TENNESSEE VALLEY AUTHORITY

Office of Natural Resources and Economic Development
Division of Air and Water Resources

RESULTS OF PLANKTON STUDIES CONDUCTED IN 1986 AND 1987 AS PART OF THE OPERATIONAL AQUATIC MONITORING PROGRAM AT SEQUOYAH NUCLEAR PLANT, CHICKAMAUGA RESERVOIR

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EXECUTIVE SUMMARY

TVA conducted plankton studies in 1986 and 1987 to further examine causes of reduced plankton densities observed in Chickamauga Reservoir under low reservoir flows and two-unit operation at Sequoyah Nuclear Plant (SQN). Studies in 1986 were conducted with both SQN units shutdown, low reservoir flows, and water pumped through the condenser cooling water (CCW) system (in May) and no water pumped through the CCW (in August). In May, phytoplankton densities were not reduced downstream of SQN; zooplankton densities were reduced. In August neither were reduced. Results of 1986 studies indicated that phytoplankton densities would not be reduced unless reservoir flows were low and SQN was dissipating heat in the CCW causing the heated water discharged through the diffusers to rise to the surface thereby mixing deeper strata water (low in phytoplankton) with upper strata water (rich in phytoplankton). Reduction of zooplankton densities in absence of dissipation of heat in the CCW indicated a relationship between reduced densities and physical effects from entrainment through the CCW.

Studies in 1987 were aimed at evaluating effects of entrainment through the CCW in absence of heat dissipation. Reservoir flows in 1987 were representative of more normal conditions than those experienced in 1986. Phytoplankton densities in the diffuser discharge pond were not reduced relative to densities in the intake

on either the July or August 1987 study dates. Similarly, comparison of phytoplankton densities in the reservoir downstream of SQN with those upstream showed no reductions. Zooplankton densities were lower at the diffuser discharge pond on both sample dates, indicating a possible relationship to physical effects from entrainment through the CCW. Zooplankton densities in the reservoir downstream of SQN were not reduced compared to upstream, indicating reservoir flows were sufficiently high to prevent manifestation of lowered densities in the reservoir.

SQN effects on plankton under two-unit operation and normal reservoir flows have yet to be fully evaluated. Coincidental occurrence of these conditions has not existed during previous study periods. Recommendations provided in earlier reports to investigate these conditions should be followed when SQN resumes operation.

INTRODUCTION

This report provides results of plankton investigations conducted in 1986 and 1987 as part of the Sequoyah Nuclear Plant (SQN) aquatic monitoring program on Chickamauga Reservoir. The monitoring program was initially designed to identify major changes in water quality and biological communities of Chickamauga Reservoir resulting from operation of SQN. Results of monitoring conducted in 1980-84 (reported in TVA, 1982, 1983, 1984, and 1985) identified few significant changes in Chickamauga Reservoir considered to be related to operation of SQN. Based on absence of plant-induced effects and fulfillment of the minimum period required by the NPDES permit, some components of the program were recommended to be terminated and others recommended to be continued (some with specific alterations).

Plankton investigations were recommended for continuation with specific changes because SQN appeared to have an influence on phytoplankton and zooplankton during low reservoir flows and two-unit operation. Coincidental occurrence of two-unit operation and more normal flows was not encountered during the 1980-84 study period to sufficiently evaluate effects of SQN during those conditions. Hence, recommendations for studies in 1985 and thereafter were primarily aimed at evaluating two-unit operation and more normal flows.

Reservoir flows in 1985 were low due to drought conditions throughout the Tennessee Valley. Results of plankton investigations conducted in 1985 supported previous results in that SQN apparently

caused reduced densities of phytoplankton and zooplankton downstream of SQN under low flow conditions (TVA, 1986). Results of the 1985 investigations were used to select specific conditions of reservoir flow and SQN operation necessary to fully evaluate SQN influence on plankton as described in table 1. Plankton investigations would not be conducted in the future unless those conditions developed.

Both units at SQN were shut down in August 1985. If recommendations were to be strictly adhered to, plankton investigations would not be conducted until SQN operation resumed. However, the drought in the Tennessee Valley continued into 1986 resulting in low reservoir flows. Also, water continued to be pumped through the condenser cooling water (CCW) and the essential raw cooling water (ERCW) systems for part of the year and only the ERCW during other times (the ERCW represents a negligible flow relative to the CCW flow). This set of conditions provided a unique opportunity to study plankton dynamics in Chickamauga Reservoir under low reservoir flows with SQN pumping water through the CCW (conducted in May) and with no flow through the CCW (conducted in August). Results of investigations conducted in May and August 1986 are reported here for the first time.

SQN continued to be shutdown through 1987. Again, if recommendations were strictly adhered to, plankton investigations would not have been conducted. However, results of the special studies conducted in 1986 indicated there would be value in conducting in-plant studies to evaluate condenser passage effects on plankton densities. Results of the "in-plant" studies conducted in 1987 are reported here.

1986 INVESTIGATIONS

Objective

Investigations in 1986 were conducted to determine if reduced plankton densities observed in previous years under conditions of low reservoir flows and SQN dissipating heat to the CCW would still be observed if (1) reservoir flows were low and SQN pumped water through the CCW and ERCW with no addition of heat in the CCW and (2) reservoir flows were low and SQN pumped water only through the ERCW (a negligible volume relative to the CCW). These conditions were examined in May and August, respectively.

Methods

Sample collection procedures, laboratory handling and processing procedures, and data analytical procedures were essentially the same as those used for 1985 studies and described in detail in TVA (1986).

Full-stratum zooplankton tows and stratified phytoplankton and water quality samples (0.3, 1.0, 3.0, and 5.0 m depths) were collected on May 20 and August 27, 1986, from five locations on Chickamauga Reservoir (figure 1). Phytoplankton community measurements (in duplicate) included at each location were organism enumeration, phytopigment concentration, and primary production rates. Water quality parameters included nutrients, alkalinity, and turbidity. In situ full stratum measurements

of dissolved oxygen (DO), pH, temperature, and conductivity were made during sample collection at all locations. Duplicate zooplankton samples were examined for organism identification and enumeration.

Samples for chlorophyll fluorescence measurements were collected on May 20 and August 28, 1986, from surface and one meter depths and then at two-meter intervals to the bottom. The samples were collected from midchannel at TRMs 478.2, 482.0, 483.4, and 484.5.

Results and Discussion

All data as well as results of statistical procedures used to analyze those data are provided in the appendices. Appendix A contains water quality data; appendix B contains phytoplankton data; appendix C contains zooplankton data.

Environmental conditions in Chickamauga Reservoir during May and August 1986 were quite different from typical years in that the Tennessee Valley was in a second consecutive drought year. Reservoir flows were substantially below normal (8,100 cfs in May and 13,500 cfs in August) and residence times in the reservoir were much longer than usual (figures 2 and 3).

Plant operating conditions were also different in 1986 than in previous years of operational monitoring. Both units at SQN were shut down in August 1985 and did not resume operation in 1986. During May the CCW was pumping about half capacity which, coupled with low river flows, resulted in a substantial proportion (11 percent) of the river flow being

entrained. During August, the CCW was not pumping any water and only nominal quantities were withdrawn for other purposes.

This combination of factors allowed evaluation of plankton dynamics in Chickamauga Reservoir under low-flow conditions with the CCW operating but without heat from unit generation (May) and without the CCW operating (August). Because reduced plankton densities had been observed during previous low-flow periods when potential for plant effect was high, studies in 1986 provided insight on those operational characteristics likely important in causing observed reductions.

During May the phytoplankton community exhibited natural successional changes from upstream to downstream. Chlorophytes decreased from upstream to downstream, while the reverse was true for chrysophytes and cyanophytes resulting in an overall increase in total cell density (figure 4). It appears that pumping water through the CCW had little influence on the phytoplankton. This could be expected because chlorophyll fluorescence data and dissolved oxygen data showed that phytoplankton were concentrated in upper strata and water entrained into the CCW was withdrawn from near bottom with little influence on upper strata.

The zooplankton community exhibited reduced densities at the diffuser station in May compared to control stations 1.1 and 7.1 miles upstream (figure 5). The reduction was apparent in several taxa although the two dominant forms (Diaphanosoma leuchtenbergianum and copepod nauplii) were affected the most. These lowered densities may have been a plant effect, i.e., destruction of organisms during passage through the

CCW. Another possibility is that there may be a sampling artifact related to the unusual hydraulics caused by the underwater dam and the mixing action created by the diffusers. Samples could be collected from the intake basin and diffuser pond to help determine if the reduction occurs during passage through the CCW.

During August neither the phytoplankton nor zooplankton data yielded any pattern that would indicate a relationship to presence/operation of SQN (figures 4 and 5). The reduced zooplankton densities typically observed at the diffuser station under low-flow conditions were not observed in August (low river flow but no flow through the CCW).

Studies conducted in 1986 indicate that pumping water through the CCW without addition of heat has little effect on the phytoplankton. Heat added in the CCW during electrical generation gives buoyancy to water discharged through the diffusers. When reservoir flows are sufficiently low, it appears that the heated water rises to the surface and mixes bottom water (low in phytoplankton) with upper strata water (rich in phytoplankton), thereby causing an apparent reduction in density in upper strata.

Recommendations

Recommendations provided in previous TVA reports and approved by the Tennessee Department of Health and Environment (with specific changes) should be followed when SQN resumes operation once the

conditions set forth (table 1) develop. In the meantime while SQN units are not generating (no addition of heat) and water is being pumped through the CCW, plankton samples should be collected from the intake near the pumping station and from the diffuser pond to help determine if densities are reduced from passage through the CCW. Samples should also be taken from TRM 484.5 and TRM 483.4 to determine if decreased densities are apparent at those locations at the time of collection.

1987 INVESTIGATIONS

Objective

Investigations in 1987 were conducted to determine if reductions observed in plankton densities (especially zooplankton) during previous low flow study periods were related to passage through the CCW.

Methods

Sample collection procedures, laboratory handling and processing procedures, and data analytical procedures were basically the same as in previous SQN studies (except as noted below) and have been detailed elsewhere (TVA, 1986). Studies in 1987 were conducted on two occasions, July 27 and August 31.

Sample collection sites differed substantially in 1987 from previous studies (figure 6). Samples were collected from near the CCW intake pumping station and near the diffuser pond discharge to examine differences resulting from passage through the plant. Samples were also collected from the cooling tower return channel near the overflow to the diffuser pond. Samples from this site were not compared directly to either the intake or discharge samples because water sampled was not in the flow path between the intake and diffuser pond under the operating scheme on both days of sample collection. When SQN is on helper mode cooling, this location is in the flow path between the intake and diffuser pond. These locations are referenced as in-plant collection sites.

All in-plant samples were collected at mid-depth of the respective sample site--5.0 m at the intake, 3.5 m in the diffuser pond, and 0.5 m in the return channel. Duplicate zooplankton enumeration samples were collected with a 50L Schindler trap from each site while duplicate phytoplankton enumeration and phytopigment samples were collected with standard gear. A single sample for chlorophyll fluorescence was collected at each of these sites also.

Two reservoir sample sites were also included--TRM 484.5 (in midchannel near the SQN skimmer wall) and TRM 483.4 (in midchannel downstream of the diffuser). These two sites were included to determine how changes caused by passage through the plant (if they occurred) were reflected at the two reservoir sites used in previous studies as the "intake" and "discharge" sites. The same types of community measurements were included at the reservoir sites with the addition of carbon assimilation rates. Full water column zooplankton tows were made with a plankton net and phytoplankton samples were collected at several depths.

In situ measurements of dissolved oxygen (DO), pH, temperature, and conductivity were made during sample collection at all sample stations except the cooling tower return channel. In addition, water samples for metals and residual chlorine were collected each survey in the diffuser pond and at 1.5 m at TRMs 484.5 and 483.4 as requested in a January 9 letter from the Tennessee Department of Health and Environment. The metals sample was analyzed for cadmium, boron, lead, aluminum, and nickel.

Statistical tests were not used to examine differences between "in-plant" stations and "reservoir" sites because of differences in

sample collection procedures required by differences in habitat at in-plant and reservoir areas. The main points of interest were the intake/discharge data relationships and the upstream/downstream reservoir data relationship.

Results and Discussion

All data as well as results of statistical procedures used to analyze those data are provided in appendices. Appendix D contains water quality data, appendix E contains phytoplankton data, and appendix F contains zooplankton data.

Environmental conditions in July and August 1987 were representative of more normal conditions than those which existed in 1985 and 1986 (figures 7 and 8). Reservoir flows were 30,300 ft^3/s (858 m^3/s) on July 27 and 23,100 ft^3/s (654 m^3/s) on August 31 which compare to long-term average flows of 29,700 and 31,500 ft^3/s (841 and 892 m^3/s) for July and August, respectively.

SQN remained shut down throughout 1987. Raw water demand was approximately 900 ft^3/s ($25m^3/s$) on both sample dates which computes to about a three percent hydraulic entrainment rate in July and four percent in August. Changes in the plankton community attributable to operation of SQN have not been observed in previous study periods with entrainment rates this low.

Water quality data indicated generally stratified conditions (temperature and DO) on July 27 and well-mixed conditions on August 31.

The lowest DO (3.9 mg/L) observed for either study period occurred near bottom at TRM 484.5 on July 27 and the highest level (9.6 mg/L) near surface at TRM 483.4 on the same date. Supersaturated DOs and elevated pH levels in upper strata at both TRM 484.5 and 483.4 on July 27 indicate substantial algal photosynthetic activity. These conditions did not exist on August 31, nor were they apparent at the inplant sites on either study date.

Concentrations of selected metals in water are in table 2 along with their respective criteria for protection of aquatic life. The only instance where a criterion was exceeded was for lead in the diffuser pond on July 27 when the 4.0 µg/L measured slightly exceeded the chronic criterion level of 3.2 µg/L. Comparisons between an instantaneous measurement and a criterion based on a 4-day average must be made conservatively and used only as an indication of potential effects. Because the measured level was much below the acute level (84 µg/L), it is unlikely that toxic effects would have resulted with a calculated maximum exposure period (retention time in diffuser pond) of 2.5 hours.

Chlorine residuals were $\leq$0.1 mg/L (the minimum detection limit) at all sites tested. Sites tested were the 5-foot depth at TRMs 484.5 and 483.4 and the diffuser pond on both sample dates.

All phytoplankton measurements on both July 27 and August 31 revealed few differences between intake and diffuser pond samples (total densities are illustrated in figure 9). These results indicate no discernible impact from passage through the plant under the conditions which existed.

Likewise, phytoplankton cell densities (figure 9) and chlorophyll a concentration at the two reservoir sites were similar. This would be expected because the relatively low volume of unheated discharge water would not be expected to reach upper strata where most algal activity occurs. Surprisingly, carbon assimilation rates were higher at TRM 483.4 than at TRM 484.5 on both occasions. This would indicate better conditions at TRM 483.4 but there is nothing in available information which could help explain this difference.

Phytoplankton cell densities and chlorophyll a concentrations were much lower at in-plant sites than reservoir sites in July but not August. This was likely due to stratified conditions in July which allowed water from deeper strata, low in phytoplankton, to be pulled under the skimmer wall into the intake basin, while in August well-mixed conditions caused the phytoplankton to be more evenly distributed in the water column.

Zooplankton densities were lower at the diffuser pond site than at the intake site on both study dates (figure 10), although reductions were much greater in July (88 percent lower) than in August (42 percent lower). In July these reductions occurred in essentially all taxa; whereas, in August most rotifer taxa were greatly reduced but cladoceran and copepod taxa were negligibly affected. These large reductions would not be expected based on entrainment studies at TVA fossil-fired plants (TVA, 1978).

Zooplankton densities at the reservoir station downstream of the diffuser were actually higher than those at the station near the

intake on both sample dates; opposite the trend observed at the in-plant stations (figure 10). Losses observed at in-plant stations would not necessarily be observed at the reservoir station because the plant was entraining such a small proportion (three - four percent) of the river flow.

Results of 1987 studies coupled with knowledge gained from previous studies provide insight on the relationship between SQN and observed differences in the plankton community. A summary of previous study conditions and conclusions drawn from plankton data are in table 3. Table 3 indicates that the phytoplankton community would not be substantially affected unless SQN entrained at least 10 percent of the river flow and had a heated effluent which apparently causes the water discharged through the diffusers to rise to the surface thereby mixing deeper strata water (low in phytoplankton) with upper strata water (rich in phytoplankton). It appears zooplankton may be affected anytime water is being pumped through the plant, but this effect is not detectable in the reservoir unless a relatively large proportion (10 percent or greater) of the river flow (or zooplankton if different from the hydraulic proportion) is entrained. It should be noted in table 3 that on some occasions SQN entrained approximately 10 percent of the river flow and effects on phytoplankton and zooplankton were not observed.

Recommendations

Recommendations provided in previous TVA reports and approved by the Tennessee Department of Health and Environment (with specific

changes) should be followed when SQN resumes operation once the conditions set forth (table 1) develop. These recommendations were developed to evaluate effects of SQN on plankton under "normal" reservoir flows and maximum SQN operation. This information is necessary to adequately evaluate effects of SQN on plankton.

Table 1. Conditions Under Which Samples Will Be Collected to Determine If Two-Unit Operation of Sequoyah Nuclear Plant Causes Effects of Plankton at Other Than Low River Flows

Season*	Level of Operation	Flow (cfs)	Required Period†
Spring	two-unit	19,000	2-3
Spring	two-unit	28,300	1-2
Summer	two-unit	12,000	6-7
Summer	two-unit	29,700	1-2
Summer	two-unit	37,500	1-2

*Spring = May; Summer = July 15 - August 15.
†Number of days required where specified conditions of plant operation and reservoir flow must exist before plankton studies would be conducted.

Table 2. Levels of Metals in Water at Each Collection Site in 1987 Plankton Studies at Sequoyah Nuclear Plant (all units mg/L unless otherwise noted).

	Water Quality Criteria		July 27			August 31		
	Chronic	Acute	TRM 484.5	TRM 483.4	Diffuser Pond	TRM 484.5	TRM 483.4	Diffuser Pond
Boron	*	*	<50	<50	<50	<50	<50	<50
Cadmium	1.1†	3.9†	0.1	0.1	0.3	<0.1	<0.1	<0.1
Lead	3.2†	82†	<1	1	4	2	<1	1
Nickel	160	1,400	2	1	4	2	2	2
Aluminum	150‡	950‡	<50	60	110	<50	<50	<50

*Not developed for protection of aquatic life.
†At water hardness 100 mg/L.
‡Levels provided in draft criteria document dated February 18, 1986.

Table 3. Subjective Evaluation of Potential for Plant Impacts on Plankton During Each Operational Monitoring Period and Conclusion Drawer for Evaluation of Plankton Data Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant

Sample Period	Plant Load	Flows			Potential for Impact	Conclusion*	
		River	Intake	%		Phytoplankton	Zooplankton
1981							
Winter†	0	20,000	900	5	None-Low	Not Different-1	Not Different-1
Spring	500-1,100	10,000	900	9	Low	Different-2	Not Different-1
Summer†	0	30,000	1,200	4	None-Low	Different-2	Different-3
Fall	1,000	20,000	1,200	6	Low	Not Different-1	Different-3
1982							
Winter	600	60,000	1,100	2	None-Low	Not Different-1	Not Different-1
Spring	2,200	9,069	2,500	28	High	Different-4	Different-4
Summer	2,200	44,000	2,500	5	Moderate	Different-3	Different-3
Fall†	0	40,000	1,100	3	None to Low	Not Different-1	Not Different-1
1983							
Winter	2,200	50,000	2,500	5	Moderate	Different-3	Not Different-1
Spring‡	2,200	25,000	2,500	10	High	Not Different-1	Different-4
Summer	1,100	40,000	1,200	3	Low	Different-3	Different-2
Fall	1,100	25,000	2,000	8	Low-Moderate	Different-3	Different-3
1984							
Winter	1,100	21,100	2,100	10	Moderate	Not Different-1	Not Different-1
Spring‡	1,100	43,000	1,500	4	Low	Different-3	Different-3
Summer‡	1,100	44,200	2,200	5	Low	Different-3	Different-3
Fall‡	1,100	27,600	1,300	5	Low	Different-3	Not Different-1
1985							
Winter	2,200	29,600	2,500	8	Moderate	Different-3	Different-3
Spring	1,100	8,100	2,100	26	High	Different-5	Different-5
July	1,100-2,200	23,200	2,500	10	High	Different-5	Different-5
Fall	-	-	-	-			

Table 3. (Continued)

Sample Period	Plant Load	Flows: River	Flows: Intake	Flows: %	Potential for Impact	Conclusion*: Phytoplankton	Conclusion*: Zooplankton
1986							
Spring†	0	8,100	875	11	Low	Not Different-1	Different-3
Summer†	0	13,500	50	<1	None-Low	Not Different-1	Not Different-1
1987							
July†	0	30,300	875	3	None-Low	Not Different-1	Not Different-1
August†	0	23,100	875	4	None-Low	Not Different-1	Not Different-1

*Categories for conclusions (summarized from previous operational monitoring reports):

1. No effect--no station differences observed; SQN had no effect.

2. Unrelated to SQN--observed differences among stations were judged to be unrelated to operation of SQN (SQN neither initiated nor accentuated differences); hence, concluded no effect.

3. Not SQN induced--observed differences among stations were not caused or initiated by operation of SQN, but plant operation may have accentuated community changes which had started upstream of SQN; differences included in this category were considered inconsequential.

4. Partially SQN related--observed differences were related to some extent but not totally to operation of SQN.

5. Differences among stations were apparently caused by operation of SQN.

†Potential of impact resulting only from entrainment through the plant.

‡Community densities quite low, probably too low to provide meaningful evaluation of plant effects.

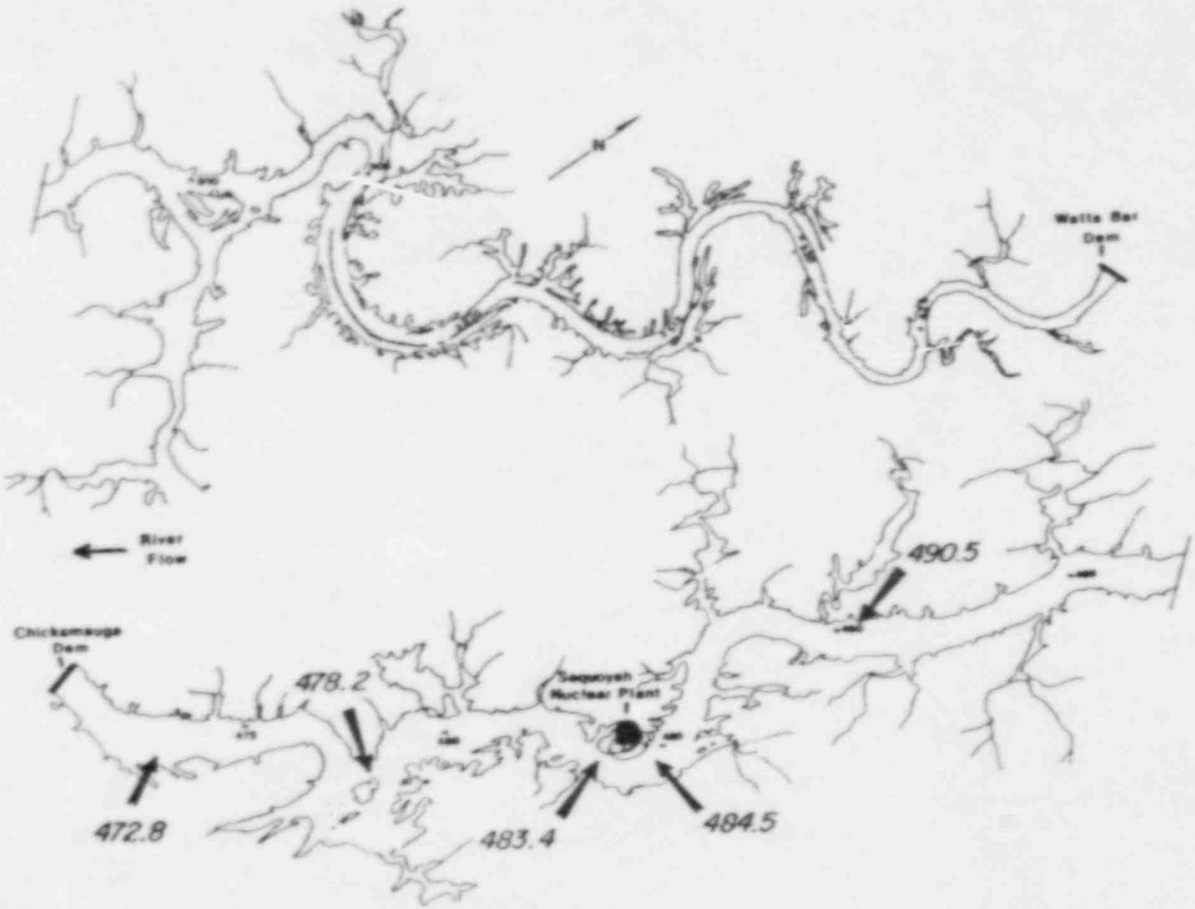


Figure 1. Location of Water Quality, Phytoplankton, and Zooplankton Sample Stations for Operation Monitoring, Sequoyah Nuclear Plant, Chickamauga Reservoir.

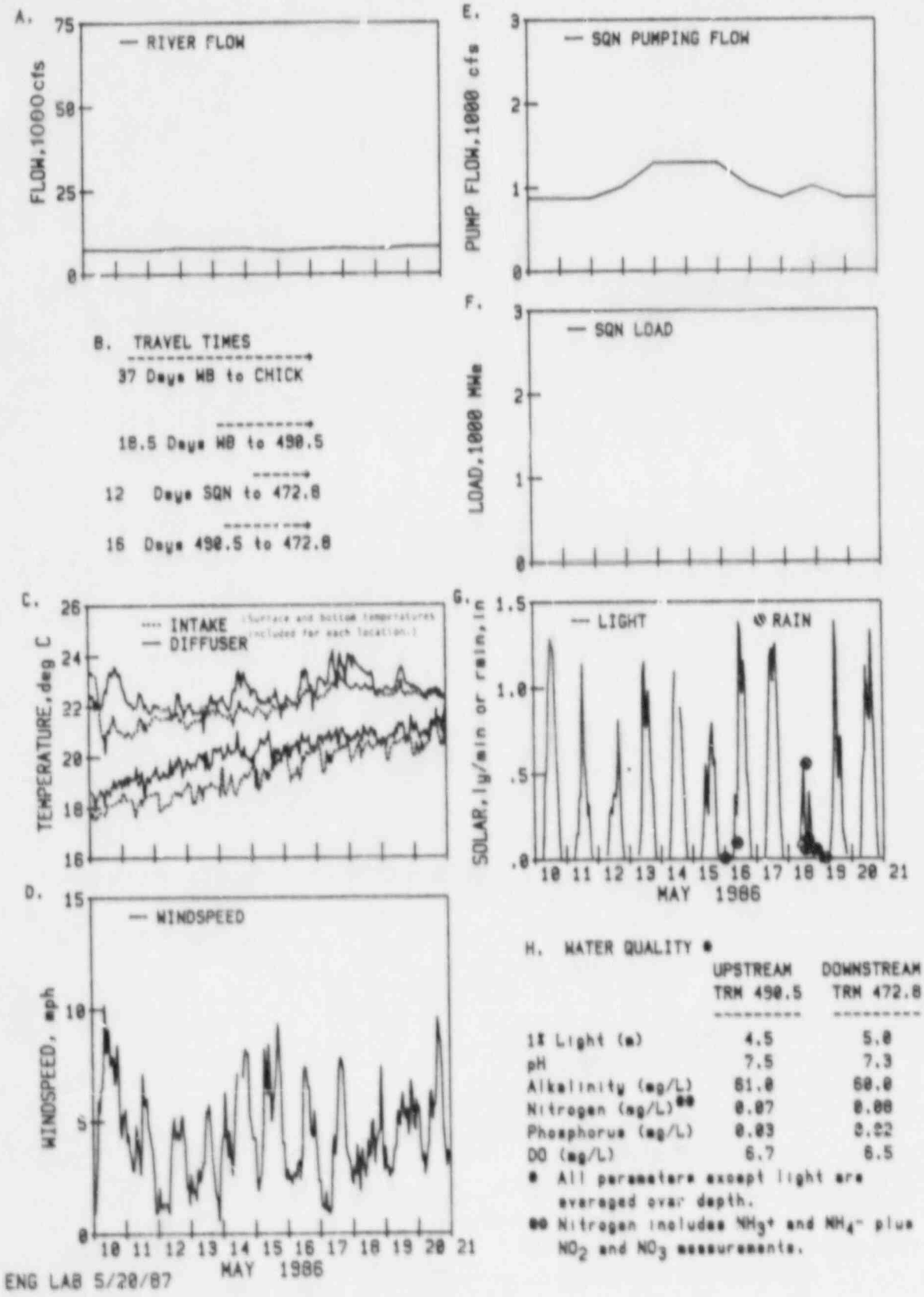
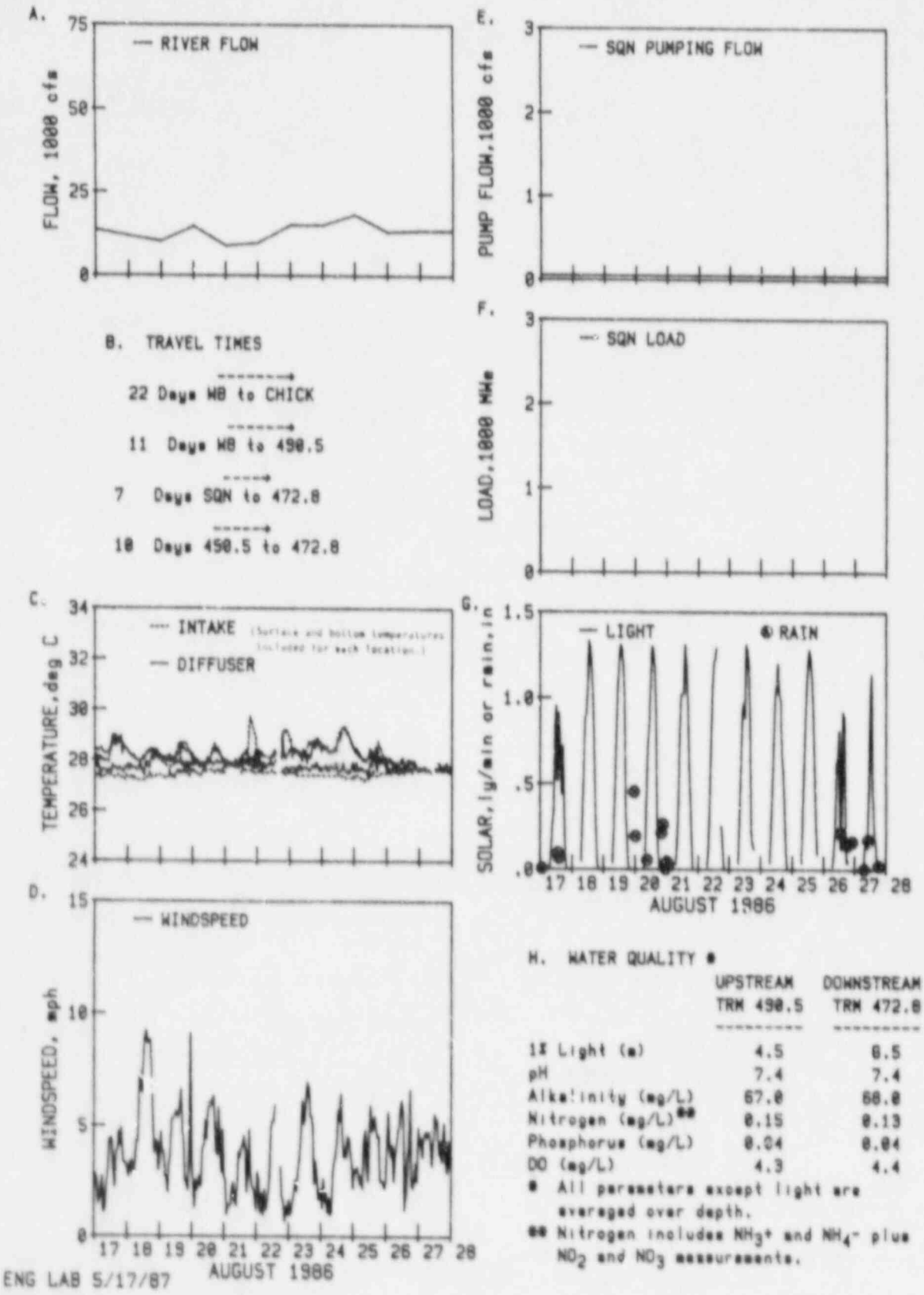


Figure 2. Conditions Prior to Plankton Sampling on May 20, 1986, for Monitoring Associated with Sequoyah Nuclear Plant, Chickamauga Reservoir.



	UPSTREAM TRM 490.5	DOWNSTREAM TRM 472.8
1% Light (m)	4.5	6.5
pH	7.4	7.4
Alkalinity (mg/L)	67.0	66.0
Nitrogen (mg/L)**	0.15	0.13
Phosphorus (mg/L)	0.04	0.04
DO (mg/L)	4.3	4.4

* All parameters except light are averaged over depth.

** Nitrogen includes NH_3^+ and NH_4^- plus NO_2 and NO_3 measurements.

Figure 3. Conditions Prior to Plankton Sampling on August 27, 1986, for Monitoring Associated with Sequoyah Nuclear Plant, Chickamauga Reservoir.

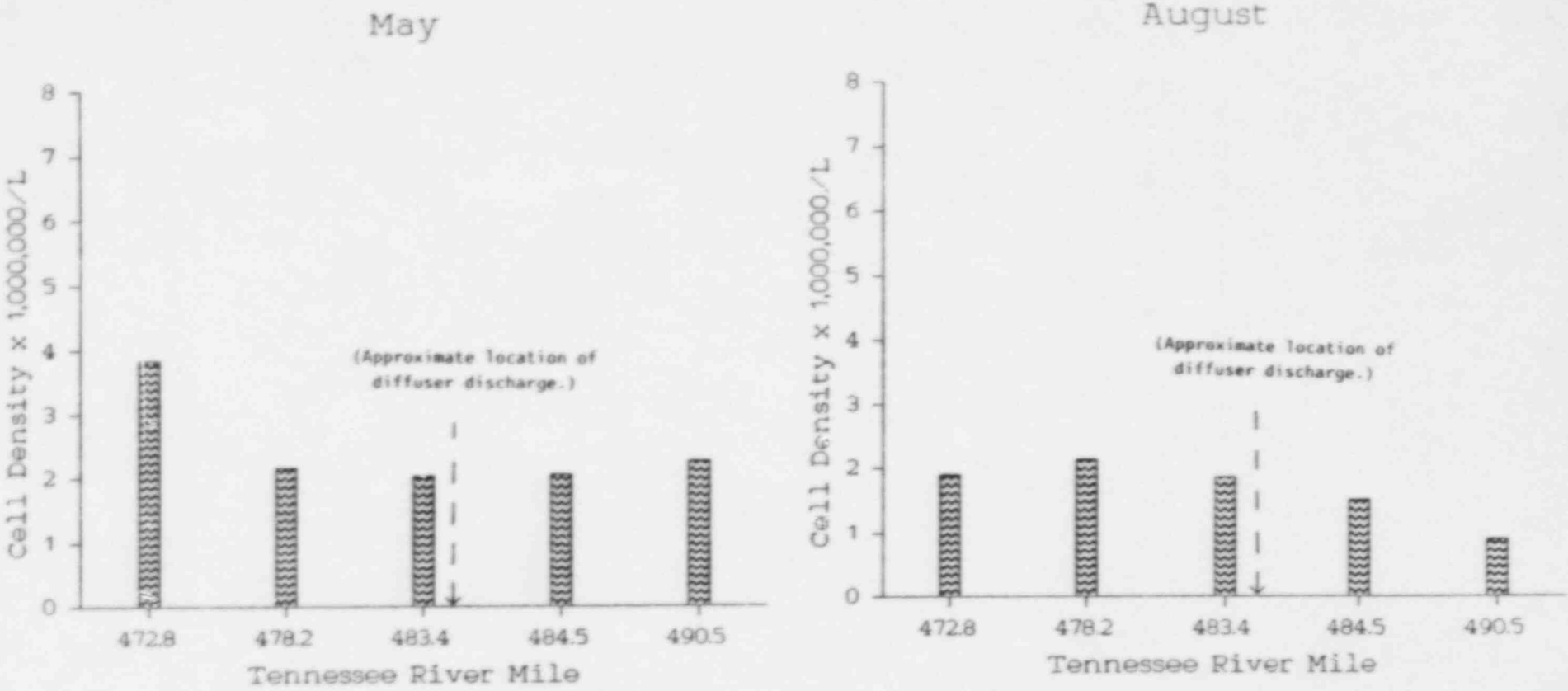


Figure 4. Mean Total Photoplankton Cell Density at Each Collection Site on Chickamauga Reservoir in May and August 1986 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.

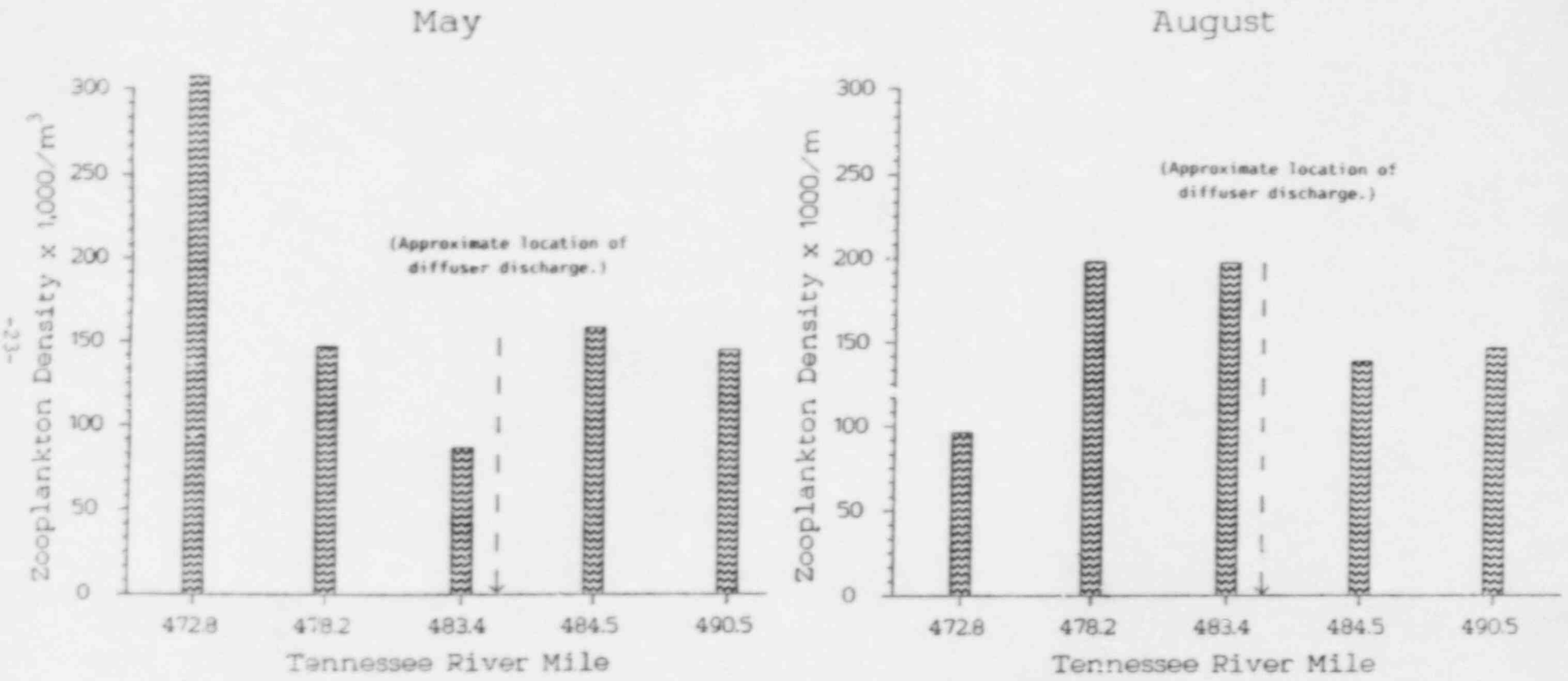


Figure 5. Mean Total Zooplankton Density at Each Collection Site on Chickamauga Reservoir in May and August 1976 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.

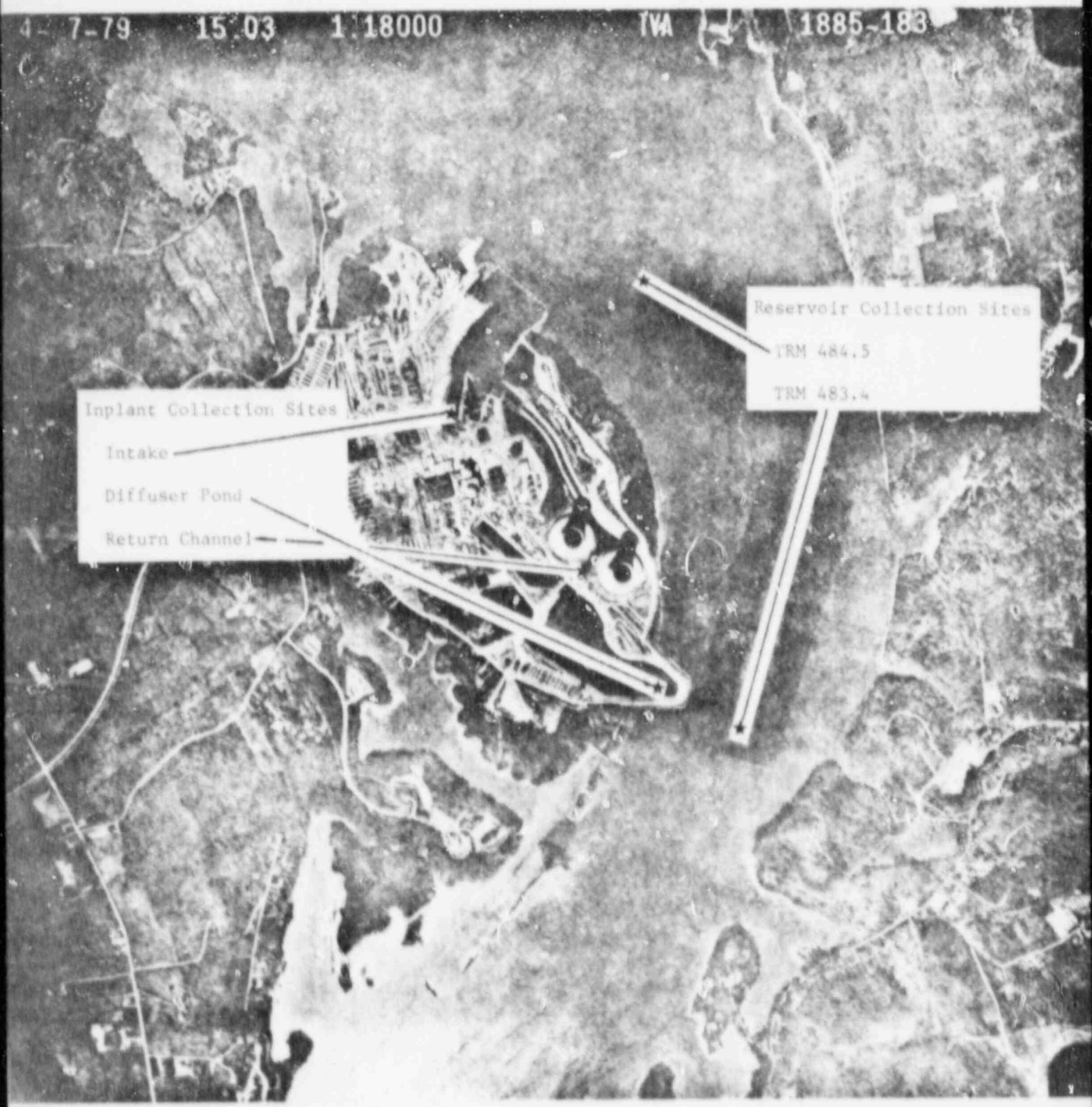


Figure 6. Location of In-Plant and Reservoir Collection Sites Included in Plankton Studies in July and August 1987 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.

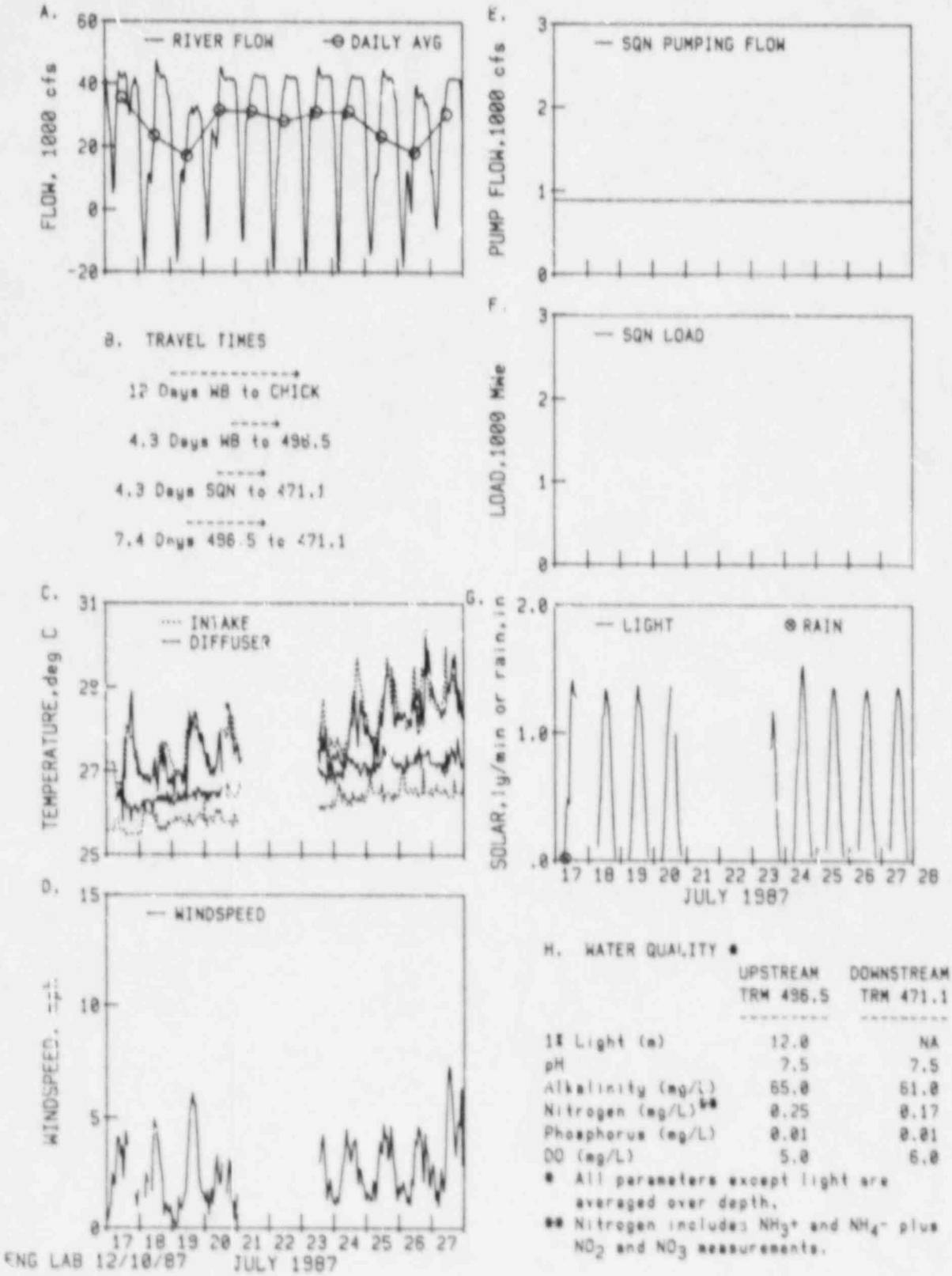
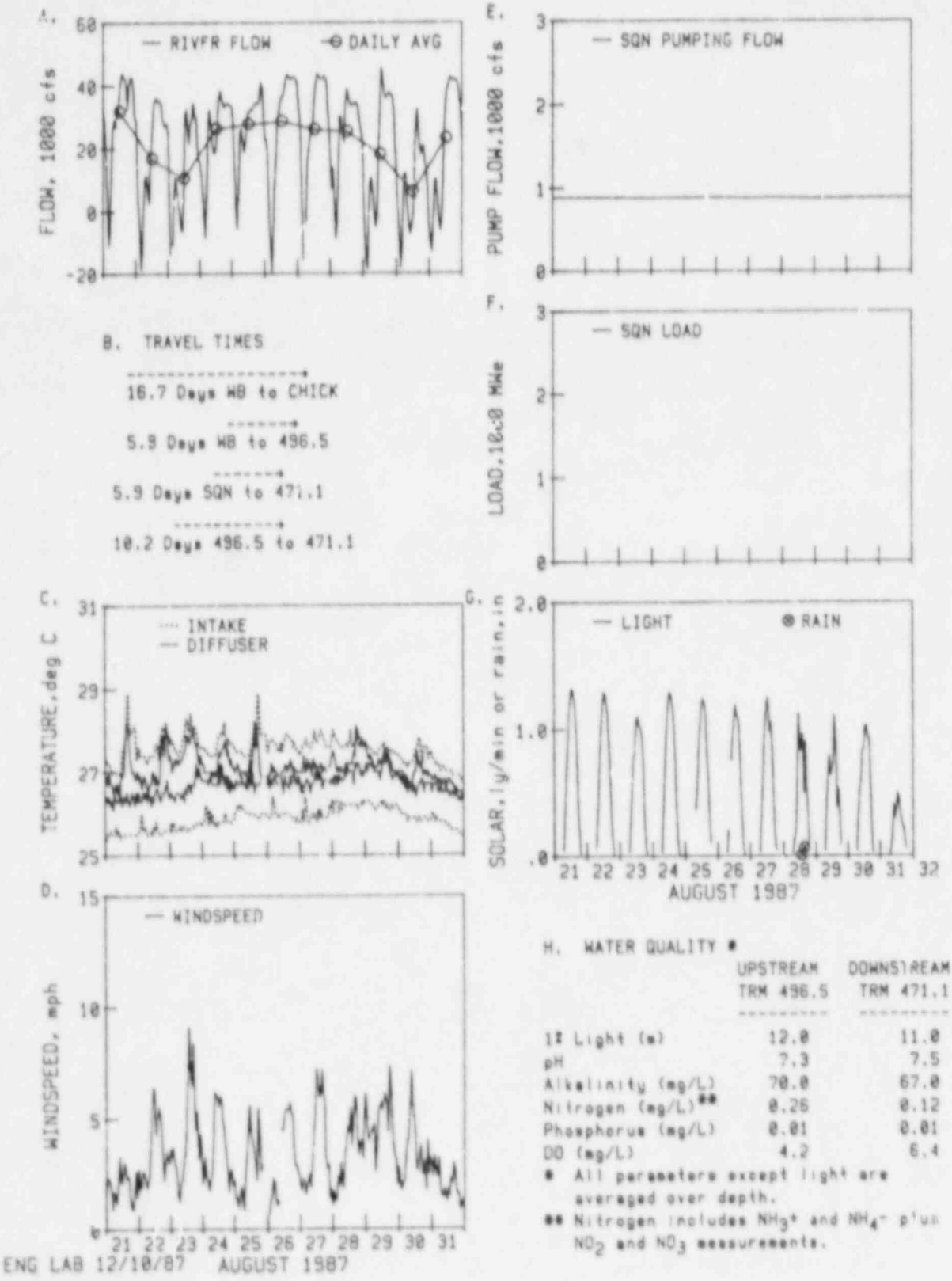


Figure 7. Conditions Prior to Plankton Sampling on July 17, 1987, for Monitoring Associated with Sequoyah Nuclear Plant, Chickamauga Reservoir.



H. WATER QUALITY *

	UPSTREAM TRM 496.5	DOWNSTREAM TRM 471.1
1% Light (m)	12.0	11.0
pH	7.3	7.5
Alkalinity (mg/L)	70.0	67.0
Nitrogen (mg/L)**	0.26	0.12
Phosphorus (mg/L)	0.01	0.01
DO (mg/L)	4.2	6.4

* All parameters except light are averaged over depth.

** Nitrogen includes NH_3^+ and NH_4^- plus NO_2 and NO_3 measurements.

Figure 8. Conditions Prior to Plankton Sampling on August 31, 1987, for Monitoring Associated with Sequoyah Nuclear Plant, Chickamauga Reservoir.

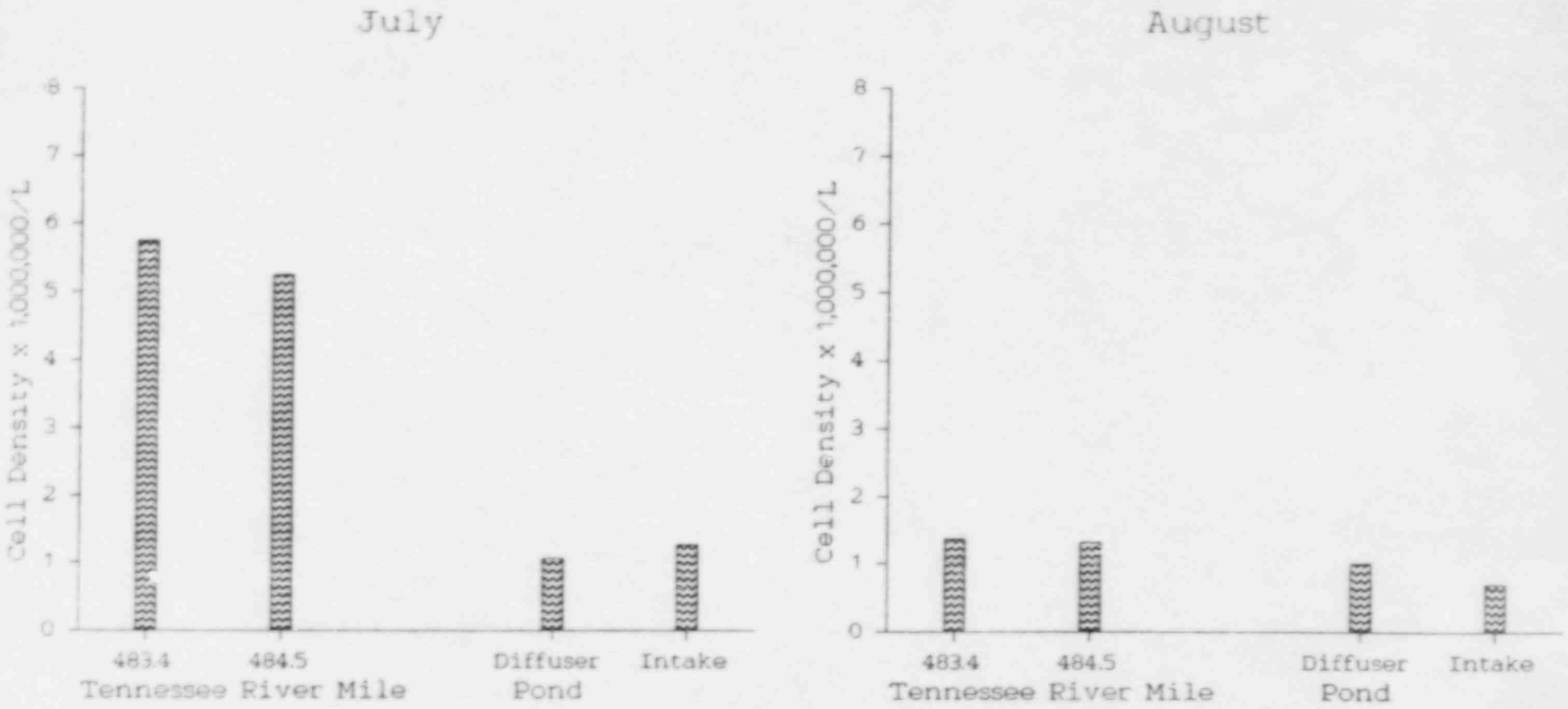


Figure 9. Mean Total Phytoplankton Cell Density at Each Collection Site in July and August 1987 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.

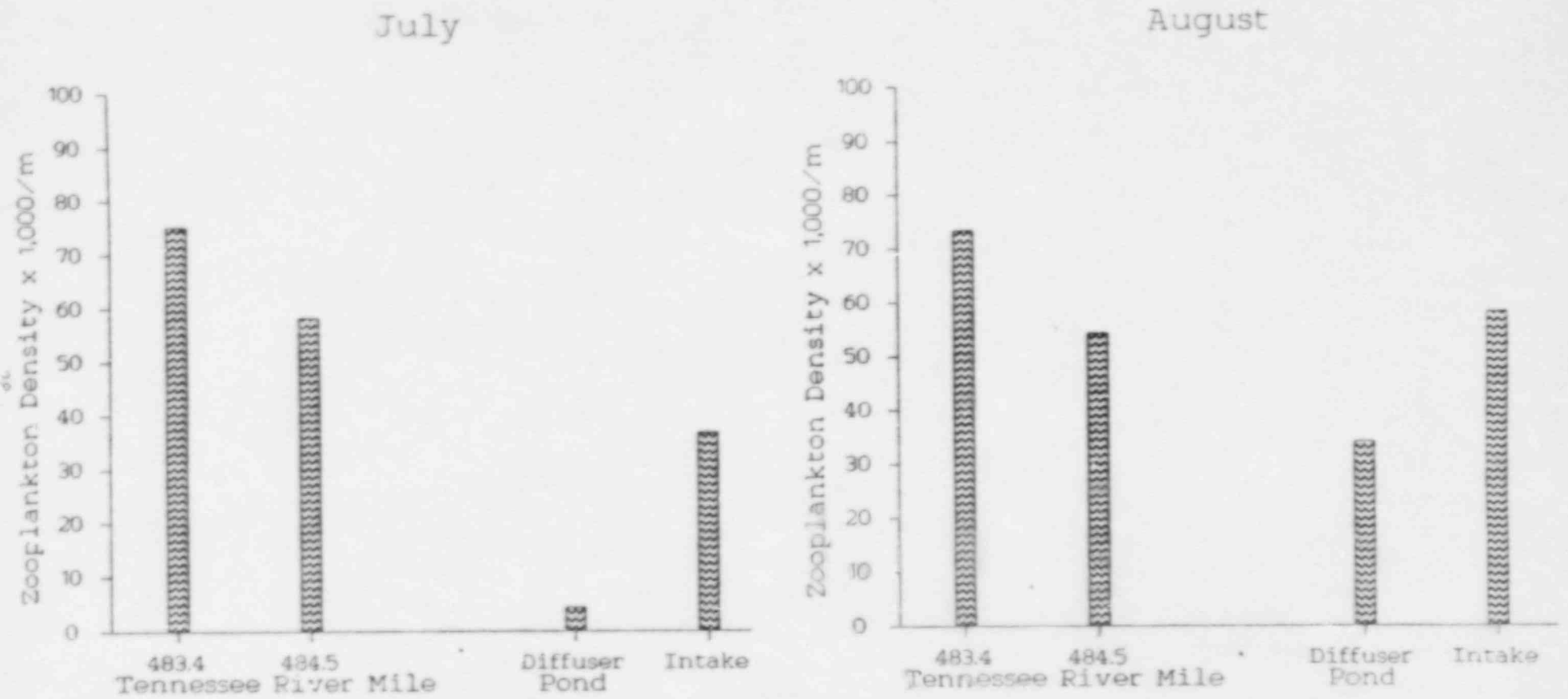


Figure 10. Mean Total Zooplankton Density at Each Collection Site in July and August 1987 Associated with Aquatic Monitoring for Sequoyah Nuclear Plant.

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APPENDIX A

WATER QUALITY DATA ON
MAY 20 AND AUGUST 27, 1986

STATION - 475302 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 478.19

DATE TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00680 T ORG C C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74041 WQF SAMPLE UPDATED	82079 TURBIDITY LAB NTU	84358 SERIES CODE ALPHA
860520 0920	1	0.01	0.01<	2.9	12.400	1.000<	1.050<	1.25<	860718	4.8	A<<<
860520 0922	3	0.02	0.01<	2.4	10.650	1.000<	1.000<	1.55<	860718	5.2	AL
860520 0924	5								860718		
860520 0926	10	0.01	0.01<	2.9	12.150	1.000<	1.000<	1.00<	860718	5.1	AJRR
860520 0928	16	0.01	0.01<	2.9	11.750	1.000<	1.050<	1.90<	860718	5.0	AR
860520 0930	26								860718		
860520 0932	39								860718		
860520 0934	46								860718		
860520 0936	52								860718		
860827 0825	1	0.03	0.01	4.2	7.850	1.000<	1.000<	2.05	870212	3.9	A AW
860827 0826	2								860919		
860827 0827	3	0.03	0.01	4.1	7.450	1.000<	2.100<	3.00	870212	3.9	A AW
860827 0829	5								860919		
860827 0831	10	0.03	0.01	4.9	7.500	1.000<	1.000<	2.80	870212	4.7	A<
860827 0833	16	0.04	0.01	4.7	7.400	1.000<	1.000<	1.95<	870212	3.4	A <<<
860827 0835	26								860919		
860827 0837	39								860919		
860827 0839	46								860919		
860827 0840	56								860919		
860520											
NUMBER	19	8	8	8	8	8	8	8	19	8	19
MAXIMUM	55	4.04	0.01	4.9	12.400	1.000<	2.100<	3.80	870212	5.2	0.00
MINIMUM	1	0.01	0.01<	2.4	7.450	1.000<	1.000<	1.00<	860719	3.8	0.00
SUM	402	0.18	0.08	28.8	77.350	8.950	9.200	16.30	16392824	36.4	0.00
SUM SQ.	15252	0.00	0.00	110.4	784.202	10.602	11.615	38.86	1.41E+13	168.0	0.00
MEAN	21	0.02	0.01	3.6	9.669	1.119	1.150	2.04	862780	4.5	0.00
VARIANCE	375	0.00	0.00	1.0	5.161	0.113	0.148	0.81	15597569	0.3	0.00
STD.DEV.	19	0.01	0.00	1.0	2.272	0.336	0.385	0.90	3949	0.6	0.00
STD.ERR.	4	0.00	0.00	0.3	0.803	0.119	0.136	0.32	906	0.2	0.00
COEF VAR	92	51.78	0.13	27.2	23.496	30.023	33.437	44.09	0	12.8	0.00
LOG MEAN	11	0.02	0.01	3.5	9.436	1.087	1.111	1.85	862760	4.5	0.00
860827											

STATION - 475302 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 472.19

DATE	TIME	00003 DEPTH FEET	00002 MSAMPLOC X FROM RT BANK	00008 LAB IDENT. NUMBER	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00099 VSAMPLOC DEPTH METERS	00300 DO MG/L	00400 PH SU	00931 ALK FIELD MG/L	00605 ORG N MG/L	00610 NH3+NH4- N TOTAL MG/L	00630 NO2&NO3 N-TOTAL MG/L
860520	0926	1	74	33029	22.2	195	0.3	7.54	7.3	62	0.16	0.04	0.07
860520	0922	3	74	33030	22.4	195	1.0	7.24	7.3	61	0.18	0.05	0.03
860520	0924	5	74		22.4	195	1.5	7.16	7.4				
860520	0926	10	74	33031	22.4	195	3.0	7.04	7.3	61	0.19	0.04	0.07
860520	0928	16	74	33032	22.4	195	5.0	6.89	7.2	61	0.21	0.04	0.07
860520	0930	26	74		22.1	195	8.0	6.03	7.1				
860520	0932	39	74		21.8	195	12.0	3.66	6.8				
860520	0934	46	74		20.0	196	14.0	2.42	6.8				
860520	0936	52	74		19.4	197	16.0	1.61	6.7				
860827	0825	1	74	37690	27.8	215	0.3	5.18	7.6	70	0.29	0.02	0.10
860827	0826	2	74				0.5						
860827	0827	3	74	37691	27.8	216	1.0	5.01	7.6	68	0.27	0.01	0.09
860827	0829	5	74		27.8	216	1.5	5.10	7.5				
860827	0831	10	74	37692	27.9	216	3.0	4.98	7.6	71	0.29	0.01	0.05
860827	0832	16	74	37693	27.8	216	5.0	32	7.6	66	0.23	0.02	0.09
860827	0835	26	74		27.8	216	8.0	5.10	7.6				
860827	0837	39	74		27.8	225	12.0	5.00	7.6				
860827	0839	46	74		27.9	220	14.0	5.02	7.5				
860827	0840	56	74		27.9	218	17.0	4.94	7.5				
860520													
	NUMBER	19			18	18	19	18	18	8	8	8	8
	MAXIMUM	56			27.9	225	17.0	7.54	7.6	71	0.29	0.05	0.10
	MINIMUM	1			19.4	195	0.3	1.61	6.7	61	0.16	0.01	0.07
	SUM	402			444.7	3716	123.1	94.84	132.1	529	1.81	0.23	0.66
	SUM SQ.	15252			11172.3	769454	1427.9	543.32	971.3	33926	0.43	0.01	0.06
	MEAN	21			24.7	206	6.5	5.27	7.3	65	0.23	0.03	0.08
	VARIANCE	375			10.9	136	35.0	2.57	0.1	19	0.00	0.00	0.00
	STD.DEV.	19			3.3	12	5.9	1.60	0.3	4	0.05	0.02	0.01
	STD.ERR.	4			0.8	3	1.4	0.38	0.1	2	0.02	0.01	0.00
	COEF VAR	92			13.4	6	91.3	30.40	4.2	7	21.77	54.31	14.12
	LOG MEAN	11			24.5	206	3.4	4.96	7.3	65	0.22	0.02	0.09
860327													

STATION - 475265 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 490.47

DATE	TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00680 T ORG C C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74041 WWF SAMPLE UPDATED	82079 TURBIDTY LAB NTU	84058 SERIES CODE ALPHA
860827	1020	33								860919		
860520												
NUMBER		16	8	8	8	8	9	8	8	16	8	16
MAXIMUM		35	0.04	0.02	3.7	24.950	1.000<	1.150<	2.65	870212	8.5	0.30
MINIMUM		1	0.03	0.01<	2.6	4.400	1.000<	1.000<	1.00<	860718	4.2	0.30
SUM		211	0.28	0.09	25.7	96.200	8.000	8.200	11.45	13782920	49.5	0.00
SUM SQ.		4735	0.01	0.00	83.3	1681.824	8.000	8.425	19.44	1.19E+13	326.0	0.00
MEAN		13	0.03	0.01	3.2	12.025	1.000	1.025	1.43	861433	6.2	0.30
VARIANCE		130	0.00	0.00	0.1	75.003	0.000	0.003	0.44	5522580	2.8	0.00
STD.DEV.		11	0.01	0.00	0.3	8.660	0.000	0.053	0.66	2350	1.7	0.00
STD.ERR.		3	0.00	0.00	0.1	3.062	0.000	0.019	0.23	588	0.6	0.00
COEF VAR		86	15.27	31.43	10.2	72.020	0.000	5.215	46.16	0	27.1	0.00
LOG MEAN		8	0.03	0.01	3.2	9.510	1.000	1.024	1.33	861425	6.0	0.30
860827												

STATION - 475265 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 490.47

DATE	TIME	00003 DEPTH FEET	00002 %SAMPLOC FROM RI BANK	00008 LAB IDENT. NUMBER	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00096 %SAMPLOC DEPTH METERS	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	00605 ORG N MG/L	00610 NH3+NH4- N TOTAL MG/L	00630 NO2&NO3 N-TOTAL MG/L
860520	1115	1	85	33021	22.7	198	0.3	8.48	7.7	62	0.34	0.02	0.03
860520	1117	3	85	33022	22.9	198	1.0	8.05	7.7	61	0.38	0.02	0.04
860520	1119	5	85		22.9	198	1.5	7.64	7.7				
860520	1121	10	85	33023	22.9	198	3.0	7.47	7.6	61	0.31	0.03	0.04
860520	1123	16	85	33024	22.7	202	5.0	6.80	7.5	60	0.27	0.05	0.06
860520	1125	23	85		21.0	196	7.0	4.55	7.5				
860520	1127	30	85		20.9	196	9.0	4.13	7.1				
860827	1006	1	85	37682	27.5	223	0.3	4.56	7.4	68	0.23	0.05	0.11
860827	1007	2	85				0.5						
860827	1009	3	85	37683	27.6	222	1.0	4.36	7.4	66	0.21	0.04	0.10
860827	1010	5	85		27.6	222	1.5	4.29	7.3				
860827	1012	10	85	37684	27.6	223	3.0	4.35	7.4	66	0.23	0.05	0.11
860827	1014	16	85	37685	27.6	223	5.0	4.27	7.4	67	0.34	0.04	0.10
860827	1016	23	85		27.6	223	7.0	4.25	7.4				
860827	1018	30	85		27.6	223	9.0	4.24	7.4				
860827	1020	33	85		27.6	223	10.0	4.18	7.4				
860520													
NUMBER		16			15	15	16	15	15	6	8	9	8
MAX/MLM		33			27.6	223	10.0	8.48	7.7	68	0.38	0.05	0.11
MINIMUM		1			20.9	156	0.3	4.13	7.1	60	0.21	0.02	0.03
SUM		211			376.7	3168	69.1	81.62	111.8	511	2.36	0.33	0.49
SUM SQ.		4733			9578.2	671394	434.9	483.76	834.1	32711	0.72	0.01	0.05
MEAN		13			25.1	211	4.0	5.44	7.5	64	0.29	0.04	0.07
VARIANCE		139			7.9	165	11.9	2.83	0.0	10	0.00	0.00	0.00
STD.DEV.		12			2.8	13	3.4	1.68	0.2	3	0.06	0.01	0.03
STD.ERR.		3			0.7	3	0.9	0.43	0.0	1	0.02	0.00	0.01
COEF VAR		86			11.2	6	86.0	30.92	2.1	5	19.77	34.18	46.94
LOG MEAN		8			25.0	211	2.4	5.23	7.5	64	0.29	0.04	0.07
860827													

DATE	TIME	00093 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00680 T ORG C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32213 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74041 WQF SAMPLE UPDATED	82079 TURBIDTY LAB NTU	84059 SERIES CODE ALPHA
860520	1115	1	0.04	0.01<	3.0	24.950	1.000<	1.150<	1.00<	860718	8.2	AC
860520	1117	3	0.03	0.01	3.2	22.450	1.000<	1.000<	1.30<	860719	8.5	AH
860520	1119	5								860718		
860520	1121	10	0.03	0.01<	3.1	19.100	1.000<	1.050<	2.30	860718	7.3	AS
860520	1123	16	0.03	0.01<	2.6	9.200	1.000<	1.000<	2.65	860719	6.5	AY
860520	1125	23								860718		
860520	1127	30								860718		
860827	1006	1	0.04	0.02	3.3	4.800	1.000<	1.000<	1.20<	861029	5.5	AQ
860827	1007	2								860919		
860827	1008	3	0.03	0.01	3.4	4.900	1.000<	1.000<	1.00<	861029	5.1	AJRR
860827	1010	5								860919		
860827	1012	10	0.04	0.01	3.4	5.900	1.000<	1.000<	1.00<	861029	4.3	ADCC
860827	1014	16	0.04	0.01	3.7	4.900	1.000<	1.000<	1.00<	870212	4.2	AC
860827	1016	23								860919		
860827	1018	30								860919		

STATION - 475304 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 483.40

DATE	TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00680 T ORG C C MG/L	32211 CHLRPHYL A LG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74041 WQF SAMPLE UPDATED	82079 TURBIDTY LAB NTU	94053 SERIES CODE ALPHA
860520	0555	1	0.01	0.01<	2.8	15.900	1.000<	1.050	1.00<	860718	5.4	AOAW
860520	0556	1	0.03	0.01<	2.9					860718	5.8	A<<CD
860520	0557	3	0.01	0.01<	2.6	17.350	1.350<	1.500	1.00<	860718	5.7	AS
860520	0555	5								860718		
860520	1001	10	0.02	0.01<	4.2	17.500	1.000<	1.000<	1.75<	860719	5.7	AS
860520	1003	16	0.02	0.01<	3.4	15.750	1.000<	1.000<	2.70<	860718	6.1	A/RR
860520	1005	26								860718		
860520	1007	39								860718		
860520	1010	49								860718		
860827	0506	1	0.04	0.01	3.7	7.450	1.000<	1.000<	1.95<	870212	4.1	AARR
860827	0507	2								860919		
860827	0508	3	0.04	0.01	3.6	7.200	1.000<	1.000<	1.85	870212	4.4	AFAW
860827	0510	5								860919		
860827	0512	10	0.04	0.01	3.8	6.550	1.000<	1.000<	1.35<	870212	4.2	AC
860827	0514	16	0.04	0.01	4.0	7.550	1.000<	1.000<	1.50	870212	4.5	AH
860827	0516	26								860919		
860827	0518	39								860919		
860827	0520	49								860919		
860827	0522	52										
860520												
	NUMBER	19	9	9	9	8	8	8	8	19	9	19
	MAXIMUM	52	0.04	0.01	4.2	17.500	1.350<	1.500	2.70	870212	6.1	0.00
	MINIMUM	1	0.01	0.01<	2.6	6.550	1.000<	1.000<	1.00<	860718	4.1	0.00
	SUM	353	0.25	0.09	31.0	95.250	8.350	8.550	13.10	16392824	45.9	0.00
	SUM SQ.	12687	0.01	0.00	109.3	1315.392	8.622	9.352	23.65	1.415+13	239.8	0.00
	MEAN	19	0.03	0.01	3.4	11.906	1.044	1.069	1.64	862780	5.1	0.00
	VARIANCE	340	0.00	0.00	0.3	25.983	0.015	0.031	0.31	15597568	0.6	0.00
	STD.DEV.	18	0.01	0.00	0.6	5.390	0.124	0.175	0.56	3949	0.8	0.00
	STD.ERR.	4	0.00	0.00	0.2	1.799	0.044	0.062	0.20	906	0.3	0.00
	COEF VAR	99	46.86	0.13	16.3	42.747	11.856	16.387	34.23	0	15.4	0.00
	LOG MEAN	9	0.02	0.01	3.4	10.917	1.036	1.058	1.56	862760	5.0	0.00
860827												

STATION - 475304 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 483.40

DATE	TIME	00003 DEPTH FEET	00032 MSAMPLOC % FROM RT BANK	00008 LAB IDENT. NUMBER	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00098 MSAMPLOC DEPTH METERS	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	00605 ORG N MG/L	00610 NH3+NH4- N TOTAL MG/L	00625 NO2&NO3 N-TOTAL MG/L
860520	0555	1	17	33025	22.5	197	0.3	8.13	7.6	61	0.21	0.32	0.26
860520	0556	1	17	33042			0.30				0.16	0.32	0.26
860520	0557	3	17	33026	22.5	197	1.0	7.86	7.6	60	0.21	0.32	0.26
860520	0555	5	17		22.5	198	1.5	7.66	7.6				
860520	1003	10	17	33027	22.5	197	3.0	7.55	7.5	60	0.24	0.33	0.26
860520	1002	16	17	33028	22.3	198	5.0	6.04	7.3	60	0.24	0.33	0.27
860520	1005	26	17		21.8	197	8.0	7.35	7.2				
860520	1007	39	17		21.5	197	12.0		7.0				
860520	1010	49	17		21.3	197	15.0		6.9				
860827	0506	1	17	37696	27.7	215	0.3	4.	7.6	68	0.28	0.32	0.12
860827	0507	2	17				0.5						
860827	0508	3	17	37687	27.7	215	1.0	4.58	7.4	68	0.21	0.31	0.12
860827	0510	5	17		27.7	215	1.5	4.50	7.4				
860827	0512	10	17	37688	27.7	215	3.0	4.41	7.5	68	0.21	0.31	0.12
860827	0514	16	17	37689	27.7	216	5.0	4.41	7.5	69	0.24	0.31	0.12
860827	0516	26	17		27.7	216	8.0	4.43	7.5				
860827	0518	39	17		27.7	216	12.0	4.39	7.5				
860827	0520	49	17		27.7	216	15.0	4.39	7.5				
860827	0522	52	17		27.7	217	16.0	4.39	7.5				
860520					17	17	19	17	17	8	9	9	9
	MEANS	19			27.7	217	16.0	8.13	7.6	69	0.28	0.33	0.12
	MAXIMUM	52			21.3	197	0.3	4.14	6.9	60	0.16	0.31	0.06
	MINIMUM	1			426.2	3519	108.4	92.09	126.2	514	2.00	0.17	0.79
	SUM	353			10819.1	729675	1197.0	532.30	937.6	33154	8.45	0.30	2.96
	SUM SQ.	12687			25.1	207	5.7	5.41	7.4	64	0.22	0.32	0.25
	MEAN	19			8.4	90	32.1	2.12	0.8	19	0.00	0.00	0.00
	VARIANCE	340			2.9	9	5.7	1.46	0.2	4	0.03	0.01	0.08
	STD.DEV.	18			0.7	2	1.3	0.35	0.1	2	0.01	0.00	0.01
	STD.ERR.	4			11.5	5	99.4	26.92	2.8	7	14.89	41.39	35.22
	COEF VAR	99			24.9	207	2.3	5.25	7.4	64	0.22	0.32	0.22
	LOG MEAN	9											
860827													

STATION - 475300 CHICKAMAUGA RESERVOIR TENNE VER 872.30

DATE	TIME	00003 DEPTH FEET	00032 MSAMPLOC & FROM RT BANK	00008 LAB IDENT. NUMBER	00010 WATER TEMP CENT	CA FI MI	00098 VSAMPLOC DEPTH METERS	00300 DO MG/L	00400 PH SU	-31 K LD MG/L	00605 ORG N MG/L	00610 NH3+NH4- N TOTAL MG/L	00630 NO2&NO3 N-TOTAL MG/L
860520	0845	1	85	33033	22.2		0.3	6.20		61	0.12	0.03	0.66
860520	0847	3	85	33034	22.3		1.0	6.30	.5	63	0.15	0.03	0.76
860520	0849	5	85		22.3		1.5	7.62	7.6				
860520	0851	10	85	33035	22.3		3.0	7.70	7.4	60	0.16	0.02	0.65
860520	0852	16	85	33036	22.4		5.0	7.45	7.3	59	0.14	0.02	0.65
860520	0855	26	85		21.9	19.	8.0	6.10	7.1				
860520	0857	39	85		20.5	196	12.0	3.46	6.8				
860520	0859	49	85		19.9	196	0	3.39	6.8				
860827	0755	1	85	37695	27.8	216		4.60	7.5	73	0.35	0.01	0.12
860827	0756	1	850	37702							0.35	0.01	0.13
860827	0756	2	85										
860827	0757	3	85	37695	27.8	216	1.	4.54	7.4	67	0.35	0.01	0.12
860827	0755	5	85		27.9	216	1.5	4.57	7.4				
860827	0801	10	85	37696	28.4	222	3.0	4.60	7.4	68	0.26	0.02	0.11
860827	0802	16	85	37697	27.9	217	5.0	4.58	7.4	67	0.23	0.02	0.12
860827	0805	26	85		27.9	216	8.0	.59	7.4				
860827	0807	52	85		27.8	219	16.0	28	7.1				
860520													
NUMBER		17			15	15	17		15	8	9	9	9
MAXIMUM		52			28.4	222	16.0	8.	7.7	73	0.35	0.03	0.13
MINIMUM		1			19.9	195	0.3	3.2	6.8	59	0.12	0.01	0.06
SUM		265			369.4	3389	81.4	82.88	109.9	512	2.11	0.17	0.82
SUM SQ.		8765			9246.8	635940	828.9	504.49	806.1	32904	0.37	0.15	0.08
MEAN		16			24.6	206	4.8	5.53	7.3	64	0.23	0.02	0.09
VARIANCE		290			10.7	134	27.4	3.32	0.1	19	0.01	0.00	0.00
STD.DEV.		17			3.3	12	5.2	1.82	0.3	4	0.10	0.01	0.02
STD.ERR.		4			0.8	3	1.3	0.47	0.1	2	0.03	0.00	0.01
COEF VAR		109			13.3	6	109.3	33.00	3.7	7	41.42	41.39	34.20
LOG MEAN		8			24.4	205	2.3	5.25	7.3	64	0.22	0.02	0.08
860827													

DATE	TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00680 T ORG C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32216 PHEOPHTN A UG/L	74041 WOF SAMPLE UPDATED	82079 TURBIDTY LAB NTU	84069 SERIES CODE ALPHA
860520	0845	1	0.02	0.01<	2.5	12.900	1.000<	1.550	1.00<	860718	4.7	A.
860520	0847	3	0.02	0.01<	2.7	13.350	1.000<	1.150	1.35<	860718	4.8	AAAA
860520	0849	5								860718		
860520	0851	10	0.03	0.01<	2.6	18.150	1.000<	1.200	1.14<	860718	7.8	AAAA
860520	0852	16	0.02	0.01<	2.9	17.100	1.000<	1.300<	1.80<	860718	6.4	AAAA
860520	0855	26								860718		
860520	0857	39								860718		
860520	0859	49								860718		
860827	0755	1	0.05	0.01	4.6	4.500	1.000<	1.000<	1.45	870212	3.6	A AA
860827	0756	1	0.04	0.01	4.5					870212	6.5	AA D
860827	0756	2								961002		
860827	0757	3	0.03	0.02	4.8	5.050	1.000<	1.000<	1.45	870212	4.8	A
860827	0755	5								860919		
860827	0801	10	0.04	0.01	4.6	5.350	1.000<	1.000<	1.50	870212	4.7	A.

STATION - 475300 CHICKAMAUGA /DIR TENNESSEE RIVER 472.80

DATE	TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	10680 °G C L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	.18 PHEOPHTN A UG/L	74041 WQF SAMPLE UPDATED	82079 TURBIDITY LAB NTU	84358 SERIES CODE ALPHA
860827	0803	16	0.04	0.01	.6	6.250	1.000<	1.000<	1.05<	870212	3.4	A ##
860827	0805	26								860919		
860827	0807	52								860919		
860523												
	NUMBER	17	9	9		8	8	8	8	17	9	17
	MAXIMUM	52	0.05	0.02	4..	13.150	1.000<	1.550	1.80	870212	7.8	0.00
	MINIMUM	1	0.02	0.01<	2.5	.530	1.000<	1.000<	1.00<	863718	3.4	0.00
	SUM	265	0.29	0.10	33.0	450	8.000	9.200	10.74	14690363	45.9	0.00
	SUM SG.	8765	0.01	0.00	128.4	1. 12	8.000	10.955	14.92	1.27E+13	251.8	0.00
	MEAN	16	0.03	0.01	3.7		1.000	1.150	1.34	863563	5.1	0.00
	VARIANCE	290	0.00	0.00	8.9	32	0.000	0.039	0.07	19640000	2.2	0.00
	STD.DEV.	17	0.01	0.00	1.0	5.6	0.000	0.198	0.27	4432	1.5	0.00
	STD.ERR.	4	0.00	0.00	0.3	2.00.	.000	0.070	0.09	1075	0.5	0.00
	COEF VAR	109	33.92	30.00	26.3	55.002		17.235	19.93	1	29.2	0.00
	LOG MEAN	6	0.03	0.01	3.5	8.935	..	1.136	1.32	863546	4.9	0.00
860827												

STATION - 475023 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 444.5

DATE	TIME	00003 DEPTH FEET	00082 MSAMPLOC 1 FROM RI BANK	00084 LAB IDENT. NUMBER	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00059 VSAMPLOC DEPTH METERS	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	00605 ORG N PG/L	00610 NH3+NH4- N TOTAL MG/L	00620 NO2&NO3 N-TOTAL MG/L
860520	1030	1	85	33037	22.5	198	0.3	7.52	7.5	60	0.15	0.35	0.06
860520	1032	3	85	33038	22.6	198	1.0	7.24	7.5	60	0.15	0.25	0.06
860520	1034	5	85		22.6	198	1.5	7.21	7.5				
860520	1036	10	85	33039	22.5	198	3.0	7.22	7.4	60	0.24	0.25	0.06
860520	1038	16	85	33040	22.6	198	5.0	7.13	7.4	60	0.19	0.25	0.06
860520	1040	26	85		22.6	198	8.0	7.09	7.4				
860520	1042	39	85		22.3	197	12.0	6.41	7.3				
860520	1044	49	85		21.2	197	15.0	4.13	7.3				
860827	0520	1	85	37698	27.7	219	0.3	4.65	7.5	68	0.27	0.31	0.12
860827	0522	2	85				0.5						
860827	0524	3	85	37699	27.8	219	1.0	4.59	7.5	70	0.27	0.31	0.12
860827	0526	5	85		27.8	218	1.5	4.55	7.5				
860827	0528	10	85	37700	27.8	217	3.0	4.49	7.4	68	0.24	0.31	0.12
860827	0530	16	85	37701	27.8	218	5.0	4.47	7.4	67	0.23	0.32	0.12
860827	0540	26	85		27.8	218	8.0	4.46	7.4				
860827	0542	46	85		27.7	219	14.0	3.38	7.3				
860520													
NUMBER		16			15	15	16	15	15	8	8	8	8
MAXIMUM		49			27.8	219	15.0	7.52	7.5	70	0.27	0.35	0.12
MINIMUM		1			21.2	197	0.3	3.38	7.3	60	0.15	0.31	0.06
SUM		258			373.3	3108	79.1	94.54	111.3	515	1.74	2.25	0.72
SUM SQ.		8176			9401.3	645512	767.9	507.76	825.1	33037	0.39	0.71	0.07
MEAN		16			24.9	207	4.9	5.64	7.4	64	0.22	0.23	0.05
VARIANCE		264			7.9	110	25.1	2.20	0.0	20	0.00	0.00	0.00
STD.DEV.		16			2.8	10	5.0	1.48	0.1	4	0.05	0.02	0.03
STD.ERR.		4			0.7	3	1.3	0.38	0.0	2	0.02	0.01	0.01
COEF VAR		101			11.3	5	101.4	26.32	1.1	7	22.36	64.99	35.64
LOG MEAN		8			24.7	207	2.6	5.45	7.4	64	0.21	0.22	0.19
860827													

DATE	TIME	00003 DEPTH FEET	00665 PHOS-TOT PG/L P	00666 PHOS-DIS PG/L P	T 090 C C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74041 WQF SAMPLE UPDATED	82079 TURBIDTY LAB NTU	24064 SERIES CODE ALPHA
860520	1030	1	0.03	0.01<	2.9	13.600	1.050<	1.050<	1.70	860718	5.8	A*CC
860520	1032	3	0.03	0.01	2.9	12.950	1.000<	1.000<	2.55<	860719	5.9	A*CC
860520	1034	5								860718		
860520	1036	10	0.04	0.01	2.9	13.750	3.900	4.350	5.80	860719	4.3	ADCC
860520	1038	16	0.04	0.01<	3.1	13.750	1.000<	1.000<	1.60<	860718	4.9	ACCC
860520	1040	26								P60718		
860520	1042	39								860718		
860520	1044	49								860718		
860827	0520	1	0.05	0.03	5.2	7.600	1.000<	1.000<	1.60<	870212	4.2	AC
860827	0521	2								860919		
860827	0522	3	0.03	0.01	6.5	8.250	1.000<	1.000<	1.25<	870212	4.5	AM
860827	0524	5								860919		
860827	0526	10	0.04	0.01	5.1	6.400	1.000<	1.000<	1.70<	870212	4.6	AIRR
860827	0538	16	0.04	0.01	5.8	4.400	1.000<	1.000<	4.00	870212	6.2	AT
860827	0540	26								860919		

STATION - 475023 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 484.5

DATE TIME	00003 DEPTH FEET	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	T 00680 ORG C C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32218 PHEOPHTN A UG/L	74241 WQF SAMPLE UPDATED 860919	82079 TURBIDITY LAB NTL	84059 SERIES CODE ALPHA
860627 0542	46										
860520											
NUMBER	16	8	8	8	8	5	8	8	16	8	16
MAXIMUM	49	0.05	0.03	6.5	13.750	3.900	4.350	5.60	870212	6.2	0.00
MINIMUM	1	0.03	0.01<	2.9	4.400	1.000<	1.000<	1.00<	860718	4.2	0.00
SUM	254	0.30	0.10	33.6	80.700	10.950	11.450	19.60	13810268	40.2	0.00
SUM SQ.	8176	0.01	0.00	155.1	916.930	22.312	26.127	67.72	1.19E+13	206.3	0.00
MEAN	16	0.04	0.01	5.2	10.087	1.367	1.431	2.47	863142	5.0	0.00
VARIANCE	268	0.00	0.00	2.0	14.696	1.046	1.391	2.67	17791003	0.6	0.00
STD.DEV.	16	0.01	0.01	1.4	3.833	1.023	1.180	1.64	4218	0.8	0.00
STD.ERR.	4	0.00	0.00	0.5	1.355	0.362	0.417	0.58	1054	0.3	0.00
COEF VAR	101	18.36	56.57	33.7	38.002	74.735	82.415	66.07	0	15.6	0.00
LOG MEAN	8	0.04	0.01	4.8	9.358	1.193	1.216	2.10	863127	5.0	0.00
860627											

APPENDIX B

PHYTOPLANKTON DATA AND RESULTS OF STATISTICAL TESTS MAY 20 AND AUGUST 27, 1986

Table B-1. Percentage Composition of Phytoplankton Groups During Operational Monitoring Periods (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Phytoplankton Group	Tennessee River Mile				
		472.8	473.2	483.4	484.5	490.5
May 1986	Chlorophyta	12	22	46	38	46
	Chrysophyta	47	43	28	20	19
	Cryptophyta	5	6	7	4	4
	Cyanophyta	35	28	19	38	30
	Euglenophyta	1	1	0	0	0
	Pyrrhophyta	0	0	0	0	0
Aug. 1986	Chlorophyta	28	31	34	38	33
	Chrysophyta	13	13	15	18	19
	Cryptophyta	2	2	2	2	3
	Cyanophyta	56	53	49	40	44
	Euglenophyta	1	0	0	1	1
	Pyrrhophyta	0	0	0	1	0

Table B-2. Individual Sample Totals, Means, Standard Deviations, and Coefficients of Variation for Total Phytoplankton and Group Cell Densities (No./L) During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

May 86

Depth (M)	TRM* 472.8 Sample 1	Sample 2	Mean	STD†	CV‡	TRM 478.2 Sample 1	Sample 2	Mean	STD	CV	TRM 483.4 Sample 1	Sample 2	Mean	STD	CV
Chlorophyta															
0.3	594392	669080	631736	52812	8	588168	563272	575720	17604	3	1023848	834016	928932	134231	14
1.0	532152	497920	515036	24206	5	395224	376552	385888	13203	3	1182560	834016	1008288	246458	24
3.0	413896	367216	390556	33008	8	451240	373440	412340	55013	13	946048	687752	816900	182643	22
5.0	357880	339208	348544	13203	4	634848	469912	552380	116627	21	1201232	743768	972500	323476	33
Chrysophyta															
0.3	2607856	2334000	2470928	193645	8	1204344	1219904	1212124	11003	1	572608	488584	530596	59414	11
1.0	1888984	1938776	1913880	35208	2	949160	942936	946048	4401	0	644184	672192	658188	19805	3
3.0	1612016	1596456	1604236	11003	1	970944	778000	874472	136432	16	569496	482360	525928	61614	12
5.0	1269696	1310152	1289924	28607	2	697088	728208	712648	22005	3	553936	535264	544600	13203	2
Cryptophyta															
0.3	164936	255184	210060	63815	30	177384	127592	152488	35208	23	208504	146264	177384	44010	25
1.0	171160	217840	194500	33008	17	80912	102696	91804	15404	17	143152	90248	116700	37409	32
3.0	158712	136928	147820	15404	10	140040	96472	118256	30807	26	146264	102696	124480	30807	25
5.0	208504	124480	166492	59414	36	108920	146264	127592	26406	21	136928	90248	113588	33008	29
Cyanophyta															
0.3	2190848	1045632	1618240	809790	50	448128	709536	578832	184843	32	65352	49792	57572	11003	19
1.0	1319488	1692928	1506208	264062	18	491696	410784	451240	57213	13	292528	298752	295640	4401	1
3.0	1518656	995840	1257248	369687	29	697088	784224	740656	61614	8	382776	734432	558604	248658	45
5.0	902480	1058080	980280	110026	11	273856	1045632	659744	545728	83	563272	721984	642628	112226	17

Table B-2. (Continued)

May 86

Depth (M)	TRM* 472.8 Sample 1	Sample 2	Mean	STD†	CV‡	TRM 478.2 Sample 1	Sample 2	Mean	STD	CV	TRM 483.4 Sample 1	Sample 2	Mean	STD	CV
							Euglenophyta								
0.3	24896	43568	34232	13203	39	31120	18672	24896	8802	35	9336	6224	7780	2201	28
1.0	24896	18672	21784	4401	20	9336	6224	7780	2201	28	6224	6224	6224	0	0
3.0	24896	21784	23340	2201	9	15560	12448	14004	2201	16	15560	9336	12448	4401	35
5.0	9336	18672	14004	6602	47	6224	9336	7780	2261	28	15560	6224	10892	6602	61
							Pyrrhophyta								
0.3	0	0	0	0	.	0	0	0	0	.	9336	3112	6224	4401	71
1.0	3112	0	1556	2201	141	0	3112	1556	2201	141	3112	3112	3112	0	0
3.0	6224	3112	4668	2201	47	3112	12443	7780	6602	85	6224	3112	4668	2201	47
5.0	6224	0	3112	4401	141	0	3112	1556	2201	141	6224	3112	4668	2201	47
							Total								
0.3	5582928	4347464	4965196	873605	18	2449144	2638976	2544060	134231	5	1888984	1527992	1708488	255260	15
1.0	3939792	4366136	4152964	301471	7	1926328	1842304	1884316	59414	3	2271760	1904544	2088152	259661	12
3.0	3734400	3121336	3427868	433502	13	2277984	2057032	2167508	156237	7	2066368	2019688	2043028	33008	2
5.0	2754120	2850592	2802356	68216	2	1720936	2402464	2061700	481913	23	2477152	2100600	2288876	266262	12

Table B-2. (Continued)

May 86

Depth (M)	TRM 484.5 Sample 1	Sample 2	Mean	STD	CV	TRM 490.5 Sample 1	Sample 2	Mean	STD	CV
Chlorophyta										
0.3	1048744	905592	977168	101224	10	1294592	1117208	1205900	125429	10
1.0	908704	594392	751548	222252	30	1223016	1005176	1114096	154036	14
3.0	784224	613064	698644	121028	17	1011400	970944	991172	28607	3
5.0	818456	494808	656632	228854	35	955384	672192	813788	200247	25
Chrysophyta										
0.3	578832	507256	543044	50612	9	522816	441904	482360	57213	12
1.0	311200	323648	317424	8802	3	473024	407672	440348	46211	10
3.0	457464	407672	432568	35208	8	463688	448128	455908	11003	2
5.0	314312	332984	323648	13203	4	385888	348544	367216	26406	7
Cryptophyta										
0.3	121368	80912	101140	28607	28	143152	102696	122924	28607	23
1.0	108920	65352	87136	30807	35	102696	84024	93360	13203	14
3.0	118256	80912	99584	26406	27	130704	102696	116700	19805	17
5.0	62240	84024	73132	15404	21	43568	59128	51348	11003	21
Cyanophyta										
0.3	1092312	1020736	1056524	50612	5	146264	675304	410784	374088	91
1.0	725096	927376	826236	143034	17	641072	902480	771776	184843	24
3.0	762440	796672	779556	24206	3	743768	983392	863580	169440	20
5.0	273856	572608	423232	211250	50	927376	357880	642628	402694	63

Table B-2. (Continued)

May 86

Depth (M)	TRM 484.5 Sample 1	TRM 484.5 Sample 2	TRM 484.5 Mean	TRM 484.5 STD	TRM 484.5 CV	TRM 490.5 Sample 1	TRM 490.5 Sample 2	TRM 490.5 Mean	TRM 490.5 STD	TRM 490.5 CV
				Euglenophyta						
0.3	3112	9336	6224	4401	71	15560	12448	14004	2201	16
1.0	3112	3112	3112	0	0	6224	6224	6224	0	0
3.0	3112	6224	4668	2201	47	9336	9336	9336	0	0
5.0	3112	6224	4668	2201	47	9336	6224	7780	2201	28
				Pyrrhophyta						
0.3	0	3112	1556	2201	141	18672	15560	17116	2201	13
1.0	0	0	0	0	0	9336	9336	9336	0	0
3.0	0	0	0	0	0	3112	3112	3112	0	0
5.0	3112	0	1556	2201	141	9336	3112	6224	4401	71
				Total						
0.3	2844368	2526944	2685656	224453	8	2141056	2365120	2253088	158437	7
1.0	2057032	1913880	1985456	101224	5	2455368	2414912	2435140	28607	1
3.0	2125496	1904544	2015020	156237	8	2362008	2517608	2439808	110026	5
5.0	1475088	1490648	1482868	11093	1	2330888	1447080	1888984	624947	33

Table B-2. (Continued)

Aug. 86

Depth (M)	IRM 472.8 Sample 1	Sample 2	Mean	STD	CV	IRM 478.2 Sample 1	Sample 2	Mean	Sample STD	Sample CV	IRM 483.4 1	2	Mean	STD	CV
							Chlorophyta								
0.3	463688	504144	483916	28607	6	883808	718872	801340	116627	15	781112	681528	731320	70417	10
1.0	678416	563232	620844	81419	13	634848	603728	619288	22005	4	634848	538376	586612	68216	12
3.0	566384	563272	564828	2201	0	653520	560160	606840	66015	11	709536	581944	645740	90221	14
5.0	476136	482360	479248	4401	1	721984	563272	642628	112226	17	591280	460576	525928	92422	18
							Chrysophyta								
0.3	258296	230288	244292	19805	8	267632	239624	253628	19805	8	301864	264520	283192	26406	9
1.0	370328	286304	328316	59414	18	308068	258296	283192	35208	12	220952	211616	216284	6602	3
3.0	273856	214728	244292	41810	17	286304	233400	259852	37409	14	311208	304976	308088	4401	1
5.0	171160	149336	160268	15404	10	357880	270744	314312	61614	20	301864	242736	272300	41810	15
							Cryptophyta								
0.3	34232	46680	40456	8802	22	49792	59128	54460	6602	12	43568	59128	51348	11003	21
1.0	34232	40456	37344	4401	12	46680	34232	40456	8802	22	31120	49792	40456	13203	33
3.0	18672	34232	26452	11003	42	31120	40456	35788	6602	18	40456	52904	46680	8802	19
5.0	21784	31120	26452	6602	25	46680	34232	40456	8802	22	31120	21784	26452	6602	25
							Cyanophyta								
0.3	1888984	1129656	1509320	536926	36	1602680	1142104	1372392	325676	24	1294592	1095424	1195008	140833	12
1.0	1335048	1325712	1330380	6602	0	1755168	1201232	1478200	391692	26	1008288	905592	956940	72617	8
3.0	880696	753104	816900	90221	11	1017624	946048	981836	50612	5	871360	862024	866692	6602	1
5.0	634848	594392	614620	28607	5	824680	606840	715760	154036	22	653520	507256	580388	103424	18

Table B-2. (Continued)

Aug. 86

Depth (M)	TRM 472.8 Sample 1	Sample 2	Mean	STD	CV	TRM 478.2 Sample 1	Sample 2	Mean	Sample STD	Sample CV	TRM 483.4 1	2	Mean	STD	CV
							Euglenophyta								
0.3	6224	6224	6224	0	0	12448	12448	124480	0	12448	3112	7780	6602	85	
1.0	40456	24896	32676	11003	34	3112	9336	6224	4401	71	6224	6224	6224	0	0
3.0	3112	9336	6224	4401	71	9336	3112	6224	4401	71	18672	9336	14004	6602	47
5.0	3112	6224	4668	2201	47	6224	3112	4668	2201	47	6224	6224	6224	0	0
							Pyrrhophyta								
0.3	0	0	0	0	.	15560	6224	10892	6602	61	9336	3112	6224	4401	71
1.0	9336	6224	7780	2201	28	6224	3112	4668	2201	47	9336	3112	6224	4401	71
3.0	12448	9336	10892	2201	20	3112	3112	3112	0	0	15560	9336	12448	4401	35
5.0	0	3112	1556	2201	141	6224	6224	6224	0	0	15560	6224	10892	6602	61
							Total								
0.3	2651424	1916992	2284208	519322	23	2831920	2178400	2505160	462108	18	2442920	2106824	2274872	237656	10
1.0	2467816	2246864	2357340	156237	7	2754120	2109936	2432028	455507	19	1910768	1714712	1812740	138623	8
3.0	1755168	1584008	1669588	121028	7	2001016	1786288	1893652	151836	8	1966784	1820520	1893652	103424	5
5.0	1307040	1266584	1286812	28607	2	1963672	1484424	1724048	338880	20	1599568	1244800	1422184	250859	18

Table B-2. (Continued)

Aug. 86

Depth (M)	TRM 484.5 Sample 1	Sample 2	Mean	STD	CV	TRM 490.5 Sample 1	Sample 2	Mean	STD	CV
						Chlorophyta				
0.3	712648	600616	656632	79219	12	389000	360992	374996	19805	5
1.0	781112	591280	686196	134231	20	304976	233400	269188	50612	19
3.0	435680	392112	413896	30807	7	298752	295640	297196	2201	1
5.0	628624	417008	522816	149635	29	238288	233400	231844	2201	1
						Chrysophyta				
0.3	348544	255184	301864	66015	22	202280	214728	208504	8802	4
1.0	314312	270744	292528	30807	11	133816	124480	129148	6602	5
3.0	317424	242736	280080	52812	19	205392	196056	200724	6602	3
5.0	252072	227176	239624	17604	7	146264	164936	155600	13203	8
						Cryptophyta				
0.3	34232	28008	31120	4401	14	40456	34232	37344	4401	12
1.0	52904	28008	40456	17604	44	18672	34232	26452	11003	42
3.0	37344	21784	29564	11003	37	31120	18672	24896	8802	35
5.0	31120	24896	28008	4401	16	21784	18672	20228	2201	11
						Cyanophyta				
0.3	585056	613064	599060	19805	3	637960	535264	586612	72617	12
1.0	525928	522816	524372	2201	0	482360	339208	410784	101224	25
3.0	743768	637960	690864	74818	11	304976	267632	286304	26406	9
5.0	728208	513480	620844	151836	24	280080	270744	275412	6602	2

Table B-2. (Continued)

	Aug. 86									
	TRM 484.5					TRM 490.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
					Euglenophyta					
0.3	18672	9336	14004	6602	47	6224	6224	6224	0	0
1.0	21784	3112	12448	13203	106	3112	3112	3112	0	0
3.0	6224	6224	6224	0	0	3112	3112	3112	0	0
5.0	18672	12448	15560	4401	28	6224	9336	7780	2201	28
					Pyrrhophyta					
0.3	15560	9336	12448	4401	35	6224	3112	4668	2201	47
1.0	12448	9336	10892	2201	20	0	0	0	0	.
3.0	15560	6224	10892	6602	61	6224	3112	4668	2201	47
5.0	9336	6224	7780	2201	28	6224	3112	4668	2201	47
					Total					
0.3	1714712	1515544	1615128	140833	9	1282144	1154552	1218348	90221	7
1.0	1708488	1425296	1566892	200247	13	942936	734432	838684	147435	18
3.0	1556000	1307040	1431520	176041	12	849576	784224	816900	46211	6
5.0	1668032	1201232	1434632	330077	23	690864	700200	695532	6602	1

*TRM = Tennessee River Mile.
†STD = Standard Deviation.
‡CV = Coefficient of Variation.

Table B-3. Results of Two-Way Analysis of Variance on Total Phytoplankton and Group Cell Densities, Operational Monitoring During 1986 at Sequoyah Nuclear Plant, Chickamauga Reservoir

	Chlorophyta		Chrysophyta		Cyanophyta		Total Phytoplankton	
	F-Ratio	P>F	F-Ratio	P>F	F-Ratio	P>F	F-Ratio	P>F
May 1986								
Station	32.03	C.0001*	564.01	0.0001*	13.10	0.0001*	32.26	0.0001*
Depth	5.68	0.0056*	46.06	0.0001*	3.34	0.0401*	7.38	0.0016*
Interaction	1.30	0.2904	8.10	0.0001*	3.62	0.0054*	3.62	0.0055*
Aug. 1986								
Station	51.14	0.0001*	21.88	0.0001*	57.96	0.0001*	52.87	0.0001*
Depth	7.23	0.0018*	3.50	0.0345*	24.90	0.0001*	17.85	0.0001*
Interaction	2.48	0.0348*	4.92	0.0009*	3.18	0.0001*	1.39	0.2478

*Significant at = 0.05

Table B-4. Disposition of Phytoplankton Density (Cells/L) Data Sets with Significant F-Ratios Identified in Table 5, Operational Monitoring During 1986 at Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Test Group	Sample Depth (m)	F-Ratio Two-Way ANOVA	F-Ratio One-Way ANOVA	SNK* High Mean			Low Mean	
May 1986	Chlorophyta†		32.03§		5	3	4	2	1
	Chrysophyta‡	0.3		120.76§	1	2	4	3	5
		1.0		372.31§	1	2	3	5	4
		3.0		67.48§	1	2	3	5	4
		5.0		347.44§	1	2	3	5	4
	Cyanophyta‡	0.3		10.45§	1	4	5	2	3
		1.0		28.05§	1	4	5	2	3
		3.0		2.62	1	5	4	2	3
		5.0		0.64	1	3	5	2	4
	Total Phytoplankton‡	0.3		22.28§	1	4	2	5	3
		1.0		42.22§	1	5	3	4	2
		3.0		16.14§	1	5	2	3	4
		5.0		3.08	1	3	2	5	4
Aug. 1986	Chlorophyta‡	0.3		19.00§	2	3	4	1	5
		1.0		13.83§	4	2	1	3	5
		3.0		28.04§	3	2	1	4	5
		5.0		10.31§	2	3	4	1	5
	Chrysophyta‡	0.3		2.71	4	3	2	1	5
		1.0		21.80§	1	4	2	3	5
		3.0		2.94	3	4	2	1	5
		5.0		11.63§	2	3	4	1	5
	Cyanophyta‡	0.3		9.20§	1	2	3	4	5
		1.0		22.96§	2	1	3	4	5
		3.0		69.26§	2	3	1	4	5
		5.0		9.82§	2	1	4	3	5

Table B-4. (Continued)

Date	Test Group	Sample Depth (m)	F-Ratio Two-Way ANOVA	F-Ratio One-Way ANOVA	SNK* High Mean	SNK* Low Mean
	Total Phytoplankton†			52.87§		
	2	1				
	1	3				
	3	4				
	4	5				
	5					

*Student, Newman, Keuls Multiple Range Test; means ranked lowest to highest using station numbers; means underscored by same line are not significantly different at $\alpha = 0.05$, means not so underscored are significantly different.

Tennessee River Mile 472.8 = station 1
Tennessee River Mile 478.2 = station 2
Tennessee River Mile 483.4 = station 3
Tennessee River Mile 484.5 = station 4
Tennessee River Mile 490.5 = station 5

†Depths not tested separately.

‡Depths tested separately with one-way ANOVA because interaction was significant in two-way ANOVA.

§Significant at $= 0.05$

Table B-5. Mean Phytoplankton Densities (No. X 100)/ at Each Sample Station (Depths Combined) During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

	May 1986					August, 1986				
	Tennessee River Mile									
	472.8	478.2	483.4	484.5	490.5	472.8	478.2	483.4	484.5	490.5
Chlorophyta										
Acanthosphaera	0	23	27	8	12	23	27	19	4	8
Actinastrum	47	51	97	93	113	0	0	39	175	163
Ankistrodesmus	253	198	657	506	622	31	187	128	105	54
Botryococcus	0	0	0	0	0	0	0	0	0	31
Characium	0	4	0	16	0	0	0	0	0	0
Chlamydomonas	311	121	66	78	148	167	222	245	245	167
Chlorella	35	74	198	187	156	152	191	109	124	70
Chodatella	54	70	27	35	39	27	35	51	12	0
Closteriopsis	4	4	4	0	4	0	0	0	0	0
Coelastrum	233	124	401	506	529	249	245	124	331	109
Cosmarium	0	0	0	62	0	0	0	0	0	0
Crucigenia	109	144	222	241	724	342	420	300	331	373
Dictyosphaerium	498	642	848	1062	1315	249	292	319	187	70
Echinosphaerella	0	0	0	0	0	0	39	0	0	0
Elakatothrix	54	47	124	47	93	39	23	31	31	8
Euastrum	0	0	0	0	0	4	4	4	0	0
Eudorina	0	0	0	0	0	0	0	0	373	0
Gloeoactinium	89	0	209	0	0	0	16	0	0	0
Golenkinia	0	12	78	19	35	27	23	35	8	19
Gonium	0	0	0	0	0	78	187	580	257	280
Kirchneriella	23	214	296	148	354	86	373	443	282	101
Micractinium	545	510	1155	867	1424	86	265	0	136	16
Oocystis	62	31	47	70	31	78	31	97	0	31
Pandorina	0	62	62	0	0	529	373	249	311	124
Pediastrum	78	167	498	249	428	249	533	451	467	171
Pteromonas	0	0	23	16	27	19	4	0	16	27
Scenedesmus	2104	2198	4205	3392	4166	2805	3034	2882	2225	1023

Table B-5. (Continued)

	May 1986					August 1986				
	Tennessee River Mile									
	472.8	478.2	483.4	484.5	490.5	472.8	478.2	483.4	484.5	490.5
Schroederia	206	113	117	70	62	47	62	51	62	39
Staurastrum	8	8	8	0	0	47	58	35	27	27
Tetrallantos	0	0	31	0	0	0	0	0	0	0
Tetrastrum	0	0	1[illegible]	31	31	4	0	0	47	0
Treubaria	0	6	0	8	0	35	31	31	23	19
Chrysophyta										
Achnanthes	8	58	31	8	12	31	23	51	39	31
Asterionella	327	136	39	97	93	0	0	0	0	0
Attheya	428	268	405	257	331	121	47	82	35	16
Chaetoceros	43	335	358	510	654	140	412	366	323	179
Cocconeis	0	0	0	0	0	4	0	0	4	4
Cymbella	8	4	8	16	23	27	16	16	4	8
Diatoma	0	0	0	0	0	8	4	4	0	4
Dinobryon	78	0	78	31	78	0	12	51	47	0
Fragilaria	8819	3944	926	759	720	0	0	0	109	0
Melosira	7722	3925	2964	1614	1751	1303	1369	1144	1494	840
Navicula	8	12	27	35	35	35	19	27	43	35
Nitzschia	0	4	8	12	12	0	0	0	4	4
Rhizosolenia	206	117	105	109	128	8	54	58	39	31
Rhoicosphenia	0	0	39	31	0	0	0	0	0	0
Stephanodiscus	230	202	342	226	296	86	159	128	89	74
Synedra	323	358	319	338	233	681	661	774	556	510
Cryptophyta										
Cryptomonas	1727	1225	1330	902	961	327	428	412	323	272
Cyanophyta										
Anabaena	148	62	0	0	0	0	0	0	0	0
Anacystis	0	0	257	408	171	4567	3894	2805	1867	1289

Table B-5. (Continued)

	May 1986					August, 1986				
	Tennessee River Mile									
	472.8	478.2	483.4	484.5	490.5	472.8	478.2	483.4	484.5	490.5
Merismopedia	156	381	829	832	949	3380	4579	3194	2287	1424
Oscillatoria	13102	5633	2801	6473	5602	1782	1836	1961	1027	0
Raphidiopsis	0	0	0	0	0	949	1062	1039	906	685
Euglenophyta										
Euglena	183	89	39	23	31	54	58	66	89	31
Phacus	0	4	0	0	0	0	0	0	0	0
Trachelomonas	51	43	54	23	62	70	16	19	31	19
Pyrrhophyta										
Ceratium	23	23	39	8	19	12	8	16	8	4
Glenodinium	0	4	0	0	0	0	0	0	0	0
Gymnodinium	0	0	8	0	70	39	54	74	93	31
Peridinium	0	0	0	0	0	0	0	0	4	0

Table B-6. Similarity of Phytoplankton Community Composition/Structure During Operational Monitoring in 1986 Based on Sorensen's Quotient of Similarity and Percentage Similarity, Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Station Comparison	Sorensen's Quotient of Similarity (%)	Percentage Similarity (%)
May	TRM* 490.5-484.5	93	88
	TRM 490.5-483.4	94	82
	TRM 490.5-478.2	87	70
	TRM 490.5-472.8	87	48
	TRM 484.5-483.4	90	78
	TRM 484.5-478.2	85	73
	TRM 484.5-472.8	83	52
	TRM 483.4-478.2	86	69
	TRM 483.4-472.8	87	47
	TRM 478.2-472.8	89	68
August	TRM 490.5-484.5	89	73
	TRM 490.5-483.4	89	69
	TRM 490.5-478.2	88	57
	TRM 490.5-472.8	92	60
	TRM 484.5-483.4	87	80
	TRM 484.5-478.2	87	76
	TRM 484.5-472.8	90	76
	TRM 483.4-478.2	94	88
	TRM 483.4-472.8	93	86
	TRM 478.2-472.8	94	89

*TRM = Tennessee River Mile

Table B-7. Diversity Index Values (Dbar) and Number of Taxa for Phytoplankton Communities During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

	Tennessee River Mile									
	472.8		478.2		483.4		484.5		490.5	
Date	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar
May 1986	37	2.84	42	3.40	46	4.00	43	3.65	41	3.82
Aug. 1986	43	3.58	44	3.75	41	3.88	46	4.15	42	3.90

Table 8-8. Chlorophyll a Concentrations, Phaeophytin a Concentrations, and Phaeophytin Index Values at Each Sample Location During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Depth (M)	Sample No.	TRM 47..8 Chl a Mg/M3	TRM 47..8 Pheo a Mg/M3	TRM 47..8 Pheo Index	TRM 478.2 Chl a Mg/M3	TRM 478.2 Pheo a Mg/M3	TRM 478.2 Pheo Index	TRM 483.4 Chl a Mg/M3	TRM 483.4 Pheo a Mg/M3	TRM 483.4 Pheo Index	TRM 484.5 Chl a Mg/M3	TRM 484.5 Pheo a Mg/M3	TRM 484.5 Pheo Index	TRM 490.5 Chl a Mg/M3	TRM 490.5 Pheo a Mg/M3	TRM 490.5 Pheo Index
May 86	0.3	1	13.50	1.00	1.65	13.60	1.00	1.74	17.10	1.00	1.69	13.10	1.70	1.61	27.80	1.00	1.72
		2	14.00	1.00	1.68	12.50	1.50	1.62	16.40	1.00	1.67	17.10	1.70	1.63	23.90	1.00	1.68
		x	13.75	1.00	1.67	13.05	1.25	1.68	16.75	1.00	1.68	15.10	1.70	1.62	25.85	1.00	1.70
		s	0.35	0.00	0.02	0.78	0.35	0.08	0.49	0.00	0.01	2.83	0.00	0.01	2.76	0.00	0.00
		cv	2.57	0.00	1.27	5.96	28.28	5.05	2.96	0.00	0.84	18.73	0.00	0.87	10.67	0.00	1.66
	1.0	1	13.20	1.70	1.61	12.10	2.10	1.58	19.90	1.00	1.67	14.90	1.00	1.66	22.00	1.60	1.65
		2	15.00	1.00	1.74	11.70	1.00	1.66	16.60	1.00	1.69	14.90	4.10	1.52	26.00	1.00	1.68
		x	14.10	1.35	1.68	11.90	1.55	1.62	18.25	1.00	1.68	14.90	2.55	1.59	24.00	1.30	1.67
		s	1.27	0.49	0.09	0.28	0.78	0.06	2.33	0.00	0.01	0.00	2.19	0.10	2.83	0.42	0.42
		cv	9.03	36.66	5.49	2.38	50.18	3.49	12.79	0.00	0.84	0.00	85.96	6.23	11.79	32.64	1.27
	3.0	1	18.00	1.80	1.63	11.90	1.00	1.67	19.50	2.50	1.61	19.80	8.30	1.45	19.20	3.00	1.59
		2	20.50	1.09	1.71	13.60	1.00	1.69	18.70	1.00	1.67	15.10	3.30	1.56	23.10	1.60	1.65
		x	19.25	1.40	1.67	12.75	1.00	1.68	19.10	1.75	1.64	17.45	5.80	1.51	21.15	2.30	1.62
		s	1.77	0.57	0.06	1.20	0.00	0.01	0.57	1.06	0.04	3.32	3.54	0.08	2.76	0.99	0.99
		cv	9.18	40.41	3.39	9.43	0.00	0.84	2.96	60.61	2.59	19.05	60.96	5.17	13.04	43.04	2.62
	5 0	1	18.50	2.60	1.60	13.00	1.00	1.68	18.40	1.00	1.69	14.00	1.00	1.66	11.20	1.50	1.61
		2	18.70	1.00	1.69	13.30	2.80	1.56	17.10	4.49	1.53	16.50	2.60	1.59	11.10	3.80	1.48
		x	18.60	1.80	1.65	13.15	1.90	1.62	17.75	2.70	1.61	15.25	1.80	1.63	11.15	2.65	1.55
		s	0.14	1.13	0.06	0.21	1.27	0.08	0.92	2.40	0.11	1.77	1.13	0.05	0.07	1.63	1.63
		cv	0.76	62.85	3.87	1.61	66.99	5.24	5.18	89.04	7.03	11.59	62.85	3.05	0.63	61.37	5.95

Table B-8. (Continued)

Date	Depth (M)	Sample No.	TRM 472.8 Chl a Mg/M3	TRM 472.8 Pheo a Mg/M3	TRM 472.8 Pheo Index	TRM 478.2 Chl a Mg/M3	TRM 478.2 Pheo a Mg/M3	TRM 478.2 Pheo Index	TRM 483.4 Chl a Mg/M3	TRM 483.4 Pheo a Mg/M3	TRM 483.4 Pheo Index	TRM 484.5 Chl a Mg/M3	TRM 484.5 Pheo a Mg/M3	TRM 484.5 Pheo Index	TRM 490.5 Chl a Mg/M3	TRM 490.5 Pheo a Mg/M3	TRM 490.5 Pheo Index
Aug. 86	0.3	1	6.30	1.40	1.56	9.50	2.10	1.56	9.30	1.00	1.64	8.50	1.00	1.67	5.70	1.00	1.59
		2	4.80	1.50	1.50	9.20	2.00	1.56	8.40	2.90	1.48	7.80	1.00	1.64	5.50	1.40	1.53
		x	5.55	1.45	1.53	9.35	2.05	1.56	8.85	1.95	1.56	8.15	1.00	1.66	5.60	1.20	1.56
		s	1.06	0.07	0.04	0.21	0.07	0.00	0.64	1.34	0.11	0.49	0.00	0.02	0.14	0.28	0.28
		cv	19.11	4.88	2.77	2.27	3.45	0.00	7.19	68.90	7.25	6.07	0.00	1.28	2.53	23.57	2.72
	1.0	1	6.70	1.50	1.55	11.60	5.80	1.41	7.90	1.70	1.56	8.80	1.00	1.62	5.00	1.00	1.63
		2	5.50	1.40	1.53	8.30	1.80	1.55	9.20	2.00	1.56	9.70	1.50	1.59	5.90	1.00	1.63
		x	6.10	1.45	1.54	9.95	3.80	1.48	8.55	1.85	1.56	9.25	1.25	1.61	5.45	1.00	1.63
		s	0.85	0.07	0.01	2.33	2.83	0.10	0.92	0.21	0.00	0.64	0.35	0.02	0.64	0.00	0.00
		cv	13.91	4.88	0.92	23.45	74.43	6.69	10.75	11.47	0.00	6.88	28.28	1.32	11.68	0.00	0.00
	3.0	1	6.10	1.50	1.54	9.30	2.60	1.52	7.00	1.00	1.63	8.10	2.40	1.51	5.90	1.00	1.73
		2	6.70	1.50	1.55	9.50	3.00	1.50	7.90	1.70	1.56	7.10	1.00	1.62	5.80	1.00	1.76
		x	6.40	1.50	1.55	9.40	2.80	1.51	7.45	1.35	1.60	7.60	1.70	1.57	5.85	1.00	1.75
		s	0.42	0.00	0.01	0.14	0.28	0.01	0.64	0.49	0.05	0.71	0.99	0.08	0.07	0.00	0.00
		cv	6.63	0.00	0.46	1.50	10.10	0.94	8.54	36.66	3.10	9.30	58.23	4.97	1.21	0.00	1.22
	5.0	1	6.20	1.00	1.77	8.20	1.00	1.64	8.10	1.20	1.60	8.30	1.40	1.59	5.80	1.00	1.65
		2	7.00	1.10	1.59	9.70	2.90	1.51	9.10	1.80	1.57	5.70	6.60	1.14	4.90	1.00	1.65
		x	6.60	1.05	1.68	8.95	1.95	1.58	8.60	1.50	1.59	7.00	4.00	1.37	5.35	1.00	1.65
		s	0.57	0.07	0.13	1.06	1.34	0.09	0.71	0.42	0.02	1.84	3.68	0.32	0.64	0.00	0.00
		cv	8.57	6.73	7.58	11.85	68.90	5.84	8.22	28.28	1.34	26.26	91.92	23.31	11.90	0.00	0.00

Table B-9. Results of Statistical Analyses (One- and Two-Way Analyses of Variance and Student, Newman, Keuls Multiple Range Text) on Phytoplankton Chlorophyll a Data, Operational Monitoring During 1986 Near Sequoyah Nuclear Plant, Chickamauga Reservoir

Results of Two-Way ANOVA

	Station		Depth		Interaction	
	F-Ratio	P>F	F-Ratio	P>F	F-Ratio	P>F
May	23.53	0.0001*	5.20	0.0081*	9.07	0.0001*
Aug.	23.39	0.0001*	0.89	0.4636	0.76	0.6706

Results of One-Way ANOVA and SNK on Data Sets with Significant F-Ratios

	Sample	F-Ratio	SNK†				
Date	Depth (m)	One-Way ANOVA	High $\bar{X}$				Low $\bar{X}$
May	0.3	14.45	5	3	4	1	2
	1.0	18.15	5	3	4	1	2
	3.0	5.22	5	1	3	4	2
	5.0	26.90	1	3	4	2	5
Aug.			2	3	4	1	5

*Significant at α = 0.05.

†Student, Newman, Kuels Multiple Range Test; means ranked lowest to highest using station numbers; means underscored by same line are not significantly different at α = 0.05; means not so underscored are significantly different.

Station 1 = Tennessee River Mile 472.8
Station 2 = Tennessee River Mile 478.2
Station 3 = Tennessee River Mile 483.4
Station 4 = Tennessee River Mile 484.5
Station 5 = Tennessee River Mile 490.5

Table B-10. Chlorophyll Fluorescence Measurments - Sequoyah Nuclear Plant - 1986

TRM*	Depth (Meters)	May 20, 1986 Raw Fluorescence†	May 20, 1986 FRI‡	August 28, 1986 Raw Fluorscence	August 28, 1986 FRI
478.2	0.3	15.8	0.633	8.2	0.559
	1.0	16.8	0.658	7.6	0.586
	3.0	16.8	0.644	7.9	0.576
	5.0	17.7	0.631	7.9	0.537
	7.0	14.9	0.619	7.9	0.569
	9.0	11.7	0.635	8.2	0.552
	11.0	6.1	0.606	7.9	0.545
	13.0	2.3	0.500	7.9	0.554
	14.0	2.5	0.457	--	--
	15.0	--	--	7.9	0.554
	17.0	--	--	7.9	0.576
482.0	0.3	17.1	0.603	8.2	0.574
	1.0	17.4	0.605	7.6	0.593
	3.0	17.4	0.605	8.2	0.566
	5.0	9.5	0.605	7.9	0.554
	7.0	5.4	0.593	7.6	0.579
	9.0	3.3	0.582	7.6	0.579
	11.0	2.3	0.617	7.6	0.579
	13.0	2.2	0.577	7.6	0.593
	15.0	2.1	0.500	6.6	0.604
	17.0	--	--	7.6	0.579
483.4	0.3	23.0	0.558	8.9	0.582
	1.0	24.0	0.600	9.2	0.574
	3.0	24.0	0.586	8.9	0.555
	5.0	22.0	0.621	7.3	0.639
	7.0	22.0	0.621	7.3	0.639
	9.0	13.9	0.579	8.2	0.580
	11.0	10.4	0.614	8.2	0.574
	13.0	5.2	0.578	8.2	0.580
	15.0	3.0	0.375	7.3	0.634
	17.0	3.0	0.500	8.9	0.562
484.5	0.3	16.4	0.609	7.9	0.627
	1.0	16.4	0.589	7.6	0.625
	3.0	15.2	0.611	7.9	0.603
	5.0	13.6	0.600	8.5	0.572
	7.0	12.6	0.579	8.2	0.580
	9.0	11.1	0.590	8.2	0.587

Table B-10. (Continued)

TRM*	Depth (Meters)	May 20, 1986 Raw Fluorescence†	May 20, 1986 FRI‡	August 28, 1986 Raw Fluorscence	August 28, 1986 FRI
	11.0	8.9	0.562	7.9	0.583
	13.0	6.4	0.587	7.3	0.610
	14.0	3.8	0.518	--	--
	15.0	--	--	7.9	0.583
	17.0	--	--	7.6	0.607

*Tennessee River Mile

†All readings equalized to maximum instrument sensitivity

‡Fluorescence Response Index

Table B-11. Carbon Assimilation Rates at Each Sample Location During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Depth (m)	Sample No.	mg C/m^3/hour TRM* 472.8	TRM 478.2	TRM 483.4	TRM 484.5	TRM 490.5
May 86	0.3	1	2.15	9.53	8.99	7.04	9.68
		2	1.87	12.49	8.83	7.07	9.34
		X†	2.01	11.01	8.91	7.05	9.51
		S‡	0.19	2.09	0.11	0.02	0.24
		CV§	9.56	18.99	1.27	0.29	2.56
	1.0	1	8.34	12.26	12.89	3.82	15.85
		2	8.74	11.80	10.31	5.98	14.48
		X	8.54	12.03	11.60	4.90	15.17
		S	0.29	0.32	1.82	1.53	0.97
		CV	3.37	2.70	15.72	31.19	6.39
	3.0	1	2.26	3.79	1.89	1.60	2.49
		2	1.43	3.74	1.19	1.85	2.45
		X	1.84	3.76	1.54	1.73	2.47
		S	0.59	0.03	0.49	0.18	0.03
		CV	31.90	0.87	32.19	10.26	1.22
	5.0	1	0.00	0.79	0.40	0.34	0.31
		2	0.00	0.89	0.32	0.44	0.29
		X	0.00	0.84	0.36	0.39	0.30
		S	0.00	0.07	0.06	0.07	0.01
		CV	.	8.43	16.27	18.13	4.18
mg C/m^2/day			159	274	242	145	333
Aug. 86	0.3	1	11.71	17.12	16.50	15.86	12.42
		2	12.19	17.21	14.81	15.68	12.09
		X	11.95	17.16	15.66	15.77	12.25
		S	0.34	0.06	1.19	0.13	0.24
		CV	2.83	0.37	7.61	0.82	1.92
	1.0	1	7.23	7.82	8.92	16.89	8.63
		2	8.97	8.06	8.93	16.57	8.66
		X	8.10	7.94	8.92	16.73	8.64
		S	1.23	0.17	0.01	0.23	0.02
		CV	15.21	2.16	0.07	1.38	0.24
	3.0	1	1.99	1.06	3.13	2.00	1.26
		2	2.59	1.02	3.80	2.41	1.84
		X	2.29	1.04	3.46	2.20	1.55
		S	0.43	0.03	0.47	0.29	0.41
		CV	18.58	3.24	13.67	12.96	26.76

Table B-11. (Continued)

Date	Depth (m)	Sample No.	mg C/m^3/hour TRM* 472.8	TRM 478.2	TRM 483.4	TRM 484.5	TRM 490.5
Aug. 86	5.0	1	0.48	0.16	0.81	0.25	0.30
		2	0.50	0.14	0.71	0.35	0.15
		$\bar{X}$	0.49	0.15	0.76	0.30	0.23
		S	0.02	0.02	0.07	0.08	0.11
		CV	3.15	12.30	9.40	25.12	47.76
mg C/m^2/day			202	214	184	201	125

*TRM = Tennessee River Mile

†$\bar{X}$ = Mean

‡S = Standard Deviation

§CV = Coefficient of Variation.

Table B-12. Results of Statistical Analyses (One- and Two-Way Analyses of Variance and Student, Newman, Keuls Multiple Range Text) on Phytoplankton Carbon Assimilation Rates, Operational Monitoring During 1986 Near Sequoyah Nuclear Plant, Chickamauga Reservoir

Results of Two-Way ANOVA

	Station		Depth		Interaction	
	F-Ratio	P>F	F-Ratio	P>F	F-Ratio	P>F
MAY	57.36	0.0001*	791.71	0.0001*	15.49	0.0001*
AUG	4.61	0.0084*	119.93	0.0001*	2.81	0.0199*

Results of One-Way ANOVA and SNK on Data Sets with Significant F-Ratios

Date	Sample Depth (m)	F-Ratio One-Way ANOVA	SNK** High $\bar{X}$				Low $\bar{X}$
MAY	0.3	87.24	2	5	3	4	1
	1.0	16.37	5	2	3	1	4
	3.0	7.69	2	5	1	4	3
	5.0	78.58	2	4	3	5	1
AUG	0.3	37.51	2	4	3	5	1
	1.0	43.16	4	3	5	1	2
	3.0	13.69	3	1	4	5	2
	5.0	21.75	3	1	4	5	2

*Significant at $\alpha = 0.05$.

†Student, Newman, Kuels Multiple Range Test; means ranked lowest to highest using station numbers; means underscored by same line are not significantly different at $\alpha = 0.05$; means not so underscored are significantly different.

‡Station 1 = Tennessee River Mile 490.5
Station 2 = Tennessee River Mile 484.5
Station 3 = Tennessee River Mile 483.4
Station 4 = Tennessee River Mile 478.2
Station 5 = Tennessee River Mile 472.8

APPENDIX C

ZOOPLANKTON DATA AND RESULTS OF STATISTICAL TESTS MAY 20 AND AUGUST 27, 1986

Table C-1. Percentage Composition of Zooplankton Groups During Operational Monitoring Periods (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Zooplankton Group	Tennessee River Mile				
		472.8	478.2	483.4	484.5	490.5
May 1986	Cladocera	19	20	22	35	28
	Copepoda	55	66	66	51	54
	Rotifera	26	14	13	14	18
Aug. 1986	Cladocera	23	12	12	24	10
	Copepoda	30	10	15	22	11
	Rotifera	47	78	73	55	79

Table C-2. Summary of Zooplankton Data Collected During Operational Monitoring Periods (1986), Sequoyah Nuclear Plant

Date	River Mile	Group	Sample 1	Sample 2	Mean	Standard Deviation	C.V.*
May 86	472.8	Cladocera	92980	25100	4040	47998.4	81.30
		Copepoda	215690	120340	168015	67422.6	40.13
		Rotifera	101380	59730	80555	29451.0	36.56
		Total	410050	205170	307610	144872.0	47.10
	478.2	Cladocera	20942	39000	29971	12768.9	42.60
		Copepoda	81151	113790	97471	23079.3	23.68
		Rotifera	19307	20640	19974	942.6	4.72
		Total	121400	173430	147415	36790.8	24.96
	483.4	Cladocera	24930	12615	18773	8708.0	46.39
		Copepoda	71800	42511	57156	20710.5	36.24
		Rotifera	13325	8641	10983	3312.1	30.16
		Total	110055	63767	86911	32730.6	37.66
	484.5	Cladocera	68627	41289	54958	19330.9	35.17
		Copepoda	98923	64112	81518	24615.1	30.20
		Rotifera	26585	17072	21829	6726.7	30.82
		Total	194135	122473	158304	50672.7	32.01
	490.5	Cladocera	44417	36428	40423	5649.1	13.98
		Copepoda	94978	60651	77815	24272.9	31.19
		Rotifera	28793	24040	26417	3360.9	12.72
		Total	168188	121119	144654	33282.8	23.01

Table C-2. (Continued)

Date	River Mile	Group	Sample 1	Sample 2	Mean	Standard Deviation	C.V.*
Aug. 86	472.8	Cladocera	20655	23458	22057	1982.0	8.99
		Copepoda	28609	29587	29098	691.6	2.38
		Rotifera	27033	63186	45110	25564.0	56.67
		Total	76297	116231	96264	28237.6	29.33
	478.2	Cladocera	30435	16226	23331	10047.3	43.07
		Copepoda	23530	17327	20429	4386.2	21.47
		Rotifera	204522	103410	153966	71497.0	46.44
		Total	258487	136963	197725	85930.4	43.46
	483.4	Cladocera	20269	27778	24024	5309.7	22.10
		Copepoda	10130	49019	29575	27498.7	92.98
		Rotifera	74096	212824	143460	98095.5	68.38
		Total	104495	289621	197058	130903.8	66.43
	484.5	Cladocera	20288	44859	32574	17374.3	53.34
		Copepoda	22192	37638	29915	10922.0	36.51
		Rotifera	64659	87062	75861	15841.3	20.88
		Total	107139	169559	138349	44137.6	31.90
	490.5	Cladocera	13030	17098	15064	2876.5	19.10
		Copepoda	14313	17099	15706	1970.0	12.54
		Rotifera	90410	140673	115542	35541.3	30.76
		Total	117753	174870	146312	40387.8	27.60

*C.V. = Coefficient of Variation.

Table C-3. Results of One-Way-Analysis of Variance and Student, Newman, Keuls Multiple Range Test on Zooplankton Data for Operational Monitoring in 1986, Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Test Group	F Ratio	P > F	Tennessee River Mile SNK* High $\bar{x}$				Low $\bar{x}$
May 1986	Total zooplankton	3.18	0.1183	472.8	484.5	478.2	490.5	483.4
	Cladocera	1.40	0.3543	484.5	472.8	490.5	478.2	483.4
	Copepoda	2.78	0.1460	472.8	478.2	484.5	490.5	483.4
	Rotifera	14.87	0.0055	472.8	490.5	484.5	478.2	483.4
Aug. 1986	Total zooplankton	0.73	0.6064	478.2	483.4	490.5	484.5	472.8
	Cladocera	1.05	0.4649	484.5	483.4	478.2	472.8	490.5
	Copepoda	0.47	0.7571	472.8	484.5	483.4	478.2	490.5
	Rotifera	1.99	0.2339	478.2	483.4	490.5	484.5	472.8

*Student, Newman, Keuls Multiple Range Test; means ranked highest to lowest using Tennessee River Mile (TRM) to identify stations; means underscored by same line are not significantly different at $\alpha = 0.05$, means not so underscored are significantly different.

Table C-4. Mean Zooplankton Densities (No./m3) at Each Sample Station During Operational Monitoring (1986) Sequoyah Nuclear Plant, Chickamauga Reservoir

	May 1986					August 1986				
	472.8	478.2	483.4	484.5	490.5	472.8	478.2	483.4	484.5	490.5
Cladocera										
Alona rectangula	0	0	0	0	0	1	0	0	0	130
Bosmina longirostris	980	0	124	0	93	13685	16735	4931	22963	11192
Camptocercus rectirostris	0	0	0	0	0	0	0	2	0	0
Ceriodaphnia lacustris	0	0	0	0	0	158	314	3	88	0
Chydorus sp.	0	0	5	0	0	2	157	0	0	1
Daphnia retrocurva	15620	10647	8279	13015	5005	0	0	0	176	0
Diaphanosoma leuchtenbergianum	38595	19270	9007	41911	34429	7891	5414	16111	7816	3352
Ilyocryptus spinifer	0	0	124	0	0	1	2	2	2	1
Leptodora kindtii	3845	50	1234	32	897	0	0	0	0	0
Moina micrura	0	0	0	0	0	317	707	2976	1528	389
Pleuroxus denticulatus	0	5	2	0	0	2	0	0	0	0
Sida crystallina	0	0	0	0	0	2	2	1	2	1
Simocephalus serrulatus	0	0	0	0	0	1	0	0	0	0
Copepoda										
Calanoid imm.	380	164	752	92	790	0	0	134	0	0
Cyclopoid imm.	5185	4942	2431	1195	4358	3156	1021	2380	4679	2316
Cyclops bicuspidatus thomasi	0	240	124	0	0	0	0	0	0	0
Cyclops vernalis	0	404	520	0	351	0	0	204	0	0
Diaptomus pallidus	385	164	124	5	444	0	0	0	0	0
Diaptomus reighardi	765	884	2443	360	1243	0	0	0	0	1
Ergasilus sp.	0	0	0	0	0	2	2	134	0	1
Eucyclops agilis	0	0	0	0	0	1	1	1	1	0
Mesocyclops edax	2945	2258	2233	1661	966	317	157	409	4057	261
Nauplii	158355	88417	48528	78206	69664	25624	18779	26315	21059	13126
Tropocyclops prasinus	0	0	2	0	0	0	471	0	120	3

Table C-4. (Continued)

	May 1986					August 1986				
	472.8	478.2	483.4	484.5	490.5	472.8	478.2	483.4	484.5	490.5
Rotifera										
Asplanchna herricki	0	0	0	0	0	53	434	809	264	0
Brachionus angularis	1040	1451	839	4485	13873	3423	20463	13295	4711	26807
Brachionus budapestinensis	0	0	0	87	88	526	9613	2238	2694	3093
Brachionus calyciflorus	0	0	1	0	0	0	589	409	88	0
Brachionus caudatus	0	0	87	0	366	4054	20226	12329	6230	7473
Brachionus quadridentatus	0	0	0	87	0	53	157	0	565	256
Brachionus urceolaris	0	0	0	0	0	0	0	0	88	0
Cephalodella sp.	0	0	124	0	0	0	0	0	0	0
Collotheca sp.	0	0	0	0	0	212	157	0	176	0
Conochiloides sp.	0	0	0	0	370	5954	29878	14193	6676	3491
Conochilus hippocrepis	0	0	0	0	0	1108	2413	1226	88	0
Conochilus unicornis	0	0	0	700	527	11406	16084	16856	4534	3109
Epiphanes macrourus	380	491	3677	523	)	0	0	0	0	0
Filinia longiseta	0	0	0	0	1668	0	0	134	0	0
Hexarthra intermedia	0	0	0	0	0	106	0	0	0	0
Kellicottia bostoniensis	4170	0	0	0	0	0	0	0	0	0
Kellicottia longispina	12960	13603	3776	9371	3055	0	0	0	0	0
Keratella cochlearis	46370	3535	864	407	0	106	1098	1021	0	259
Keratella crassa	3810	0	0	0	278	0	628	817	0	0
Keratella earlinae	2670	164	173	1048	1072	474	1706	204	0	259
Keratella quadrata	0	0	0	0	0	0	275	0	88	259
Lecane sp.	0	0	0	0	0	0	0	204	0	0
Machrochaetus subquadratus	0	0	0	0	0	0	0	879	88	0
Platyias patulus	0	0	0	0	0	527	2061	1696	0	766
Ploesoma truncata	0	0	0	233	0	1947	14810	3935	2236	5424
Polyarthra sp.	1860	240	370	0	911	5424	11948	18447	16744	18409
Synchaeta stylata	7295	491	1074	4889	4031	9636	21273	54638	30592	45939
Trichocerca sp.	0	0	0	0	181	106	157	134	0	0

Table C-5. Similarity of Zooplankton Community Composition/Structure During Operational Monitoring in 1986 Based on Sorensen's Quotient of Similarity and Percentage Similarity, Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Station Comparison	Sorensen's Quotient of Similarity (%)	Percentage Similarity (%)
May	TRM* 490.5-484.5	71	83
	TRM 490.5-483.4	69	65
	TRM 490.5-478.2	71	73
	TRM 490.5-472.8	76	56
	TRM 484.5-483.4	67	62
	TRM 484.5-478.2	79	81
	TRM 484.5-472.8	79	65
	TRM 483.4-478.2	84	68
	TRM 483.4-472.8	76	41
	TRM 478.2-472.8	84	64
August	TRM 490.5-484.5	70	71
	TRM 490.5-483.4	68	72
	TRM 490.5-478.2	83	62
	TRM 490.5-472.8	79	52
	TRM 484.5-483.4	72	67
	TRM 484.5-478.2	83	62
	TRM 484.5-472.8	73	70
	TRM 483.4-478.2	83	67
	TRM 483.4-472.8	77	59
	TRM 478.2-472.8	88	57

*Tennessee River Mile.

Table C-6. Zooplankton Diversity Index Values During Operational Monitoring Periods (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Tennessee River Mile									
	472.8		478.2		483.4		484.5		490.5	
	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar	No. Taxa	Dbar
May 1986	16	2.83	16	2.49	23	3.15	16	2.20	20	2.54
Aug. 1986	30	3.31	30	3.56	30	3.24	26	3.15	24	2.82

APPENDIX D

WATER QUALITY DATA ON JULY 27 AND AUGUST 31, 1987

[illegible]

[illegible] 23
35 13 30.0 0[illegible] 4 44.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040601
TENNESSEE RIVER 484.5
131TVAC 850[illegible] 06020001022 0010.630 ON
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	MEDIUM	RMK OR DEPTH (FT)	00098 VSAMPLOC DEPTH METERS	00032 HSAMPLOC % FROM RT BANK	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	82079 TURBIDTY LAB NTU	00605 ORG N N MG/L	00610 NH3+NH4- N TOTAL MG/L
87/07/27	12[illegible]	WATER	1	.3	40	28.7	1[illegible]2	8.6	8.50	61	2.0	.23	.03
87/07/27	1205	WATER	3	1.0	40	28.6	191	8.6	8.50	61	2.0	.23	.01
87/07/27	12[illegible]	WATER	5	1.5	40	28.3	191	7.6	8.25				
87/07/27	1207	WATER	7	2.0	40	28.0	182	6.7	7.79				
87/07/27	12[illegible]	WATER	[illegible]	2.5	40	28.0	182	6.4	7.75				
87/07/27	1210	WATER	10	3.0	40	27.8	182	6.2	7.68	61	2.0	.15	.01K
87/07/27	1212	WATER	15	4.5	40	27.7	182	5.6	7.57	61			
87/07/27	1215	WATER	16	5.0	40						2.0	.15	.03
87/07/27	121[illegible]	WATER	20	6.0	40	27.2	182	4.7	7.42				
87/07/27	1217	WATER	25	7.5	40	27.1	182	4.4	7.36				
87/07/27	1218	WATER	30	9.0	40	27.0	182	4.3	7.32				
87/07/27	1219	WATER	34	10.5	40	26.9	182	4.0	7.29				
87/07/27	1220	WATER	39	12.0	40	26.9	183	4.0	7.26				
87/07/27	1221	WATER	44	13.5	40	26.9	182	4.0	7.22				
87/07/27	1222	WATER	46	13.9	40	26.9	181	3.9	7.21				
87/0[illegible]/31	120[illegible]	WATER	1	.3	40	26.5	195	5.7	7.40	70	1.6	.14	.02
87/0[illegible]/31	120[illegible]	WATER	1	.23	100						1.5	.12	.02
87/0[illegible]/31	120[illegible]	WATER	3	1.0	40	26.5	195	5.7	7.40	70	1.7	.14	.02
87/0[illegible]/31	12[illegible]	WATER	5	1.5	40	26.5	195	5.7	7.40				
87/0[illegible]/31	121[illegible]	WATER	10	3.0	40	26.5	195	5.7	7.40	70	1.6	.19	.02
87/0[illegible]/31	1215	WATER	16	5.0	40	26.5	195	5.7	7.40	70	1.7	.15	.01
87/0[illegible]/31	1217	WATER	26	8.0	40	26.5	195	5.[illegible]	7.43				
87/0[illegible]/31	1219	WATER	36	11.0	40	26.5	195	5.[illegible]	7.50				
87/0[illegible]/31	1221	WATER	46	14.0	40	26.5	196	5.[illegible]	7.5[illegible]				

CHICKAMAUGA RESERVOIR
TENNESSEE HAMILTON
TENNESSEE RIVER BASIN
TENNESSEE RIVER 484.5
06020001022 0010.630 ON

DATE TIME	DEPTH (FEET)	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC, TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	PHOSPHORUS, DISSOLVED (MG/L AS P)	CHLOROPHYLL A, CORRECTED (UG/L)	32211 CHLORPHYL A UG/L CORRECTD	32212 CHLORPHYL B UG/L	32214 CHLORPHYL C UG/L	32218 PHEOPHTN A UG/L	01027 CADMIUM, TOTAL (UG/L AS CD)	01027 CADMIUM, TOTAL (UG/L AS CD)
[illegible]	1	.06	.03	.01K	3.6	9.30A	1.00K	1.55A	1.75A			
[illegible]	5	.06	.04	.01	3.7	9.45A	1.30A	1.70A	1.75A			
[illegible]	9										50K	.1
[illegible]	10	.10	.04	.01K	3.4	11.75A	1.40A	2.30A	1.65A			
[illegible]	16	.12	.05	.02	3.1	11.20A	1.30A	2.05A	1.25A			
[illegible]	1	.13	.01K	.01K	1.5	4.90A	1.00K	1.00K	1.60A			
[illegible]	5	.13	.01K		1.2							
[illegible]	5	.13	.01	.01K	1.4	5.30A	1.05K	1.00K	1.70A			
[illegible]	9										50K	.1K
[illegible]	10	.13	.02	.01K	1.3	5.05A	1.00K	1.00K	1.65A			
[illegible]	16	.13	.01K	.01K	1.3	5.20A	1.00K	1.00K	1.00K			

[illegible] 1 [illegible]

/TYPA/AMBNT/STREAM

[illegible]
35 15 30.0 085 04 54.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040331
TENNESSEE RIVER 449.5
131TVAC 852810
0000 FEET DEPTH
06020001022 0010.630 ON

DATE FROM TO	TIME OF DAY	MEDIUM	SMK OR DEPTH (FT)	01051 LEAD PB,TOT UG/L	01067 NICKEL NI,TOTAL UG/L	01105 ALUMINUM AL,TOT UG/L	00078 TRANSP SECCHI METERS	84002 CODE GENERAL REMARKS	00028 LAB IDENT. NUMBER
87/07/27	122[illegible]	WATER	1						9553
87/07/27	1225	WATER	3						9594
87/07/27	1226	WATER	5	1K	2	50K			9595
87/07/27	121[illegible]	WATER	10						9595
87/07/27	121[illegible]	WATER	15						9596
87/08/31	12[illegible]	WATER	1				1.50	01	11353
87/08/31	1231	WATER	1					02	11354
87/08/31	1235	WATER	3						11355
87/08/31	129[illegible]	WATER	5	2	2	50K			11350
87/08/31	121[illegible]	WATER	13						11356
87/08/31	121[illegible]	WATER	16						11357

[illegible]

[illegible] 1035
35 [illegible] 25.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040601
TENNESSEE RIVER 463.40
131TVAC 06020001022 0009.050 ON
FEET DEPTH

DATE FROM TO DAY	TIME	MEDIUM	SMK CD DEPTH (FT)	00035 VSAMPLDC DEPTH METERS	00032 HSAMPLDC % FROM RT BANK	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00300 DO PG/L	00400 PH SU	00431 T ALK FIELD PG/L	R2075 TURBIDITY LAB NTU	00605 ORG N PG/L	00610 NH3+NH4- N TOTAL PG/L
[illegible]	1[illegible]	WATER	0	.0	17	29.4	190	9.6	9.71	59	2.0	.23	.01
07/07/27	1201	WATER	1	.30	170						2.0	.19	.01
07/07/27	1205	WATER	5	1.5	17	29.4	190	9.6	9.70	59	2.0	.29	.01
[illegible]	1209	WATER	9	2.5	17	29.3	190	9.7	8.70				
07/07/27	1210	WATER	10	3.0	17	29.3	190	9.5	8.66	60	2.0	.22	.02
07/07/27	1212	WATER	13	4.0	17	29.0	191	8.6	8.48				
07/07/27	1213	WATER	15	5.0	17	28.8	191	7.3	8.24	62	2.0	.19	.02
07/07/27	1216	WATER	19	5.5	17	28.4	192	6.9	7.91				
07/07/27	1217	WATER	21	6.0	17	28.6	193	5.6	7.59				
07/07/27	1219	WATER	23	6.5	17	27.8	192	5.4	7.48				
07/07/27	1219	WATER	25	7.0	17	27.6	192	5.0	7.44				
07/07/27	1221	WATER	31	9.5	17	27.3	192	4.7	7.35				
07/07/27	1221	WATER	35	11.0	17	27.3	191	4.6	7.31				
07/07/27	1222	WATER	41	12.5	17	27.2	192	4.5	7.26				
07/07/27	1223	WATER	46	14.3	17	27.2	193	4.5	7.25				
07/07/27	1224	WATER	51	15.5	17	27.3	192	4.5	7.24				
[illegible]	1225	WATER	56	17.3	17	27.2	192	4.5	7.23				
07/07/27	1226	WATER	59	17.8	17	27.2	191	4.5	7.23				
07/07/31	1200	WATER	1	.3	17	26.6	196	5.7	7.10	74	1.6	.18	.02
07/07/31	1205	WATER	5	1.0	17	26.6	196	5.7	7.10	72	1.6	.16	.02
07/07/31	1207	WATER	7	1.5	17	26.6	196	5.6	7.27				
07/07/31	1210	WATER	10	3.0	17	26.6	196	5.6	7.30	67	1.6	.11	.02
07/07/31	1215	WATER	15	5.0	17	26.6	196	5.6	7.30	64	1.5	.16	.01
07/07/31	1216	WATER	21	6.6	17	26.6	196	5.6	7.30				
07/07/31	1217	WATER	35	11.0	17	26.6	196	5.6	7.30				
07/07/31	1217	WATER	45	14.0	17	26.6	194	5.6	7.30				
07/07/31	1219	WATER	55	17.0	17	26.6	195	5.4	7.30				
07/07/31	1220	WATER	57	17.8	17	26.6	195	5.3	7.31				

[illegible]

[illegible]
[illegible]
CHICKAMAUGA RESERVOIR
[illegible] TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040801
TENNESSEE RIVER 483.4C
131TVAC 06020001022 0009.050 ON
0001 FEET DEPTH

DATE FROM TO	TIME OF DAY	PERIOD OF	SAM DEPTH (FT)	00630 NO2&NO3 N-TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	00671 T ORG C MG/L C	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32213 CHLRPHYL C UG/L	32216 PHECPHTN A UG/L	01022 BCRON 9,TOT UG/L	01027 CADMIUM CD,TOT UG/L
[illegible]	1200	WATER	1	.03	.04	.01K	4.4	12.30	1.20	2.10	1.00K		
[illegible]	1201	WATER	1	.03	.04	.01K	3.5	13.10	1.10	1.80	1.00K		
[illegible]	1205	WATER	5	.04	.04	.01K	3.6	13.65A	1.60A	2.45A	1.30A		
[illegible]	1206	WATER	5									50K	<1
[illegible]	1210	WATER	10	.04	.04	<.01	3.3	11.75A	1.45A	2.20A	2.00A		
[illegible]	1215	WATER	15	.05	.05	.01K	2.9	12.95A	1.40A	2.35A	1.15A		
[illegible]	1200	WATER	1	.13	.01K	.01K	1.4	5.45A	1.00K	1.00K	1.45K		
[illegible]	1205	WATER	5	.13	.02	.01K	0.0	4.25A	1.00K	1.00K	2.25A		
[illegible]	1210	WATER	10									50K	<1
[illegible]	1215	WATER	10	.13	.06	.01K	1.2	4.60A	1.10K	1.15K	1.35A		
[illegible]	1215	WATER	14	.13	<.2	.01K	1.2	4.40A	1.00K	1.00K	1.85A		

CHICKAMAUGA RESERVOIR
TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040401
TENNESSEE RIVER 483.40
1311VAC 06120001022 0009.050 ON
0000 FEET DEPTH

DATE TIME OF SAMPLE	DEPTH OF SAMPLE	MEDIUM	SMA DEPTH FEET	01051 LEAD PB,TOT UG/L	01067 NICKEL NI,TOTAL UG/L	01105 ALUMINUM AL,TOT UG/L	00078 TRANSP SECCHI METERS	REMARK CODE GENERAL REMARKS	LAB IDENT. NUMBER
[illegible]	12[illegible]	WATER	1					01	9588
[illegible]	12[illegible]	WATER	1					02	9589
[illegible]	1205	WATER	5						9590
[illegible]	12[illegible]	WATER	5	1	1	60			9586
[illegible]	1217	WATER	17						9591
[illegible]	1215	WATER	15						9592
[illegible]	1200	WATER	1				1.50		11358
[illegible]	1205	WATER	5						11359
[illegible]	1217	WATER	17	2K	2	5?K			11351
[illegible]	1215	WATER	15						11360
[illegible]	1215	WATER	15						11361

[illegible]

[illegible]
SEQUOYAH NUCLEAR PLANT INTAKE POND
[illegible] TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040602
ADJACENT TO TENNESSEE RIVER 484.5
1311WAC 871024 06020001
0030 FEET DEPTH

DATE FROM TO	TIME FROM TO DAY	MEDIUM	TIME OF DEPTH (FEET)	00094 WGAMPLDC DEPTH METERS	00032 HGAMPLDC % FROM AT BANK	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	82079 TURBIDITY LAB NTU	00605 ORG N N MG/L	00610 NH3+NH4- N TOTAL MG/L
[illegible]	1122	WATER	1	0.3		27.4	183	9.4	7.14				
[illegible]	1123	WATER	3	1.0		27.4	183	9.4	7.14				
[illegible]	1124	WATER	7	2.0		27.2	183	9.3	7.13				
[illegible]	1125	WATER	13	4.0		27.2	183	9.3	7.12				
[illegible]	1125	WATER	16	5.0									
[illegible]	1126	WATER	27	8.0		27.2	182	9.3	7.13				
[illegible]	1127	WATER	26	8.0		27.2	182	9.2	7.13				
[illegible]	1127	WATER	33	10.0		27.2	182	9.2	7.15				
[illegible]	1127	WATER	36	10.9		27.2	182	9.2	7.15				
[illegible]	1035	WATER	1	0.3		26.6	183		7.32				
[illegible]	1035	WATER	3	1.0		26.6	183		7.33				
[illegible]	1041	WATER	7	2.0		26.6	183		7.33				
[illegible]	1041	WATER	13	3.0		26.6	183		7.33				
[illegible]	1042	WATER	16	5.0		26.6	183		7.33				
[illegible]	1043	WATER	23	7.0		26.6	183		7.33				
[illegible]	1044	WATER	33	9.0		26.6	184		7.33				
[illegible]	1044	WATER	36	10.3		26.6	183		6.93				

477352
35 23 26.0 084 58 17.0 2
SEQUOYAH NUCLEAR PLANT INTAKE POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 2601-02
ADJACENT TO TENNESSEE RIVER MILE 484.5
1611WAC 471024 06020001
0001 FEET DEPTH

DATE TIME	DEPTH OF SAMPLE FEET	00400 PH SU	00630 N+N02-N,TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	70300 DRY RESIDUE MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32215 PHEOPHTN A UG/L	01022 BORON B,TOT UG/L	01027 CADMIUM CD,TOT UG/L
77/07/27 1125 EST	1						2.60A	1.00K	1.00K	1.20A		
77/07/31 1042 EST	1						4.47A	1.00K	1.00K	1.20K		

477E52
35 13 24.0 085 05 17.0 2
SEQUOYAH NUCLEAR PLANT INTAKE POND
47365 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060502
ADJACENT TO TENNESSEE RIVER 464.5
131TVAC 471024 06020001
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	MEDIUM	SMK DR DEPTH (FT)	01051 LEAD PB,TOT UG/L	01067 NICKEL NI,TOTAL UG/L	01105 ALUMINUM AL,TOT UG/L	00078 TRANSP SECCHI METERS	84602 CODE GENERAL REMARKS	00028 LAB IDENT. NUMBER
87/07/27	1125	WATER	16						9609
87/04/31	1042	WATER	16						11371

477.01
35 13 04.0 085 15 29.0 2
SEQUOYAH NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 06020001
ADJACENT TO TENNESSEE RIVER 483.4
1311WAC 471024 06020001
0030 FEET DEPTH

DATE FROM TO	TIME OF DAY	MEDIUM	LMK AR DEPTH (FT)	00058 WSAMPLOC DEPTH METERS	00082 MSAMPLOC % FROM AT BANK	00010 WATER TEMP CENT	00094 CNDUCTVY FIELD MICROMHO	00300 DO MG/L	00400 PH SU	00431 T ALK FIELD MG/L	82079 TURBIDTY LAB NTU	00605 ORG N N MG/L	00610 NH3+NH4- N TOTAL MG/L
[illegible]	1427	WATER	1	.3		28.2	183	5.4	7.20				
[illegible]	1404	WATER	5	1.5		28.1	183	5.2	7.20				
[illegible]	1417	WATER	10	3.0		28.2	184	5.1	7.10				
[illegible]	1417	WATER	11	3.5									
[illegible]	1401	WATER	16	5.0		27.9	183	4.9	7.10				
[illegible]	1407	WATER	20	6.0		27.8	184	4.8	7.10				
07/30/91	1219	WATER	1	.3		26.7	182		7.04				
07/30/91	1220	WATER	5	1.5		26.7	183		7.07				
07/30/91	1221	WATER	7	2.0		26.7	183		7.08				
07/30/91	1222	WATER	10	3.0		26.7	184		7.09				
07/30/91	1222	WATER	11	3.5									
07/30/91	1225	WATER	12	3.6		26.7	183		7.08				

/TYPE/INC/FREQ/CUTFL/SUNAME/PIPE/IPPCMT

477151
35 13 04.0 085 05 28.0 2
SEQUOYAH NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060602
ADJACENT TO TENNESSEE RIVER 483.4
1511VAC 871024 06020001
4900 FEET DEPTH

DATE FROM TO	TIME OF DAY	MEDIUM	SMK OR DEPTH (FT)	00630 NO2&NO3 N-TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P	T 00680 ORG C C MG/L	32211 CHLRPHYL A UG/L CORRECTD	32212 CHLRPHYL B UG/L	32214 CHLRPHYL C UG/L	32216 PHECPHTN A UG/L	01022 BORON B-TOT UG/L	01027 CADMIUM CD-TOT UG/L
87/07/27	1435	WATER	1										
87/07/27	1437	WATER	11					2.70A	1.00K	1.10K	1.65A	50K	.3
87/08/31	1219	WATER	1										
87/08/31	1222	WATER	11					4.50A	1.00K	1.00K	1.80A	50K	.1

477251
35 13 04.0 085 15 24.0 2
SEQUOYAH NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060602
ADJACENT TO TENNESSEE RIVER 483.4
1511WAC 871024 06020301
0000 FEET DEPTH.

/STORAGE/ALIAS/STORET/OUTFALL/SEQUOYAH/PIPE/IPPDMT

DATE FROM TO	TIME OF DAY	MEDIUM	SMK GR DEPTH FEET	01051 LEAD PB,TOT UG/L	01067 NICKEL NI,TOTAL UG/L	01105 ALUMINUM AL,TOT UG/L	00078 TRANSP SECCHI METERS	84102 CODE GENERAL REMARKS	00008 LAB IDENT. NUMBER
87/07/27	1425	WATER	1	4	4	110			9587
87/07/27	1437	WATER	11						9603
87/10/31	1217	WATER	1	1	2	50K			11352
87/10/31	1222	WATER	11						11369

APPENDIX E

PHYTOPLANKTON DATA AND RESULTS OF STATISTICAL TESTS, JULY 27 AND AUGUST 31, 1987

Table E-1. Percentage Composition of Phytoplankton Groups During Operational Monitoring Periods (1987), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Phytoplankton Group	Tennessee River Mile		Inplant Station		
		483.4	484.5	Cooling Return	Diffuser Fond	Intake
July 1987	Chlorophyta	30	33	50	39	28
	Chrysophyta	13	15	28	23	23
	Cyanophyta	0	0	0	0	0
	Cyanophyta	56	50	22	37	49
	Euglenophyta	0	0	0	0	0
	Pyrrophyta	0	0	0	0	0
August 1987	Chlorophyta	32	36	42	37	46
	Chrysophyta	27	25	20	34	26
	Cyanophyta	1	1	1	1	1
	Cyanophyta	39	37	36	27	26
	Euglenophyta	0	1	1	0	0
	Pyrrophyta	0	0	1	0	1

Table E-2. Individual Sample Totals, Means, Standard Deviations, and Coefficients of Variation for Total Phytoplankton and Group Cell Densities (No./L) During Operational Monitoring (1987), Sequoyah Nuclear Plant, Chickamauga Reservoir

	July 87									
	TRM 483.4					TRM 484.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
				Chlorophyta						
0.3	2141056	2057032	2099044	59414	3	2408688	2218856	2313772	134231	6
1.0	2063256	1795624	1929440	189244	10	1680480	1727160	1703820	33008	2
3.0	1484424	1297704	1391064	132031	9	1649360	1543552	1596456	74818	5
5.0	1518656	1244800	1381728	193645	14	1627576	1384840	1506208	171640	11
				Chrysophyta						
0.3	921152	778000	849576	101224	12	1269696	697088	983392	404895	41
1.0	899368	827792	863580	50612	6	824680	762440	793560	44010	6
3.0	591280	613064	602172	15404	3	843352	715760	779556	90221	12
5.0	790448	697088	743768	66015	9	665968	619288	642628	33008	5
				Cryptophyta						
0.3	34232	28008	31120	4401	14	12448	24896	18672	8802	47
1.0	34232	21784	28008	8802	31	21784	9336	15560	8802	57
3.0	18672	28008	23340	6602	28	21784	31120	26452	6602	25
5.0	15560	28008	21784	8802	40	21784	18672	20228	2201	11
				Cyanophyta						
0.3	3815312	4235432	4025372	297070	7	3535232	3071544	3303388	327877	10
1.0	3616144	3469880	3543012	103424	3	2757232	2713664	2735448	30807	1
3.0	2962624	2894160	2928392	48411	2	2586072	2502048	2544060	59414	2
5.0	2638976	2172176	2405576	330077	14	2150392	2178400	2164396	19805	1

Table E-2. (Continued)

	July 87									
	TRM 483.4					TRM 484.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
				Euglenophyta						
0.3	31120	28008	29564	2201	7	40456	46680	43568	4401	10
1.0	24896	21784	23340	2201	9	31120	6224	18672	17604	94
3.0	6224	6224	6224	0	0	34232	18672	26452	11003	42
5.0	9336	6224	7780	2201	28	12448	9336	10892	2201	20
				Pyrrophyta						
0.3	24896	21784	23340	2201	9	9336	15560	12448	4401	35
1.0	9336	12448	10892	2201	20	18672	21784	20228	2201	11
3.0	18672	9336	14004	6602	47	15560	15560	15560	0	0
5.0	15560	6224	10892	6602	61	12448	6224	9336	4401	47
				Total						
0.3	6967768	7148264	7058016	127630	2	7275856	6074624	6675240	849399	13
1.0	6647232	6149312	6398272	352083	6	5333968	5240608	5287288	66015	1
3.0	5081896	4848496	4965196	165039	3	5150360	4826712	4988536	228854	5
5.0	4988536	4154520	4571528	589738	13	4490616	4216760	4353688	193645	4

Table E-2. (Continued)

	July 87														
	Intake pond					Diffuser pond					Cooling channel return				
	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
Chlorophyta	348544	357880	353212	6602	2	360992	469912	415452	77018	19	273856	329872	301864	39609	13
Chrysophyta	280080	298752	289416	13203	5	149376	336096	242736	132031	54	143152	189832	166492	33009	20
Cryptophyta	0	0	0	0	.	0	0	0	0	.	0	0	0	0	.
Cyanophyta	628624	628624	628624	0	0	233400	557048	395224	228854	58	133816	136928	135372	2201	2
Euglenophyta	3112	3112	3112	0	0	3112	0	1556	2201	141	0	0	0	0	.
Pyrrophyta	0	0	0	0	.	9336	0	4668	6602	141	0	0	0	0	.
Total	1260360	1288368	1274364	19805	2	756216	1363056	1059636	429101	40	550824	656632	603728	74818	12

Table E-2. (Continued)

	Aug. 87									
	TRM 483.4					TRM 484.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
				Chlorophyta						
0.3	628624	659744	644184	22005	3	771776	628624	700200	101224	14
1.0	631736	637960	634848	4401	1	634848	525928	580388	77018	13
3.0	566384	665968	616176	70417	11	473024	417008	445016	39609	9
5.0	441904	332984	387444	77018	20	532152	379664	455908	107825	24
8.0	314312	289416	301864	17604	6	348544	376552	362548	19805	5
11.0	336096	357880	346988	15404	4	497920	463688	480804	24206	5
14.0	248960	242736	245848	4401	2	270744	270744	270744	0	0
17.0	367216	252072	309644	81419	26					
				Chrysophyta						
0.3	606840	746880	676860	99023	15	575720	622400	599060	33008	6
1.0	572608	395224	483916	125429	26	373440	336096	354768	26406	7
3.0	491696	482360	487028	6602	1	329872	286304	308088	30807	10
5.0	429456	426344	427900	2201	1	230288	264520	247404	24206	10
8.0	295640	336096	315868	28607	9	283192	245848	264520	26406	10
11.0	292528	261408	276968	22005	8	292528	255184	273856	26406	10
14.0	186720	171160	178940	11003	6	270744	273856	272300	2201	1
17.0	205392	174272	189832	22005	12					
				Cryptophyta						
0.3	12448	12448	12448	0	0	31120	18672	24896	8802	35
1.0	6224	9336	7780	2201	28	18672	12448	15560	4401	28
3.0	6224	12448	9336	4401	47	18672	12448	15560	4401	28
5.0	12448	18672	15560	4401	28	12448	18672	15560	4401	28
8.0	9336	9336	9336	0	0	12448	18672	15560	4401	28
11.0	6224	9336	7780	2201	28	15560	9336	12448	4401	35
14.0	6224	3112	4668	2201	47	12448	9336	10892	2201	20
17.0	6224	15560	10892	6602	61					

Table E-2. (Continued)

	Aug. 87									
	TRM 483.4					TRM 484.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
				Cyanophyta						
0.3	905592	725096	815344	127630	16	911816	837128	874472	52812	6
1.0	709536	824680	767108	81419	11	665968	516592	591280	105625	18
3.0	715760	846464	781112	92422	12	759328	519704	639516	169440	26
5.0	345432	379664	362548	24206	7	609952	420120	515036	134231	26
8.0	756216	650408	703312	74818	11	208504	304976	256740	68216	27
11.0	360992	398336	379664	26406	7	264520	280080	272300	11003	4
14.0	174272	177384	175828	2201	1	320536	239624	280080	57213	20
17.0	438792	311200	374996	90221	24					
				Euglenophyta						
0.3	12448	6224	9336	4401	47	12448	9336	10892	2201	20
1.0	6224	3112	4668	2201	47	3112	9336	6224	4401	71
3.0	3112	18672	10892	11003	101	6224	3112	4668	2201	47
5.0	3112	3112	3112	0	0	9336	6224	7780	2201	28
8.0	9336	6224	7780	2201	28	6224	6224	6224	0	0
11.0	3112	9336	6224	4401	71	3112	3112	3112	0	0
14.0	3112	6224	4668	2201	47	9336	6224	7780	2201	28
17.0	3112	3112	3112	0	0					
				Pyrrophyta						
0.3	9336	6224	7780	2201	28	3112	9336	6224	4401	71
1.0	3112	6224	4668	2201	47	9336	6224	7780	2201	28
3.0	12448	0	6224	8802	141	3112	3112	3112	0	0
5.0	3112	3112	3112	0	0	3112	6224	4668	2201	47
8.0	3112	6224	4668	2201	47	9336	9336	9336	0	0
11.0	3112	12448	7780	6602	85	6224	6224	6224	0	0
14.0	3112	3112	3112	0	0	3112	6224	4668	2201	47
17.0	6224	6224	6224	0	0					

Table E-2. (Continued)

	Aug. 87									
	TRM 483.4					TRM 484.5				
Depth (M)	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
				Total						
0.3	2175288	2156616	2165952	13203	1	2305992	2125496	2215744	127630	6
1.0	1929440	1876536	1902988	37409	2	1705376	1406624	1556000	211250	14
3.0	1795624	2025912	1910768	162838	9	1590232	1241688	1415960	246458	17
5.0	1235464	1163888	1199676	50612	4	1397288	1095424	1246356	213450	17
8.0	1387952	1297704	1342828	63815	5	868248	961608	914928	66015	7
11.0	1002064	1048744	1025404	33008	3	1079864	1017624	1048744	44010	4
14.0	622400	603728	613064	13203	2	886920	806008	846464	57213	7
17.0	1026960	762440	894700	187044	21					

Table E-2. (Continued)

Aug. 87

	Intake pond					Diffuser pond					Cooling channel return				
	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV	Sample 1	Sample 2	Mean	STD	CV
Chlorophyta	379664	264520	322092	81 19	25	242736	494808	368772	178242	48	255184	463688	359436	147435	41
Chrysophyta	183608	177384	180496	4401	2	314312	373440	343876	41810	12	183608	149376	166492	24206	15
Cryptophyta	6224	9336	7780	2201	28	6224	21784	14004	11003	79	6224	12448	9336	4401	47
Cyanophyta	171160	196056	183608	17604	10	264520	280080	272300	11003	4	426344	183608	304976	171640	56
Euglenophyta	3112	3112	3112	0	0	3112	3112	3112	0	0	9336	3112	6224	4401	71
Pyrrophyta	9336	3112	6224	4401	71	6224	3112	4668	2201	47	3112	6224	4668	2201	47
Total	753104	653520	703312	70417	10	837128	1176336	1006732	239856	24	883808	818456	851132	44211	5

Table E-3. Results of Two-Way Analysis of Variance on Phytoplankton Cell Densities from Reservoir Sites on Chickamauga Reservoir, July and August 1987

	P > F			
Test Date	Total Phytoplankton	Chlorophyta	Chrysophyta	Cyanophyta
July 1987				
Station	0.0792	0.2703	0.7060	0.0008*
Depth	0.0002*	0.0004*	0.1333	0.0001*
Interaction	0.3340	0.2102	0.3753	0.4233
August 1987				
Station	0.0801	0.2240	0.0007*	0.0436*
Depth	0.0001*	0.0001*	0.0001*	0.0001*
Interaction	0.0026*	0.0496*	0.0003*	0.0004*

*Significant at $\alpha = 0.05$

Table E-4. Disposition of Phytoplankton Density (Cell/L) Date Sets with Significant Station Differences Identified in Table E-3

Date	Test Group	Sample Depth (m)	P>F Two-Way	P>F One-Way	Location Rank Low → High Mean	
July	Cyanophyta*	-	0.0003	-	TRM 484.5	TRM 483.4
August	Chrysophyta†	0.3	-	0.4005		
		1.0	-	0.2658		
		3.0	-	0.0232	TRM 484.5	TRM 483.4
		5.0	-	0.0155	TRM 484.5	TRM 483.4
		8.0	-	0.2035		
		11.0	-	0.9041		
		14.0	-	0.0107	TRM 483.	TRM 484.5
	Cyanophyta†	0.3	-	0.5920		
		1.0	-	0.2138		
		3.0	-	0.4092		
		5.0	-	0.2237		
		8.0	-	0.0377	TRM 484.5	TRM 483.4
		11.0	-	0.0282	TRM 484.5	TRM 483.4
		14.0	-	0.0891		

*Depths not tested separately.
†Depths tested separately with one-way ANOVA because interaction was significant in two-way ANOVA.

Table E-5. Results of One-Way-Analysis of Variance on Phytoplankton In-Plant Data July and August 1987

Test Data	Date	P > F	Location Rank Low → High Mean	
Total Phytoplankton	July	0.5214		
	August	0.2006		
Chlorophyta	July	0.3658		
	August	0.8435		
Chrysophyta	July	0.5942		
	August	0.0183*	Intake	Diffuser Pond
Cyanophyta	July	0.3295		
	August	0.0329*	Intake	Diffuser Pond

*Significant at $\alpha = 0.05$.

Table E-6. Mean Phytoplankton Densities (No. · 100/L) at Each Sample Station (Depths Combined) During Operational Monitoring (1987), Sequoyah Nuclear Plant, Chickamauga Reservoir

	Collection Sites*							
	July 1987				August 1987			
	483.4	484.5	P1	P2	483.4	484.5	P1	P2
Chlorophyta								
Acanthosphaera	109	128	0	0	8	37	0	0
Actinastrum	914	996	498	171	198	117	0	296
Ankistrodesmus	195	159	0	265	241	156	124	109
Characium	43	0	0	0	0	0	0	0
Chlamydomonas	350	443	16	0	198	235	109	109
Chlorella	241	412	31	0	76	70	16	0
Chlorococcum	0	4	0	0	0	0	0	0
Chodatella	70	58	0	0	2	18	0	0
Closteridium	0	4	0	0	0	0	0	0
Coelastrum	751	778	0	0	99	179	0	0
Cosmarium	0	0	0	0	0	4	0	0
Crucigenia	751	813	62	576	265	191	0	918
Dictyosphaerium	619	657	62	0	208	210	249	249
Elakatothrix	132	62	0	93	8	8	0	0
Euastrum	0	23	16	0	0	0	0	0
Eudorina	654	124	0	0	187	249	498	0
Gloeoactinium	552	459	0	0	82	54	0	0
Gloeocystis	0	0	0	0	0	19	0	0
Golenkinia	191	198	31	0	23	31	0	0
Gonium	1074	1241	156	202	358	323	249	249
Kirchneriella	1046	1416	171	124	105	130	78	93
Micractinium	311	163	0	0	21	8	0	93
Mougeotia	31	0	0	0	0	0	0	0
Oocystis	303	319	0	0	39	16	0	0
Pandorina	871	626	498	498	405	218	249	249
Pediastrum	848	825	249	249	329	346	373	0
Planktosphaeria	0	0	0	0	0	31	0	0

Table E-6. (Continued)

	Collection Sites*							
	July 1987				August 1987			
	483.4	484.5	P1	P2	483.4	484.5	P1	P2
Platydorina	451	171	0	249	249	156	0	0
Polyedriopsis	0	19	0	0	0	0	0	0
Pteromonas	66	51	0	0	18	21	0	0
Pyramimonas	16	0	0	0	0	0	0	0
Scenedesmus	5967	7204	1525	1649	1155	1188	1043	1260
Schroederia	249	249	109	78	47	51	109	47
Staurastrum	105	58	31	0	21	33	31	16
Tetrastrum	31	16	62	0	0	16	62	0
Treubaria	62	121	16	0	18	6	31	0
Chrysophyta								
Achnanthes	315	584	16	140	89	119	93	31
Asterionella	0	0	0	0	0	16	0	124
Attheya	113	70	0	0	41	41	16	0
Chaetoceros	673	486	93	187	282	263	311	358
Cymbella	35	51	0	47	0	0	0	93
Dinobryon	8	66	0	0	29	86	0	0
Fragilaria	1354	1774	654	0	14	0	0	0
Gomphonema	0	0	16	0	0	0	0	0
Gyrosigma	0	4	0	0	0	0	0	0
Melosira	4322	3894	2054	1525	2838	1964	1229	2318
Navicula	70	187	16	62	49	35	16	109
Nitzschia	4	47	0	31	0	10	0	16
Rhizosolenia	206	202	0	31	31	25	0	16
Rhoicosphenia	0	8	0	0	0	0	0	0
Stephanodiscus	307	319	16	47	68	91	47	124

Table E-6. (Continued)

	Colleciton Sites*							
	July 1987				August			
	483.4	484.5	P1	P2	483.4	484.5	P1	P2
Surirella	0	0	0	0	8	0	0	0
Synedra	241	337	31	296	348	251	93	249
Tabellaria	0	0	0	62	0	0	0	0
Cryptophyta								
Cryptomonas	261	202	0	0	97	138	78	140
Cyanophyta								
Anacystis	9068	7204	498	0	1694	1891	871	1105
Merismopedia	10900	8278	3050	2194	2077	1879	778	1416
Oscillatoria	8931	8177	2116	1494	1323	249	0	0
Oscillatoria (spirai)	0	0	0	0	109	0	0	0
Raphidiopsis	3357	3209	622	265	247	268	187	202
Euglenophyta								
Euglena	105	78	16	16	45	47	0	31
Phacus	4	0	0	0	2	0	0	0
Trachelomonas	58	171	16	0	16	12	31	0
Pyrrophyta								
Ceratium	31	16	0	0	0	0	0	0
Glenodinium	0	0	0	0	0	6	0	0
Gymnodinium	66	93	0	47	35	21	0	16
Peridinium	51	35	0	0	19	25	62	31

*Collection Sites: Tennessee River Miles 483.4 and 484.5, P1 = Intake, P2 = Diffuser Pond

Table E-7. Chlorophyll a Concentrations, Phaeophytin a Concentrations, and Phaeophytin Index Values at Each Sample Location During Operational Monitoring (1987), Sequoyah Nuclear Plant, Chickamauga Reservoir

	Depth	Sample	TRM 483.4			TRM 484.5		
			Chl a mg/m³	Pheo a mg/m³	Pheo Index	Chl a mg/m³	Pheo a mg/m³	Pheo Index
July 87	0.3	1	11.90	1.00	1.78	8.80	1.90	1.56
		2	13.70	1.00	1.68	10.30	1.60	1.60
		x	12.80	1.00	1.73	9.55	1.75	1.58
		s	1.27	0.00	0.07	1.06	0.21	0.03
		CV	9.94	0.00	4.09	11.11	12.12	1.79
	1.0	1	13.50	1.50	1.62	10.50	1.50	1.60
		2	16.10	1.10	1.65	11.10	2.00	1.58
		x	14.80	1.30	1.64	10.80	1.75	1.59
		s	1.84	0.28	0.02	0.42	0.35	0.01
		CV	12.42	21.76	1.30	3.93	20.20	0.89
	3.0	1	12.60	1.90	1.60	11.50	2.30	1.57
		2	13.90	2.10	1.60	14.40	1.00	1.67
		x	13.25	2.00	1.60	12.95	1.65	1.62
		s	0.92	0.14	0.00	2.05	0.92	0.07
		CV	6.94	7.07	0.00	15.83	55.71	4.36
	5.0	1	13.70	1.30	1.64	10.60	1.70	1.59
		2	13.90	1.00	1.68	13.90	1.00	1.66
		x	13.80	1.15	1.66	12.25	1.35	1.63
		s	0.14	0.21	0.03	2.33	0.49	0.05
		CV	1.02	18.45	1.70	19.05	36.66	3.05
Aug. 87	0.3	1	6.10	1.90	1.50	6.30	1.40	1.56
		2	6.90	1.00	1.61	5.80	1.80	1.50
		x	6.50	1.45	1.56	6.05	1.60	1.53
		s	0.57	0.64	0.08	0.35	0.28	0.04
		CV	8.70	43.89	5.00	5.84	17.68	2.77
	1.0	1	6.10	1.90	1.50	6.50	1.80	1.53
		2	5.40	2.60	1.41	6.50	1.60	1.54
		x	5.75	2.25	1.45	6.50	1.70	1.54
		s	0.49	0.49	0.06	0.00	0.14	0.01
		CV	8.61	22.00	4.37	0.00	8.32	0.46

Table E-7. (Continued)

Depth	Sample	TRM 483.4 Chl a mg/m^3	TRM 483.4 Pheo a mg/m^3	TRM 483.4 Pheo Index	TRM 484.5 Chl a mg/m^3	TRM 484.5 Pheo a mg/m^3	TRM 484.5 Pheo Index
3.0	1	6.30	1.40	1.56	6.00	2.20	1.47
	2	5.20	1.30	1.53	6.40	1.10	1.58
	x	5.75	1.35	1.55	6.20	1.65	1.53
	s	0.78	0.07	0.02	0.28	0.78	0.08
	CV	13.53	5.24	1.37	4.56	47.14	5.10
5.0	1	5.90	2.00	1.49	5.70	1.00	1.59
	2	5.40	1.70	1.50	5.60	1.00	1.69
	x	5.65	1.85	1.50	5.65	1.00	1.64
	s	0.35	0.21	0.01	0.07	0.00	0.07
	CV	6.26	11.47	0.47	1.25	0.00	4.31

Depth	Sample	TRM 483.4 Chl a mg/m^3	TRM 483.4 Pheo a mg/m^3	TRM 483.4 Pheo Index	TRM 484.5 Chl a mg/m^3	TRM 484.5 Pheo a mg/m^3	TRM 484.5 Pheo Index
July 87	1	3.20	1.10	1.47	3.50	1.30	1.48
	2	4.00	1.30	1.50	3.90	2.00	1.40
	x	3.60	1.20	1.49	3.70	1.65	1.44
	s	0.57	0.14	0.02	0.28	0.49	0.06
	CV	15.71	11.79	1.43	7.64	30.00	3.93
Aug. 87	1	5.80	1.40	1.55	5.70	1.60	1.52
	2	4.50	1.00	1.60	5.90	2.00	1.49
	x	5.15	1.20	1.58	5.80	1.80	1.51
	s	0.92	0.28	0.04	0 14	0.28	0.02
	CV	17.85	23.57	2.24	2.44	15.71	1.41

Table E-8. Results of Two-Way Analysis of Variance (River Stations) and One-Way Analysis of Variance (Inplant Stations) on Chlorophyll a Concentrations, and Carbon Assimilation Rates, Sequoyah Nuclear Plant, Chickamauga Reservoir July and August 1987

Test Data	P>F	
	River Stations*	Inplant Stations†
Chlorophyll a Concentration		
July 1987		
Station	0.0100‡	0.8249
Depth	0.2187	
Interaction	0.3154	
August 1987		
Station	0.3905	0.4267
Depth	0.2956	
Interaction	0.3133	
Carbon Assimilation Rates		
July 1987		
Station	0.0036‡	§
Depth	0.0004‡	
Interaction	0.3054	
August 1987		
Station	0.0810	§
Depth	0.0001‡	
Interaction	0.7026	

*Tennessee River Miles 483.4 and 484.5.
†Intake and Diffuser Pond; One-Way ANOVA used because samples collected at only one depth.
‡Significant at $\alpha = 0.05$; Both chlorophyll a concentrations and carbon assimilation rates were significantly higher at TRM 483.4 than at TRM 484.5.
§Samples for estimation of carbon assimilation rates not collected at inplant stations.

Table E-9. Results of Fluorometric Analyses at Each Collection Site, Aquatic Monitoring for Sequoyah Nuclear Plant, Chickamauga Reservoir, July and August 1987

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:00 AM

Location (TRM): 483.4
Lake Elevation: 682.0
Collector: RNB/NMW
Analyst: JDR

Survey Date: 07/27/87
Time Collected: 1350
Start Analyses (Time): 1455
End Analyses (Time): 1508

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
0.3	4.0	3.16	7.7	3.16	40.00	77.00	0.481	-Corrected Chloro a (mg/m³) = 12.7
1.0	4.4	3.16	8.0	3.16	44.00	80.00	0.450	-Corrected Chloro a (mg/m³) = 13.7
3.0	4.9	3.16	2.8	MS	49.00	88.48	0.446	-Corrected Chloro a (mg/m³) = 11.0
5.0	4.8	3.16	2.8	MS	48.00	88.48	0.458	-Corrected Chloro a (mg/m³) = 13.0
8.0	3.2	3.16	6.6	3.16	32.00	66.00	0.515	
11.0	3.4	3.16	6.8	3.16	34.00	68.00	0.500	
14.0	3.7	10.00	8.3	10.00	11.69	26.23	0.554	
17.0	3.3	10.00	7.2	10.00	10.43	22.75	0.542	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:00 AM

Location (TRM): 484.0
Lake Elevation: 682.0
Collector: RNB/NMW
Analyst: JDR

Survey Date: 07/27/87
Time Collected: 1240
Start Analyses (Time): 1333
End Analyses (Time): 1405

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
0.3	4.0	3.16	8.2	3.16	40.00	82.00	0.512	-Corrected Chloro a (mg/m³) = 8.3
1.0	4.1	3.16	8.5	3.16	41.00	85.00	0.518	-Corrected Chloro a (mg/m³) = 9.5
3.0	4.3	3.16	8.9	3.16	43.00	89.00	0.517	-Corrected Chloro a (mg/m³) = 11.7
5.0	3.0	3.16	6.4	3.16	30.00	64.00	0.531	-Corrected Chloro a (mg/m³) = 11.2
8.0	4.8	10.00	3.3	3.16	15.17	33.00	0.540	
11.0	3.2	3.16	6.8	3.16	32.00	68.00	0.529	
14.0	2.0	3.16	4.1	3.16	20.00	41.02	0.512	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	

Table E-9. (Continued)

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:08 AM

Location (TRM): INTAKE
Lake Elevation: 682.0
Collector: RNB/NMW
Analyst: JDR

Survey Date: 07/27/87
Time Collected: 1215
Start Analyses (Time): 1320
End Analyses (Time): 1330

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
5.0	2.4	10.00	5.5	10.00	7.58	17.38	0.564	-Corrected Chloro a (mg/m³) = 2.4
5.0	2.4	10.00	5.5	10.00	7.58	17.38	0.564	-Corrected Chloro a (mg/m³) = 3.2
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:08 AM

Location (TRM): DIFFUSER
Lake Elevation: 682.0
Collector: RNB/NMW
Analyst: JDR

Survey Date: 07/27/87
Time Collected: 1300
Start Analyses (Time): 1435
End Analyses (Time): 1450

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
3.5	2.8	10.00	5.5	10.00	8.85	17.38	0.491	2.7
3.5	2.8	10.00	5.5	10.00	8.85	17.38	0.491	2.7
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	

Table E-9. (Continued)

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:03 AM

Location (TRM): 483.4
Lake Elevation: -----
Collector: RNB/NAM
Analyst: JDR

Survey Date: 08/31/87
Time Collected: 0950
Start Analyses (Time): 1315
End Analyses (Time): 1410

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
0.3	3.1	10.00	7.6	10.00	9.80	24.02	0.592	-Corrected Chloro a (ug/m³) = 5.5
1.0	3.2	10.00	7.4	10.00	10.11	23.34	0.568	-Corrected Chloro a (ug/m³) = 4.3
3.0	2.8	10.00	7.2	10.00	8.85	22.75	0.611	-Corrected Chloro a (ug/m³) = 4.8
5.0	3.0	10.00	7.4	10.00	9.46	23.38	0.595	-Corrected Chloro a (ug/m³) = 4.4
8.0	3.1	10.00	7.8	10.00	9.80	24.65	0.603	
11.0	2.8	10.00	7.9	10.00	8.85	24.96	0.646	
14.0	2.7	10.00	7.2	10.00	8.53	22.75	0.625	
17.0	2.7	10.00	6.8	10.00	8.53	21.49	0.603	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:03 AM

Location (TRM): 484.5
Lake Elevation: -----
Collector: RNB/NAM
Analyst: JDR

Survey Date: 08/31/87
Time Collected: 1100
Start Analyses (Time): 1520
End Analyses (Time): 1620

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
0.3	3.8	10.00	8.7	10.00	12.01	27.49	0.563	-Corrected Chloro a (ug/m³) = 4.9
1.0	3.8	10.00	3.0	3.16	12.01	30.00	0.600	-Corrected Chloro a (ug/m³) = 5.3
3.0	3.3	10.00	7.8	10.00	10.43	24.65	0.577	-Corrected Chloro a (ug/m³) = 5.1
5.0	3.1	10.00	7.9	10.00	9.80	24.96	0.608	-Corrected Chloro a (ug/m³) = 5.2
8.0	2.5	10.00	6.1	10.00	7.90	19.28	0.590	
11.0	NA	NA	NA	NA	NA	NA	NA	
14.0	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	

Table E-9. (Continued)

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:03 AM

Location (TRM): INTAKE
Lake Elevation: -----
Collector: RNB/MAM
Analyst: JDR
Survey Date: 08/31/87
Time Collected: 1030
Start Analyses (Time): 1400
End Analyses (Time): 1410

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
5.0	2.5	10.00	6.1	10.00	7.90	19.28	0.590	-Corrected Chlor\ ϕ (mg/m³) = 4.8
5.0	2.6	10.00	6.4	10.00	8.22	20.22	0.594	-Corrected Chlor\ ϕ (mg/m³) = 4.0
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	

SEQUOYAH OPERATIONAL SPECIAL STUDY - FLUOROMETRY SURVEY

Date Issued: 04-Dec-87
Time Issued: 08:03 AM

Location (TRM): DIFFUSER
Lake Elevation: -----
Collector: RNB/MAM
Analyst: JDR
Survey Date: 08/31/87
Time Collected: 1210
Start Analyses (Time): 1400
End Analyses (Time): 1410

Depth (m)	F (Meter)	F (Scale)	F-dcmu (Meter)	F-dcmu (Scale)	F (Actual)	F-dcmu (Actual)	FRI	Comments
3.5	2.4	10.00	6.4	10.00	7.58	20.22	0.625	-Correcte-Corrected Chloro ϕ (mg/m³) = 4.5
3.5	2.8	10.00	6.2	10.00	8.85	19.59	0.549	-Correcte-Corrected Chloro ϕ (mg/m³) = 4.5
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	
ND	ND	ND	ND	ND	ND	ND	ND	

Table E-10. Carbon Assimilation Rates at Each Sample Location During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Depth m	Sample	mg C/m^3/hour TRM 483.4	TRM 484.5
July 1987	0.0	1	8.40	6.59
		2	21.38	9.14
		x	14.89	7.86
		s	9.18	1.81
		cv	61.62	22.99
	1.0	1	11.36	9.55
		2	11.64	8.15
		x	11.50	8.85
		s	0.20	0.99
		cv	1.74	11.22
	3.0	1	8.65	1.62
		2	5.59	1.62
		x	7.12	1.62
		s	2.16	0.00
		cv	30.38	0.12
	5.0	1	4.70	0.46
		2	1.18	0.00
		x	2.94	0.23
		s	2.49	0.33
		cv	84.60	141.42
Aug. 1987	0.0	1	25.72	14.26
		2	21.60	14.14
		x	23.66	14.20
		s	2.92	0.08
		cv	12.33	0.57
	1.0	1	8.22	11.46
		2	20.19	11.27
		x	14.20	11.36
		s	8.47	0.13
		cv	59.61	1.18
	3.0	1	4.30	2.49
		2	4.94	2.53
		x	4.62	2.51
		s	0.45	0.03
		cv	9.81	1.18

Table E-10. (Continued)

Date	Depth m	Sample	mg C/m^3/hour TRM 483.4	TRM 484.5
	5.0	1	2.76	0.90
		2	0.89	1.98
		x	1.82	1.44
		s	1.32	0.76
		cv	72.44	52.74

APPENDIX F

ZOOPLANKTON DATA AND RESULTS OF STATISTICAL TEST, JULY 27 AND AUGUST 31, 1987

Table F-1. Percentage Composition of Zooplankton Groups During Operational Monitoring Periods (1987), Sequoyah Nuclear Plant, Chickamauga Reservoir

Date	Zooplankton Group	Tennessee River Mile 483.4	Tennessee River Mile 484.5	Inplant Stations: Cooling Channel Return	Inplant Stations: Diffuser Pond	Inplant Stations: Intake
July 1987	Cladocera	9	14	19	16	19
	Copepoda	11	19	32	37	33
	Rotifera	80	67	49	47	48
Aug. 1987	Cladocera	8	12	9	10	5
	Copepoda	6	10	23	10	8
	Rotifera	86	78	68	80	88

Table F-2. Summary of Zooplankton Data Collected During Operational Monitoring Periods (1987), Sequoyah Nuclear Plant

Month	Site*	Group	Sample 1	Sample 2	Mean	Standard Deviation	C.V.†
July 87	483.4	Cladocera	7770	6246	7008	1077.6	15.38
		Copepoda	5957	10221	8089	3015.1	37.27
		Rotifera	56986	62849	59918	4145.8	6.92
		Total	70713	79316	75015	6083.2	8.11
	484.5	Cladocera	6406	9843	8125	2430.3	29.91
		Copepoda	9024	12591	10808	2522.2	23.34
		Rotifera	45779	32597	39188	9321.1	23.79
		Total	61209	55031	58120	4368.5	7.52
Aug. 87	483.4	Cladocera	4189	7281	5735	2186.4	38.12
		Copepoda	4563	4971	4767	288.5	6.05
		Rotifera	63188	63228	63208	28.3	0.04
		Total	71940	75480	73710	2503.2	3.40
	484.5	Cladocera	5020	7698	6359	1893.6	29.78
		Copepoda	5856	5198	5527	465.3	8.42
		Rotifera	34635	50114	42375	10945.3	25.83
		Total	45511	63010	54261	12373.7	22.80

Table F-2. (Continued)

Month	Site*	Group	Sample 1	Sample 2	Mean	Standard Deviation	C.V.†
July 87	P3	Cladocera	2976	‡	2976		
		Copepoda	5073		5073		
		Rotifera	7597		7597		
		Total	15646		15646		
	P2	Cladocera	770	616	693	108.9	15.71
		Copepoda	873	2310	1592	1016.1	63.85
		Rotifera	1129	2873	2001	1233.2	61.63
		Total	2772	5799	4286	2140.4	49.95
	P1	Cladocera	9261	5005	7133	3009.4	42.19
		Copepoda	7700	16170	11935	5989.2	50.18
		Rotifera	22330	12706	17518	6805.9	38.85
		Total	39291	33880	36586	3826.2	10.46
Aug. 87	P3	Cladocera	616	2156	1386	1088.9	78.57
		Copepoda	4723	2669	3696	1452.4	39.30
		Rotifera	9548	11807	10678	1597.4	14.96
		Total	14887	16632	15760	1233.9	7.83
	P2	Cladocera	2967	3696	3332	515.5	15.47
		Copepoda	3871	3234	3553	450.4	12.68
		Rotifera	26324	27874	27099	1096.0	4.04
		Total	33162	34804	33983	1161.1	3.42
	P1	Cladocera	2197	3080	2639	624.4	23.66
		Copepoda	3506	5236	4371	1223.3	27.99
		Rotifera	37473	64989	51231	19456.8	37.98
		Total	43176	73305	58241	21304.4	36.58

*Collection Sites: Tennessee River Miles 483.4 and 484.5, P1=Intake; P2=Diffuser Pond, P3=Return channel.
†C. V. = Coefficient of Variation.
‡Data not available.

Table F-3. Results of One-Way-Analysis of Variance on Zooplankton Data Collect in July and August 1987, Sequoyah Nuclear Plant, Chickamauga Reservoir

Test Data	Date	P>F	Locations Ranked from Low to High Mean		
Reservoir Sites					
Total Zooplankton	July	0.0827		-	
	August	0.1917		-	
Cladocera	July	0.6414		-	
	August	0.7671		-	
Copepoda	July	0.4291		-	
	August	0.1829		-	
Rotifera	July	0.1316		-	
	August	0.1526		-	
In-Plant Sites					
Total Zooplankton	July	0.0278*	Diffuser		Intake
	August	0.1981		-	
Cladocera	July	0.0198*	Diffuser		Intake
	August	0.3536		-	
Copepoda	July	0.0779		-	
	August	0.4756		-	
Rotifera	July	0.0547		-	
	August	0.1625		-	

*Significant at $\alpha = 0.05$.

Table F-4. Mean Zooplankton Densities (No./m3) at Each Sample Station During Operational Monitoring (1987) Sequoyah Nuclear Plant, Chickamauga Reservoir

	Collection Sites*									
	July 1987					August 1987				
	483.4	484.5	P1	P2	P3	483.4	484.5	P1	P2	P3
Cladocera										
Acroperus harpae	41	0	0	0	0	0	0	0	0	0
Alona quadrangularis	0	0	0	0	0	1	0	0	0	0
Alona sp.	0	1	0	0	0	0	0	64	0	52
Bosmina longirostris	5127	6447	5968	488	0	3568	4769	2182	2618	0
Camptocercus rectirostris	0	0	0	0	2053	1	0	0	0	975
Ceriodaphnia lacustris	213	100	0	0	0	1	0	41	0	0
Chydorus sp.	87	2	11	0	0	0	0	0	77	31
Daphnia pulex	43	68	0	0	513	0	0	0	0	0
Daphnia retrocurva	294	164	0	77	0	0	0	113	0	21
Diaphanosoma leuchtenbergianum	1161	1339	963	129	205	1614	1046	116	560	52
Ilyocryptus spinifer	2	1	193	0	205	66	42	0	0	257
Leptodora kindtii	0	2	0	0	0	0	0	0	0	0
Moina imm.	0	0	0	0	0	27	0	0	0	0
Moina micrura	41	0	0	0	0	457	502	123	77	0
Pleuroxus denticulatus	1	2	0	0	0	0	1	0	0	0
Scapholebris kingi	0	1	0	0	0	0	0	0	0	0
Sida crystallina	1	1	0	0	0	1	0	0	0	0
Simocephalus serrulatus	0	1	0	0	0	1	1	0	0	0
Copepoda										
Calanoid imm.	1	71	0	26	103	0	44	21	11	0
Cyclopoid imm.	1364	1608	3658	129	103	1078	1966	719	924	975
Cyclops bicuspidatus thomasi	0	0	0	0	0	0	1	0	0	0
Cyclops vernalis	1	1	0	0	21	1	0	0	0	0
Diaptomus pallidus	0	33	0	0	0	1	0	0	0	0
Diaptomus reighardi	2	1	0	0	0	1	1	0	0	0
Diaptomus siciloides	1	0	0	0	0	0	0	0	0	0
Ergasilus sp.	0	1	0	0	0	1	1	0	0	0

Table F-4. (Continued)

	Collection Sites*									
	July 1987					August 1987				
	483.4	484.5	P1	P2	P3	483.4	484.5	P1	P2	P3
Copepoda (Continued)										
Eucyclops agilis	0	1	0	0	0	1	1	0	0	0
Eucyclops prionophorus	0	0	0	0	0	1	0	0	0	0
Eurytemora affinis	0	2	0	0	0	2	84	0	0	52
Mesocyclops edax	124	327	0	0	21	66	43	103	77	52
Nauplii	6597	8765	8278	1438	4825	3618	3388	3530	2541	2618
Tropocyclops prasinus	1	1	0	0	0	1	1	0	0	0
Rotifera										
Asplanchna herricki	122	238	770	0	0	1308	586	1912	308	154
Brachionus angularis	24591	11138	4235	385	4620	9092	5605	13630	6545	2156
Brachionus bennini	0	0	0	0	0	81	0	0	0	0
Brachionus bidentata	0	36	0	0	0	0	0	0	0	0
Brachionus budapestinensis	1655	582	193	0	205	6806	3430	3350	3850	1643
Brachionus calyciflorus	81	199	1155	0	205	314	42	64	77	0
Brachionus caudatus	3222	710	963	128	411	3296	2510	757	2002	411
Brachionus quadridentatus	786	164	0	0	0	300	210	616	77	52
Brachionus urceolaris	0	32	0	0	0	0	0	0	0	0
Collotheca sp.	81	107	0	0	0	0	42	270	77	0
Conochiloides sp.	15702	16520	6545	154	411	19633	16565	2246	924	514
Conochilus hippocrepis	0	171	0	0	0	333	251	0	0	0
Conochilus unicornis	6059	3408	578	231	0	18435	9287	5224	1848	359
Filinia longiseta	173	0	193	26	0	0	0	0	0	103
Hexarthra intermedia	0	0	0	0	0	0	42	0	77	0
Hexarthra mira	0	0	0	0	0	0	0	154	77	206
Kellicottia bostoniensis	0	0	0	0	719	0	0	180	77	0
Kellicottia longispina	0	0	0	462	0	0	0	0	0	360
Keratella cochlearis	0	0	0	0	0	54	0	0	0	0

Table F-4. (Continued)

	Collection Sites*									
	July 1987					August 1987				
	483.4	484.5	P1	P2	P3	483.4	484.5	P1	P2	P3
Rotifera (Continued)										
Keratella crassa	0	36	0	0	0	134	0	206	231	52
Keratella earlinae	548	419	2118	257	513	60	0	2772	1155	719
Lecane sp.	130	227	0	0	0	27	0	64	77	0
Monostyla sp.	124	0	0	0	0	0	0	0	77	0
Platyias patulus	216	71	0	26	0	533	335	0	231	0
Ploesoma hudsoni	0	107	0	0	0	0	0	0	0	0
Ploesoma truncata	2907	749	0	180	0	754	586	1771	1309	1386
Polyarthra sp.	735	320	193	51	0	719	879	11178	5621	1489
Synchaeta stylata	2746	3724	0	103	513	1335	1924	6738	2459	976
Trichocerca sp.	43	235	578	0	0	0	84	103	0	103

*Collection Sites = Tennessee River Miles 483.4 and 484.5; P1: Intake; P2: Discharge Pond; and P3: Return Channel.