EFFECTS OF K-REACTOR PRE-OPERATIONAL COLD FLOW TESTING ON TOTAL SUSPENDED SOLIDS IN PEN BRANCH (U)

by

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This is a technical report

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ABSTRACT

Total suspended solids (TSS) levels were monitored by SRL Environmental Sciences personnel at two locations in the Pen Branch Creek system in conjunction with K Reactor cold flow (pump) testing required as part of the reactor restart effort. The TSS data were compared with flow and rainfall data collected simultaneously in an effort to obtain insight on the suspension and movement of particulate material in the Pen Branch system in response to natural and operational causes. Pump testing clearly caused higher TSS levels at the two sampling locations. The artificially elevated TSS levels were more pronounced at a sampling location near the reactor than at a sampling location farther downstream. Although the environmental data provided by this study were obtained and used exclusively for process control and research purposes, rather than for formal regulatory compliance (i.e. NPDES monitoring), the TSS levels determined by the comprehensive testing were compared with NPDES limits required at various SRS outfalls. TSS values in Pen Branch were seldom in excess of these limits. Because of the relatively few times that TSS values at the two sampling locations exceeded "typical" NPDES limits, and the fact that occasional relatively high TSS values could clearly be solely attributed to rainfall, it was concluded that no major adverse environmental impacts were caused to the Pen Branch system as a result of the K-Reactor pre-operational pump testing.

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INTRODUCTION

Preparation for restarting K Reactor required testing of numerous cooling water flow and pumping systems. The testing required that ambient temperature water be released from the reactor's secondary cooling water outfall and discharge canal to Indian Grave Branch, a tributary of Pen Branch. Intermittent testing of emergency cooling system pumps and pumps providing water to the heat exchangers, combined with periods of gravity flow (which can be higher than running one or two pumps) resulted in the discharge of water at a variety of flow rates for a variety of frequencies during the study period, which ranged from October 1990 through May 1991. The majority of the pump testing activity occurred between February and April of 1991. Thus, the environmental sampling conducted as part of this study overlapped the majority of pump tests and allowed an assessment of environmental monitoring data attributable to natural factors such as rainfall and runoff to be compared with values primarily attributable to the pump tests.

Total Suspended solids (TSS) was one of the parameters selected to be monitored by the SRL Environmental Sciences Section (ESS) during the principal period in which pump testing was conducted and is the focus of this report. A report describing the impact of the pump testing on the fish community of Pen Branch has been prepared by Paller (1991). One of the reasons that TSS was selected for monitoring was because such data can be obtained at frequent intervals and reported relatively quickly. This allowed monitoring data obtained by ESS to be used in the design of the pump testing while it was in progress to aid in the protection of the biotic communities in Pen Branch.

The term total suspended solids (TSS) is synonymous with the terms "non-filterable residue" and "dry weight" and essentially is the combination of organic and inorganic particulate material that is retained on a glass fiber filter dried to a constant weight of 103-105°C. This parameter gives an indication of the flow and sediment transport related impacts to a stream ecosystem, particularly the fish and aquatic invertebrates. Water quality criteria proposed by the U.S. EPA require that "settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonably established norm for aquatic life" (U.S. EPA, 1986). It was not practical to measure compensation point depths in the Pen branch system and no specific numerical TSS values for protection of aquatic life have been established by the EPA. However, NPDES permits typically contain TSS limits for point source discharges. At SRS, these limits typically include daily maximum values of 60 mg/l and/or monthly mean values of 30 mg/l at many outfalls (State of South Carolina, 1984).

TSS sampling involved the collection of water by automatic portable samplers programmed to collect discrete samples at pre-determined intervals, typically every four hours when pump testing was not known to be in progress and more frequently when pump testing was known to be in progress. This sampling strategy and equipment allowed collections to be made in a consistent manner during all parts of the day and night as well as during inclement weather. However, the use of unattended samplers resulted in some problems such as sampling gear being dislodged by logs traveling downstream, etc. These events are undoubtedly responsible for some anomalies in the resulting data.

To aid in the interpretation of results from the TSS sampling, hourly flow data (provisional) for gaging stations nearest the TSS sampling locations were obtained from the U.S. Geological Survey (USGS) and daily rainfall data recorded at K Area were obtained from the SRL Environmental Technology Section's Environmental Transport Group. This supplemental information was used in determining periods when pump tests affected flow in the stream system and differentiating between TSS quantities primarily attributable to the pump testing and TSS quantities partially or fully attributable to natural factors such as rainfall and runoff.

METHOD AND MATERIALS

TSS Sampling Locations

Two locations in the Pen Branch watershed were selected for monitoring of TSS (Figure 1). Both locations are downstream from the K Reactor cooling water discharge point. The station on Indian Grave Branch at Road B is below the confluence of The K-Reactor cooling water discharge canal with Indian Grave Branch, approximately 700 m below the discharge pipe. The station on Pen Branch at Road A-13.2 is below the confluence of Indian Grave Branch and upper Pen Branch, approximately 6.2 km below Road B.

TSS Sampling Procedures

Portable, automatic sequential samplers (Isco and/or Manning) housing 24 bottles each were placed on a catwalk adjacent to the stream locations described above. Approximately 8 m of tubing attached to each sampler was positioned at approximately midstream and middepth using floats and weights. The samplers were programmed to collect water samples of approximately 400 ml each at intervals which ranged in frequency from daily to hourly. Generally the samplers were programmed to collect four samples per day at six-hour intervals. When all, or in some cases most, bottles within a sampler contained samples, the bottles were exchanged with empty ones and the sample containing bottles were returned to the lab for processing.

Figure 1. TSS Sampling Locations in Relation to K Reactor and the Pen Branch Drainage System.

TSS Sample Analysis Procedures

TSS sample processing and analysis procedures were performed by trained personnel in accordance with SRL Environmental Sciences Section Procedure 2-48 that parallels EPA Method 160.2 for non-filterable residue (U.S. EPA, 1979). The contents of all sample bottle were filtered within one hour of the time they were returned to the laboratory. Whatman 47 mm diameter GF/C glass fiber filter disks were used. Prior to use, the filters were labeled and pre-washed three times with 20 ml of deionized water. The clean filters were dried at 103-105°C and placed in a desiccator to cool to room temperature. After a constant weight of a washed and dried filter was obtained and recorded, the filter was subjected to use with a sample of stream water. A 100 ml aliquot from a vigorously shaken sample bottle was filtered using a Millipore filtering apparatus which included a suction flask, vacuum pump, and coarse fritted disk filter support. After filtering, the filter was dried at 103-105°C for one hour and cooled in a desiccator until a constant weight was obtained. All samples were analyzed in duplicate. TSS values were calculated by the following formula:

$$\text{TSS in mg/l} = \frac{(A-B) \times 1000}{C}$$

Where:

- A = weight of filter + residue in mg (mean of two weighings)
- B = weight of filter (mean of two weighings)
- C = ml of sample filtered

All TSS data obtained from the study were recorded in logbook WSRC-NB-90-329 and are recorded on electronic media (computer files) being maintained by E.W. Wilde.

Procurement of Ancillary Data

Provisional flow data were obtained from the USGS which maintains flow monitoring stations at the Road A-13.2 location, SRS NPDES Outfall K-011 located in the K Reactor discharge canal, and Indian Grave Branch located above Road B. Unfortunately, the latter station was not operational for much of the time during the present study. To estimate the total flow in Indian Grave Branch at Road B, we added the flow recorded at K-011 with the flow recorded at the upstream Indian Grave Branch location. When no data were available for the upstream Indian Grave Branch gaging station, a correction factor of 0.4 cfs, an approximate long term average for this location (Larry Moray, USGS, personal communication) was added to the K-011 flow value to obtain an estimate of flow at Road B. Daily rainfall records for K Area were obtained from the SRL Environmental Technology Section.

Data Processing

All TSS and flow data along with pertinent other ancillary data were entered into a Lotus 1-2-3 data set. Data processing and graph preparation were conducted using Lotus 1-2-3 and Harvard Graphics computer software with an IBM PC.

RESULTS AND DISCUSSION

Tabular summaries of the hourly and average values (daily and monthly) from TSS and flow measurements at Road A-13.2 and Road B are included in Appendix Tables A1 and A2. Daily average TSS and flow values along with daily precipitation measured in K Area are listed in Appendix Table A3. Appendix Table A4 lists daily average flow data (provisional) for the three gaging stations in the Pen Branch drainage system maintained by the USGS. Slightly different daily averages flow values between Appendix Table A4 compared to the other Appendix Tables are a result of averaging 24 hourly flow measurements for a daily average in Appendix table A4, while only flow measurements taken concurrently with TSS measurements were used to obtain the daily average flow measurements in Appendix Tables A1-A3.

Figure 2 shows the daily average flow data presented in Appendix Table A4. The relatively minor contribution of flow from upstream Indian Grave Branch (station IGB) is obvious, even though this gaging station was not operational during much of the study period. It is also clear that the flow at Outfall K-011, principally consisting of K Reactor cooling water discharges, is very closely linked to the flow in Pen Branch at Road A-13.2. However, exceptions occur during heavy rainfall. Four peaks of flow at Road A-13.2 that were not accompanied by corresponding peaks of flow at Outfall K-011 occurred in October (mid and late), late January, and the beginning of March. Heavy rainfall occurred during each of these periods. (Appendix Table A3).

Relationship of TSS and Flow

At the Road A-13.2 location, 603 TSS measurements were made. The average TSS concentration was 17 mg/l with a range of 0.5 to 145 mg/l. There were 626 measurements of TSS at the Road B Location. The average value was 17.5 with a range of 0.5 to 268.5 mg/l.

Specific flow values corresponding to the TSS values were obtained from the hourly USGS monitoring data as previously described. These flow values averaged 159 cfs and 193 cfs at Road B and Road A-13.2, respectively. At Road B, flow ranged from 29 cfs to 484 cfs while at Road A-13.2, flow ranged from 34 cfs to 833 cfs during periods that samples for TSS were collected.

FLOW AT THREE USGS GAGING STATIONS OCTOBER 1990 - MAY 1991

Figure 2. Daily Average Flow at Three Locations of the Pen Branch Drainage System: Indian Grave Branch above Road B (IGB), within the K-Reactor Cooling Water Discharge Canal (K-011), and Downstream Pen Branch at Road A-13.2 (A-13.2).

The relationships between flow and TSS were not as distinctive as was expected. Correlation coefficients between flow and TSS values were statistically significant ($r = 0.45$ and 0.22 , at the Road B and Road A-13.2 locations, respectively) but not strong. Figure 3 shows a scatter plot matrix illustration of TSS data plotted against flow at the Road A-13.2 location for data collected from February through May 1991, the period encompassing most of the pump testing. The data contain numerous outliers for which no explanation is obvious. Because of the extreme variability in TSS in relation to flow at specific times, The data were primarily analyzed in terms of daily average values.

Figure 4 shows daily average TSS values during the study period. There were four distinct peaks of TSS values. The first peak occurred in October and appeared to be caused by heavy rainfall. The second peak occurred in late November. This peak occurred at only the Road A-13.2 location and is believed to be the result of a sampling problem when a transient log dislodged the intake hose of the sampling device. The third and fourth peaks of TSS values occurred in mid-February and mid-March and appeared to be primarily caused by the pump testing.

Figures 5 and 6 show TSS values in relation to corresponding flows at the two sampling locations. With the exception of the previously discussed anomalous TSS peak in November at Road A-13.2, flows and TSS values tend to follow similar patterns. The first surges in flow attributable to the pump tests in February and March resulted in much higher corresponding TSS values than did subsequent flow surges of similar magnitude. This finding resulted in a decision which allowed the pump tests to be conducted more quickly by rapidly increasing and decreasing flow as routine pump test protocols dictated, rather than being restricted to stepwise increases in flow as a precaution against causing TSS related adverse impacts to the stream biota during the tests.

Consistent relatively high TSS values at Road A-13.2 during late May did not correspond to high flows, heavy rainfall or high TSS or flow values at Road B during this period. Two possible explanations for these results are that work was being done on the railroad bridge a short distance above the Road A-13.2 sampling location during this period and there were ongoing activities associated with the K-Reactor cooling tower. Either or both of these activities may have resulted in an increased load of particulate material during the late May sample collections. Cooling tower construction may have also been a factor in some of the other relatively high TSS values that were reported at the Road A-13.2 location with no corresponding increased flow.

TSS VERSUS FLOW: FEBRUARY - MAY 1991 ROAD A-13.2

Figure 3. Scatter Plot Showing Correlations of TSS and Flow Measurements in Pen Branch at Road A-13.2, February through May 1991.

TSS AT ROAD B AND ROAD A13.2 OCTOBER 1990 - MAY 1991

Figure 4. Daily Averages of TSS Values Measured in Indian Grave Branch at Road B and in Pen Branch at Road A-13.2, October 1990 through May 1991.

TSS AND FLOW AT ROAD B OCTOBER 1990 - MAY 1991

Figure 5. Daily Average TSS Values vs. Flow Measured Simultaneously in Indian Grave Branch at Road B, October 1990 through May 1991.

TSS AND FLOW AT RD A-13.2 OCTOBER 1990 - MAY 1991

Figure 6. Daily Average TSS Values vs. Flow Measured Simultaneously in Pen Branch at Road A-13.2, October 1990 through May 1991.

Influence of Rainfall on TSS and Flow

Figures 7 and 8 show total daily rainfall in relation to daily average TSS values at the two sampling locations. Figures 9 and 10 show a similar comparison of rainfall in relation to flow. It is clear that the high TSS values in October were caused by heavy rainfall (9.74 inches in three days; Appendix Table A-3) that preceded the peaks. High flow and TSS levels at the Road A-13.2 location in late January also appeared to be caused by heavy rainfall (Appendix Table A-3). Conversely, the TSS peaks in February at Road A-13.2 and at Road B in February and March did not appear to be substantially influenced by rainfall since higher rainfall during other periods resulted in much lower TSS values. Rainfall was more strongly correlated with flow at Road A-13.2 than at Road B. However, because of the flow increases caused by the pump tests, neither station showed a distinct relationship between rainfall and flow during much of the study period.

TSS Values in Relation to Compliance Limits and Environmental Impacts.

This study was not conducted as a regulatory monitoring/compliance activity and the sampling was not conducted at specifically designated NPDES Outfall sampling locations. However, for comparative purposes, the data were processed and examined similarly. NPDES limits for TSS are based on daily maximum and monthly average values. The daily maximum is defined as the highest daily average during a month, while the monthly average is defined as the arithmetic mean of all samples collected during a month. The NPDES effluent limitation value that is most relevant to this study is a daily maximum of 60 mg/l, the upper acceptable limit proposed for the future K-Reactor cooling tower blowdown outfall which will be designated as NPDES Outfall K-018. This station will be very close to the Road B sampling location of the present study. Although the present draft permit does not stipulate a monthly mean TSS limit for Outfall K-018, several other SRS outfalls are required to meet a limit of 30 mg/l. Thus, for comparative purposes, values from the present study were compared to "typical" NPDES limits which are assumed to represent levels that would not result in any significant adverse impact if not exceeded.

The monthly mean and daily maximum TSS values obtained from the present study along with corresponding flow values and the amount of precipitation received during each month of the study are shown in Table 1. The monthly mean TSS values at the two locations reached or exceeded "typical" NPDES limits in March at the Road B location and in October at the Road A-13.2 location. As previously discussed, pump testing was a substantial factor in the relatively high March value and not a factor in the high monthly mean TSS value for October. However, both October and March had considerable

TSS AT ROAD B AND RAINFALL IN K AREA OCTOBER 1990 - MAY 1991

Figure 7. Total Daily Rainfall in Relation to Daily Average TSS Values In Indian Grave Branch at Road B.

TSS AT ROAD A-13.2 VS RAINFALL IN K AREA OCTOBER 1990 - MAY 1991

Figure 8. Total Daily Rainfall in Relation to Daily Average TSS Values in Pen Branch at Road A-13.2.

RAINFALL AND FLOW AT ROAD B OCTOBER 1990 - MAY 1991

Figure 9. Total Daily Rainfall in Relation to Daily Average Flow Measured Concurrently with TSS Sampling in Indian Grave Branch at Road B.

RAINFALL AND FLOW AT ROAD A-13.2 OCTOBER 1990 - MAY 1991

Figure 10. Total Daily Rainfall in Relation to Daily Average Flow Measured Concurrently with TSS Sampling in Pen Branch at Road A-13.2.

Table 1. Monthly Average* and Daily Maximum (in Parentheses)** Total Suspended Solids (mg/l) and Flow (cfs) at Two Locations of the Pen Branch System before and during K Reactor Pump Testing. Total Inches of Rainfall Recorded in K Area Are Also Reported for Each Month.

MONTH	TOTAL SUSPENDED SOLIDS			DISCHARGE (FLOW)				PRECIPITATION IN K AREA
	ROAD B		ROAD A13.2	ROAD B		ROAD A13.2		
OCT 90	27	(51)	40 (60)	51	(60)	298	(714)	15.01
NOV 90	4	(4)	30 (57)	53	(64)	79	(84)	1.44
DEC 90	11	(22)	17 (32)	69	(79)	79	(93)	1.41
JAN 91	4	(6)	13 (34)	76	(78)	153	(355)	7.09
FEB 91	19	(76)	19 (56)	200	(416)	242	(527)	2.46
MAR 91	42	(113)	17 (29)	281	(454)	284	(453)	8.40
APR 91	10	(19)	14 (24)	185	(449)	196	(379)	7.30
MAY 91	8	(16)	15 (39)	52	(102)	72	(166)	2.66

* Monthly average = arithmetic mean of all samples collected during month.

** Daily maximum = highest daily average during month.

rainfall, 15.01 and 8.40 inches, respectively. Daily maximum TSS values equalled or exceeded 60 mg/l in February and March at the Road B location and in October at the Road A-13.2 location. These values corresponded with the highest flow values recorded during the study. Again, the relatively high TSS value in October appeared to be entirely caused by substantial rainfall, while the relatively high values for February and March were caused by a combination of rainfall and pump testing, with pump testing being the primary factor.

Flow at Road B was more indicative of pump test activity than flow at Road A-13.2 because a much higher percentage of the flow at Road B comes from K-Reactor cooling water discharges. Flow values at Road B did not correspond to rainfall values nearly as much as did the flow values at Road A-13.2. The flow at Road A-13.2 was highest in October during a rain storm (when no pump testing was being conducted) than at any other time during the study, while the flow at Road B was highest in February, March and April, the period that most of the pump testing was conducted.

In summary, pump testing clearly caused higher TSS levels at the two sampling locations in the Pen Branch system. The artificially elevated TSS levels were more pronounced at the Road B location than at the farther downstream Road A-13.2 location. However, the relatively few times that TSS values at the two sampling locations exceeded "typical" NPDES limits and the occasional relatively high TSS and flow values that could be clearly attributed to rainfall alone indicated that no major adverse environmental impacts were caused to the stream system as a result of the pump testing.

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APPENDIX

Appendix Table A1. Total Suspended Solids (TSS) and Flow in Pen Branch at Road A-13.2, October 1990 through May 1991.

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
10/12/90	1030	21	594
10/12/90	1830	29	833
10/12/90	2230	16	714
10/12/90	MEAN	22	714
10/13/90	230	12	637
10/13/90	630	12	373
10/13/90	1030	21	248
10/13/90	1430	95	166
10/13/90	1830	145	127
10/13/90	2230	77	99
10/13/90	MEAN	60	275
10/15/90	1300	41	81
10/15/90	1700	23	72
10/15/90	2100	22	72
10/15/90	MEAN	28	75
10/16/90	100	19	78
10/16/90	500	27	78
10/16/90	MEAN	23	78
10/90	AVE.	40	298
11/28/90	1730	57	78
11/29/90	1730	25	84
11/30/90	1730	8	74
11/90	AVE	30	79
12/1/90	1730	4	78
12/2/90	1730	5	67
12/3/90	1730	7	69

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
12/4/90	1400	20	70
12/4/90	2000	8	68
12/4/90	MEAN	14	69
12/5/90	200	3	68
12/5/90	800	9	68
12/5/90	1400	7	68
12/5/90	2000	7	68
12/5/90	MEAN	7	68
12/6/90	200	10	66
12/6/90	800	11	66
12/6/90	1400	12	68
12/6/90	2000	12	68
12/6/90	MEAN	11	67
12/7/90	200	20	72
12/7/90	800	23	83
12/7/90	MEAN	21	78
12/10/90	1430	13	84
12/10/90	2030	7	83
12/10/90	MEAN	10	84
12/11/90	230	23	81
12/11/90	1500	13	76
12/11/90	2100	12	76
12/11/90	MEAN	16	78
12/12/90	300	18	76
12/12/90	900	14	76
12/12/90	1500	10	67
12/12/90	2100	8	76
12/12/90	MEAN	12	74
12/13/90	300	14	76
12/13/90	900	16	74
12/13/90	1500	16	74
12/13/90	2100	12	73
12/13/90	MEAN	14	74

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
12/14/90	300	14	74
12/14/90	900	19	78
12/14/90	1500	15	78
12/14/90	2100	14	78
12/14/90	MEAN	15	77
12/15/90	300	19	78
12/15/90	900	9	77
12/15/90	1500	13	77
12/15/90	2100	15	76
12/15/90	MEAN	14	77
12/16/90	300	12	76
12/16/90	900	7	75
12/16/90	1500	13	76
12/16/90	2100	16	74
12/16/90	MEAN	12	76
12/18/90	1000	14	89
12/18/90	1600	11	90
12/18/90	2200	17	90
12/18/90	MEAN	14	90
12/19/90	400	24	93
12/19/90	1000	21	96
12/19/90	1600	17	94
12/19/90	2200	25	85
12/19/90	MEAN	21	92
12/20/90	400	41	84
12/20/90	1000	36	89
12/20/90	1600	23	100
12/20/90	2200	30	97
12/20/90	MEAN	32	93
12/21/90	400	32	96
12/21/90	1000	24	94
12/21/90	1600	14	92
12/21/90	2200	44	83
12/21/90	MEAN	28	91

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
12/22/90	400	24	82
12/22/90	1000	28	79
12/22/90	1600	36	78
12/22/90	2200	22	78
12/22/90	MEAN	27	80
12/23/90	400	17	77
12/23/90	1000	23	76
12/23/90	1600	31	74
12/23/90	MEAN	23	76
12/90	AVE	17	79
1/22/91	1100	9	94
1/22/91	1700	4	92
1/22/91	2300	14	92
1/22/91	MEAN	9	93
1/23/91	500	7	82
1/23/91	1100	7	88
1/23/91	1700	13	89
1/23/91	2300	8	93
1/23/91	MEAN	9	88
1/24/91	500	7	83
1/24/91	1100	19	101
1/24/91	1700	12	190
1/24/91	2300	16	215
1/24/91	MEAN	13	147
1/25/91	500	11	178
1/25/91	1100	8	145
1/25/91	1700	12	124
1/25/91	2300	12	113
1/25/91	MEAN	11	140
1/26/91	500	6	113
1/26/91	1100	8	107
1/26/91	1700	8	104
1/26/91	2300	6	101
1/26/91	MEAN	7	106

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
1/27/91	500	5	101
1/27/91	1100	6	101
1/27/91	1700	9	99
1/27/91	2300	7	99
1/27/91	MEAN	6	100
1/29/91	1100	10	97
1/29/91	1700	8	97
1/29/91	2300	19	117
1/29/91	MEAN	12	104
1/30/91	500	18	104
1/30/91	1100	39	282
1/30/91	1700	52	600
1/30/91	2300	27	435
1/30/91	MEAN	34	355
1/31/91	500	18	300
1/31/91	1100	15	202
1/31/91	1700	12	163
1/31/91	2300	15	132
1/31/91	MEAN	15	199
01/91	AVE	13	153
2/1/91	500	16	137
2/1/91	1100	14	125
2/1/91	1700	18	122
2/1/91	2300	10	108
2/1/91	MEAN	14	123
2/2/91	500	13	108
2/2/91	1100	11	111
2/2/91	1700	13	106
2/2/91	2300	14	106
2/2/91	MEAN	13	108
2/3/91	500	15	108
2/3/91	1100	16	103
2/3/91	1700	6	103
2/3/91	2300	6	103

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
2/3/91	MEAN	11	104
2/4/91	500	9	101
2/5/91	1800	7	97
2/5/91	2000	9	97
2/5/91	2200	13	97
2/5/91	2400	6	97
2/5/91	MEAN	8	97
2/6/91	200	8	94
2/6/91	400	10	94
2/6/91	600	8	94
2/6/91	800	5	94
2/6/91	1000	7	94
2/6/91	1200	9	94
2/6/91	1400	3	97
2/6/91	1600	8	106
2/6/91	1800	11	111
2/6/91	2000	15	106
2/6/91	2200	29	154
2/6/91	2400	30	154
2/6/91	MEAN	12	108
2/7/91	200	31	129
2/7/91	400	37	159
2/7/91	600	36	198
2/7/91	800	29	242
2/7/91	1000	14	265
2/7/91	1200	2	300
2/7/91	1400	1	319
2/7/91	1600	22	254
2/7/91	1800	7	354
2/7/91	2000	19	254
2/7/91	2200	14	325
2/7/91	2400	12	297
2/7/91	MEAN	18	258
2/8/91	200	15	288
2/8/91	400	18	271
2/8/91	600	15	262
2/8/91	800	12	248
2/8/91	1000	14	237
2/8/91	1200	1	226
2/8/91	1400	14	215

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
2/8/91	1600	13	210
2/8/91	1800	13	206
2/8/91	2000	15	206
2/8/91	2200	14	202
2/8/91	2400	14	198
2/8/91	MEAN	13	231
2/9/91	200	14	206
2/9/91	400	12	204
2/9/91	600	12	190
2/9/91	800	14	206
2/9/91	930	12	206
2/9/91	1130	8	196
2/9/91	1330	19	192
2/9/91	1530	7	174
2/9/91	1730	6	198
2/9/91	1930	10	200
2/9/91	2130	8	218
2/9/91	2330	20	248
2/9/91	MEAN	11	203
2/10/91	130	25	231
2/10/91	330	25	259
2/10/91	530	38	277
2/10/91	730	28	291
2/10/91	930	109	306
2/10/91	MEAN	45	273
2/11/91	930	58	457
2/11/91	1130	66	500
2/11/91	1330	68	532
2/11/91	1530	50	549
2/11/91	1730	58	549
2/11/91	1930	52	543
2/11/91	2130	49	538
2/11/91	2230	45	543
2/11/91	MEAN	56	527
2/12/91	130	32	538
2/12/91	330	77	158
2/12/91	530	38	107
2/12/91	730	77	240
2/12/91	930	50	210

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/12/91	1130	43	369
2/12/91	1330	35	511
2/12/91	1530	27	560
2/12/91	1730	31	577
2/12/91	1930	27	242
2/12/91	2130	29	577
2/12/91	2330	24	435
2/12/91	MEAN	41	377
2/13/91	130	25	176
2/13/91	330	24	134
2/13/91	530	43	237
2/13/91	730	40	306
2/13/91	1000	31	511
2/13/91	1600	26	543
2/13/91	2200	25	522
2/13/91	MEAN	30	347
2/14/91	400	23	511
2/14/91	1000	26	516
2/14/91	1400	21	506
2/14/91	1500	19	506
2/14/91	1600	18	495
2/14/91	1700	19	495
2/14/91	1800	17	481
2/14/91	1900	17	476
2/14/91	2000	20	404
2/14/91	2100	23	350
2/14/91	2200	32	396
2/14/91	2300	24	448
2/14/91	2400	23	422
2/14/91	MEAN	21	462
2/15/91	100	20	388
2/15/91	200	23	339
2/15/91	300	23	354
2/15/91	400	21	392
2/15/91	500	19	417
2/15/91	600	17	435
2/15/91	700	17	435
2/15/91	800	19	435
2/15/91	900	19	426
2/15/91	930	27	430
2/15/91	1130	25	430
2/15/91	1330	25	430

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/15/91	1530	24	422
2/15/91	1730	22	422
2/15/91	1930	19	422
2/15/91	2130	18	422
2/15/91	MEAN	21	412
2/19/91	1000	7	158
2/19/91	1200	7	161
2/19/91	1400	10	161
2/19/91	1600	15	147
2/19/91	1800	8	108
2/19/91	2000	11	128
2/19/91	2200	18	120
2/19/91	2400	7	120
2/19/91	MEAN	10	138
2/20/91	200	24	129
2/20/91	400	20	186
2/20/91	600	22	184
2/20/91	800	19	186
2/20/91	1000	14	182
2/20/91	1200	14	182
2/20/91	1400	15	186
2/20/91	1600	20	182
2/20/91	1800	14	182
2/20/91	2000	11	184
2/20/91	2200	17	182
2/20/91	2400	14	188
2/20/91	MEAN	17	179
2/21/91	200	9	168
2/21/91	400	9	165
2/21/91	600	1	165
2/21/91	800	8	158
2/21/91	1000	10	151
2/21/91	1200	8	147
2/21/91	1400	9	137
2/21/91	1600	9	144
2/21/91	1800	5	140
2/21/91	2000	8	131
2/21/91	2200	9	128
2/21/91	2400	5	125
2/21/91	MEAN	7	146

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/22/91	200	8	132
2/22/91	400	9	125
2/22/91	600	8	117
2/22/91	800	15	140
2/22/91	930	6	128
2/22/91	1530	7	122
2/22/91	2130	8	128
2/22/91	MEAN	8	127
2/23/91	330	21	131
2/23/91	930	16	129
2/23/91	1530	11	123
2/23/91	2130	11	122
2/23/91	MEAN	14	126
2/24/91	330	12	121
2/24/91	930	13	106
2/24/91	1530	9	103
2/24/91	2130	9	100
2/24/91	MEAN	11	107
2/25/91	330	20	159
2/25/91	930	16	168
2/25/91	1530	16	158
2/25/91	2130	16	156
2/25/91	MEAN	17	160
2/26/91	330	23	122
2/26/91	930	12	96
2/26/91	1530	10	93
2/26/91	2130	9	93
2/26/91	MEAN	13	101
2/27/91	330	10	94
2/27/91	930	9	93
2/27/91	1530	6	94
2/27/91	2130	4	88
2/27/91	MEAN	7	92
2/28/91	330	4	83
02/91	MEAN	19	242

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
3/5/91	900	26	358
3/5/91	1500	38	350
3/5/91	2100	24	350
3/5/91	MEAN	29	353
3/6/91	300	24	322
3/6/91	900	14	373
3/6/91	1500	36	549
3/6/91	2100	24	538
3/6/91	MEAN	24	445
3/7/91	300	18	413
3/7/91	900	27	404
3/7/91	1500	20	298
3/7/91	2100	28	409
3/7/91	MEAN	23	381
3/8/91	300	26	404
3/8/91	900	17	422
3/8/91	1500	15	329
3/8/91	2100	20	268
3/8/91	MEAN	19	356
3/9/91	300	16	245
3/9/91	900	15	251
3/9/91	1500	14	242
3/9/91	2100	4	245
3/9/91	MEAN	12	246
3/10/91	300	9	481
3/10/91	900	20	202
3/10/91	1500	12	188
3/10/91	2100	14	194
3/10/91	MEAN	14	266
3/11/91	300	12	176
3/12/91	1000	10	245
3/12/91	1600	17	192
3/12/91	2200	18	192
3/12/91	MEAN	15	210

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
3/13/91	400	24	168
3/13/91	1000	18	184
3/13/91	1600	19	229
3/13/91	2200	12	280
3/13/91	MEAN	18	215
3/14/91	400	7	245
3/14/91	1000	14	476
3/14/91	1600	12	457
3/14/91	2200	12	138
3/14/91	MEAN	11	329
3/15/91	400	11	200
3/15/91	1000	9	74
3/15/91	1600	5	234
3/15/91	2200	8	231
3/15/91	MEAN	8	185
3/16/91	400	5	206
3/16/91	1000	4	229
3/16/91	1600	5	226
3/16/91	2200	2	210
3/16/91	MEAN	4	218
3/17/91	400	5	127
3/17/91	1000	20	259
3/17/91	1600	8	256
3/17/91	2200	6	256
3/17/91	MEAN	10	225
3/18/91	400	5	417
3/19/91	1000	20	430
3/19/91	1600	22	457
3/19/91	2200	20	471
3/19/91	MEAN	21	453
3/20/91	400	20	248
3/20/91	1000	16	384
3/20/91	1600	16	392
3/20/91	2200	14	384

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
3/20/91	MEAN	16	352
3/21/91	400	19	388
3/21/91	1000	23	343
3/21/91	1600	14	377
3/21/91	2200	14	381
3/21/91	MEAN	17	372
3/22/91	400	19	404
3/22/91	1000	13	396
3/22/91	1600	10	396
3/22/91	2200	13	396
3/22/91	MEAN	13	398
3/23/91	400	11	396
3/23/91	1000	19	172
3/23/91	1600	16	137
3/23/91	2200	16	49
3/23/91	MEAN	15	188
3/24/91	400	12	70
3/24/91	1000	14	76
3/24/91	1600	11	74
3/24/91	2200	11	68
3/24/91	MEAN	12	72
3/25/91	400	19	67
3/26/91	930	7	138
3/26/91	1530	16	117
3/26/91	2130	59	481
3/26/91	MEAN	27	245
3/27/91	330	37	369
3/27/91	930	18	358
3/27/91	1530	28	313
3/27/91	2130	22	381
3/27/91	MEAN	26	355
3/28/91	330	17	377
3/28/91	930	17	373
3/28/91	1530	14	377

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
3/28/91	2130	17	373
3/28/91	MEAN	16	375
3/29/91	330	15	506
3/29/91	930	15	168
3/29/91	1530	46	56
3/29/91	2130	28	358
3/29/91	MEAN	26	272
3/30/91	330	20	329
3/30/91	930	17	291
3/30/91	1530	15	161
3/30/91	2130	11	122
3/30/91	MEAN	16	226
3/31/91	330	18	154
3/31/91	930	14	140
3/31/91	1530	12	132
3/31/91	2130	19	168
3/31/91	MEAN	16	149
03/91	AVE	17	284
4/1/91	330	17	144
4/1/91	1030	11	93
4/1/91	1630	15	125
4/1/91	2230	18	131
4/1/91	MEAN	15	123
4/2/91	430	21	129
4/2/91	1030	12	127
4/2/91	1630	14	131
4/2/91	2230	17	132
4/2/91	MEAN	16	130
4/3/91	430	22	131
4/3/91	1030	22	129
4/3/91	1630	22	128
4/3/91	2230	23	127
4/3/91	MEAN	22	129

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/4/91	430	19	127
4/4/91	1030	16	127
4/4/91	1630	16	127
4/4/91	2230	14	124
4/4/91	MEAN	16	126
4/5/91	430	22	121
4/5/91	1030	14	122
4/5/91	1630	34	231
4/5/91	2230	22	259
4/5/91	MEAN	23	183
4/6/91	430	24	259
4/6/91	1030	16	200
4/6/91	MEAN	20	229
4/8/91	1000	11	144
4/8/91	1600	10	147
4/8/91	2200	10	151
4/8/91	MEAN	10	147
4/9/91	400	14	161
4/9/91	1000	11	163
4/9/91	1600	14	132
4/9/91	2200	7	144
4/9/91	MEAN	11	150
4/10/91	400	12	137
4/10/91	1000	13	137
4/10/91	1600	14	149
4/10/91	2200	11	142
4/10/91	MEAN	12	141
4/11/91	400	9	138
4/11/91	1000	10	121
4/11/91	1600	12	121
4/11/91	2200	11	128
4/11/91	MEAN	10	127
4/12/91	400	12	96
4/12/91	1000	16	104

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
4/12/91	1600	11	118
4/12/91	2200	11	400
4/12/91	MEAN	12	180
4/13/91	400	43	163
4/13/91	1000	20	152
4/13/91	1600	11	121
4/13/91	2200	10	121
4/13/91	MEAN	21	139
4/14/91	400	11	124
4/16/91	1000	9	124
4/16/91	1600	6	129
4/16/91	2200	17	118
4/16/91	MEAN	11	124
4/17/91	400	7	62
4/17/91	1000	11	122
4/17/91	1600	12	297
4/17/91	2200	31	282
4/17/91	MEAN	15	191
4/18/91	400	14	66
4/18/91	1000	10	400
4/18/91	1600	15	444
4/18/91	2200	8	453
4/18/91	MEAN	12	341
4/19/91	400	8	204
4/19/91	1000	9	404
4/19/91	1600	8	409
4/19/91	2200	10	413
4/19/91	MEAN	9	357
4/20/91	400	6	490
4/20/91	1000	6	485
4/20/91	1600	15	103
4/20/91	2200	8	196
4/20/91	MEAN	8	318

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/21/91	400	5	381
4/21/91	1000	9	381
4/21/91	1600	9	381
4/21/91	2200	7	373
4/21/91	MEAN	8	379
4/22/91	400	12	373
4/23/91	900	16	373
4/23/91	1500	13	310
4/23/91	2100	11	373
4/23/91	MEAN	13	357
4/24/91	300	10	404
4/24/91	900	11	400
4/24/91	1500	18	384
4/24/91	2100	13	291
4/24/91	MEAN	13	370
4/25/91	300	8	85
4/25/91	900	4	75
4/25/91	1500	12	75
4/25/91	2100	9	70
4/25/91	MEAN	8	77
4/26/91	300	8	66
4/26/91	900	8	66
4/26/91	1500	9	63
4/26/91	2100	8	63
4/26/91	MEAN	8	64
4/27/91	300	4	52
4/27/91	900	48	64
4/27/91	1500	29	138
4/27/91	2100	14	145
4/27/91	MEAN	24	100
4/28/91	300	7	159
4/28/91	900	20	122
4/28/91	1500	15	310
4/28/91	2100	10	285

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/28/91	MEAN	13	219
4/29/91	300	13	208
4/30/91	1500	16	322
4/30/91	2100	14	93
4/30/91	MEAN	15	207
04/91	AVE	14	196
5/1/91	300	11	97
5/1/91	900	12	92
5/1/91	1500	13	106
5/1/91	2100	10	110
5/1/91	MEAN	11	101
5/2/91	300	11	97
5/2/91	900	8	79
5/2/91	1500	8	76
5/2/91	2100	16	75
5/2/91	MEAN	11	82
5/3/91	300	11	73
5/3/91	900	8	137
5/3/91	1500	9	137
5/3/91	2100	7	140
5/3/91	MEAN	8	122
5/4/91	300	4	117
5/4/91	900	8	117
5/4/91	1500	7	120
5/4/91	2100	8	128
5/4/91	MEAN	6	120
5/5/91	300	7	134
5/5/91	900	10	134
5/5/91	1500	21	147
5/5/91	2100	14	251
5/5/91	MEAN	13	166
5/7/91	800	10	152
5/7/91	1400	6	128

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/7/91	2000	6	77
5/7/91	MEAN	7	119
5/8/91	200	6	72
5/8/91	800	6	69
5/8/91	1400	5	79
5/8/91	2000	10	70
5/8/91	MEAN	7	73
5/9/91	200	11	69
5/9/91	800	12	64
5/9/91	1400	9	62
5/9/91	2000	11	73
5/9/91	MEAN	11	67
5/10/91	200	10	73
5/10/91	800	9	71
5/10/91	1400	6	68
5/10/91	2000	8	63
5/10/91	MEAN	8	69
5/11/91	200	11	63
5/11/91	800	8	63
5/11/91	1400	6	62
5/11/91	2000	8	60
5/11/91	MEAN	8	62
5/12/91	200	10	59
5/12/91	800	7	59
5/12/91	1400	10	59
5/12/91	2000	12	54
5/12/91	MEAN	10	58
5/13/91	200	7	63
5/14/91	800	19	93
5/14/91	1400	17	83
5/14/91	2000	16	72
5/14/91	MEAN	17	83
5/15/91	200	12	68

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/15/91	800	13	63
5/15/91	1400	30	59
5/15/91	2000	8	56
5/15/91	MEAN	16	61
5/16/91	200	15	56
5/16/91	800	16	53
5/16/91	1400	26	47
5/16/91	2000	21	46
5/16/91	MEAN	19	50
5/17/91	200	23	46
5/17/91	800	12	46
5/17/91	1400	16	46
5/17/91	2000	25	50
5/17/91	MEAN	19	47
5/18/91	200	21	46
5/18/91	800	19	46
5/18/91	1400	21	45
5/18/91	2000	24	45
5/18/91	MEAN	21	45
5/21/91	800	46	52
5/21/91	1400	32	54
5/21/91	2000	21	53
5/21/91	MEAN	33	53
5/22/91	200	30	53
5/22/91	800	26	45
5/22/91	1400	16	45
5/22/91	2000	12	45
5/22/91	MEAN	21	47
5/23/91	200	23	45
5/23/91	800	16	45
5/23/91	1400	35	45
5/23/91	2000	20	45
5/23/91	MEAN	23	45
5/24/91	200	21	45

APPENDIX TABLE A1. (CONT.)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/24/91	800	19	43
5/24/91	1400	18	43
5/24/91	2000	13	58
5/24/91	MEAN	18	47
5/25/91	800	5	39
5/25/91	1400	21	39
5/25/91	2000	93	39
5/25/91	MEAN	39	39
5/26/91	200	33	38
5/26/91	1400	19	38
5/26/91	MEAN	26	38
5/28/91	1300	32	45
5/28/91	1900	12	39
5/28/91	MEAN	22	42
5/29/91	100	21	34
5/31/91	1900	16	46
05/91	AVE	15	72

Appendix Table A2. Total Suspended Solids (TSS) and Flow in Indian Grave Branch at Road B, October 1990 through May 1991.

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
10/12/90	1115	106	52
10/12/90	1515	21	52
10/12/90	1915	70	52
10/12/90	2315	7	52
10/12/90	MEAN	51	52
10/13/90	315	5	52
10/13/90	715	60	52
10/13/90	1115	6	52
10/13/90	1515	7	52
10/13/90	1915	18	46
10/13/90	2315	8	46
10/13/90	MEAN	17	50
10/14/90	315	28	46
10/14/90	715	15	48
10/14/90	1115	14	48
10/14/90	1515	15	46
10/14/90	1915	18	46
10/14/90	2315	51	44
10/14/90	MEAN	23	46
10/15/90	315	26	50
10/15/90	715	31	52
10/15/90	1115	27	52
10/15/90	1515	22	44
10/15/90	1915	29	52
10/15/90	2315	20	56
10/15/90	MEAN	26	51
10/16/90	315	26	56
10/16/90	715	23	64
10/16/90	MEAN	24	60
10/90	AVE	27	51
11/28/90	1800	4	48
11/29/90	1800	4	48

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
11/30/90	1800	4	64
11/90	AVE	4	53
12/01/90	1800	4	60
12/02/90	1800	7	60
12/03/90	1800	8	60
12/04/90	1500	6	60
12/04/90	2000	38	60
12/04/90	MEAN	22	60
12/05/90	200	22	62
12/10/90	1530	5	74
12/11/90	1400	8	69
12/11/90	2000	8	69
12/11/90	MEAN	8	69
12/12/90	200	7	69
12/12/90	800	6	69
12/12/90	1400	6	69
12/12/90	2000	9	69
12/12/90	MEAN	7	69
12/13/90	200	6	67
12/13/90	800	6	64
12/13/90	1400	8	64
12/13/90	2000	9	64
12/13/90	MEAN	7	65
12/14/90	200	10	71
12/14/90	800	7	69
12/14/90	1400	7	69
12/14/90	2000	7	69
12/14/90	MEAN	8	70
12/15/90	200	7	69
12/15/90	800	10	69

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
12/15/90	1400	8	69
12/15/90	2000	9	67
12/15/90	MEAN	8	68
12/16/90	200	4	67
12/16/90	800	8	67
12/16/90	1400	10	67
12/16/90	2000	12	64
12/16/90	MEAN	8	66
12/18/90	900	24	79
12/18/90	2100	5	79
12/18/90	MEAN	14	79
12/19/90	300	7	79
12/19/90	900	14	85
12/19/90	1500	15	74
12/19/90	2100	10	74
12/19/90	MEAN	11	78
12/20/90	300	13	74
12/20/90	900	14	85
12/20/90	1500	12	74
12/20/90	2100	19	74
12/20/90	MEAN	14	77
12/21/90	300	12	74
12/21/90	900	12	74
12/21/90	1500	17	69
12/21/90	2100	10	64
12/21/90	MEAN	13	69
12/22/90	300	18	64
12/22/90	900	9	64
12/22/90	1500	16	64
12/22/90	2100	18	64
12/22/90	MEAN	15	64

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
12/23/90	300	15	64
12/23/90	900	10	64
12/23/90	1500	15	64
12/23/90	MEAN	13	64
12/90	AVE	11	69
1/22/91	1000	4	74
1/22/91	1600	3	74
1/22/91	2200	3	74
1/22/91	MEAN	3	74
1/23/91	400	5	74
1/23/91	1000	4	74
1/23/91	1600	3	74
1/23/91	2200	6	79
1/23/91	MEAN	4	75
1/24/91	400	2	79
1/24/91	1000	4	79
1/24/91	1600	3	79
1/24/91	2200	4	76
1/24/91	MEAN	3	78
1/25/91	400	6	76
1/25/91	1000	4	79
1/25/91	1600	2	79
1/25/91	2200	4	76
1/25/91	MEAN	4	78
1/26/91	400	4	79
1/26/91	1000	3	79
1/26/91	1600	4	76
1/26/91	2200	5	76
1/26/91	MEAN	4	78
1/27/91	400	4	76
1/27/91	1000	6	76
1/27/91	1600	3	76
1/27/91	2200	4	74
1/27/91	MEAN	4	76

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
1/28/91	400	6	76
1/29/91	1000	7	74
1/29/91	1600	3	74
1/29/91	2200	5	74
1/29/91	MEAN	5	74
1/30/91	400	5	71
1/30/91	1000	9	74
1/30/91	1600	5	74
1/30/91	2200	6	71
1/30/91	MEAN	6	73
1/31/91	400	5	71
1/31/91	1000	6	74
1/31/91	1600	4	85
1/31/91	2200	9	79
1/31/91	MEAN	6	77
01/91	AVE	4	76
2/1/91	400	7	79
2/1/91	1000	20	74
2/1/91	1600	9	71
2/1/91	2200	14	71
2/1/91	MEAN	12	74
2/2/91	400	11	76
2/2/91	1000	9	74
2/2/91	1600	10	74
2/2/91	2200	15	74
2/2/91	MEAN	11	75
2/3/91	400	12	74
2/3/91	1000	11	74
2/3/91	1600	10	74
2/3/91	2200	9	74
2/3/91	MEAN	10	74
2/4/91	400	12	74
2/5/91	1730	8	74

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/5/91	1930	2	74
2/5/91	2130	6	74
2/5/91	2330	6	74
2/5/91	MEAN	5	74
2/6/91	130	5	74
2/6/91	330	4	74
2/6/91	530	4	74
2/6/91	730	5	74
2/6/91	930	7	75
2/6/91	1130	5	73
2/6/91	1330	7	90
2/6/91	1530	8	85
2/6/91	1730	8	85
2/6/91	1930	24	127
2/6/91	2130	18	124
2/6/91	2330	24	134
2/6/91	MEAN	10	91
2/7/91	130	20	144
2/7/91	330	30	144
2/7/91	530	19	144
2/7/91	730	25	147
2/7/91	930	18	150
2/7/91	1130	4	150
2/7/91	1330	14	147
2/7/91	1530	17	150
2/7/91	1730	11	150
2/7/91	1930	10	150
2/7/91	2130	18	150
2/7/91	2330	15	150
2/7/91	MEAN	16	148
2/8/91	130	17	150
2/8/91	330	20	150
2/8/91	530	18	150
2/8/91	730	20	150
2/8/91	930	13	150
2/8/91	1130	11	150
2/8/91	1330	13	149
2/8/91	1530	9	149
2/8/91	1730	9	145
2/8/91	1930	11	144
2/8/91	2130	12	144
2/8/91	2330	7	144

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/8/91	MEAN	13	148
2/9/91	130	11	144
2/9/91	330	15	144
2/9/91	530	12	160
2/9/91	730	10	145
2/9/91	845	4	144
2/9/91	900	8	144
2/9/91	1100	11	144
2/9/91	1300	35	186
2/9/91	1500	11	158
2/9/91	1700	10	158
2/9/91	1900	31	190
2/9/91	2100	26	198
2/9/91	2300	40	214
2/9/91	MEAN	17	164
2/10/91	100	116	240
2/10/91	300	37	245
2/10/91	500	66	275
2/10/91	700	71	270
2/10/91	900	109	303
2/10/91	1100	91	292
2/10/91	1300	67	292
2/10/91	1500	69	292
2/10/91	1700	54	292
2/10/91	1900	54	303
2/10/91	2100	47	303
2/10/91	2300	52	303
2/10/91	MEAN	69	284
2/11/91	100	50	309
2/11/91	300	100	388
2/11/91	500	116	400
2/11/91	700	106	448
2/11/91	900	87	460
2/11/91	1100	133	466
2/11/91	1300	71	466
2/11/91	1500	64	460
2/11/91	1700	50	460
2/11/91	1900	40	460
2/11/91	2100	47	460
2/11/91	2300	48	214
2/11/91	MEAN	76	416

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
2/12/91	100	25	118
2/12/91	300	16	124
2/12/91	500	46	424
2/12/91	700	26	286
2/12/91	900	52	466
2/12/91	1100	50	460
2/12/91	1300	53	460
2/12/91	1500	31	436
2/12/91	1700	37	436
2/12/91	1900	26	442
2/12/91	2100	24	190
2/12/91	2300	14	158
2/12/91	MEAN	33	333
2/13/91	100	13	144
2/13/91	300	22	315
2/13/91	500	35	448
2/13/91	700	34	448
2/13/91	930	32	448
2/13/91	1530	19	439
2/13/91	2130	23	445
2/13/91	MEAN	25	384
2/14/91	330	25	448
2/14/91	930	23	436
2/14/91	1330	37	436
2/14/91	1430	26	436
2/14/91	1530	24	436
2/14/91	1630	30	358
2/14/91	1730	20	260
2/14/91	1830	39	341
2/14/91	1930	35	445
2/14/91	2030	28	370
2/14/91	2130	24	322
2/14/91	2230	18	346
2/14/91	2330	24	343
2/14/91	MEAN	27	383
2/15/91	30	17	376
2/15/91	130	36	403
2/15/91	230	25	394
2/15/91	330	25	388
2/15/91	430	23	388
2/15/91	530	30	388
2/15/91	630	24	388

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/15/91	730	22	388
2/15/91	830	20	382
2/15/91	900	8	376
2/15/91	1100	14	376
2/15/91	1300	11	376
2/15/91	1500	11	376
2/15/91	1700	3	376
2/15/91	1900	2	376
2/15/91	MEAN	18	383
2/16/91	100	84	436
2/16/91	300	92	436
2/16/91	500	15	128
2/16/91	700	3	74
2/16/91	900	7	76
2/16/91	1100	6	79
2/16/91	1300	12	137
2/16/91	1500	7	130
2/16/91	MEAN	28	187
2/17/91	1000	3	74
2/17/91	1200	9	90
2/17/91	1400	9	115
2/17/91	1600	3	118
2/17/91	1800	6	124
2/17/91	2000	8	124
2/17/91	2200	10	124
2/17/91	2400	9	124
2/17/91	MEAN	7	112
2/18/91	200	7	124
2/18/91	400	5	124
2/18/91	600	5	127
2/18/91	800	9	124
2/18/91	1000	6	124
2/18/91	1200	5	130
2/18/91	1400	19	150
2/18/91	1600	12	137
2/18/91	1800	5	137
2/18/91	2000	7	130
2/18/91	2200	8	130
2/18/91	2400	12	158
2/18/91	MEAN	8	133

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/19/91	200	11	144
2/19/91	400	11	137
2/19/91	600	12	140
2/19/91	800	13	144
2/19/91	930	2	144
2/19/91	1130	6	142
2/19/91	1330	5	139
2/19/91	1530	5	110
2/19/91	1730	4	121
2/19/91	1930	4	112
2/19/91	2130	4	112
2/19/91	2330	7	149
2/19/91	MEAN	7	133
2/20/91	130	11	173
2/20/91	330	6	173
2/20/91	530	8	173
2/20/91	730	7	173
2/20/91	930	7	173
2/20/91	1130	8	173
2/20/91	1330	9	171
2/20/91	1530	6	167
2/20/91	1730	8	169
2/20/91	1930	7	167
2/20/91	2130	5	186
2/20/91	2330	6	143
2/20/91	MEAN	7	170
2/21/91	130	1	145
2/21/91	330	7	147
2/21/91	530	6	142
2/21/91	730	7	140
2/21/91	830	6	140
2/21/91	900	3	130
2/21/91	900	1	137
2/21/91	1100	2	137
2/21/91	1300	2	124
2/21/91	1500	4	124
2/21/91	1700	5	118
2/21/91	1900	5	118
2/21/91	2100	4	115
2/21/91	2300	2	118
2/21/91	MEAN	4	131
2/22/91	100	4	115

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
2/22/91	300	4	118
2/22/91	500	8	165
2/22/91	700	5	112
2/22/91	900	1	112
2/22/91	1500	1	112
2/22/91	2100	1	112
2/22/91	MEAN	3	121
2/23/91	300	7	85
2/23/91	900	3	95
2/23/91	1500	2	98
2/23/91	2100	4	95
2/23/91	MEAN	4	93
2/24/91	300	4	95
2/24/91	900	3	90
2/24/91	1500	2	90
2/24/91	2100	7	134
2/24/91	MEAN	4	102
2/25/91	300	5	150
2/25/91	900	2	150
2/25/91	1500	4	144
2/25/91	2100	2	144
2/25/91	MEAN	3	147
2/26/91	300	1	87
2/26/91	900	1	85
2/26/91	1500	1	85
2/26/91	2100	4	85
2/26/91	MEAN	1	85
2/27/91	300	4	85
2/27/91	900	4	85
2/27/91	1500	6	79
2/27/91	2100	3	82
2/27/91	MEAN	4	82
2/28/91	300	2	85
02/91	AVE	19	198

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
3/5/91	830	52	288
3/5/91	1430	46	292
3/5/91	2030	27	292
3/5/91	MEAN	41	291
3/6/91	230	26	294
3/6/91	830	40	478
3/6/91	1430	43	454
3/6/91	2030	37	460
3/6/91	MEAN	36	422
3/7/91	230	29	457
3/7/91	830	25	337
3/7/91	2030	32	460
3/7/91	MEAN	29	418
3/8/91	230	65	460
3/8/91	830	109	484
3/8/91	1430	172	328
3/8/91	2030	269	321
3/8/91	MEAN	153	398
3/9/91	230	160	315
3/9/91	830	98	328
3/9/91	1430	97	334
3/9/91	2030	98	328
3/9/91	MEAN	113	326
3/10/91	230	59	178
3/10/91	830	96	178
3/10/91	1430	80	169
3/10/91	2030	61	165
3/10/91	MEAN	74	173
3/11/91	230	87	154
3/12/91	900	69	165
3/12/91	1500	66	154
3/12/91	2100	72	154
3/12/91	MEAN	69	158

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS (MG/L)</u>	<u>FLOW (CFS)</u>
3/13/91	300	86	158
3/13/91	900	61	150
3/13/91	1500	64	218
3/13/91	2100	68	190
3/13/91	MEAN	69	179
3/14/91	300	107	472
3/14/91	900	77	460
3/14/91	1500	74	460
3/14/91	2100	34	144
3/14/91	MEAN	73	384
3/15/91	300	19	173
3/15/91	900	21	173
3/15/91	1500	19	178
3/15/91	2100	21	173
3/15/91	MEAN	20	174
3/16/91	300	18	173
3/16/91	900	23	173
3/16/91	1500	13	173
3/16/91	2100	13	173
3/16/91	MEAN	16	173
3/17/91	300	13	165
3/17/91	900	26	292
3/17/91	1500	42	292
3/17/91	2100	42	292
3/17/91	MEAN	31	260
3/18/91	300	61	144
3/19/91	900	24	466
3/19/91	1500	18	442
3/19/91	2100	17	454
3/19/91	MEAN	20	454
3/20/91	300	47	292
3/20/91	900	20	448
3/20/91	1500	13	442
3/20/91	2100	11	448

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
3/20/91	MEAN	23	407
3/21/91	300	22	460
3/21/91	900	74	442
3/21/91	MEAN	48	451
3/26/91	900	13	137
3/26/91	1500	12	130
3/26/91	2100	13	448
3/26/91	MEAN	12	238
3/27/91	300	16	448
3/27/91	900	7	85
3/27/91	1500	15	448
3/27/91	2100	7	448
3/27/91	MEAN	11	357
3/28/91	300	8	448
3/28/91	900	10	442
3/28/91	1500	9	448
3/28/91	2100	6	448
3/28/91	MEAN	8	446
3/29/91	300	9	460
3/29/91	900	2	69
3/29/91	1500	8	79
3/29/91	2100	12	79
3/29/91	MEAN	8	172
3/30/91	300	8	98
3/30/91	900	6	101
3/30/91	1500	5	101
3/30/91	2100	4	101
3/30/91	MEAN	5	100
3/31/91	300	6	98
3/31/91	900	8	101
3/31/91	1500	9	98
3/31/91	2100	9	140
3/31/91	MEAN	8	109

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
03/91	AVE	42	285
4/1/91	300	13	64
4/1/91	1000	7	79
4/1/91	1600	7	112
4/1/91	2200	9	112
4/1/91	MEAN	9	92
4/2/91	400	7	112
4/2/91	1000	15	112
4/2/91	1600	6	118
4/2/91	2200	10	118
4/2/91	MEAN	9	115
4/3/91	400	12	118
4/3/91	1000	22	115
4/3/91	1600	11	112
4/3/91	2200	15	112
4/3/91	MEAN	15	115
4/4/91	400	16	115
4/4/91	1000	14	118
4/4/91	1600	16	115
4/4/91	2200	10	112
4/4/91	MEAN	14	115
4/5/91	400	12	118
4/5/91	1000	8	112
4/5/91	1600	11	112
4/5/91	2200	9	106
4/5/91	MEAN	10	112
4/6/91	400	7	134
4/6/91	1000	8	124
4/6/91	1600	9	124
4/6/91	2200	9	124
4/6/91	MEAN	8	127
4/7/91	400	7	124
4/8/91	930	6	121
4/8/91	1530	5	121

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/8/91	2130	13	121
4/8/91	MEAN	8	121
4/9/91	330	6	118
4/9/91	930	3	109
4/9/91	1530	4	101
4/9/91	2130	8	112
4/9/91	MEAN	5	110
4/10/91	330	6	112
4/10/91	930	8	118
4/10/91	1530	7	124
4/10/91	2130	12	118
4/10/91	MEAN	8	118
4/11/91	330	9	118
4/11/91	930	4	118
4/11/91	1530	6	118
4/11/91	2130	7	118
4/11/91	MEAN	6	118
4/12/91	330	5	112
4/12/91	930	7	106
4/12/91	1530	6	134
4/12/91	2130	11	315
4/12/91	MEAN	7	167
4/13/91	330	6	137
4/13/91	930	6	124
4/13/91	1530	8	118
4/13/91	2130	5	118
4/13/91	MEAN	6	124
4/14/91	330	3	112
4/16/91	900	9	109
4/16/91	1500	5	112
4/16/91	2100	9	106
4/16/91	MEAN	6	110
4/17/91	300	37	106
4/17/91	900	9	292

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/17/91	1500	13	315
4/17/91	2100	16	303
4/17/91	MEAN	18	254
4/18/91	300	21	118
4/18/91	900	21	448
4/18/91	1500	18	448
4/18/91	2100	16	442
4/18/91	MEAN	19	364
4/19/91	300	14	270
4/19/91	900	16	448
4/19/91	1500	13	448
4/19/91	2100	16	448
4/19/91	MEAN	15	403
4/20/91	300	14	448
4/20/91	900	12	436
4/20/91	1500	14	130
4/20/91	2100	5	448
4/20/91	MEAN	11	365
4/21/91	300	12	448
4/21/91	900	13	448
4/21/91	1500	8	454
4/21/91	2100	12	448
4/21/91	MEAN	11	449
4/22/91	300	11	448
4/23/91	1400	6	448
4/23/91	2000	21	448
4/23/91	MEAN	13	448
4/24/91	200	19	454
4/24/91	800	5	448
4/24/91	1400	11	448
4/24/91	2000	2	130
4/24/91	MEAN	9	370
4/25/91	200	5	79
4/25/91	800	4	79

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
4/25/91	1400	3	79
4/25/91	2000	3	69
4/25/91	MEAN	4	77
4/26/91	200	8	69
4/26/91	800	4	69
4/26/91	1400	5	69
4/26/91	2000	6	67
4/26/91	MEAN	6	68
4/27/91	200	5	67
4/27/91	800	4	64
4/27/91	1400	3	64
4/27/91	2000	10	60
4/27/91	MEAN	5	64
4/28/91	200	3	60
4/28/91	800	7	60
4/28/91	1400	11	240
4/28/91	2000	11	226
4/28/91	MEAN	8	146
4/29/91	200	15	230
4/30/91	800	10	60
4/30/91	1400	10	62
4/30/91	MEAN	10	61
04/91	AVE	10	186
5/1/91	200	20	60
5/1/91	800	9	60
5/1/91	1400	19	52
5/1/91	2000	7	76
5/1/91	MEAN	14	62
5/2/91	200	10	48
5/2/91	800	5	60
5/2/91	1400	4	62
5/2/91	2000	3	62
5/2/91	MEAN	5	58

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/3/91	200	6	64
5/3/91	800	5	112
5/3/91	1400	6	112
5/3/91	2000	11	118
5/3/91	MEAN	7	102
5/4/91	200	8	101
5/4/91	800	5	101
5/4/91	1400	7	101
5/4/91	2000	2	101
5/4/91	MEAN	5	101
5/5/91	200	5	101
5/5/91	800	7	101
5/5/91	1400	9	101
5/5/91	2000	8	101
5/5/91	MEAN	7	101
5/6/91	200	12	101
5/7/91	800	8	56
5/7/91	1400	14	52
5/7/91	2000	7	52
5/7/91	MEAN	9	53
5/8/91	200	16	52
5/8/91	800	4	52
5/8/91	1400	9	52
5/8/91	2000	3	52
5/8/91	MEAN	8	52
5/9/91	200	7	52
5/9/91	800	5	52
5/9/91	1400	9	52
5/9/91	2000	8	52
5/9/91	MEAN	7	52
5/10/91	200	4	52
5/10/91	800	8	52
5/10/91	1400	5	52
5/10/91	2000	2	52

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/10/91	MEAN	5	52
5/11/91	200	4	52
5/11/91	800	2	52
5/11/91	1400	2	52
5/11/91	2000	6	52
5/11/91	MEAN	3	52
5/12/91	200	4	52
5/12/91	800	5	52
5/12/91	1400	4	52
5/12/91	2000	2	52
5/12/91	MEAN	4	52
5/13/91	200	3	52
5/14/91	800	20	52
5/14/91	1400	14	54
5/14/91	2000	13	48
5/14/91	MEAN	16	51
5/15/91	200	9	48
5/15/91	800	27	48
5/15/91	1400	20	48
5/15/91	2000	7	48
5/15/91	MEAN	16	48
5/16/91	200	9	48
5/16/91	800	7	48
5/16/91	1400	8	44
5/16/91	2000	11	44
5/16/91	MEAN	9	46
5/17/91	200	9	44
5/17/91	800	6	44
5/17/91	1400	5	48
5/17/91	2000	7	44
5/17/91	MEAN	6	45
5/18/91	200	6	44
5/18/91	800	7	44
5/18/91	1400	7	44

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/18/91	2000	8	44
5/18/91	MEAN	7	44
5/19/91	200	7	44
5/19/91	800	9	44
5/19/91	1400	9	48
5/19/91	2000	6	48
5/19/91	MEAN	8	46
5/20/91	200	7	48
5/21/91	800	12	48
5/21/91	1400	7	48
5/21/91	2000	3	48
5/21/91	MEAN	7	48
5/22/91	200	9	48
5/22/91	800	5	40
5/22/91	1400	16	42
5/22/91	2200	8	44
5/22/91	MEAN	9	44
5/23/91	200	6	42
5/23/91	800	19	42
5/23/91	1400	9	44
5/23/91	2000	12	42
5/23/91	MEAN	11	43
5/24/91	200	15	42
5/24/91	800	12	42
5/24/91	1400	7	42
5/24/91	2000	6	40
5/24/91	MEAN	10	41
5/25/91	200	10	40
5/25/91	800	5	40
5/25/91	1400	4	40
5/25/91	2000	8	40
5/25/91	MEAN	7	40
5/26/91	200	5	40

APPENDIX TABLE A2. (CONT)

<u>DATE</u>	<u>TIME</u>	<u>TSS</u> <u>(MG/L)</u>	<u>FLOW</u> <u>(CFS)</u>
5/26/91	800	6	40
5/26/91	1400	6	52
5/26/91	2000	6	52
5/26/91	MEAN	6	46
5/27/91	200	8	44
5/28/91	1300	8	28
5/28/91	1900	2	28
5/28/91	MEAN	5	28
5/29/91	100	5	28
5/29/91	700	5	28
5/29/91	1300	5	28
5/29/91	1900	1	28
5/29/91	MEAN	4	28
5/30/91	100	6	28
5/30/91	700	6	28
5/30/91	1300	6	28
5/30/91	1900	7	28
5/30/91	MEAN	6	28
5/31/91	100	8	13
5/31/91	700	16	13
5/31/91	1300	16	40
5/31/91	1900	5	40
5/31/91	MEAN	11	26
05/91	AVE	8	52

**Appendix Table A3. Rainfall in K Area in Relation to Total
Suspended Solids and Corresponding Flows at Two
Locations in the Pen Branch System.**

DATE	PRECIP. TOTAL	TSS (mg/L)	TSS (mg/L)	FLOW (CFS)	FLOW (CFS)
<u>DATE</u>	<u>INCHES</u>	<u>RD B</u>	<u>RD A13.2</u>	<u>RD B</u>	<u>RD A-13.2</u>
10/1/90	0.20				
10/2/90	0.00				
10/3/90	0.00				
10/4/90	0.20				
10/5/90	0.03				
10/6/90	0.00				
10/7/90	0.00				
10/8/90	0.00				
10/9/90	0.00				
10/10/90	4.75				
10/11/90	2.50				
10/12/90	2.50	51	22	52	714
10/13/90	0.07	17	60	50	275
10/14/90	0.00	23		46	
10/15/90	0.00	26	28	51	75
10/16/90	0.00	24	23	60	78
10/17/90	0.00				
10/18/90	0.15				
10/19/90	0.00				
10/20/90	0.00				
10/21/90	0.00				
10/22/90	3.85				
10/23/90	0.03				
10/24/90	0.20				
10/25/90	0.03				
10/26/90	0.50				
10/27/90	0.00				
10/28/90	0.00				
10/29/90	0.00				
10/30/90	0.00				
10/31/90	0.00				
11/1/90	0.00				
11/2/90	0.00				
11/3/90	0.00				
11/4/90	0.00				
11/5/90	0.00				
11/6/90	0.00				
11/7/90	0.00				
11/8/90	1.25				
11/9/90	0.00				
11/10/90	0.00				
11/11/90	0.00				
11/12/90	0.00				
11/13/90	0.00				
11/14/90	0.00				

APPENDIX TABLE A-3 (CONT.)

DATE	PRECIP.	TSS	TSS	FLOW	FLOW
DATE	TOTAL	(mg/L)	(mg/L)	(CFS)	(CFS)
	INCHES	RD B	RD A13.2	RD B	RD A-13.2
11/15/90	0.00				
11/16/90	0.00				
11/17/90	0.00				
11/18/90	0.00				
11/19/90	0.00				
11/20/90	0.00				
11/21/90	0.00				
11/22/90	0.00				
11/23/90	0.00				
11/24/90	0.00				
11/25/90	0.00				
11/26/90	0.00				
11/27/90	0.05				
11/28/90	0.14	4	57	48	78
11/29/90	0.00	4	25	48	84
11/30/90	0.00	4	8	64	74
12/01/90	0.00	4	4	60	78
12/02/90	0.00	7	5	60	67
12/03/90	0.00	8	7	60	69
12/04/90	0.00	22	14	60	69
12/05/90	0.00	22	7	62	68
12/06/90	0.00		11		67
12/07/90	0.55		21		78
12/08/90	0.00				
12/09/90	0.00				
12/10/90	0.00	5	10	74	84
12/11/90	0.00	8	16	69	78
12/12/90	0.00	7	12	69	74
12/13/90	0.00	7	14	65	74
12/14/90	0.00	8	15	70	77
12/15/90	0.05	8	14	68	77
12/16/90	0.00	8	12	66	76
12/17/90	0.00				
12/18/90	0.10	14	14	79	90
12/19/90	0.20	11	21	78	92
12/20/90	0.30	14	32	77	93
12/21/90	0.05	13	28	69	91
12/22/90	0.00	15	27	64	80
12/23/90	0.05	13	23	64	76
12/24/90	0.00				
12/25/90	0.00				
12/26/90	0.00				
12/27/90	0.01				
12/28/90					
12/29/90	0.05				

APPENDIX TABLE A-3 (CONT.)

DATE	PRECIP.	TSS	TSS	FLOW	FLOW
DATE	TOTAL	(mg/L)	(mg/L)	(CFS)	(CFS)
	INCHES	RD B	RD A13.2	RD B	RD A-13.2
12/30/90	0.05				
12/31/90	0.00				
01/01/91	0.40				
01/02/91	0.02				
01/03/91	0.12				
01/04/91	0.01				
01/05/91	0.00				
01/06/91	0.00				
01/07/91	0.17				
01/08/91	0.03				
01/09/91	0.00				
01/10/91	0.15				
01/11/91	1.00				
01/12/91	0.00				
01/13/91	0.00				
01/14/91	0.00				
01/15/91	0.40				
01/16/91	0.04				
01/17/91	0.05				
01/18/91	0.05				
01/19/91	1.25				
01/20/91	0.00				
01/21/91	0.00				
1/22/91	0.00	3	9	74	93
1/23/91	0.15	4	9	75	88
1/24/91	1.00	3	13	78	147
1/25/91	0.10	4	11	78	140
1/26/91	0.00	4	7	78	106
1/27/91	0.00	4	6	76	100
1/28/91	0.10	6		76	
1/29/91	0.80	5	12	74	104
1/30/91	1.25	6	34	73	355
1/31/91	0.00	6	15	77	199
2/1/91	0.00	12	14	74	123
2/2/91	0.00	11	13	75	108
2/3/91	0.00	10	11	74	104
2/4/91	0.00	12	9	74	101
2/5/91	0.00	5	8	74	97
2/6/91	0.80	10	12	91	108
2/7/91	0.41	16	18	148	258
2/8/91		13	13	148	231
2/9/91		17	11	164	203
2/10/91	0.00	69	45	284	273
2/11/91	0.00	76	56	416	527
2/12/91	0.00	33	41	333	377

APPENDIX TABLE A-3 (CONT.)

DATE	PRECIP.	TSS	TSS	FLOW	FLOW
<u>DATE</u>	<u>TOTAL</u>	(mg/L)	(mg/L)	(CFS)	(CFS)
	<u>INCHES</u>	<u>RD B</u>	<u>RD A13.2</u>	<u>RD B</u>	<u>RD A-13.2</u>
2/13/91	0.02	25	30	384	347
2/14/91	0.00	27	21	383	462
2/15/91	0.00	18	21	383	412
2/16/91	0.00	28		187	
2/17/91	0.00	7		112	
2/18/91	0.00	8		133	
2/19/91	0.00	7	10	133	138
2/20/91	0.00	7	17	170	179
2/21/91	0.00	4	7	131	146
2/22/91	0.60	3	8	121	127
2/23/91	0.60	4	14	93	126
2/24/91	0.03	4	11	102	107
2/25/91	0.00	3	17	147	160
2/26/91	0.00	1	13	85	101
2/27/91	0.00	4	7	82	92
2/28/91	0.00	2	4	85	83
3/1/91	1.25				
3/2/91	0.70				
3/3/91	1.65				
3/4/91	0.00				
3/5/91	0.00	41	29	291	353
3/6/91	0.00	36	24	422	445
3/7/91	0.00	29	23	418	381
3/8/91	0.07	153	19	398	356
3/9/91	0.00	113	12	326	246
3/10/91	0.01	74	14	173	266
3/11/91	0.00	87	12	154	176
3/12/91	1.70	69	15	158	210
3/13/91	0.52	69	18	179	215
3/14/91	0.03	73	11	384	329
3/15/91	0.00	20	8	174	185
3/16/91	0.00	16	4	173	218
3/17/91	0.04	31	10	260	225
3/18/91	0.15	61	5	144	417
3/19/91	0.00	20	21	454	453
3/20/91	0.00	23	16	407	352
3/21/91	0.00	48	17	451	372
3/22/91	0.00		13		398
3/23/91	0.00		15		188
3/24/91	0.00		12		72
3/25/91	0.00		19		67
3/26/91	0.00	12	27	238	245
3/27/91	0.00	11	26	357	355
3/28/91	0.00	8	17	446	373
3/29/91	2.25	8	26	172	272

APPENDIX TABLE A-3 (CONT.)

DATE	PRECIP.	TSS	TSS	FLOW	FLOW
<u>DATE</u>	<u>TOTAL</u>	(mg/L)	(mg/L)	(CFS)	(CFS)
	<u>INCHES</u>	<u>RD B</u>	<u>RD A13.2</u>	<u>RD B</u>	<u>RD A-13.2</u>
3/30/91	0.03	5	16	100	226
3/31/91	0.00	8	16	109	149
4/1/91	0.00	9	15	92	123
4/2/91	0.00	9	16	115	130
4/3/91	0.00	15	22	115	129
4/4/91	0.00	14	16	115	126
4/5/91	1.27	10	23	112	183
4/6/91	0.00	8	20	127	229
4/7/91	0.02	7		124	
4/8/91	0.30	8	10	121	147
4/9/91	0.07	5	11	110	150
4/10/91	0.00	8	12	118	141
4/11/91	0.02	6	10	118	127
4/12/91	0.00	7	12	167	180
4/13/91	0.00	6	21	124	139
4/14/91	0.00	3	11	112	124
4/15/91	0.15				
4/16/91	0.00	6	11	110	124
4/17/91	0.00	18	15	254	191
4/18/91	0.00	19	12	364	341
4/19/91	0.48	15	9	403	357
4/20/91	0.00	11	8	365	318
4/21/91	0.00	11	8	449	379
4/22/91	0.03	11	12	448	
4/23/91	0.00	13	13	448	357
4/24/91	0.00	9	13	370	370
4/25/91	0.00	4	8	77	77
4/26/91	1.00	6	8	68	64
4/27/91	2.00	5	24	64	100
4/28/91	0.14	8	13	146	219
4/29/91	0.91	15	13	230	208
4/30/91	0.92	10	15	61	207
5/1/91	0.15	14	11	62	101
5/2/91	0.00	5	11	58	82
5/3/91	0.00	7	8	102	122
5/4/91	0.30	5	6	101	120
5/5/91	1.00	7	13	101	166
5/6/91	0.05	12		101	
5/7/91	0.00	9	7	53	119
5/8/91	0.00	8	7	52	73
5/9/91	0.20	7	11	52	67
5/10/91	0.00	5	8	52	69
5/11/91	0.00	3	8	52	62
5/12/91	0.19	4	10	52	58
5/13/91	0.40	3	7	52	63

APPENDIX TABLE A-3 (CONT.)

DATE	PRECIP.	TSS	TSS	FLOW	FLOW
<u>DATE</u>	<u>TOTAL</u>	(mg/L)	(mg/L)	(CFS)	(CFS)
	<u>INCHES</u>	<u>RD B</u>	<u>RD A13.2</u>	<u>RD B</u>	<u>RD A-13.2</u>
5/14/91	0.01	16	17	51	83
5/15/91	0.00	16	16	48	61
5/16/91	0.00	9	19	46	50
5/17/91	0.00	6	19	45	47
5/18/91	0.00	7	21	44	45
5/19/91	0.00	8		46	
5/20/91	0.02	7		48	
5/21/91	0.05	7	33	48	53
5/22/91	0.00	9	21	44	47
5/23/91	0.00	11	23	43	45
5/24/91	0.00	10	13	41	47
5/25/91	0.00	7	39	40	39
5/26/91	0.00	6	26	46	38
5/27/91	0.09	8		44	
5/28/91	0.00	5	22	28	42
5/29/91		4	21	28	34
5/30/91		6	16	28	
5/31/91	0.13	11		26	46

Appendix Table A4. USGS Flow Measurements (Provisional Data). Daily Averages at Three Gaging Stations; Indian Grave Branch above Road B (IGB), K-Reactor Cooling Water Discharge Canal (K-011), and Pen Branch at Road A-13.2.

DATE	IGB	K-011	RD A-13.2
1990	CFS)	(CFS)	(CFS)
10/1	0.31	38	39
10/2	0.30	35	30
10/3	0.29	43	34
10/4	0.30	48	44
10/5	0.32	47	44
10/6	0.30	49	45
10/7	0.30	48	45
10/8	0.31	47	45
10/9	0.32	48	44
10/10		50	102
10/11		51	263
10/12		52	357
10/13	1.20	49	258
10/14	0.39	46	100
10/15	0.25	50	79
10/16	0.22	62	86
10/17	0.26	55	76
10/18	0.29	58	82
10/19	0.27	52	74
10/20	0.26	51	69
10/21	0.28	50	66
10/22		48	101
10/23		47	562
10/24	2.60	50	164
10/25	1.90	50	104
10/26	1.80	48	84
10/27	1.70	49	77
10/28	1.50	49	70
10/29	1.40	48	67
10/30	1.40	50	66
10/31	1.30	49	64
11/1	1.30	51	63
11/2	1.40	57	66
11/3	1.40	59	72
11/4	1.50	40	57
11/5	1.50	37	49
11/6	1.70	37	47
11/7	1.70	40	48
11/8	1.80	47	54
11/9		47	67
11/10		46	110
11/11	2.40	45	76

Appendix Table A4 (Cont.)

<u>DATE</u> <u>1990</u>	<u>IGB</u> <u>CFS)</u>	<u>K-011</u> <u>(CFS)</u>	<u>RD A-13.2</u> <u>(CFS)</u>
11/12	2.50	46	66
11/13	2.80	47	64
11/14	3.40	47	63
11/15	4.00	48	63
11/16	3.20	47	61
11/17	1.70	48	61
11/18	2.70	53	64
11/19		54	68
11/20		51	64
11/21		51	65
11/22		51	65
11/23		51	65
11/24		51	65
11/25		52	65
11/26		53	63
11/27		60	66
11/28		69	78
11/29		69	80
11/30		66	76
12/1		65	75
12/2		59	69
12/3		60	69
12/4		60	72
12/5		60	70
12/6		62	69
12/7		75	83
12/8		75	99
12/9		72	89
12/10		72	83
12/11		69	80
12/12		69	77
12/13		65	75
12/14		69	78
12/15		69	78
12/16		65	76
12/17		73	81
12/18		79	88
12/19		77	90
12/20		74	91
12/21		70	91
12/22		64	80
12/23		64	77
12/24		58	70
12/25		53	63

Appendix Table A4 (Cont.)

<u>DATE</u> <u>1990</u>	<u>IGB</u> <u>CFS)</u>	<u>K-011</u> <u>(CFS)</u>	<u>RD A-13.2</u> <u>(CFS)</u>
12/26		44	54
12/27		31	41
12/28		29	38
12/29		28	37
12/30		28	37
12/31		28	38
1991			
1/1		28	39
1/2		31	48
1/3		31	45
1/4		31	44
1/5		44	51
1/6		51	60
1/7		51	60
1/8		51	64
1/9		51	61
1/10		51	60
1/11		51	87
1/12		51	96
1/13		53	71
1/14		51	64
1/15		45	60
1/16		33	55
1/17		54	69
1/18		54	67
1/19		81	110
1/20		75	150
1/21		73	104
1/22		74	93
1/23		76	89
1/24		77	131
1/25		76	149
1/26		77	106
1/27		75	98
1/28		74	100
1/29		73	99
1/30		73	292
1/31		76	216
2/1	0.43	76	127
2/2	0.37	74	107
2/3	0.35	74	102
2/4	0.33	73	98
2/5	0.33	73	95
2/6		89	103

Appendix Table A4 (Cont.)

<u>DATE</u> <u>1990</u>	<u>TGB</u> <u>CFS)</u>	<u>K-011</u> <u>(CFS)</u>	<u>RD A-13.2</u> <u>(CFS)</u>
2/7		148	258
2/8		148	234
2/9		161	206
2/10		283	305
2/11	0.43	418	431
2/12		327	370
2/13	0.43	411	390
2/14	0.29	412	450
2/15	0.25	388	388
2/16	0.24	156	221
2/17	0.24	99	105
2/18	0.27	136	146
2/19		132	150
2/20		171	181
2/21	0.25	133	151
2/22	0.25	115	125
2/23	0.40	97	124
2/24	0.27	97	109
2/25	0.24	141	161
2/26	0.26	86	99
2/27	0.28	82	90
2/28	0.25	109	110
3/1	0.29	143	154
3/2	2.00	112	214
3/3		124	337
3/4	1.40	275	407
3/5		292	340
3/6		424	411
3/7		430	436
3/8		384	420
3/9		326	331
3/10		180	221
3/11		211	220
3/12		168	182
3/13		169	196
3/14		372	379
3/15		172	186
3/16		173	182
3/17		268	251
3/18		169	203
3/19		410	356
3/20		418	423
3/21		438	431
3/22	0.38	451	452
3/23	0.43	168	240

Appendix Table A4 (Cont.)

<u>DATE</u> <u>1990</u>	<u>IGB</u> <u>(CFS)</u>	<u>K-011</u> <u>(CFS)</u>	<u>RD A-13.2</u> <u>(CFS)</u>
3/24	0.43	58	76
3/25	0.30	56	71
3/26		205	144
3/27	0.38	419	418
3/28	0.38	448	433
3/29		168	285
3/30		100	236
3/31	0.66	109	133
4/1	0.58	96	113
4/2	0.53	114	120
4/3	0.50	114	120
4/4	0.50	115	118
4/5		113	151
4/6	0.76	128	194
4/7	0.59	123	
4/8	0.66	120	130
4/9	0.74	112	134
4/10	0.63	117	129
4/11	0.58	118	125
4/12	0.56	180	163
4/13	0.56	141	149
4/14	0.56	112	115
4/15	0.53	112	118
4/16	0.55	107	114
4/17	0.52	228	216
4/18	0.52	360	337
4/19	0.71	411	390
4/20	0.59	350	355
4/21	0.55	448	435
4/22	0.53	450	436
4/23	0.54	445	429
4/24	0.48	386	402
4/25	0.41	78	85
4/26	0.50	68	69
4/27		63	96
4/28		148	207
4/29		220	255
4/30		61	116
5/1	0.85	71	88
5/2	0.70	62	74
5/3	0.82	102	99
5/4	0.70	101	101
5/5		101	128
5/6		101	167
5/7	1.10	80	101

Appendix Table A4 (Cont.)

<u>DATE</u> <u>1990</u>	<u>IGB</u> <u>CFS)</u>	<u>K-011</u> <u>(CFS)</u>	<u>RD A-13.2</u> <u>(CFS)</u>
5/8		52	64
5/9	1.30	51	61
5/10	1.10	51	61
5/11	0.58	51	56
5/12	0.61	51	55
5/13	0.80	52	76
5/14	0.65	51	75
5/15	0.57	47	55
5/16	0.56	45	48
5/17	0.55	46	47
5/18	0.51	45	45
5/19	0.52	45	47
5/20	0.57	45	48
5/21	0.56	46	49
5/22	0.56	43	45
5/23	0.54	42	44
5/24	0.53	42	44
5/25	0.56	39	39
5/26	0.52	46	43
5/27	0.81	31	40
5/28	0.75	28	41
5/29	0.51	28	34
5/30	0.56	28	33
5/31	0.64	28	32
Avg.	0.81	109	134
Max.	4.00	451	562
Min.	0.22	28	30

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