APPENDIX G

Rice Creek Sampling Locations and Analytical Measurement Results

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Rice Creek Data Presentation Summary

The map of Rice Creek (Fig.G1), shows the location where each water sample was taken. Global Positioning System (GPS) coordinates were used to plot the locations. The map image is from an orthophoto taken in 1997, obtained from Wenck Associates, Inc., Maple Plain, Minnesota. These coordinates recorded in the field, during sampling, are reported in tables G1 through G5. For mapping purposes, second quarter sampling locations were not mapped by their GPS coordinates. (However, the following GPS data tables do show the recorded coordinates). Second quarter samples were mapped with first quarter coordinates, with the exception of sampling location 03. During second quarter sampling there was a problem with the crypto key, causing samples to show imprecise coordinates. Based on landmarks, the field team leader noted in the field logbook (USACHPPM 2000) that sample locations for the second quarter were as close as possible to first quarter coordinates. Maps from the Work Plan (USACHPPM 1999) were also used to pinpoint the location to be sampled.

The tables G6 through G9 summarize the data for Rice Creek surface water samples taken during the quarterly water monitoring. The summaries include the field and analytical result for each analyte at each sample location. Summary data used for statistical analysis such as the central tendencies, standard deviations and confidence intervals are report in tables found in Appendix A.

The number of digits reported for each value in the following tables does not necessarily reflect the precision and accuracy of the measurement. The data tables present significant figures as they were originally reported by the analyzing laboratory. Significant figures reported for the analytes were based on the analytical detection limit values. However, some sample values have more significant figures than others to demonstrate that blank correction was discontinued, as was requested by USEPA comments on the draft version of this report (see Appendix R). Data quality is discussed in Appendix K.

The results are reported in the following manner to facilitate data review.

- If the detection limit is sample-specific (as it was for the pesticides in sediment), the value reported for the achieved detection limit for a site is the highest detection limit for that parameter for all samples (including the field duplicate) from that site.

- If a parameter was not detected in any samples from a site (e.g. Pond G, water, alpha-BHC) then the minimum and maximum values represent the lowest and highest achieved detection limits for those data.

- Any concentrations that were below the detection limit but still quantified are identified in Volume 2 of this report as estimated values (J-flagged). These values are reported and used uncensored in the following tables.

- If a parameter was undetected in at least one but not all samples from a site, then the minimum reflects the lowest detection limit of the undetected samples. If there was a

J-flagged value lower than the highest undetected value, the J-flagged value was reported as the maximum because the value was actually detected but estimated.

- Field duplicates (FD) were used as quality control samples and were not included in the reported minima and maxima columns. However, if an analyte was detected in the FD and not in it's corresponding sample, then the FD detection was counted in the detection frequency column (only in the numerator).

- When laboratory replicate samples (R1, R2) were available, the values from the primary sample (R1) were reported. See Appendix K section K1.2.1 for explanation.

Definition of Data Qualifiers (Flags)

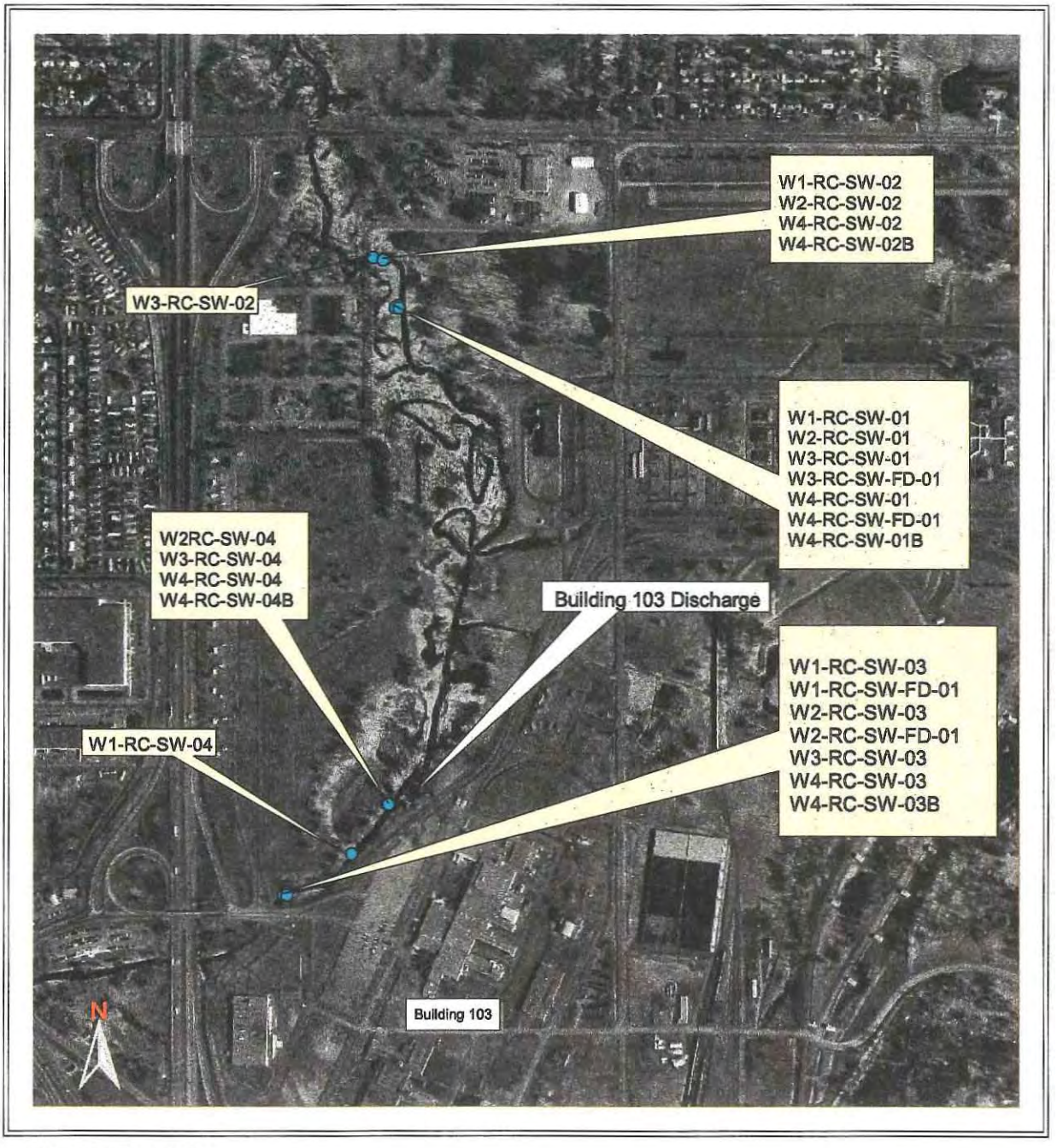
During the data validation process, all laboratory data were assigned appropriate data validation flags and reason codes. Validation flags used in the following tables are defined as follows:

No flag	When the analyte value reported is detected and usable. The integrity of the analyte's identification, accuracy, and precision has been validated
"U"	When the material was analyzed for, but not detected above the level of the associated detection limit value.
"UB"	When an analyte was detected in the method blank, then the analyte was considered non detected in the sample if the value was less than 5 times the highest method blank concentration associated with the particular batch the sample was analyzed with.
"J"	When the associated value is an estimated quantity. Indicating there is cause to question accuracy or precision of the reported value. The value is still used in the risk assessment.
"UJ"	When the analyte was analyzed for, but not detected, above the associated value, however, the reported value is an estimate and demonstrates a decreased confidence in its accuracy or precision.
"UBJ"	When an analyte was detected in the method blank, then the analyte was considered non detected in the sample if the value was less than 5 times the highest method blank concentration associated with the particular batch the sample was analyzed with; however, the reported value is an estimate and demonstrates a decreased confidence in its accuracy or precision.

Other information regarding data validation can be found in Volume 2 (CD ROM version) of the report.

Note: References cited in the text of this appendix can be found in the reference section of the main Tier II Ecological Risk Assessment Report.

Figure G1. Rice Creek Water Monitoring Sample Locations



Wx= sampling quarter
RC= Rice Creek
SW=Surface Water
FD= Field duplicate
0#B = second set of samples taken during qtr 4

100 0 100 200 Meters

Table G1. Rice Creek First Quarter Surface Water Sampling GPS Coordinates

Sample Number	Date	Sample depth	N*			W*		
			degrees	minutes	seconds	degrees	minutes	seconds
W1-RC-SW-01	26-Sep-99	4"	45	6	19.02	93	10	59.16
W1-RC-SW-02	26-Sep-99	4"	45	6	21.76	93	11	0.19
W1-RC-SW-03 W1-RC-SW-FD-01	26-Sep-99	4"	45	5	44.86	93	11	8.22
W1-RC-SW-04	26-Sep-99	4"	45	5	47.07	93	11	2.84

Table G2. Rice Creek Second Quarter Surface Water Sampling GPS Coordinates

Sample Number	Date	Sample depth	N*			W*		
			degrees	minutes	seconds	degrees	minutes	seconds
W2-RC-SW-01	21-Jan-00	6"	45	6	19.8	93	10	58.27
W2-RC-SW-02	21-Jan-00	5"	45	6	22.46	93	11	1.18
W2-RC-SW-03 W2-RC-SW-FD-01	21-Jan-00	7"	45	5	45.31	93	11	10.18
W2-RC-SW-04	21-Jan-00	10"	45	5	50.77	93	10	59.06

Table G3. Rice Creek Third Quarter Surface Water Sampling GPS Coordinates

Sample Number	Date	Sample depth	N*			W*		
			degrees	minutes	seconds	degrees	minutes	seconds
W3-RC-SW-01 W3-RC-SW-FD-01	27-Apr-00	6-10"	45	6	18.91	93	10	59.38
W3-RC-SW-02	27-Apr-00	6-10"	45	6	21.82	93	11	1.27
W3-RC-SW-03	27-Apr-00	6-10"	45	5	44.7	93	11	8.48
W3-RC-SW-04	27-Apr-00	6-10"	45	5	50.12	93	10	59.9

Table G4. Rice Creek Fourth Quarter Surface Water Sampling GPS Coordinates

Sample Number	Date	Sample depth	N*			W*		
			degrees	minutes	seconds	degrees	minutes	seconds
W4-RC-SW-01 W4-RC-SW-FD-01	21-Jun-00	4-6"	45	6	18.87	93	10	59.08
W4-RC-SW-02	21-Jun-00	4-6"	45	6	21.72	93	11	0.29
W4-RC-SW-03	21-Jun-00	6-8"	45	5	44.79	93	11	8.22
W4-RC-SW-04	21-Jun-00	4-6"	45	5	50.01	93	10	59.79

Table G5. Rice Creek Additional Fourth Quarter Surface Water Sample GPS Coordinates

Sample Number	Date	Sample depth	N*			W*		
			degrees	minutes	seconds	degrees	minutes	seconds
W4-RC-SW-01B	23-Jun-00	4-6"	45	6	18.87	93	10	59.08
W4-RC-SW-02B	23-Jun-00	4-6"	45	6	21.68	93	11	0.4
W4-RC-SW-03B	23-Jun-00	6-8"	45	5	44.66	93	11	8.18
W4-RC-SW-04B	23-Jun-00	4-6"	45	5	49.94	93	10	59.81

* The GPS unit used in the study was a military-issue Precision Light Weight GPS Receiver (PLGR). The Department of Defense (DoD) intentionally places errors in the GPS navigation and timing signal, in a process called selective availability (Department of the Army 1993). Errors resulting from this process are unpredictable and can produce significant horizontal and elevation errors. Military GPS receivers must have crypto keys loaded to detect and nullify selective availability errors, in order to allow for more accurate position data (Department of the Army 1993). The PLGR was equipped with a crypto key, and was therefore not subject to the selective availability and spoofing errors that affect non-military GPS. (The only exception was during the second quarter). The PLGR operations manual (Department of the Army 1995) states that with crypto keys installed, the PLGR provides horizontal 2-D position accuracies better than the worst-case error of 10 meters.

Table G6. Rice Creek First Quarter Water Quality and Metals Data

Parameter	W1-RC-SW-01	W1-RC-SW-02	W1-RC-SW-03	W1-RC-SW-04	Detection limit
pH	8.49	8.54	8.59	8.62	na
DO (mg/L)	8.62	8.74	9.43	9.5	na
DO (%)	91.6	93.6	101.5	101.9	na
Conductivity (µmhos/L)	376	371	378	378	na
Temperature (°C)	18.33	18.52	18.90	18.70	na
Hardness (mg/L)	156	156	150	152	2.00
TKN (mg/L)	3.9	3.6	3.3	3.8	0.50
TOC (mg/L)	21	21	21	21	1.00
Total Phosphorus (mg/L)	0.24	0.27	0.24	0.26	0.01
TSS (mg/L)	78	76	66	64	1.00
Metals (µg/L)					
Aluminum	73.25	74.25	73.25	78.25	0.056
Barium	68 J	68 J	69 J	72 J	0.0056
Cadmium	0.021	0.025	0.022	0.025	0.015
Copper	1.0	1.0	1.5	1.1	0.014
Mercury	0.042	0.0035	0.0038	0.0033	0.00018
Silver	0.0282 UB	0.0212 UB	0.0172 UB	0.0172 UB	0.0043

QC Samples

Parameter	W1-RC-FB-01	W1-RC-SW-FD-XX
pH	na	na
DO (mg/L)	na	na
DO (%)	na	na
Conductivity (µmhos/L)	na	na
Temperature (°C)	na	na
Hardness (mg/L)	na	160
TKN (mg/L)	na	3.5
TOC (mg/L)	na	21
Total Phosphorus (mg/L)	na	0.23
TSS (mg/L)	na	66
Metals (µg/L)		
Aluminum	1.30 UB	89
Barium	0.22 UB	70.16 J
Cadmium	0.015 U	0.015 U
Copper	0.19	1.2
Mercury	0.00022	0.0035
Silver	0.0114 UB	0.013 UB
		W1-RC-SW-03

Table G7. Rice Creek Second Quarter Surface Water Quality and Metals Data

Parameter	W2-RC-SW-01	W2-RC-SW-02	W2-RC-SW-03	W2-RC-SW-04	Detection limit
pH	7.23	7.25	7.23	7.25	na
DO (mg/L)	7.23	8.91	12.07	11.21	na
DO (%)	49.2	58.8	82.8	74.9	na
Conductivity (µmhos/L)	667	661	673	650	na
Temperature (°C)	0.07	0.086	0.05	0.05	na
Hardness (mg/L)	268	272	264	272	2.00
TKN (mg/L)	1.8	2.1	2.1	1.9	0.50
TOC (mg/L)	20	20	19	19	1.00
Total Phosphorus (mg/L)	0.06	0.06	0.06	0.06	0.01
TSS (mg/L)	2	4	5	5	1.00
Metals (µg/L)					
Aluminum	5.22	4.92	4.52	4.32	0.056
Barium	83.011	81.011	80.011	86.011	0.0056
Cadmium	<0.015 U	<0.015 U	<0.015 U	<0.015 U	0.015
Copper	0.86	0.90	0.84	0.80	0.014
Mercury	0.0009	0.00057 UB	0.00059 UB	0.00078	0.000039
Silver	0.0143 UBJ	0.0143 UBJ	0.0143 UBJ	0.0107 UBJ	0.0043

QC Samples Parameter	W2-RC-FB-01	W2-RC-FD-00
pH	na	na
DO (mg/L)	na	na
DO (%)	na	na
Conductivity (µmhos/L)	na	na
Temperature (°C)	na	na
Hardness (mg/L)	na	290
TKN (mg/L)	na	1.8
TOC (mg/L)	na	18
Total Phosphorus (mg/L)	na	0.06
TSS (mg/L)	na	4
Metals (µg/L)		
Aluminum	1.62 UB	4.82
Barium	0.0183 UBJ	82.011
Cadmium	0.015 U	0.015 U
Copper	0.024	0.88
Mercury	0.00047 UB	0.00055 UB
Silver	0.0189 UBJ	0.0143 UBJ
		W2-RC-SW-03

Table G8. Rice Creek Third Quarter Water Quality and Metals Data

Parameter	W3-RC-SW-01	W3-RC-SW-02	W3-RC-SW-03	W3-RC-SW-04	Detection limit
pH	8.7	8.75	8.73	8.76	na
DO (%)	117	120.2	122.1	122.2	na
DO (mg/L)	10.7	10.98	11.07	11.08	na
Conductivity (umhos/L)	397	395	401	399	na
Temperature (C)	19.54	19.7	20.09	20.11	na
Hardness (mg/L)	168	166	170	168	2.00
TKN (mg/L)	3.2	2.8	3.1	3.4	0.50
TOC (mg/L)	16	16	16	16	0.20
Total Phosphorus (mg/L)	0.2	0.21	0.18	0.24	0.01
TSS (mg/L)	83	82	94	88	1.00
Metals (ug/L)					
Aluminum	180	150	240	240	0.0099
Barium	92 J	91 J	96 J	94 J	0.00088
Cadmium	0.03495	0.03495	0.04095	0.04695	0.00066
Copper	1.3	1.2	1.6	1.7	0.0043
Mercury	0.00468	0.00488	0.00508	0.00528	0.000063
Silver	0.01858 UBJ	0.01858 UBJ	0.01858 UBJ	0.01858 UBJ	0.00058

QC samples

Parameter	W3-RC-FB-01	W3-RC-FD-01
pH	na	8.7
DO (%)	na	116.9
DO (mg/L)	na	10.69
Conductivity (umhos/L)	na	397
Temperature (C)	na	19.55
Hardness (mg/L)	na	188
TKN (mg/L)	na	3
TOC (mg/L)	na	17
Total Phosphorus (mg/L)	na	0.22
TSS (mg/L)	na	93
Metals (ug/L)		
Aluminum	2.2	180
Barium	0.014 J	93 J
Cadmium	0.00161 UB	0.03695
Copper	0.010	1.3
Mercury	0.000318 UB	0.00438
Silver	0.01858 UBJ	0.01858 UBJ

Table G9. Rice Creek Fourth Quarter Surface Water Quality and Metals Data

Parameter	W4-RC-SW-01	W4-RC-SW-01B	W4-RC-SW-02	W4-RC-SW-02B	W4-RC-SW-03	W4-RC-SW-03B	W4-RC-SW-04	W4-RC-SW-04B	Detection limit
pH	7.99	7.72	8.03	7.78	8.03	7.74	8.06	7.8	na
DO (%)	86.8	69.7	88.6	69.8	91.2	74.6	91.8	76	na
DO (mg/L)	7.83	6.22	8.03	6.23	8.22	6.65	8.3	6.77	na
Conductivity (umhos/L)	385	379	383	378	392	386	390	383	na
Temperature (C)	20.3	20.89	20.1	20.88	20.33	20.87	20.17	20.99	na
Hardness (mg/L)	148	150	168	150	154	148	150	150	2.00
TKN (mg/L)	2.2	2.4	1.8	2.1	2.1	2.2	2.1	2.5	0.50
TOC (mg/L)	17	17	17	17	17	16	17	17	0.20
Total Phosphorus (mg/L)	0.17	0.18	0.17	0.18	0.17	0.19	0.18	0.18	0.01
TSS (mg/L)	60	48	58	56	52	49	47	50	1.00
Metals (ug/L)									
Aluminum	180.49	180.49	130.49	200.49	150.49	190.49	120.49	170.49	0.0099
Barium	74	73	71	73	73	74	70	74	0.00088
Cadmium	0.029	0.035	0.029	0.033	0.026	0.029	0.024	0.030	0.00066
Copper	1.3	1.6	1.3	1.5	1.3	1.6	1.2	1.6	0.0043
Mercury	0.0041	0.0046	0.0038	0.0045	0.0038	0.0050	0.0036	0.0040	0.000039
Silver	0.00348 UBJ	0.00328 UBJ	0.0034 UBJ	0.0055 UBJ	0.00363 UBJ	0.0057 UBJ	0.00331 UBJ	0.0047 UBJ	0.004

QC Samples

Parameter	W4-RC-FB-01	W4-RC-FD-01
pH	na	8
DO (%)	na	86.7
DO (mg/L)	na	7.83
Conductivity (umhos/L)	na	386
Temperature (C)	na	20.3
Hardness (mg/L)	na	174
TKN (mg/L)	na	2.7
TOC (mg/L)	na	17
Total Phosphorus (mg/L)	na	0.19
TSS (mg/L)	na	64
Metals (ug/L)		
Aluminum	0.98 UB	170.49
Barium	<0.00088 U	73
Cadmium	0.0017	0.031
Copper	<0.0043 U	1.3
Mercury	0.00021	0.0049
Silver	0.0035 UBJ	0.0041 UBJ