380	1440	1413	26.36	1438	1438	mg/L
Iron	1	5	20	0.0055	0.013	0.0070	0.0034	0.010	0.010	mg/L
Manganese	5	5	100	0.16	0.17	0.16	0.004	0.17	0.17	mg/L
Molybdenum	5	5	100	0.49	0.51	0.50	0.01	0.51	0.51	mg/L
Nitrate	5	5	100	444.0	462.0	451.0	7.21	457.9	457.9	mg/L
Selenium	4	5	80	0.0010	0.0040	0.0022	0.0011	0.0033	0.0033	mg/L
Strontium	5	5	100	3.28	3.45	3.38	0.08	3.46	3.45	mg/L
Sulfate	5	5	100	2,680	2,840	2,754	71.97	2,823	2,823	mg/L
Total Phosphorus as PO_4	0	5	0	0.022	0.022	0.022	0	NA	0.022	mg/L
Uranium	5	5	100	0.15	0.16	0.15	0.0036	0.16	0.16	mg/L
Vanadium	5	5	100	0.0064	0.0095	0.0078	0.0014	0.0092	0.0092	mg/L
Zinc	4	5	80	0.0015	0.019	0.0083	0.0079	0.016	0.016	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics For Roaring Fork Pond - Inorganics in Unfiltered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	96.40	97.90	97.05	0.60	97.62	97.62	mg/L
Arsenic	5	5	100	0.0032	0.0043	0.0039	0.00044	0.0043	0.0043	mg/L
Cadmium	0	5	0	0.00055	0.00055	0.00055	0	NA	0.00055	mg/L
Calcium Carbonate	5	5	100	960.0	975.0	968.3	6.76	974.7	974.7	mg/L
Fluoride	5	5	100	0.41	0.45	0.44	0.014	0.45	0.45	mg/L
Hardness	5	5	100	1,450	1,470	1,464	8.94	1,473	1,470	mg/L
Iron	1	5	20	0.045	0.27	0.12	0.09	0.20	0.20	mg/L
Manganese	5	5	100	0.211	0.25	0.23	0.014	0.24	0.24	mg/L
Molybdenum	5	5	100	0.50	0.52	0.51	0.0071	0.52	0.52	mg/L
Nitrate	5	5	100	443.0 N (98)	450.0 N (101)	447.0 N(99)	2.74	449.6	449.6	mg/L
Selenium	0	5	0	0.0011	0.0011	0.0011	0.0	NA	0.0011	mg/L
Strontium	5	5	100	3.30	3.35	3.32	0.020	3.34	3.34	mg/L
Sulfate	5	5	100	2,720	2,850	2,765	57.66	2,820	2,820	mg/L
Total Phosphorus as PO_4	0	5	0	0.022	0.0215	0.022	0	NA	0.022	mg/L
Uranium	5	5	100	0.16	0.16	0.157	0.0017	0.159	0.159	mg/L
Vanadium	0	5	0	0.0028	0.0028	0.0028	0	NA	0.0028	mg/L
Zinc	0	5	0	0.0033	0.0089	0.0051	0.0023	0.0072	0.0089	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA- Not applicable.
EPC- Exposure point concentration, mg/L

Summary Statistics For the Reference Wetland - Inorganics in Sediment (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	0.56	6.80	2.80	2.57	5.25	5.25	mg/kg
Arsenic	5	5	100	5.30	7.20	6.34	0.80	7.10	7.10	mg/kg
Cadmium	3	5	60	0.07	0.17	0.12	0.05	0.16	0.16	mg/kg
Fluoride	5	5	100	8.80	10.45	9.55	0.67	10.19	10.19	mg/kg
Iron	5	5	100	12100	16,800	15,200	1,883	16,995	16,800	mg/kg
Manganese	5	5	100	250.0	329.0	296.4	28.64	323.7	323.7	mg/kg
Molybdenum	1	5	20	0.3	0.8	0.4	0.23	0.6	0.6	mg/kg
Nitrate	0	5	0	0.80	1.03	0.93	0	NA	1.03	mg/kg
Percent Solids	5	5	100	68.81	74.46	72.08	2.34	74.31	74.31	%
Selenium	0	5	0	0.14	0.15	0.14	0	NA	0.15	mg/kg
Strontium	5	5	100	96.5	145.0	122.5	18.05	139.7	139.7	mg/kg
Sulfate	5	5	100	424.0	2,110	1,042	669	1,680	1,680	mg/kg
Total Phosphorus as PO_4	0	5	0	0.29	0.31	0.30	0	NA	0.31	mg/kg
Uranium	5	5	100	4.50	5.65	4.93	0.49	5.40	5.40	mg/kg
Vanadium	5	5	100	19.80	32.00	27.30	5.01	32.08	32.00	mg/kg
Zinc	5	5	100	37.40	50.00	45.24	4.80	49.81	49.81	mg/kg

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA- Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics For the Reference Wetland - Inorganics in Filtered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	0.04	0.11	0.07	0.03	0.1	0.097	mg/L
Arsenic	5	5	100	0.002	0.005	0.004	0.001	0.00	0.0049	mg/L
Cadmium	0	5	0	0.001	0.001	0.001	0	NA	0.001	mg/L
Calcium Carbonate	5	5	100	155.0	189.0	175.1	12.76	187.3	187.3	mg/L
Fluoride	5	5	100	0.28	0.41	0.32	0.05	0.37	0.37	mg/L
Hardness	5	5	100	331.0	400.0	369.8	25.20	393.8	393.8	mg/L
Iron	5	5	100	0.04	0.11	0.08	0.03	0.11	0.11	mg/L
Manganese	5	5	100	0.18	0.70	0.39	0.233	0.61	0.61	mg/L
Molybdenum	4	5	80	0.001	0.003	0.002	0.001	0.0024	0.0024	mg/L
Nitrate	0	5	0	0.04	0.06	0.05	0	NA	0.06	mg/L
Selenium	1	5	20	0.001	0.002	0.001	0.0005	0.002	0.002	mg/L
Strontium	5	5	100	1.02	1.26	1.12	0.09	1.21	1.21	mg/L
Sulfate	5	5	100	249.00	291.0	267.2	15.27	281.8	281.8	mg/L
Total Phosphorus as PO_4	1	5	20	0.02	0.45	0.11	0.19	0.29	0.29	mg/L
Uranium	5	5	100	0.005	0.008	0.006	0.002	0.008	0.008	mg/L
Vanadium	2	5	40	0.003	0.01	0.004	0.002	0.01	0.01	mg/L
Zinc	4	5	80	0.002	0.02	0.009	0.007	0.016	0.02	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA- Not applicable.
EPC- Exposure point concentration

Summary Statistics For the Reference Wetland - Inorganics in Unfiltered Surface Water (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units
Ammonia as NH_4	5	5	100	0.030	0.12	0.057	0.037	0.092	0.092	mg/L
Arsenic	5	5	100	0.0028	0.006	0.0054	0.0015	0.007	0.01	mg/L
Cadmium	0	5	0	0.001	0.001	0.001	0	NA	0.0006	mg/L
Calcium Carbonate	5	5	100	178.0	192.0	185.7	5.19	190.6	190.6	mg/L
Fluoride	5	5	100	0.284	0.362	0.32	0.03	0.35	0.35	mg/L
Hardness	5	5	100	382.0	413.0	396.7	11.44	407.6	407.6	mg/L
Iron	4	5	80	0.109	0.308	0.25	0.08	0.33	0.31	mg/L
Manganese	5	5	100	0.204	0.829	0.477	0.243	0.709	0.709	mg/L
Molybdenum	0	5	0	0.00	0.001	0.001	0	NA	0.001	mg/L
Nitrate	0	5	0	0.015	0.079	0.043	0	NA	0.079	mg/L
Selenium	0	5	0	0.0011	0.0011	0.0011	0	NA	0.0011	mg/L
Strontium	5	5	100	1.04	1.22	1.13	0.07	1.19	1.19	mg/L
Sulfate	5	5	100	250.00	291.0	269.2	15.29	283.8	283.8	mg/L
Total Phosphorus as PO_4	3	5	60	0.022	0.442	0.181	0.203	0.375	0.375	mg/L
Uranium	5	5	100	0.0049	0.009	0.007	0.002	0.009	0.009	mg/L
Vanadium	0	5	0	0.0028	0.0028	0.0028	0	NA	0.0028	mg/L
Zinc	1	5	20	0.002	0.010	0.0045	0.003	0.008	0.008	mg/L

UCL95 - Upper 95% confidence limit.
mg/L - milligrams per liter
NA - Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-1. Summary Statistics for Ecological Risk Assessment

Summary Statistics for the Reference Wetland - Metals in Cattail Roots (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units (wet-weight)
Arsenic	5	5	100	5.50	9.20	7.32	1.38	8.63	8.63	mg/kg
Cadmium	5	5	100	0.28	0.37	0.32	0.03	0.36	0.36	mg/kg
Iron	5	5	100	7,040	15,900	12,168	3,231	15,249	15,249	mg/kg
Manganese	5	5	100	249.0	377.0	292.3	49.32	339.3	339.3	mg/kg
Molybdenum	5	5	100	0.75	1.30	0.99	0.22	1.20	1.20	mg/kg
Selenium	0	5	0	0.10	0.10	0.10	0	NA	0.10	mg/kg
Strontium	5	5	100	119.0	144.0	129.5	10.40	139.4	139.4	mg/kg
Uranium	5	5	100	1.90	3.40	2.80	0.64	3.41	3.40	mg/kg
Vanadium	5	5	100	15.80	39.70	28.70	8.68	36.97	36.97	mg/kg
Zinc	5	5	100	48.20	64.30	53.60	6.61	59.90	59.90	mg/kg
Loss on Drying	5	5	100	82.30	93.20	89.64	4.40	93.8	93.20	%

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA - Not applicable.
EPC- Exposure point concentration, mg/kg

Summary Statistics for the Reference Wetland - Metals in Cattail Stems (Eco-1998)

Analyte	Number of Detects	Number of Samples	% Detects	Minimum	Maximum	Average	Std. Deviation	UCL95	EPC	Units (wet-weight)
Arsenic	0	5	0	0.34	0.65	0.42	0	NA	0.65	mg/kg
Cadmium	4	5	80	0.05	0.54	0.25	0.2	0.42	0.42	mg/kg
Iron	5	5	100	370.0	2,710	984.8	992.8	1,931	1,931	mg/kg
Manganese	5	5	100	344.0	638.5	504.9	126.5	625.5	625.5	mg/kg
Molybdenum	5	5	100	0.6	1.1	0.8	0.2	1.0	1.0	mg/kg
Selenium	0	5	0	0.15	0.27	0.20	0	NA	0.27	mg/kg
Strontium	5	5	100	115.0	166.0	145.0	18.85	163.0	163.0	mg/kg
Uranium	5	5	100	0.11	0.46	0.26	0.18	0.43	0.43	mg/kg
Vanadium	5	5	100	0.73	4.10	1.77	1.35	3.05	3.05	mg/kg
Zinc	5	5	100	18.70	38.90	26.04	8.02	33.68	33.68	mg/kg
Loss on Drying	5	5	100	86.7	92.5	89.8	2.24	91.9	91.9	%

UCL95 - Upper 95% confidence limit.
mg/kg - milligrams per kilogram
NA - Not applicable.
EPC- Exposure point concentration, mg/kg

Table A-2. Results of Statistical Testing

Summary of Analyte Data Evaluations By Matrix - 1998 New Rifle Ecological Sampling

Analyte	Site Maximum Concentration of Concern	QC Check on Resolution	Matrix	Submatrix	Filtered / Unfiltered	Test	Test Result	N	Location	Comment
Ammonia as NH_4			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum < reference area maximum
Arsenic	10.8	√	Sediment	None	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Cadmium	0.82	√	Sediment	None	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs NRW	100% DF at NRW; 3/5 detects at reference area
Fluoride			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW values all < reference area values
Iron		√	Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	revised test results based on rerun of NRW Location 1207
Manganese		√	Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	test results based on rerun of NRW Location 1207
Molybdenum	2.4	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**Only 1 detect at reference area; 100% DF at NRW - visual inspection sufficient to discern differences**
Nitrate	133	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at reference area; all detects at NRW; visual inspection sufficient to discern differences**
Phosphate	4.7	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at reference area; all detects at NRW- visual inspection sufficient to discern differences**
Selenium			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Strontium	357	√	Sediment	None	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs NRW	**Includes rerun value of NRW Loc. 1207**
Sulfate			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	All NRW values << reference area
Uranium			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value; detects at all locations
Vanadium			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	
Zinc			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	
Ammonia as NH_4			Surface water	None	Filtered	KW	Means are same	5 vs 5	Reference area vs NRW	
Arsenic			Surface water	None	Filtered	KW	Means are same	5 vs 5	Reference area vs NRW	3 of 5 detects at NRW; 100% DF at reference area
Cadmium			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Fluoride	0.674	√	Surface water	None	Filtered	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Iron			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	All NRW detects (3) << all reference area detects (5 of 5)
Manganese			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	All NRW values << reference area values
Molybdenum	0.0775	√	Surface water	None	Filtered	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Nitrate	2.57	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	**2 detects - NRW; no detects at reference area ; maximum value is 2.57 mg/L (location 1209)**
Phosphate			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	Single NRW detect << single reference area detect
Selenium			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	Single NRW detect < single reference area detect
Strontium			Surface water	None	Filtered	KW	Means are same	5 vs 5	Reference area vs NRW	
Sulfate			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	All NRW values << all reference area values
Uranium	0.0395	√	Surface water	None	Filtered	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Vanadium	0.011	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	**Only 2 detects at reference area; 3 detects at NRW - look at differences between maxima**
Zinc			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW detect < maximum reference area detect
Ammonia as NH_4			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW detect < maximum reference area detect
Arsenic			Surface water	None	Unfiltered	KW	Means are same	5 vs 5	Reference area vs NRW	
Cadmium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Fluoride	0.656	√	Surface water	None	Unfiltered	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Iron			Surface water	None	Unfiltered	KW	Means are same	5 vs 5	Reference area vs NRW	No change in results - both reference area and NRW had one nondetect
Manganese			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	Single NRW detect < all reference area values
Molybdenum	0.0721	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at reference area; 100% DF at NRW; visible inspection sufficient to discern differences**
Nitrate			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Phosphate			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW detect < maximum reference area detect
Selenium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Strontium			Surface water	None	Unfiltered	KW	Means are same	5 vs 5	Reference area vs NRW	
Sulfate			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	All NRW values < all reference area values
Uranium	0.0371	√	Surface water	None	Unfiltered	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Vanadium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Zinc			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs NRW	Only 1 detect - reference area
Arsenic			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Cadmium			Cattail	Stems	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	**4 detects out of 5 samples at reference area; 100% DF at NRW**
Iron			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value
Manganese			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value
Molybdenum	8.4	√	Cattail	Stems	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Selenium	0.95	√	Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**Only 1 detect at any location (NRW 1210 - 0.95 mg/kg)**
Strontium			Cattail	Stems	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	
Uranium			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value; 4 detects out of 5 samples (NRW); 100% DF at reference area
Vanadium			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value
Zinc			Cattail	Stems	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	NRW maximum value < reference area maximum value
Arsenic			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	All 4 NRW detects < all reference area values
Cadmium			Cattail	*Roots*	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	
Iron			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW value < maximum reference area value
Manganese			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW value < maximum reference area value
Molybdenum	5	√	Cattail	*Roots*	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs NRW	
Selenium			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	**No detects at any location**
Strontium			Cattail	*Roots*	Not applicable	KW	Means are same	5 vs 5	Reference area vs NRW	
Uranium			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW value < maximum reference area value
Vanadium			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW value < maximum reference area value
Zinc			Cattail	*Roots*	Not applicable	None	Not applicable	5 vs 5	Reference area vs NRW	Maximum NRW value < maximum reference area value

Table A-2. Results of Statistical Testing

Summary of Analyte Data Evaluations By Matrix - 1998 New Rifle Ecological Sampling

Analyte	Site Maximum Concentration of Concern	QC Check on Resolution	Matrix	Submatrix	Filtered / Unfiltered	Test	Test Result	N	Location	Comment
Ammonia as NH_4		√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient to discern differences**
Arsenic			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	RFP maximum value (7.4 mg/kg) @ reference area maximum (7.2 mg/kg)
Cadmium	0.9	√	Sediment	None	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs RFP	**RFP detects (5/5) > reference area detects (3/5)**
Fluoride			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	All RFP values < all reference area values; visual inspection sufficient
Iron			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs RFP	
Manganese			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs RFP	
Molybdenum	4.5	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values > single reference area detect; visual inspection sufficient to discern differences**
Nitrate	214	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	**No reference area detects; 100% DF at RFP; visual inspection sufficient to discern differences**
Phosphate	3.7	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	**No reference area detects; 100% DF at RFP; visual inspection sufficient to discern differences**
Selenium	0.47	√	Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	**Only 1 detect at any location (RFP Location 1213 (0.47 mg/kg))**
Strontium			Sediment	None	Not applicable	None	Not applicable	5 vs 5	Reference area vs RFP	All RFP values < all reference area values; visual inspection sufficient
Sulfate			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs RFP	
Uranium			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs RFP	
Vanadium			Sediment	None	Not applicable	KW	Means are same	5 vs 5	Reference area vs RFP	
Zinc	103	√	Sediment	None	Not applicable	KW	**Means are different**	5 vs 5	Reference area vs RFP	
Ammonia as NH_4	99.5	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Arsenic			Surface water	None	Filtered	KW	Means are same	5 vs 5	Reference area vs RFP	
Cadmium			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**No detects at any location**
Fluoride	0.483	√	Surface water	None	Filtered	KW	**Means are different**	5 vs 5	Reference area vs RFP	
Iron			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	Single RFP detect < all reference area values
Manganese			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	All RFP values < all reference area values; visual inspection sufficient
Molybdenum	0.511	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Nitrate	462	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Phosphate			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	No detects at RFP; only 1 detect at reference area
Selenium	0.004	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**Only single reference area detect; 4 detects at RFP; maximum RFP detect approx. 2x reference area detect**
Strontium	3.45	√	Surface water	None	Filtered	KW	**Means are different**	5 vs 5	Reference area vs RFP	
Sulfate	2840	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Uranium	0.158	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Vanadium	0.0095	√	Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	**RFP 100% DF; 2 detects at reference area; maximum RFP detect (0.0095 mg/L) > reference area maximum detect (0.0081 mg/L)**
Zinc			Surface water	None	Filtered	None	Not applicable	5 vs 5	Reference area vs RFP	Maximum RFP detect < maximum reference area detect; 80% DF at both areas
Ammonia as NH_4	97.9	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Arsenic			Surface water	None	Unfiltered	KW	Means are same	5 vs 5	Reference area vs RFP	
Cadmium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**No detects at any location**
Fluoride	0.447	√	Surface water	None	Unfiltered	KW	**Means are different**	5 vs 5	Reference area vs RFP	
Iron			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	Single RFP detect < reference area maximum value
Manganese			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	Maximum RFP value < reference area maximum value
Molybdenum	0.519	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**100% DF at RFP; no detects at reference area**
Nitrate	450	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**100% DF at RFP; no detects at reference area**
Phosphate			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	No detects at RFP; 3 detects at reference area
Selenium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**No detects at any location**
Strontium	3.35	√	Surface water	None	Unfiltered	KW	**Means are different**	5 vs 5	Reference area vs RFP	
Sulfate	2850	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Uranium	0.16	√	Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**All RFP values >> all reference area values; visual inspection sufficient**
Vanadium			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	**No detects at any location**
Zinc			Surface water	None	Unfiltered	None	Not applicable	5 vs 5	Reference area vs RFP	Only 1 detect - reference area

NRW – New Rifle wetland
RFP– Roaring Fork pond
KW– Kruskal-Wallis
DF – Detection frequency
Units– sediment and vegetation - mg/kg (milligrams/kilogram)
Units – surface water - mg/L (milligrams/liter)
mg/L - milligrams per liter
mg/kg - milligrams per kilogram

Table A-3. Exposure Point Concentrations used in Ecological Risk Assessment

EPCs for the New Rifle Wetland	Measured EPCs in Abiotic Media			Measured EPCs in Biotic Media (mg/kg)		Estimated Concentrations in Biotic Media (mg/kg)		
Analyte Name	**Filtered Surface Water (µg/L)**	**Sediment (mg/kg)**	**Unfiltered Surface Water (mg/L)**	**Cattail Roots**	**Cattail Stems**	**Benthic Invertebrate (mg/kg)**	**Fish (mg/kg)**	**Frogs (mg/kg)**
Ammonia as Total N	*13.53*		*0.0025*			0.00E+00	0.00E+00	0.00E+00
Arsenic	8.60	10.33	0.01			1.65E-01	1.65E-01	1.65E-01
Cadmium		0.74		0.45	0.52	0.00E+00	0.00E+00	0.00E+00
Fluoride	648.9		0.62			0.00E+00	0.00E+00	0.00E+00
Iron	21.60		1.17			0.00E+00	0.00E+00	0.00E+00
Manganese		347.6				0.00E+00	0.00E+00	0.00E+00
Molybdenum	77.50	2.02	0.072	4.03	7.10	0.00E+00	0.00E+00	0.00E+00
Nitrate	1668	88.67	0.071			0.00E+00	0.00E+00	0.00E+00
Phosphate		4.46				0.00E+00	0.00E+00	0.00E+00
Selenium					0.83	0.00E+00	0.00E+00	0.00E+00
Strontium	1334	292.4	1.35		222.0	0.00E+00	0.00E+00	0.00E+00
Sulfate						0.00E+00	0.00E+00	0.00E+00
Uranium	39.32		0.037			0.00E+00	0.00E+00	0.00E+00
Vanadium	8.79	33.17	0.0028			0.00E+00	0.00E+00	0.00E+00
Zinc		51.54				0.00E+00	0.00E+00	0.00E+00

EPCs - exposure point concentrations

µg/L - micrograms per liter

mg/L - milligrams per liter

mg/kg - milligrams per kilogram

Italics - calculated for pH=8.1 and temperature of 17.5 deg. C

Note - Empty cell indicates analyte was removed as a COPC

Note - Empty cell for ammonium, fluoride, nitrate, phosphate and sulfate in vegetation - analyte was not determined.

GBH - Great blue heron

Note - Zeros for benthic invertebrates, fish, frogs indicate that no BCF was available to calculate a tissue concentration based on unfiltered surface water; also, if analyte was removed as a COPC from unfiltered surface water, then a zero entered for estimated tissue concentration; applies only to GBH.

Table A-3. Exposure Point Concentrations used in Ecological Risk Assessment

EPCs for the Reference Wetland	**Measured EPCs in Abiotic Media**			**Measured EPCs in Biotic Media (mg/kg)**		**Estimated Concentrations in Biotic Media (mg/kg)**		
Analyte Name	**Filtered Surface Water (µg/L)**	**Sediment (mg/kg)**	**Unfiltered Surface Water (mg/L)**	**Cattail Roots**	**Cattail Stems**	**Benthic Invertebrate (mg/kg)**	**Fish (mg/kg)**	**Frogs (mg/kg)**
Ammonia as Total N	*0.7*		*0.0006*			0.00E+00	0.00E+00	0.00E+00
Arsenic	4.89	7.10	0.006			1.28E-01	1.28E-01	1.28E-01
Cadmium		0.16		0.36	0.42	0.00E+00	0.00E+00	0.00E+00
Fluoride	369.8		0.35			0.00E+00	0.00E+00	0.00E+00
Iron	110.8		0.31			0.00E+00	0.00E+00	0.00E+00
Manganese		323.7				0.00E+00	0.00E+00	0.00E+00
Molybdenum	2.37	0.60	0.0014	1.20	0.98	0.00E+00	0.00E+00	0.00E+00
Nitrate	55.00	1.025	0.079			0.00E+00	0.00E+00	0.00E+00
Phosphate		0.31				0.00E+00	0.00E+00	0.00E+00
Selenium					0.27	0.00E+00	0.00E+00	0.00E+00
Strontium	1207	139.7	1.19		162.98	0.00E+00	0.00E+00	0.00E+00
Sulfate						0.00E+00	0.00E+00	0.00E+00
Uranium	8.10		0.009			0.00E+00	0.00E+00	0.00E+00
Vanadium	6.41	32.00	0.0028			0.00E+00	0.00E+00	0.00E+00
Zinc		49.81				0.00E+00	0.00E+00	0.00E+00

EPCs - exposure point concentrations

µg/L - micrograms per liter

mg/L - milligrams per liter

mg/kg - milligrams per kilogram

Italics - calculated for pH=7.22 and temperature of 23.8 deg. C

Note - Empty cell indicates analyte was removed as a COPC

Note - Empty cell for ammonium, fluoride, nitrate, phosphate and sulfate in vegetation - analyte was not determined.

GBH - Great blue heron

Note - Zeros for benthic invertebrates, fish, frogs indicate that no BCF was available to calculate a tissue concentration based on unfiltered surface water; also, if analyte was removed as a COPC from unfiltered surface water, then a zero entered for estimated tissue concentration; applies only to GBH.

Table A-3. Exposure Point Concentrations used in Ecological Risk Assessment

EPCs for the Roaring Fork Pond	Measured EPCs in Abiotic Media			Predicted EPCs in Biotic Media (mg/kg)		Estimated Concentrations in Biotic Media (mg/kg)		
Analyte Name	**Filtered Surface Water (µg/L)**	**Sediment (mg/kg)**	**Unfiltered Surface Water (mg/L)**	**Cattail Roots**	**Cattail Stems**	**Benthic Invertebrate (mg/kg)**	**Fish (mg/kg)**	**Frogs (mg/kg)**
Ammonia as Total N	*3200*	80.58	*3.15*	No BAF	No BAF	0.00E+00	0.00E+00	0.00E+00
Arsenic	5.60	7.15	0.0043	12.44	12.44	8.50E-02	8.50E-02	8.50E-02
Cadmium		0.74		4.21	3.30	0.00E+00	0.00E+00	0.00E+00
Fluoride	471.6		0.45	No BAF	No BAF	0.00E+00	0.00E+00	0.00E+00
Iron		18,247		27918	4014	0.00E+00	0.00E+00	0.00E+00
Manganese		420.4		634.9	1030	0.00E+00	0.00E+00	0.00E+00
Molybdenum	506.3	3.50	0.52	3.50	2.98	0.00E+00	0.00E+00	0.00E+00
Nitrate	457875	205.2	449.6	No BAF	No BAF	0.00E+00	0.00E+00	0.00E+00
Phosphate		3.56		No BAF	No BAF	0.00E+00	0.00E+00	0.00E+00
Selenium	3.27	0.35	0.0011	No BAF	No BAF	4.92E-02	8.58E-02	8.58E-02
Strontium	3450		3.34	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sulfate	2822623	2,739	2820	No BAF	No BAF	0.00E+00	0.00E+00	0.00E+00
Uranium	158.0	5.93	0.159	6.11	0.71	0.00E+00	0.00E+00	0.00E+00
Vanadium	9.19	32.36	0.003	53.07	6.80	0.00E+00	0.00E+00	0.00E+00
Zinc		88.74		132.22	92.29	0.00E+00	0.00E+00	0.00E+00

EPCs - exposure point concentrations

µg/L - micrograms per liter

mg/L - milligrams per liter

mg/kg - milligrams per kilogram

Italics - calculated for pH=7.22 and temperature of 23.8 deg. C

Note - Empty cell indicates analyte was removed as a COPC

Note - No BAF for ammonium, fluoride, nitrate, phosphate and sulfate in vegetation - analyte was not determined.

Note - No BAF for selenium - due to low detection frequency, no BAF was calculated

Italics - Calculated for pH=8.1 and temperature of 17.5 deg. C

BAF - bioaccumulation factor.

Note - Zeros for strontium in vegetation - analyte removed as a COPC in sediment; therefore no tissue concentration

GBH - Great blue heron

Table A–4. Summary of Analytes in Sediment for Which Statistical Testing Was Not Performed or Population Means Showed Significant Differences

Analyte	Test	Test Result	N (Number of Samples)	Result	Comment
Arsenic	Kruskal-Wallis (KW)	Reference wetland and New Rifle Wetland (NRW) analyte means are different	5 (Reference wetland) vs. 5 (NRW)	NRW maximum value is 10.8 mg/kg; 9.95 mg/kg is next highest NRW value; all NRW values were J qualified as estimated.	Maximum reference wetland value is 7.2 mg/kg.
Cadmium	KW	Reference wetland and NRW analyte means are different	5 (Reference wetland) vs. 5 (NRW)	NRW maximum value is 0.82 mg/kg; 100% DF at NRW; 60% DF at reference wetland.	Maximum reference wetland value is 0.17 mg/kg.
Molybdenum	None	Not applicable (NA)	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 2.4 mg/kg; 100% DF at NRW; only 1 detect at reference wetland.	Maximum reference wetland value is 0.785mg/kg.
Nitrate	None	NA	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 133 mg/kg; 100% DF at NRW.	No detects at reference wetland.
Phosphate	None	NA	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 4.7 mg/kg; 100% DF at NRW.	No detects at reference wetland.
Strontium	KW	Reference wetland and NRW analyte means are different	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 387 mg/kg.	Maximum reference wetland value is 145 mg/kg.
Ammonia as NH_4	None	NA	5 (Reference wetland) vs. 5 (Roaring Fork Pond (RFP))	RFP maximum value is 114 mg/kg; all RFP values >> reference wetland values.	Reference wetland maximum value is 6.8 mg/kg.
Cadmium	KW	Reference wetland and RFP analyte means are different	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 0.9 mg/kg; 100% DF at RFP; 60% DF at reference wetland.	Reference wetland maximum value is 0.17 mg/kg.
Molybdenum	None	NA	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 4.5 mg/kg; all RFP values > single reference wetland detect.	Reference wetland maximum value is 0.78 mg/kg.
Nitrate	None	NA	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 214 mg/kg; 100% DF at RFP; no detects at reference wetland.	Highest detection limit (DL) based on non-detects for the reference wetland is 1.02 mg/kg.
Phosphate	None	NA	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 3.7 mg/kg; 100% DF at RFP; no detects at reference wetland.	Highest DL based on non-detects for reference wetland is 0.31 mg/kg.
Selenium	None	NA	5 (Reference wetland) vs. 5 (RFP)	Only 1 detect - RFP Location 1213 (0.47 g/kg).	Highest DL for reference wetland based on non-detects is 0.145 mg/kg.
Zinc	KW	Reference wetland and RFP analyte means are different	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 103 mg/kg.	Reference wetland maximum value is 50 mg/kg.

Note–. Not applicable due to low detection frequency in one or both data sets.
mg/kg – milligrams per kilogram, wet-weight
DF – detection frequency
DL – detection limit

Table A–5. Summary of Analytes in Surface Water for Which Statistical Testing Was Not Performed or Population Means Showed Significant Differences

Analyte	Filtered /Unfiltered ?	Test	Test Result	N (Number of Samples)	Result	Comment
Fluoride	Filtered	Kruskal-Wallis (KW)	Reference wetland and New Rifle wetland (NRW) analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	0.674 mg/L is NRW maximum value.	Maximum reference wetland value is 0.408 mg/L.
Molybdenum	Filtered	KW	Reference wetland and NRW analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	0.0775 mg/L is NRW maximum value.	Maximum reference wetland value is 0.0026 mg/L.
Nitrate	Filtered	None	Not applicable (NA)	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 2.57 mg/L (Location 1209); 2 detects at NRW.	No detects at reference wetland.
Uranium	Filtered	KW	Reference wetland and NRW analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	NRW maximum value is 0.0395 mg/L.	Maximum reference wetland value is 0.0084 mg/L.
Vanadium	Filtered	None	NA	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW detect is 0.011 mg/L; 60% DF at NRW; 50% DF at reference wetland; evaluate maxima difference.	Maximum reference wetland value is 0.0081 mg/L.
Fluoride	Unfiltered	KW	Reference wetland and NRW analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	NRW maximum value is 0.656 mg/L.	Maximum reference wetland value is 0.362 mg/L.
Molybdenum	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (NRW)	Maximum NRW value is 0.0721 mg/L; 100% DF at NRW.	No detects at reference wetland.
Uranium	Unfiltered	KW	Reference wetland and NRW analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	NRW maximum value is 0.0371 mg/L.	Maximum reference wetland value is 0.0088 mg/L.
Ammonia as NH_4	Filtered	None	NA	5 (Reference wetland) vs. 5 (Roaring Fork Pond (RFP))	All RFP values >> all reference wetland values; maximum RFP value is 99.5 mg/L.	Maximum reference wetland value is 0.111 mg/L.
Fluoride	Filtered	KW	Reference wetland and RFP analyte means are different.	5 (Reference wetland) vs. 5 (RFP)	RFP maximum value is 0.483 mg/L; all RFP values are between 0.43 mg/L and 0.483 mg/L.	Maximum reference wetland value is 0.408 mg/L.
Molybdenum	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 0.511 mg/L.	Maximum reference wetland value is 0.0026 mg/L.
Nitrate	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	100% DF at RFP; no detects at reference wetland; maximum RFP value is 462 mg/L.	Highest DL based on non-detects at reference wetland value is 0.055 mg/L.
Selenium	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	80% DF at RFP; 20% DF at reference wetland; maximum detect at RFP (0.004 mg/L) is approximately 2 times the maximum reference wetland detect.	Maximum reference wetland value is 0.0021 mg/L.

Table A–5. Summary of Analytes in Surface Water for Which Statistical Testing Was Not Performed or Population Means Showed Significant Differences

Analyte	Filtered /Unfiltered ?	Test	Test Result	N (Number of Samples)	Result	Comment
Strontium	Filtered	KW	Reference wetland and RFP analyte means are different.	5 (Reference wetland) vs. 5 (RFP)	3.45 mg/L is RFP maximum value.	Maximum reference wetland value is 1.26 mg/L.
Sulfate	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 2,840 mg/L.	Maximum reference wetland value is 291 mg/L.
Uranium	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 0.158 mg/L.	Maximum reference wetland value is 0.0084 mg/L.
Vanadium	Filtered	None	NA	5 (Reference wetland) vs. 5 (RFP)	100% DF at RFP; 40% DF at reference wetland; RFP maximum value is 0.0095 mg/L.	Reference wetland maximum value is 0.0081 mg/L.
Ammonia as NH_4	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 97.9 mg/L.	Maximum reference wetland value is 0.12 mg/L.
Fluoride	Unfiltered	KW	Reference wetland and RFP analyte means are different.	5 (Reference wetland) vs. 5 (RFP)	0.447 mg/L is RFP maximum value.	Maximum reference wetland value is 0.362 mg/L.
Molybdenum	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (RFP)	100% DF at RFP; no detects at reference wetland; maximum RFP value is 0.519 mg/L.	Highest DL based on non-detects at reference wetland is 0.0014 mg/L.
Nitrate	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (RFP)	100% DF at RFP; no detects at reference wetland; maximum RFP value is 450 mg/L.	Highest DL based on non-detects at reference wetland is 0.079 mg/L.
Strontium	Unfiltered	KW	Reference wetland and RFP analyte means are different.	5 (Reference wetland) vs. 5 (RFP)	3.35 mg/L is RFP maximum value.	Maximum reference wetland value is 1.22 mg/L.
Sulfate	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 2,850 mg/L.	Maximum reference wetland value is 291 mg/L.
Uranium	Unfiltered	None	NA	5 (Reference wetland) vs. 5 (RFP)	All RFP values >> all reference wetland values; maximum RFP value is 0.16 mg/L.	Maximum reference wetland value is 0.0088 mg/L.

Note–.Not applicable due to low detection frequency in one or both data sets.
mg/L – milligrams per liter.
DF – detection frequency
DL – detection limit

Table A–6. Summary of Analytes in Vegetation For Which Statistical Testing Was Not Performed or Population Means Showed Significant Differences

Analyte	Vegetation	Test	Test Result	N	Result	Comment
Molybdenum	Cattail stems	Kruskal-Wallis (KW)	Reference wetland and New Rifle Wetland (NRW) analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	10.8 mg/kg is NRW maximum value.	Highest reference wetland value is 1.1 mg/kg.
Selenium	Cattail stems	None	Not applicable (NA)	5 (Reference wetland) vs. 5 (NRW)	Single detect (0.95 mg/kg) is at NRW Location 1210.	Highest DL based on non-detects at reference wetland is 0.265 mg/kg.
Molybdenum	Cattail roots	KW	Reference wetland and NRW analyte means are different.	5 (Reference wetland) vs. 5 (NRW)	5 mg/kg is NRW maximum value.	Highest reference wetland value is 1.3 mg/kg.

NA—Not applicable due to low detection frequency in one or both data sets.
DL – detection limit.
mg/kg – milligrams per kilogram (wet-weight)

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Arsenic	Sediment	10.8 mg/kg (WWB)	8.2 mg/kg (DWB) – NOAA ERL, OSWER SQB	In clayey sediments, arsenic on average may be concentrated as high as 13 mg/kg (Kabata-Pendias and Pendias 1992); sediments at New Rifle Wetland (NRW) appeared to have a high clay content; estimated NRW DWB concentration is 8.54 mg/kg based on 79.1% mean solids for NRW. NRW mean concentration (9.21 mg/kg WWB) is approximately 1.5 times mean reference wetland concentration (6.34 mg/kg WWB). Reference wetland maximum value is 5.2 mg/kg (DWB). Historical background mean concentration is 3.53 mg/kg (WWB).	NRW value (DWB) just exceeds ecological benchmarks. **Based on the approximate 1.5-fold increase in NRW and reference wetland mean concentrations, it is recommended as a conservative measure that arsenic be retained as a NRW COPC.**
Cadmium	Sediment	0.82 mg/kg (WWB)	1.2 mg/kg (DWB) – NOAA ERL, OSWER SQB	Estimated NRW concentration is 0.65 mg/kg (DWB) based on 79.1% mean solids for NRW. NRW mean concentration (0.61 mg/kg WWB) based on 100% DF is approximately 5 times mean reference wetland concentration (0.12 mg/kg WWB) based on 60% DF. Historical background mean concentration (0.18 mg/kg WWB) is based on 25% DF.	Maximum NRW value is below ecological benchmarks. **Based on the 5-fold increase in mean concentrations at NRW relative to the reference wetland, and the difference in DF, it is recommended as a conservative measure that cadmium be retained as a NRW COPC.**

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Molybdenum	Sediment	2.4 mg/kg (WWB)	2.0 mg/kg - soil - terrestrial plant benchmark (Bench 1996); no SQC available	Estimated DWB concentration is 1.9 mg/kg based on mean % solids value of 79.1 for NRW. NRW mean concentration (1.54 mg/kg WWB) based on 100% DF is approximately 4 times mean reference wetland concentration (0.38 mg/kg WWB) based on 20% DF. Historical background mean concentration (1.0 mg/kg WWB) is based on non-detects.	Maximum estimated value (DWB) is just below benchmark. **Based on the disparity in DF and 4-fold increase in mean concentration at NRW relative to the reference wetland, it is recommended as a conservative measure that molybdenum be retained as a NRW COPC.**
Nitrate	Sediment	133 mg/kg (WWB)	None	NRW values ranged from 5.8 mg/kg to 133 mg/kg. NRW mean concentration (36.9 mg/kg WWB) based on 100% DF is approximately 40 times the mean reference wetland concentration (0.92 mg/kg WWB) based on non-detects. Historical background mean concentration (1.0 mg/kg WWB) was based on non-detects.	**Based on the 40-fold increase in mean concentration at NRW relative to the reference wetland, lack of screening criteria, and the difference in DF, nitrate should be retained as a NRW COPC.**
Phosphate	Sediment	4.7 mg/kg (WWB)	None	NRW mean concentration (3.52 mg/kg WWB) based on 100% DF is approximately 12 times the mean reference wetland concentration (0.30 mg/kg WWB) based on non-detects. NRW - values ranged from 2.3 mg/kg (WWB) to 4.7 mg/kg (WWB). No historical background data were available.	**Based on the 12-fold increase in mean concentration at NRW relative to the reference wetland, lack of screening criteria, and the difference in DF, phosphate should be retained as a RFP COPC.**

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Strontium	Sediment	357 mg/kg (WWB)	None	Maximum reference wetland value is 145 mg/kg. NRW mean concentration (207 mg/kg WWB) is 1.7 times reference wetland concentration (122 mg/kg WWB). DF is 100% at both NRW and reference wetland. No historical background data were available.	**Although the increase in mean concentration at NRW relative to the reference wetland may well be within a reasonable margin of error, it is recommended as a conservative measure that strontium be retained as a NRW COPC due to the lack of a screening criterion.**
Fluoride	Filtered surface water	0.674 mg/L	2.0 mg/L - Colorado agricultural standard	NRW mean concentration (0.56 mg/L) is 1.7 times the mean reference wetland concentration (0.32 mg/L). DF is 100% at both the NRW and reference wetland. Historical background single value was 0.29 mg/L.	**Although the NRW site concentrations do not exceed the agricultural standard, it is recommended as a conservative measure that fluoride be retained as a NRW COPC since no relevant ecological benchmark was available for comparison.**
Molybdenum	Filtered surface water	0.0775 mg/L	0.24 mg/L - Tier II (Ecotox 1996; Bench 1996) 0.88 mg/L - LCV for all organisms (Bench 1996)	Mean NRW concentration (0.0603 mg/L) is 37 times the mean reference wetland concentration (0.0016 mg/L). DF at NRW was 100% while the reference wetland DF was 80%. Historical background mean concentration was 0.014 mg/L based on 100% DF.	Maximum concentration is well below both benchmarks. **Although the maximum concentration is below the benchmarks, based on the 37-fold increase in concentrations at NRW relative to the reference wetland, it is recommended as a conservative measure that molybdenum be retained as a NRW COPC.**
Nitrate	Filtered surface water	2.57 mg/L	100 mg/L - nitrate + nitrite - Colorado agricultural standard	Mean NRW concentration (0.62 mg/L) based on 40% DF is 13 times the reference wetland mean concentration (0.05 mg/L) based on non-detects. Historical background mean concentration was 0.54 mg/L based on 83% DF.	Maximum concentration is below standard. Another more relevant ecological benchmark was unavailable. **Although the maximum concentration is below the agricultural standard, based on the 13-fold increase in concentrations at NRW relative to the reference wetland, it is recommended as a conservative measure that nitrate be retained as a NRW COPC.**

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Uranium	Filtered surface water	0.0395 mg/L	0.142 mg/L - estimated LCV for all organisms (Bench 1996)	Mean NRW concentration (0.028 mg/L) based on 100% DF is 4.3 times the reference wetland mean concentration (0.0065 mg/L) based on 100% DF. Historical background mean concentration was 0.013 mg/L based on 100% DF.	Maximum concentration is below benchmark. **Although the maximum concentration is below the benchmark, based on the approximate 4-fold increase in concentrations at NRW relative to the reference wetland, and a 2-fold increase relative to the historical background, it is recommended as a conservative measure that uranium be retained as a NRW COPC.**
Vanadium	Filtered surface water	0.011 mg/L	0.019 mg/L - Tier II (Ecotox 1996) 0.08 mg/L - LCV for all organisms (Bench 1996) 0.1 mg/L - Colorado agricultural standard	NRW mean concentration (0.0055 mg/L) based on 60% DF is approximately 1.3 times mean reference wetland concentration (0.0041 mg/L) based on 40% DF. Historical background mean concentration was 0.0042 mg/L.	Maximum concentration is below benchmarks. **Based on the approximate 1.3-fold increase in mean concentration at NRW relative to the reference wetland, it is recommended as a conservative measure that vanadium be retained as a NRW COPC.**
Fluoride	Unfiltered surface water	0.656 mg/L	2.0 mg/L - Colorado agricultural standard	NRW mean concentration (0.56 mg/L) based on 100%DF is 1.7 times the reference wetland mean concentration (0.32 mg/L) based on 100%DF. Historical background concentration was 0.30 mg/L based on 100%DF.	Maximum concentration is below agricultural standard. Another more relevant ecological benchmark was unavailable. **Although the NRW site concentrations do not exceed the agricultural standard, and the difference in mean concentration between NRW, reference wetland, and historical background may be within a reasonable margin of error, it is recommended as a conservative measure that fluoride be retained as a NRW COPC.**
Molybdenum	Unfiltered surface water	0.072 mg/L	0.24 mg/L - Tier II (Ecotox 1996; Bench 1996) 0.88 mg/L - LCV for all organisms (Bench 1996)	NRW mean concentration (0.058 mg/L)based on 100%DF is approximately 56 times the mean reference wetland concentration (0.001 mg/L) based on non-detects. The historical mean background concentration was 0.009 mg/L based on 40%DF.	Maximum concentration is below benchmarks. **Although the NRW site concentrations do not exceed benchmarks, based on the DF disparity and 56-fold increase in mean concentrations between the NRW and reference wetland, it is recommended as a conservative measure that molybdenum be retained as a NRW COPC.**

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Uranium	Unfiltered surface water	0.0371 mg/L	0.142 mg/L - estimated LCV for all organisms (Bench 1996)	NRW mean concentration (0.027 mg/L) is approximately 4 times mean reference wetland concentration (0.007 mg/L). DF was 100% at both NRW and reference wetland. Maximum value at reference wetland is 0.0088 mg/L. The historical background mean concentration was 0.012 mg/L based on 100%DF.	Maximum concentration is below benchmark. **Although the maximum concentration is below the benchmark, based on the approximate 4-fold increase in concentrations at NRW relative to the reference wetland, and a 2-fold increase relative to the historical background, it is recommended as a conservative measure that uranium be retained as a NRW COPC.**
Molybdenum	Cattail stems	8.4 mg/kg (WWB)	1.28 mg/kg as MoO_4 concentration in food item necessary to produce a NOAEL of 0.04 mg/kg for white-tail deer (Bench 1996); benchmark does not specify weight basis although dry weight is frequently cited in literature. 0.52 mg/kg as MoO_4 concentration in food item necessary to produce a NOAEL of 0.1 mg/kg for cottontail rabbit (Bench 1996).	NRW mean concentration (5.09 mg/kg (WWB)) is approximately 6.5 times the mean reference wetland concentration (0.78 mg/kg (WWB)). DF was 100% at both NRW and reference wetland. Maximum value at reference wetland is 1.1 mg/kg (WWB). A BAF was calculated BAF for NRW (7.0); due to low DF (20%) of Mo in reference wetland sediment, no BAF could be calculated.	The 8.4 mg/kg (WWB) concentration of 1.07 mg/kg (DWB) is just below the benchmark based on 87.3% moisture. The same concentration of 1.07 mg/kg (DWB) is above 2nd benchmark Food item not likely for referenced receptors. **Based on the approximate 6-fold increase in concentrations at NRW relative to the reference wetland, it is recommended as a conservative measure that molybdenum be retained as a NRW COPC.**
Selenium	Cattail stems	0.95 mg/kg (WWB)	0.74 mg/kg as selenate (SeO_4)- concentration in food item necessary to produce a NOAEL of 0.147 mg/kg for cottontail rabbit (Bench 1996); benchmark does not specify weight basis although dry weight is frequently cited in literature. 0.1 mg/kg (DWB) - Level in crops thought to be safe and adequate for animals (Kabata-Pendias and Pendias 1992).	Concentration of 0.12 mg/kg (DWB) is below benchmark based on 87.3% moisture. Other than 1 detect in sediment at RFP, this value was the only detect in sediment or cattails at any location.	Concentration of 0.12 mg/kg is just slightly above benchmark but within reasonable margin of error for environmental data. Cattails are not a likely food item for referenced receptors. **Based on the bioaccumulation potential of selenium, it is recommended as a conservative measure that selenium be retained as a NRW COPC..**

Table A–7a. Summary of New Rifle Wetland Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	New Rifle Wetland Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Molybdenum	Cattail roots	5 mg/kg (WWB)	1.28 mg/kg as MoO_4 concentration in food item necessary to produce a NOAEL of 0.04 mg/kg for white-tail deer (Bench 1996); benchmark does not specify weight basis although dry weight is frequently cited in literature. 0.52 mg/kg as MoO_4 concentration in food item necessary to produce a NOAEL of 0.1 mg/kg for cottontail rabbit (Bench 1996) 10 mg/kg DWB - In general, exceedance of this level in forage is likely to cause serious problems in most classes of livestock ((Kabata-Pendias and Pendias 1992).	NRW mean concentration (2.89 mg/kg (WWB)) is approximately 3 times the mean reference wetland concentration (0.99 mg/kg (WWB)). DF was 100% at both NRW and reference wetland. Concentration of 5 mg/kg (WWB) is equivalent to 0.64 mg/kg (DWB) based on 87.7% moisture. DF was 100% at both the NRW and reference wetland. Calculated BAF for NRW (4.2); due to low DF (20%) of molybdenum in reference wetland sediment, no BAF could be calculated.	The DWB concentration of 0.64 mg/kg is below 1st benchmark and slightly above the 2nd benchmark. Cattails are not a likely food item for referenced benchmark receptors. Root data have a higher degree of uncertainty due to difficulty in cleaning of tissue prior to analysis. **Based on the difference in mean concentrations between the NRW and reference wetland, it is recommended as a conservative measure that molybdenum be retained as a NRW COPC.**

Note—. Included on this table are those analytes for which the population means showed significant differences or site concentrations were substantially elevated above the reference wetland.
BAF–bioaccumulation factor.
WWB–wet-weight basis.
DWB–dry-weight basis.
NRW–New Rifle wetland.
DF–detection frequency.
NOAA – National Oceanic and Atmospheric Administration.
ERL – Effects range – low
SQB –Sediment Quality Benchmark
Colorado Agricultural Standards: The Basic Standards for Ground Waters (Sections 24-4-103(4)- CRS 1982 and 1985 supplement, and 25-8-203, CRS (1982))
mg/kg–milligrams per kilogram.
mg/L–milligrams per liter.
Tier II–Great Lakes Water Quality Initiative Tier II Methodology.
LCV–lowest chronic value.
AWQC–Ambient Water Quality Criteria.
NOAEL–no observed adverse effect level.
ORNL–Radiological Benchmarks for Screening Contaminants of Potential Concern for Effects on Aquatic Biota at Oak Ridge National Laboratory, Oak Ridge Tennessee, BJC/0R-80, July 1998.
Bench–Screening Benchmarks for Ecological Risk Assessment (Oak Ridge National Laboratory, version 1.6, 10/1996).
Ecotox–Ecotox Thresholds, USEPA Office of Solid Waste and Emergency Response (OSWER), January 1996, EPA 540/F-95/038.

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Ammonia as NH_4	Sediment	114 mg/kg (WWB)	None	RFP mean concentration (84.4 mg/kg (WWB)) is approximately 30 times the reference wetland mean concentration (2.8 mg/kg (WWB)). DF was 100% at both the RFP and reference wetland. No historical background data were available.	**Evaluation of the revised surface water AWQC, lack of screening criteria, and the significant 30-fold increase in mean concentrations between RFP and the reference wetland, ammonia should be retained as a RFP COPC.**
Cadmium	Sediment	0.9 mg/kg (WWB)	1.2 mg/kg (DWB) – NOAA ERL, OSWER SQB (Bench 1996)	RFP mean concentration (0.54 mg/kg (WWB)) is approximately 5 times the reference wetland mean concentration (0.12 mg/kg WWB). DF was 100% at RFP and 60% at reference wetland. Estimated DWB concentration for 0.9 mg/kg is 0.65 mg/kg based on mean % solids value of 72.2 for RFP. Historical background data DF was 25% with a maximum value of 0.4 mg/kg (WWB) and mean concentration of 0.18 mg/kg (WWB).	Maximum RFP value on a DWB is below benchmarks. **Based on a 5-fold increase in mean concentrations between the RFP and reference wetland, and the difference in DF between locations and background, cadmium should be retained as a RFP COPC.**
Molybdenum	Sediment	4.5 mg/kg (WWB)	None	Mean RFP concentration (2.24 mg/kg (WWB)) based on 100% DF is 5.8 times the mean reference wetland concentration (0.38 mg/kg (WWB)) based on 20% DF. Estimated DWB concentration is 3.25 mg/kg based on mean % solids value of 72.2 for RFP. Historical background mean concentration was 1.0 mg/kg (WWB) based on non-detects.	**Evaluation of the significant 6-fold increased concentrations relative to the reference wetland, lack of screening criteria, and the disparity in DF indicate that molybdenum should be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Nitrate	Sediment	214 mg/kg (WWB)	None	Mean RFP concentration (150 mg/kg (WWB)) based on 100% DF is 162 times mean reference wetland concentration (0.92 mg/kg (WWB)) based on non-detects. No historical background data were available.	**Based on the significant 162-fold increase in mean concentrations relative to the reference wetland, lack of screening criteria, and the disparity in DF, nitrate should be retained as a RFP COPC.**
Phosphate	Sediment	3.7 mg/kg (WWB)	None	Mean RFP concentration (2.6 mg/kg (WWB)) based on 100% DF is approximately 8.5 times mean reference wetland concentration (0.30 mg/kg (WWB)) based on non-detects. No historical background data were available.	**Based on the significant 8-fold increase in mean concentrations relative to the reference wetland, lack of screening criteria, and the disparity in DF, phosphate should be retained as a RFP COPC.**
Selenium	Sediment	0.47 mg/kg (WWB)	1.0 mg/kg in soil – terrestrial plant benchmark (Bench 1996); no SQC available	Mean RFP concentration (0.20 mg/kg (WWB)) based on 20% DF is approximately 1.5 times mean reference wetland concentration (0.14 mg/kg (WWB)) based on non-detects. Historical background mean concentration (0.75 mg/kg (WWB)) was based on 50% DF.	Although not strictly comparable, RFP value is below terrestrial plant benchmark for soil. RFP maximum value is less than historical background mean concentration. **Based on its bioaccumulation potential, it is recommended as a conservative measure that selenium be retained as a RFP COPC.**
Zinc	Sediment	103 mg/kg (WWB)	150 mg/kg (DWB) – NOAA ERL, OSWER SQB (Bench 1996)	Estimated DWB concentration is 74.4 mg/kg based on mean % solids value of 72.2 for RFP. Mean RFP concentration (71.6 mg/kg (WWB)) is approximately 1.6 times mean reference wetland concentration (45.2 mg/kg (WWB)). Historical background mean concentration was 43 mg/kg (WWB).	Maximum RFP value on a DWB is below benchmarks. **Based on the approximate 1.6-fold increase between RFP and reference wetland mean concentrations, it is recommended as a conservative measure that zinc be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Ammonia as NH_4	Filtered surface water	99.5 mg/L 2.01 mg/L as N at pH=7.97 and 15 C	8.40 mg/L as N - CMC (no salmonids) for pH=8 (AWQC, EPA 1998) 1.27 mg/L as N - CCC for pH=8 (AWQC, EPA 1998) 2.4 mg/L as NH_3 (est. 97.8 mg/L as NH_4 at pH=7.97 and 15.2 C) - LCV for aquatic plants (Bench 1996)	Mean RFP concentration (97.8 mg/L) is 1,343 times the mean reference wetland concentration (0.073 mg/L). DF was 100% at both RFP and reference wetland. Historical background mean concentration was 0.13 mg/L (83% DF).	RFP maximum exceeds chronic AWQC (i.e., the CCC); RFP maximum is at or below remaining 2 benchmarks. **Although the exceedance is only approximately 2 times the CCC, the presence of high nitrate (and nitrite to some degree) is likely excessive. The significant 1,343-fold increase in mean concentration relative to the reference wetland is of ecological concern, as is the additive potential effects from the other elevated COPCs. Ammonia should be retained as a RFP COPC.**
Fluoride	Filtered surface water	0.483 mg/L	2.0 mg/L - Colorado agricultural standard	Mean RFP concentration (0.45 mg/L) is approximately 1.4 times the mean reference wetland concentration (0.32 mg/L). DF was 100% at both the RFP and reference wetland. Historical background single concentration was 0.29 mg/L.	Maximum RFP value is below the agricultural standard. **Based on the increased mean RFP concentration relative to the reference wetland and the absence of any other more relevant ecological benchmarks, it is recommended that fluoride be retained as a RFP COPC.**
Molybdenum	Filtered surface water	0.511 mg/L	0.24 mg/L - Tier II (Ecotox 1996; Bench 1996) 0.88 mg/L - LCV for all organisms (Bench 1996)	Mean RFP concentration (0.497 mg/L) is approximately 320 times the mean reference wetland concentration (0.0016 mg/L). DF was 100% at both the RFP and reference wetland. Historical background mean concentration was 0.014 mg/L (100% DF).	Maximum concentration exceeds the Tier II value. **Based on the significant 320-fold increase in mean concentration relative to the reference wetland, and comparison to the historical background mean concentration, molybdenum should be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Nitrate	Filtered surface water	462 mg/L	100 mg/L - nitrate + nitrite – Colorado agricultural standard	Mean RFP concentration (0.048 mg/L) based on 100% DF is approximately 9,500 times the mean reference wetland concentration based on non-detects (0.048 mg/L). Historical background mean concentration was 0.54 mg/L based on 83% DF.	Maximum concentration exceeds the agricultural standard. **Based on the significant increase in mean concentrations relative to the reference wetland, disparity in the DF, as well as the standard exceedance, nitrate should be retained as a RFP COPC.**
Selenium	Filtered surface water	0.004 mg/L	0.02 mg/L - Colorado agricultural standard 0.0088 mg/L - LCV for all organisms (Bench 1996) 0.005 mg/L - AWQC (Bench 1996)	Mean RFP concentration (0.0022 mg/L) based on 80% DF is approximately 1.8 times the mean reference wetland concentration of 0.0012 mg/L (20% DF). Historical background mean concentration was 0.0024 mg/L based on 67% DF.	Maximum RFP concentration is below all benchmarks. **Based on its bioaccumulation potential, it is recommended that selenium be retained as a RFP COPC.**
Strontium	Filtered surface water	3.45 mg/L	42 mg/L - LCV for all organisms (Bench 1996) 15 mg/L - Secondary chronic value (CV) (Bench 1996)	Mean RFP concentration (3.38 mg/L) is approximately 3 times the mean reference wetland concentration (1.12 mg/L). DF was 100% at both the RFP and reference wetland. No historical background data were available.	Maximum RFP concentration is below benchmarks. **Although the RFP site concentrations do not exceed benchmarks, based on the lack of historical data for comparison, and an approximate 3-fold increase in mean concentration relative to the reference wetland, it is recommended as a conservative measure that strontium be retained as a RFP COPC.**
Sulfate	Filtered surface water	2,840 mg/L	None	Mean RFP concentration (2,754 mg/L) is approximately 10 times mean reference wetland concentration (267 mg/L). DF was 100% at both the RFP and reference wetland. Historical background mean concentration was 363 mg/L.	**In the absence of any ecological benchmark, and consideration of the additive potential effects associated with the other COPCs, as well as the 10-fold increase in concentration relative to the reference wetland, sulfate be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Uranium	Filtered surface water	0.158 mg/L	0.142 mg/L - estimated LCV for all organisms (Bench 1996)	Mean RFP concentration (0.155 mg/L) is approximately 24 times the mean reference wetland concentration (0.0065 mg/L). DF was 100% at both the RFP and reference wetland. Historical background mean concentration was 0.013 mg/L (100% DF).	Maximum value exceeds benchmark. **Based on the significant increase in mean concentration relative to the reference wetland, uranium should be retained as a RFP COPC .**
Vanadium	Filtered surface water	0.0095 mg/L	0.019 mg/L - Tier II (Ecotox 1996) 0.08 mg/L - LCV for all organisms (Bench 1996 0.1 mg/L - Colorado agricultural standard	Mean RFP concentration (0.0078 mg/L) based on 100% DF is approximately 1.9 times the mean reference wetland concentration (0.0041 mg/L) based on 40% DF. Historical background mean concentration was 0.0042 mg/L based on non-detects.	**Although the RFP site concentrations do not exceed benchmarks, based on the DF disparity between RFP and reference wetland and historical background, it is recommended as a conservative measure that vanadium be retained as a RFP COPC.**
Ammonia as NH_4	Unfiltered surface water	97.9 mg/L 1.97 mg/L as N at pH=7.97 and 15.2 C	8.40 mg/L as N - CMC (no salmonids) for pH=8 (AWQC, EPA 1998) 1.27 mg/L as N - CCC for pH=8 (AWQC, EPA 1998) 2.4 mg/L as NH_3 (est. 97.8 mg/L as NH_4 at pH=7.97 and 15.2 C) - LCV for aquatic plants (Bench 1996)	Mean RFP concentration (97.1 mg/L) is approximately 1,706 times the mean reference wetland concentration (0.057 mg/L). DF was 100% at both the RFP and reference wetland. Historical background mean concentration was 0.18 mg/L based on 25% DF.	RFP maximum exceeds the chronic AWQC (CCC); RFP maximum is at or below remaining 2 benchmarks. **Although the exceedance is only approximately 2 times the CCC, the presence of high nitrate (and likely nitrite to some degree) may be excessive. The additive potential effects from the other elevated COPCs, and the significant increase in mean concentration relative to the reference wetland and historical background are cause for ecological concern. Ammonia should be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Fluoride	Unfiltered surface water	0.477 mg/L	2.0 mg/L - Colorado agricultural standard	Mean RFP concentration (0.44 mg/L) is approximately 1.4 times the mean reference wetland concentration (0.32 mg/L). Historical background mean concentration was 0.30 mg/L.	Maximum RFP concentration is below the agricultural benchmark. **Based on the absence of a more relevant ecological benchmark, it is recommended as a conservative measure that fluoride be retained as a RFP COPC.**
Molybdenum	Unfiltered surface water	0.519 mg/L	0.24 mg/L - Tier II (Ecotox 1996; Bench 1996) 0.88 mg/L - LCV for all organisms (Bench 1996)	Mean RFP concentration (0.51 mg/L) based on 100% DF is approximately 497 times the mean reference wetland concentration (0.001 mg/L) based on non-detects. Historical background mean concentration was 0.009 mg/L based on 40% DF.	Maximum value exceeds the Tier II value. **Based on the significant increase in mean concentration relative to the reference wetland and the disparity in DF, molybdenum should be retained as a RFP COPC.**
Nitrate	Unfiltered surface water	450 mg/L	100 mg/L - nitrate + nitrite – Colorado agricultural standard	Mean RFP concentration (447 mg/L) based on 100% DF is approximately 10,510 times the mean reference wetland concentration (0.042 mg/L) based on non-detects. Historical background mean concentration was 0.5 mg/L based on 0% DF.	Maximum value exceeds the agricultural standard. **Evaluation of the significant increase in mean concentration relative to the reference wetland and historical background, as well as the disparity in DF, nitrate should be retained as a RFP COPC.**
Strontium	Unfiltered surface water	3.35 mg/L	42 mg/L - LCV for all organisms (Bench 1996) 15 mg/L - Secondary CV (Bench 1996)	Mean RFP concentration (3.32 mg/L) is approximately 2.9 times the mean reference wetland concentration (1.13 mg/L). DF was 100% at both the RFP and reference wetland. No historical background data were available.	**Although the RFP site concentrations do not exceed benchmarks, based on the 3-fold increase in mean concentration between RFP and reference wetland, as well as the lack of historical background data for comparison, it is recommended as a conservative measure that strontium be retained as a RFP COPC.**

Table A–7b. Summary of Roaring Fork Gravel Pit Pond Potential Contaminants by Medium, Screening Criteria, and Interpretation of Ecological Risk

Analyte	Medium	Roaring Fork Pond Concentration of Concern	Screening Criterion	Comment	Risk Interpretation
Sulfate	Unfiltered surface water	2,850 mg/L	None	Mean RFP concentration (2,765 mg/L) is approximately 10 times the mean reference wetland concentration (269 mg/L). Historical background mean concentration was 670 mg/L.	**In the absence of any ecological benchmark, and in consideration of the additive potential effects associated with the other COPCs, as well as the 10-fold increase in concentrations relative to the reference wetland, sulfate should be retained as a RFP COPC.**
Uranium	Unfiltered surface water	0.16 mg/L	0.142 mg/L - estimated LCV for all organisms (Bench 1996)	Mean RFP concentration (0.157 mg/L) is approximately 23 times mean the reference wetland concentration (0.0070 mg/L). DF at RFP and reference wetland was 100%. Historical background mean concentration was 0.0122 mg/L (100% DF).	Maximum value exceeds the benchmark. **Based on the 23-fold increase in mean concentration relative to the reference wetland, uranium should be retained as a RFP COPC.**

Note—. Included on this table are those analytes for which the population means showed significant differences or site concentrations were substantially elevated above the reference wetland.
BAF–bioaccumulation factor.
CCC–Criteria Continuous Concentration.
CMC–Criteria Maximum Concentration.
RFP–Roaring Fork Gravel Pit Pond.
DF–detection frequency.
Colorado Agricultural Standards: The Basic Standards for Ground Waters (Sections 24-4-103(4)- CRS 1982 and 1985 supplement, and 25-8-203, CRS (1982))
NOAA – National Oceanic and Atmospheric Administration.
ERL – Effects range – low
SQB –Sediment Quality Benchmark
mg/kg–milligrams per kilogram.
mg/L–milligrams per liter.
Tier II–Great Lakes Water Quality Initiative Tier II Methodology..
LCV–lowest chronic value.
AWQC–Ambient Water Quality Criteria.
NOAEL–no observed adverse effect level.
WWB–Wet-weight basis.
DWB–Dry-weight basis.
ORNL–Radiological Benchmarks for Screening Contaminants of Potential Concern for Effects on Aquatic Biota at Oak Ridge National Laboratory, Oak Ridge Tennessee, BJC/0R-80, July 1998.
Bench–Screening Benchmarks for Ecological Risk Assessment (Oak Ridge National Laboratory, version 1.6, 10/1996).
Ecotox–Ecotox Thresholds, USEPA Office of Solid Waste and Emergency Response (OSWER), January 1996, EPA 540/F-95/038.

Table A-8. Ecological Risk Assessment Exposure Parameters

Reasonable Maximum Exposure Scenario (RME) Exposure Parameters

			Ecological Receptors				
RME Parameter		**Units**	**Muskrat ***	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Dietary Ingestion Rate	(DIR)	kg/kg-day	0.34	0.035	0.18	ND	ND
Water Ingestion Rate	(WIR)	kg/kg-day	0.98	0.02	0.047	ND	ND
Adjusted Dietary Ingestion Rate	(DIRadj)	kg/kg-day	0.335	0.0346	0.176	ND	ND
Sediment (or soil) Fraction in Diet	(SFD)	unitless	0.015	0.02	0.025	ND	ND
Invert Fraction in Diet	(IFD)	unitless	0	0	0.2	ND	ND
Fish Fraction in Diet	(FFD)	unitless	0	0	0.6	ND	ND
Amphibian Fraction	(AFD)	unitless	0	0	0.2	ND	ND
Mammal Fraction in Diet	(MFD)	unitless	0	0	0	ND	ND
Bird Fraction in Diet	(BFD)	unitless	0	0	0	ND	ND
Plant Fraction in Diet	(PFD)	unitless	1	1	0	ND	ND
Body Weight	(BW)	g	1550	25600	1990	ND	ND
Body Weight	(BW)	kg	1.55	25.6	1.99	ND	ND
Home Range/Territory Size	(HR)	hectares	0.05	1	0.60	ND	ND

Notes:

Body weights and home range are minima; all other parameters are 95th percentile values.

Body weights are minimas, which result in more conservative assumptions if allometric equations are used to obtain DIR

* - Values from Monticello OU3 ERA

NA: Not Applicable

ND: Not Determined

Central Tendency (CT) Exposure Scenario Exposure Parameters

			Ecological Receptors				
CT Parameter		**Units**	**Muskrat ***	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Dietary Ingestion Rate	(DIR)	kg/kg-day	0.30	0.028	0.18	ND	ND
Water Ingestion Rate	(WIR)	kg/kg-day	0.98	0.019	0.045	ND	ND
Adjusted Dietary Ingestion Rate	(DIRadj)	kg/kg-day	0.296	0.028	0.1755	ND	ND
Sediment (or soil) Fraction in Diet	(SFD)	unitless	0.015	0.02	0.025	ND	ND
Invert Fraction in Diet	(IFD)	unitless	0	0	0.2	ND	ND
Fish Fraction in Diet	(FFD)	unitless	0	0	0.6	ND	ND
Amphibian Fraction	(AFD)	unitless	0	0	0.2	ND	ND
Mammal Fraction in Diet	(MFD)	unitless	0	0	0	ND	ND
Bird Fraction in Diet	(BFD)	unitless	0	0	0	ND	ND
Plant Fraction in Diet	(PFD)	unitless	1	1	0	ND	ND
Body Weight	(BW)	g	1140	80700	2268	ND	ND
Body Weight	(BW)	kg	1.14	80.7	2.268	ND	ND
Home Range/Territory Size	(HR)	hectares	0.11	1	4.50	ND	ND

Notes:

Except for muskrat, all values are means; muskrat data are median value of the reported range

NA: Not Applicable

ND: Not Determined

* - Values from Monticello OU3 ERA

Table A-9. Area Use Factors

RME AUF	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
NRW	1.000	1.000	1.000	NA	NA
RFP	1.000	1.000	1.000	NA	NA
REF	1.000	1.000	1.000	NA	NA
	Site Size (ha)	**CF**			
NRW	17.64	4.047E-01			
RFP	6.73				
REF	1000				
CT AUF	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
NRW	1.000	1.000	1.0000	NA	NA
RFP	1.000	1.000	1.0000	NA	NA
REF	1.000	1.000	1.0000	NA	NA

RME - Reasonable Maximum Exposure

CF - conversion factor (acres to hectares)

CT - Central Tendency

NRW - New Rifle Wetland

RFP - Roaring Fork Pond

REF- Reference Wetland (One Mile Pond)

ha- hectare

Table A–10. Bioaccumulation and Bioconcentration Factors for Ecological Receptor s

	BAFs from sediment		BCFs from water	
Analyte	Aquatic Plant root	Aquatic Plant stem	Benthic Invertebrate	Fish or Frogs
Ammonia as Total N				
Arsenic	1.74	1.74	20	20
Cadmium	5.69	4.46	110.8	8
Fluoride				
Iron	1.53	0.22		
Manganese	1.51	2.45		
Molybdenum	1	0.85		
Nitrate				
Phosphate				
Selenium			44.7	78
Strontium	1.32	1.72		
Sulfate				
Uranium	1.03	0.12		
Vanadium	1.64	0.21		
Zinc	1.49	1.04	1899	282

Columns 2 and 3 - calculated BAFs from Reference or New Rifle wetlands (maxima used)

Note -. These values apply to risk assessment for Roaring Fork Pond and comparison risks for reference wetland

BAFs - bioaccumulation factors

BCFs - bioconcentration factors

Table A-11. Calculated Intakes for Ecological Receptors

Intakes for Ecological Receptors - New Rifle Wetland (RME and CT Exposure Scenarios)

NRW	Intakes Due to Sediment Ingestion - RME					Intakes Due to Dietary Ingestion - RME					Intakes Due to Surface Water Ingestion - RME				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.43E-03	5.81E-05	1.17E-04	NA	NA
Arsenic	5.27E-02	7.30E-03	4.65E-02	NA	NA	No Data	No Data	2.89E-02	NA	NA	8.07E-03	1.93E-04	3.87E-04	NA	NA
Cadmium	3.77E-03	5.22E-04	3.33E-03	NA	NA	1.64E-01	1.81E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.04E-01	1.44E-02	2.90E-02	NA	NA
Iron	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	1.14E+00	2.73E-02	5.48E-02	NA	NA
Manganese	1.77E+00	2.46E-01	1.56E+00	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	1.03E-02	1.43E-03	9.11E-03	NA	NA	1.86E+00	2.46E-01	0.00E+00	NA	NA	7.07E-02	1.69E-03	3.39E-03	NA	NA
Nitrate	4.52E-01	6.27E-02	3.99E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.91E-02	1.65E-03	3.31E-03	NA	NA
Phosphate	2.27E-02	3.15E-03	2.01E-02	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	No Data	No Data	No Data	NA	NA	2.77E-01	2.86E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Strontium	1.49E+00	2.07E-01	1.32E+00	NA	NA	7.43E+01	7.69E+00	0.00E+00	NA	NA	1.33E+00	3.17E-02	6.36E-02	NA	NA
Sulfate	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Uranium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.64E-02	8.69E-04	1.74E-03	NA	NA
Vanadium	1.69E-01	2.34E-02	1.49E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.74E-03	6.56E-05	1.32E-04	NA	NA
Zinc	2.63E-01	3.64E-02	2.32E-01	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA

NRW	Intakes Due to Sediment Ingestion - CT					Intakes Due to Dietary Ingestion - CT					Intakes Due to Surface Water Ingestion - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.43E-03	4.70E-05	1.12E-04	NA	NA
Arsenic	4.65E-02	5 86E-03	4.65E-02	NA	NA	No Data	No Data	2.89E-02	NA	NA	8.07E-03	1.56E-04	3.70E-04	NA	NA
Cadmium	3.33E-03	4 19E-04	3.33E-03	NA	NA	1.44E-01	1.45E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.04E-01	1.17E-02	2.77E-02	NA	NA
Iron	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	1.14E+00	2.21E-02	5.24E-02	NA	NA
Manganese	1.56E+00	1.97E-01	1.56E+00	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	9.11E-03	1.15E-03	9.11E-03	NA	NA	1.64E+00	1.97E-01	0.00E+00	NA	NA	7.07E-02	1.37E-03	3.24E-03	NA	NA
Nitrate	3.99E-01	5.03E-02	3.99E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.91E-02	1.34E-03	3.17E-03	NA	NA
Phosphate	2.01E-02	2.53E-03	2.01E-02	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	No Data	No Data	No Data	NA	NA	2.44E-01	2.30E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Strontium	1.32E+00	1 66E-01	1 32E+00	NA	NA	6.56E+01	6.17E+00	0.00E+00	NA	NA	1.33E+00	2.56E-02	6.09E-02	NA	NA
Sulfate	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Uranium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.64E-02	7.03E-04	1.67E-03	NA	NA
Vanadium	1.49E-01	1.88E-02	1 49E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.74E-03	5.30E-05	1.26E-04	NA	NA
Zinc	2.32E-01	2.92E-02	2.32E-01	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA

NRW - New Rifle wetland

RME - Reasonable maximum exposure

CT - Central tendency

NA - Not applicable

No Data - Analyte was removed as a COPC in the particular medium or not analyzed

COPC - Contaminant of potential concern

Note - Zeros in the dietary pathway for GBH indicate that an intake could not be calculated due to the lack of a BCF based on unfiltered surface water

Note - "No Data" in the dietary pathway for the GBH indicates that analyte was removed as a COPC for unfiltered surface water; therefore an intake was not calculated

GBH - Great blue heron

Table A-11. Calculated Intakes for Ecological Receptors

Intakes for Ecological Receptors - Reference Wetland for New Rifle Wetland (RME and CT Exposure Scenarios)

REF	Intakes Due to Sediment Ingestion - RME					Intakes Due to Dietary Ingestion - RME					Intakes Due to Surface Water Ingestion - RME				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.09E-04	1.45E-05	2.92E-05	NA	NA
Arsenic	3.62E-02	5.02E-03	3.20E-02	NA	NA	No Data	No Data	2.25E-02	NA	NA	6.27E-03	1.50E-04	3.01E-04	NA	NA
Cadmium	8.24E-04	1.14E-04	7.27E-04	NA	NA	1.31E-01	1.47E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.39E-01	8.10E-03	1.62E-02	NA	NA
Iron	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.02E-01	7.21E-03	1.45E-02	NA	NA
Manganese	1.65E+00	2.29E-01	1.46E+00	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	3.06E-03	4.24E-04	2.70E-03	NA	NA	3.65E-01	3.40E-02	0.00E+00	NA	NA	1.37E-03	3.28E-05	6.58E-05	NA	NA
Nitrate	5.23E-03	7.25E-04	4.61E-03	NA	NA	No Data	No Data	0.00E+00	NA	NA	7.74E-02	1.85E-03	3.71E-03	NA	NA
Phosphate	1.59E-03	2.21E-04	1.41E-03	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	No Data	No Data	No Data	NA	NA	8.87E-02	9.18E-03	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Strontium	7.13E-01	9.88E-02	6.29E-01	NA	NA	5.46E+01	5.64E+00	0.00E+00	NA	NA	1.17E+00	2.79E-02	5.60E-02	NA	NA
Sulfate	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Uranium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	8.41E-03	2.01E-04	4.03E-04	NA	NA
Vanadium	1.63E-01	2.26E-02	1.44E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.74E-03	6.56E-05	1.32E-04	NA	NA
Zinc	2.54E-01	3.52E-02	2.24E-01	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA

REF	Intakes Due to Sediment Ingestion - CT					Intakes Due to Dietary Ingestion - CT					Intakes Due to Surface Water Ingestion - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	6.09E-04	1.18E-05	2.80E-05	NA	NA
Arsenic	3.20E-02	4.03E-03	3.20E-02	NA	NA	No Data	No Data	2.25E-02	NA	NA	6.27E-03	1.21E-04	2.88E-04	NA	NA
Cadmium	7.27E-04	9.17E-05	7.27E-04	NA	NA	1.15E-01	1.18E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.39E-01	6.55E-03	1.56E-02	NA	NA
Iron	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.02E-01	5.83E-03	1.39E-02	NA	NA
Manganese	1.46E+00	1.84E-01	1.46E+00	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	2.70E-03	3.40E-04	2.70E-03	NA	NA	3.22E-01	2.73E-02	0.00E+00	NA	NA	1.37E-03	2.65E-05	6.30E-05	NA	NA
Nitrate	4.61E-03	5.81E-04	4.61E-03	NA	NA	No Data	No Data	0.00E+00	NA	NA	7.74E-02	1.50E-03	3.56E-03	NA	NA
Phosphate	1.41E-03	1.77E-04	1.41E-03	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	No Data	No Data	No Data	NA	NA	7.83E-02	7.37E-03	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Strontium	6.29E-01	7.92E-02	6.29E-01	NA	NA	4.82E+01	4.53E+00	0.00E+00	NA	NA	1.17E+00	2.26E-02	5.36E-02	NA	NA
Sulfate	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Uranium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	8.41E-03	1.63E-04	3.86E-04	NA	NA
Vanadium	1.44E-01	1.82E-02	1.44E-01	NA	NA	No Data	No Data	0.00E+00	NA	NA	2.74E-03	5.30E-05	1.26E-04	NA	NA
Zinc	2.24E-01	2.83E-02	2.24E-01	NA	NA	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	NA	NA

REF - Reference wetland

RME - Reasonable maximum exposure

CT - Central tendency

NA - Not applicable

No Data - Analyte was removed as a COPC in the particular medium or not analyzed

COPC - Contaminant of potential concern

Note - Zeros in the dietary pathway for GBH indicate that an intake could not be calculated due to the lack of a BCF based on unfiltered surface water.

Note - "No Data" in the dietary pathway for the GBH indicates that analyte was removed as a COPC for unfiltered surface water; therefore an intake was not calculated.

GBH - Great blue heron

Table A-11. Calculated Intakes for Ecological Receptors

Intakes for Ecological Receptors - Roaring Fork Pond (RME and CT Exposure Scenarios)

RFP	Intakes Due to Sediment Ingestion - RME					Intakes Due to Dietary Ingestion - RME					Intakes Due to Surface Water Ingestion - RME				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	4.11E-01	5.70E-02	3.63E-01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	3.08E+00	7.37E-02	1.48E-01	NA	NA
Arsenic	3.65E-02	5.05E-03	3.22E-02	NA	NA	4.17E+00	4.31E-01	1.49E-02	NA	NA	4.17E-03	9.95E-05	2.00E-04	NA	NA
Cadmium	3.78E-03	5.24E-04	3.33E-03	NA	NA	1.26E+00	1.14E-01	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	4.38E-01	1.05E-02	2.10E-02	NA	NA
Iron	9.31E+01	1.29E+01	8.21E+01	NA	NA	5.35E+03	1.39E+02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Manganese	2.14E+00	2.97E-01	1.89E+00	NA	NA	2.79E+02	3.57E+01	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	1.79E-02	2.48E-03	1.58E-02	NA	NA	1.08E+00	1.03E-01	0.00E+00	NA	NA	5.05E-01	1.21E-02	2.42E-02	NA	NA
Nitrate	1.05E+00	1.45E-01	9.23E-01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	4.41E+02	1.05E+01	2.11E+01	NA	NA
Phosphate	1.82E-02	2.52E-03	1.60E-02	NA	NA	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	1.76E-03	2.44E-04	1.56E-03	NA	NA	No BAF	No BAF	1.38E-02	NA	NA	1.08E-03	2.58E-05	5.17E-05	NA	NA
Strontium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.27E+00	7.82E-02	1.57E-01	NA	NA
Sulfate	1.40E+01	1.94E+00	1.23E+01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	2.76E+03	6.60E+01	1.33E+02	NA	NA
Uranium	3.02E-02	4.19E-03	2.67E-02	NA	NA	1.14E+00	2.46E-02	0.00E+00	NA	NA	1.56E-01	3.72E-03	7.47E-03	NA	NA
Vanadium	1.65E-01	2.29E-02	1.46E-01	NA	NA	1.00E+01	2.35E-01	0.00E+00	NA	NA	2.74E-03	6.56E-05	1.32E-04	NA	NA
Zinc	4.53E-01	6.27E-02	3.99E-01	NA	NA	3.76E+01	3.20E+00	No Data	NA	NA	No Data	No Data	No Data	NA	NA

RFP	Intakes Due to Sediment Ingestion - CT					Intakes Due to Dietary Ingestion - CT					Intakes Due to Surface Water Ingestion - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	3.63E-01	4.57E-02	3.63E-01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	3.08E+00	5.96E-02	1.42E-01	NA	NA
Arsenic	3.22E-02	4.06E-03	3.22E-02	NA	NA	3.68E+00	3.46E-01	1.49E-02	NA	NA	4.17E-03	8.05E-05	1.91E-04	NA	NA
Cadmium	3.33E-03	4.20E-04	3.33E-03	NA	NA	1.11E+00	9.18E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	4.38E-01	8.47E-03	2.01E-02	NA	NA
Iron	8.21E+01	1.04E+01	8.21E+01	NA	NA	4.72E+03	1.12E+02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Manganese	1.89E+00	2.38E-01	1.89E+00	NA	NA	2.46E+02	2.86E+01	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	1.58E-02	1.99E-03	1.58E-02	NA	NA	9.57E-01	8.27E-02	0.00E+00	NA	NA	5.05E-01	9.77E-03	2.32E-02	NA	NA
Nitrate	9.23E-01	1.16E-01	9.23E-01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	4.41E+02	8.52E+00	2.02E+01	NA	NA
Phosphate	1.60E-02	2.02E-03	1.60E-02	NA	NA	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	1.56E-03	1.96E-04	1.56E-03	NA	NA	No BAF	No BAF	1.38E-02	NA	NA	1.08E-03	2.08E-05	4.95E-05	NA	NA
Strontium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.27E+00	6.33E-02	1.50E-01	NA	NA
Sulfate	1.23E+01	1.55E+00	1.23E+01	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	2.76E+03	5.34E+01	1.27E+02	NA	NA
Uranium	2.67E-02	3.36E-03	2.67E-02	NA	NA	1.01E+00	1.98E-02	0.00E+00	NA	NA	1.56E-01	3.01E-03	7.15E-03	NA	NA
Vanadium	1.46E-01	1.84E-02	1.46E-01	NA	NA	8.84E+00	1.89E-01	0.00E+00	NA	NA	2.74E-03	5.30E-05	1.26E-04	NA	NA
Zinc	3.99E-01	5.03E-02	3.99E-01	NA	NA	3.32E+01	2.57E+00	No Data	NA	NA	No Data	No Data	No Data	NA	NA

No Data - Analyte was removed as a COPC in the particular medium or not analyzed

COPC - Contaminant of potential concern

Note - Zeros in the dietary pathway for GBH indicate that an intake could not be calculated due to the lack of a BCF based on unfiltered surface water.

GBH - Great blue heron

No Data - For muskrat and mule deer, analyte was removed as a COPC in sediment; therefore a dietary intake was not calculated

No Data - For muskrat and mule deer, for selenium in the dietary pathway, no BAF was calculated due to low detection frequency

Note - "No Data" in the dietary pathway for the GBH indicates that analyte was removed as a COPC for unfiltered surface water; therefore an intake was not calculated.

No BAF - For muskrat and mule deer: ammonium, fluoride, nitrate, phosphate and sulfate were not analyzed in vegetation; therefore a BAF was not calculated

RFP - Roaring Fork Pond

RME - Reasonable maximum exposure

CT - Central tendency

NA - Not applicable

Table A-11. Calculated Intakes for Ecological Receptors

Intakes for Ecological Receptors - Reference for Roaring Fork Pond (RME and CT Exposure Scenarios)

REF_RFP	Intakes Due to Sediment Ingestion - RME					Intakes Due to Dietary Ingestion - RME					Intakes Due to Surface Water Ingestion - RME				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	2.08E-02	2.89E-03	1.84E-02	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	6.08E-04	1.45E-05	2.91E-05	NA	NA
Arsenic	3.62E-02	5.02E-03	3.20E-02	NA	NA	4.14E+00	4.28E-01	2.25E-02	NA	NA	6.27E-03	1.50E-04	3.01E-04	NA	NA
Cadmium	8.24E-04	1.14E-04	7.27E-04	NA	NA	2.75E-01	2.50E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.39E-01	8.10E-03	1.62E-02	NA	NA
Iron	8.57E+01	1.19E+01	7.56E+01	NA	NA	4.92E+03	1.28E+02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Manganese	1.65E+00	2.29E-01	1.46E+00	NA	NA	2.15E+02	2.75E+01	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	3.06E-03	4.24E-04	2.70E-03	NA	NA	1.86E-01	1.77E-02	0.00E+00	NA	NA	1.37E-03	3.28E-05	6.58E-05	NA	NA
Nitrate	5.23E-03	7.25E-04	4.61E-03	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	7.74E-02	1.85E-03	3.71E-03	NA	NA
Phosphate	1.59E-03	2.21E-04	1.41E-03	NA	NA	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	7.40E-04	1.02E-04	6.53E-04	NA	NA	No BAF	No BAF	1.38E-02	NA	NA	1.08E-03	2.58E-05	5.17E-05	NA	NA
Strontium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	1.17E+00	2.79E-02	5.60E-02	NA	NA
Sulfate	8.57E+00	1.19E+00	7.56E+00	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	2.78E+02	6.65E+00	1.33E+01	NA	NA
Uranium	2.75E-02	3.82E-03	2.43E-02	NA	NA	1.04E+00	2.25E-02	0.00E+00	NA	NA	8.41E-03	2.01E-04	4.03E-04	NA	NA
Vanadium	1.63E-01	2.26E-02	1.44E-01	NA	NA	9.91E+00	2.33E-01	0.00E+00	NA	NA	2.74E-03	6.56E-05	1.32E-04	NA	NA
Zinc	2.54E-01	3.52E-02	2.24E-01	NA	NA	2.11E+01	1.79E+00	No Data	NA	NA	No Data	No Data	No Data	NA	NA

REF_RFP	Intakes Due to Sediment Ingestion - CT					Intakes Due to Dietary Ingestion - CT					Intakes Due to Surface Water Ingestion - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	1.84E-02	2.32E-03	1.84E-02	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	6.08E-04	1.17E-05	2.79E-05	NA	NA
Arsenic	3.20E-02	4.03E-03	3.20E-02	NA	NA	3.65E+00	3.43E-01	2.25E-02	NA	NA	6.27E-03	1.21E-04	2.88E-04	NA	NA
Cadmium	7.27E-04	9.17E-05	7.27E-04	NA	NA	2.42E-01	2.00E-02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Fluoride	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	3.39E-01	6.55E-03	1.56E-02	NA	NA
Iron	7.56E+01	9.53E+00	7.56E+01	NA	NA	4.34E+03	1.03E+02	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Manganese	1.46E+00	1.84E-01	1.46E+00	NA	NA	1.89E+02	2.20E+01	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Molybdenum	2.70E-03	3.40E-04	2.70E-03	NA	NA	1.64E-01	1.42E-02	0.00E+00	NA	NA	1.37E-03	2.65E-05	6.30E-05	NA	NA
Nitrate	4.61E-03	5.81E-04	4.61E-03	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	7.74E-02	1.50E-03	3.56E-03	NA	NA
Phosphate	1.41E-03	1.77E-04	1.41E-03	NA	NA	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	NA	NA
Selenium	6.53E-04	8.23E-05	6.53E-04	NA	NA	No BAF	No BAF	1.38E-02	NA	NA	1.08E-03	2.08E-05	4.95E-05	NA	NA
Strontium	No Data	No Data	No Data	NA	NA	No Data	No Data	0.00E+00	NA	NA	1.17E+00	2.26E-02	5.36E-02	NA	NA
Sulfate	7.56E+00	9.53E-01	7.56E+00	NA	NA	No BAF	No BAF	0.00E+00	NA	NA	2.78E+02	5.38E+00	1.28E+01	NA	NA
Uranium	2.43E-02	3.06E-03	2.43E-02	NA	NA	9.18E-01	1.80E-02	0.00E+00	NA	NA	8.41E-03	1.63E-04	3.86E-04	NA	NA
Vanadium	1.44E-01	1.82E-02	1.44E-01	NA	NA	8.75E+00	1.87E-01	0.00E+00	NA	NA	2.74E-03	5.30E-05	1.26E-04	NA	NA
Zinc	2.24E-01	2.83E-02	2.24E-01	NA	NA	1.86E+01	1.44E+00	No Data	NA	NA	No Data	No Data	No Data	NA	NA

No Data - Analyte was removed as a COPC in the particular medium or not analyzed

COPC - Contaminant of potential concern

Note - Zeros in the dietary pathway for GBH indicate that an intake could not be calculated due to the lack of a BCF based on unfiltered surface water.

GBH - Great blue heron

No Data - For muskrat and mule deer, analyte was removed as a COPC in sediment; therefore a dietary intake was not calculated

No Data - For muskrat and mule deer, for selenium in the dietary pathway, no BAF was calculated due to low detection frequency.

Note - "No Data" in the dietary pathway for the GBH indicates that analyte was removed as a COPC for unfiltered surface water; therefore an intake was not calculated.

No BAF - For muskrat and mule deer: ammonium, fluoride, nitrate, phosphate and sulfate were not analyzed in vegetation; therefore a BAF was not calculated

REF_RFP - Reference for Roaring Fork Pond

RME - Reasonable maximum exposure

CT - Central tendency

NA - Not applicable

Table A-12A. Toxicity Reference Values for Animals

Chemical	TRV-NOAEL (mg/kg bw/d)	TRV-LOAEL (mg/kg bw/d)	Species	Study Endpoint UF	Study Duration UF	NOAEL (mg/kg bw/d)	LOAEL (mg/kg bw/d)	Study Description	Reference	Comment
Ammonia	800	2400	Cow	3	1	NA	2400	6% liquid ammonia added to hay of lactating cows as main ration for 6 wks. Fever, neurological effects in calves. Assume dietary intake of 0.04 g/g bw/d = 0.0024 g NH3/g bw/d.	Motoi et al., 1997	Primary citation. Abstract only.
Ammonia	1200	NA	Sheep	1	1	1200	NA	3% NH3 added to hay as % dry matter and given as main ration for 63 d growth study. No adverse effects on serum prolactin, body weigh., Assume dietary intake of 0.04 g/g bw/d = 0.0024 g NH3/g bw/d.	Chestnut et al., 1991	Primary citation. Abstract only. Use this as the NOAEL, the cow value as the LOAEL to define boundaries of toxicity for ruminants.
Arsenic	14.0	42	Mallard	1	1	14	42	NOAEL @ 100 ppm in diet for behavior (LOAEL was 300 ppm for behavior and growth). Converted with 0.14 kg diet/kg bw from Camardese et al., 1990.	Camardese et al., 1990; Whitworth et al., 1991	Only avian value.
Arsenic	0.03	0.3776	Rat	1	1	0.0276	0.3776	Endpoints growth, heart weight, longevity, blood and urine chemistry, liver pathology. Lifetime exposure by diet and drinking water. Minimal effects for LOAEL (decreased male heart weight and increased serum cholesterol)	Schroeder et al., 1968	Clear endpoint relating to effects on assessment endpoints. Author concludes that the LOAEL is not toxic to rats based on minimal effects observed. No population
Cadmium	0.13	2	Mallard	3	5	NA	2	NOAEL for adults; LOAEL for kidney lesions in ducklings. Lesions uncertain for population effects w/o link to survival or repro. Measured 14.6 ppm in diet. Used 42.8 g /798.5 g bw, or 0.054.	White and Finley, 1978	Only avian value.
Cadmium	0.50	NA	Rat	1	5	2.5	NA	NOAEL for behavior, condition, body weight, food consumption (30 ppm)	Groten et al., 1991	Clear endpoint; primary reference.
Cadmium	8.10	24.3	Rabbit	3	1	NA	24.3	Renal effects from 300 ppm diet, 10 month study. Estimated with 0.081 g/g bw/d from Equation 3-9 (EPA, 1993) and assumed body weight of 1.3 kg.	WHO, 1992b	
Fluoride	3.5	NA	Japanese Quail	1	1	3.5	NA	50 ppm in drinking water produced no effect on mortality, growth, skeleton, egg shell thickness after 6 wks exposure. 0.059*BW^0.67 (EPA, 1993) or 0.07 L/kg/d for a 0.5 kg fowl.	Anonymous, 1989	
Fluoride	2.23	11.36	Rat	1	5	11.17	11.36	Females dosed in drinking water for 20 days (throughout gestation) with 0, 10, 25, 100, 175, or 250 ppm (0, 1.4, 3.9, 15.6,24.7, 25.1 mg/kg bw-d) NaF daily. No behavior or clinical signs noted. Decreased food intake & BW by 12% at 250 ppm. Decrease water intake at 175 ppm.. No effects on reproductive endpoints, inc. # of viable fetuses and fetal development or weight. NOAEL in F as 11.17 mg/kg-d.	Collins et al., 1995	Primary citation. Appropriate endpoint. Study noted significant skeletal "variations" (reduced ossification) at 250 ppm - these were not considered an appropriate or adverse population effect. All F values appear consistent with each other.
Iron	390	780	Bird	1	1	390	NA	Assumed based on nutritional requirements of 2.4-3.9 mg/kg bw/day (Wiseman, 1987).		Remain above nutritional requirement for TBVs to be technically defensible.
Iron	19.55	NA	Rat	1	1	19.55	NA	230 ppm in basal diet of controls. Convert with 0.085 g/g bw/d from Groton et al., 1991.	Schlicker and Cox, 1968	
Manganese	410	820	Bird	1	1	410	NA	Assumed based on nutritional requirements of 6.8 and 4.13 for chickens and ducks (Wiseman, 1987)		Only suggested value.
Manganese	200	615	Rat, mouse	1	1	200	615	NOAEL for mortality for chronic exposure; 615 the LOAEL for mortality. NOAEL for mice 160-200.	NTP, 1993	Chronic study resulting in NOAEL and LOAEL.
Manganese	80.0	NA	Grazer	1	1	80	NA	Maximum chronic tolerated dietary level is 400 - 2000 ppm dwb (converted with 0.04 kg diet/kg bw (Sax, 1984))	Bodek et al., 1988	Secondary citation.
Molybdenum	19.4	29.1	Bird	1	1	19.4	29.1	Growth reduction occurs at 200-300 ppm diet; reproductive impairment at 500 ppm; optimal growth at 6 ppm diet. Use 200 ppm as NOAEL, 300 ppm as LOAEL. Convert with 0.097 g/g bw/d for chicken (Wiseman, 1987).	Eisler, 1989	Must stay above 6 ppm (0.58 mg/kg bw/d) which is beneficial.
Molybdenum	0.8	2.5	Goat	3	1	NA	2.5	Feeding 50 ppm in diet decreased weight gain and caused hematological changes; 235 day study. Use 0.577 WT^0.727 and 10 kg bw to get DIR of 0.05 g/g bw/d (EPA, 1993).	Sharma and Parihar, 1994 a,b	Long term study; diet vehicle more closely related to site exposures.
Nitrate	7.9	277.2	Japanese quail	7	5	NA	277.2	Increased mortality when given 3960 ppm or higher in drinking water. Convert with 0.059 BW^0.67 (EPA, 1993) for a 0.5 kg chicken, or ingestion rate of 0.07 L/kg bw/d.	Bruning-Fann and Kaneene, 1993	Could have higher bioavailability from water.

Table A-12A. Toxicity Reference Values for Animals

Chemical	TRV-NOAEL (mg/kg bw/d)	TRV-LOAEL (mg/kg bw/d)	Species	Study Endpoint UF	Study Duration UF	NOAEL (mg/kg bw/d)	LOAEL (mg/kg bw/d)	Study Description	Reference	Comment
Nitrate	44.0	660.0	Cow	3	5	NA	660.0	Increased weight of pituitary gland. Effect on function unknown.	Bruning-Fann and Kaneene, 1993	
Nitrate	30.0	NA	Ruminant	1	1	30.0	NA	Acute poisoning occurs when drinking water exceeds 500 ppm nitrate. WIR=0.099BW^0.9/BW (EPA, 1993), or 0.06 L/kg bw/d for a 180 kg ruminant.	Bruning-Fann and Kaneene, 1993	Could have higher bioavailability from water.
Phosphate	189.15	NA	Chicken	1	1	189.15	NA	Birds fed 1950 ppm total P in diet (with ~66% bioavailable) had improved weight gain. For nutrition, 0.39- 0.55% or more of the total diet must be P. Convert with 0.097 kg diet/kg bw/d from Wiseman, 1987.	Ertl et al., 1998	Only value
Phosphorus	200.0	NA	Horse	1	1	200	NA	0.5% is the minimum nutritional requirement.	Manna Pro Corporation, 1999	Label from Equine Senior
Selenium	0.66	1.32	Chicken	1	1	0.66	NA	NOAEL for egg production and egg weight, although slight decrease in hatchability.	Ort and Latshaw, 1978	Appropriate toxicity endpoints relative to assessment endpoint. Must remain above required nutrient level.
Selenium	1.25	1.664	Rat	1	1	1.248	1.664	Diet of 4.8 ppm NEL for blood chemistry, growth, histopathology for 6 week study. LEL was 6.4 ppm. Convert with 0.26 kg/kg bw/d from EPA, 1993 for mice.	Friberg et al., 1979	Secondary citation.
Strontium	31.67	31.67							INEEL	
Sulfate	9.5	28.6	Human	3	1	NA	28.57	For humans, dissolved in drinking water, causes diarrhea	EPA 811F94008	
Sulfate	1000	NA	Chicken	1	1	1000	NA	1000 mg/kg-day as NOAEL	Agricul. & Food Chem. 1980	
Uranium	11.9	595.1	Japanese quail	5	10	NA	595.1	Quail injected IV with 15 µmol U/100 g bw died; 5 µmol U/100 g bw (11.9 mg/kg bw) survived but moribund by 18 hr. Adjust with 2% absorption for oral exposure relative to injection.	Robinson et al., 1984	5 umol/100 g bw= 5 E-5 mol/kg bw=5E-5*238.03 g/mol *1000 mg/g/2%
Uranium	10.0	25.0	Mouse	1	1	10	25	NOAEL for 60 day study was 10 mg/kg/d for fertility, gestation, survival. LOAEL of 25 mg/kg/d caused embryolethality.	Paternain et al., 1989	Use this as is longer study providing NOAEL and LOAEL.
Vanadium	0.03	0.485	Chicken	3	5	NA	0.485	5 ppm in diet a LOAEL for growth rate decreases in 4 week study. Convert with 0.097 g/g bw/d for diet (Wiseman, 1987).	Cervantes and Jensen, 1986	Data highly conflicting- don't use toxicity UFs on this. Use this value but discuss in uncertainty section if a driver.
Zinc	27.0	189	Mallard	7	1	NA	189	Ducks fed 3000 ppm in diet had decreased gonad size, probably impairment of function. Overt toxicity after 20 days. Mortality high by 60 days. Convert with 0.063 g/g/d, EPA, 1993.	Gasaway and Buss, 1972	Appropriate endpoint. Long study.
Zinc	56.7	340	Rat	3	1	170	340	0.2% in diet NOAEL for effects on fetus. 0.4% in diet caused reproductive effects. Study ranged from 16 to 40 days. Convert with 0.085 kg/kg bw/d from Groton et al., 1991.	Schlicker and Cox, 1968	Use this. Consistent with other rat study as well.
Zinc	0.75	1.44	Cattle	1	1	0.748	1.44	2 mg/kg diet is deficient; 18.7 mg/kg is typical, and 36 mg/kg is enriched. Convert with 0.04 g/g/d from Sax, 1984.	Miller et al., 1968	TBV below this would trigger deficiency. Note this for Final TBVs with UFs applied.

Note- values in bold were included in quantitative risk estimates.

Note - Values in bold include study duration and study endpoint UFs but not intertaxon UFs. See final TRVs for incorporation of intertaxon UFs

UF - uncertainty factor

TRV - toxicity reference value

NOAEL - no observed adverse effects level

LOAEL - lowest observed adverse effects level

NA - not available or no data.

mg/kg bw/d - milligrams per kilogram body weight per day

Table A-12B. Toxicity Reference Values for Plants

Analyte	TRV-NOAEL (mg/kg)	TRV-LOAEL (mg/kg)	Species	Uncertainty Factors for Health Effects	NOEC	LOEC	Endpoint Description	Reference	Comment
Arsenic	25	NA	plants	1	25	NA	Recommended criterion is <25 mg total arsenic/kg soil.	Eisler, 1988	Appropriate value; growth suppression was vague endpoint; secondary citation.
Cadmium	50	100	soybean	2	NA	100	Decreased yield by 76% relative to controls.	Wallace, 1989b	Primary reference. Clear toxicological endpoint.
Manganese	500	NA	plants	1	500	NA	Recommended benchmark value	Will and Suter, 1995	Only value.
Selenium	1	NA	plants	1	1	NA	Recommended benchmark value.	Will and Suter, 1995	Secondary citation.
Vanadium	2	NA	Plants	1	2	NA	Recommended benchmark value	Will and Suter, 1995	Only value.Secondary citation.
Zinc	379	NA	plants	1	379	NA	Maximum concentration from bioassay indicating unimpacted or nonphytotoxic soils.	Kapustka et al., 1995	Use this since involves mixture; more site-specific since uses pH.

Note -. TRVs are for terrestrial plants exposed to soil

TRV-NOAEL - toxicity reference value - no observed adverse effects level

TRV-LOAEL - toxicity reference value - lowest observed adverse effects level

NOEC - no observed effects concentration

LOEC - lowest observed effects concentration

NEL - no effects level

Table A-12C. Taxonomy Classification for Application of Taxonomy Uncertainty Factors (UFs)

Common Name	Class	Order	Family	Genus	Species	Key Receptor
American kestrel	Aves	Falconiformes	Falconidae	Falco	sparverius	N
American robin	Aves	Passeriformes	Turdidae	Turdus	migratorius	N
Bald eagle	Aves	Falconiformes	Accipitridae	Haliaeetus	leucocephalus	N
Barn Owl	Aves	Strigiformes	Tytonidae	Tyto	alba	N
Belted kingfisher	Aves	Coraciiformes	Alcedinidae	Megaceryle	alcyon	N
Black duck	Aves	Anseriformes	Anatidae	Anas	rubripes	N
Blue Grouse	Aves	Galliformes	Tetraonidae	Dendragapus	obscurus	N
Chicken	Aves	Galliformes	Phasianidae	Gallus	domesticus	N
Chimney Swift	Aves	Micropodiformes	Micropodidae	Chaetura	pelagica	N
Golden eagle	Aves	Falconiformes	Accipitridae	Aquila	chrysaetos	N
Gray partridge	Aves	Galliformes	Phasianidae	Perdix	perdix	N
Great Blue Heron	**Aves**	**Ciconiiformes**	**Ardeidae**	**Ardea**	**herodias**	**Y**
Great horned owl	Aves	Strigiformes	Strigidae	Bubo	virginianus	N
Mallard duck	Aves	Anseriformes	Anatidae	Anas	platyrhynchos	N
Mountain bluebird	Aves	Passeriformes	Turdidae	Sialia	currucoides	N
Mourning dove	Aves	Columbiformes	Columbidae	Zenaida	macroura	N
Partridge sp.	Aves	Galliformes	Perdicidae	NA	NA	N
Passerine	Aves	Passeriformes	NA	NA	NA	N
Pelican sp.	Aves	Pelecaniformes	Pelicanidae	NA	NA	N
Peregrine falcon	Aves	Falconiformes	Falconidae	Falco	peregrinus	N
Quail sp.	Aves	Galliformes	Phasianidae	NA	NA	N
Red-tailed Hawk	Aves	Falconiformes	Accipitridae	Buteo	jamaicensis	N
Red winged blackbird	Aves	Passeriformes	Icteridae	Agelaius	phoeniceus	N
Ring-necked pheasant	Aves	Galliformes	Phasianidae	Phasianus	colchicus	N
Ring dove	Aves	Columbiformes	Columbidae	Streptopelia	risoria	N
Spotted sandpiper	Aves	Charadriiformes	Scolopacidae	Actitis	macularia	N
Tern sp.	Aves	Charadriiformes	Laridae,Sterninae	NA	NA	N
Turkey	Aves	Galliformes	Phasianidae	Meleagris	gallopavo	N
Woodcock	Aves	Charadriiformes	Scolopacidae	Scolopax	minor	N
Black-tailed jackrabbit	Mammalia	Lagomorpha	Leporidae	Lepus	californicus	N
Buffalo	Mammalia	Artiodactyla	Bovidae	?	?	N
Cat	Mammalia	Carnivora	Felidae	Felis	domesticus	N
Cow	Mammalia	Artiodactyla	Bovidae	Bos	taurus	N
Deer Mouse	Mammalia	Rodentia	Muridae	Peromyscus	maniculata	N
Dog	Mammalia	Carnivora	Canidae	Canis	familiaris	N
Eastern Cottontail	Mammalia	Lagomorpha	Leporidae	Sylvilagus	floridanus	N

Table A-12C. Taxonomy Classification for Application of Taxonomy Uncertainty Factors (UFs)

Common Name	Class	Order	Family	Genus	Species	Key Receptor
Ferret	Mammalia	Carnivora	Mustelidae	Mustela	sp.	N
Goat	Mammalia	Artiodactyla	Bovidae	Capra	hircus	N
Grazer	Mammalia	Artiodactyla	NA	NA	NA	N
Guinea pig	Mammalia	Rodentia	Caviae	Cavia	porcellus	N
Hamster	Mammalia	Rodentia	Muridae	Cricetus	cricetus	N
Kit Fox	Mammalia	Carnivora	Canidae	Vulpes	macrotis	N
Least chipmunk	Mammalia	Rodentia	Sciuridae	Eutamias	minimus	N
Little Brown Myotis	Mammalia	Chiroptera	Vespertilionidae	Myotis	lucifugus	N
Long-tailed vole	Mammalia	Rodentia	Muridae	Microtus	longicaudus	N
Meadow Vole	Mammalia	Rodentia	Muridae	Microtus	pennsylvanicus	N
Mink	Mammalia	Carnivora	Mustelidae	Mustela	vision	N
Mouse (lab)	Mammalia	Rodentia	Muridae	Mus	musculus	N
Mule Deer	**Mammalia**	**Artiodactyla**	**Cervidae**	**Odocoileus**	**hemionus**	Y
Muskrat	**Mammalia**	**Rodentia**	**Muridae**	**Ondatra**	**zibethica**	Y
Pig	Mammalia	Artiodactyla	Suidae	Sus	scrofa	N
Pocket Gopher	Mammalia	Rodentia	Geomyidae	Thomomys	bottae	N
Rabbit	Mammalia	Lagomorpha	Leporidae	Lepus	cuniculus	N
Raccoon	Mammalia	Carnivora	Procyonidae	Procyon	lotor	N
Rat, lab	Mammalia	Rodentia	Muridae	Rattus	norvegicus	N
Red fox	Mammalia	Carnivora	Canidae	Vulpes	fulva	N
Sheep	Mammalia	Artiodactyla	Bovidae	Ovis	aries	N
Short-tailed shrew	Mammalia	Insectivora	Soricidae	Blarina	brevicauda	N
Western Harvest Mouse	Mammalia	Rodentia	Muridae	Reithrodontomys	megalotis	N
White-footed Mouse	Mammalia	Rodentia	Muridae	Peromyscus	leucopus	N

Burt and Grossenheider, 1980 — Peterson Field Guides:Mammals
Palmer and Fowler, 1975 — Fieldbook of Natural History
Source: Udvardy, 1977 — Audubon Society: Field Guide to North American Birds, Western Region
Y - yes; N-no — Key receptor - species for which risk estimates were calculated

Table A–13A. Final Toxicity Reference Values for Mammals, Birds, or Plants

Parameter	Muskrat-NOAEL	Muskrat-LOAEL	Mule Deer-NOAEL	Mule Deer-LOAEL	Great-Blue Heron-NOAEL	Great-Blue Heron-LOAEL	Plant* - NOAEL	Plant* - LOAEL
Ammonia as Total N	197.6	395.3	329.4	658.8	NA	NA	NA	NA
Arsenic	1.27	7.5	0.76	4.5	2.80	8.40	25	NA
Fluoride	0.74	3.79	0.45	2.27	0.7	NA	NA	NA
Iron	3.92	83.3	3.92	83.3	78.00	156	NA	NA
Manganese	50.0	153.75	16.0	NA	82.00	164	500	NA
Molybdenum	0.1	0.5	0.13	0.625	3.9	5.8	NA	NA
Nitrate	6.0	132	6	165	1.58	55.44	65	185
Phosphate	40	NA	40	NA	37.84	NA	110	180
Selenium	0.42	0.555	0.25	0.333	0.13	0.264	1	NA
Strontium	31.7	31.7	31.7	31.7	NA	NA	NA	NA
Sulfate	1.9	5.7	1.9	5.7	200	NA	NA	NA
Uranium	3.33	8.333	2	5.0	2.38	119.02	NA	NA
Vanadium	0.14	0.7	0.08	0.42	0.01	0.097	2	NA
Zinc	56.67	113.3	0.187	0.4	5.40	37.8	379	NA

Note. Underlined values are from Monticello OU3 ERA; remainder are from JPG

NOAEL - No observed adverse effects level

LOAEL - Lowest observed adverse effects level

Units are in mg/kg bw/day for muskrat, mule deer, and great blue heron; units are mg/kg of sediment for plants.

Table A–13B. Final Toxicity Reference Values for Aquatic Organisms in Freshwater and Sediment

Toxicity Reference Values for Protection of Aquatic Organisms in Freshwater and Sediment

	Freshwater (ug/L)				Sediments (mg/kg)					
Analyte	Chronic AWQC, FCV, or Tier II Value		Acute AWQC	EPA Freshwater SQC	EPA SQB or NOAA ERL		EPA ARCS SEC	Ontario Lower Effect Level	EPA NEC	Min SQC †
Ammonia as Total N	2782	5	28871	NA	NA	NA	NA	NA	NA	NA
Arsenic	190		360	NA	8.2	ERL	13.26	6	92.9	6
Cadmium	1.0	h	3.9	NA	1.2	ERL	2.15	0.6	8	0.6
Fluoride	2.7	1	43	NA	NA	NA	NA	NA	NA	NA
Iron	1000	i	NA	NA	NA	NA	84400	20000	289900	20000
Manganese	80	II	NA	NA	NA	NA	726.00	460	4460	460
Molybdenum	240	II	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphate	60	2	100	NA	NA	NA	NA	NA	NA	NA
Selenium	5.0		20	NA	NA	NA	NA	NA	NA	NA
Strontium	*1500*	B	*15000*	NA	NA	NA	NA	NA	NA	NA
Sulfate	284.2	4	2842	NA	NA	NA	NA	NA	120.59 *	120.59
Uranium	*2.6*	B	*27*	NA	NA	NA	NA	NA	NA	NA
Vanadium	19	II	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	100	h	120	NA	150	ERL	124.64	120	1300	120

† Minimum sediment values used

Note-. Use chronic freshwater value as NOAEL, acute value as LOAEL.

Source: EPA, 1996 (ECO Update, Ecotox Thresholds, Intermittent Bulletin, Vol. 3, No. 2)

Metal criteria are for total dissolved concentrations.

f - Final Chronic Value (FCV)

h - hardness dependent ambient water quality criterion (100 mg/L $CaCO_3$ used in table)

i - instantaneous maximum

pH - pH dependent ambient water quality criterion (7.8 pH used in table)

AWQC - Ambient Water Quality Criterion

II - Great Lakes Water Quality Initiative Tier II methodology

SQC - Sediment Quality Criteria

SQB -Sediment Quality Benchmarks by equilibrium partitioning assuming 1% organic carbon

ERL - Effects Range --Low (Long et al., 1995)

Source: EPA, 1996c (ARCS)

EPA ARCs NEC = Lowest NEC values for each analyte from EPA, 1996c. Dry weight basis.

Based on 14 d Chironomid or 28 d Hyalella total extraction data; normalized to TOC for organics

[1] Anonymous. 1989. Integrated Criteria Document Fluorides. Effects. National Institute for Public Health and Environmental protection. Netherlands. Appendix to Report No. 758474010. 98

[2] Correll, D.L. 1998. The Role of Phosphorus in the Eutrophication of Receiving Waters: A Review. J. Environ. Qual. 27:261-166

[3] Salizzarto et al., 1998. ET&C. 17:655-661

[4] Hansen et al., 1993. Sulfur printout. Invert exposed to 240X more sulfur than selenium (Se); Se was 0.71mg/l; sulfur ameliorated selenium toxicity.

* Brower, H. and T. Murphy (1995); 205 ug/ml + 1.7 g/ml = 120.59 ug/g

[5] (CCC) Continuous chronic criterion and continuous maximum criterion (CMC) (no salmonids) for pH=7.22 (One Mile Pond); EPA 1998

[B] Bench (ORNL 1996)

Table A–14A. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the New Rifle Wetland

NRW	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME			
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**
Ammonia as To	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.23E-05	1.76E-07	No Tox Value	1.24E-02	1.24E-02	1.23E-05	1.76E-07	0.00E+00	1.24E-02
Arsenic	4.15E-02	9.61E-03	1.66E-02	1.72E+00	1.72E+00	4.13E-01	No Data	No Data	1.03E-02	NA	NA	6.35E-03	2.54E-04	1.38E-04	4.53E-02	4.53E-02	4.78E-02	9.86E-03	2.71E-02	1.77E+00
Cadmium	3.02E-02	5.22E-03	1.25E-01	1.23E+00	1.23E+00	1.48E-02	1.31E+00	1.81E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.34E+00	1.86E-01	1.25E-01	1.23E+00
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	8.13E-01	3.24E-02	4.14E-02	2.40E+02	2.40E+02	8.13E-01	3.24E-02	4.14E-02	2.40E+02
Iron	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	NA	NA	2.91E-01	6.96E-03	7.02E-04	2.16E-02	2.16E-02	2.91E-01	6.96E-03	7.02E-04	2.16E-02
Manganese	3.55E-02	1.54E-02	1.91E-02	7.56E-01	7.56E-01	6.95E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.55E-02	1.54E-02	1.91E-02	7.56E-01
Molybdenum	1.03E-01	1.10E-02	2.35E-03	No Tox Value	No Tox Value	No Tox Value	1.86E+01	1.89E+00	0.00E+00	NA	NA	7.07E-01	1.30E-02	8.73E-04	3.23E-01	3.23E-01	1.94E+01	1.91E+00	3.22E-03	3.23E-01
Nitrate	7.54E-02	1.04E-02	2.53E-01	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.15E-02	2.75E-04	2.10E-03	No Tox Value	No Tox Value	8.69E-02	1.07E-02	2.55E-01	0.00E+00
Phosphate	5.69E-04	7.88E-05	5.30E-04	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.69E-04	7.88E-05	5.30E-04	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	6.65E-01	1.15E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	6.65E-01	1.15E-01	0.00E+00	0.00E+00
Strontium	4.70E-02	6.52E-03	No Tox Value	No Tox Value	No Tox Value	No Tox Value	2.35E+00	2.43E-01	No Tox Value	NA	NA	4.18E-02	1.00E-03	No Tox Value	8.90E-01	8.90E-01	2.43E+00	2.50E-01	0.00E+00	8.90E-01
Sulfate	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.09E-02	4.34E-04	7.33E-04	1.51E+01	1.51E+01	1.09E-02	4.34E-04	7.33E-04	1.51E+01
Vanadium	1.21E+00	2.93E-01	2.31E+01	No Tox Value	No Tox Value	1.66E+01	No Data	No Data	0.00E+00	NA	NA	1.96E-02	8.20E-04	2.04E-02	4.63E-01	4.63E-01	1.23E+00	2.94E-01	2.31E+01	4.63E-01
Zinc	4.64E-03	1.95E-01	4.29E-02	4.29E-01	4.29E-01	1.36E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.64E-03	1.95E-01	4.29E-02	4.29E-01
HI_NOAEL	**1.55**	**0.55**	**23.54**	**4.14**	**4.14**	**17.84**	**22.96**	**2.43**	**0.01**	**0.0**	**0.0**	**1.90**	**0.06**	**0.07**	**257.2**	**257.2**	**26.40**	**3.03**	**23.62**	**261.35**

NRW	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME			
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**
Ammonia as To	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	6.15E-06	8.82E-08	No Tox Value	1.95E-03	1.95E-03	6.15E-06	8.82E-08	0.00E+00	1.95E-03
Arsenic	7.03E-03	1.62E-03	5.53E-03	1.72E+00	1.72E+00	No Tox Value	No Data	No Data	3.44E-03	NA	NA	1.08E-03	4.28E-05	4.60E-05	2.39E-02	2.39E-02	8.10E-03	1.67E-03	9.02E-03	1.75E+00
Cadmium	7.76E-04	1.08E-04	8.32E-03	1.23E+00	1.23E+00	7.39E-03	3.37E-02	3.73E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.45E-02	3.84E-03	8.32E-03	1.23E+00
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.60E-01	6.35E-03	No Tox Value	1.51E+01	1.51E+01	1.60E-01	6.35E-03	0.00E+00	1.51E+01
Iron	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.37E-02	3.27E-04	3.51E-04	No Tox Value	No Tox Value	1.37E-02	3.27E-04	3.51E-04	0.00E+00
Manganese	1.15E-02	No Tox Value	9.54E-03	7.56E-01	7.56E-01	No Tox Value	No Data	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.15E-02	0.00E+00	9.54E-03	7.56E-01
Molybdenum	2.06E-02	2.29E-03	1.57E-03	No Tox Value	No Tox Value	No Tox Value	3.73E+00	3.93E-01	0.00E+00	NA	NA	1.41E-01	2.70E-03	5.82E-04	No Tox Value	No Tox Value	3.89E+00	3.98E-01	2.15E-03	0.00E+00
Nitrate	3.43E-03	3.80E-04	7.20E-03	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.23E-04	1.00E-05	5.98E-05	No Tox Value	No Tox Value	3.95E-03	3.90E-04	7.26E-03	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	4.99E-01	8.61E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.99E-01	8.61E-02	0.00E+00	0.00E+00
Strontium	4.70E-02	6.52E-03	No Tox Value	No Tox Value	No Tox Value	No Tox Value	2.35E+00	2.43E-01	No Tox Value	NA	NA	4.18E-02	1.00E-03	No Tox Value	8.90E-02	8.90E-02	2.43E+00	2.50E-01	0.00E+00	8.90E-02
Sulfate	No Data	No Data	No Tox Value	No Data	No Data	No Tox Value	No Data	No Data	No Tox Value	NA	NA	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.36E-03	1.74E-04	1.47E-05	1.46E+00	1.46E+00	4.36E-03	1.74E-04	1.47E-05	1.46E+00
Vanadium	2.42E-01	5.58E-02	1.54E+00	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	3.92E-03	1.56E-04	1.36E-03	No Tox Value	No Tox Value	2.46E-01	5.60E-02	1.54E+00	0.00E+00
Zinc	2.32E-03	1.01E-01	6.14E-03	4.29E-01	4.29E-01	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.32E-03	1.01E-01	6.14E-03	4.29E-01
HI_LOAEL	**0.33**	**0.17**	**1.58**	**4.14**	**4.14**	**0.01**	**6.61**	**0.73**	**0.00**	**0**	**0**	**0.37**	**0.01**	**0.00**	**16.66**	**16.66**	**7.31**	**0.90**	**1.58**	**20.80**

NRW- New Rifle wetland
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A–14A. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the New Rifle Wetland

NRW	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as To	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.23E-05	1.43E-07	No Tox Value	1.24E-02	1.24E-02	1.23E-05	1.43E-07	0.00E+00	1.24E-02	1.24E-02
Arsenic	3.66E-02	7.71E-03	1.66E-02	1.72E+00	1.72E+00	No Data	No Data	1.03E-02	NA	NA	6.35E-03	2.05E-04	1.32E-04	4.53E-02	4.53E-02	4.30E-02	7.92E-03	2.71E-02	1.77E+00	1.77E+00
Cadmium	2.66E-02	4.19E-03	1.25E-01	1.23E+00	1.23E+00	1.16E+00	1.45E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.18E+00	1.50E-01	1.25E-01	1.23E+00	1.23E+00
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	8.13E-01	2.62E-02	3.96E-02	2.40E+02	2.40E+02	8.13E-01	2.62E-02	3.96E-02	2.40E+02	2.40E+02
Iron	No Data	No Data	No Data	No Data	No Data	No Data	No Data	0.00E+00	NA	NA	2.91E-01	5.63E-03	6.72E-04	2.16E-02	2.16E-02	2.91E-01	5.63E-03	6.72E-04	2.16E-02	2.16E-02
Manganese	3.13E-02	1.23E-02	1.91E-02	7.56E-01	7.56E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.13E-02	1.23E-02	1.91E-02	7.56E-01	7.56E-01
Molybdenum	9.11E-02	8.83E-03	2.35E-03	No Tox Value	No Tox Value	1.64E+01	1.52E+00	0.00E+00	NA	NA	7.07E-01	1.05E-02	8.36E-04	3.23E-01	3.23E-01	1.72E+01	1.54E+00	3.18E-03	3.23E-01	3.23E-01
Nitrate	6.65E-02	8.38E-03	2.53E-01	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.15E-02	2.23E-04	2.01E-03	No Tox Value	No Tox Value	7.80E-02	8.61E-03	2.55E-01	0.00E+00	0.00E+00
Phosphate	5.02E-04	6.32E-05	5.30E-04	No Tox Value	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.02E-04	6.32E-05	5.30E-04	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	5.86E-01	9.19E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.86E-01	9.19E-02	0.00E+00	0.00E+00	0.00E+00
Strontium	4.15E-02	5.23E-03	No Tox Value	No Tox Value	No Tox Value	2.07E+00	1.95E-01	No Tox Value	NA	NA	4.18E-02	8.09E-04	No Tox Value	8.90E-01	8.90E-01	2.15E+00	2.01E-01	0.00E+00	8.90E-01	8.90E-01
Sulfate	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.09E-02	3.51E-04	7.01E-04	1.51E+01	1.51E+01	1.09E-02	3.51E-04	7.01E-04	1.51E+01	1.51E+01
Vanadium	1.07E+00	2.35E-01	2.31E+01	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.96E-02	6.63E-04	1.95E-02	4.63E-01	4.63E-01	1.09E+00	2.36E-01	2.31E+01	4.63E-01	4.63E-01
Zinc	4.09E-03	1.56E-01	4.29E-02	4.29E-01	4.29E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.09E-03	1.56E-01	4.29E-02	4.29E-01	4.29E-01
HI_NOAEL	**1.36**	**0.44**	**23.54**	**4.14**	**4.14**	**20.26**	**1.95**	**0.01**	**0**	**0**	**1.90**	**0.04**	**0.06**	**257.2**	**257.2**	**23.52**	**2.43**	**23.61**	**261.4**	**261.4**

NRW	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as To	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	6.15E-06	7.13E-08	No Tox Value	1.95E-03	1.95E-03	6.15E-06	7.13E-08	0.00E+00	1.95E-03	1.95E-03
Arsenic	6.20E-03	1.30E-03	5.53E-03	1.72E+00	1.72E+00	No Data	No Data	3.44E-03	NA	NA	1.08E-03	3.46E-05	4.41E-05	2.39E-02	2.39E-02	7.27E-03	1.34E-03	9.02E-03	1.75E+00	1.75E+00
Cadmium	6.84E-04	8.63E-05	8.32E-03	1.23E+00	1.23E+00	2.97E-02	2.99E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.04E-02	3.08E-03	8.32E-03	1.23E+00	1.23E+00
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.60E-01	5.14E-03	No Tox Value	1.51E+01	1.51E+01	1.60E-01	5.14E-03	0.00E+00	1.51E+01	1.51E+01
Iron	No Data	No Data	No Data	No Data	No Data	No Data	No Data	0.00E+00	NA	NA	1.37E-02	2.65E-04	3.36E-04	No Tox Value	No Tox Value	1.37E-02	2.65E-04	3.36E-04	0.00E+00	0.00E+00
Manganese	1.02E-02	No Tox Value	9.54E-03	7.56E-01	7.56E-01	No Data	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.02E-02	0.00E+00	9.54E-03	7.56E-01	7.56E-01
Molybdenum	1.82E-02	1.84E-03	1.57E-03	No Tox Value	No Tox Value	3.29E+00	3.16E-01	0.00E+00	NA	NA	1.41E-01	2.19E-03	5.57E-04	No Tox Value	No Tox Value	3.45E+00	3.20E-01	2.12E-03	0.00E+00	0.00E+00
Nitrate	3.02E-03	3.05E-04	7.20E-03	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.23E-04	8.09E-06	5.72E-05	No Tox Value	No Tox Value	3.55E-03	3.13E-04	7.25E-03	0.00E+00	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	4.41E-01	6.91E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.41E-01	6.91E-02	0.00E+00	0.00E+00	0.00E+00
Strontium	4.15E-02	5.23E-03	No Tox Value	No Tox Value	No Tox Value	2.07E+00	1.95E-01	No Tox Value	NA	NA	4.18E-02	8.09E-04	No Tox Value	8.90E-02	8.90E-02	2.15E+00	2.01E-01	0.00E+00	8.90E-02	8.90E-02
Sulfate	No Data	No Data	No Tox Value	No Data	No Data	No Data	No Data	No Tox Value	NA	NA	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.36E-03	1.41E-04	1.40E-05	1.46E+00	1.46E+00	4.36E-03	1.41E-04	1.40E-05	1.46E+00	1.46E+00
Vanadium	2.13E-01	4.48E-02	1.54E+00	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	3.92E-03	1.26E-04	1.30E-03	No Tox Value	No Tox Value	2.17E-01	4.49E-02	1.54E+00	0.00E+00	0.00E+00
Zinc	2.05E-03	8.12E-02	6.14E-03	4.29E-01	4.29E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.05E-03	8.12E-02	6.14E-03	4.29E-01	4.29E-01
HI_LOAEL	**0.30**	**0.13**	**1.58**	**4.14**	**4.14**	**5.83**	**0.58**	**0.00**	**0**	**0**	**0.37**	**0.01**	**0.00**	**16.66**	**16.66**	**6.49**	**0.73**	**1.58**	**20.80**	**20.80**

NRW- New Rifle wetland
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A–14B. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the Reference Wetland for the New Rifle Wetland

REF	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME			
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate
Ammonia as Total N	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.08E-06	4.42E-08	No Tox Value	2.36E-04	2.36E-04	3.08E-06	4.42E-08	0.00E+00	2.36E-04
Arsenic	2.85E-02	6.60E-03	1.14E-02	1.18E+00	1.18E+00	2.84E-01	No Data	No Data	8.02E-03	NA	NA	4.94E-03	1.97E-04	1.07E-04	2.57E-02	2.57E-02	3.35E-02	6.80E-03	1.95E-02	1.21E+00
Cadmium	6.59E-03	1.14E-03	2.73E-02	2.69E-01	2.69E-01	3.23E-03	1.04E+00	1.47E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.05E+00	1.48E-01	2.73E-02	2.69E-01
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.56E-01	1.82E-02	2.32E-02	1.37E+02	1.37E+02	4.56E-01	1.82E-02	2.32E-02	1.37E+02
Iron	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	NA	NA	7.70E-02	1.84E-03	1.86E-04	1.11E-01	1.11E-01	7.70E-02	1.84E-03	1.86E-04	1.11E-01
Manganese	3.30E-02	1.43E-02	1.78E-02	7.04E-01	7.04E-01	6.47E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.30E-02	1.43E-02	1.78E-02	7.04E-01
Molybdenum	3.06E-02	3.26E-03	6.95E-04	No Tox Value	No Tox Value	No Tox Value	3.65E+00	2.61E-01	0.00E+00	NA	NA	1.37E-02	2.52E-04	1.70E-05	9.85E-03	9.85E-03	3.70E+00	2.65E-01	7.12E-04	9.85E-03
Nitrate	8.71E-04	1.21E-04	2.92E-03	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.29E-02	3.08E-04	2.35E-03	No Tox Value	No Tox Value	1.38E-02	4.29E-04	5.27E-03	0.00E+00
Phosphate	3.98E-05	5.52E-06	3.72E-05	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.98E-05	5.52E-06	3.72E-05	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	2.11E-01	3.67E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.11E-01	3.67E-02	0.00E+00	0.00E+00
Strontium	2.25E-02	3.12E-03	No Tox Value	No Tox Value	No Tox Value	No Tox Value	1.72E+00	1.78E-01	No Tox Value	NA	NA	3.68E-02	8.80E-04	No Tox Value	8.04E-01	8.04E-01	1.78E+00	1.82E-01	0.00E+00	8.04E-01
Sulfate	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	2.52E-03	1.00E-04	1.69E-04	3.12E+00	3.12E+00	2.52E-03	1.00E-04	1.69E-04	3.12E+00
Vanadium	1.17E+00	2.83E-01	2.23E+01	No Tox Value	No Tox Value	1.60E+01	No Data	No Data	0.00E+00	NA	NA	1.96E-02	8.20E-04	2.04E-02	3.37E-01	3.37E-01	1.19E+00	2.84E-01	2.23E+01	3.37E-01
Zinc	4.48E-03	1.88E-01	4.15E-02	4.15E-01	4.15E-01	1.31E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.48E-03	1.88E-01	4.15E-02	4.15E-01
HI_NOAEL	**1.29**	**0.50**	**22.37**	**2.57**	**2.57**	**17.07**	**6.63**	**0.62**	**0.01**	**0**	**0**	**0.62**	**0.02**	**0.05**	**141.4**	**141.4**	**8.54**	**1.14**	**22.42**	**143.9**

REF	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME			
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate
Ammonia as Total N	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.54E-06	2.21E-08	No Tox Value	2.15E-08	2.15E-08	1.54E-06	2.21E-08	0.00E+00	2.15E-08
Arsenic	4.83E-03	1.12E-03	3.80E-03	1.18E+00	1.18E+00	No Tox Value	No Data	No Data	2.67E-03	NA	NA	8.36E-04	3.33E-05	3.58E-05	1.78E-05	1.78E-05	5.67E-03	1.15E-03	6.51E-03	1.18E+00
Cadmium	1.70E-04	2.35E-05	1.82E-03	2.69E-01	2.69E-01	1.62E-03	2.69E-02	3.02E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.70E-02	3.04E-03	1.82E-03	2.69E-01
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	8.95E-02	3.56E-03	No Tox Value	8.04E-03	8.04E-03	8.95E-02	3.56E-03	0.00E+00	8.04E-03
Iron	No Data	No Data	No Data	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	NA	NA	3.62E-03	8.66E-05	9.28E-05	No Tox Value	No Tox Value	3.62E-03	8.66E-05	9.28E-05	0.00E+00
Manganese	1.07E-02	No Tox Value	8.88E-03	7.04E-01	7.04E-01	No Tox Value	No Data	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.07E-02	0.00E+00	8.88E-03	7.04E-01
Molybdenum	6.12E-03	6.78E-04	4.64E-04	No Tox Value	No Tox Value	No Tox Value	7.30E-01	5.43E-02	0.00E+00	NA	NA	2.74E-03	5.25E-05	1.13E-05	No Tox Value	No Tox Value	7.39E-01	5.51E-02	4.75E-04	0.00E+00
Nitrate	3.96E-05	4.39E-06	8.32E-05	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.87E-04	1.12E-05	6.70E-05	No Tox Value	No Tox Value	6.26E-04	1.56E-05	1.50E-04	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	1.60E-01	2.76E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.60E-01	2.76E-02	0.00E+00	0.00E+00
Strontium	2.25E-02	3.12E-03	No Tox Value	No Tox Value	No Tox Value	No Tox Value	1.72E+00	1.78E-01	No Tox Value	NA	NA	3.68E-02	8.80E-04	No Tox Value	7.94E-05	7.94E-05	1.78E+00	1.82E-01	0.00E+00	7.94E-05
Sulfate	No Data	No Data	No Tox Value	No Data	No Data	No Tox Value	No Data	No Data	No Tox Value	NA	NA	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.01E-03	4.02E-05	3.39E-06	3.18E-04	3.18E-04	1.01E-03	4.02E-05	3.39E-06	3.18E-04
Vanadium	2.33E-01	5.39E-02	1.48E+00	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	3.92E-03	1.56E-04	1.36E-03	No Tox Value	No Tox Value	2.37E-01	5.40E-02	1.49E+00	0.00E+00
Zinc	2.24E-03	9.78E-02	5.93E-03	4.15E-01	4.15E-01	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.24E-03	9.78E-02	5.93E-03	4.15E-01
HI_LOAEL	**0.28**	**0.16**	**1.51**	**2.57**	**2.57**	**0.00**	**2.64**	**0.26**	**0.00**	**0**	**0**	**0.14**	**0.00**	**0.00**	**0.01**	**0.01**	**3.06**	**0.42**	**1.51**	**2.58**

REF- Reference wetland
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A–14B. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the Reference Wetland for the New Rifle Wetland

REF	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.08E-06	3.57E-08	No Tox Value	2.36E-04	2.36E-04	3.08E-06	3.57E-08	0.00E+00	2.36E-04	2.36E-04
Arsenic	2.52E-02	5.30E-03	1.14E-02	1.18E+00	1.18E+00	No Data	No Data	8.02E-03	NA	NA	4.94E-03	1.60E-04	1.03E-04	2.57E-02	2.57E-02	3.01E-02	5.46E-03	1.95E-02	1.21E+00	1.21E+00
Cadmium	5.82E-03	9.17E-04	2.73E-02	2.69E-01	2.69E-01	9.22E-01	1.18E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	9.27E-01	1.19E-01	2.73E-02	2.69E-01	2.69E-01
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.56E-01	1.47E-02	2.22E-02	1.37E+02	1.37E+02	4.56E-01	1.47E-02	2.22E-02	1.37E+02	1.37E+02
Iron	No Data	No Data	No Data	No Data	No Data	No Data	No Data	0.00E+00	NA	NA	7.70E-02	1.49E-03	1.78E-04	1.11E-01	1.11E-01	7.70E-02	1.49E-03	1.78E-04	1.11E-01	1.11E-01
Manganese	2.91E-02	1.15E-02	1.78E-02	7.04E-01	7.04E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.91E-02	1.15E-02	1.78E-02	7.04E-01	7.04E-01
Molybdenum	2.70E-02	2.62E-03	6.95E-04	No Tox Value	No Tox Value	3.22E+00	2.10E-01	0.00E+00	NA	NA	1.37E-02	2.04E-04	1.62E-05	9.85E-03	9.85E-03	3.26E+00	2.12E-01	7.12E-04	9.85E-03	9.85E-03
Nitrate	7.69E-04	9.69E-05	2.92E-03	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.29E-02	2.49E-04	2.25E-03	No Tox Value	No Tox Value	1.37E-02	3.46E-04	5.17E-03	0.00E+00	0.00E+00
Phosphate	3.52E-05	4.43E-06	3.72E-05	No Tox Value	No Tox Value	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.52E-05	4.43E-06	3.72E-05	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	1.86E-01	2.95E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.86E-01	2.95E-02	0.00E+00	0.00E+00	0.00E+00
Strontium	1.98E-02	2.50E-03	No Tox Value	No Tox Value	No Tox Value	1.52E+00	1.43E-01	No Tox Value	NA	NA	3.68E-02	7.12E-04	No Tox Value	8.04E-01	8.04E-01	1.58E+00	1.46E-01	0.00E+00	8.04E-01	8.04E-01
Sulfate	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	2.52E-03	8.13E-05	1.62E-04	3.12E+00	3.12E+00	2.52E-03	8.13E-05	1.62E-04	3.12E+00	3.12E+00
Vanadium	1.03E+00	2.27E-01	2.23E+01	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.96E-02	6.63E-04	1.95E-02	3.37E-01	3.37E-01	1.05E+00	2.28E-01	2.23E+01	3.37E-01	3.37E-01
Zinc	3.96E-03	1.51E-01	4.15E-02	4.15E-01	4.15E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.96E-03	1.51E-01	4.15E-02	4.15E-01	4.15E-01
HI_NOAEL	**1.14**	**0.40**	**22.37**	**2.57**	**2.57**	**5.85**	**0.50**	**0.01**	**0**	**0**	**0.62**	**0.02**	**0.04**	**141.36**	**141.4**	**7.61**	**0.92**	**22.42**	**143.9**	**143.9**

REF	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.54E-06	1.79E-08	No Tox Value	2.15E-08	2.15E-08	1.54E-06	1.79E-08	0.00E+00	2.15E-08	2.15E-08
Arsenic	4.26E-03	8.95E-04	3.80E-03	1.18E+00	1.18E+00	No Data	No Data	2.67E-03	NA	NA	8.36E-04	2.69E-05	3.43E-05	1.78E-05	1.78E-05	5.10E-03	9.22E-04	6.51E-03	1.18E+00	1.18E+00
Cadmium	1.50E-04	1.89E-05	1.82E-03	2.69E-01	2.69E-01	2.37E-02	2.42E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.39E-02	2.44E-03	1.82E-03	2.69E-01	2.69E-01
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	8.95E-02	2.88E-03	No Tox Value	8.04E-03	8.04E-03	8.95E-02	2.88E-03	0.00E+00	8.04E-03	8.04E-03
Iron	No Data	No Data	No Data	No Data	No Data	No Data	No Data	0.00E+00	NA	NA	3.62E-03	7.00E-05	8.88E-05	No Tox Value	No Tox Value	3.62E-03	7.00E-05	8.88E-05	0.00E+00	0.00E+00
Manganese	9.47E-03	No Tox Value	8.88E-03	7.04E-01	7.04E-01	No Data	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	9.47E-03	0.00E+00	8.88E-03	7.04E-01	7.04E-01
Molybdenum	5.40E-03	5.44E-04	4.64E-04	No Tox Value	No Tox Value	6.44E-01	4.36E-02	0.00E+00	NA	NA	2.74E-03	4.24E-05	1.08E-05	No Tox Value	No Tox Value	6.52E-01	4.42E-02	4.74E-04	0.00E+00	0.00E+00
Nitrate	3.49E-05	3.52E-06	8.32E-05	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.87E-04	9.07E-06	6.41E-05	No Tox Value	No Tox Value	6.21E-04	1.26E-05	1.47E-04	0.00E+00	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	No Data	No Data	No Data	No Tox Value	No Tox Value	1.41E-01	2.21E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.41E-01	2.21E-02	0.00E+00	0.00E+00	0.00E+00
Strontium	1.98E-02	2.50E-03	No Tox Value	No Tox Value	No Tox Value	1.52E+00	1.43E-01	No Tox Value	NA	NA	3.68E-02	7.12E-04	No Tox Value	7.94E-05	7.94E-05	1.58E+00	1.46E-01	0.00E+00	7.94E-05	7.94E-05
Sulfate	No Data	No Data	No Tox Value	No Data	No Data	No Data	No Data	No Tox Value	NA	NA	No Data	No Data	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Uranium	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	1.01E-03	3.25E-05	3.25E-06	3.18E-04	3.18E-04	1.01E-03	3.25E-05	3.25E-06	3.18E-04	3.18E-04
Vanadium	2.06E-01	4.32E-02	1.48E+00	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	3.92E-03	1.26E-04	1.30E-03	No Tox Value	No Tox Value	2.10E-01	4.33E-02	1.49E+00	0.00E+00	0.00E+00
Zinc	1.98E-03	7.85E-02	5.93E-03	4.15E-01	4.15E-01	No Data	No Data	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.98E-03	7.85E-02	5.93E-03	4.15E-01	4.15E-01
HI_LOAEL	**0.25**	**0.13**	**1.51**	**2.57**	**2.57**	**2.33**	**0.21**	**0.00**	**0**	**0**	**0.14**	**0.00**	**0.00**	**0.01**	**0.01**	**2.71**	**0.34**	**1.51**	**2.58**	**2.58**

REF- Reference wetland
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A-14C. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at Roaring Fork Pond

RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N	2.08E-03	1.73E-04	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	1.56E-02	2.24E-04	No Tox Value	2.92E+00	2.92E+00	1.77E-02	3.97E-04	0.00E+00	2.92E+00	2.92E+00	No Tox Value
Arsenic	2.87E-02	6.65E-03	1.15E-02	1.19E+00	1.19E+00	2.86E-01	3.28E+00	5.67E-01	5.33E-03	NA	NA	3.28E-03	1.31E-04	7.13E-05	2.95E-02	2.95E-02	3.31E+00	5.74E-01	1.69E-02	1.22E+00	1.22E+00	2.86E-01
Cadmium	3.02E-02	5.24E-03	1.25E-01	1.23E+00	1.23E+00	1.48E-02	1.01E+01	1.14E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.01E+01	1.15E+00	1.25E-01	1.23E+00	1.23E+00	1.48E-02
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.89E-01	2.35E-02	3.00E-02	1.75E+02	1.75E+02	5.89E-01	2.35E-02	3.00E-02	1.75E+02	1.75E+02	No Tox Value
Iron	2.37E+01	3.29E+00	1.05E+00	9.12E-01	9.12E-01	No Tox Value	1.36E+03	3.55E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.39E+03	3.88E+01	1.05E+00	9.12E-01	9.12E-01	No Tox Value
Manganese	4.29E-02	1.86E-02	2.31E-02	9.14E-01	9.14E-01	8.41E-01	5.58E+00	2.23E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.62E+00	2.25E+00	2.31E-02	9.14E-01	9.14E-01	8.41E-01
Molybdenum	1.79E-01	1.90E-02	4.06E-03	No Tox Value	No Tox Value	No Tox Value	1.08E+01	7.93E-01	0.00E+00	NA	NA	5.05E+00	9.29E-02	6.25E-03	2.11E+00	2.11E+00	1.61E+01	9.05E-01	1.03E-02	2.11E+00	2.11E+00	No Tox Value
Nitrate	1.74E-01	2.42E-02	5.84E-01	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	7.34E+01	1.75E+00	1.34E+01	No Tox Value	No Tox Value	7.36E+01	1.78E+00	1.40E+01	0.00E+00	0.00E+00	No Tox Value
Phosphate	4.54E-04	6.30E-05	4.24E-04	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.54E-04	6.30E-05	4.24E-04	0.00E+00	0.00E+00	No Tox Value
Selenium	4.20E-03	9.77E-04	1.18E-02	No Tox Value	No Tox Value	3.46E-01	No BAF	No BAF	1.04E-01	NA	NA	2.57E-03	1.03E-04	3.92E-04	6.54E-01	6.54E-01	6.76E-03	1.08E-03	1.17E-01	6.54E-01	6.54E-01	3.46E-01
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.03E-01	2.47E-03	No Tox Value	2.30E+00	2.30E+00	1.03E-01	2.47E-03	0.00E+00	2.30E+00	2.30E+00	No Tox Value
Sulfate	7.35E+00	1.02E+00	6.16E-02	2.27E+01	2.27E+01	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	1.45E+03	3.48E+01	6.63E-01	9.93E+03	9.93E+03	1.46E+03	3.58E+01	7.24E-01	9.96E+03	9.96E+03	No Tox Value
Uranium	9.07E-03	2.10E-03	1.12E-02	No Tox Value	No Tox Value	No Tox Value	3.43E-01	1.23E-02	0.00E+00	NA	NA	4.67E-02	1.86E-03	3.14E-03	6.08E+01	6.08E+01	3.98E-01	1.63E-02	1.44E-02	6.08E+01	6.08E+01	No Tox Value
Vanadium	1.18E+00	2.86E-01	2.25E+01	No Tox Value	No Tox Value	1.62E+01	7.16E+01	2.94E+00	0.00E+00	NA	NA	1.96E-02	8.20E-04	2.04E-02	4.84E-01	4.84E-01	7.28E+01	3.23E+00	2.25E+01	4.84E-01	4.84E-01	1.62E+01
Zinc	7.99E-03	3.35E-01	7.40E-02	7.40E-01	7.40E-01	2.34E-01	6.63E-01	1.71E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	6.71E-01	1.74E+01	7.40E-02	7.40E-01	7.40E-01	2.34E-01
HI_NOAEL	**32.75**	**5.01**	**24.48**	**27.70**	**27.70**	**17.90**	**1466**	**60.25**	**0.11**	**0.00**	**0.00**	**1534**	**36.63**	**14.10**	**10177**	**10177**	**3033**	**101.89**	**38.68**	**10205**	**10205**	**17.90**

RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N	1.04E-03	8.65E-05	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	7.80E-03	1.12E-04	No Tox Value	4.60E-01	4.60E-01	8.84E-03	1.98E-04	0.00E+00	4.60E-01	4.60E-01	No Tox Value
Arsenic	4.86E-03	1.12E-03	3.83E-03	1.19E+00	1.19E+00	No Tox Value	5.56E-01	9.58E-02	1.78E-03	NA	NA	5.55E-04	2.21E-05	2.38E-05	1.56E-02	1.56E-02	5.61E-01	9.69E-02	5.63E-03	1.21E+00	1.21E+00	No Tox Value
Cadmium	7.77E-04	1.08E-04	8.33E-03	1.23E+00	1.23E+00	7.41E-03	2.59E-01	2.35E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.60E-01	2.37E-02	8.33E-03	1.23E+00	1.23E+00	7.41E-03
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.16E-01	4.61E-03	No Tox Value	1.10E+01	1.10E+01	1.16E-01	4.61E-03	0.00E+00	1.10E+01	1.10E+01	No Tox Value
Iron	1.12E+00	1.55E-01	5.26E-01	9.12E-01	9.12E-01	No Tox Value	6.42E+01	1.67E+00	No Data	NA	NA	No Data	No Data	No Data	No Tox Value	No Tox Value	6.53E+01	1.82E+00	5.26E-01	9.12E-01	9.12E-01	No Tox Value
Manganese	1.39E-02	No Tox Value	1.15E-02	9.14E-01	9.14E-01	No Tox Value	1.81E+00	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.83E+00	0.00E+00	1.15E-02	9.14E-01	9.14E-01	No Tox Value
Molybdenum	3.57E-02	3.96E-03	2.71E-03	No Tox Value	No Tox Value	No Tox Value	2.17E+00	1.65E-01	0.00E+00	NA	NA	1.01E+00	1.93E-02	4.16E-03	No Tox Value	No Tox Value	3.22E+00	1.88E-01	6.87E-03	0.00E+00	0.00E+00	No Tox Value
Nitrate	7.93E-03	8.79E-04	1.67E-02	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	3.34E+00	6.38E-02	3.81E-01	No Tox Value	No Tox Value	3.35E+00	6.47E-02	3.98E-01	0.00E+00	0.00E+00	No Tox Value
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No Tox Value
Selenium	3.18E-03	7.34E-04	5.89E-03	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	5.22E-02	NA	NA	1.94E-03	7.74E-05	1.96E-04	1.63E-01	1.63E-01	5.12E-03	8.11E-04	5.83E-02	1.63E-01	1.63E-01	No Tox Value
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.03E-01	2.47E-03	No Tox Value	2.30E-01	2.30E-01	1.03E-01	2.47E-03	0.00E+00	2.30E-01	2.30E-01	No Tox Value
Sulfate	2.44E+00	3.38E-01	No Tox Value	2.27E+01	2.27E+01	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	4.83E+02	1.15E+01	No Tox Value	9.93E+02	9.93E+02	4.86E+02	1.19E+01	0.00E+00	1.02E+03	1.02E+03	No Tox Value
Uranium	3.63E-03	8.38E-04	2.24E-04	No Tox Value	No Tox Value	No Tox Value	1.37E-01	4.93E-03	0.00E+00	NA	NA	1.87E-02	7.45E-04	6.28E-05	5.85E+00	5.85E+00	1.59E-01	6.51E-03	2.87E-04	5.85E+00	5.85E+00	No Tox Value
Vanadium	2.36E-01	5.45E-02	1.50E+00	No Tox Value	No Tox Value	No Tox Value	1.43E+01	5.60E-01	0.00E+00	NA	NA	3.92E-03	1.56E-04	1.36E-03	No Tox Value	No Tox Value	1.46E+01	6.15E-01	1.50E+00	0.00E+00	0.00E+00	No Tox Value
Zinc	3.99E-03	1.74E-01	1.06E-02	7.40E-01	7.40E-01	No Tox Value	3.32E-01	8.88E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.36E-01	9.05E+00	1.06E-02	7.40E-01	7.40E-01	No Tox Value
HI_LOAEL	**3.87**	**0.73**	**2.09**	**27.70**	**27.70**	**0.01**	**83.75**	**11.40**	**0.05**	**0.00**	**0.00**	**487.7**	**11.64**	**0.39**	**1011**	**1011**	**575**	**23.76**	**2.53**	**1039**	**1039**	**0.01**

RFP - Roaring Fork Pond
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A-14C. RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at Roaring Fork Pond

RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	1.83E-03	1.39E-04	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	1.56E-02	1.81E-04	No Tox Value	2.92E+00	2.92E+00	1.74E-02	3.20E-04	0.00E+00	2.92E+00	2.92E+00
Arsenic	2.53E-02	5.34E-03	1.15E-02	1.19E+00	1.19E+00	2.89E+00	4.55E-01	5.33E-03	NA	NA	3.28E-03	1.06E-04	6.83E-05	2.95E-02	2.95E-02	2.92E+00	4.60E-01	1.69E-02	1.22E+00	1.22E+00
Cadmium	2.67E-02	4.20E-03	1.25E-01	1.23E+00	1.23E+00	8.89E+00	9.18E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	8.91E+00	9.22E-01	1.25E-01	1.23E+00	1.23E+00
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	5.89E-01	1.90E-02	2.87E-02	1.75E+02	1.75E+02	5.89E-01	1.90E-02	2.87E-02	1.75E+02	1.75E+02
Iron	2.09E+01	2.64E+00	1.05E+00	9.12E-01	9.12E-01	1.20E+03	2.85E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.22E+03	3.11E+01	1.05E+00	9.12E-01	9.12E-01
Manganese	3.78E-02	1.49E-02	2.31E-02	9.14E-01	9.14E-01	4.92E+00	1.79E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.96E+00	1.80E+00	2.31E-02	9.14E-01	9.14E-01
Molybdenum	1.58E-01	1.53E-02	4.06E-03	No Tox Value	No Tox Value	9.57E+00	6.37E-01	0.00E+00	NA	NA	5.05E+00	7.52E-02	5.98E-03	2.11E+00	2.11E+00	1.48E+01	7.27E-01	1.00E-02	2.11E+00	2.11E+00
Nitrate	1.54E-01	1.94E-02	5.84E-01	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	7.34E+01	1.42E+00	1.28E+01	No Tox Value	No Tox Value	7.36E+01	1.44E+00	1.34E+01	0.00E+00	0.00E+00
Phosphate	4.01E-04	5.05E-05	4.24E-04	No Tox Value	No Tox Value	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.01E-04	5.05E-05	4.24E-04	0.00E+00	0.00E+00
Selenium	3.70E-03	7.84E-04	1.18E-02	No Tox Value	No Tox Value	No BAF	No BAF	1.04E-01	NA	NA	2.57E-03	8.34E-05	3.75E-04	6.54E-01	6.54E-01	6.27E-03	8.68E-04	1.16E-01	6.54E-01	6.54E-01
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.03E-01	2.00E-03	No Tox Value	2.30E+00	2.30E+00	1.03E-01	2.00E-03	0.00E+00	2.30E+00	2.30E+00
Sulfate	6.49E+00	8.18E-01	6.16E-02	2.27E+01	2.27E+01	No BAF	No BAF	0.00E+00	NA	NA	1.45E+03	2.81E+01	6.34E-01	9.93E+03	9.93E+03	1.46E+03	2.89E+01	6.96E-01	9.96E+03	9.96E+03
Uranium	8.01E-03	1.68E-03	1.12E-02	No Tox Value	No Tox Value	3.02E-01	9.89E-03	0.00E+00	NA	NA	4.67E-02	1.51E-03	3.01E-03	6.08E+01	6.08E+01	3.57E-01	1.31E-02	1.42E-02	6.08E+01	6.08E+01
Vanadium	1.04E+00	2.29E-01	2.25E+01	No Tox Value	No Tox Value	6.32E+01	2.36E+00	0.00E+00	NA	NA	1.96E-02	6.63E-04	1.95E-02	4.84E-01	4.84E-01	6.42E+01	2.59E+00	2.25E+01	4.84E-01	4.84E-01
Zinc	7.05E-03	2.69E-01	7.40E-02	7.40E-01	7.40E-01	5.85E-01	1.37E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.92E-01	1.40E+01	7.40E-02	7.40E-01	7.40E-01
HI_NOAEL	**28.90**	**4.02**	**24.48**	**27.70**	**27.70**	**1294**	**48.35**	**0.11**	**0.00**	**0.00**	**1534**	**29.63**	**13.50**	**10177**	**10177**	**2857**	**82.00**	**38.08**	**10205**	**10205**

RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	9.17E-04	6.94E-05	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	7.80E-03	9.05E-05	No Tox Value	4.60E-01	4.60E-01	8.72E-03	1.60E-04	0.00E+00	4.60E-01	4.60E-01
Arsenic	4.29E-03	9.01E-04	3.83E-03	1.19E+00	1.19E+00	4.90E-01	7.68E-02	1.78E-03	NA	NA	5.55E-04	1.79E-05	2.28E-05	1.56E-02	1.56E-02	4.95E-01	7.78E-02	5.63E-03	1.21E+00	1.21E+00
Cadmium	6.86E-04	8.65E-05	8.33E-03	1.23E+00	1.23E+00	2.29E-01	1.89E-02	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.29E-01	1.90E-02	8.33E-03	1.23E+00	1.23E+00
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.16E-01	3.73E-03	No Tox Value	1.10E+01	1.10E+01	1.16E-01	3.73E-03	0.00E+00	1.10E+01	1.10E+01
Iron	9.85E-01	1.24E-01	5.26E-01	9.12E-01	9.12E-01	5.66E+01	1.34E+00	No Data	NA	NA	No Data	No Data	No Data	No Tox Value	No Tox Value	5.76E+01	1.46E+00	5.26E-01	9.12E-01	9.12E-01
Manganese	1.23E-02	No Tox Value	1.15E-02	9.14E-01	9.14E-01	1.60E+00	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.61E+00	0.00E+00	1.15E-02	9.14E-01	9.14E-01
Molybdenum	3.15E-02	3.18E-03	2.71E-03	No Tox Value	No Tox Value	1.91E+00	1.32E-01	0.00E+00	NA	NA	1.01E+00	1.56E-02	3.99E-03	No Tox Value	No Tox Value	2.96E+00	1.51E-01	6.70E-03	0.00E+00	0.00E+00
Nitrate	6.99E-03	7.05E-04	1.67E-02	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	3.34E+00	5.16E-02	3.65E-01	No Tox Value	No Tox Value	3.35E+00	5.23E-02	3.82E-01	0.00E+00	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	o Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	2.80E-03	5.89E-04	5.89E-03	No Tox Value	No Tox Value	No BAF	No BAF	5.22E-02	NA	NA	1.94E-03	6.26E-05	1.88E-04	1.63E-01	1.63E-01	4.75E-03	6.52E-04	5.82E-02	1.63E-01	1.63E-01
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	1.03E-01	2.00E-03	No Tox Value	2.30E-01	2.30E-01	1.03E-01	2.00E-03	0.00E+00	2.30E-01	2.30E-01
Sulfate	2.15E+00	2.72E-01	No Tox Value	2.27E+01	2.27E+01	No BAF	No BAF	No Tox Value	NA	NA	4.83E+02	9.34E+00	No Tox Value	9.93E+02	9.93E+02	4.85E+02	9.61E+00	0.00E+00	1.02E+03	1.02E+03
Uranium	3.20E-03	6.73E-04	2.24E-04	No Tox Value	No Tox Value	1.21E-01	3.96E-03	0.00E+00	NA	NA	1.87E-02	6.02E-04	6.01E-05	5.85E+00	5.85E+00	1.43E-01	5.23E-03	2.84E-04	5.85E+00	5.85E+00
Vanadium	2.08E-01	4.37E-02	1.50E+00	No Tox Value	No Tox Value	1.26E+01	4.50E-01	0.00E+00	NA	NA	3.92E-03	1.26E-04	1.30E-03	No Tox Value	No Tox Value	1.28E+01	4.94E-01	1.50E+00	0.00E+00	0.00E+00
Zinc	3.52E-03	1.40E-01	1.06E-02	7.40E-01	7.40E-01	2.93E-01	7.13E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.96E-01	7.27E+00	1.06E-02	7.40E-01	7.40E-01
HI_LOAEL	**3.41**	**0.59**	**2.09**	**27.70**	**27.70**	**73.90**	**9.15**	**0.05**	**0.00**	**0.00**	**487.7**	**9.41**	**0.37**	**1011**	**1011**	**565.1**	**19.14**	**2.51**	**1039**	**1039**

RFP - Roaring Fork Pond
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A-14D.RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the Reference Wetland for Roaring Fork Pond

REF_RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N	1.05E-04	8.77E-06	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	3.07E-06	4.41E-08	No Tox Value	2.37E-04	2.37E-04	1.09E-04	8.81E-06	0.00E+00	2.37E-04	2.37E-04	No Tox Value
Arsenic	2.85E-02	6.60E-03	1.14E-02	1.18E+00	1.18E+00	2.84E-01	3.26E+00	5.63E-01	8.02E-03	NA	NA	4.94E-03	1.97E-04	1.07E-04	2.57E-02	2.57E-02	3.29E+00	5.70E-01	1.95E-02	1.21E+00	1.21E+00	2.84E-01
Cadmium	6.59E-03	1.14E-03	2.73E-02	2.69E-01	2.69E-01	3.23E-03	2.20E+00	2.50E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	2.20E+00	2.51E-01	2.73E-02	2.69E-01	2.69E-01	3.23E-03
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.56E-01	1.82E-02	2.32E-02	1.37E+02	1.37E+02	4.56E-01	1.82E-02	2.32E-02	1.37E+02	1.37E+02	No Tox Value
Iron	2.19E+01	3.03E+00	9.69E-01	8.40E-01	8.40E-01	No Tox Value	1.26E+03	3.27E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.28E+03	3.57E+01	9.69E-01	8.40E-01	8.40E-01	No Tox Value
Manganese	3.30E-02	1.43E-02	1.78E-02	7.04E-01	7.04E-01	6.47E-01	4.29E+00	1.72E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	4.33E+00	1.73E+00	1.78E-02	7.04E-01	7.04E-01	6.47E-01
Molybdenum	3.06E-02	3.26E-03	6.95E-04	No Tox Value	No Tox Value	No Tox Value	1.86E+00	1.36E-01	0.00E+00	NA	NA	1.37E-02	2.52E-04	1.70E-05	9.85E-03	9.85E-03	1.90E+00	1.39E-01	7.12E-04	9.85E-03	9.85E-03	No Tox Value
Nitrate	8.71E-04	1.21E-04	2.92E-03	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	1.29E-02	3.08E-04	2.35E-03	No Tox Value	No Tox Value	1.38E-02	4.29E-04	5.27E-03	0.00E+00	0.00E+00	No Tox Value
Phosphate	3.98E-05	5.52E-06	3.72E-05	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.98E-05	5.52E-06	3.72E-05	0.00E+00	0.00E+00	No Tox Value
Selenium	1.76E-03	4.10E-04	4.94E-03	No Tox Value	No Tox Value	1.45E-01	No BAF	No BAF	1.04E-01	NA	NA	2.57E-03	1.03E-04	3.92E-04	3.38E-01	3.38E-01	4.33E-03	5.13E-04	1.10E-01	3.38E-01	3.38E-01	1.45E-01
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.68E-02	8.80E-04	No Tox Value	8.04E-01	8.04E-01	3.68E-02	8.80E-04	0.00E+00	8.04E-01	8.04E-01	No Tox Value
Sulfate	4.51E+00	6.25E-01	3.78E-02	1.39E+01	1.39E+01	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	1.46E+02	3.50E+00	6.67E-02	9.92E+02	9.92E+02	1.51E+02	4.12E+00	1.04E-01	1.01E+03	1.01E+03	No Tox Value
Uranium	8.26E-03	1.91E-03	1.02E-02	No Tox Value	No Tox Value	No Tox Value	3.12E-01	1.12E-02	0.00E+00	NA	NA	2.52E-03	1.00E-04	1.69E-04	3.12E+00	3.12E+00	3.23E-01	1.32E-02	1.04E-02	3.12E+00	3.12E+00	No Tox Value
Vanadium	1.17E+00	2.83E-01	2.23E+01	No Tox Value	No Tox Value	1.60E+01	7.08E+01	2.91E+00	0.00E+00	NA	NA	1.96E-02	8.20E-04	2.04E-02	3.37E-01	3.37E-01	7.20E+01	3.19E+00	2.23E+01	3.37E-01	3.37E-01	1.60E+01
Zinc	4.48E-03	1.88E-01	4.15E-02	4.15E-01	4.15E-01	1.31E-01	3.72E-01	9.60E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.77E-01	9.78E+00	4.15E-02	4.15E-01	4.15E-01	1.31E-01
HI_NOAEL	**27.65**	**4.15**	**23.39**	**17.34**	**17.34**	**17.21**	**1339**	**47.84**	**0.11**	**0**	**0**	**146.9**	**3.52**	**0.113**	**1133**	**1133**	**1514**	**55.51**	**23.62**	**1150**	**1150**	**17.21**

REF_RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N	5.27E-05	4.38E-06	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	1.54E-06	2.20E-08	No Tox Value	2.29E-05	2.29E-05	5.43E-05	4.41E-06	0.00E+00	2.29E-05	2.29E-05	No Tox Value
Arsenic	4.83E-03	1.12E-03	3.80E-03	1.18E+00	1.18E+00	No Tox Value	5.52E-01	9.51E-02	2.67E-03	NA	NA	8.36E-04	3.33E-05	3.58E-05	1.36E-02	1.36E-02	5.57E-01	9.63E-02	6.51E-03	1.20E+00	1.20E+00	No Tox Value
Cadmium	1.70E-04	2.35E-05	1.82E-03	2.69E-01	2.69E-01	1.62E-03	5.65E-02	5.14E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.67E-02	5.16E-03	1.82E-03	2.69E-01	2.69E-01	1.62E-03
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	8.95E-02	3.56E-03	No Tox Value	8.60E+00	8.60E+00	8.95E-02	3.56E-03	0.00E+00	8.60E+00	8.60E+00	No Tox Value
Iron	1.03E+00	1.43E-01	4.85E-01	8.40E-01	8.40E-01	No Tox Value	5.91E+01	1.54E+00	No Data	NA	NA	No Data	No Data	No Data	No Tox Value	No Tox Value	6.01E+01	1.68E+00	4.85E-01	8.40E-01	8.40E-01	No Tox Value
Manganese	1.07E-02	No Tox Value	8.88E-03	7.04E-01	7.04E-01	No Tox Value	1.40E+00	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.41E+00	0.00E+00	8.88E-03	7.04E-01	7.04E-01	No Tox Value
Molybdenum	6.12E-03	6.78E-04	4.64E-04	No Tox Value	No Tox Value	No Tox Value	3.72E-01	2.82E-02	0.00E+00	NA	NA	2.74E-03	5.25E-05	1.13E-05	No Tox Value	No Tox Value	3.80E-01	2.90E-02	4.75E-04	0.00E+00	0.00E+00	No Tox Value
Nitrate	3.96E-05	4.39E-06	8.32E-05	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	5.87E-04	1.12E-05	6.70E-05	No Tox Value	No Tox Value	6.26E-04	1.56E-05	1.50E-04	0.00E+00	0.00E+00	No Tox Value
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No Tox Value
Selenium	1.33E-03	3.08E-04	2.47E-03	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	5.22E-02	NA	NA	1.94E-03	7.74E-05	1.96E-04	8.45E-02	8.45E-02	3.28E-03	3.85E-04	5.48E-02	8.45E-02	8.45E-02	No Tox Value
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.68E-02	8.80E-04	No Tox Value	8.04E-02	8.04E-02	3.68E-02	8.80E-04	0.00E+00	8.04E-02	8.04E-02	No Tox Value
Sulfate	1.50E+00	2.08E-01	No Tox Value	1.39E+01	1.39E+01	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	4.86E+01	1.16E+00	No Tox Value	9.92E+01	9.92E+01	5.01E+01	1.37E+00	0.00E+00	1.13E+02	1.13E+02	No Tox Value
Uranium	3.31E-03	7.64E-04	2.04E-04	No Tox Value	No Tox Value	No Tox Value	1.25E-01	4.49E-03	0.00E+00	NA	NA	1.01E-03	4.02E-05	3.39E-06	3.00E-01	3.00E-01	1.29E-01	5.29E-03	2.08E-04	3.00E-01	3.00E-01	No Tox Value
Vanadium	2.33E-01	5.39E-02	1.48E+00	No Tox Value	No Tox Value	No Tox Value	1.42E+01	5.54E-01	0.00E+00	NA	NA	3.92E-03	1.56E-04	1.36E-03	No Tox Value	No Tox Value	1.44E+01	6.08E-01	1.49E+00	0.00E+00	0.00E+00	No Tox Value
Zinc	2.24E-03	9.78E-02	5.93E-03	4.15E-01	4.15E-01	No Tox Value	1.86E-01	4.98E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.88E+01	5.08E+00	5.93E-03	4.15E-01	4.15E-01	No Tox Value
HI_LOAEL	**2.79**	**0.50**	**1.99**	**17.34**	**17.34**	**0.00**	**75.92**	**7.21**	**0.05**	**0**	**0**	**48.76**	**1.17**	**0.002**	**108.2**	**108.2**	**127.5**	**8.88**	**2.05**	**125.6**	**125.6**	**0**

REF_RFP - Reference wetland for Roaring Fork Pond
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A-14D.RME-Based Risks Expressed as HQs and HIs for Ecological Receptors at the Reference Wetland for Roaring Fork Pond

REF_RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	9.30E-05	7.04E-06	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	3.07E-06	3.57E-08	No Tox Value	2.37E-04	2.37E-04	9.61E-05	7.07E-06	0.00E+00	2.37E-04	2.37E-04
Arsenic	2.52E-02	5.30E-03	1.14E-02	1.18E+00	1.18E+00	2.88E+00	4.52E-01	8.02E-03	NA	NA	4.94E-03	1.60E-04	1.03E-04	2.57E-02	2.57E-02	2.91E+00	4.57E-01	1.95E-02	1.21E+00	1.21E+00
Cadmium	5.82E-03	9.17E-04	2.73E-02	2.69E-01	2.69E-01	1.94E+00	2.00E-01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.94E+00	2.01E-01	2.73E-02	2.69E-01	2.69E-01
Fluoride	No Data	No Data	No Data	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	NA	NA	4.56E-01	1.47E-02	2.22E-02	1.37E+02	1.37E+02	4.56E-01	1.47E-02	2.22E-02	1.37E+02	1.37E+02
Iron	1.93E+01	2.43E+00	9.69E-01	8.40E-01	8.40E-01	1.11E+03	2.62E+01	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.13E+03	2.86E+01	9.69E-01	8.40E-01	8.40E-01
Manganese	2.91E-02	1.15E-02	1.78E-02	7.04E-01	7.04E-01	3.79E+00	1.38E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.82E+00	1.39E+00	1.78E-02	7.04E-01	7.04E-01
Molybdenum	2.70E-02	2.62E-03	6.95E-04	No Tox Value	No Tox Value	1.64E+00	1.09E-01	0.00E+00	NA	NA	1.37E-02	2.04E-04	1.62E-05	9.85E-03	9.85E-03	1.68E+00	1.12E-01	7.12E-04	9.85E-03	9.85E-03
Nitrate	7.69E-04	9.69E-05	2.92E-03	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	1.29E-02	2.49E-04	2.25E-03	No Tox Value	No Tox Value	1.37E-02	3.46E-04	5.17E-03	0.00E+00	0.00E+00
Phosphate	3.52E-05	4.43E-06	3.72E-05	No Tox Value	No Tox Value	No BAF	No BAF	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.52E-05	4.43E-06	3.72E-05	0.00E+00	0.00E+00
Selenium	1.55E-03	3.29E-04	4.94E-03	No Tox Value	No Tox Value	No BAF	No BAF	1.04E-01	NA	NA	2.57E-03	8.34E-05	3.75E-04	3.38E-01	3.38E-01	4.12E-03	4.12E-04	1.10E-01	3.38E-01	3.38E-01
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.68E-02	7.12E-04	No Tox Value	8.04E-01	8.04E-01	3.68E-02	7.12E-04	0.00E+00	8.04E-01	8.04E-01
Sulfate	3.98E+00	5.01E-01	3.78E-02	1.39E+01	1.39E+01	No BAF	No BAF	0.00E+00	NA	NA	1.46E+02	2.83E+00	6.38E-02	9.92E+02	9.92E+02	1.50E+02	3.33E+00	1.02E-01	1.01E+03	1.01E+03
Uranium	7.29E-03	1.53E-03	1.02E-02	No Tox Value	No Tox Value	2.75E-01	9.01E-03	0.00E+00	NA	NA	2.52E-03	8.13E-05	1.62E-04	3.12E+00	3.12E+00	2.85E-01	1.06E-02	1.04E-02	3.12E+00	3.12E+00
Vanadium	1.03E+00	2.27E-01	2.23E+01	No Tox Value	No Tox Value	6.25E+01	2.33E+00	0.00E+00	NA	NA	1.96E-02	6.63E-04	1.95E-02	3.37E-01	3.37E-01	6.35E+01	2.56E+00	2.23E+01	3.37E-01	3.37E-01
Zinc	3.96E-03	1.51E-01	4.15E-02	4.15E-01	4.15E-01	3.29E-01	7.70E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	3.33E-01	7.85E+00	4.15E-02	4.15E-01	4.15E-01
HI_NOAEL	**24.39**	**3.33**	**23.39**	**17.34**	**17.34**	**1181**	**38.39**	**0.11**	**0**	**0**	**146.9**	**2.85**	**0.11**	**1133**	**1133**	**1353**	**44.57**	**23.61**	**1150**	**1150**

REF_RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N	4.65E-05	3.52E-06	No Tox Value	No Tox Value	No Tox Value	No BAF	No BAF	No Tox Value	NA	NA	1.54E-06	1.78E-08	No Tox Value	2.29E-05	2.29E-05	4.81E-05	3.54E-06	0.00E+00	2.29E-05	2.29E-05
Arsenic	4.26E-03	8.95E-04	3.80E-03	1.18E+00	1.18E+00	4.87E-01	7.63E-02	2.67E-03	NA	NA	8.36E-04	2.69E-05	3.43E-05	1.36E-02	1.36E-02	4.92E-01	7.72E-02	6.51E-03	1.20E+00	1.20E+00
Cadmium	1.50E-04	1.89E-05	1.82E-03	2.69E-01	2.69E-01	4.99E-02	4.12E-03	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	5.00E-02	4.14E-03	1.82E-03	2.69E-01	2.69E-01
Fluoride	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	8.95E-02	2.88E-03	No Tox Value	8.60E+00	8.60E+00	8.95E-02	2.88E-03	0.00E+00	8.60E+00	8.60E+00
Iron	9.07E-01	1.14E-01	4.85E-01	8.40E-01	8.40E-01	5.21E+01	1.23E+00	No Data	NA	NA	No Data	No Data	No Data	No Tox Value	No Tox Value	5.30E+01	1.35E+00	4.85E-01	8.40E-01	8.40E-01
Manganese	9.47E-03	No Tox Value	8.88E-03	7.04E-01	7.04E-01	1.23E+00	No Tox Value	No Data	NA	NA	No Data	No Tox Value	No Data	No Tox Value	No Tox Value	1.24E+00	0.00E+00	8.88E-03	7.04E-01	7.04E-01
Molybdenum	5.40E-03	5.44E-04	4.64E-04	No Tox Value	No Tox Value	3.28E-01	2.27E-02	0.00E+00	NA	NA	2.74E-03	4.24E-05	1.08E-05	No Tox Value	No Tox Value	3.36E-01	2.33E-02	4.74E-04	0.00E+00	0.00E+00
Nitrate	3.49E-05	3.52E-06	8.32E-05	No Tox Value	No Tox Value	No BAF	No BAF	0.00E+00	NA	NA	5.87E-04	9.07E-06	6.41E-05	No Tox Value	No Tox Value	6.21E-04	1.26E-05	1.47E-04	0.00E+00	0.00E+00
Phosphate	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	No Tox Value	NA	NA	o Tox Value	No Tox Value	No Tox Value	No Data	No Data	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	1.18E-03	2.47E-04	2.47E-03	No Tox Value	No Tox Value	No BAF	No BAF	5.22E-02	NA	NA	1.94E-03	6.26E-05	1.88E-04	8.45E-02	8.45E-02	3.12E-03	3.10E-04	5.48E-02	8.45E-02	8.45E-02
Strontium	No Data	No Data	No Tox Value	No Tox Value	No Tox Value	No Data	No Data	No Tox Value	NA	NA	3.68E-02	7.12E-04	No Tox Value	8.04E-02	8.04E-02	3.68E-02	7.12E-04	0.00E+00	8.04E-02	8.04E-02
Sulfate	1.32E+00	1.67E-01	No Tox Value	1.39E+01	1.39E+01	No BAF	No BAF	No Tox Value	NA	NA	4.86E+01	9.40E-01	No Tox Value	9.92E+01	9.92E+01	4.99E+01	1.11E+00	0.00E+00	1.13E+02	1.13E+02
Uranium	2.92E-03	6.13E-04	2.04E-04	No Tox Value	No Tox Value	1.10E-01	3.60E-03	0.00E+00	NA	NA	1.01E-03	3.25E-05	3.25E-06	3.00E-01	3.00E-01	1.14E-01	4.25E-03	2.07E-04	3.00E-01	3.00E-01
Vanadium	2.06E-01	4.32E-02	1.48E+00	No Tox Value	No Tox Value	1.25E+01	4.45E-01	0.00E+00	NA	NA	3.92E-03	1.26E-04	1.30E-03	No Tox Value	No Tox Value	1.27E+01	4.88E-01	1.49E+00	0.00E+00	0.00E+00
Zinc	1.98E-03	7.85E-02	5.93E-03	4.15E-01	4.15E-01	1.64E-01	4.00E+00	No Data	NA	NA	No Data	No Data	No Data	No Data	No Data	1.66E-01	4.08E+00	5.93E-03	4.15E-01	4.15E-01
HI_LOAEL	**2.46**	**0.40**	**1.99**	**17.34**	**17.34**	**66.99**	**5.78**	**0.05**	**0**	**0**	**48.76**	**0.94**	**0.002**	**108.2**	**108.2**	**118.2**	**7.13**	**2.05**	**125.6**	**125.6**

REF_RFP - Reference wetland for Roaring Fork Pond
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
COPC - Contaminant of potential concern
GBH - Great blue heron

No Tox Value - No toxicity reference value (TRV)
No Data - Analyte was removed as a COPC in a particular medium or was not analyzed.
No BAF - No bioaccumulation factor
NA - Not applicable
LOAEL - Lowest observed adverse effects level
Note - Zeros in dietary pathway for GBH indicate that an intake could not be calculated due to lack of a BCF for that analyte for unfiltered surface water; therefore, no risk could be calculated.

Table A–15A. Risk Drivers for the New Rifle Wetland

NRW	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										NA	NA											
Arsenic				1.72	1.72					NA	NA									1.77	1.77	
Cadmium				1.23	1.23		1.31			NA	NA						1.34			1.23	1.23	
Fluoride										NA	NA				240.3	240.3				240.3	240.3	
Iron										NA	NA											
Manganese										NA	NA											
Molybdenum							18.64	1.89		NA	NA						19.45	1.91				
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium							2.35			NA	NA						2.43					
Sulfate										NA	NA											
Uranium										NA	NA				15.12	15.12				15.12	15.12	
Vanadium	1.21		23.08			16.58				NA	NA						1.23		23.10			16.58
Zinc										NA	NA											
HI_NOAEL	1.21	0	23.08	2.95	2.95	16.58	22.29	1.89	0	0	0	0	0	0	255.5	255.5	24.45	1.91	23.10	258.5	258.5	16.58

NRW	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										NA	NA											
Arsenic				1.72	1.72					NA	NA									1.75	1.75	
Cadmium				1.23	1.23					NA	NA									1.23	1.23	
Fluoride										NA	NA				15.09	15.09				15.09	15.09	
Iron										NA	NA											
Manganese										NA	NA											
Molybdenum							3.73			NA	NA						3.89					
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium							2.35			NA	NA						2.43					
Sulfate										NA	NA											
Uranium										NA	NA				1.46	1.46				1.46	1.46	
Vanadium			1.54							NA	NA								1.54			
Zinc										NA	NA											
HI_LOAEL	0	0	1.54	2.95	2.95	0	6.07	0	0	0	0	0	0	0	16.55	16.55	6.32	0	1.54	19.53	19.53	0

NRW - New Rifle wetland
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF", "No Data", or "No Tox Value".

Table A–15A. Risk Drivers for the New Rifle Wetland

NRW	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N									NA	NA										
Arsenic				1.72	1.72				NA	NA									1.77	1.77
Cadmium				1.23	1.23	1.16			NA	NA						1.18			1.23	1.23
Fluoride									NA	NA				240.3	240.3				240.3	240.3
Iron									NA	NA										
Manganese									NA	NA										
Molybdenum						16.44	1.52		NA	NA						17.24	1.54			
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium						2.07			NA	NA						2.15				
Sulfate									NA	NA										
Uranium									NA	NA				15.12	15.12				15.12	15.12
Vanadium	1.07		23.08						NA	NA						1.09		23.10		
Zinc									NA	NA										
HI_NOAEL	1.07	0.00	23.08	2.95	2.95	19.67	1.52	0	0	0	0	0	0	255.5	255.5	21.66	1.54	23.10	258.5	258.5

NRW	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N									NA	NA										
Arsenic				1.72	1.72				NA	NA									1.75	1.75
Cadmium				1.23	1.23				NA	NA									1.23	1.23
Fluoride									NA	NA				15.09	15.09				15.09	15.09
Iron									NA	NA										
Manganese									NA	NA										
Molybdenum						3.29			NA	NA						3.45				
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium						2.07			NA	NA						2.15				
Sulfate									NA	NA										
Uranium									NA	NA				1.46	1.46				1.46	1.46
Vanadium			1.54						NA	NA								1.54		
Zinc									NA	NA										
HI_LOAEL	0.00	0.00	1.54	2.95	2.95	5.36	0	0	0	0	0	0	0	16.55	16.55	5.60	0	1.54	19.53	19.53

NRW - New Rifle wetland
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15B. Risk Drivers for the New Rifle Wetlands Reference Area

REF	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										NA	NA											
Arsenic				1.18	1.18					NA	NA									1.21	1.21	
Cadmium							1.04			NA	NA						1.05					
Fluoride										NA	NA				137.0	137.0				137.0	137.0	
Iron										NA	NA											
Manganese										NA	NA											
Molybdenum							3.65			NA	NA						3.70					
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium							1.72			NA	NA						1.78					
Sulfate										NA	NA											
Uranium										NA	NA				3.12	3.12				3.12	3.12	
Vanadium	1.17		22.27			16.00				NA	NA						1.19		22.29			16.00
Zinc										NA	NA											
HI_NOAEL	**1.17**	**0**	**22.27**	**1.18**	**1.18**	**16.00**	**6.42**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**140.1**	**140.1**	**7.71**	**0**	**22.29**	**141.3**	**141.3**	**16.00**

REF	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										NA	NA											
Arsenic				1.18	1.18					NA	NA									1.18	1.18	
Cadmium										NA	NA											
Fluoride										NA	NA											
Iron										NA	NA											
Manganese										NA	NA											
Molybdenum										NA	NA											
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium							1.72			NA	NA						1.78					
Sulfate										NA	NA											
Uranium										NA	NA											
Vanadium			1.48							NA	NA								1.49			
Zinc										NA	NA											
HI_LOAEL	**0.00**	**0.00**	**1.48**	**1.18**	**1.18**	**0**	**1.72**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.78**	**0**	**1.49**	**1.18**	**1.18**	**0**

REF - Reference wetland
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15B. Risk Drivers for the New Rifle Wetlands Reference Area

REF	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Ammonia as Total N									NA	NA										
Arsenic				1.18	1.18				NA	NA									1.21	1.21
Cadmium									NA	NA										
Fluoride									NA	NA				137.0	137.0				137.0	137.0
Iron									NA	NA										
Manganese									NA	NA										
Molybdenum						3.22			NA	NA						3.26				
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium						1.52			NA	NA						1.58				
Sulfate									NA	NA										
Uranium									NA	NA				3.12	3.12				3.12	3.12
Vanadium	1.03		22.27						NA	NA						1.05		22.29		
Zinc									NA	NA										
HI_NOAEL	1.03	0	22.27	1.18	1.18	4.74	0	0	0	0	0	0	0	140.1	140.1	5.89	0	22.29	141.3	141.3

REF	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Ammonia as Total N									NA	NA										
Arsenic				1.18	1.18				NA	NA									1.18	1.18
Cadmium									NA	NA										
Fluoride									NA	NA										
Iron									NA	NA										
Manganese									NA	NA										
Molybdenum									NA	NA										
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium						1.52			NA	NA						1.58				
Sulfate									NA	NA										
Uranium									NA	NA										
Vanadium			1.48						NA	NA								1.49		
Zinc									NA	NA										
HI_LOAEL	0	0	1.48	1.18	1.18	1.52	0	0	0	0	0	0	0	0	0	1.58	0	1.49	1.18	1.18

REF - Reference wetland
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15C. Risk Drivers for Roaring Fork Pond

RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N										NA	NA				2.92	2.92				2.92	2.92	
Arsenic				1.19	1.19		3.28			NA	NA						3.31			1.22	1.22	
Cadmium				1.23	1.23		10.07	1.14		NA	NA						10.10	1.15		1.23	1.23	
Fluoride										NA	NA				174.7	174.7				174.7	174.7	
Iron	23.74	3.29	1.05				1364	35.47		NA	NA						1388	38.76	1.05			
Manganese							5.58	2.23		NA	NA						5.62	2.25				
Molybdenum							10.85			NA	NA	5.05			2.11	2.11	16.08			2.11	2.11	
Nitrate										NA	NA	73.44	1.75	13.37			73.61	1.78	13.96			
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium										NA	NA				2.30	2.30				2.30	2.30	
Sulfate	7.35	1.02		22.71	22.71					NA	NA	1455	34.76		9933	9933	1462	35.78		9956	9956	
Uranium										NA	NA				60.77	60.77				60.77	60.77	
Vanadium	1.18		22.52			16.18	71.60	2.94		NA	NA						72.80	3.23	22.54			16.18
Zinc								17.09		NA	NA							17.43				
HI_NOAEL	32.27	4.31	23.57	25.14	25.14	16.18	1465	58.88	0.00	0.00	0.00	1533	36.51	13.37	10176	10176	3031	100.4	37.55	10201	10201	16.18

RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N										NA	NA											
Arsenic				1.19	1.19					NA	NA									1.21	1.21	
Cadmium				1.23	1.23					NA	NA									1.23	1.23	
Fluoride										NA	NA				10.97	10.97				10.97	10.97	
Iron	1.12						64.16	1.67		NA	NA						65.28	1.82				
Manganese							1.81			NA	NA						1.83					
Molybdenum							2.17			NA	NA	1.01					3.22					
Nitrate										NA	NA	3.34					3.35					
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium										NA	NA											
Sulfate	2.44			22.71	22.71					NA	NA	483.1	11.54		993.3	993.3	485.6	11.88		1016	1016	
Uranium										NA	NA				5.85	5.85				5.85	5.85	
Vanadium			1.50				14.32			NA	NA						14.56		1.50			
Zinc								8.88		NA	NA							9.05				
HI_LOAEL	3.56	0.00	1.50	25.14	25.14	0	82.47	10.55	0	0	0	487.5	11.54	0	1010	1010	573.8	22.76	1.50	1035	1035	0

RFP - Roaring Fork Pond
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15C. Risk Drivers for Roaring Fork Pond

RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total NOAEL-Based HQs Summed Across Pathways - CT				
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Ammonia as Total N									NA	NA				2.92	2.92				2.92	2.92
Arsenic				1.19	1.19	2.89			NA	NA						2.92			1.22	1.22
Cadmium				1.23	1.23	8.89			NA	NA						8.91			1.23	1.23
Fluoride									NA	NA				174.7	174.7				174.7	174.7
Iron	20.95	2.64	1.05			1204	28.46		NA	NA						1225	31.10	1.05		
Manganese						4.92	1.79		NA	NA						4.96	1.80			
Molybdenum						9.57			NA	NA	5.05			2.11	2.11	14.79			2.11	2.11
Nitrate									NA	NA	73.44	1.42	12.81			73.59	1.44	13.39		
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium									NA	NA				2.30	2.30				2.30	2.30
Sulfate	6.49			22.71	22.71				NA	NA	1455	28.12		9933	9933	1461	28.93		9956	9956
Uranium									NA	NA				60.77	60.77				60.77	60.77
Vanadium	1.04		22.52			63.18	2.36		NA	NA						64.24	2.59	22.54		
Zinc							13.72		NA	NA							13.99			
HI_NOAEL	**28.47**	**2.64**	**23.57**	**25.14**	**25.14**	**1293**	**46.33**	**0**	**0**	**0**	**1533**	**29.54**	**12.81**	**10176**	**10176**	**2855**	**79.86**	**36.98**	**10201**	**10201**

RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**
Ammonia as Total N									NA	NA										
Arsenic				1.19	1.19				NA	NA									1.21	1.21
Cadmium				1.23	1.23				NA	NA									1.23	1.23
Fluoride									NA	NA				10.97	10.97				10.97	10.97
Iron						56.62	1.34		NA	NA						57.60	1.46			
Manganese						1.60			NA	NA						1.61				
Molybdenum						1.91			NA	NA	1.01					2.96				
Nitrate									NA	NA	3.34					3.35				
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium									NA	NA										
Sulfate	2.15			22.71	22.71				NA	NA	483.1	9.34		993.3	993.3	485.3	9.61		1016	1016
Uranium									NA	NA				5.85	5.85				5.85	5.85
Vanadium			1.50			12.64			NA	NA						12.85		1.50		
Zinc							7.13		NA	NA							7.27			
HI_LOAEL	**2.15**	**0.00**	**1.50**	**25.14**	**25.14**	**72.77**	**8.46**	**0.00**	**0.00**	**0.00**	**487.5**	**9.34**	**0.00**	**1010**	**1010**	**563.66**	**18.34**	**1.50**	**1035**	**1035**

RFP - Roaring Fork Pond
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15D. Risk Drivers for the Roaring Fork Pond Reference Area

REF_RFP	NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						NOAEL-Based HQs Due to Dietary Ingestion - RME					NOAEL-Based					Total NOAEL-					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total										NA	NA											
Arsenic				1.18	1.18		3.26			NA	NA						3.29			1.21	1.21	
Cadmium							2.20			NA	NA						2.20					
Fluoride										NA	NA				137.0	137.0				137.0	137.0	
Iron	21.86	3.03					1256	32.66		NA	NA						1278	35.69				
Manganese							4.29	1.72		NA	NA						4.33	1.73				
Molybdenum							1.86			NA	NA						1.90					
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium										NA	NA											
Sulfate	4.51			13.93	13.93					NA	NA	146.4	3.50		991.6	991.6	150.9	4.12		1005	1005	
Uranium										NA	NA				3.12	3.12				3.12	3.12	
Vanadium	1.17		22.27			16.00	70.81	2.91		NA	NA						71.99	3.19	22.29			16.00
Zinc								9.60		NA	NA							9.78				
HI_NOAEL	27.53	3.03	22.27	15.11	15.11	16.00	1338	46.88	0	0	0	146.4	3.50	0	1132	1132	1512	54.52	22.29	1147	1147	16.00

REF_RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact						LOAEL-Based HQs Due to Dietary Ingestion - RME					LOAEL-Based HQs Due to Surface Water Ingestion or					Total LOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										NA	NA											
Arsenic				1.18	1.18					NA	NA									1.20	1.20	
Cadmium										NA	NA											
Fluoride										NA	NA				8.60	8.60				8.60	8.60	
Iron	1.03						59.08	1.54		NA	NA						60.10	1.68				
Manganese							1.40			NA	NA						1.41					
Molybdenum										NA	NA											
Nitrate										NA	NA											
Phosphate										NA	NA											
Selenium										NA	NA											
Strontium										NA	NA											
Sulfate	1.50			13.93	13.93					NA	NA	48.62	1.16		99.16	99.16	50.12	1.37		113.1	113.1	
Uranium										NA	NA											
Vanadium			1.48				14.16			NA	NA						14.40		1.49			
Zinc								4.98		NA	NA							5.08				
HI_LOAEL	2.53	0.00	1.48	15.11	15.11	0.00	74.63	6.52	0	0	0	48.62	1.16	0.00	107.8	107.8	126.0	3.13	1.49	122.9	122.9	0

REF_RFP - Reference for Roaring Fork Pond
RME - Reasonable maximum exposure
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–15D. Risk Drivers for the Roaring Fork Pond Reference Area

REF_RFP	NOAEL-Based					NOAEL-Based HQs Due to Dietary Ingestion - CT					NOAEL-Based					Total NOAEL-				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N									NA	NA										
Arsenic				1.18	1.18	2.88			NA	NA						2.91			1.21	1.21
Cadmium						1.94			NA	NA						1.94				
Fluoride									NA	NA				137.0	137.0				137.0	137.0
Iron	19.29	2.43				1108	26.21		NA	NA						1127	28.64			
Manganese						3.79	1.38		NA	NA						3.82	1.39			
Molybdenum						1.64			NA	NA						1.68				
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium									NA	NA										
Sulfate	3.98			13.93	13.93				NA	NA	146.4	2.83		991.6	991.6	150.3	3.33		1005	1005
Uranium									NA	NA				3.12	3.12				3.12	3.12
Vanadium	1.03		22.27			62.48	2.33		NA	NA						63.53	2.56	22.29		
Zinc							7.70		NA	NA							7.85			
HI_NOAEL	24.29	2.43	22.27	15.11	15.11	1181	37.62	0	0	0	146.4	2.83	0	1132	1132	1352	43.77	22.29	1147	1147

REF_RFP	LOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - CT					LOAEL-Based HQs Due to Dietary Ingestion - CT					LOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - CT					Total LOAEL-Based HQs Summed Across Pathways - CT				
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub
Ammonia as Total N									NA	NA										
Arsenic				1.18	1.18				NA	NA									1.20	1.20
Cadmium									NA	NA										
Fluoride									NA	NA				8.60	8.60				8.60	8.60
Iron						52.13	1.23		NA	NA						53.03	1.35			
Manganese						1.23			NA	NA						1.24				
Molybdenum									NA	NA										
Nitrate									NA	NA										
Phosphate									NA	NA										
Selenium									NA	NA										
Strontium									NA	NA										
Sulfate	1.32			13.93	13.93				NA	NA	48.62			99.16	99.16	49.94	1.11		113.1	113.1
Uranium									NA	NA										
Vanadium			1.48			12.50			NA	NA						12.71		1.49		
Zinc							4.00		NA	NA							4.08			
HI_LOAEL	1.32	0	1.48	15.11	15.11	65.85	5.23	0	0	0	48.62	0	0	107.8	107.8	116.9	6.53	1.49	122.9	122.9

REF_RFP - Reference for Roaring Fork Pond
CT - Central tendency
NOAEL - No observed adverse effects level
HQ - Hazard quotient
HI - Hazard index
LOAEL - Lowest observed adverse effects level
NA - Not applicable
Note - Blank cell indicates HQ < 1 or could not be evaluated due to "No BAF, "No Data", or "No Tox Value".

Table A–16A. Risk Ratios for New Rifle Wetland

NRW to REF Risk Ratio - Relative Risk for RME-NOAEL Risks

NRW:REF	Relative Risks for NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						Relative Risks for NOAEL-Based HQs Due to Dietary Ingestion - RME			Relative Risks for NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Relative Risks for Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Muskrat**	**Mule Deer**	**Great Blue Heron**	**Benthic Invertebrate**	**Creek Chub**	**Aquatic Plants**
Ammonia as Total N										**4.0**	**4.0**		**52.5**	**52.5**	**4.0**	**4.0**		**52.5**	**52.5**	
Arsenic	1.5	1.5	1.5	1.5	1.5	1.5			1.3	1.3	1.3	1.3	1.8	1.8	1.4	1.4	1.4	1.5	1.5	1.5
Cadmium	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	1.3	1.2							1.3	1.3	**4.6**	**4.6**	**4.6**	**4.6**
Fluoride										1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
Iron										**3.8**	**3.8**	**3.8**	0.2	0.2	**3.8**	**3.8**	**3.8**	0.2	0.2	
Manganese	1.1	1.1	1.1	1.1	1.1	1.1									1.1	1.1	1.1	1.1	1.1	1.1
Molybdenum	**3.4**	**3.4**	**3.4**				**5.1**	**7.2**		**51.5**	**51.5**	**51.5**	**32.8**	**32.8**	**5.3**	**7.2**	**4.5**	**32.8**	**32.8**	
Nitrate	**86.5**	**86.5**	**86.5**							0.9	0.9	0.9			**6.3**	**25.0**	**48.3**			
Phosphate	**14.3**	**14.3**	**14.3**												**14.3**	**14.3**	**14.3**			
Selenium							**3.1**	**3.1**							**3.1**	**3.1**				
Strontium	**2.1**	**2.1**					1.4	1.4		1.1	1.1		1.1	1.1	1.4	1.4		1.1	1.1	
Sulfate																				
Uranium										**4.3**	**4.3**	**4.3**	**4.9**	**4.9**	**4.3**	**4.3**	**4.3**	**4.9**	**4.9**	
Vanadium	1.0	1.0	1.0			1.0				1.0	1.0	1.0	1.4	1.4	1.0	1.0	1.0	1.4	1.4	1.0
Zinc	1.0	1.0	1.0	1.0	1.0	1.0									1.0	1.0	1.0	1.0	1.0	1.0
HI_NOAEL RATIO	**1.2**	**1.1**	**1.1**	**1.6**	**1.6**	**1.0**	**3.5**	**3.9**	**1.3**	**3.0**	**2.4**	**1.4**	**1.8**	**1.8**	**3.1**	**2.6**	**1.1**	**1.8**	**1.8**	**1.0**

Note - Shaded cells indicate NRW HQ >=1 which constitutes a risk driver
Note - Blank cells are associated with divide by zero errors and no data
Bold - Indicates instances where HI ratio is greater than or equal to 2.
NOAEL - No observed adverse effects level
HQ - Hazard quotient
NRW - New Rifle Wetland
HI - hazard index
REF - Reference wetland
RME - Reasonable maximum exposure

Table A–16B. Risk Ratios for Roaring Fork Pond

RFP:REF_RFP	Relative Risks for NOAEL-Based HQs Due to Sediment Ingestion or Direct Contact - RME						Relative Risks for NOAEL-Based HQs Due to Dietary Ingestion - RME			Relative Risks for NOAEL-Based HQs Due to Surface Water Ingestion or Direct Contact - RME					Relative Risks for Total NOAEL-Based HQs Summed Across Pathways - RME					
Parameter	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants	Muskrat	Mule Deer	Great Blue Heron	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Muskrat	Mule Deer	Great Blue Heron	Benthic Invertebrate	Creek Chub	Aquatic Plants
Ammonia as Total N	**19.7**	**19.7**								**5074**	**5074**		**12319**	**12319**	**163**	**45.0**		**12319**		
Arsenic	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.7	0.7	0.7	0.7	1.1	1.1	1.0	1.0	0.9	1.0		1.0
Cadmium	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**							**4.6**	**4.6**	**4.6**	**4.6**		**4.6**
Fluoride										1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		
Iron	1.1	1.1	1.1	1.1	1.1		1.1	1.1							1.1	1.1	1.1	1.1		
Manganese	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3							1.3	1.3	1.3	1.3		1.3
Molybdenum	**5.8**	**5.8**	**5.8**				**5.8**	**5.8**		**368**	**368**	**368**	**214**	**214**	**8.5**	**6.5**	**14.5**	**214**		
Nitrate	**200**	**200**	**200**							**5691**	**5691**	**5691**			**5344**	**4146**	**649**			
Phosphate	**11.4**	**11.4**	**11.4**												**11.4**	**11.4**	**11.4**			
Selenium	**2.4**	**2.4**	**2.4**			**2.4**			1.0	1.0	1.0	1.0	1.9	1.9	1.6	**2.1**	1.1	1.9		**2.4**
Strontium										**2.8**	**2.8**		**2.9**	**2.9**	**2.8**	**2.8**		**2.9**		
Sulfate	1.6	1.6	1.6	1.6	1.6					**9.9**	**9.9**	**9.9**	**10.0**	**10.0**	**9.7**	**8.7**	**6.9**	**9.9**		
Uranium	1.1	1.1	1.1				1.1	1.1		**18.5**	**18.5**	**18.5**	**19.5**	**19.5**	1.2	1.2	1.4	**19.5**		
Vanadium	1.0	1.0	1.0			1.0	1.0	1.0		1.0	1.0	1.0	1.4	1.4	1.0	1.0	1.0	1.4		1.0
Zinc	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8							1.8	1.8	1.8	1.8		1.8
HI_NOAEL RATIO	**1.2**	**1.2**	**1.0**	**1.6**	**1.6**	**1.0**	**1.1**	**1.3**	**1.0**	**10.4**	**10.4**	**124.4**	**9.0**	**9.0**	**2.0**	**1.8**	**1.6**	**8.9**		**1.0**

Note - Shaded cells indicate RFP HQ >=1 which constitutes a risk driver
Note - Blank cells are associated with divide by zero errors and no data
Bold - Indicates instances where HI ratio is greater than or equal to 2.
NOAEL - No observed adverse effects level
HQ - Hazard quotient
RFP - Roaring Fork Pond
HI - Hazard index
REF_RFP - Reference for Roaring Fork Pond
RME - Reasonable maximum exposure

Table A–17A. Summary of New Rifle Wetland COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available?**	Comment	Retain as COPC ?
Ammonia as NH_4	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD; **No - GBH, AP**	No	NA	NA	New Rifle wetland (NRW) maximum value < REF (Reference wetland) maximum value; screened out from QRA	N
Arsenic	Sediment	Y(HQ=1.72)	BI, CC	DC	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=1.5 for all receptors; RR is likely within a reasonable margin of error for environmental data	N
Cadmium	Sediment	Y (HQ=1.23)	BI, CC	DC	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=4.6 for all receptors	Y
Fluoride	Sediment	N	—	—	I, DC		MR, MD, GBH,	Yes – MR, MD,	No	NA	NA	All NRW values < REF values; screened out from QRA	N
Iron	Sediment	N	—	—	I, DC		MR, MD, GBH,	Yes – MR, MD,	Yes	NA	NA	NRW EPC < REF EPC; means same between sites by KW; screened out from QRA	N
Manganese	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1.1 for MR, MD, GBH, BI, CC, AP; RR is likely within a reasonable margin of error for environmental data	N
Molybdenum	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	No	NA	NA	NRW EPC > REF EPC; NRW DF = 100% vs. REF DF = 20%; lack of SQC underestimated risks for BI, CC; lack of TRV underestimated risk for AP; RR=3.4 for MR, MD, GBH	Y
Nitrate	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No - AP**	No	NA	NA	100% DF at NRW vs. 0% DF at REF; lack of SQC underestimated risks to BI, CC; lack of TRV underestimated risk for AP; RR=86.5 for MR, MD, GBH, AP	Y
Phosphate	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No - AP**	No	NA	NA	100% DF at NRW vs. 0% DF at REF; lack of SQC underestimated risks to BI, CC; lack of TRV underestimated risk for AP; RR=14.3 for MR, MD, GBH	Y
Selenium	Sediment	N	—	—	I, DC		MR, MD, GBH,	Yes – MR, MD,	No	NA	NA	No detects; screened out from QRA	N
Strontium	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD; **No – GBH, AP**	No	NA	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; lack of TRVs underestimated risk to GBH, AP; lack of SQC underestimated risks to BI, CC; RR=2.1 for MR, MD	Y
Sulfate	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	Yes	NA	NA	NRW EPC < REF EPC; all NRW values < REF; screened out from QRA	N
Uranium	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	No	NA	NA	NRW maximum value < REF maximum value; screened out from QRA	N
Vanadium	Sediment	Y (HQ= 1.21, 23.1, 16.6 respectively)	MR, GBH, AP	I, DC	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	No	NA	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; lack of SQC underestimated risks for BI, CC; uncertainty highest for BI, CC; RR = 1 for MR, MD, GBH, AP	N
Zinc	Sediment	N	—	—	I, DC		MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1 for all receptors	N
Ammonia as NH_4	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; uncertainty highest with this COPC based on NH3 toxicity (temp and pH dependent); RR = 52.5 for BI, CC	N
Arsenic	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	NRW EPC > REF EPC; means same by KW; RR=1.8 for BI and CC; RR is likely within a reasonable margin of error for environmental data	N
Cadmium	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	No detects; screened out from QRA	N
Fluoride	Filtered SW	Y (HQ=240)	BI, CC	DC	DC		BI, CC	NA	NA	Yes	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=1.8 for BI, CC	Y
Iron	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes – Chronic (NOAEL)only	NA	NRW EPC < REF EPC; all NRW values < REF values; included in QRA based on discrepancy between filtered and unfiltered results; RR = 0.2 for BI, CC since REF EPC > NRW site EPC	N
Manganese	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes – Chronic (NOAEL)only	NA	NRW EPC < REF EPC; all NRW values << REF values; screened out from QRA	N
Molybdenum	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes – Chronic (NOAEL)only	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=33 for BI and CC	Y
Nitrate	Filtered SW	N	—	—	DC		BI, CC	NA	NA	**No**	NA	NRW EPC > REF EPC; 0% DF at REF; Lack of AWQC underestimated risks to BI and CC	Y
Phosphate	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	Single NRW detect << REF detect; screened out from QRA	N
Selenium	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	Single NRW detect < REF detect; screened out from QRA	N
Strontium	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	NRW EPC < REF EPC; means same between NRW and REF by KW; RR = 1.1 for BI and CC; RR is likely within a reasonable margin of error for environmental data	N
Sulfate	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	All NRW values << REF values; screened out from QRA	N
Uranium	Filtered SW	Y (HQ=15.1)	BI, CC	DC	DC		BI, CC	NA	NA	Yes	NA	NRW EPC > REF EPC; means different between NRW and REF; RR=4.9 for BI, CC	Y

Table A–17A. Summary of New Rifle Wetland COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available?**	Comment	Retain as COPC ?
Vanadium	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes – Chronic (NOAEL)only	NA	NRW EPC (8.79 mg/L) > REF EPC 6.41 mg/L); RR = 1.4 for BI and CC; NRW DF=60% vs. REF DF=40%; RR is likely within a reasonable margin of error for environmental data;	N
Zinc	Filtered SW	N	—	—	DC		BI, CC	NA	NA	Yes	NA	NRW maximum value < REF maximum value; screened out from QRA	N
Ammonia as NH_4	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD; **No - GBH**	NA	NA	**No**	NRW Max detect < REF Max detect; NRW EPC < REF EPC for NH4; uncertainty highest with this COPC based on NH3 toxicity (temp and pH dependent); lack of TRV underestimated risk to GBH; RR=4 for MR and MD	**Y**
Arsenic	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1.3 for MR, MD, GBH; RR is likely within a reasonable margin of error for environmental data	N
Cadmium	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD,	NA	NA	Yes	No detects; screened out from QRA	N
Fluoride	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	NRW EPC > REF EPC; means different between NRW and REF by KW; lack of BCF underestimated dietary risk to GBH; RR=1.8 for MR, MD, GBH	**Y**
Iron	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	NRW EPC > REF EPC; means same between NRW and REF by KW; lack of BCF underestimated dietary risk to GBH; RR=3.8 for MR, MD, GBH	**Y**
Manganese	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	Single NRW detect < REF values; screened out from QRA	N
Molybdenum	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	100% DF at NRW vs. 0% DF at REF; NRW EPC > REF EPC; RR=52 for MR, MD, and GBH; lack of BCF underestimated dietary risk to GBH	**Y**
Nitrate	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	No detects; included in QRA based on discrepancy between filtered and unfiltered results; RR=0.9 based on non-detects	N
Phosphate	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	NRW maximum detect < REF maximum value; screened out from QRA	N
Selenium	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	No detects; screened out from QRA	N
Strontium	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD; **No – GBH**	NA	NA	**No**	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1.1 for MR, MD; lack of TRV and BCF underestimated risk for GBH; RR is likely within a reasonable margin of error for environmental data	N
Sulfate	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	All NRW values < All REF values; screened out from QRA	N
Uranium	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=4.3 for MR, MD, GBH; lack of BCF underestimated dietary risks to GBH	**Y**
Vanadium	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	No detects; included in QRA based on discrepancy between filtered and unfiltered results; RR=1 based on non-detects	N
Zinc	Unfiltered SW	N	—	—	I		MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	Only detect was at REF area; NRW EPC > REF EPC based on non-detects; screened out from QRA	N
Arsenic	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	No detects	N
Cadmium	Cattail stems	Y (HQ=1.31)	MR	DI	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1.3 (MR) and 1.2 (MD); RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N
Iron	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW maximum value < REF maximum value; screened out from QRA	N
Manganese	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW maximum value < REF maximum value; screened out from QRA	N
Molybdenum	Cattail stems	Y (HQ=18.64, 1.89, respectively)	MR, MD	DI	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=5.1 (MR) RR=7.2 (MD)	Y
Selenium	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	Single NRW detect and EPC > REF EPC based on non-detects; RR=3.1 for MR, MD; based on bioaccumulation potential, recommend retain as a conservative measure	Y
Strontium	Cattail stems	Y (HQ=2.35)	MR	DI	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC > REF EPC; means between NRW and REF same by KW; RR=1.4 for MR, MD; RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N
Uranium	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Vanadium	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Zinc	Cattail stems	N	—	—	DI		MR, MD	Yes – MR, MD	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Arsenic	Cattail roots	N	—	—	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Cadmium	Cattail roots	Y (HQ=1.31)	MR	DI	DI		MR	Yes – MR	NA	NA	NA	NRW EPC > REF EPC; means same between NRW and REF by KW; RR=1.3 for MR; RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N

Table A–17A. Summary of New Rifle Wetland COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available?**	Comment	Retain as COPC ?
Iron	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Manganese	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Molybdenum	Cattail roots	Y (HQ=18.64)	MR	DI	DI		MR	Yes – MR	NA	NA	NA	NRW EPC > REF EPC; means different between NRW and REF by KW; RR=5.1 for MR	Y
Selenium	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	No detects; screened out from QRA	N
Strontium	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; means same between NRW and REF; screened out from QRA	N
Uranium	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Vanadium	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N
Zinc	Cattail roots	N	---	---	DI		MR	Yes – MR	NA	NA	NA	NRW EPC < REF EPC; screened out from QRA	N

I - Ingestion
DC - Direct contact
MR - Muskrat
MD - Mule deer
DI - Dietary ingestion
NA - Not applicable
BAF - Bioaccumulation factor
TRV - Toxicity reference value
AWQC - Ambient water quality criterion
SQC - Sediment quality criterion
COPC - Contaminant of potential concern
GBH - Great blue heron
CC - Creek chub
BI - Benthic invertebrates
AP - Aquatic plants
BCF - Bioconcentration factor
Y - Yes
N - No
DF - Detection frequency
RR - Relative risk
EPC - Exposure point concentration

** - BCF used for **unfiltered** water to predict tissue concentrations as dietary items in aquatic invertebrates, fish/frogs for GBH

Table A–17B. Summary of Roaring Fork Pond COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available? **	Comment	Retain as COPC ?
Ammonia as NH_4	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD; **No - GBH, AP**	**No**	NA	NA	All RFP values >> REF_RFP values; lack of TRVs for GBH and AP, and lack of SQC for BI, CC underestimated risks to these receptors; RR=19.7 for MR, MD	Y
Arsenic	Sediment	Y (HQ=1.2)	BI, CC	DC	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	RFP maximum value @ REF_RFP maximum value; RFP EPC > REF_RFP EPC; RR=1 for all receptors	N
Cadmium	Sediment	Y (HQ=1.23)	BI, CC	DC	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP by KW; RR=4.6 for all receptors	Y
Fluoride	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	**No**	NA	NA	All RFP values < REF_RFP values; screened from QRA	N
Iron	Sediment	Y (HQ=23.7, 3.3, 1.0,	MR, MD, GBH	I	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	Yes	NA	NA	RFP EPC > REF EPC; means same between RFP and REF by KW; RR=1.1 for all receptors except AP; risks underestimated to AP	N
Manganese	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	RFP EPC > REF_RFP EPC; means same between RFP and REF_RFP by KW; RR=1.3 for all receptors	N
Molybdenum	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	**No**	NA	NA	RFP EPC > REF_RFP EPC; all RFP values > single REF_RFP detect; lack of TRV underestimated AP risk; lack of SQC underestimates risks to BI, CC; RR=5.8 for MR, MD, GBH	Y
Nitrate	Sediment	Y (HQ=3.2)	AP	DC	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	**No**	NA	NA	100% DF at RFP vs. 0% DF at REF_RFP; lack of SQC underestimated risks to BI, CC; RR=200 for MR, MD, GBH, AP	Y
Phosphate	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	**No**	NA	NA	100% DF at RFP vs. 0% DF at REF_RFP; lack of SQC underestimated risks to BI, CC; RR=11.4 for MR, MD, GBH, AP	Y
Selenium	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	**No**	NA	NA	Single NRW detect; 0% DF at REF_RFP; lack of SQC underestimated risks to BI, CC; RR=2.4 for MR, MD, GBH, AP; due to bioaccumulation potential, recommend retain as COPC	Y
Strontium	Sediment	N	---	---	I, DC	MR, MD, GBH,	Yes – MR, MD;	**No**	NA	NA	All RFP values << REF_RFP values; screened out from QRA	N
Sulfate	Sediment	Y (HQ=7.3, 1.0, 22.7, 22.7)	MR, MD, BI, CC	I, DC	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	Yes	NA	NA	RFP EPC > REF_RFP EPC; means same between RFP and REF_RFP by KW; lack of TRV underestimated risks for AP; RR=1.6 for MR, MD, GBH, BI, CC; RR is likely within a reasonable margin of error for environmental data; uncertainty high for sulfate TRVs and SQC	N
Uranium	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH; **No – AP**	**No**	NA	NA	RFP EPC > REF_RFP EPC; means same between RFP and REF_RFP by KW; lack of TRV and SQC underestimate risks to AP, BI, CC; RR=1.1 for MR, MD, GBH; RR is likely within a reasonable margin of error for environmental data;	N
Vanadium	Sediment	Y (HQ=1.2, 22.5, 16.2 respectively)	MR, GBH, AP	I, DC	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	**No**	NA	NA	RFP EPC > REF_RFP EPC; means same between RFP and REF_RFP by KW; lack of SQC underestimated risks to BI, CC; RR=1.0 for MR, MD,GBH, AP; RR is likely within a reasonable margin of error for environmental data;	N
Zinc	Sediment	N	---	---	I, DC	MR, MD, GBH, BI, CC, AP	Yes – MR, MD, GBH, AP	Yes	NA	NA	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP by KW; RR=1.8 for all receptors; RR is likely within a reasonable margin of error for environmental data	N
Ammonia as NH_4	Filtered SW	Y (HQ=2.92)	BI, CC	DC	DC	BI, CC	NA	NA	Yes	NA	All RFP values >> REF_RFP values; RR=12K for BI, CC	Y
Arsenic	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes	NA	RFP EPC > REF_RFP EPC; means same between RFP and REF_RFP by KW; RR=1.1 for BI, CC	N
Cadmium	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes	NA	No detects; screened out from QRA	N
Fluoride	Filtered SW	Y (HQ=175)	BI, CC	DC	DC	BI, CC	NA	NA	Yes	NA	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP by KW; RR=1.3 for BI, CC; RR is likely within a reasonable margin of error for environmental data	N
Iron	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes – Chronic	NA	Single RFP detect < all REF_RFP values; screened out from QRA	N
Manganese	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes – Chronic	NA	All RFP values < all REF_RFP values; screened out from QRA	N
Molybdenum	Filtered SW	Y (HQ=2.11)	BI, CC	DC	DC	BI, CC	NA	NA	Yes – Chronic	NA	All RFP vales >> REF_RFP values; RR=214 for BI, CC	Y
Nitrate	Filtered SW	N	---	---	DC	BI, CC	NA	NA	**No**	NA	All RFP vales >> REF_RFP values; lack of AWQC underestimated risks to BI, CC	Y
Phosphate	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes	NA	No detects at RFP; screened out from QRA	N
Selenium	Filtered SW	N	---	---	DC	BI, CC	NA	NA	Yes	NA	RFP EPC > REF_RFP EPC; RI=1.9 for BI, CC; based on RFP DF and bioaccumulation potential, recommend retain as COPC	Y
Strontium	Filtered SW	Y (HQ=2.3)	BI, CC	DC	DC	BI, CC	NA	NA	Yes	NA	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP by KW; RR=2.9 for BI, CC	Y
Sulfate	Filtered SW	Y	BI, CC	DC	DC	BI, CC	NA	NA	Yes	NA	All RFP vales >> REF_RFP values; RR=10 for BI, CC	Y

Table A–17B. Summary of Roaring Fork Pond COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available? **	Comment	Retain as COPC ?
Uranium	Filtered SW	Y (HQ=61)	BI, CC	DC	DC	BI, CC	NA	NA	Yes	NA	All RFP vales >> REF_RFP values; RR=19.5 for BI, CC	Y
Vanadium	Filtered SW	N	----	----	DC	BI, CC	NA	NA	Yes – Chronic (NOAEL)only	NA	RFP EPC > REF_RFP EPC; RR=1.4; RR is likely within a reasonable margin of error for environmental data	N
Zinc	Filtered SW	N	----	----	DC	BI, CC	NA	NA	Yes	NA	RFP EPC < REF_RFP EPC; screened out from QRA	N
Ammonia as NH_4	*Unfiltered SW*	N	---	---	I	MR, MD, GBH	Yes – MR, MD; **No - GBH**	NA	NA	**No**	All RFP vales >> REF_RFP values; lack of TRV underestimated risk to GBH; RR=5,074 for MR, MD; TRV uncertain	Y
Arsenic	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	RFP EPC < REF_RFP EPC; means same between RFP and REF_RFP by KW; RR=0.7 for MR, MD, GBH	N
Cadmium	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	No detects; screened out from QRA	N
Fluoride	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP by KW; RR = 1.3 for MR, MD, GBH; lack of BCF underestimated risk to GBH; RR is likely within a reasonable margin of error for environmental data	N
Iron	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD,	NA	NA	**No**	Single RFP detect < REF_RFP maximum value; screened out from QRA	N
Manganese	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD,	NA	NA	**No**	RFP maximum value < REF_RFP maximum value; screened out from QRA	N
Molybdenum	Unfiltered SW	Y (HQ=5.0)	MR	I	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	100% DF at RFP vs. 0% DF at REF_RFP; RR=368 for MR, MD, GBH; lack of BCF underestimated risk to GBH	Y
Nitrate	Unfiltered SW	Y (HQ=73.4, 1.7, 13.3,	MR, MD, GBH	I	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	100% DF at RFP vs. 0% DF at REF_RFP; RR=5691 for MR, MD, GBH; lack of BCF underestimated risk to GBH	Y
Phosphate	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD,	NA	NA	**No**	No detects at RFP; screened out from QRA	N
Selenium	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	Yes	No detects at RFP or REF_RFP; based on disparity between filtered and unfiltered, included in QRA; RR=1 for MR, MD, GBH based on non-detects	N
Strontium	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD; **No – GBH**	NA	NA	**No**	RFP EPC > REF_RFP EPC; means different between RFP and REF_RFP; lack of TRV and BCF underestimated risks to GBH; RR=2.9 for MR, MD	Y
Sulfate	Unfiltered SW	Y (HQ=1,455, 34.8,	MR, MD	I	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	All RFP vales >> REF_RFP values; RR=9.9 for MR, MD, GBH; lack of BCF underestimated risk to GBH	Y
Uranium	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	All RFP vales >> REF_RFP values; RR=18.5 for MR, MD, GBH; lack of BCF underestimated risk to GBH	Y
Vanadium	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD, GBH	NA	NA	**No**	No detects at RFP or REF_RFP; based on disparity between filtered and unfiltered, included in QRA; RR=1 for MR, MD, GBH based on non-detects	N
Zinc	Unfiltered SW	N	---	---	I	MR, MD, GBH	Yes – MR, MD,	NA	NA	Yes	Only detect was at REF_RFP; screened out from QRA	N
Arsenic	Cattail stems	Y (HQ=3.3)	MR	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and using RFP sediment EPC; RR=1 for MR, MD; risks likely overestimated since cattails are assumed to be only dietary item	N
Cadmium	Cattail stems	Y (HQ=10.1, 1.1, respectively)	MR, MD	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; risks likely overestimated since cattails are assumed to be only dietary item; RR=4.6 for MR, MD; based on difference in sediment EPCs (RFP=0.74 mg/kg vs. REF_RFP=0.16 mg/kg), recommend retain as COPC	Y
Iron	Cattail stems	Y (HQ=1,364, 35.5, respectively)	MR, MD	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=1.1 for MR, MD; risks likely overestimated since cattails are assumed to be only dietary item; RR is likely within a reasonable margin of error for environmental data	N
Manganese	Cattail stems	Y (HQ=5.6, 2.2, respectively)	MR, MD	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=1.3 for MR, MD; RR is likely within a reasonable margin of error for environmental data	N
Molybdenum	Cattail stems	Y (HQ=10.8)	MR	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=5.8 for MR, MD	Y
Selenium	Cattail stems	N	---	---	DI	MR, MD	Yes – MR, MD	NA	NA	**No**	Since there were no detects at NRW or REF for this analyte in cattail stems, no BAF was used to derive a tissue concentration; likely not a RFP COPC since RFP DF=20% for sediment (1detect in 5 samples)	N
Strontium	Cattail stems	N	---	---	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Since strontium in sediment was removed from QRA, no tissue concentration could be predicted; likely not a RFP COPC for dietary pathway	N

Table A–17B. Summary of Roaring Fork Pond COPCs and Evaluation of Risks Following Quantitative Risk Assessment (QRA)

Analyte	Medium	Risk Driver	Risk Driving Receptor	Risk Driving Pathway	Applicable Pathways	Applicable Receptor	TRV Available?	SQC Available?	AWQC Available?	BAF/BCF Available? **	Comment	Retain as COPC ?
Uranium	Cattail stems	N	---	---	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=1.1 for MR, MD	N
Vanadium	Cattail stems	Y (HQ=71.6, 2..9,	MR, MD	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=1.0 for MR, MD	N
Zinc	Cattail stems	Y (HQ=17.1)	MD	DI	DI	MR, MD	Yes – MR, MD	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for stems and RFP sediment EPC; RR=1.8 for MR, MD; RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N
Arsenic	Cattail roots	Y (HQ=3.3)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1 for MR; risks likely overestimated since cattails are assumed to be only dietary item	N
Cadmium	Cattail roots	Y (HQ=10.1)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPc; RR=4.6 for MR	Y
Iron	Cattail roots	Y (HQ=1,364)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1.1 for MR; RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N
Manganese	Cattail roots	Y (HQ=5.6)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1.3 for MR; risks likely overestimated since cattails are assumed to be only dietary item	N
Molybdenum	Cattail roots	Y (HQ=10.8)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=5.8 for MR	Y
Selenium	Cattail roots	N	---	---	DI	MR	Yes – MR	NA	NA	**No**	Since there were no detects at NRW or REF for this analyte in cattail roots, no BAF was used to derive a tissue concentration; likely not a RFP COPC since RFP DF=20% for sediment (1detect in 5 samples)	N
Strontium	Cattail roots	N	---	---	DI	MR	Yes – MR	NA	NA	Yes	Since strontium in sediment was removed from QRA, no tissue concentration could be predicted	N
Uranium	Cattail roots	N	---	---	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1.1 for MR	N
Vanadium	Cattail roots	Y (HQ=71.6)	MR	DI	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1 for MR	N
Zinc	Cattail roots	N	---	---	DI	MR	Yes – MR	NA	NA	Yes	Tissue concentration predicted from either NRW or REF maximum BAF for roots and RFP sediment EPC; RR=1.8 for MR; RR is likely within a reasonable margin of error for environmental data; risks likely overestimated since cattails are assumed to be only dietary item	N

I - ingestion
DC - direct contact
MR - muskrat
REF - reference wetland
RFP - Roaring Fork Pond
MD - mule deer
DI - dietary ingestion
NA - not applicable
BAF - bioaccumulation factor
TRV - toxicity reference value
AWQC - ambient water quality criterion
SQC - sediment quality criterion
COPC - contaminant of potential concern

GBH - great blue heron
CC - creek chub
BI - benthic invertebrates
NRW - New Rifle wetland
REF_RFP - reference for Roaring Fork Pond
AP - aquatic plants
BCF - bioconcentration factor
Y - yes
N - no
DF - detection frequency
RR - relative risk
EPC - exposure point concentration

** - BCF used for **unfiltered** water to predict tissue concentrations as dietary items in aquatic invertebrates, fish/frogs for GBH
BAF - used to predict tissue concentrations in cattails for MR and MD

Appendix B

Raw Data

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	0.102			#	-	-
	mg/L	05/28/1998	N001	0.0681			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0063	B	U	#	-	-
	mg/L	05/28/1998	N001	0.0086	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	181.000			#	-	-
	mg/L	05/28/1998	N001	222.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.674			#	-	-
	mg/L	05/28/1998	N001	0.656			#	-	-
Hardness	mg/L	05/28/1998	0001	419.000			#	-	-
	mg/L	05/28/1998	N001	457.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	N001	1.490			#	-	-
Manganese	mg/L	05/28/1998	0001	0.0157			#	-	-
	mg/L	05/28/1998	N001	0.110			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.0736			#	-	-
	mg/L	05/28/1998	N001	0.0651			#	-	-
Nitrate	mg/L	05/28/1998	0001	0.363			#	-	-
	mg/L	05/28/1998	N001	0.120	B	U	#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	1.360			#	-	-
	mg/L	05/28/1998	N001	1.380			#	-	-
Sulfate	mg/L	05/28/1998	0001	158.000			#	-	-
	mg/L	05/28/1998	N001	151.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0570	B		#	-	-
Uranium	mg/L	05/28/1998	0001	0.0365			#	-	-
	mg/L	05/28/1998	N001	0.0357			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0064	B	U	#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0030	U		#	0.003	-
	mg/L	05/28/1998	N001	0.0063	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1207
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	0.0408			#	-	-
	mg/L	05/28/1998	N001	0.0636			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0067	B	U	#	-	-
	mg/L	05/28/1998	N001	0.0044	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	253.000			#	-	-
	mg/L	05/28/1998	N001	276.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.423			#	-	-
	mg/L	05/28/1998	N001	0.429			#	-	-
Hardness	mg/L	05/28/1998	0001	347.000			#	-	-
	mg/L	05/28/1998	N001	379.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	N001	0.208		U	#	-	-
Manganese	mg/L	05/28/1998	0001	0.0159			#	-	-
	mg/L	05/28/1998	N001	0.0195		U	#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.0285	B		#	-	-
	mg/L	05/28/1998	N001	0.0295	B		#	-	-
Nitrate	mg/L	05/28/1998	0001	0.146	B	U	#	-	-
	mg/L	05/28/1998	N001	0.141	B	U	#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	0.795			#	-	-
	mg/L	05/28/1998	N001	0.807			#	-	-
Sulfate	mg/L	05/28/1998	0001	91.700			#	-	-
	mg/L	05/28/1998	N001	87.800			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.0087			#	-	-
	mg/L	05/28/1998	N001	0.0094			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0050	U		#	0.005	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1207
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0073	B		#	-	-
	mg/L	05/28/1998	N001	0.0082	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	0.0704			#	-	-
	mg/L	05/28/1998	0002	0.0499			#	-	-
	mg/L	05/28/1998	N001	0.0454			#	-	-
	mg/L	05/28/1998	N002	0.105			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0068	B		#	-	-
	mg/L	05/28/1998	0002	0.0083	B		#	-	-
	mg/L	05/28/1998	N001	0.0043	B		#	-	-
	mg/L	05/28/1998	N002	0.0041	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	0002	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
	mg/L	05/28/1998	N002	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	208.000			#	-	-
	mg/L	05/28/1998	0002	217.000			#	-	-
	mg/L	05/28/1998	N001	222.000			#	-	-
	mg/L	05/28/1998	N002	222.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.545			#	-	-
	mg/L	05/28/1998	0002	0.502			#	-	-
	mg/L	05/28/1998	N001	0.546			#	-	-
	mg/L	05/28/1998	N002	0.542			#	-	-
Hardness	mg/L	05/28/1998	0001	359.000			#	-	-
	mg/L	05/28/1998	0002	378.000			#	-	-
	mg/L	05/28/1998	N001	387.000			#	-	-
	mg/L	05/28/1998	N002	389.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0218	B		#	-	-
	mg/L	05/28/1998	0002	0.0227	B		#	-	-
	mg/L	05/28/1998	N001	0.143		U	#	-	-
	mg/L	05/28/1998	N002	0.335			#	-	-
Manganese	mg/L	05/28/1998	0001	0.0139	B		#	-	-
	mg/L	05/28/1998	0002	0.0130	B		#	-	-
	mg/L	05/28/1998	N001	0.0147	B	U	#	-	-
	mg/L	05/28/1998	N002	0.0172		U	#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.0537			#	-	-
	mg/L	05/28/1998	0002	0.0579			#	-	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Molybdenum	mg/L	05/28/1998	N001	0.0595			#	-	-
	mg/L	05/28/1998	N002	0.0600			#	-	-
Nitrate	mg/L	05/28/1998	0001	0.115	B	U	#	-	-
	mg/L	05/28/1998	0002	0.118	B	U	#	-	-
	mg/L	05/28/1998	N001	0.0927	B	U	#	-	-
	mg/L	05/28/1998	N002	0.0902	B	U	#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	0002	0.0024	B		#	-	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
	mg/L	05/28/1998	N002	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	1.050			#	-	-
	mg/L	05/28/1998	0002	1.120			#	-	-
	mg/L	05/28/1998	N001	1.110			#	-	-
	mg/L	05/28/1998	N002	1.110			#	-	-
Sulfate	mg/L	05/28/1998	0001	127.000			#	-	-
	mg/L	05/28/1998	0002	128.000			#	-	-
	mg/L	05/28/1998	N001	126.000			#	-	-
	mg/L	05/28/1998	N002	128.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	0002	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N002	0.0520	B		#	-	-
Uranium	mg/L	05/28/1998	0001	0.0219			#	-	-
	mg/L	05/28/1998	0002	0.0238			#	-	-
	mg/L	05/28/1998	N001	0.0234			#	-	-
	mg/L	05/28/1998	N002	0.0243			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0050	U		#	0.005	-
	mg/L	05/28/1998	0002	0.0061	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-
	mg/L	05/28/1998	N002	0.0056	U		#	0.0056	-
Zinc	mg/L	05/28/1998	0001	0.0042	B		#	-	-
	mg/L	05/28/1998	0002	0.0030	U		#	0.003	-
	mg/L	05/28/1998	N001	0.0130	B	U	#	-	-
	mg/L	05/28/1998	N002	0.0062	B	U	#	-	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1209
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	0.623			#	-	-
	mg/L	05/28/1998	N001	0.0795			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0081	B		#	-	-
	mg/L	05/28/1998	N001	0.0067	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	224.000			#	-	-
	mg/L	05/28/1998	N001	233.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.556			#	-	-
	mg/L	05/28/1998	N001	0.523			#	-	-
Hardness	mg/L	05/28/1998	0001	395.000			#	-	-
	mg/L	05/28/1998	N001	415.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0214	B		#	-	-
	mg/L	05/28/1998	N001	0.904			#	-	-
Manganese	mg/L	05/28/1998	0001	0.0136	B		#	-	-
	mg/L	05/28/1998	N001	0.0431		U	#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.0661			#	-	-
	mg/L	05/28/1998	N001	0.0628			#	-	-
Nitrate	mg/L	05/28/1998	0001	2.570			#	-	-
	mg/L	05/28/1998	N001	0.0831	B	U	#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	1.200			#	-	-
	mg/L	05/28/1998	N001	1.220			#	-	-
Sulfate	mg/L	05/28/1998	0001	135.000			#	-	-
	mg/L	05/28/1998	N001	134.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0570	B		#	-	-
	mg/L	05/28/1998	N001	0.0520	B		#	-	-
Uranium	mg/L	05/28/1998	0001	0.0303			#	-	-
	mg/L	05/28/1998	N001	0.0317			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0110	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1209
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0040	B		#	-	-
	mg/L	05/28/1998	N001	0.0091	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE "*R*" OR data_validation_qualifiers LIKE "*X*") OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	0.0931			#	-	-
	mg/L	05/28/1998	N001	0.0681			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0086	B		#	-	-
	mg/L	05/28/1998	N001	0.0078	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	225.000			#	-	-
	mg/L	05/28/1998	N001	243.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.615			#	-	-
	mg/L	05/28/1998	N001	0.545			#	-	-
Hardness	mg/L	05/28/1998	0001	394.000			#	-	-
	mg/L	05/28/1998	N001	421.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0144	B		#	-	-
	mg/L	05/28/1998	N001	0.362			#	-	-
Manganese	mg/L	05/28/1998	0001	0.0070	B		#	-	-
	mg/L	05/28/1998	N001	0.0198		U	#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.0775			#	-	-
	mg/L	05/28/1998	N001	0.0721			#	-	-
Nitrate	mg/L	05/28/1998	0001	0.103	B	U	#	-	-
	mg/L	05/28/1998	N001	0.0791	B	U	#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	1.220			#	-	-
	mg/L	05/28/1998	N001	1.230			#	-	-
Sulfate	mg/L	05/28/1998	0001	142.000			#	-	-
	mg/L	05/28/1998	N001	140.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.0395			#	-	-
	mg/L	05/28/1998	N001	0.0371			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0066	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0046	B		#	-	-
	mg/L	05/28/1998	N001	0.0194	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1211
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	98.100			#	-	-
	mg/L	05/28/1998	N001	97.900			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0057	B		#	-	-
	mg/L	05/28/1998	N001	0.0032	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	919.000			#	-	-
	mg/L	05/28/1998	N001	974.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.483			#	-	-
	mg/L	05/28/1998	N001	0.444			#	-	-
Hardness	mg/L	05/28/1998	0001	1380.000			#	-	-
	mg/L	05/28/1998	N001	1470.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	N001	0.216		U	#	-	-
Manganese	mg/L	05/28/1998	0001	0.161			#	-	-
	mg/L	05/28/1998	N001	0.232			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.488			#	-	-
	mg/L	05/28/1998	N001	0.519			#	-	-
Nitrate	mg/L	05/28/1998	0001	444.000			#	-	-
	mg/L	05/28/1998	N001	450.000			#	-	-
Selenium	mg/L	05/28/1998	0001	0.0021	B		#	-	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	3.280			#	-	-
	mg/L	05/28/1998	N001	3.350			#	-	-
Sulfate	mg/L	05/28/1998	0001	2840.000			#	-	-
	mg/L	05/28/1998	N001	2850.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.152			#	-	-
	mg/L	05/28/1998	N001	0.156			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0067	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1211
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0030	U		#	0.003	-
	mg/L	05/28/1998	N001	0.0104	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1212
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	99.500			#	-	-
	mg/L	05/28/1998	N001	97.000			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0058	B		#	-	-
	mg/L	05/28/1998	N001	0.0036	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	923.000			#	-	-
	mg/L	05/28/1998	N001	960.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.439			#	-	-
	mg/L	05/28/1998	N001	0.447			#	-	-
Hardness	mg/L	05/28/1998	0001	1390.000			#	-	-
	mg/L	05/28/1998	N001	1450.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	N001	0.0904	B	U	#	-	-
Manganese	mg/L	05/28/1998	0001	0.165			#	-	-
	mg/L	05/28/1998	N001	0.248			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.493			#	-	-
	mg/L	05/28/1998	N001	0.506			#	-	-
Nitrate	mg/L	05/28/1998	0001	446.000			#	-	-
	mg/L	05/28/1998	N001	449.000			#	-	-
Selenium	mg/L	05/28/1998	0001	0.0040	B		#	-	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	3.310			#	-	-
	mg/L	05/28/1998	N001	3.300			#	-	-
Sulfate	mg/L	05/28/1998	0001	2730.000			#	-	-
	mg/L	05/28/1998	N001	2800.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.150			#	-	-
	mg/L	05/28/1998	N001	0.157			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0073	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1212
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0187	B		#	-	-
	mg/L	05/28/1998	N001	0.0177	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1213
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	95.400			#	-	-
	mg/L	05/28/1998	N001	96.400			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0036	B		#	-	-
	mg/L	05/28/1998	N001	0.0042	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	953.000			#	-	-
	mg/L	05/28/1998	N001	970.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.435			#	-	-
	mg/L	05/28/1998	N001	0.440			#	-	-
Hardness	mg/L	05/28/1998	0001	1440.000			#	-	-
	mg/L	05/28/1998	N001	1470.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	N001	0.268			#	-	-
Manganese	mg/L	05/28/1998	0001	0.171			#	-	-
	mg/L	05/28/1998	N001	0.237			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.491			#	-	-
	mg/L	05/28/1998	N001	0.500			#	-	-
Nitrate	mg/L	05/28/1998	0001	454.000			#	-	-
	mg/L	05/28/1998	N001	447.000			#	-	-
Selenium	mg/L	05/28/1998	0001	0.0023	B		#	-	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	3.450			#	-	-
	mg/L	05/28/1998	N001	3.330			#	-	-
Sulfate	mg/L	05/28/1998	0001	2700.000			#	-	-
	mg/L	05/28/1998	N001	2730.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.158			#	-	-
	mg/L	05/28/1998	N001	0.160			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0092	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1213
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0149	B		#	-	-
	mg/L	05/28/1998	N001	0.0065	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1214
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	98.800			#	-	-
	mg/L	05/28/1998	N001	96.600			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0039	B		#	-	-
	mg/L	05/28/1998	N001	0.0040	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	N001	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	947.000			#	-	-
	mg/L	05/28/1998	N001	975.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.463			#	-	-
	mg/L	05/28/1998	N001	0.411			#	-	-
Hardness	mg/L	05/28/1998	0001	1430.000			#	-	-
	mg/L	05/28/1998	N001	1470.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0130	B		#	-	-
	mg/L	05/28/1998	N001	0.210		U	#	-	-
Manganese	mg/L	05/28/1998	0001	0.163			#	-	-
	mg/L	05/28/1998	N001	0.230			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.503			#	-	-
	mg/L	05/28/1998	N001	0.512			#	-	-
Nitrate	mg/L	05/28/1998	0001	462.000			#	-	-
	mg/L	05/28/1998	N001	446.000			#	-	-
Selenium	mg/L	05/28/1998	0001	0.0020	U		#	0.002	-
	mg/L	05/28/1998	N001	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	3.440			#	-	-
	mg/L	05/28/1998	N001	3.310			#	-	-
Sulfate	mg/L	05/28/1998	0001	2680.000			#	-	-
	mg/L	05/28/1998	N001	2720.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	N001	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.157			#	-	-
	mg/L	05/28/1998	N001	0.158			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0095	B		#	-	-
	mg/L	05/28/1998	N001	0.0056	U		#	0.0056	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1214
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/L	05/28/1998	0001	0.0030	B		#	-	-
	mg/L	05/28/1998	N001	0.0091	B	U	#	-	-

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND. location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1215
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/L	05/28/1998	0001	97.200			#	-	-
	mg/L	05/28/1998	0002	97.000			#	-	-
	mg/L	05/29/1998	N001	97.000			#	-	-
	mg/L	05/29/1998	N002	97.700			#	-	-
Arsenic	mg/L	05/28/1998	0001	0.0030	B		#	-	-
	mg/L	05/28/1998	0002	0.0047	B		#	-	-
	mg/L	05/29/1998	N001	0.0043	B		#	-	-
	mg/L	05/29/1998	N002	0.0042	B		#	-	-
Cadmium	mg/L	05/28/1998	0001	0.0010	U		#	0.001	-
	mg/L	05/28/1998	0002	0.0010	U		#	0.001	-
	mg/L	05/29/1998	N001	0.0011	U		#	0.0011	-
	mg/L	05/29/1998	N002	0.0011	U		#	0.0011	-
Calcium Carbonate	mg/L	05/28/1998	0001	932.000			#	-	-
	mg/L	05/28/1998	0002	946.000			#	-	-
	mg/L	05/29/1998	N001	955.000			#	-	-
	mg/L	05/29/1998	N002	970.000			#	-	-
Fluoride	mg/L	05/28/1998	0001	0.441			#	-	-
	mg/L	05/28/1998	0002	0.441			#	-	-
	mg/L	05/29/1998	N001	0.438			#	-	-
	mg/L	05/29/1998	N002	0.431			#	-	-
Hardness	mg/L	05/28/1998	0001	1420.000			#	-	-
	mg/L	05/28/1998	0002	1430.000			#	-	-
	mg/L	05/29/1998	N001	1450.000			#	-	-
	mg/L	05/29/1998	N002	1470.000			#	-	-
Iron	mg/L	05/28/1998	0001	0.0110	U		#	0.011	-
	mg/L	05/28/1998	0002	0.0110	U		#	0.011	-
	mg/L	05/29/1998	N001	0.120		U	#	-	-
	mg/L	05/29/1998	N002	0.159		U	#	-	-
Manganese	mg/L	05/28/1998	0001	0.159			#	-	-
	mg/L	05/28/1998	0002	0.160			#	-	-
	mg/L	05/29/1998	N001	0.207			#	-	-
	mg/L	05/29/1998	N002	0.214			#	-	-
Molybdenum	mg/L	05/28/1998	0001	0.512			#	-	-
	mg/L	05/28/1998	0002	0.510			#	-	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1215
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Molybdenum	mg/L	05/29/1998	N001	0.509			#	-	-
	mg/L	05/29/1998	N002	0.507			#	-	-
Nitrate	mg/L	05/28/1998	0001	452.000			#	-	-
	mg/L	05/28/1998	0002	446.000			#	-	-
	mg/L	05/29/1998	N001	443.000			#	-	-
	mg/L	05/29/1998	N002	443.000			#	-	-
Selenium	mg/L	05/28/1998	0001	0.0021	B		#	-	-
	mg/L	05/28/1998	0002	0.0020	U		#	0.002	-
	mg/L	05/29/1998	N001	0.0022	U		#	0.0022	-
	mg/L	05/29/1998	N002	0.0022	U		#	0.0022	-
Strontium	mg/L	05/28/1998	0001	3.440			#	-	-
	mg/L	05/28/1998	0002	3.440			#	-	-
	mg/L	05/29/1998	N001	3.300			#	-	-
	mg/L	05/29/1998	N002	3.320			#	-	-
Sulfate	mg/L	05/28/1998	0001	2800.000			#	-	-
	mg/L	05/28/1998	0002	2840.000			#	-	-
	mg/L	05/29/1998	N001	2730.000			#	-	-
	mg/L	05/29/1998	N002	2720.000			#	-	-
Total Phosphorus as PO4	mg/L	05/28/1998	0001	0.0430	U		#	0.043	-
	mg/L	05/28/1998	0002	0.0430	U		#	0.043	-
	mg/L	05/29/1998	N001	0.0430	U		#	0.043	-
	mg/L	05/29/1998	N002	0.0430	U		#	0.043	-
Uranium	mg/L	05/28/1998	0001	0.159			#	-	-
	mg/L	05/28/1998	0002	0.156			#	-	-
	mg/L	05/29/1998	N001	0.155			#	-	-
	mg/L	05/29/1998	N002	0.157			#	-	-
Vanadium	mg/L	05/28/1998	0001	0.0067	B		#	-	-
	mg/L	05/28/1998	0002	0.0061	B		#	-	-
	mg/L	05/29/1998	N001	0.0056	U		#	0.0056	-
	mg/L	05/29/1998	N002	0.0056	U		#	0.0056	-
Zinc	mg/L	05/28/1998	0001	0.0051	B		#	-	-
	mg/L	05/28/1998	0002	0.0030	U		#	0.003	-
	mg/L	05/29/1998	N001	0.0064	B	U	#	-	-
	mg/L	05/29/1998	N002	0.0075	B	U	#	-	-

SURFACE WATER QUALITY DATA BY LOCATION (USEE102) FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1215
REPORT DATE: 11/12/1999 1:30 pm

PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE102 WHERE site_code='RFN01' AND location_code in('1200','1201','1202','1203','1204','1205','1206','1207','1208','1209','1210','1211','1212','1213','1214','1215','1216','1217','1218','1219','1220','1221','1222','1223','1224','1225','1226','1227','1228','1229','1230','1231','1232','1233','1234','1235','1236','1237','1238','1239','1240') AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE "*R*" OR data_validation_qualifiers LIKE "*X*") OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #1/1/1998# and #12/12/1999#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- G Possible grout contamination, pH > 9.
- R Unusable result.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/27/1998	00S1	5259 - 5258.0			2.0	*		#	-	-
Arsenic	mg/kg	05/27/1998	00S1	5259 - 5258.0			7.8	N	J	#	-	-
Cadmium	mg/kg	05/27/1998	00S1	5259 - 5258.0			0.45	B		#	-	-
Fluoride	mg/kg	05/27/1998	00S1	5259 - 5258.0			7.0			#	-	-
Iron	mg/kg	05/27/1998	00S1	5259 - 5258.0			14100			#	-	-
Manganese	mg/kg	05/27/1998	00S1	5259 - 5258.0			334			#	-	-
Molybdenum	mg/kg	05/27/1998	00S1	5259 - 5258.0			1.3	B		#	-	-
Nitrate	mg/kg	05/27/1998	00S1	5259 - 5258.0			133			#	-	-
Percent Solids	%	05/27/1998	00S1	5259 - 5258.0			78.16			#	-	-
Selenium	mg/kg	05/27/1998	00S1	5259 - 5258.0			0.26	U		#	0.26	-
Strontium	mg/kg	05/27/1998	00S1	5259 - 5258.0			157	N*	J	#	-	-
Sulfate	mg/kg	05/27/1998	00S1	5259 - 5258.0			108			#	-	-
Total Phosphorus as PO4	mg/kg	05/27/1998	00S1	5259 - 5258.0			4.2			#	-	-
Uranium	mg/kg	05/27/1998	00S1	5259 - 5258.0			3.9			#	-	-
Vanadium	mg/kg	05/27/1998	00S1	5259 - 5258.0			25.2			#	-	-
Zinc	mg/kg	05/27/1998	00S1	5259 - 5258.0			47.3			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.

DATA QUALIFIERS:

J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.
U	Parameter analyzed for but was not detected.
F	Low flow sampling method used.
R	Unusable result.
G	Possible grout contamination, pH > 9.
X	Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1207
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/27/1998	00S1	5258 - 5257.7			5.4	*		#	-	-
Arsenic	mg/kg	05/27/1998	00S1	5258 - 5257.7			8.9	N	J	#	-	-
Cadmium	mg/kg	05/27/1998	00S1	5258 - 5257.7			0.62	B		#	-	-
Calcium	mg/kg	05/27/1998	00S1	5258 - 5257.7			33100				-	-
Fluoride	mg/kg	05/27/1998	00S1	5258 - 5257.7			4.5			#	-	-
Iron	mg/kg	05/27/1998	00S1	5258 - 5257.7			10400	*			-	-
Magnesium	mg/kg	05/27/1998	00S1	5258 - 5257.7			7300				-	-
Manganese	mg/kg	05/27/1998	00S1	5258 - 5257.7			251				-	-
Molybdenum	mg/kg	05/27/1998	00S1	5258 - 5257.7			1.2	B		#	-	-
Nitrate	mg/kg	05/27/1998	00S1	5258 - 5257.7			26.4			#	-	-
Percent Solids	%	05/27/1998	00S1	5258 - 5257.7			79.15			#	-	-
Potassium	mg/kg	05/27/1998	00S1	5258 - 5257.7			1520	*			-	-
Selenium	mg/kg	05/27/1998	00S1	5258 - 5257.7			0.25	U		#	0.25	-
Strontium	mg/kg	05/27/1998	00S1	5258 - 5257.7			137	N			-	-
Sulfate	mg/kg	05/27/1998	00S1	5258 - 5257.7			55.5			#	-	-
Total Phosphorus as PO4	mg/kg	05/27/1998	00S1	5258 - 5257.7			2.3	B		#	-	-
Uranium	mg/kg	05/27/1998	00S1	5258 - 5257.7			3.6			#	-	-
Vanadium	mg/kg	05/27/1998	00S1	5258 - 5257.7			24.2			#	-	-
Zinc	mg/kg	05/27/1998	00S1	5258 - 5257.7			49.4			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1207
REPORT DATE: 10/25/1999 10:50 am

		SAMPLE:		ELEV. RANGE	DIGEST.	SAMP		QUALIFIERS:			DETECTION	UN-
PARAMETER	UNITS	DATE	ID	(FT NGVD)	CODE	DESC.	RESULT	LAB	DATA	QA	LIMIT	CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/27/1998	00S1	5258 - 5257.4			1.1	*		#	-	-
Arsenic	mg/kg	05/27/1998	00S1	5258 - 5257.4			8.6	N	J	#	-	-
Cadmium	mg/kg	05/27/1998	00S1	5258 - 5257.4			0.55	B		#	-	-
Fluoride	mg/kg	05/27/1998	00S1	5258 - 5257.4			5.1			#	-	-
Iron	mg/kg	05/27/1998	00S1	5258 - 5257.4			13000			#	-	-
Manganese	mg/kg	05/27/1998	00S1	5258 - 5257.4			296			#	-	-
Molybdenum	mg/kg	05/27/1998	00S1	5258 - 5257.4			1.2	B		#	-	-
Nitrate	mg/kg	05/27/1998	00S1	5258 - 5257.4			5.8			#	-	-
Percent Solids	%	05/27/1998	00S1	5258 - 5257.4			79.94			#	-	-
Selenium	mg/kg	05/27/1998	00S1	5258 - 5257.4			0.25	U		#	0.25	-
Strontium	mg/kg	05/27/1998	00S1	5258 - 5257.4			221	N*	J	#	-	-
Sulfate	mg/kg	05/27/1998	00S1	5258 - 5257.4			66.3			#	-	-
Total Phosphorus as PO4	mg/kg	05/27/1998	00S1	5258 - 5257.4			3.6			#	-	-
Uranium	mg/kg	05/27/1998	00S1	5258 - 5257.4			3.2			#	-	-
Vanadium	mg/kg	05/27/1998	00S1	5258 - 5257.4			25.2			#	-	-
Zinc	mg/kg	05/27/1998	00S1	5258 - 5257.4			44.0			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1209
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/27/1998	00S1	5258 - 5257.5			0.69	*		#	-	-
Arsenic	mg/kg	05/27/1998	00S1	5258 - 5257.5			10.8	N	J	#	-	-
Cadmium	mg/kg	05/27/1998	00S1	5258 - 5257.5			0.82			#	-	-
Fluoride	mg/kg	05/27/1998	00S1	5258 - 5257.5			7.2			#	-	-
Iron	mg/kg	05/27/1998	00S1	5258 - 5257.5			16200			#	-	-
Manganese	mg/kg	05/27/1998	00S1	5258 - 5257.5			311			#	-	-
Molybdenum	mg/kg	05/27/1998	00S1	5258 - 5257.5			2.4	B		#	-	-
Nitrate	mg/kg	05/27/1998	00S1	5258 - 5257.5			9.7			#	-	-
Percent Solids	%	05/27/1998	00S1	5258 - 5257.5			78.64			#	-	-
Selenium	mg/kg	05/27/1998	00S1	5258 - 5257.5			0.25	U		#	0.25	-
Strontium	mg/kg	05/27/1998	00S1	5258 - 5257.5			164	N*	J	#	-	-
Sulfate	mg/kg	05/27/1998	00S1	5258 - 5257.5			74.2			#	-	-
Total Phosphorus as PO4	mg/kg	05/27/1998	00S1	5258 - 5257.5			2.8			#	-	-
Uranium	mg/kg	05/27/1998	00S1	5258 - 5257.5			4.5			#	-	-
Vanadium	mg/kg	05/27/1998	00S1	5258 - 5257.5			36.9			#	-	-
Zinc	mg/kg	05/27/1998	00S1	5258 - 5257.5			53.0			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1209
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/27/1998	00S1	- -.5			1.2	*		#	-	-
	mg/kg	05/27/1998	00S2	- -.5			1.0	*		#	-	-
Arsenic	mg/kg	05/27/1998	00S1	- -.5			7.4	N	J	#	-	-
	mg/kg	05/27/1998	00S2	- -.5			12.5	N	J	#	-	-
Cadmium	mg/kg	05/27/1998	00S1	- -.5			0.68			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			0.54	B		#	-	-
Fluoride	mg/kg	05/27/1998	00S1	- -.5			7.4			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			5.9			#	-	-
Iron	mg/kg	05/27/1998	00S1	- -.5			12900			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			12100			#	-	-
Manganese	mg/kg	05/27/1998	00S1	- -.5			332			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			380			#	-	-
Molybdenum	mg/kg	05/27/1998	00S1	- -.5			1.6	B		#	-	-
	mg/kg	05/27/1998	00S2	- -.5			1.6	B		#	-	-
Nitrate	mg/kg	05/27/1998	00S1	- -.5			4.3			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			14.7			#	-	-
Percent Solids	%	05/27/1998	00S1	- -.5			79.52			#	-	-
	%	05/27/1998	00S2	- -.5			79.97			#	-	-
Selenium	mg/kg	05/27/1998	00S1	- -.5			0.25	U		#	0.25	-
	mg/kg	05/27/1998	00S2	- -.5			0.25	U		#	0.25	-
Strontium	mg/kg	05/27/1998	00S1	- -.5			469	N*	J	#	-	-
	mg/kg	05/27/1998	00S2	- -.5			245	N*	J	#	-	-
Sulfate	mg/kg	05/27/1998	00S1	- -.5			67.4			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Sulfate	mg/kg	05/27/1998	00S2	- -.5			56.3			#	-	-
Total Phosphorus as PO4	mg/kg	05/27/1998	00S1	- -.5			3.3			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			6.1			#	-	-
Uranium	mg/kg	05/27/1998	00S1	- -.5			4.0			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			3.8			#	-	-
Vanadium	mg/kg	05/27/1998	00S1	- -.5			37.7			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			20.8			#	-	-
Zinc	mg/kg	05/27/1998	00S1	- -.5			42.2			#	-	-
	mg/kg	05/27/1998	00S2	- -.5			37.1			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:-

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1211
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/28/1998	00S1	- -.5			64.2			#	-	-
Arsenic	mg/kg	05/28/1998	00S1	- -.5			4.2			#	-	-
Cadmium	mg/kg	05/28/1998	00S1	- -.5			0.46	B		#	-	-
Fluoride	mg/kg	05/28/1998	00S1	- -.5			1.9	B		#	-	-
Iron	mg/kg	05/28/1998	00S1	- -.5			10800			#	-	-
Manganese	mg/kg	05/28/1998	00S1	- -.5			302			#	-	-
Molybdenum	mg/kg	05/28/1998	00S1	- -.5			1.1	B		#	-	-
Nitrate	mg/kg	05/28/1998	00S1	- -.5			71.2			#	-	-
Percent Solids	%	05/28/1998	00S1	- -.5			79.53			#	-	-
Selenium	mg/kg	05/28/1998	00S1	- -.5			0.25	U		#	0.25	-
Strontium	mg/kg	05/28/1998	00S1	- -.5			53.3			#	-	-
Sulfate	mg/kg	05/28/1998	00S1	- -.5			2370			#	-	-
Total Phosphorus as PO4	mg/kg	05/28/1998	00S1	- -.5			0.98	B		#	-	-
Uranium	mg/kg	05/28/1998	00S1	- -.5			3.8			#	-	-
Vanadium	mg/kg	05/28/1998	00S1	- -.5			27.7			#	-	-
Zinc	mg/kg	05/28/1998	00S1	- -.5			63.1			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1211
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:
ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A *TIC is a suspected aldol-condensation product.*
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> *Result above upper detection limit.*

DATA QUALIFIERS:
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1212
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/28/1998	00S1	5249 - 5248.4			77.0			#	-	-
Arsenic	mg/kg	05/28/1998	00S1	5249 - 5248.4			7.4			#	-	-
Cadmium	mg/kg	05/28/1998	00S1	5249 - 5248.4			0.90			#	-	-
Fluoride	mg/kg	05/28/1998	00S1	5249 - 5248.4			2.7	B		#	-	-
Iron	mg/kg	05/28/1998	00S1	5249 - 5248.4			18600			#	-	-
Manganese	mg/kg	05/28/1998	00S1	5249 - 5248.4			458			#	-	-
Molybdenum	mg/kg	05/28/1998	00S1	5249 - 5248.4			4.5	B		#	-	-
Nitrate	mg/kg	05/28/1998	00S1	5249 - 5248.4			184			#	-	-
Percent Solids	%	05/28/1998	00S1	5249 - 5248.4			72.71			#	-	-
Selenium	mg/kg	05/28/1998	00S1	5249 - 5248.4			0.28	U		#	0.28	-
Strontium	mg/kg	05/28/1998	00S1	5249 - 5248.4			89.5			#	-	-
Sulfate	mg/kg	05/28/1998	00S1	5249 - 5248.4			2880			#	-	-
Total Phosphorus as PO4	mg/kg	05/28/1998	00S1	5249 - 5248.4			2.8			#	-	-
Uranium	mg/kg	05/28/1998	00S1	5249 - 5248.4			5.1			#	-	-
Vanadium	mg/kg	05/28/1998	00S1	5249 - 5248.4			29.3			#	-	-
Zinc	mg/kg	05/28/1998	00S1	5249 - 5248.4			103			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1212
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1213
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/28/1998	00S1	5250 - 5249			114			#	-	-
Arsenic	mg/kg	05/28/1998	00S1	5250 - 5249			4.9			#	-	-
Cadmium	mg/kg	05/28/1998	00S1	5250 - 5249			0.36	B		#	-	-
Fluoride	mg/kg	05/28/1998	00S1	5250 - 5249			3.8			#	-	-
Iron	mg/kg	05/28/1998	00S1	5250 - 5249			15300			#	-	-
Manganese	mg/kg	05/28/1998	00S1	5250 - 5249			230			#	-	-
Molybdenum	mg/kg	05/28/1998	00S1	5250 - 5249			1.8	B		#	-	-
Nitrate	mg/kg	05/28/1998	00S1	5250 - 5249			214			#	-	-
Percent Solids	%	05/28/1998	00S1	5250 - 5249			65.61			#	-	-
Selenium	mg/kg	05/28/1998	00S1	5250 - 5249			0.47	B		#	-	-
Strontium	mg/kg	05/28/1998	00S1	5250 - 5249			69.9			#	-	-
Sulfate	mg/kg	05/28/1998	00S1	5250 - 5249			2320			#	-	-
Total Phosphorus as PO4	mg/kg	05/28/1998	00S1	5250 - 5249			3.7			#	-	-
Uranium	mg/kg	05/28/1998	00S1	5250 - 5249			5.5			#	-	-
Vanadium	mg/kg	05/28/1998	00S1	5250 - 5249			34.5			#	-	-
Zinc	mg/kg	05/28/1998	00S1	5250 - 5249			65.6			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1213
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits.. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1214
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/28/1998	00S1	5249 - 5248.9			71.4			#	-	-
Arsenic	mg/kg	05/28/1998	00S1	5249 - 5248.9			6.6			#	-	-
Cadmium	mg/kg	05/28/1998	00S1	5249 - 5248.9			0.49	B		#	-	-
Fluoride	mg/kg	05/28/1998	00S1	5249 - 5248.9			2.3	B		#	-	-
Iron	mg/kg	05/28/1998	00S1	5249 - 5248.9			17400			#	-	-
Manganese	mg/kg	05/28/1998	00S1	5249 - 5248.9			395			#	-	-
Molybdenum	mg/kg	05/28/1998	00S1	5249 - 5248.9			2.2	B		#	-	-
Nitrate	mg/kg	05/28/1998	00S1	5249 - 5248.9			170			#	-	-
Percent Solids	%	05/28/1998	00S1	5249 - 5248.9			66.15			#	-	-
Selenium	mg/kg	05/28/1998	00S1	5249 - 5248.9			0.30	U		#	0.3	-
Strontium	mg/kg	05/28/1998	00S1	5249 - 5248.9			54.2			#	-	-
Sulfate	mg/kg	05/28/1998	00S1	5249 - 5248.9			1030			#	-	-
Total Phosphorus as PO4	mg/kg	05/28/1998	00S1	5249 - 5248.9			2.1	B		#	-	-
Uranium	mg/kg	05/28/1998	00S1	5249 - 5248.9			4.6			#	-	-
Vanadium	mg/kg	05/28/1998	00S1	5249 - 5248.9			29.0			#	-	-
Zinc	mg/kg	05/28/1998	00S1	5249 - 5248.9			68.4			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1214
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1215
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/28/1998	00S1	5249 - 5248.7			93.4			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			97.0			#	-	-
Arsenic	mg/kg	05/28/1998	00S1	5249 - 5248.7			6.1			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			6.7			#	-	-
Cadmium	mg/kg	05/28/1998	00S1	5249 - 5248.7			0.45	B		#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			0.56	B		#	-	-
Fluoride	mg/kg	05/28/1998	00S1	5249 - 5248.7			4.8			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			4.6			#	-	-
Iron	mg/kg	05/28/1998	00S1	5249 - 5248.7			14800			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			15000			#	-	-
Manganese	mg/kg	05/28/1998	00S1	5249 - 5248.7			292			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			259			#	-	-
Molybdenum	mg/kg	05/28/1998	00S1	5249 - 5248.7			1.7	B		#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			1.5	B		#	-	-
Nitrate	mg/kg	05/28/1998	00S1	5249 - 5248.7			111			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			109			#	-	-
Percent Solids	%	05/28/1998	00S1	5249 - 5248.7			76.85			#	-	-
	%	05/28/1998	00S2	5249 - 5248.7			77.14			#	-	-
Selenium	mg/kg	05/28/1998	00S1	5249 - 5248.7			0.26	U		#	0.26	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			0.26	U		#	0.26	-
Strontium	mg/kg	05/28/1998	00S1	5249 - 5248.7			52.4			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			53.2			#	-	-
Sulfate	mg/kg	05/28/1998	00S1	5249 - 5248.7			950			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1215
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Sulfate	mg/kg	05/28/1998	00S2	5249 - 5248.7			929			#	-	-
Total Phosphorus as PO4	mg/kg	05/28/1998	00S1	5249 - 5248.7			3.2			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			3.2			#	-	-
Uranium	mg/kg	05/28/1998	00S1	5249 - 5248.7			7.3			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			5.2			#	-	-
Vanadium	mg/kg	05/28/1998	00S1	5249 - 5248.7			27.0			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			29.7			#	-	-
Zinc	mg/kg	05/28/1998	00S1	5249 - 5248.7			56.7			#	-	-
	mg/kg	05/28/1998	00S2	5249 - 5248.7			59.5			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J *Estimated value.*
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F *Low flow sampling method used.*
- R Unusable result.
- G *Possible grout contamination, pH > 9.*
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1201 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/29/1998	00S1	- -.5			2.0			#	-	-
Arsenic	mg/kg	05/29/1998	00S1	- -.5			5.3			#	-	-
Cadmium	mg/kg	05/29/1998	00S1	- -.5			0.13	U		#	0.13	-
Fluoride	mg/kg	05/29/1998	00S1	- -.5			9.4			#	-	-
Iron	mg/kg	05/29/1998	00S1	- -.5			12100			#	-	-
Manganese	mg/kg	05/29/1998	00S1	- -.5			250			#	-	-
Molybdenum	mg/kg	05/29/1998	00S1	- -.5			0.52	B	U	#	-	-
Nitrate	mg/kg	05/29/1998	00S1	- -.5			1.7	B	U	#	-	-
Percent Solids	%	05/29/1998	00S1	- -.5			74.46			#	-	-
Selenium	mg/kg	05/29/1998	00S1	- -.5			0.27	U		#	0.27	-
Strontium	mg/kg	05/29/1998	00S1	- -.5			96.5			#	-	-
Sulfate	mg/kg	05/29/1998	00S1	- -.5			933			#	-	-
Total Phosphorus as PO4	mg/kg	05/29/1998	00S1	- -.5			0.58	U		#	0.58	-
Uranium	mg/kg	05/29/1998	00S1	- -.5			5.2			#	-	-
Vanadium	mg/kg	05/29/1998	00S1	- -.5			19.8			#	-	-
Zinc	mg/kg	05/29/1998	00S1	- -.5			37.4			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:
ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

[redacted]

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1202 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/29/1998	00S1	- -.5			0.56			#	-	-
Arsenic	mg/kg	05/29/1998	00S1	- -.5			5.8			#	-	-
Cadmium	mg/kg	05/29/1998	00S1	- -.5			0.14	B		#	-	-
Fluoride	mg/kg	05/29/1998	00S1	- -.5			9.1			#	-	-
Iron	mg/kg	05/29/1998	00S1	- -.5			15100			#	-	-
Manganese	mg/kg	05/29/1998	00S1	- -.5			301			#	-	-
Molybdenum	mg/kg	05/29/1998	00S1	- -.5			0.60	B	U	#	-	-
Nitrate	mg/kg	05/29/1998	00S1	- -.5			1.6	B	U	#	-	-
Percent Solids	%	05/29/1998	00S1	- -.5			74.10			#	-	-
Selenium	mg/kg	05/29/1998	00S1	- -.5			0.27	U		#	0.27	-
Strontium	mg/kg	05/29/1998	00S1	- -.5			117			#	-	-
Sulfate	mg/kg	05/29/1998	00S1	- -.5			557			#	-	-
Total Phosphorus as PO4	mg/kg	05/29/1998	00S1	- -.5			0.58	U		#	0.58	-
Uranium	mg/kg	05/29/1998	00S1	- -.5			4.5			#	-	-
Vanadium	mg/kg	05/29/1998	00S1	- -.5			25.3			#	-	-
Zinc	mg/kg	05/29/1998	00S1	- -.5			44.5			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1202 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:

ESL1 *ESL Labatory Report ESL-RPT-99-04*

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	*Possible grout contamination*, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1203 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/29/1998	00S1	- - .5			6.2			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			7.4			#	-	-
Arsenic	mg/kg	05/29/1998	00S1	- - .5			6.5			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			6.3			#	-	-
Cadmium	mg/kg	05/29/1998	00S1	- - .5			0.15	U		#	0.15	-
	mg/kg	05/29/1998	00S2	- - .5			0.14	U		#	0.14	-
Fluoride	mg/kg	05/29/1998	00S1	- - .5			10.5			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			10.4			#	-	-
Iron	mg/kg	05/29/1998	00S1	- - .5			16400			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			17200			#	-	-
Manganese	mg/kg	05/29/1998	00S1	- - .5			306			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			298			#	-	-
Molybdenum	mg/kg	05/29/1998	00S1	- - .5			0.78	B		#	-	-
	mg/kg	05/29/1998	00S2	- - .5			0.79	B		#	-	-
Nitrate	mg/kg	05/29/1998	00S1	- - .5			2.0	B	U	#	-	-
	mg/kg	05/29/1998	00S2	- - .5			2.1	B	U	#	-	-
Percent Solids	%	05/29/1998	00S1	- - .5			67.91			#	-	-
	%	05/29/1998	00S2	- - .5			69.70			#	-	-
Selenium	mg/kg	05/29/1998	00S1	- - .5			0.29	U		#	0.29	-
	mg/kg	05/29/1998	00S2	- - .5			0.29	U		#	0.29	-
Strontium	mg/kg	05/29/1998	00S1	- - .5			123			#	-	-
	mg/kg	05/29/1998	00S2	- - .5			121			#	-	-
Sulfate	mg/kg	05/29/1998	00S1	- - .5			1620			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1203 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Sulfate	mg/kg	05/29/1998	00S2	- -.5			750			#	-	-
Total Phosphorus as PO4	mg/kg	05/29/1998	00S1	- -.5			0.63	U		#	0.63	-
	mg/kg	05/29/1998	00S2	- -.5			0.62	U		#	0.62	-
Uranium	mg/kg	05/29/1998	00S1	- -.5			5.8			#	-	-
	mg/kg	05/29/1998	00S2	- -.5			5.5			#	-	-
Vanadium	mg/kg	05/29/1998	00S1	- -.5			28.8			#	-	-
	mg/kg	05/29/1998	00S2	- -.5			34.2			#	-	-
Zinc	mg/kg	05/29/1998	00S1	- -.5			48.4			#	-	-
	mg/kg	05/29/1998	00S2	- -.5			45.8			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1203 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:
ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:
* Replicate analysis not within control limits.
+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.

DATA QUALIFIERS:
J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1204 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/29/1998	00S1	- -.5			0.84			#	-	-
Arsenic	mg/kg	05/29/1998	00S1	- -.5			7.2			#	-	-
Cadmium	mg/kg	05/29/1998	00S1	- -.5			0.17	B		#	-	-
Fluoride	mg/kg	05/29/1998	00S1	- -.5			10.0			#	-	-
Iron	mg/kg	05/29/1998	00S1	- -.5			16600			#	-	-
Manganese	mg/kg	05/29/1998	00S1	- -.5			329			#	-	-
Molybdenum	mg/kg	05/29/1998	00S1	- -.5			0.64	B	U	#	-	-
Nitrate	mg/kg	05/29/1998	00S1	- -.5			1.9	B	U	#	-	-
Percent Solids	%	05/29/1998	00S1	- -.5			70.87			#	-	-
Selenium	mg/kg	05/29/1998	00S1	- -.5			0.28	U		#	0.28	-
Strontium	mg/kg	05/29/1998	00S1	- -.5			132			#	-	-
Sulfate	mg/kg	05/29/1998	00S1	- -.5			424			#	-	-
Total Phosphorus as PO4	mg/kg	05/29/1998	00S1	- -.5			0.61	U		#	0.61	-
Uranium	mg/kg	05/29/1998	00S1	- -.5			4.8			#	-	-
Vanadium	mg/kg	05/29/1998	00S1	- -.5			32.0			#	-	-
Zinc	mg/kg	05/29/1998	00S1	- -.5			50.0			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1204 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:
ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1205 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia as NH4	mg/kg	05/29/1998	00S1	- -.5			3.8			#	-	-
Arsenic	mg/kg	05/29/1998	00S1	- -.5			7.0			#	-	-
Cadmium	mg/kg	05/29/1998	00S1	- -.5			0.14	B		#	-	-
Fluoride	mg/kg	05/29/1998	00S1	- -.5			8.8			#	-	-
Iron	mg/kg	05/29/1998	00S1	- -.5			15400			#	-	-
Manganese	mg/kg	05/29/1998	00S1	- -.5			300			#	-	-
Molybdenum	mg/kg	05/29/1998	00S1	- -.5			0.52	B	U	#	-	-
Nitrate	mg/kg	05/29/1998	00S1	- -.5			2.0	B	U	#	-	-
Percent Solids	%	05/29/1998	00S1	- -.5			72.14			#	-	-
Selenium	mg/kg	05/29/1998	00S1	- -.5			0.28	U		#	0.28	-
Strontium	mg/kg	05/29/1998	00S1	- -.5			145			#	-	-
Sulfate	mg/kg	05/29/1998	00S1	- -.5			2110			#	-	-
Total Phosphorus as PO4	mg/kg	05/29/1998	00S1	- -.5			0.60	U		#	0.6	-
Uranium	mg/kg	05/29/1998	00S1	- -.5			4.5			#	-	-
Vanadium	mg/kg	05/29/1998	00S1	- -.5			27.9			#	-	-
Zinc	mg/kg	05/29/1998	00S1	- -.5			47.2			#	-	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1205 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:50 am

PARAMETER	UNITS	SAMPLE: DATE	ID	ELEV. RANGE (FT NGVD)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE500

DIGESTION CODES:
ESL1 ESL Labatory Report ESL-RPT-99-04

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:
- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	SAMPLE: ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.3		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.1			#	-	-
Cadmium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.75			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.29	B		#	-	-
Iron	mg/kg	05/27/1998	00V1	CATTAIL STEMS	779			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	3360			#	-	-
Loss on Drying	%	05/27/1998	00V1	CATTAIL STEMS	86.8			#	-	-
	%	05/27/1998	00V2	CATTAIL ROOTS	88.7			#	-	-
Manganese	mg/kg	05/27/1998	00V1	CATTAIL STEMS	300		J	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	135		J	#	-	-
Molybdenum	mg/kg	05/27/1998	00V1	CATTAIL STEMS	4.4	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.0	B		#	-	-
Selenium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.79		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	141			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	85.5			#	-	-
Uranium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.19	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	1.7			#	-	-
Vanadium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.3	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	11.8			#	-	-
Zinc	mg/kg	05/27/1998	00V1	CATTAIL STEMS	33.5			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	34.3			#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1206
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- \> Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1207
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.0		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.5			#	-	-
Cadmium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.51			#	-	-
Iron	mg/kg	05/27/1998	00V1	CATTAIL STEMS	344			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	3320			#	-	-
Loss on Drying	%	05/27/1998	00V1	CATTAIL STEMS	86.7			#	-	-
	%	05/27/1998	00V2	CATTAIL ROOTS	90.7			#	-	-
Manganese	mg/kg	05/27/1998	00V1	CATTAIL STEMS	318		J	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	220		J	#	-	-
Molybdenum	mg/kg	05/27/1998	00V1	CATTAIL STEMS	5.5			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.5	B		#	-	-
Selenium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.3		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.23	B	U	#	-	-
Strontium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	230			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	142			#	-	-
Uranium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.63			#	-	-
Vanadium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.3	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	12.3			#	-	-
Zinc	mg/kg	05/27/1998	00V1	CATTAIL STEMS	24.5			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	30.6			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1208
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.89	B	U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	4.9			#	-	-
Cadmium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.18	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.42	B		#	-	-
Iron	mg/kg	05/27/1998	00V1	CATTAIL STEMS	261			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	7500			#	-	-
Loss on Drying	%	05/27/1998	00V1	CATTAIL STEMS	87.4			#	-	-
	%	05/27/1998	00V2	CATTAIL ROOTS	85.5			#	-	-
Manganese	mg/kg	05/27/1998	00V1	CATTAIL STEMS	457		J	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	188		J	#	-	-
Molybdenum	mg/kg	05/27/1998	00V1	CATTAIL STEMS	2.7	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.4	B		#	-	-
Selenium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.82		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	197			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	143			#	-	-
Uranium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.10	U		#	0.1	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	1.5			#	-	-
Vanadium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.93	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	28.5			#	-	-
Zinc	mg/kg	05/27/1998	00V1	CATTAIL STEMS	30.0			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	33.7			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I *Increased detection limit due to required dilution.*
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1209
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.85	B	U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	1.3		U	#	-	-
Cadmium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.17	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.24	B		#	-	-
Iron	mg/kg	05/27/1998	00V1	CATTAIL STEMS	582			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	1580			#	-	-
Loss on Drying	%	05/27/1998	00V1	CATTAIL STEMS	86.6			#	-	-
	%	05/27/1998	00V2	CATTAIL ROOTS	85.7			#	-	-
Manganese	mg/kg	05/27/1998	00V1	CATTAIL STEMS	380		J	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	105		J	#	-	-
Molybdenum	mg/kg	05/27/1998	00V1	CATTAIL STEMS	8.4			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	5.0			#	-	-
Selenium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.3		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.50	B	U	#	-	-
Strontium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	209			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	90.8			#	-	-
Uranium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.15	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.0			#	-	-
Vanadium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.8	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	6.5			#	-	-
Zinc	mg/kg	05/27/1998	00V1	CATTAIL STEMS	27.6			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	15.8			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.76	B	U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.6			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	0.91	B	U	#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	3.0			#	-	-
Cadmium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.10	U		#	0.1	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.24	B		#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	0.22	B		#	-	-
Iron	mg/kg	05/27/1998	00V1	CATTAIL STEMS	626			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	3640			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	608			#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	3800			#	-	-
Loss on Drying	%	05/27/1998	00V1	CATTAIL STEMS	89.1			#	-	-
	%	05/27/1998	00V2	CATTAIL ROOTS	88.0			#	-	-
	%	05/27/1998	00V3	CATTAIL STEMS	88.9			#	-	-
	%	05/27/1998	00V4	CATTAIL ROOTS	87.8			#	-	-
Manganese	mg/kg	05/27/1998	00V1	CATTAIL STEMS	434		J	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	173	N	J	#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	385		J	#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	176	N	J	#	-	-
Molybdenum	mg/kg	05/27/1998	00V1	CATTAIL STEMS	4.6	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	2.6	B		#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	4.3	B		#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	2.5	B		#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Selenium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.0		U	#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	0.25	B	U	#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	1.4			#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	0.27	B	U	#	-	-
Strontium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	166			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	94.4			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	145			#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	96.0			#	-	-
Uranium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	0.12	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	1.3			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	1.5			#	-	-
Vanadium	mg/kg	05/27/1998	00V1	CATTAIL STEMS	1.8	B		#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	12.0			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	2.3	B		#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	13.0			#	-	-
Zinc	mg/kg	05/27/1998	00V1	CATTAIL STEMS	28.1			#	-	-
	mg/kg	05/27/1998	00V2	CATTAIL ROOTS	24.7			#	-	-
	mg/kg	05/27/1998	00V3	CATTAIL STEMS	30.6			#	-	-
	mg/kg	05/27/1998	00V4	CATTAIL ROOTS	24.5			#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFN01, RIFLE (NEW)
LOCATION: 1210
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1201 *Risk Assessment Sample Site*
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.3		U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	9.2			#	-	-
Cadmium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.29	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.37	B		#	-	-
Iron	mg/kg	05/29/1998	00V1	CATTAIL STEMS	2710			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	13400			#	-	-
Loss on Drying	%	05/29/1998	00V1	CATTAIL STEMS	90.6			#	-	-
	%	05/29/1998	00V2	CATTAIL ROOTS	91.8			#	-	-
Manganese	mg/kg	05/29/1998	00V1	CATTAIL STEMS	613		J	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	377	N	J	#	-	-
Molybdenum	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.1	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	1.3	B		#	-	-
Selenium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.53		U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	166			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	127			#	-	-
Uranium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.46	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	3.4			#	-	-
Vanadium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	4.1	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	29.2			#	-	-
Zinc	mg/kg	05/29/1998	00V1	CATTAIL STEMS	38.9			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	55.6			#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1201 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1202 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.80	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	5.5			#	-	-
Cadmium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.16	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.30	B		#	-	-
Iron	mg/kg	05/29/1998	00V1	CATTAIL STEMS	482			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	15900			#	-	-
Loss on Drying	%	05/29/1998	00V1	CATTAIL STEMS	86.7			#	-	-
	%	05/29/1998	00V2	CATTAIL ROOTS	82.3			#	-	-
Manganese	mg/kg	05/29/1998	00V1	CATTAIL STEMS	344		J	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	284	N	J	#	-	-
Molybdenum	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.82	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.75	B		#	-	-
Selenium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.45	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	115			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	136			#	-	-
Uranium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.44	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	2.4			#	-	-
Vanadium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.1	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	39.7			#	-	-
Zinc	mg/kg	05/29/1998	00V1	CATTAIL STEMS	28.5			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	50.5			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L *Less than 3 bore volumes purged prior to sampling.*
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R *Unusable result.*
- G Possible grout contamination, pH > 9.
- X *Location is undefined.*

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1203 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.67	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	7.8			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.83	B	U	#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	8.0			#	-	-
Cadmium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.25	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.32	B		#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.14	B		#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	0.33	B		#	-	-
Iron	mg/kg	05/29/1998	00V1	CATTAIL STEMS	430			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	13600			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	310			#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	11000			#	-	-
Loss on Drying	%	05/29/1998	00V1	CATTAIL STEMS	91.9			#	-	-
	%	05/29/1998	00V2	CATTAIL ROOTS	90.8			#	-	-
	%	05/29/1998	00V3	CATTAIL STEMS	84.9			#	-	-
	%	05/29/1998	00V4	CATTAIL ROOTS	93.2			#	-	-
Manganese	mg/kg	05/29/1998	00V1	CATTAIL STEMS	587		J	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	268	N	J	#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	690		J	#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	295	N	J	#	-	-
Molybdenum	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.65	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.97	B		#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.94	B		#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	1.2	B		#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1203 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Selenium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.40	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.46	B	U	#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	155			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	122			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	135			#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	121			#	-	-
Uranium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	3.1			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.11	B		#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	3.5			#	-	-
Vanadium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.1	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	31.1			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	0.70	U		#	0.7	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	22.7			#	-	-
Zinc	mg/kg	05/29/1998	00V1	CATTAIL STEMS	24.1			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	57.3			#	-	-
	mg/kg	05/29/1998	00V3	CATTAIL STEMS	20.1			#	-	-
	mg/kg	05/29/1998	00V4	CATTAIL ROOTS	71.3			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1204 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.69	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	6.7			#	-	-
Cadmium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.54			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.28	B		#	-	-
Iron	mg/kg	05/29/1998	00V1	CATTAIL STEMS	406			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	7040			#	-	-
Loss on Drying	%	05/29/1998	00V1	CATTAIL STEMS	92.5			#	-	-
	%	05/29/1998	00V2	CATTAIL ROOTS	93.2			#	-	-
Manganese	mg/kg	05/29/1998	00V1	CATTAIL STEMS	516		J	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	249	N	J	#	-	-
Molybdenum	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.56	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.83	B		#	-	-
Selenium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.29	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	145			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	119			#	-	-
Uranium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.13	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	1.9			#	-	-
Vanadium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.2	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	15.8			#	-	-
Zinc	mg/kg	05/29/1998	00V1	CATTAIL STEMS	22.0			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	49.4			#	-	-

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- \+ Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1205 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.67	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	7.3			#	-	-
Cadmium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.10	U		#	0.1	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.34	B		#	-	-
Iron	mg/kg	05/29/1998	00V1	CATTAIL STEMS	956			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	12200			#	-	-
Loss on Drying	%	05/29/1998	00V1	CATTAIL STEMS	90.6			#	-	-
	%	05/29/1998	00V2	CATTAIL ROOTS	88.9			#	-	-
Manganese	mg/kg	05/29/1998	00V1	CATTAIL STEMS	413		J	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	270	N	J	#	-	-
Molybdenum	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.63	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	1.0	B		#	-	-
Selenium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.29	B	U	#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	0.20	U		#	0.2	-
Strontium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	154			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	144			#	-	-
Uranium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	0.14	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	3.0			#	-	-
Vanadium	mg/kg	05/29/1998	00V1	CATTAIL STEMS	1.7	B		#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	31.9			#	-	-
Zinc	mg/kg	05/29/1998	00V1	CATTAIL STEMS	18.7			#	-	-
	mg/kg	05/29/1998	00V2	CATTAIL ROOTS	48.2			#	-	-

VEGETATION CHEMISTRY DATA BY LOCATION FOR SITE RFO01, RIFLE (OLD)
LOCATION: 1205 Risk Assessment Sample Site
REPORT DATE: 10/25/1999 10:42 am

PARAMETER	UNITS	SAMPLE: DATE	ID	MATRIX SUBTYPE	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
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- A TIC is a suspected aldol-condensation product.
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- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
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- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
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- \> Result above upper detection limit.

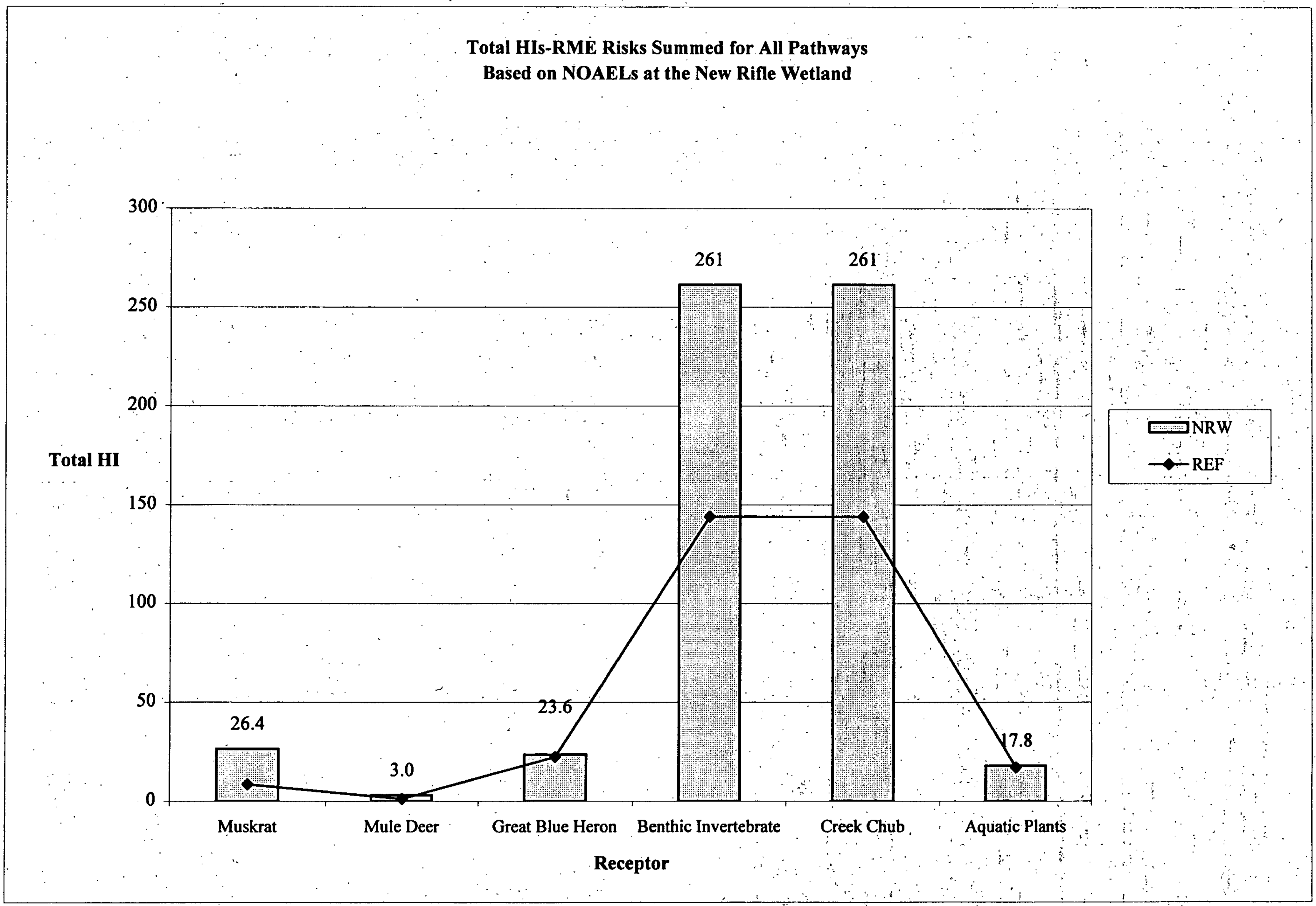
DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

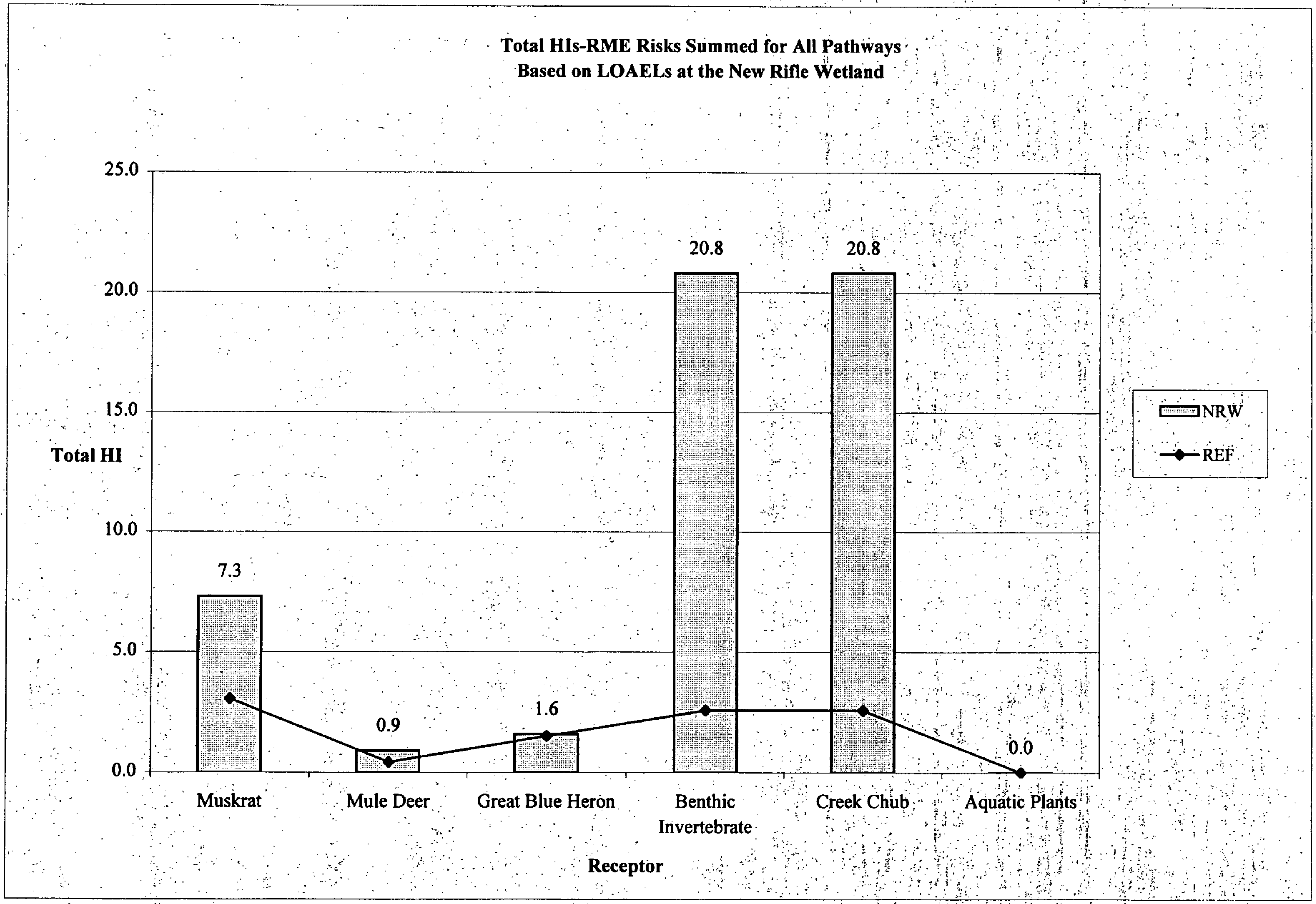
QA QUALIFIER: # = validated according to Quality Assurance guidelines.

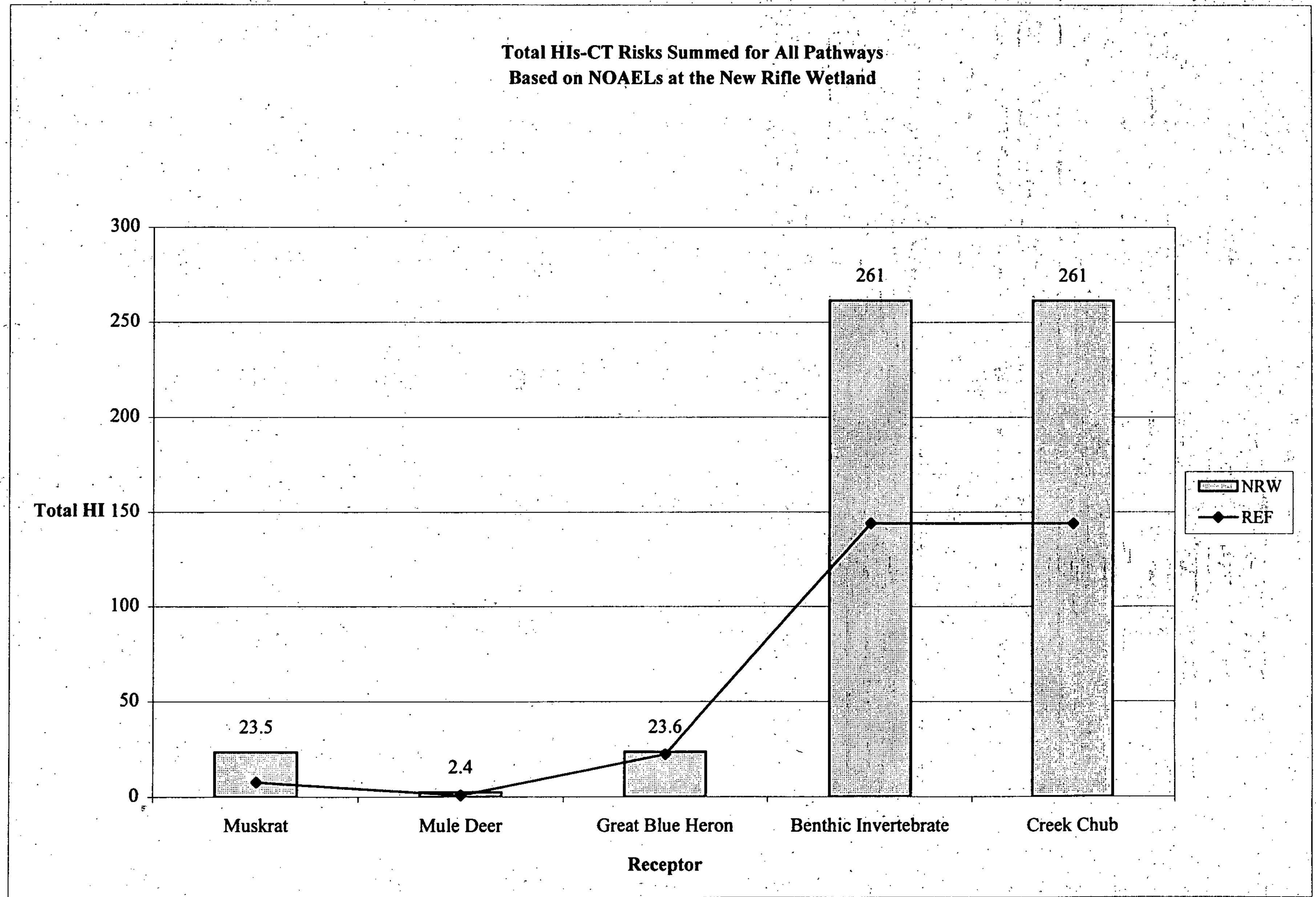
Appendix C

Figures Summarizing Ecological Risk

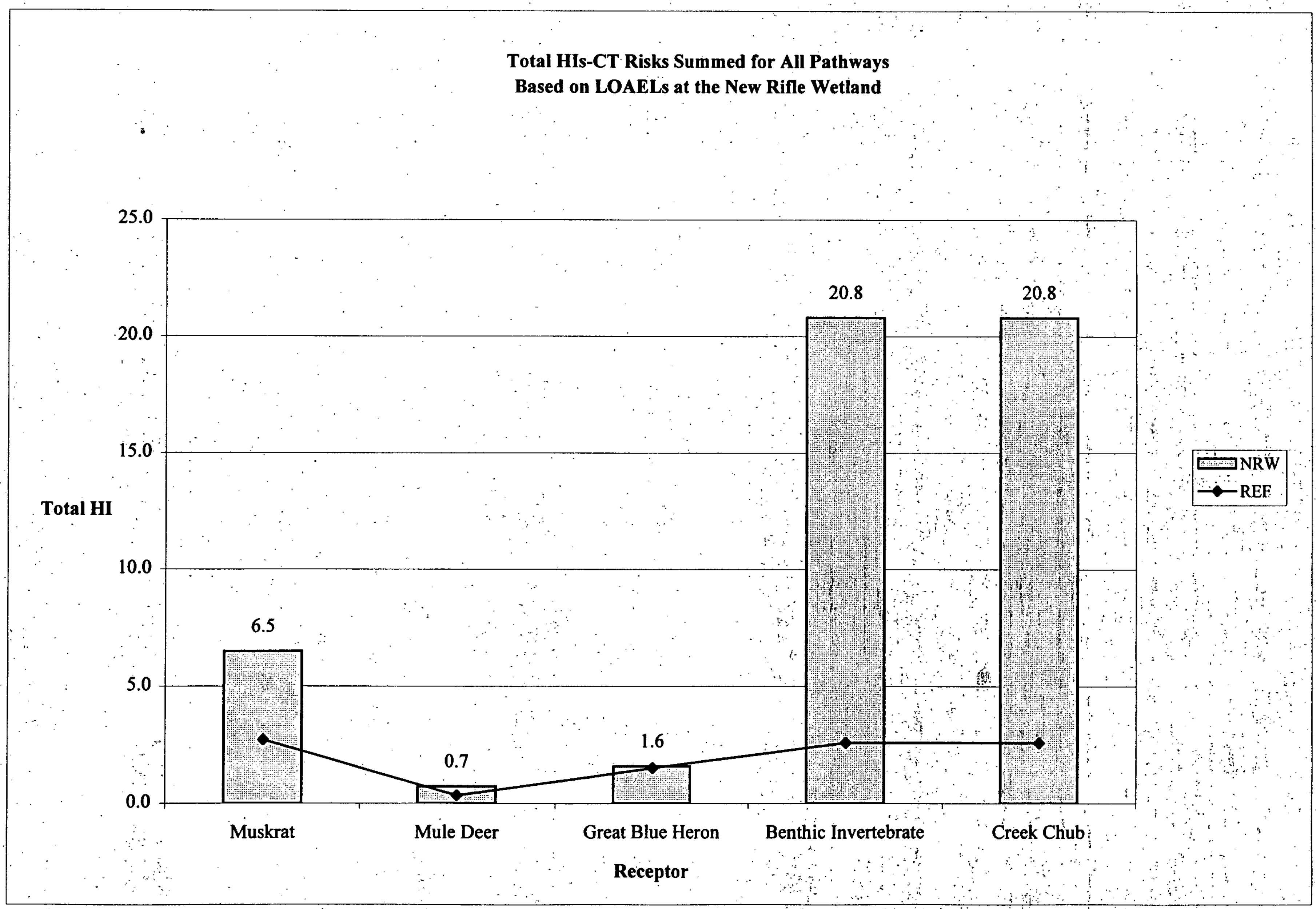


Total HIs-RME Risks Summed for All Pathways
Based on NOAELs at the New Rifle Wetland
Total HI
300
250
200
150
100
50
0
261
261
26.4
3.0
23.6
17.8
NRW
REF
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor

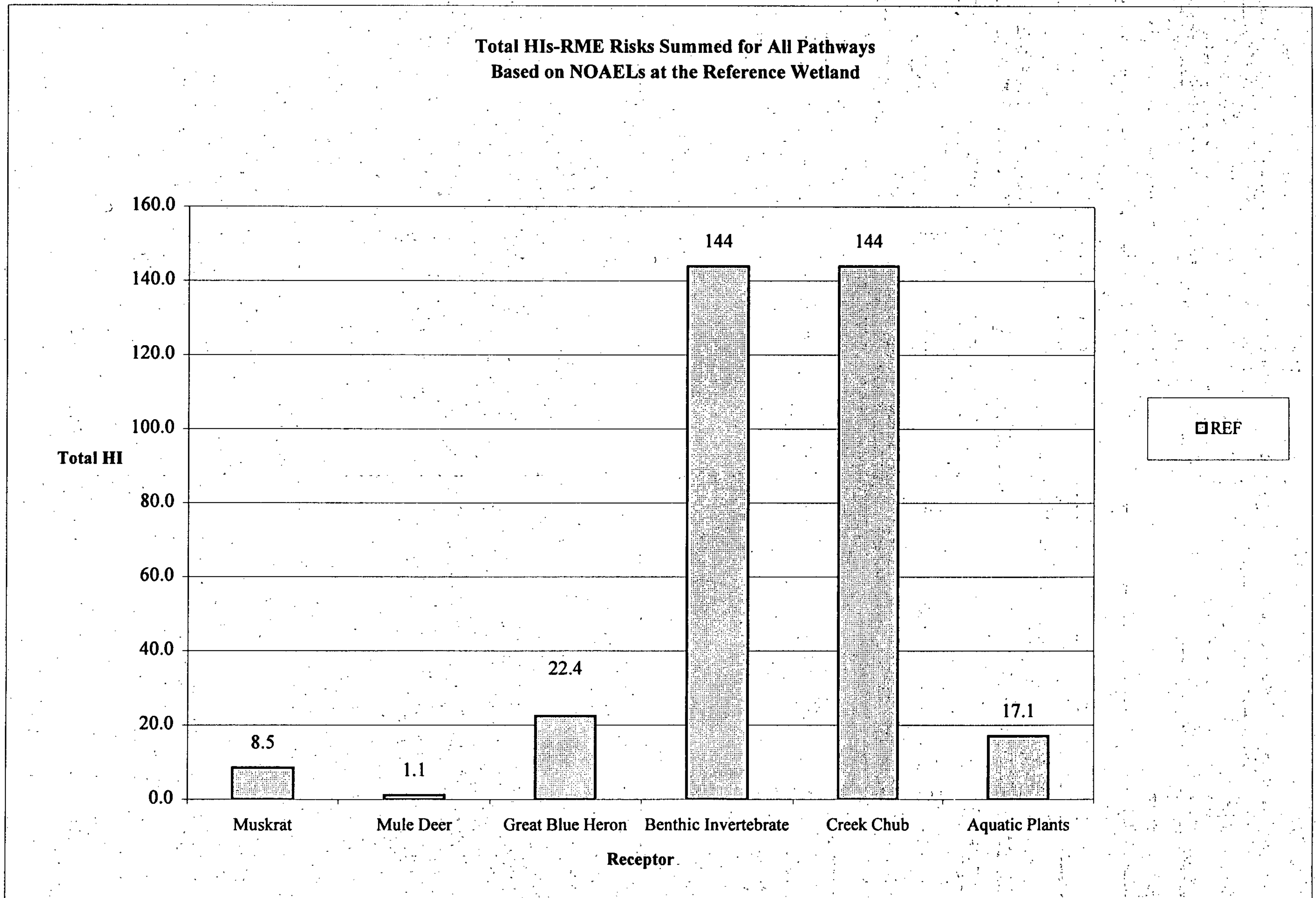

Total HIs-RME Risks Summed for All Pathways
Based on LOAELs at the New Rifle Wetland
25.0
20.0
15.0
10.0
5.0
0.0
Total HI
7.3
0.9
1.6
20.8
20.8
0.0
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
NRW
REF

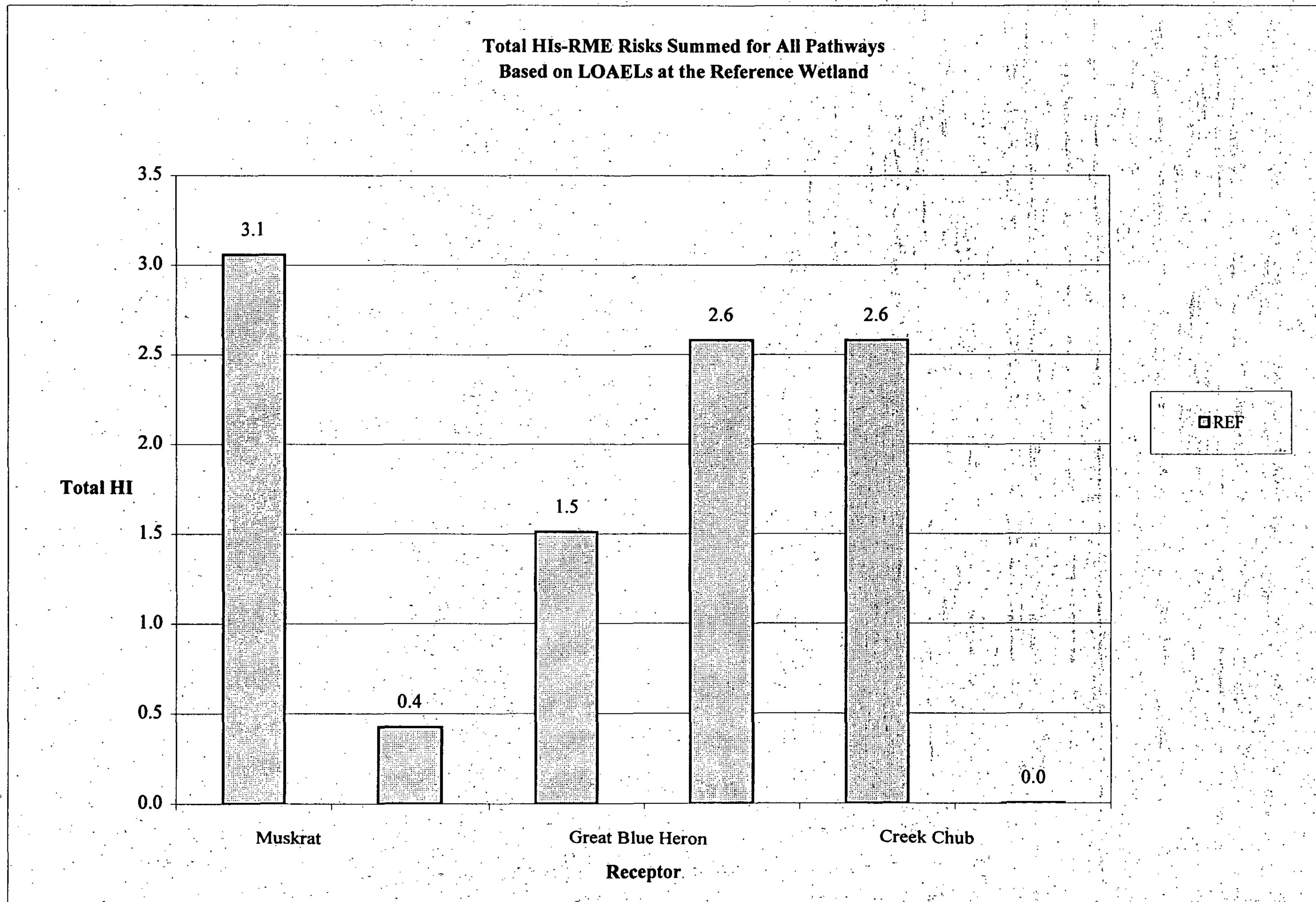


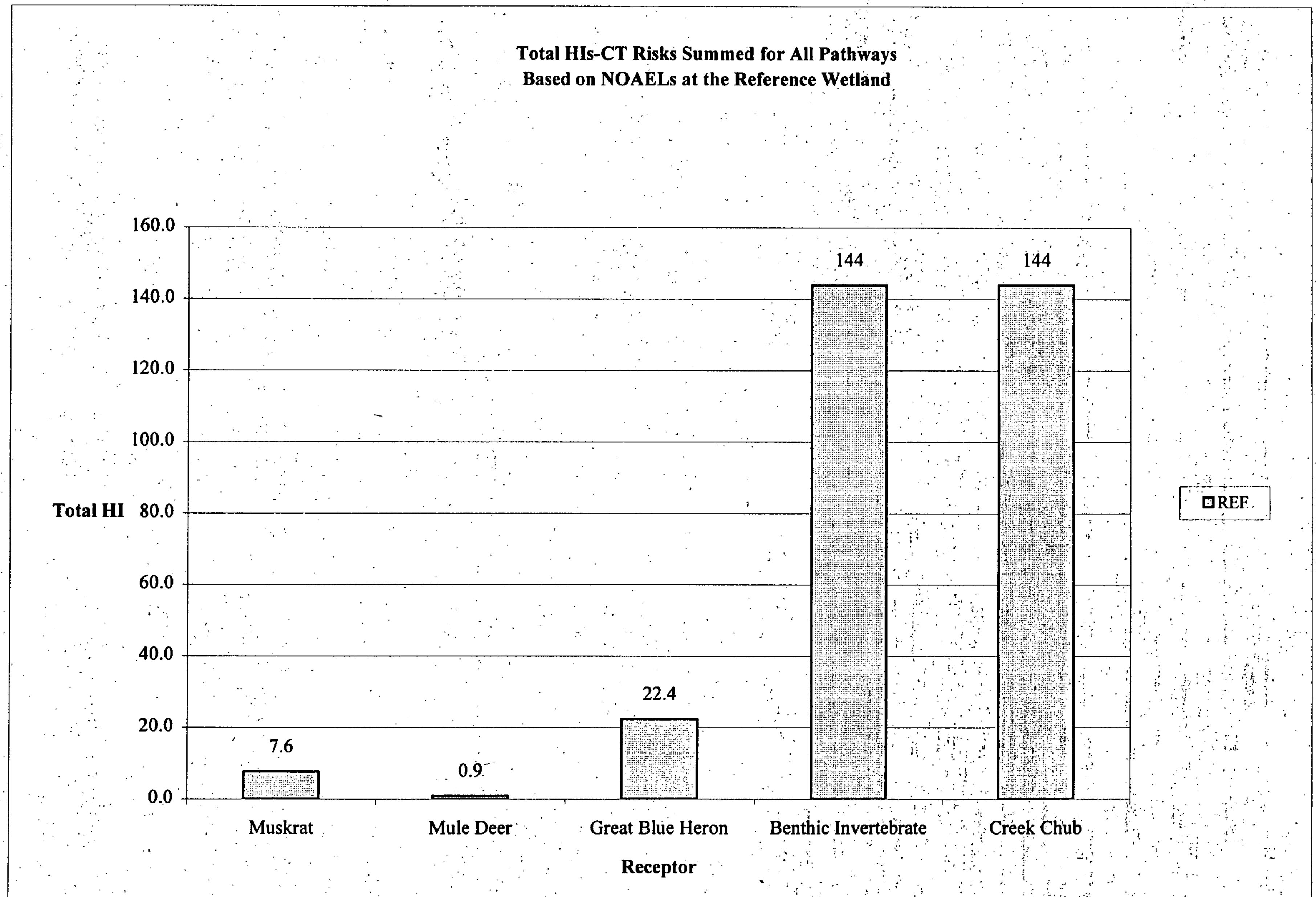
Total HIs-CT Risks Summed for All Pathways
Based on NOAELs at the New Rifle Wetland
300
250
200
Total HI 150
100
50
0
261
261
23.5
2.4
23.6
NRW
REF
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor

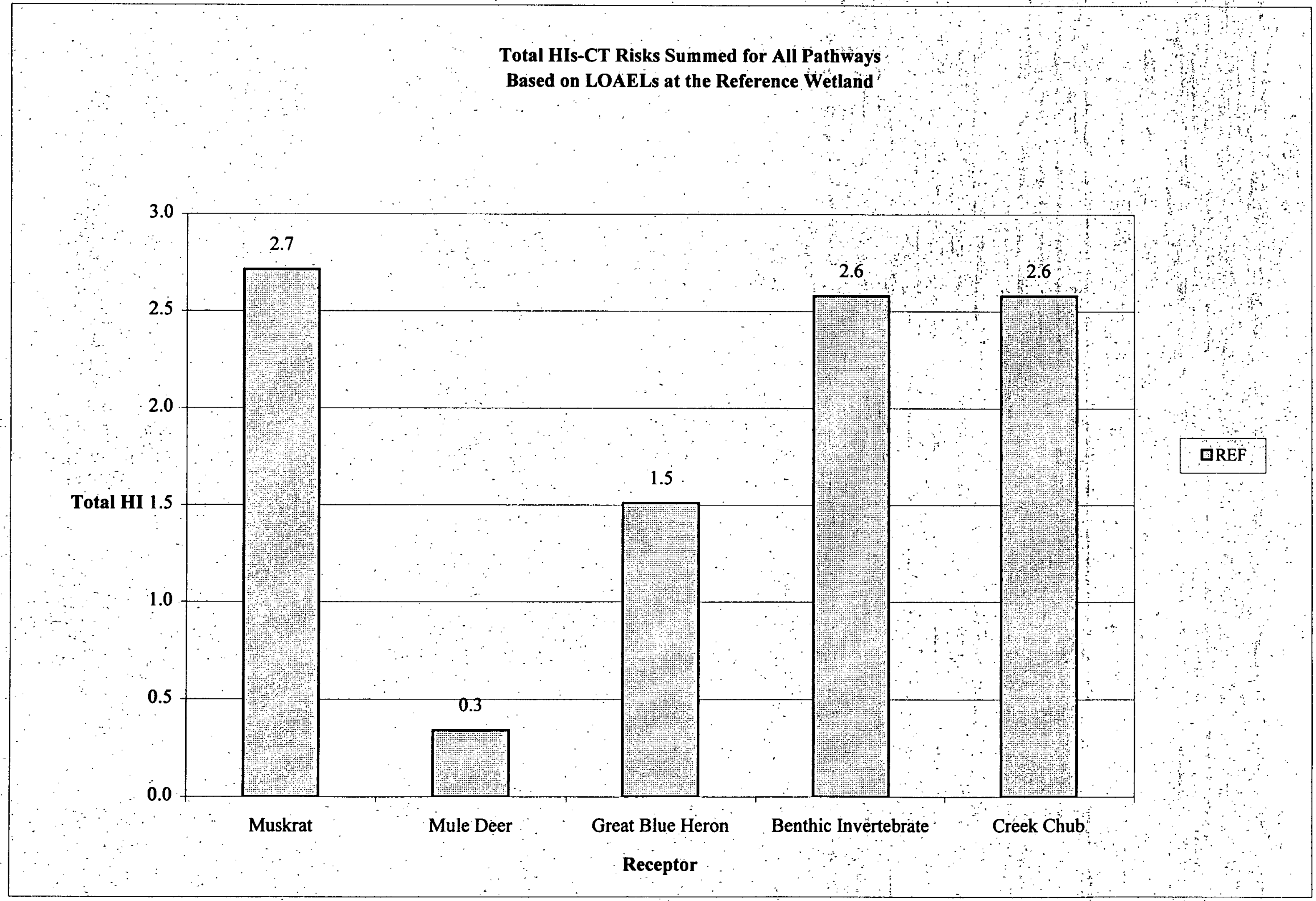


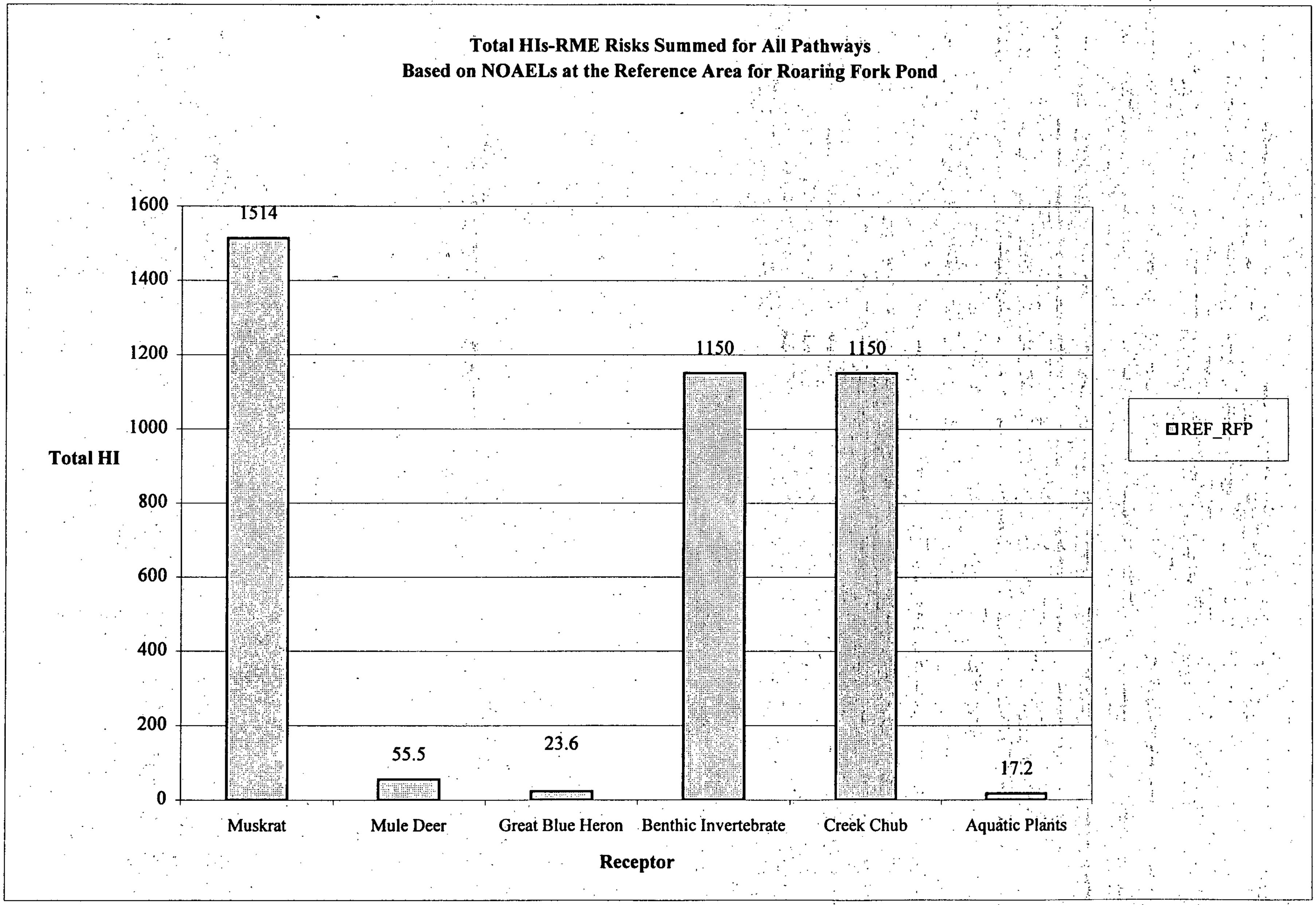
Total HIs-CT Risks Summed for All Pathways
Based on LOAELs at the New Rifle Wetland
25.0
20.0
15.0
10.0
5.0
0.0
Total HI
6.5
0.7
1.6
20.8
20.8
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
NRW
REF

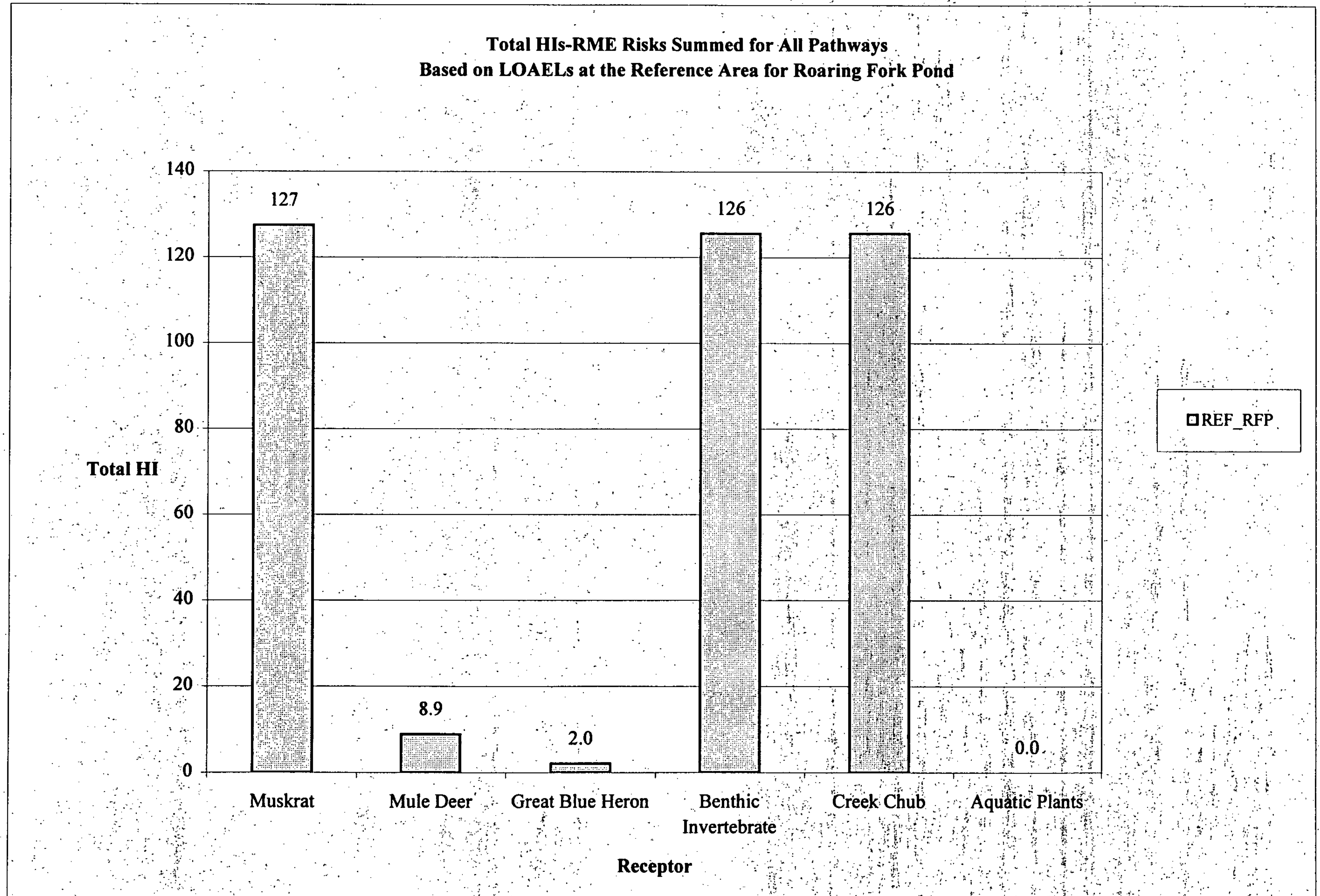

Total HIs-RME Risks Summed for All Pathways
Based on NOAELs at the Reference Wetland
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Total HI
8.5
1.1
22.4
144
144
17.1
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
REF

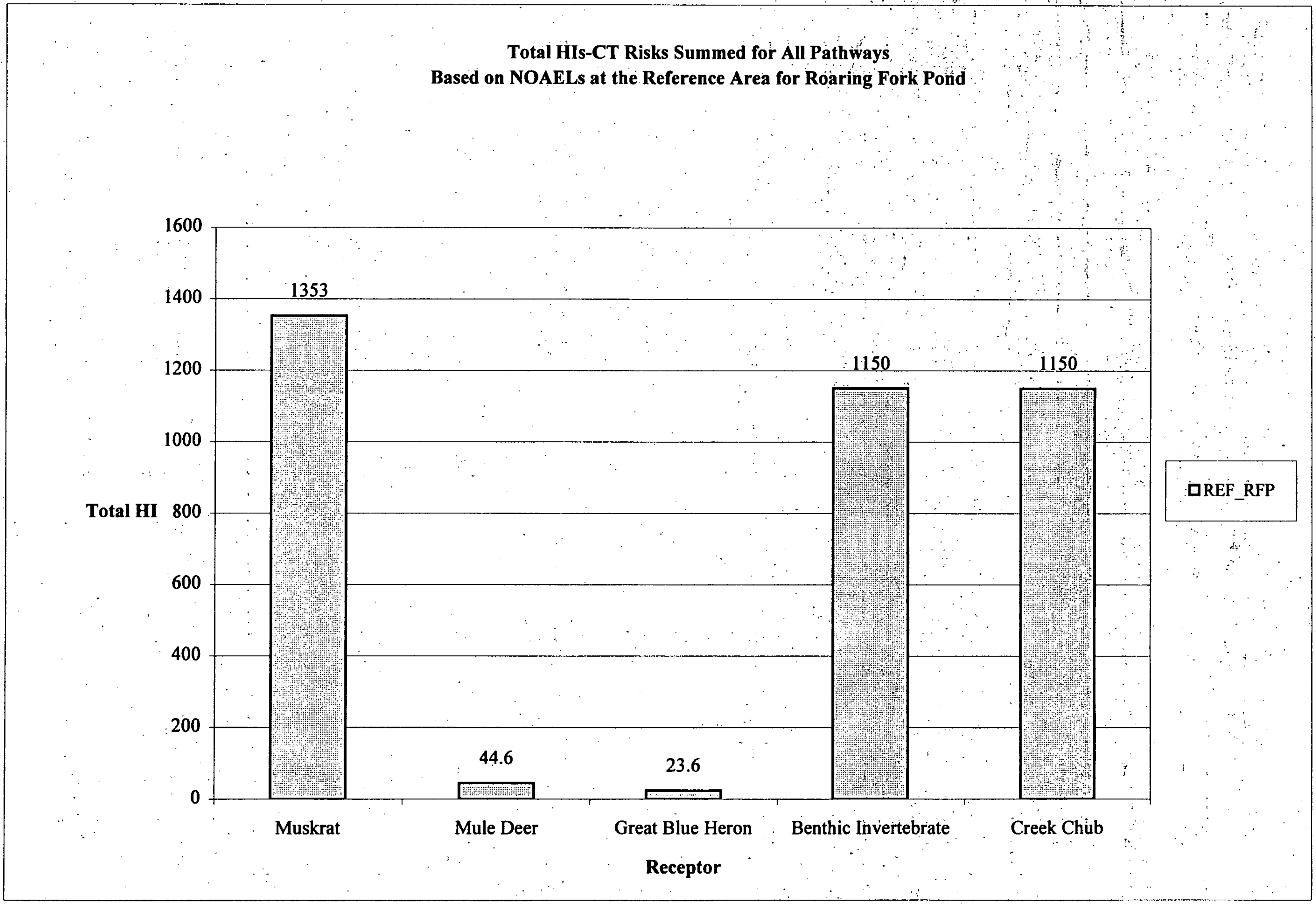

Total HIs-RME Risks Summed for All Pathways
Based on LOAELs at the Reference Wetland
Total HI
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
3.1
0.4
1.5
2.6
2.6
0.0
Muskrat
Great Blue Heron
Creek Chub
Receptor
REF

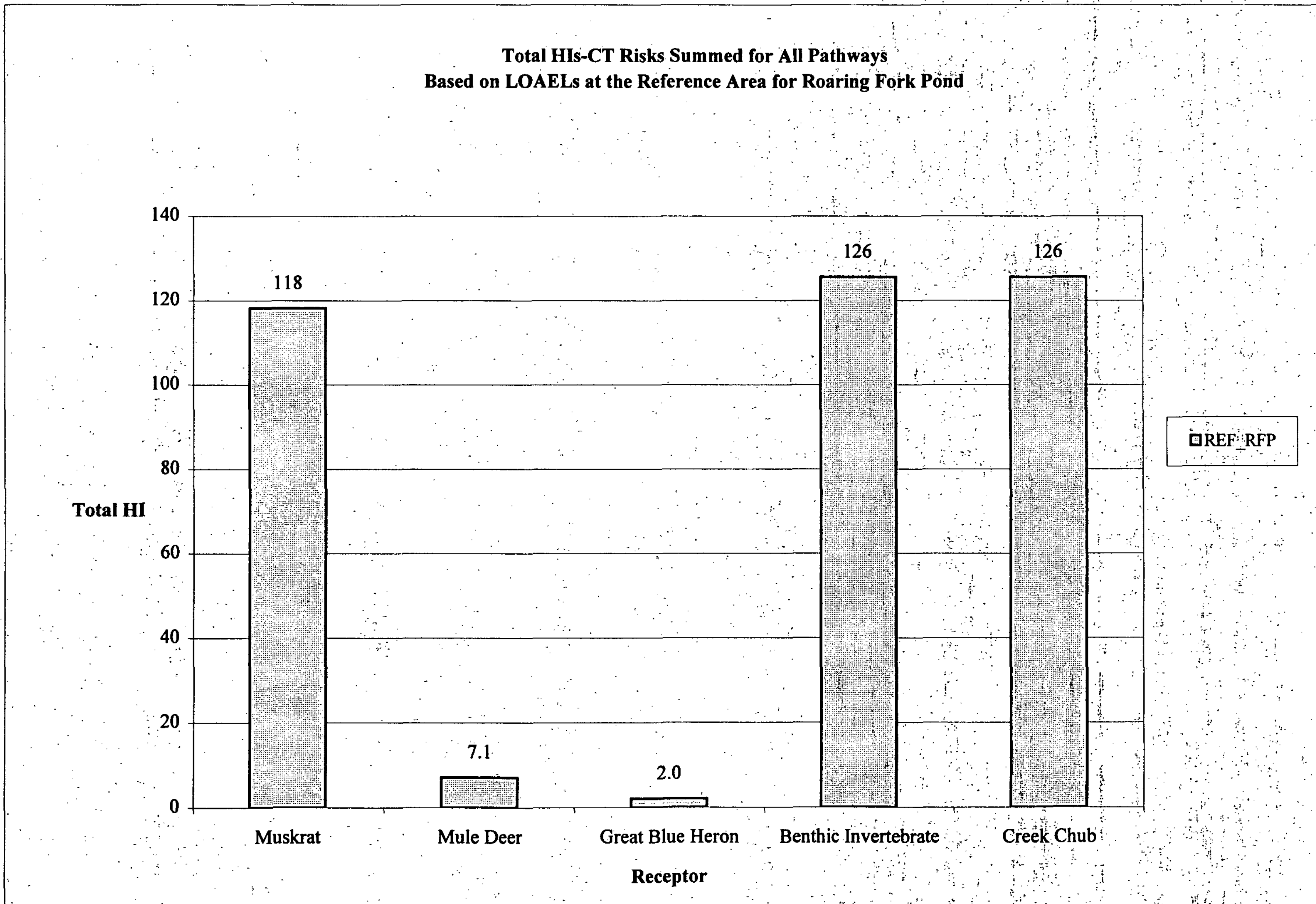

Total HIs-CT Risks Summed for All Pathways
Based on NOAELs at the Reference Wetland
Total HI
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
7.6
0.9
22.4
144
144
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
REF


Total HIs-CT Risks Summed for All Pathways
Based on LOAELs at the Reference Wetland
3.0
2.5
2.0
Total HI 1.5
1.0
0.5
0.0
2.7
0.3
1.5
2.6
2.6
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
REF

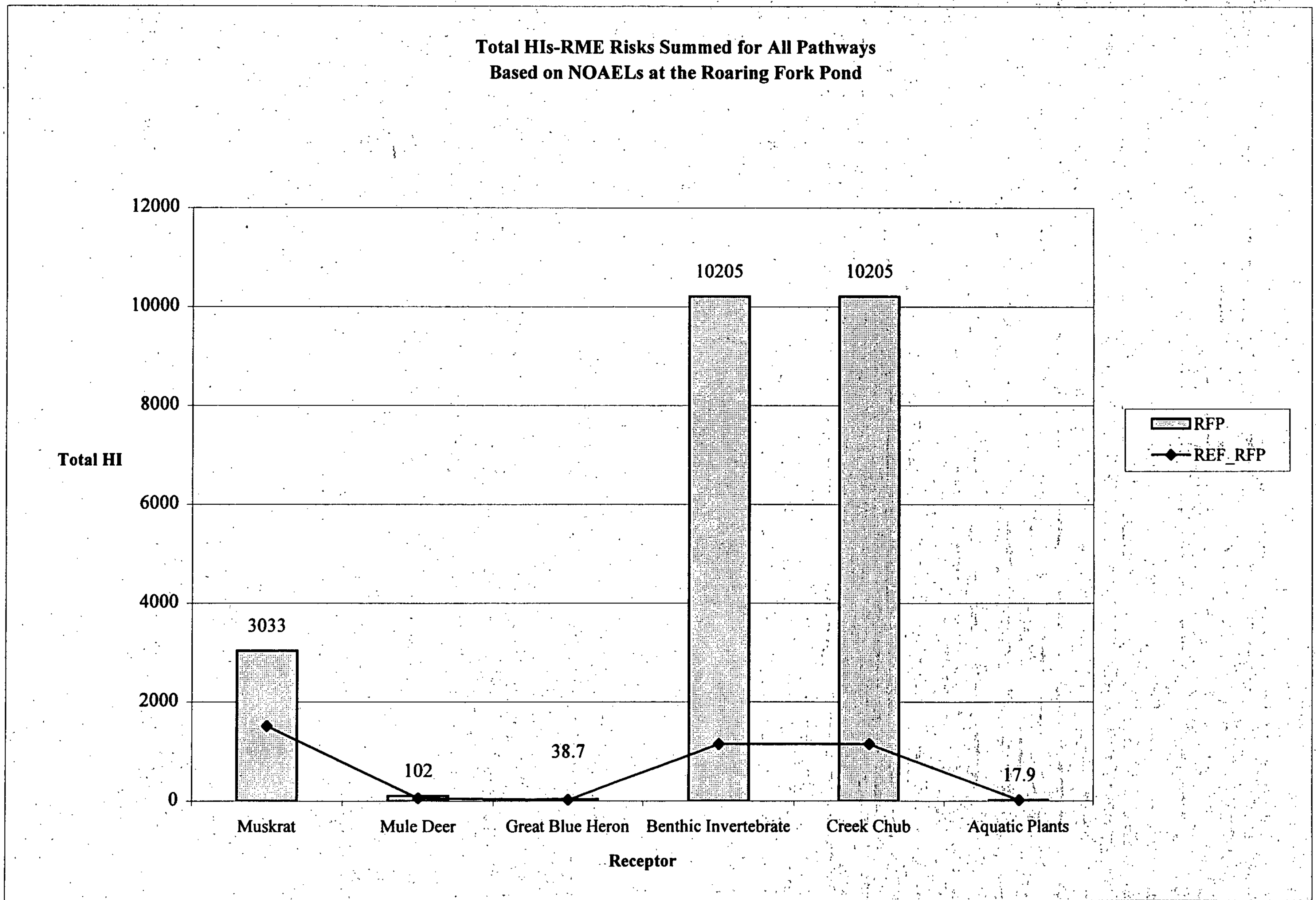

Total HIs-RME Risks Summed for All Pathways
Based on NOAELs at the Reference Area for Roaring Fork Pond
Total HI
0
200
400
600
800
1000
1200
1400
1600
1514
55.5
23.6
1150
1150
17.2
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
REF_RFP


Total HIs-RME Risks Summed for All Pathways
Based on LOAELs at the Reference Area for Roaring Fork Pond
Total HI
0
20
40
60
80
100
120
140
127
8.9
2.0
126
126
0.0
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
REF_RFP

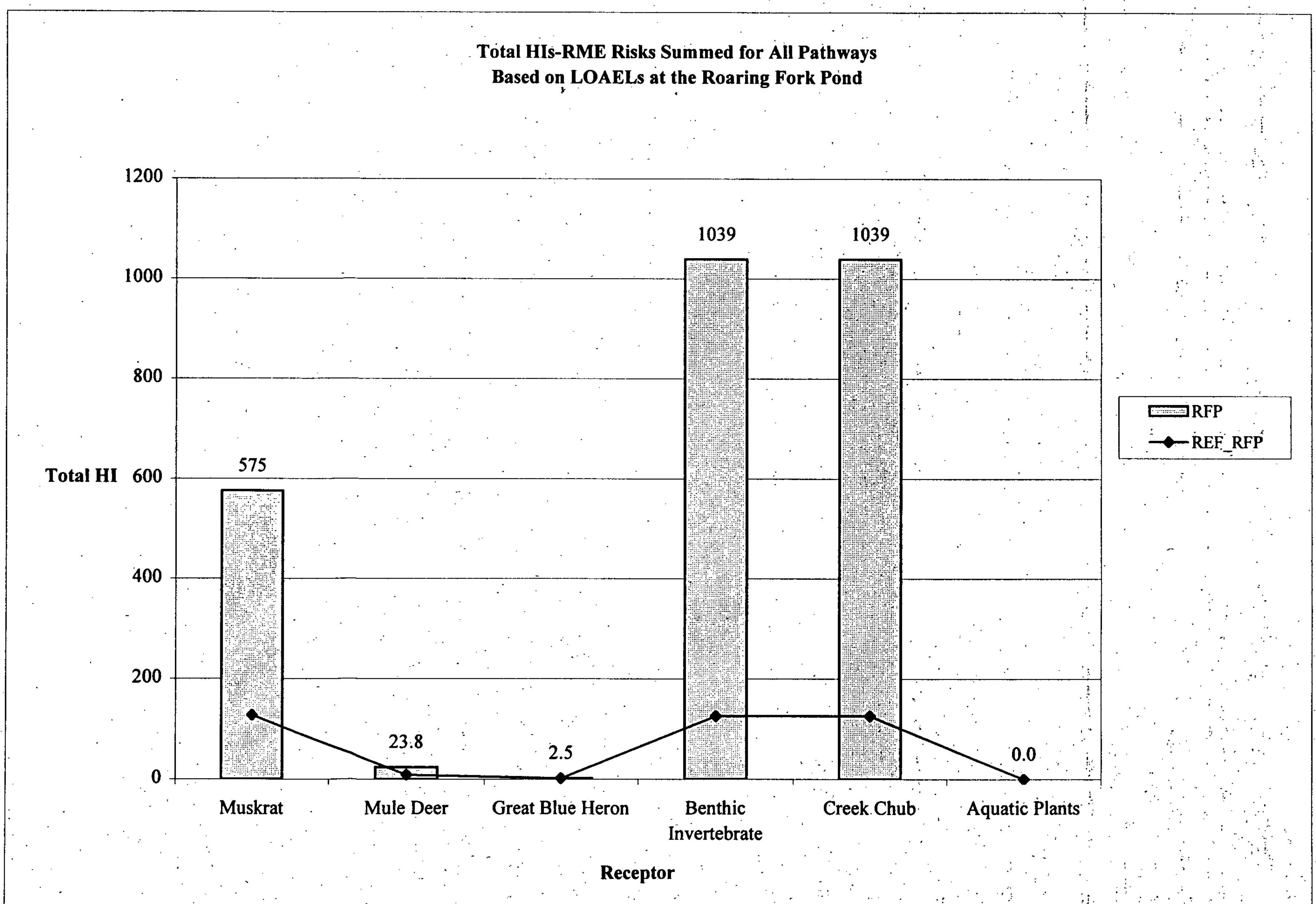

Total HIs-CT Risks Summed for All Pathways
Based on NOAELs at the Reference Area for Roaring Fork Pond
Total HI
1600
1400
1200
1000
800
600
400
200
0
1353
44.6
23.6
1150
1150
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
REF_RFP



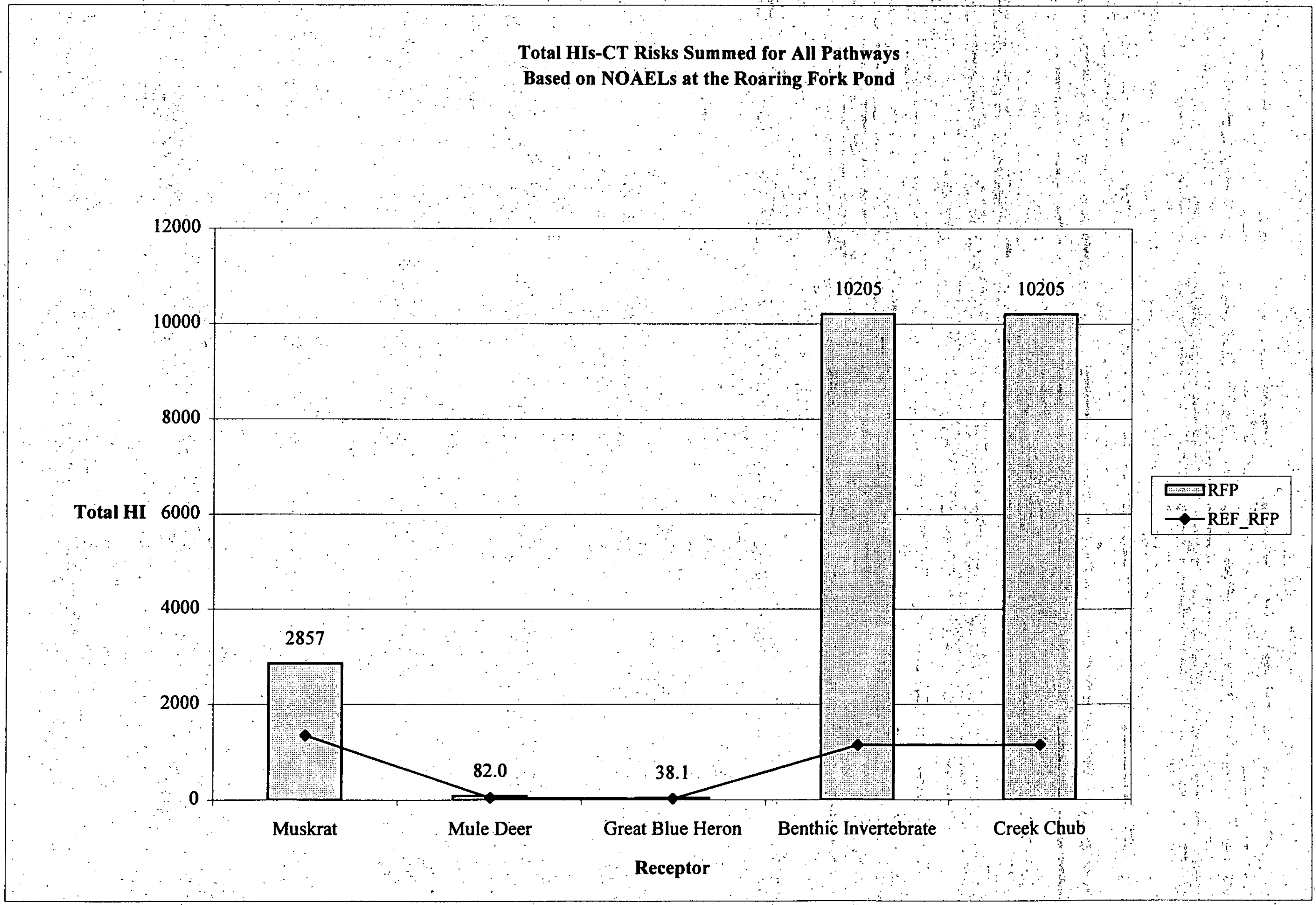
Total HIs-CT Risks Summed for All Pathways
Based on LOAELs at the Reference Area for Roaring Fork Pond
Total HI
140
120
100
80
60
40
20
0
118
7.1
2.0
126
126
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
REF_RFP

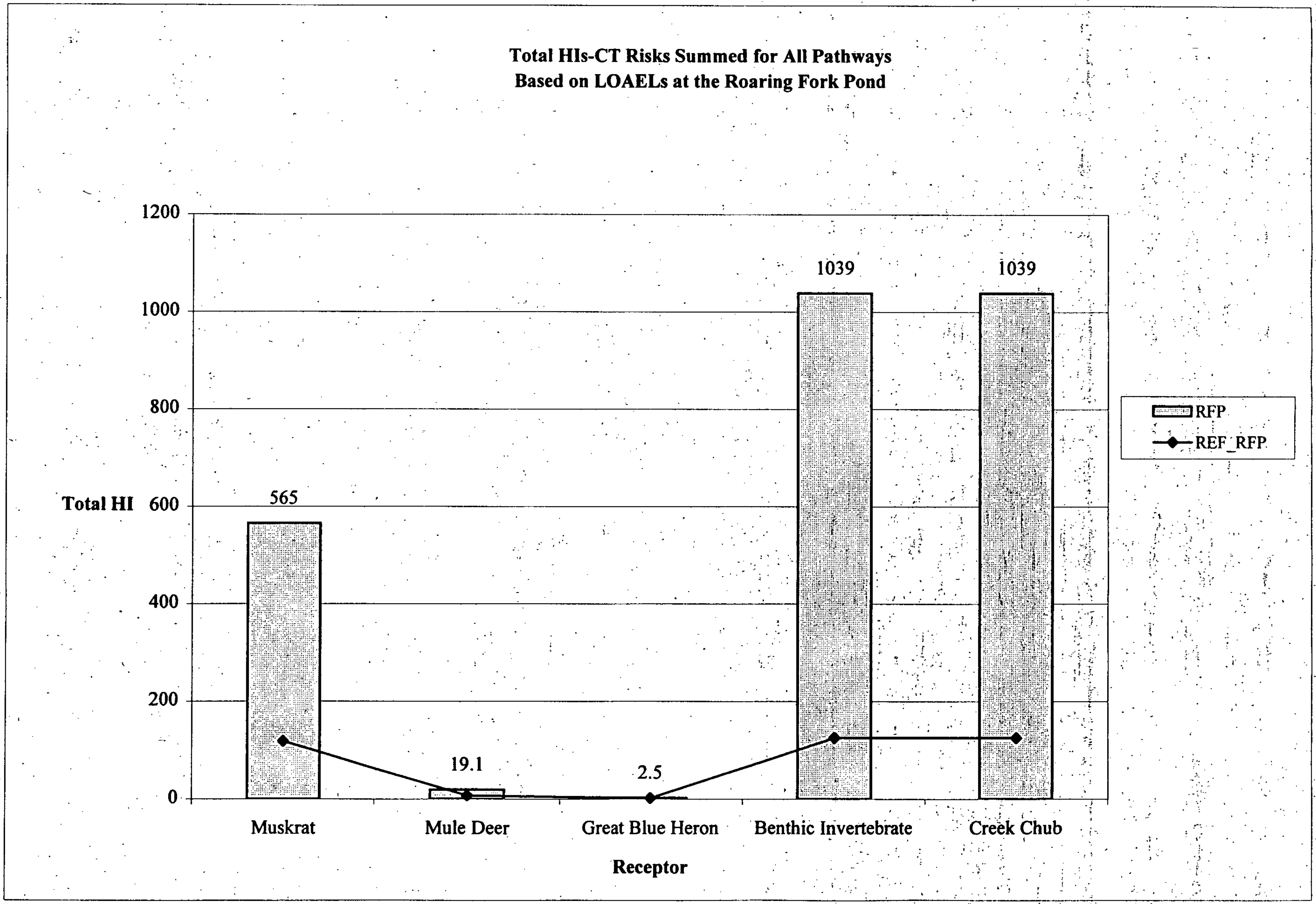


Total HIs-RME Risks Summed for All Pathways
Based on NOAELs at the Roaring Fork Pond
12000
10000
8000
6000
4000
2000
0
Total HI
3033
102
38.7
10205
10205
17.9
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
RFP
REF_RFP



Total HIs-RME Risks Summed for All Pathways
Based on LOAELs at the Roaring Fork Pond
1200
1000
800
600
400
200
0
Total HI
575
23.8
2.5
1039
1039
0.0
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Aquatic Plants
Receptor
RFP
REF_RFP


Total HIs-CT Risks Summed for All Pathways
Based on NOAELs at the Roaring Fork Pond
Total HI
12000
10000
8000
6000
4000
2000
0
2857
82.0
38.1
10205
10205
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
RFP
REF_RFP


Total HIs-CT Risks Summed for All Pathways
Based on LOAELs at the Roaring Fork Pond
Total HI
1200
1000
800
600
400
200
0
565
19.1
2.5
1039
1039
Muskrat
Mule Deer
Great Blue Heron
Benthic Invertebrate
Creek Chub
Receptor
RFP
REF_RFP

Technical Task Cover Sheet

Discipline Hydrology **Number of Sheets** 12

Project:
UMTRA Ground Water

Site:
New Rifle

Subject:
Horizontal and Vertical Ground Water Gradient Calculation for New Rifle

Sources of Data:

USDOE, 1996. Site Observational Work Plan for the UMTRA Project Sites at Rifle, Colorado, Rev. 0.
USDOE, 1999. Final Site Observational Work Plan for the UMTRA Project Old Rifle Site

Task Order No. MAC99-05 File Index No. GWRFL13.1

Proj. No. 331404002 Calc. No. U0060500 Supersedes Calc. No.

Calculated by	Date	Checked by	Date	Approved by	Date
K W Rel	9/20/99	Kent Kupp	9/20/99	Roberta C [illegible]	9/20/99

mactec-ers
U.S. Department of Energy Grand Junction Office

Horizontal and Vertical Ground Water Gradient Calculations for New Rifle

Objective

Determinations of horizontal and vertical ground water gradients are necessary for complete characterization of the ground water flow system at the New Rifle site. The horizontal ground water hydraulic gradient and associated flow direction provides insight into contaminant transport within the flow system. The calculation of the vertical ground water gradient will determine the extent to which flow from the underlying Wasatch aquifer impacts the alluvial aquifer.

Horizontal Ground Water Gradient of the Alluvial Aquifer

Procedure

Water level data collected from 32 alluvial wells (Figure 1) were used to determine the horizontal ground water gradient at various times of the year. These data were measured by hand using a well sounder or collected using pressure transducers connected to a data logger.

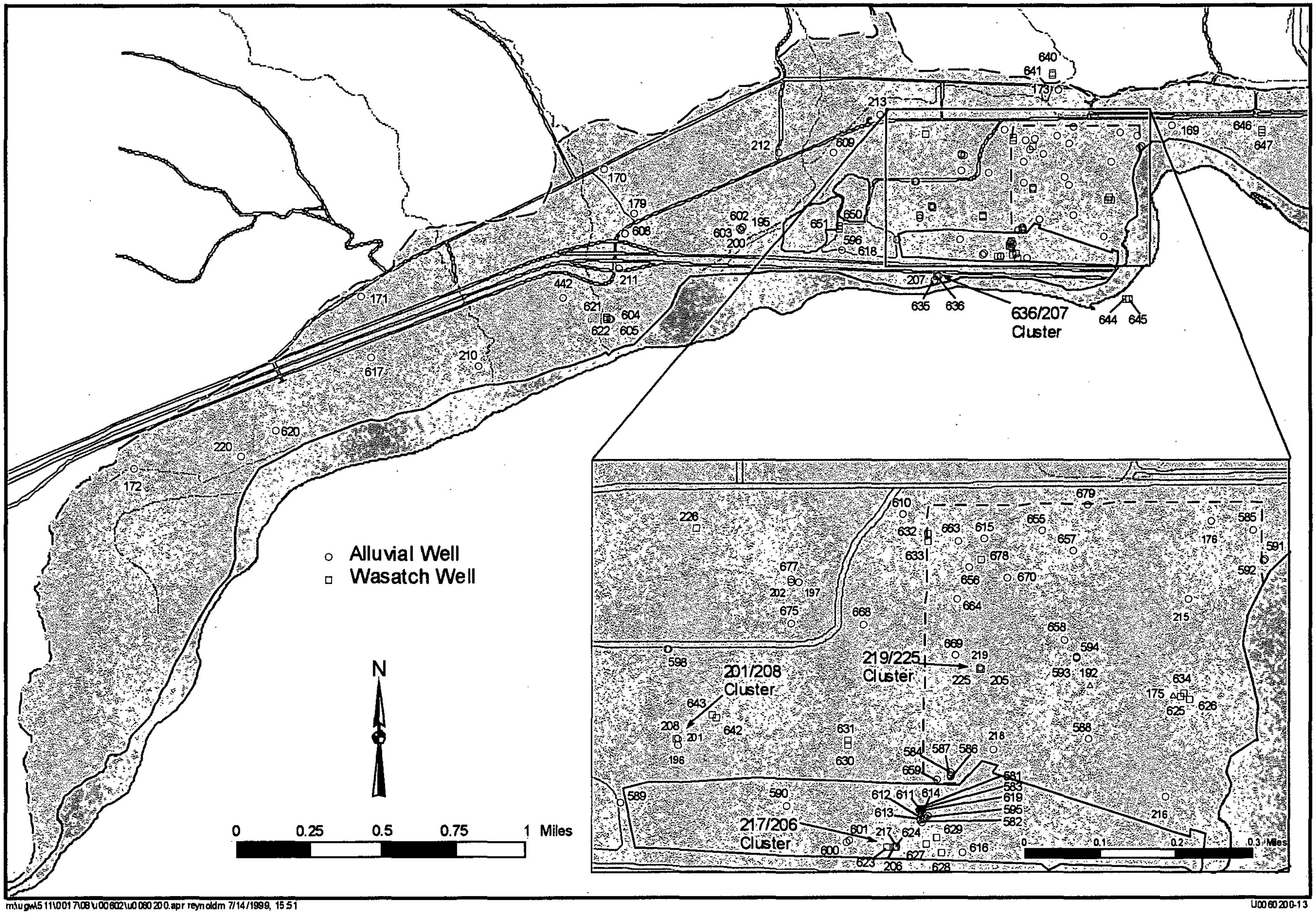
Depth-to-water measurements were converted into ground water elevations, and the data were entered into SURFER (Golden Software, Version 6.04.27) to generate contour maps. These maps were generated using data collected within a 24-hr period. The alluvial aquifer ground water surface elevation is influenced by the Colorado River stage represented by the hydrograph contained in the Old Rifle SOWP (DOE 1999). The contour map of the May 1999 alluvial aquifer ground water surface is shown as Figure 2 and represents the data collected during the highest river stage of the nearby Colorado River. Figure 3 is the ground water surface contour map generated using alluvial well water level data collected in July 1998, which represents the approximate average Colorado River stage.

Ground water flow lines (which represent the ground water flow direction) were drawn perpendicular to the contours. As shown on each map, the ground water surface is influenced by the gravel pit dewatered excavation and overflow pond. Flow lines were drawn east of the area affected by the dewatering activities and to the west of the dewatered excavation.

The gradient was calculated by dividing the elevation difference by the distance between the contour lines along the flow line. These gradient values have the units of ft/ft, and are therefore considered unitless. All historical water level data collected from the alluvial wells used to generate these maps are included at the end of this calculation.

Results

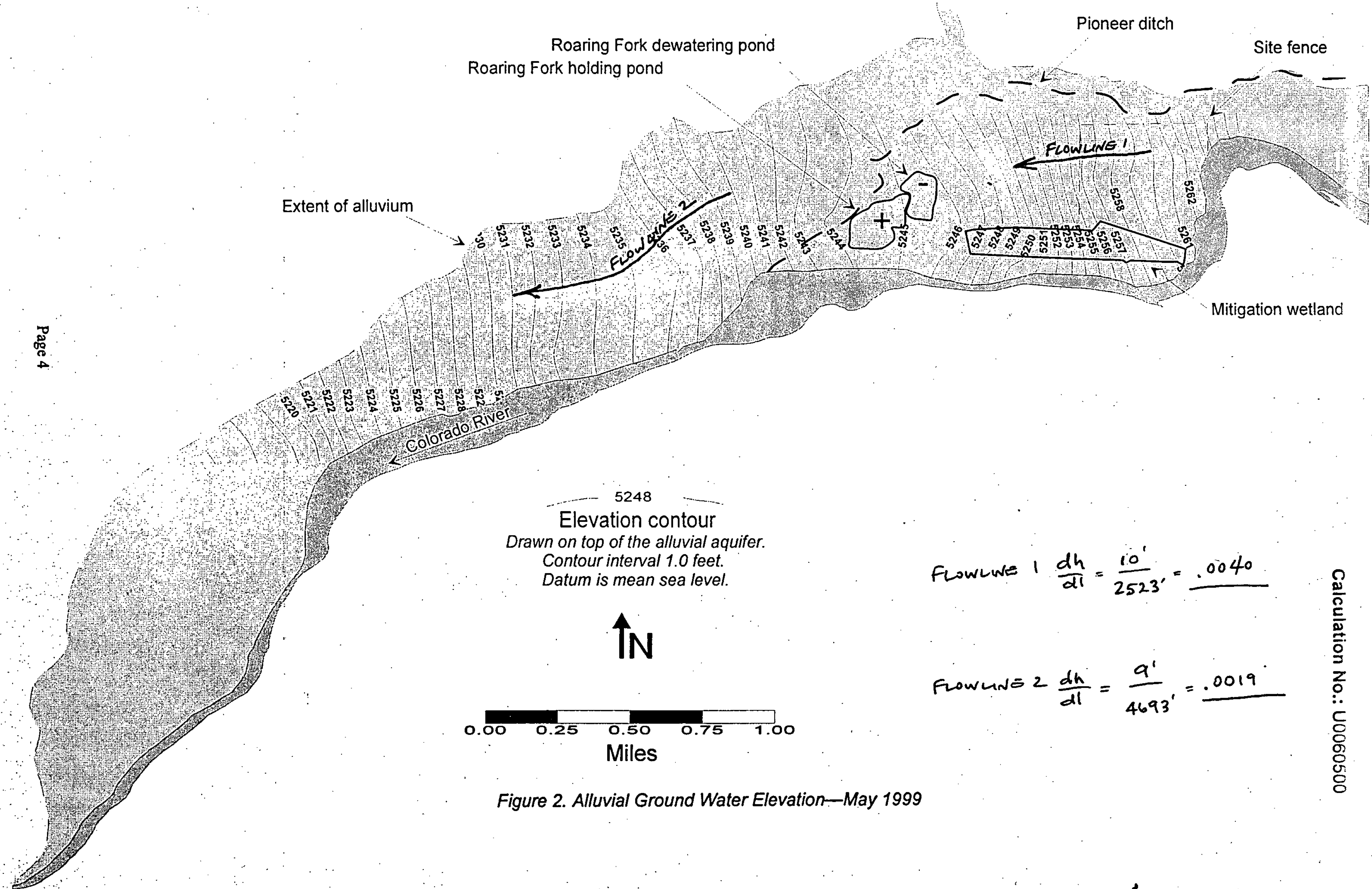
Interpretation of the water level data collected from the alluvial wells during July 1998 and May 1999 (Table 1) indicate the ground water flow within the alluvial aquifer is towards the west-southwest with a gradient between 0.0019 to 0.0040. Gradients near the higher end of the range were associated with the area to the east of the dewatered excavation. The ground water flow direction and gradient presented in this calculation are consistent with the historical ground water flow direction and gradient range determined by previous investigations (SOWP 1996).



Alluvial Well
Wasatch Well
N
0 0.25 0.5 0.75 1 Miles
636/207 Cluster
219/225 Cluster
201/208 Cluster
217/206 Cluster
0 0.1 0.2 0.3 Miles
213
212
609
170
179
608
602
195
603
200
651
650
596
618
211
442
621
604
622
605
171
617
210
620
220
172
207
635
636
644
645
640
641
173
169
646
647
610
679
226
632
633
663
615
655
657
585
176
591
592
678
677
202
197
656
670
664
675
668
215
658
669
219
594
598
225
205
593
192
634
175
625
626
643
642
208
201
196
631
630
218
588
584
587
586
659
681
583
619
595
582
589
590
612
611
614
613
216
601
217
624
629
600
623
206
627
628
616
m:\ugw\511\0017\08\u00602\u0060200.apr reynoldm 7/14/1999, 15:51
U0060200-13

Figure 1.

Alluvial Ground Water Elevation - May 1999



5248

Elevation contour

Drawn on top of the alluvial aquifer.
Contour interval 1.0 feet.
Datum is mean sea level.

N

0.00 0.25 0.50 0.75 1.00

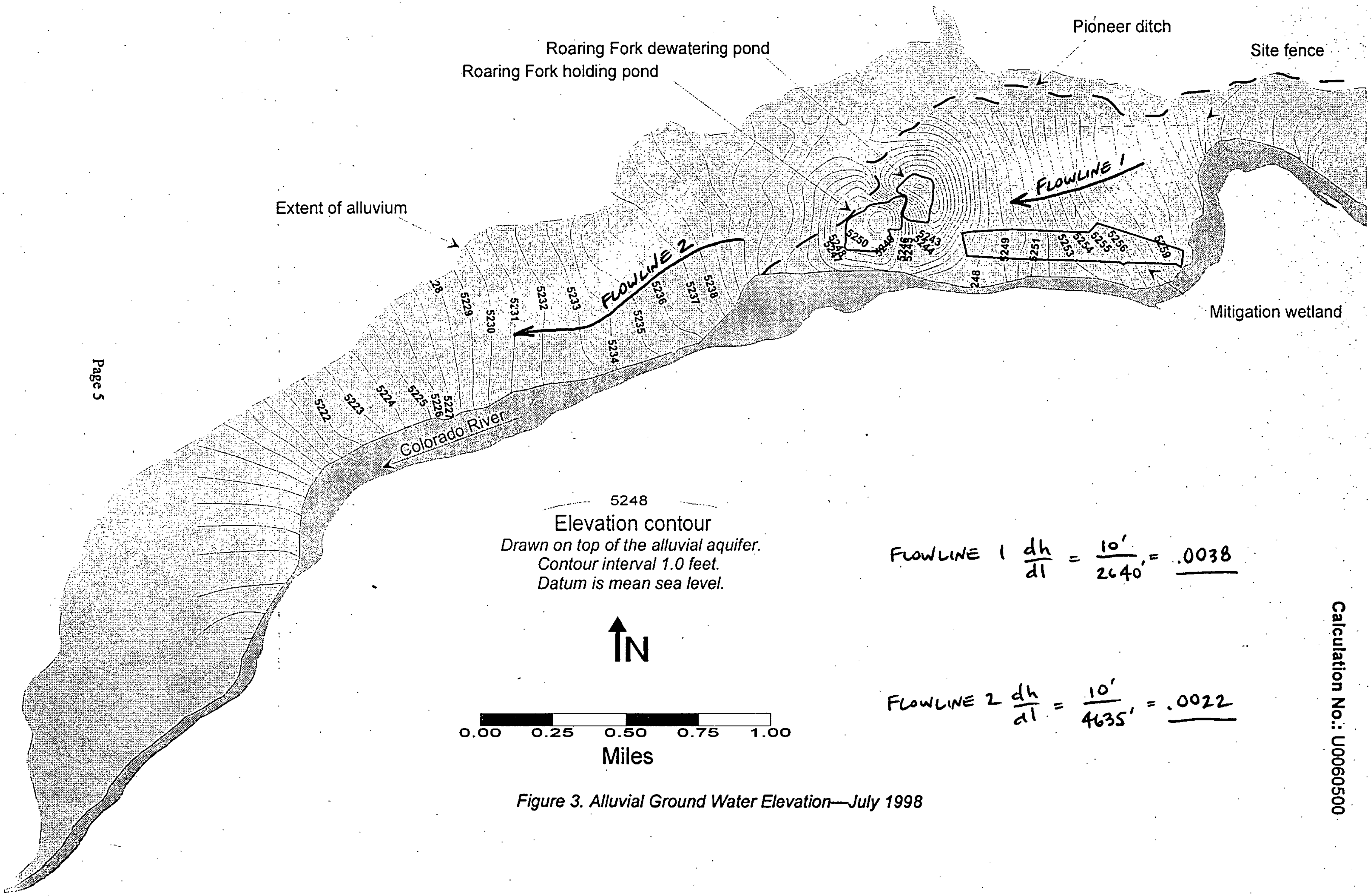
Miles

FLOWLINE 1 $\frac{dh}{dl} = \frac{10'}{2523'} = \underline{.0040}$

FLOWLINE 2 $\frac{dh}{dl} = \frac{9'}{4693'} = \underline{.0019}$

Figure 2. Alluvial Ground Water Elevation—May 1999

Alluvial Ground Water Elevation - July 1998



FLOWLINE 1 $\frac{dh}{dl} = \frac{10'}{2640'} = \underline{.0038}$

FLOWLINE 2 $\frac{dh}{dl} = \frac{10'}{4635'} = \underline{.0022}$

Figure 3. Alluvial Ground Water Elevation—July 1998

Table 1. Results of Horizontal Ground Water Gradient Calculations

Date	Ground Water Gradient East of the Dewatered Excavation	Ground Water Gradient West of the Dewatered Excavation
July 1998	0.0038	0.0022
May 1999	0.0040	0.0019

Horizontal Ground Water Gradient of the Wasatch Aquifer

Procedure

There are 29 wells screened over various depths of the Wasatch aquifer in the vicinity of the New Rifle site. The construction of a potentiometric map using water level data from all 29 wells would be impractical since these wells are screened over different flow zones within the Wasatch aquifer. A review of the boring logs and well completion diagrams indicate 13 wells across the site are screened over approximately the same depth and flow zone within the Wasatch aquifer.

Water level data were collected by hand using a well sounder or collected using pressure transducers connected to a data logger. In turn, these depth-to-water measurements were converted into ground water elevations and entered into SURFER to generate contour maps. These maps represent the potentiometric surface of the upper flow zone of the Wasatch aquifer. Potentiometric maps were generated from data collected during May 1999 (Figure 4) and March 1999 (Figure 5), which represent the time periods of high and low flow of the Colorado River (DOE 1999), respectively. Data were not available for the average river stage time period

A single flow line (which represents the ground water flow direction) was drawn perpendicular to the contours on each map. The gradient was calculated by dividing the elevation difference by the distance between the contour lines along this flow line. These gradient values have the units of ft/ft, and are therefore considered unitless. Water level data collected from Wasatch wells used to generate these maps are included at the end of this calculation.

Results

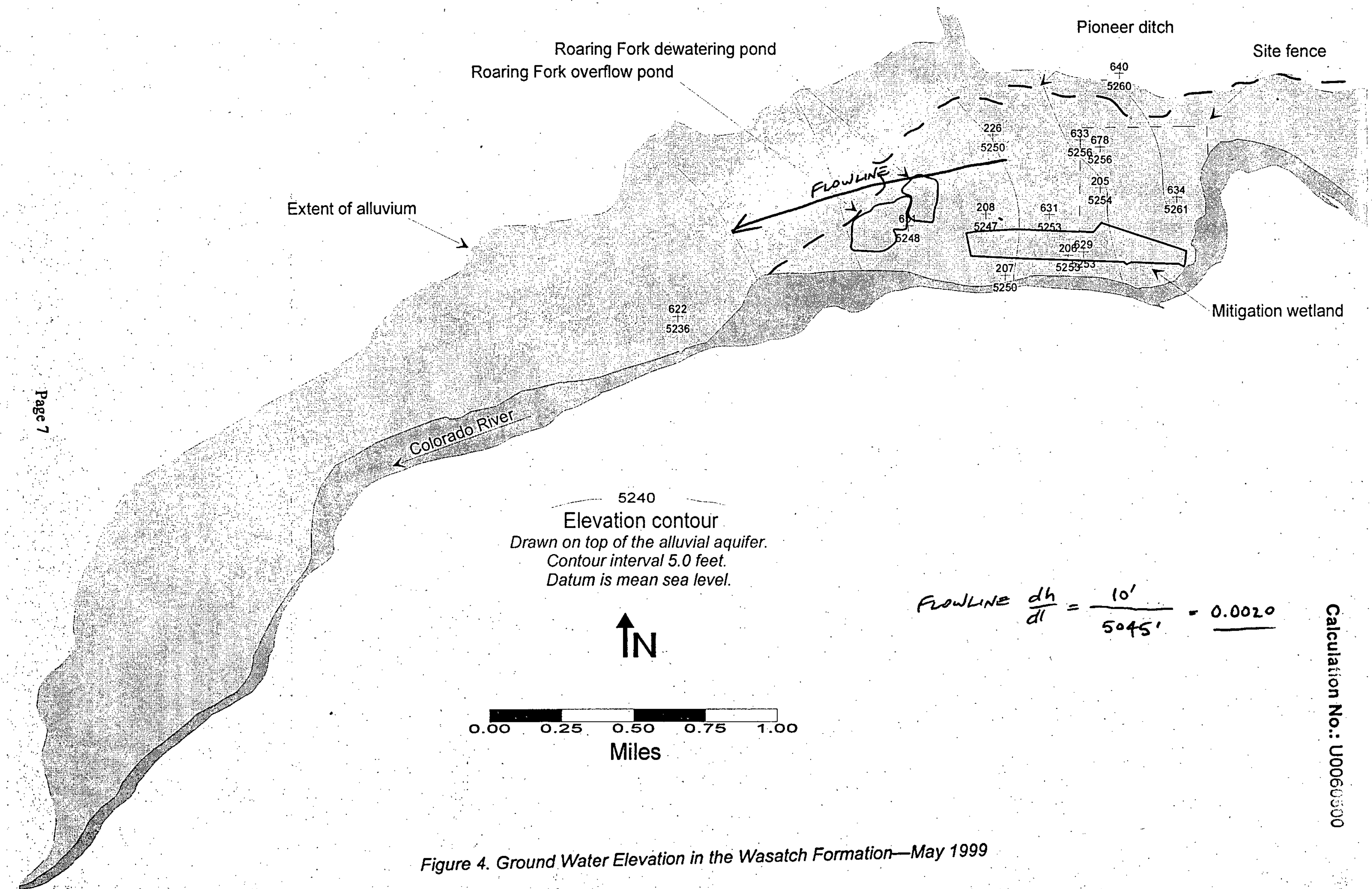
Analysis of the data indicate the ground water flow within the upper zone of the Wasatch aquifer is towards the west-southwest with a gradient of 0.0020. This value falls within the horizontal gradient range determined by previous investigations (SOWP 1996).

Vertical Ground Water Gradients

Procedure

The vertical gradient between the alluvial and Wasatch aquifers at Old Rifle was calculated using water levels measured at four locations where well clusters are present. These locations include well clusters 201/208, 636/207, 217/206, and 219/225 (locations shown on Figure 1). Wells 201, 636, 217, and 219 are all screened over the alluvial aquifer, while wells 208, 207, 206, and 225 are all screened within the shallow portion of the Wasatch aquifer.

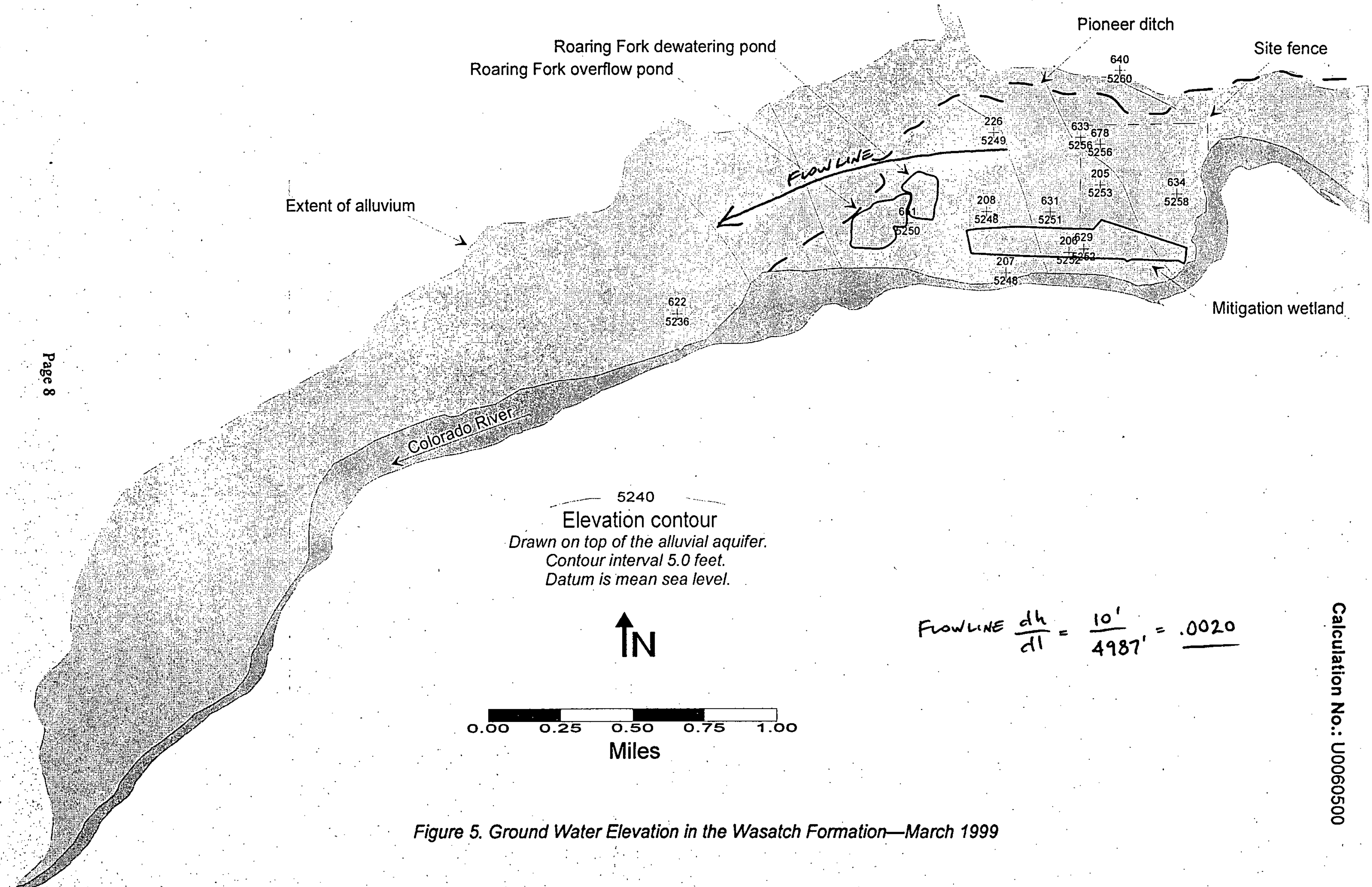
Ground Water Elevation in the Wasatch Formation - May 1999



FLOWLINE $\frac{dh}{dl} = \frac{10'}{5045'} = \underline{0.0020}$

Figure 4. Ground Water Elevation in the Wasatch Formation—May 1999

Ground Water Elevation in the Wasatch Formation - March 1999



FLOWLINE $\frac{dh}{dl} = \frac{10'}{4987'} = \underline{.0020}$

Figure 5. Ground Water Elevation in the Wasatch Formation—March 1999

Water levels were measured either by hand using a well sounder or by pressure transducer in each of the wells. The water level data were imported to a spreadsheet (Table 2) and converted from depth-to-water to ground water surface elevation (ft MSL). The head difference between the elevations measured at nearly the same time (within 24 hours) are listed in Table 2. These data in turn were used to determine the vertical hydraulic gradient by dividing the head difference by the distance between the mid-point of the screened intervals for the associated wells. Similar to the horizontal gradients, these vertical gradient values have the units of ft/ft, and are therefore considered unitless.

Results

A negative gradient value indicates an upward ground water flow direction. According to Table 2, the average of the data collected from the 201/208 well cluster indicate essentially no vertical flow was present between the alluvial and Wasatch aquifers. On average there is an upward vertical gradient in the vicinity of the 636/207 well cluster, and a vertical downward gradient in the vicinity of the 217/206 and 219/225 well clusters.

Table 2. Ground Water Vertical Gradient Calculations—New Rifle
Negative Value Indicates Upward Gradient

201/208 CLUSTER						
well	tos elev	bos elev	mid pt elev		diff scrn	
201	5250.9	5236.4	5243.7		midpt	
208	5231.1	5221.3	5226.2		17.4	
	WELL 201 ALLUVIAL		WELL 208 WASATCH			
DATE	DTW	GW ELEV	DTW	GW ELEV	HD DIFF	GRAD
8/20/98	13.78	5247.29	13.38	5247.4	-0.11	-0.0063
10/22/98	13.73	5247.34	13.4	5247.38	-0.04	-0.0023
11/24/98	13.7	5247.37	13.29	5247.49	-0.12	-0.0069
12/30/98	13.8	5247.27	13.48	5247.3	-0.03	-0.0017
1/20/99	13.79	5247.28	13.45	5247.33	-0.05	-0.0029
3/3/99	13.29	5247.78	13.08	5247.7	0.08	0.0046
4/1/99	14.86	5246.21	14.89	5245.89	0.32	0.0184
5/27/99	13.97	5247.1	13.62	5247.16	-0.06	-0.0034
				avg	0.01	-0.0001
636/207 CLUSTER						
well	tos elev	bos elev	mid pt elev		diff scrn	
636	5242.1	5237.1	5239.6		midpt	
207	5223.6	5214.1	5218.9		20.8	
	WELL 636 ALLUVIAL		WELL 207 WASATCH			
DATE	DTW	GW ELEV	DTW	GW ELEV	HD DIFF	GRAD
8/20/98	8.05	5248.19	8.92	5248.01	0.18	0.0087
1/20/99	8.88	5247.36	9.01	5247.92	-0.56	-0.0269
3/3/99	8.84	5247.4	9.32	5247.61	-0.21	-0.0101
4/1/99	9.11	5247.13	9.44	5247.49	-0.36	-0.0173
5/27/99	5.95	5250.29	7.3	5249.63	0.66	0.0317
				avg	-0.06	-0.0028
217/206 CLUSTER						
well	tos elev	bos elev	mid pt elev		diff scrn	
217	5247.9	5232.9	5240.4		midpt	
206	5228.2	5218.37	5223.3		17.1	
	WELL 217 ALLUVIAL		WELL 206 WASATCH			
DATE	DTW	GW ELEV	DTW	GW ELEV	HD DIFF	GRAD
8/20/98	4.7	5252.28	6.18	5252.02	0.26	0.0152
10/22/98	4.75	5252.23	6.27	5251.93	0.3	0.0175
11/24/98	4.62	5252.36	6.18	5252.02	0.34	0.0199
12/30/98	4.85	5252.13	6.38	5251.82	0.31	0.0181
1/20/99	4.98	5252	6.46	5251.74	0.26	0.0152
3/3/99	4.75	5252.23	6.48	5251.72	0.51	0.0298
4/1/99	5.33	5251.65	6.83	5251.37	0.28	0.0164
5/27/99	4.42	5252.56	5.29	5252.91	-0.35	-0.0205
				avg	0.24	0.0140
219/225 CLUSTER						
well	tos elev	bos elev	mid pt elev		diff scrn	
219	5257	5237.4	5247.2		midpt	
225	5234.2	5224.2	5229.2		18.0	
	WELL 219 ALLUVIAL		WELL 225 WASATCH			
DATE	DTW	GW ELEV	DTW	GW ELEV	HD DIFF	GRAD
1/21/99	9.96	5256.62	10.02	5256.95	-0.33	-0.0183
3/3/99	9.95	5256.63	12.52	5254.45	2.18	0.1211
4/22/99	10.2	5256.38	12.24	5254.73	1.65	0.0917
5/27/99	9.28	5257.3	12.45	5254.52	2.78	0.1544
				avg	1.57	0.0872

NOTES: tos elev = top of screen elevation (ft msl)
bos elev = bottom of screen elevation (ft msl)
mid pt elev = screen midpoint elevation (ft msl)
DTW = depth to water (ft below top of casing)
GW ELEV = ground water elevation (ft msl)
HD DIFF = head difference (ft)
GRAD = ground water gradient

Historical Alluvial Aquifer

Water Level Data

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0169	U	5275.47	07/30/1998	09:29	7.14	5268.33
		5275.47	08/20/1998	15:32	7.76	5267.71
		5275.47	01/20/1999	14:34	8.16	5267.31
		5275.47	01/28/1999	15:42	8.19	5267.28
		5275.47	03/03/1999	13:15	8.23	5267.24
		5275.47	04/23/1999	11:25	7.99	5267.48
		5275.47	05/27/1999	13:05	6.80	5268.67
		5275.47	06/09/1999	12:55	6.26	5269.21
		5275.47	06/29/1999	14:20	6.34	5269.13
		5275.47	07/28/1999	14:47	7.45	5268.02
0170	D	5332.97	07/30/1998	15:32	94.05	5238.92
		5332.97	08/20/1998	10:00	94.05	5238.92
		5332.97	09/02/1998	10:41	94.24	5238.73
		5332.97	09/30/1998	10:42	94.26	5238.71
		5332.97	10/22/1998	11:30	94.43	5238.54
		5332.97	11/24/1998	14:02	94.34	5238.63
		5332.97	12/30/1998		94.36	5238.61
		5332.97	01/20/1999	13:30	94.33	5238.64
		5332.97	01/21/1999		94.33	5238.64
		5332.97	03/03/1999	10:52	94.45	5238.52
		5332.97	04/01/1999	10:29	94.59	5238.38
		5332.97	04/22/1999	14:52	94.50	5238.47
		5332.97	05/27/1999	14:22	94.48	5238.49
		5332.97	06/24/1999	10:56	94.20	5238.77
		5332.97	06/29/1999	11:11	94.82	5238.15
		5332.97	07/29/1999	14:25	43.96	5289.01
0171	D	5250.48	07/30/1998	17:22	23.28	5227.20
		5250.48	08/27/1998	10:41	23.44	5227.04
		5250.48	09/02/1998	10:29	23.53	5226.95
		5250.48	09/30/1998	10:21	23.58	5226.90
		5250.48	10/22/1998	11:16	23.66	5226.82
		5250.48	11/24/1998	14:11	23.55	5226.93
		5250.48	12/30/1998		23.54	5226.94
		5250.48	01/21/1999	11:09	23.63	5226.85
		5250.48	01/25/1999	10:30	23.54	5226.94

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0171	D	5250.48	03/03/1999	11:01	23.62	5226.86
		5250.48	04/01/1999	10:40	23.62	5226.86
		5250.48	04/22/1999	14:42	23.53	5226.95
		5250.48	05/27/1999	14:15	23.50	5226.98
		5250.48	06/15/1999	10:14	23.45	5227.03
		5250.48	06/29/1999	11:24	25.32	5225.16
		5250.48	07/29/1999	14:20	23.58	5226.90
0172	D	5229.45	07/30/1998	16:42	13.12	5216.33
		5229.45	08/19/1998	13:37	13.36	5216.09
		5229.45	09/01/1998	15:56	13.66	5215.79
		5229.45	09/29/1998	14:55	14.17	5215.28
		5229.45	10/23/1998	10:25	14.13	5215.32
		5229.45	11/24/1998	14:45	14.16	5215.29
		5229.45	12/30/1998		14.46	5214.99
		5229.45	01/20/1999	11:43	14.57	5214.88
		5229.45	01/22/1999	10:05	14.56	5214.89
		5229.45	03/03/1999	10:12	14.40	5215.05
		5229.45	04/01/1999	09:45	13.94	5215.51
		5229.45	05/27/1999	09:11	12.69	5216.76
		5229.45	06/15/1999	09:20	12.90	5216.55
		5229.45	06/29/1999	10:22	13.01	5216.44
		5229.45	07/29/1999	15:05	14.43	5215.02
0176	O	5286.60	07/30/1998	09:38	23.06	5263.54
		5286.60	08/14/1998	13:31	23.26	5263.34
		5286.60	09/01/1998	12:57	23.61	5262.99
		5286.60	10/23/1998	13:25	23.97	5262.63
		5286.60	12/30/1998		24.20	5262.40
		5286.60	01/20/1999	14:45	24.35	5262.25
		5286.60	01/28/1999	14:40	37.80	5248.80
		5286.60	03/03/1999	13:11	24.34	5262.26
		5286.60	04/01/1999	10:54	24.38	5262.22
		5286.60	04/23/1999	14:16	24.33	5262.27
		5286.60	05/27/1999	13:09	23.61	5262.99
		5286.60	06/22/1999	11:51	22.61	5263.99
		5286.60	06/29/1999	14:25	22.47	5264.13

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0176	O	5286.60	07/28/1999	14:55	23.02	5263.58
0179	D	5302.56	07/30/1998	15:00	64.03	5238.53
		5302.56	08/20/1998	12:29	64.12	5238.44
		5302.56	09/02/1998	10:18	64.23	5238.33
		5302.56	09/30/1998	10:50	64.28	5238.28
		5302.56	10/22/1998	11:39	64.34	5238.22
		5302.56	11/24/1998	13:33	64.32	5238.24
		5302.56	12/30/1998		64.40	5238.16
		5302.56	01/20/1999	14:24	64.45	5238.11
		5302.56	01/21/1999		64.45	5238.11
		5302.56	03/03/1999	10:46	64.49	5238.07
		5302.56	04/01/1999	10:25	64.63	5237.93
		5302.56	04/22/1999	14:55	64.59	5237.97
		5302.56	05/27/1999	14:25	64.43	5238.13
		5302.56	06/24/1999	13:10	64.12	5238.44
		5302.56	06/29/1999	11:05	64.10	5238.46
		5302.56	07/29/1999	14:30	64.00	5238.56
0195	D	5253.10	07/30/1998	14:21	9.53	5243.57
		5253.10	08/19/1998	11:45	9.78	5243.32
		5253.10	09/02/1998	11:26	9.81	5243.29
		5253.10	09/30/1998	11:32	9.57	5243.53
		5253.10	10/22/1998	15:05	9.41	5243.69
		5253.10	11/24/1998	13:25	9.20	5243.90
		5253.10	12/30/1998		9.21	5243.89
		5253.10	01/21/1999	11:30	9.33	5243.77
		5253.10	03/03/1999	11:28	9.29	5243.81
		5253.10	04/01/1999	11:02	9.72	5243.38
		5253.10	05/27/1999	11:40	9.29	5243.81
		5253.10	06/29/1999	11:37	9.23	5243.87
		5253.10	07/29/1999	13:53	9.77	5243.33
0196	D	5260.99	07/30/1998	11:26	13.65	5247.34
		5260.99	08/18/1998	14:35	13.70	5247.29
		5260.99	09/29/1998	12:57	13.74	5247.25
		5260.99	10/23/1998	13:44	13.69	5247.30
		5260.99	11/24/1998	12:33	13.60	5247.39

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0196	D	5260.99	12/30/1998		13.74	5247.25
		5260.99	01/21/1999	13:20	13.75	5247.24
		5260.99	03/03/1999	13:11	13.45	5247.54
		5260.99	04/01/1999	12:44	15.36	5245.63
		5260.99	04/23/1999	15:08	14.95	5246.04
		5260.99	05/27/1999	10:52	13.96	5247.03
		5260.99	06/29/1999	13:32	13.76	5247.23
		5260.99	07/28/1999	16:20	14.45	5246.54
0210	D	5249.13	07/30/1998	16:12	17.13	5232.00
		5249.13	08/27/1998	14:35	17.61	5231.52
		5249.13	09/01/1998	15:13	17.68	5231.45
		5249.13	09/29/1998	14:38	17.85	5231.28
		5249.13	10/22/1998	12:10	17.76	5231.37
		5249.13	11/24/1998	14:35	17.88	5231.25
		5249.13	12/30/1998		17.97	5231.16
		5249.13	01/21/1999	10:19	18.12	5231.01
		5249.13	01/26/1999	10:20	18.05	5231.08
		5249.13	03/03/1999	10:20	18.11	5231.02
		5249.13	04/01/1999	10:05	18.08	5231.05
		5249.13	05/27/1999	09:35	16.25	5232.88
		5249.13	06/15/1999	11:40	16.02	5233.11
		5249.13	06/29/1999	10:43	15.89	5233.24
		5249.13	07/29/1999	14:47	17.10	5232.03
0211	D	5286.97	07/30/1998	18:01	50.24	5236.73
		5286.97	08/20/1998	13:28	50.46	5236.51
		5286.97	09/02/1998	09:33	50.67	5236.30
		5286.97	09/30/1998	11:04	50.89	5236.08
		5286.97	10/22/1998	11:47	50.98	5235.99
		5286.97	11/24/1998	13:47	51.00	5235.97
		5286.97	12/30/1998		51.55	5235.42
		5286.97	01/20/1999	12:50	51.11	5235.86
		5286.97	01/21/1999	10:52	51.21	5235.76
		5286.97	03/03/1999	10:40	51.28	5235.69
		5286.97	04/01/1999	10:20	51.29	5235.68
		5286.97	04/22/1999	15:03	51.23	5235.74

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0211	D	5286.97	05/27/1999	14:30	50.80	5236.17
		5286.97	06/24/1999	09:53	49.87	5237.10
		5286.97	06/29/1999	11:00	49.82	5237.15
		5286.97	07/29/1999	14:36	51.20	5235.77
0212	D	5285.62	07/30/1998	14:01	42.13	5243.49
		5285.62	08/18/1998	15:33	41.88	5243.74
		5285.62	09/02/1998	10:59	41.69	5243.93
		5285.62	09/30/1998	11:16	41.36	5244.26
		5285.62	10/22/1998	14:35	41.51	5244.11
		5285.62	11/24/1998	13:12	41.62	5244.00
		5285.62	12/30/1998		41.79	5243.83
		5285.62	01/21/1999	10:22	41.87	5243.75
		5285.62	01/21/1999	11:22	41.87	5243.75
		5285.62	03/03/1999	11:20	41.97	5243.65
		5285.62	04/01/1999	10:51	42.10	5243.52
		5285.62	04/22/1999	14:29	42.04	5243.58
		5285.62	05/27/1999	11:50	41.83	5243.79
		5285.62	06/15/1999	14:30	41.83	5243.79
		5285.62	06/29/1999	11:54	41.91	5243.71
		5285.62	07/29/1999	14:09	71.46	5214.16
0213	D	5265.83	07/30/1998	17:56	17.92	5247.91
		5265.83	08/19/1998	09:58	16.58	5249.25
		5265.83	09/02/1998	11:09	16.30	5249.53
		5265.83	09/30/1998	11:54	16.70	5249.13
		5265.83	10/22/1998	14:00	17.15	5248.68
		5265.83	11/24/1998	12:58	17.69	5248.14
		5265.83	12/30/1998		17.95	5247.88
		5265.83	01/21/1999	12:34	18.00	5247.83
		5265.83	01/26/1999	13:47	18.34	5247.49
		5265.83	03/03/1999	11:37	18.61	5247.22
		5265.83	04/01/1999	11:10	18.74	5247.09
		5265.83	04/22/1999	14:22	18.67	5247.16
		5265.83	05/27/1999	11:57	18.05	5247.78
		5265.83	06/15/1999	13:41	18.30	5247.53
		5265.83	06/29/1999	12:00	18.08	5247.75

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0213	D	5265.83	07/29/1999	13:50	17.03	5248.80
0215	O	5271.42	07/30/1998	09:41	10.35	5261.07
		5271.42	08/14/1998	12:28	10.70	5260.72
		5271.42	09/01/1998	13:00	11.09	5260.33
		5271.42	09/29/1998	12:40	11.35	5260.07
		5271.42	10/23/1998	13:27	11.35	5260.07
		5271.42	11/24/1998	12:03	11.56	5259.86
		5271.42	12/30/1998		11.79	5259.63
		5271.42	01/20/1999	14:08	11.95	5259.47
		5271.42	01/28/1999	11:24	12.00	5259.42
		5271.42	03/03/1999	13:30	12.06	5259.36
		5271.42	04/01/1999	11:02	11.98	5259.44
		5271.42	04/23/1999	11:30	11.89	5259.53
		5271.42	05/27/1999	13:22	10.20	5261.22
		5271.42	06/22/1999	13:35	8.86	5262.56
		5271.42	06/29/1999	14:14	8.82	5262.60
		5271.42	07/28/1999	14:57	10.35	5261.07
0216	O	5265.41	07/30/1998	09:45	6.36	5259.05
		5265.41	08/18/1998	10:15	7.08	5258.33
		5265.41	01/20/1999	14:23	7.76	5257.65
		5265.41	01/28/1999	12:02	7.60	5257.81
		5265.41	03/03/1999	13:44	7.83	5257.58
		5265.41	04/01/1999	11:06	7.71	5257.70
		5265.41	04/23/1999	11:40	7.56	5257.85
		5265.41	05/27/1999	13:13	5.13	5260.28
		5265.41	06/23/1999	10:46	4.49	5260.92
		5265.41	06/29/1999	14:00	4.61	5260.80
		5265.41	07/28/1999	15:05	6.54	5258.87
0217	D	5256.98	07/30/1998	10:47	4.26	5252.72
		5256.98	08/18/1998	09:10	4.70	5252.28
		5256.98	09/01/1998	13:18	4.85	5252.13
		5256.98	09/29/1998	12:46	4.79	5252.19
		5256.98	10/23/1998	13:30	4.75	5252.23
		5256.98	11/24/1998	12:22	4.62	5252.36
		5256.98	12/30/1998		4.85	5252.13

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0217	D	5256.98	01/21/1999	13:19	4.97	5252.01
		5256.98	03/10/1999	09:50	5.05	5251.93
		5256.98	04/01/1999	13:55	5.33	5251.65
		5256.98	05/27/1999	10:15	4.42	5252.56
		5256.98	06/28/1999	09:40	3.68	5253.30
		5256.98	06/29/1999		3.68	5253.30
		5256.98	07/28/1999	15:20	8.86	5248.12
0218	O	5265.24	07/30/1998	10:20	9.07	5256.17
		5265.24	08/13/1998	11:31	9.20	5256.04
		5265.24	09/01/1998	14:05	9.55	5255.69
		5265.24	09/29/1998	13:39	9.63	5255.61
		5265.24	10/23/1998	12:56	9.55	5255.69
		5265.24	11/24/1998	11:40	9.56	5255.68
		5265.24	12/30/1998		9.69	5255.55
		5265.24	01/20/1999	13:39	9.78	5255.46
		5265.24	01/27/1999	10:27	9.51	5255.73
		5265.24	03/03/1999	14:51	9.71	5255.53
		5265.24	04/01/1999	13:17	9.88	5255.36
		5265.24	04/23/1999	13:10	9.88	5255.36
		5265.24	05/27/1999	12:49	8.47	5256.77
		5265.24	06/22/1999	10:18	8.12	5257.12
		5265.24	06/29/1999	13:56	8.22	5257.02
		5265.24	07/29/1999	11:43	8.88	5256.36
0219	O	5266.58	07/30/1998	10:14	9.14	5257.44
		5266.58	08/13/1998	12:51	9.26	5257.32
		5266.58	09/01/1998	14:08	9.61	5256.97
		5266.58	09/29/1998	13:43	9.66	5256.92
		5266.58	10/23/1998	12:59	9.71	5256.87
		5266.58	11/24/1998	11:36	9.76	5256.82
		5266.58	12/30/1998		9.88	5256.70
		5266.58	01/20/1999	13:46	9.96	5256.62
		5266.58	01/25/1999	14:35	10.00	5256.58
		5266.58	03/03/1999	14:03	9.95	5256.63
		5266.58	04/01/1999	13:13	10.08	5256.50
		5266.58	04/23/1999	13:00	10.20	5256.38

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0219	O	5266.58	05/27/1999	13:42	9.28	5257.30
		5266.58	06/23/1999	12:49	8.49	5258.09
		5266.58	06/29/1999	14:57	8.37	5258.21
		5266.58	07/29/1999	12:08	9.08	5257.50
0220	D	5228.60	07/30/1998	16:34	9.72	5218.88
		5228.60	08/19/1998	14:47	9.84	5218.76
		5228.60	09/01/1998	15:49	9.93	5218.67
		5228.60	09/29/1998	14:51	10.20	5218.40
		5228.60	10/23/1998	10:21	9.53	5219.07
		5228.60	11/24/1998	14:45	10.51	5218.09
		5228.60	12/30/1998		10.93	5217.67
		5228.60	01/20/1999	11:50	11.05	5217.55
		5228.60	01/22/1999	10:55	11.04	5217.56
		5228.60	03/03/1999	10:00	10.81	5217.79
		5228.60	04/01/1999	09:55	9.60	5219.00
		5228.60	05/27/1999	09:21	9.33	5219.27
		5228.60	06/14/1999	13:26	8.87	5219.73
		5228.60	06/29/1999	10:24	8.65	5219.95
		5228.60	07/29/1999	14:57	9.88	5218.72
0589	D	5257.86	01/10/1983	14:00	9.69	5248.17
		5257.86	02/10/1983	10:00	9.59	5248.27
		5257.86	02/23/1983	11:41	9.49	5248.37
		5257.86	06/06/1983	12:43	7.79	5250.07
		5257.86	06/17/1983	17:02	7.59	5250.27
		5257.86	06/21/1983	18:11	7.49	5250.37
		5257.86	09/19/1983	16:08	8.99	5248.87
		5257.86	09/27/1983	10:44	9.29	5248.57
		5257.86	10/01/1983	16:34	9.49	5248.37
		5257.86	01/16/1984	14:05	9.09	5248.77
		5257.86	01/24/1984	09:06	9.19	5248.67
		5257.86	06/25/1985	11:00	5.90	5251.96
		5257.86	10/27/1987	15:10	10.17	5247.69
		5257.86	04/21/1989	09:21	8.76	5249.10
		5257.86	03/10/1993	17:07	1.38	5256.48
		5257.86	08/04/1993	13:55	8.52	5249.34

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0589	D	5257.86	03/10/1994	15:38	10.79	5247.07
		5257.86	08/25/1994	09:15	10.37	5247.49
		5257.86	03/11/1995	15:18	10.98	5246.88
		5257.86	08/02/1995	11:05	7.35	5250.51
		5257.86	03/07/1996	13:51	8.64	5249.22
		5257.86	11/27/1996		11.49	5246.37
		5257.86	07/30/1998	11:54	11.75	5246.11
		5257.86	08/27/1998	13:27	12.00	5245.86
		5257.86	09/01/1998	13:25	12.05	5245.81
		5257.86	09/29/1998	12:52	12.09	5245.77
		5257.86	10/23/1998	13:40	12.02	5245.84
		5257.86	11/24/1998	12:26	12.03	5245.83
		5257.86	12/30/1998		11.98	5245.88
		5257.86	01/20/1999	15:35	12.12	5245.74
		5257.86	03/03/1999	14:25	12.12	5245.74
		5257.86	03/10/1999	13:29	12.20	5245.66
		5257.86	04/01/1999	11:24	13.25	5244.61
		5257.86	04/23/1999	13:55	12.59	5245.27
		5257.86	05/27/1999	11:11	11.82	5246.04
		5257.86	06/29/1999		11.55	5246.31
		5257.86	07/28/1999	13:16	12.85	5245.01
0590	D	5256.37	01/21/1983	13:36	4.70	5251.67
		5256.37	02/10/1983	10:00	4.70	5251.67
		5256.37	06/06/1983	12:33	3.40	5252.97
		5256.37	06/17/1983	15:08	2.90	5253.47
		5256.37	06/21/1983	18:18	2.70	5253.67
		5256.37	09/19/1983	15:57	3.50	5252.87
		5256.37	09/27/1983	08:36	3.70	5252.67
		5256.37	10/01/1983	16:30	3.70	5252.67
		5256.37	01/16/1984	09:45	4.10	5252.27
		5256.37	01/24/1984	08:57	4.10	5252.27
		5256.37	12/18/1985	14:25	2.83	5253.54
		5256.37	10/27/1987	14:15	5.05	5251.32
		5256.37	04/21/1989	09:44	4.25	5252.12
		5256.37	11/01/1992	10:05	5.45	5250.92

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0590	D	5256.37	03/10/1993	17:12	3.17	5253.20
		5256.37	08/04/1993	13:11	4.40	5251.97
		5256.37	03/10/1994	11:47	6.50	5249.87
		5256.37	03/11/1995	15:25	5.84	5250.53
		5256.37	08/02/1995	11:12	3.80	5252.57
		5256.37	11/26/1996		5.28	5251.09
		5256.37	04/23/1997		4.97	5251.40
		5256.37	07/30/1998	10:53	6.70	5249.67
		5256.37	08/12/1998	15:21	6.84	5249.53
		5256.37	09/01/1998	13:22	7.18	5249.19
		5256.37	09/29/1998	12:49	7.16	5249.21
		5256.37	10/23/1998	13:37	7.11	5249.26
		5256.37	11/24/1998	12:16	6.95	5249.42
		5256.37	12/30/1998		7.25	5249.12
		5256.37	01/29/1999	11:13	6.54	5249.83
		5256.37	03/10/1999	11:21	6.68	5249.69
		5256.37	04/01/1999	13:31	7.80	5248.57
		5256.37	05/27/1999	10:36	7.23	5249.14
		5256.37	06/24/1999	14:00	6.60	5249.77
		5256.37	06/29/1999	15:27	6.66	5249.71
		5256.37	07/28/1999	15:35	7.25	5249.12
0598	D	5257.09	06/26/1985	11:45	3.60	5253.49
		5257.09	12/16/1985	15:00	3.48	5253.61
		5257.09	04/21/1989	08:59	5.48	5251.61
		5257.09	09/22/1989	10:19	6.64	5250.45
		5257.09	02/22/1990	11:50	5.56	5251.53
		5257.09	08/29/1990	15:38	6.69	5250.40
		5257.09	03/10/1992	09:16	6.31	5250.78
		5257.09	07/01/1992	08:46	7.01	5250.08
		5257.09	11/01/1992	16:45	6.12	5250.97
		5257.09	03/10/1993	16:46	5.43	5251.66
		5257.09	08/04/1993	13:24	6.42	5250.67
		5257.09	03/10/1994	15:21	8.39	5248.70
		5257.09	08/25/1994	09:32	7.04	5250.05
		5257.09	03/11/1995	10:15	8.22	5248.87

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
			DATE	TIME		
0598	D	5257.09	08/02/1995	11:04	6.77	5250.32
		5257.09	03/07/1996	16:08	6.87	5250.22
		5257.09	11/18/1996		9.36	5247.73
		5257.09	04/25/1997		8.90	5248.19
		5257.09	09/18/1997		9.05	5248.04
		5257.09	08/13/1998	13:30	9.54	5247.55
		5257.09	09/01/1998	13:41	9.61	5247.48
		5257.09	09/29/1998	13:02	9.57	5247.52
		5257.09	10/23/1998	13:57	9.57	5247.52
		5257.09	11/24/1998	12:44	9.68	5247.41
		5257.09	12/30/1998		9.83	5247.26
		5257.09	01/21/1999	13:12	9.94	5247.15
		5257.09	03/03/1999	12:59	9.69	5247.40
		5257.09	04/01/1999	13:49	10.15	5246.94
		5257.09	04/22/1999	14:04	10.32	5246.77
		5257.09	05/27/1999		9.61	5247.48
		5257.09	06/29/1999	13:26	10.03	5247.06
		5257.09	07/28/1999	16:23	10.00	5247.09
0620	D	5231.22	08/25/1994	14:40	11.96	5219.26
		5231.22	03/11/1995	11:38	12.05	5219.17
		5231.22	08/02/1995	12:06	9.61	5221.61
		5231.22	03/07/1996	14:52	11.02	5220.20
		5231.22	12/04/1996		9.11	5222.11
		5231.22	04/28/1997		8.81	5222.41
		5231.22	09/16/1997		9.17	5222.05
		5231.22	07/30/1998	16:50	8.91	5222.31
		5231.22	08/17/1998	15:25	8.85	5222.37
		5231.22	09/01/1998	15:42	9.10	5222.12
		5231.22	09/29/1998	14:49	9.21	5222.01
		5231.22	10/23/1998	10:18	9.01	5222.21
		5231.22	11/24/1998	14:45	9.62	5221.60
		5231.22	12/30/1998		9.80	5221.42
		5231.22	01/20/1999	11:56	10.03	5221.19
		5231.22	01/22/1999	12:58	9.97	5221.25
		5231.22	03/03/1999	10:06	9.63	5221.59

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0620	D	5231.22	04/01/1999	10:00	9.11	5222.11
		5231.22	05/27/1999	09:27	8.55	5222.67
		5231.22	06/14/1999	15:00	8.22	5223.00
		5231.22	06/29/1999	10:35	8.00	5223.22
		5231.22	07/29/1999	15:00	8.89	5222.33
0636	D	5256.24	03/11/1995	11:47	8.68	5247.56
		5256.24	08/02/1995	12:30	4.77	5251.47
		5256.24	03/07/1996	15:04	7.57	5248.67
		5256.24	11/25/1996		8.02	5248.22
		5256.24	04/28/1997		6.95	5249.29
		5256.24	09/18/1997		7.77	5248.47
		5256.24	07/30/1998	12:16	7.37	5248.87
		5256.24	08/17/1998	13:20	8.05	5248.19
		5256.24	09/02/1998	11:40	8.35	5247.89
		5256.24	09/30/1998	09:30	8.35	5247.89
		5256.24	10/22/1998	12:32	8.42	5247.82
		5256.24	11/24/1998	14:44	8.52	5247.72
		5256.24	12/30/1998		8.70	5247.54
		5256.24	01/26/1999	13:55	8.94	5247.30
		5256.24	04/01/1999	14:35	7.11	5249.13
		5256.24	05/27/1999	14:39	5.95	5250.29
		5256.24	06/17/1999	14:35	4.83	5251.41
		5256.24	06/29/1999	12:02	4.77	5251.47
		5256.24	07/28/1999	13:00	7.61	5248.63
0655	O	5276.91	02/15/1996	14:45	5294.98	-18.07
		5276.91	03/07/1996	13:02	5294.58	-17.67
		5276.91	11/14/1996		18.25	5258.66
		5276.91	04/22/1997		17.80	5259.11
		5276.91	07/30/1998	10:02	17.67	5259.24
		5276.91	08/14/1998	09:21	17.80	5259.11
		5276.91	09/01/1998	14:29	17.98	5258.93
		5276.91	09/29/1998	14:03	18.22	5258.69
		5276.91	10/23/1998	13:20	18.35	5258.56
		5276.91	11/24/1998	11:54	18.49	5258.42
		5276.91	12/30/1998		18.68	5258.23

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0655	O	5276.91	01/20/1999	13:22	18.75	5258.16
		5276.91	01/28/1999	13:52	18.77	5258.14
		5276.91	03/03/1999	13:53	18.79	5258.12
		5276.91	04/01/1999	12:48	18.88	5258.03
		5276.91	04/23/1999	14:01	18.95	5257.96
		5276.91	05/27/1999	13:29	18.15	5258.76
		5276.91	06/22/1999	15:09	17.80	5259.11
		5276.91	06/29/1999	14:39	17.71	5259.20
		5276.91	07/29/1999	11:53	17.71	5259.20
0657	O	5274.13	02/15/1996	13:30	5288.98	-14.85
		5274.13	03/07/1996	13:00	5288.56	-14.43
		5274.13	11/14/1996		14.80	5259.33
		5274.13	04/22/1997		14.59	5259.54
		5274.13	07/30/1998	09:55	14.47	5259.66
		5274.13	08/13/1998	15:21	14.61	5259.52
		5274.13	09/01/1998	14:31	14.85	5259.28
		5274.13	09/29/1998	14:12	15.10	5259.03
		5274.13	10/23/1998	13:19	15.23	5258.90
		5274.13	11/24/1998	11:56	15.36	5258.77
		5274.13	12/30/1998		16.62	5257.51
		5274.13	01/20/1999	13:19	15.70	5258.43
		5274.13	01/28/1999	13:25	15.64	5258.49
		5274.13	03/03/1999	13:55	15.66	5258.47
		5274.13	04/01/1999	12:41	15.77	5258.36
		5274.13	04/23/1999	14:06	15.83	5258.30
		5274.13	05/27/1999	13:25	15.38	5258.75
		5274.13	06/23/1999	11:23	14.45	5259.68
		5274.13	06/29/1999	14:33	14.37	5259.76
		5274.13	07/29/1999	11:50	14.58	5259.55
0658	O	5265.91	02/15/1996	12:20	5272.01	-6.10
		5265.91	03/07/1996	13:15	5272.03	-6.12
		5265.91	11/14/1996		6.69	5259.22
		5265.91	04/22/1997		6.47	5259.44
		5265.91	07/30/1998	09:51	6.56	5259.35
		5265.91	08/13/1998	13:45	6.73	5259.18

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0658	O	5265.91	09/01/1998	14:37	7.05	5258.86
		5265.91	09/29/1998	14:10	7.24	5258.67
		5265.91	10/23/1998	13:17	7.32	5258.59
		5265.91	11/24/1998	12:00	7.42	5258.49
		5265.91	12/30/1998		7.60	5258.31
		5265.91	01/20/1999	14:02	7.65	5258.26
		5265.91	01/28/1999	13:42	7.75	5258.16
		5265.91	03/03/1999	14:00	7.72	5258.19
		5265.91	04/01/1999	12:45	7.78	5258.13
		5265.91	04/23/1999	12:50	7.88	5258.03
		5265.91	05/27/1999	13:24	6.79	5259.12
		5265.91	06/23/1999	14:55	5.67	5260.24
		5265.91	06/29/1999	14:29	5.60	5260.31
		5265.91	07/29/1999	11:47	6.58	5259.33
0659	O	5261.33	02/15/1996	08:30	5267.88	-6.55
		5261.33	03/07/1996	13:23	5267.88	-6.55
		5261.33	11/15/1996		6.67	5254.66
		5261.33	04/22/1997		6.24	5255.09
		5261.33	07/29/1998	14:20	6.75	5254.58
		5261.33	08/13/1998	10:11	8.21	5253.12
		5261.33	09/01/1998	14:02	7.17	5254.16
		5261.33	09/29/1998	13:33	7.11	5254.22
		5261.33	10/23/1998	12:53	6.98	5254.35
		5261.33	11/24/1998	11:42	6.94	5254.39
		5261.33	12/30/1998		7.02	5254.31
		5261.33	01/20/1999	13:35	6.97	5254.36
		5261.33	01/29/1999	11:26	6.76	5254.57
		5261.33	03/03/1999	13:57	7.02	5254.31
		5261.33	03/10/1999	14:45	7.02	5254.31
		5261.33	04/01/1999	13:20	7.23	5254.10
		5261.33	04/23/1999	13:20	7.29	5254.04
		5261.33	05/27/1999		6.65	5254.68
		5261.33	06/22/1999	09:41	6.14	5255.19
		5261.33	06/29/1999	13:53	6.25	5255.08
		5261.33	07/29/1999	11:41	6.76	5254.57

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0664	O	5270.17	11/12/1996		12.82	5257.35
		5270.17	09/17/1997		12.39	5257.78
		5270.17	07/30/1998	10:35	12.90	5257.27
		5270.17	09/01/1998	14:14	13.20	5256.97
		5270.17	09/29/1998	13:48	13.26	5256.91
		5270.17	10/23/1998	13:04	13.38	5256.79
		5270.17	11/24/1998	11:31	13.45	5256.72
		5270.17	12/30/1998		13.64	5256.53
		5270.17	01/20/1999	13:29	13.76	5256.41
		5270.17	03/03/1999	14:14	13.82	5256.35
		5270.17	04/01/1999	13:07	13.84	5256.33
		5270.17	04/23/1999	13:32	13.95	5256.22
		5270.17	05/27/1999	13:38	13.58	5256.59
		5270.17	06/28/1999	14:53	12.87	5257.30
		5270.17	07/29/1999	12:03	12.94	5257.23
0669	O	5266.56	11/13/1996		9.66	5256.90
		5266.56	09/17/1997		6.20	5260.36
		5266.56	07/30/1998	10:31	9.65	5256.91
		5266.56	09/01/1998	14:10	10.05	5256.51
		5266.56	09/29/1998	13:45	10.06	5256.50
		5266.56	10/23/1998	13:01	10.12	5256.44
		5266.56	11/24/1998	11:34	10.11	5256.45
		5266.56	12/30/1998		10.28	5256.28
		5266.56	01/20/1999	13:32	10.35	5256.21
		5266.56	03/03/1999	14:12	10.30	5256.26
		5266.56	04/01/1999	13:09	10.51	5256.05
		5266.56	04/23/1999	13:25	10.60	5255.96
		5266.56	05/27/1999	13:39	9.79	5256.77
		5266.56	06/28/1999	14:55	9.12	5257.44
		5266.56	07/29/1999	12:05	9.61	5256.95
0670	O	5270.94	11/13/1996		12.48	5258.46
		5270.94	09/17/1997		11.96	5258.98
		5270.94	07/30/1998	10:07	12.43	5258.51
		5270.94	09/01/1998	14:27	12.78	5258.16
		5270.94	09/29/1998	14:08	12.96	5257.98

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:45 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0670	O	5270.94	10/23/1998	13:14	18.06	5252.88
		5270.94	11/24/1998	11:28	13.16	5257.78
		5270.94	12/30/1998		13.38	5257.56
		5270.94	01/20/1999	14:00	13.49	5257.45
		5270.94	03/03/1999	14:20	13.56	5257.38
		5270.94	04/01/1999	12:55	13.65	5257.29
		5270.94	04/23/1999	13:55	13.68	5257.26
		5270.94	05/27/1999	13:37	13.22	5257.72
		5270.94	06/29/1999	14:41	12.38	5258.56
		5270.94	07/29/1999	11:55	12.51	5258.43
0679	O	5290.07	04/23/1997		29.77	5260.30
		5290.07	09/25/1997		29.55	5260.52
		5290.07	07/30/1998	09:58	29.97	5260.10
		5290.07	09/01/1998	14:33	30.11	5259.96
		5290.07	09/29/1998	14:14	30.11	5259.96
		5290.07	10/23/1998	13:23	30.10	5259.97
		5290.07	11/24/1998	11:22	30.08	5259.99
		5290.07	12/30/1998			-
		5290.07	01/20/1999	13:16	30.17	5259.90
		5290.07	03/03/1999	13:50	30.19	5259.88
		5290.07	04/01/1999	12:38	30.20	5259.87
		5290.07	04/23/1999	14:10	30.15	5259.92
		5290.07	05/27/1999	13:27	30.17	5259.90
		5290.07	06/29/1999	14:26	30.19	5259.88
		5290.07	07/29/1999	11:52	30.00	5260.07

RECORDS: SELECTED FROM USEE700 WHERE site_code='RFN01' AND location_code in('0169','0170','0171','0172','0176','0179','0195','0196','0210','0211','0212','0213','0215','0216','0217','0218','0219','0220','0589','0590','0598','0620','0636','0655','0657','0658','0659','0664','0669','0670','0679')

FLOW CODES:
D DOWN GRADIENT   O ON-SITE   U UPGRADIENT

Historical Wasatch Aquifer

Water Level Data

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0205	O	5267.07	08/20/1998	13:52	16.56	5250.51
		5267.07	01/20/1999	13:34	10.08	5256.99
		5267.07	01/25/1999	13:15	10.01	5257.06
		5267.07	03/03/1999	14:00	13.82	5253.25
		5267.07	04/23/1999	12:55	12.36	5254.71
		5267.07	05/27/1999	13:43	12.63	5254.44
		5267.07	06/24/1999	14:56	12.59	5254.48
		5267.07	06/28/1999	14:59	42.72	5224.35
		5267.07	07/29/1999	12:12	15.73	5251.34
0206	D	5258.20	08/20/1998	08:54	6.18	5252.02
		5258.20	01/29/1999	11:50	6.21	5251.99
		5258.20	03/03/1999	13:47	6.48	5251.72
		5258.20	04/01/1999	13:50	6.83	5251.37
		5258.20	04/23/1999	11:53	6.60	5251.60
		5258.20	05/27/1999	10:14	5.29	5252.91
		5258.20	06/28/1999		4.58	5253.62
		5258.20	06/28/1999	10:13	4.58	5253.62
		5258.20	07/28/1999	15:22	6.04	5252.16
0207	D	5256.93	08/17/1998	11:24	8.92	5248.01
		5256.93	01/20/1999	12:12	9.01	5247.92
		5256.93	01/26/1999	13:12	9.08	5247.85
		5256.93	03/03/1999	14:52	9.32	5247.61
		5256.93	04/01/1999	14:20	9.44	5247.49
		5256.93	04/23/1999	16:19	9.55	5247.38
		5256.93	05/27/1999	14:38	7.30	5249.63
		5256.93	06/17/1999	13:00	5.87	5251.06
		5256.93	06/28/1999	12:00	5.82	5251.11
		5256.93	07/28/1999	13:02	7.89	5249.04
0208	D	5260.78	08/18/1998	11:48	13.38	5247.40
		5260.78	01/29/1999	10:03	13.24	5247.54
		5260.78	03/03/1999	13:08	13.08	5247.70
		5260.78	04/01/1999	12:34	14.89	5245.89
		5260.78	04/23/1999	15:03	14.65	5246.13
		5260.78	05/27/1999	10:56	13.62	5247.16
		5260.78	06/25/1999	11:08	13.55	5247.23

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0208	D	5260.78	06/29/1999	13:29	13.40	5247.38
		5260.78	07/28/1999	16:15	13.98	5246.80
0226	D	5262.08	08/26/1998	13:25	10.96	5251.12
		5262.08	01/21/1999	13:45	12.63	5249.45
		5262.08	01/29/1999	10:43	12.72	5249.36
		5262.08	03/03/1999	13:29	12.72	5249.36
		5262.08	04/01/1999	12:10	12.63	5249.45
		5262.08	04/23/1999	14:52	12.74	5249.34
		5262.08	05/27/1999	11:29	11.98	5250.10
		5262.08	06/21/1999	10:12	12.55	5249.53
		5262.08	06/29/1999		11.82	5250.26
		5262.08	07/28/1999	16:37	8.85	5253.23
0622	D	5260.23	01/16/1986	09:30	25.47	5234.76
		5260.23	05/13/1986	10:19	24.57	5235.66
		5260.23	11/03/1987	10:45	25.07	5235.16
		5260.23	04/21/1989	12:02	23.36	5236.87
		5260.23	09/22/1989	13:47	24.87	5235.36
		5260.23	02/21/1990	16:22	23.45	5236.78
		5260.23	09/15/1990	09:15	25.21	5235.02
		5260.23	03/13/1992	15:02	23.84	5236.39
		5260.23	11/01/1992	14:30	25.25	5234.98
		5260.23	03/10/1993	09:56	24.02	5236.21
		5260.23	08/04/1993	16:49	25.21	5235.02
		5260.23	03/10/1994	13:40	24.42	5235.81
		5260.23	08/24/1994	16:27	16.34	5243.89
		5260.23	03/11/1995	11:24	23.82	5236.41
		5260.23	08/02/1995	11:55	24.48	5235.75
		5260.23	03/07/1996	14:41	23.94	5236.29
		5260.23	12/04/1996		24.65	5235.58
		5260.23	09/16/1997		25.15	5235.08
		5260.23	08/11/1998	15:30	25.53	5234.70
		5260.23	01/21/1999	10:37	24.21	5236.02
		5260.23	01/27/1999	14:47	24.11	5236.12
		5260.23	01/28/1999	10:00	28.72	5231.51
		5260.23	03/03/1999	10:27	24.61	5235.62

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0622	D	5260.23	04/01/1999	10:12	24.46	5235.77
		5260.23	04/23/1999	16:08	24.44	5235.79
		5260.23	05/27/1999	09:41	24.60	5235.63
		5260.23	06/17/1999	09:38	24.51	5235.72
		5260.23	06/29/1999	10:52	25.82	5234.41
		5260.23	07/29/1999	14:43	25.55	5234.68
0629	O	5257.34	12/07/1985	10:30	2.42	5254.92
		5257.34	05/23/1986	08:37	1.66	5255.68
		5257.34	11/02/1987	08:20	4.11	5253.23
		5257.34	04/21/1989	10:11	3.59	5253.75
		5257.34	09/20/1989	15:57	4.34	5253.00
		5257.34	02/22/1990	14:03	4.92	5252.42
		5257.34	09/12/1990	14:12	4.56	5252.78
		5257.34	03/18/1992	08:50	5.27	5252.07
		5257.34	03/10/1994	16:39	5.01	5252.33
		5257.34	08/25/1994	11:03	4.84	5252.50
		5257.34	03/11/1995	14:48	4.92	5252.42
		5257.34	09/25/1997		3.58	5253.76
		5257.34	08/31/1998	11:45	5.00	5252.34
		5257.34	01/20/1999	15:10	5.28	5252.06
		5257.34	01/21/1999	14:37	5.23	5252.11
		5257.34	03/03/1999	13:53	5.21	5252.13
		5257.34	04/23/1999	11:41	5.32	5252.02
		5257.34	05/27/1999	10:09	4.20	5253.14
		5257.34	06/25/1999	13:02	3.23	5254.11
		5257.34	06/29/1999	13:10	3.40	5253.94
		5257.34	07/28/1999	15:10	8.83	5248.51
0631	D	5254.50	01/11/1986	09:01	-1.93	5256.43
		5254.50	05/19/1986	12:10	-1.16	5255.66
		5254.50	11/04/1987	13:45	0.60	5253.90
		5254.50	04/21/1989	08:46	-0.35	5254.85
		5254.50	09/22/1989	10:14	0.62	5253.88
		5254.50	02/22/1990	13:13	0.36	5254.14
		5254.50	08/28/1990	15:57	0.90	5253.60
		5254.50	11/04/1992	15:06	1.17	5253.33

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0631	D	5254.50	03/10/1993	16:32	-5.80	5260.30
		5254.50	08/04/1993	13:17	0.38	5254.12
		5254.50	03/10/1994	11:30	1.70	5252.80
		5254.50	08/24/1994	18:31	1.88	5252.62
		5254.50	03/11/1995	10:43	1.47	5253.03
		5254.50	09/25/1997		1.78	5252.72
		5254.50	01/21/1999	13:51	2.75	5251.75
		5254.50	03/03/1999	13:16	3.14	5251.36
		5254.50	04/23/1999	15:27	0.40	5254.10
		5254.50	05/27/1999	09:58	1.96	5252.54
		5254.50	06/29/1999	13:47	2.05	5252.45
		5254.50	07/28/1999	15:55	2.41	5252.09
0633	O	5278.64	01/13/1986	10:08	18.11	5260.53
		5278.64	05/27/1986	15:48	18.31	5260.33
		5278.64	04/21/1989	08:33	20.01	5258.63
		5278.64	09/22/1989	09:30	20.16	5258.48
		5278.64	02/22/1990	13:40	19.09	5259.55
		5278.64	08/30/1990	12:30	20.11	5258.53
		5278.64	03/12/1992	11:25	20.57	5258.07
		5278.64	06/25/1992	08:45	20.90	5257.74
		5278.64	11/03/1992	13:14	21.17	5257.47
		5278.64	03/10/1993	16:25	20.81	5257.83
		5278.64	08/04/1993	12:53	20.81	5257.83
		5278.64	03/10/1994	14:33	22.01	5256.63
		5278.64	08/24/1994	17:45	22.28	5256.36
		5278.64	08/02/1995	10:58	21.33	5257.31
		5278.64	03/07/1996	11:42	23.28	5255.36
		5278.64	11/18/1996		22.16	5256.48
		5278.64	11/27/1996		22.53	5256.11
		5278.64	09/19/1997		21.74	5256.90
		5278.64	08/12/1998	13:48	32.33	5246.31
		5278.64	01/20/1999	14:55	22.69	5255.95
		5278.64	01/25/1999	10:21	22.70	5255.94
		5278.64	03/03/1999	13:25	23.03	5255.61
		5278.64	04/23/1999	13:38	22.66	5255.98

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0633	O	5278.64	05/27/1999	09:57	22.72	5255.92
		5278.64	06/25/1999	09:50	22.62	5256.02
		5278.64	06/29/1999	15:55	34.93	5243.71
0634	O	5267.40	01/13/1986	15:22	5.64	5261.76
		5267.40	05/21/1986	10:36	4.39	5263.01
		5267.40	10/29/1987	07:20	6.45	5260.95
		5267.40	04/21/1989	08:00	6.21	5261.19
		5267.40	09/20/1989	15:13	6.88	5260.52
		5267.40	02/22/1990	14:40	7.49	5259.91
		5267.40	08/27/1990	11:20	6.80	5260.60
		5267.40	11/02/1992	10:45	7.15	5260.25
		5267.40	03/10/1994	17:09	7.55	5259.85
		5267.40	08/25/1994	11:13	7.71	5259.69
		5267.40	10/06/1997		7.36	5260.04
		5267.40	08/31/1998	14:45	8.59	5258.81
		5267.40	01/20/1999	14:18	9.21	5258.19
		5267.40	03/03/1999	13:34	8.90	5258.50
		5267.40	04/23/1999	11:31	8.55	5258.85
		5267.40	05/27/1999	13:17	5.92	5261.48
		5267.40	06/29/1999	14:10	5.15	5262.25
		5267.40	07/28/1999	14:59	7.40	5260.00
0640	C	5335.90	01/16/1986	13:55	93.28	5242.62
		5335.90	05/12/1986	10:40	72.40	5263.50
		5335.90	10/30/1987	09:05	73.27	5262.63
		5335.90	09/15/1990	16:00	73.80	5262.10
		5335.90	03/13/1992	09:20	74.64	5261.26
		5335.90	11/03/1992	16:28	74.65	5261.25
		5335.90	03/10/1994	13:29	74.70	5261.20
		5335.90	08/25/1994	12:25	74.54	5261.36
		5335.90	03/11/1995	12:16	74.69	5261.21
		5335.90	08/02/1995	12:51	74.48	5261.42
		5335.90	03/07/1996	12:50	75.17	5260.73
		5335.90	12/10/1996		74.88	5261.02
		5335.90	09/20/1997		74.20	5261.70
		5335.90	08/10/1998	14:05	74.68	5261.22

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0640	C	5335.90	01/21/1999	12:45	75.43	5260.47
		5335.90	03/03/1999	11:47	75.49	5260.41
		5335.90	04/01/1999	11:21	75.81	5260.09
		5335.90	05/27/1999	16:43	75.56	5260.34
		5335.90	06/29/1999	12:18	75.33	5260.57
		5335.90	07/29/1999	13:25	75.03	5260.87
0651	D	5254.60	01/15/1986	09:26	11.18	5243.42
		5254.60	05/23/1986	14:54	4.11	5250.49
		5254.60	11/03/1987	14:35	11.61	5242.99
		5254.60	04/21/1989	09:09	8.67	5245.93
		5254.60	09/22/1989	10:37	8.93	5245.67
		5254.60	02/22/1990	11:13	8.51	5246.09
		5254.60	08/29/1990	15:15	9.51	5245.09
		5254.60	03/10/1994	12:23	5.81	5248.79
		5254.60	08/25/1994	08:53	10.03	5244.57
		5254.60	08/02/1995	11:14	9.00	5245.60
		5254.60	03/07/1996	13:45	4.95	5249.65
		5254.60	11/15/1996		5.44	5249.16
		5254.60	09/16/1997		5.06	5249.54
		5254.60	08/13/1998	10:49	5.51	5249.09
		5254.60	01/21/1999	13:40	5.14	5249.46
		5254.60	01/25/1999	11:20	5.24	5249.36
		5254.60	03/03/1999	12:44	4.93	5249.67
		5254.60	04/01/1999	12:21	7.14	5247.46
		5254.60	04/22/1999	13:45	8.01	5246.59
		5254.60	05/27/1999	11:11	6.69	5247.91
		5254.60	06/18/1999	10:52	6.79	5247.81
		5254.60	06/29/1999	13:24	6.76	5247.84
		5254.60	07/29/1999	13:07	7.21	5247.39
0678	O	5272.26	11/13/1996		15.31	5256.95
		5272.26	09/24/1997		14.97	5257.29
		5272.26	10/23/1998	13:10	15.70	5256.56
		5272.26	01/20/1999	13:57	16.13	5256.13
		5272.26	03/03/1999	14:18	16.22	5256.04
		5272.26	04/23/1999	13:51	16.31	5255.95

STATIC GROUND WATER LEVELS (USEE700) FOR SITE RFN01, RIFLE (NEW)
REPORT DATE: 8/4/1999 1:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)
0678	O	5272.26	05/27/1999	13:35	16.00	5256.26
		5272.26	06/29/1999	14:43	14.48	5257.78
		5272.26	07/29/1999		15.40	5256.86

RECORDS: SELECTED FROM USEE700 WHERE site_code='RFN01' AND location_code in('0205','0206','0207','0208','0226','0622','0629','0631','0633','0634','0640','0651','0678')

FLOW CODES:
C CROSS GRADIENT D DOWN GRADIENT O ON-SITE