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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January 1988

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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 $ft^3/s$ (25$m^3/s$) 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 | 800 | 60,000 | 1,100 | 2 | None-Low | Not Different-1 | Not Different-1 |
| Spring | 2,200 | 9,000 | 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.

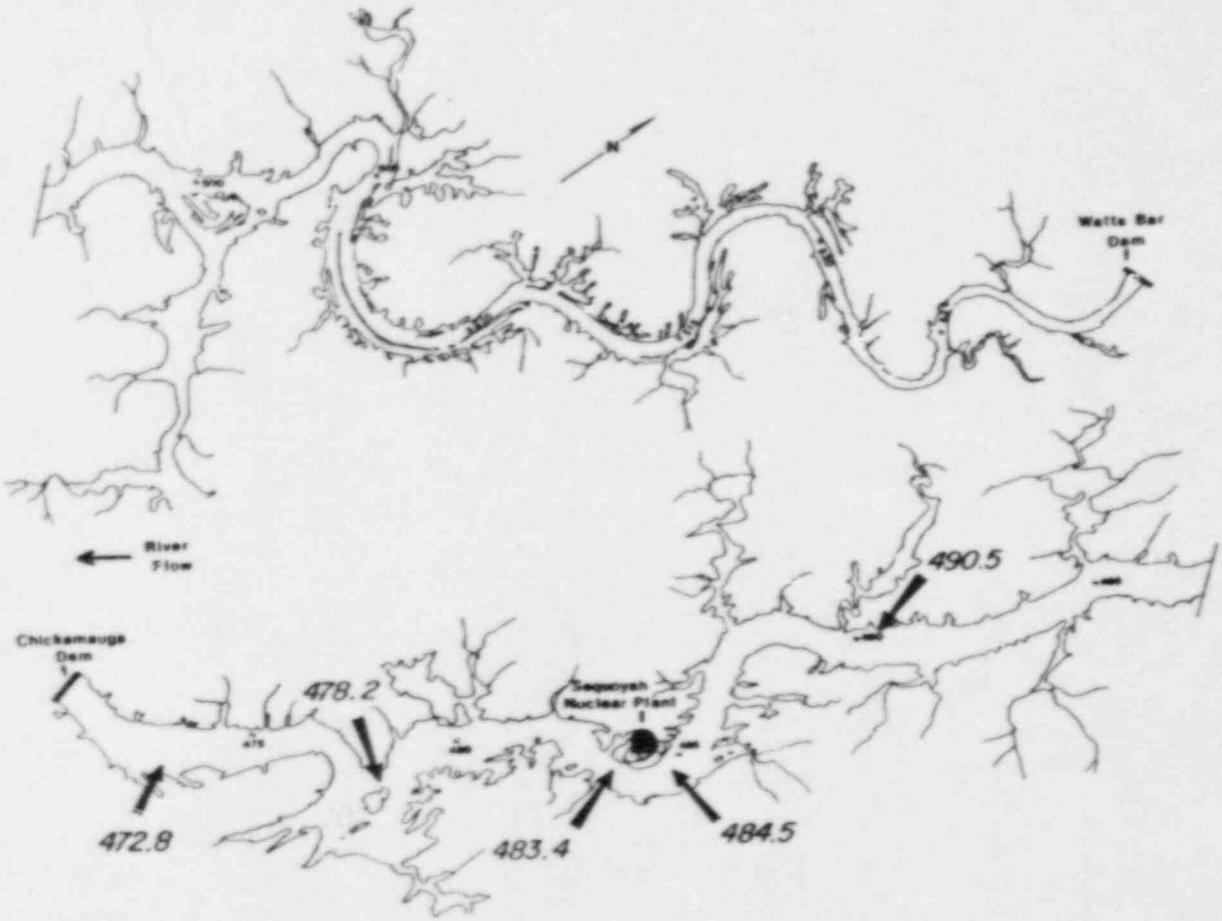
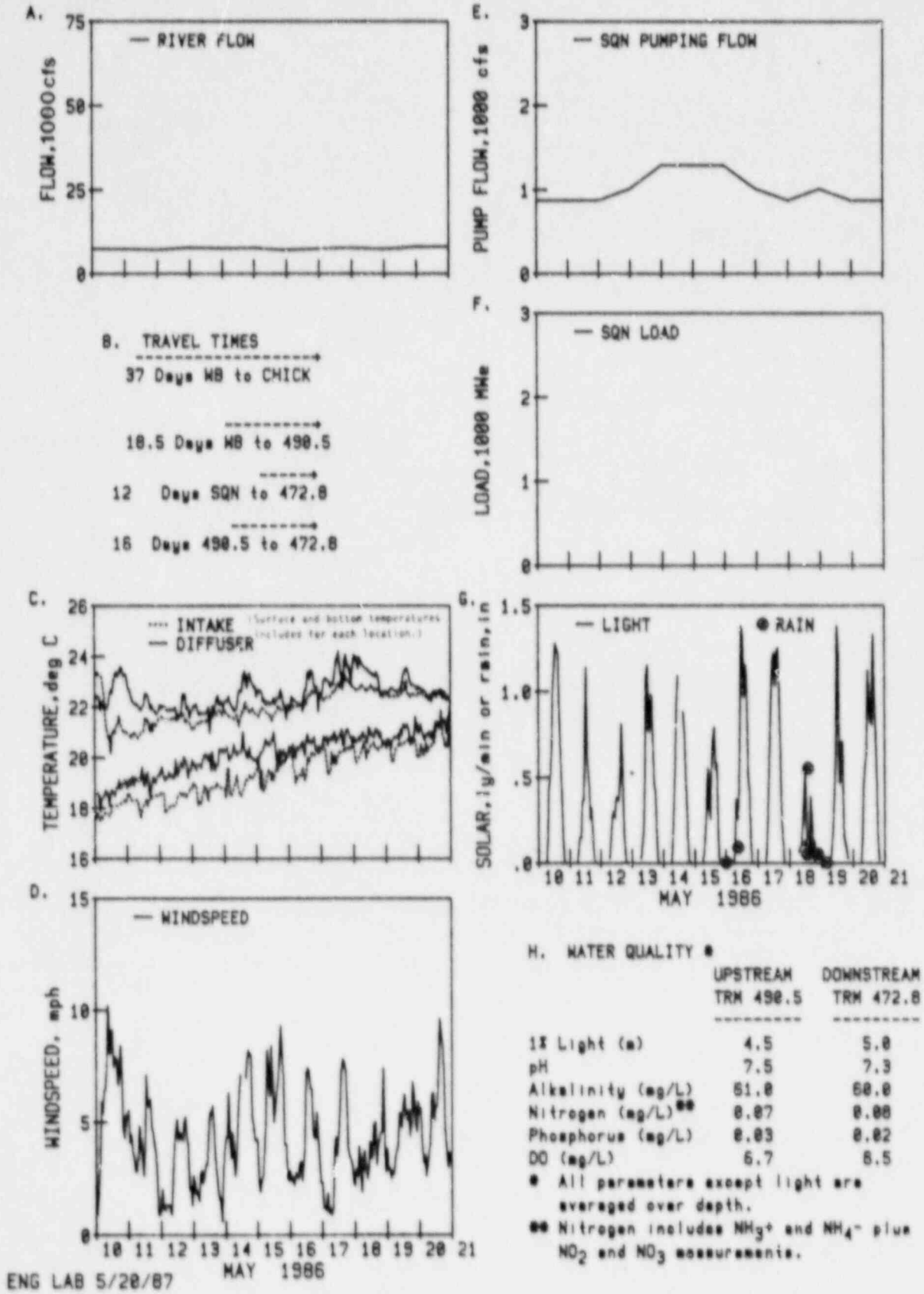



Figure 1. Location of Water Quality, Phytoplankton, and Zooplankton Sample Stations for Operation Monitoring, Sequoyah Nuclear Plant, Chickamauga Reservoir.




| | UPSTREAM TRM 490.5 | DOWNSTREAM TRM 472.8 |
|---|---|---|
| 1% Light (m) | 4.5 | 5.0 |
| pH | 7.5 | 7.3 |
| Alkalinity (mg/L) | 61.0 | 60.0 |
| Nitrogen (mg/L)** | 0.07 | 0.08 |
| Phosphorus (mg/L) | 0.03 | 0.02 |
| DO (mg/L) | 6.7 | 6.5 |

* All parameters except light are averaged over depth.

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

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

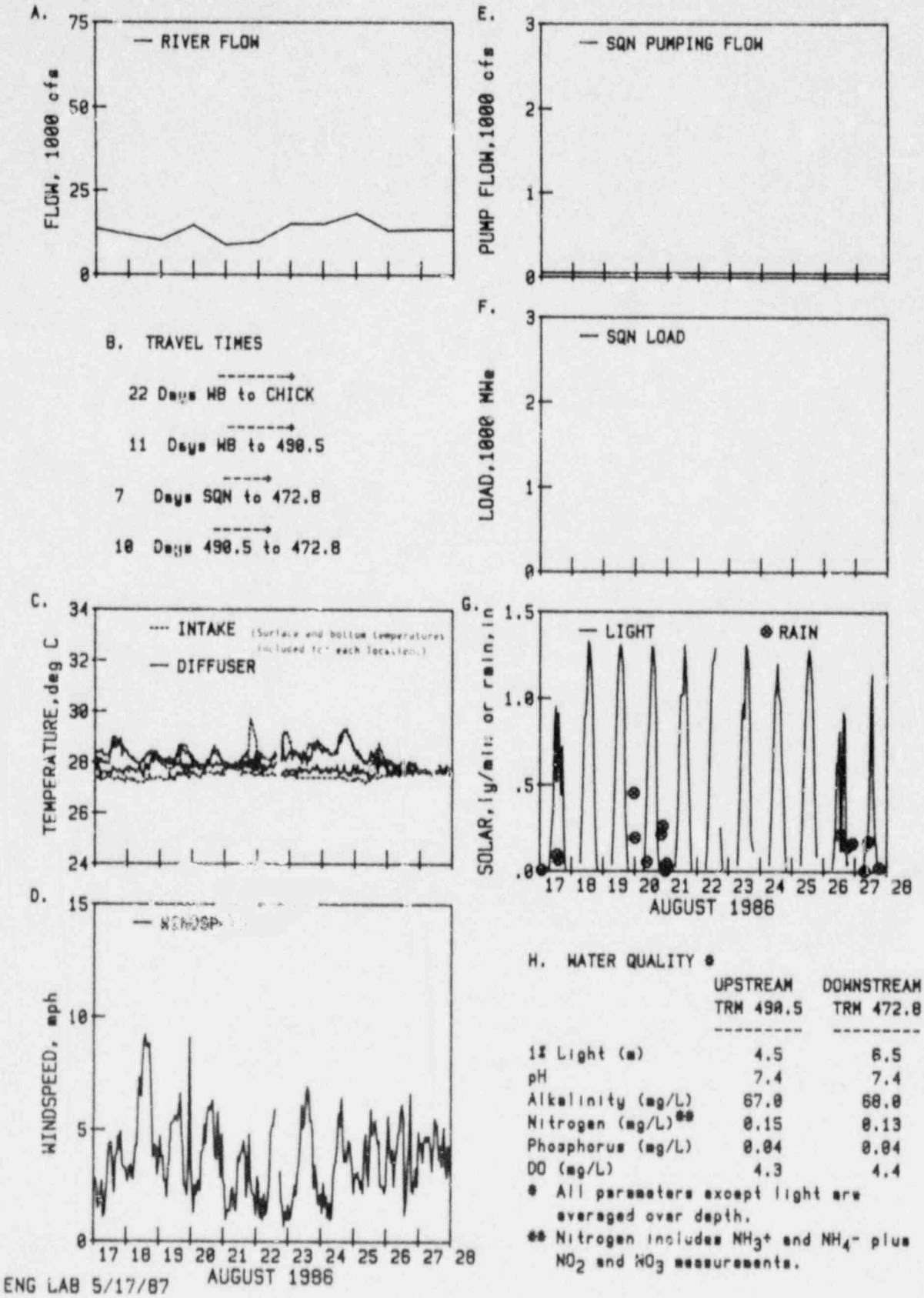



Figure 3. Conditions Prior to Plankton Sampling on August 27, 1986, for Monitoring Associated with Sequoyah Nuclear Plant, Chickamauga Reservoir.

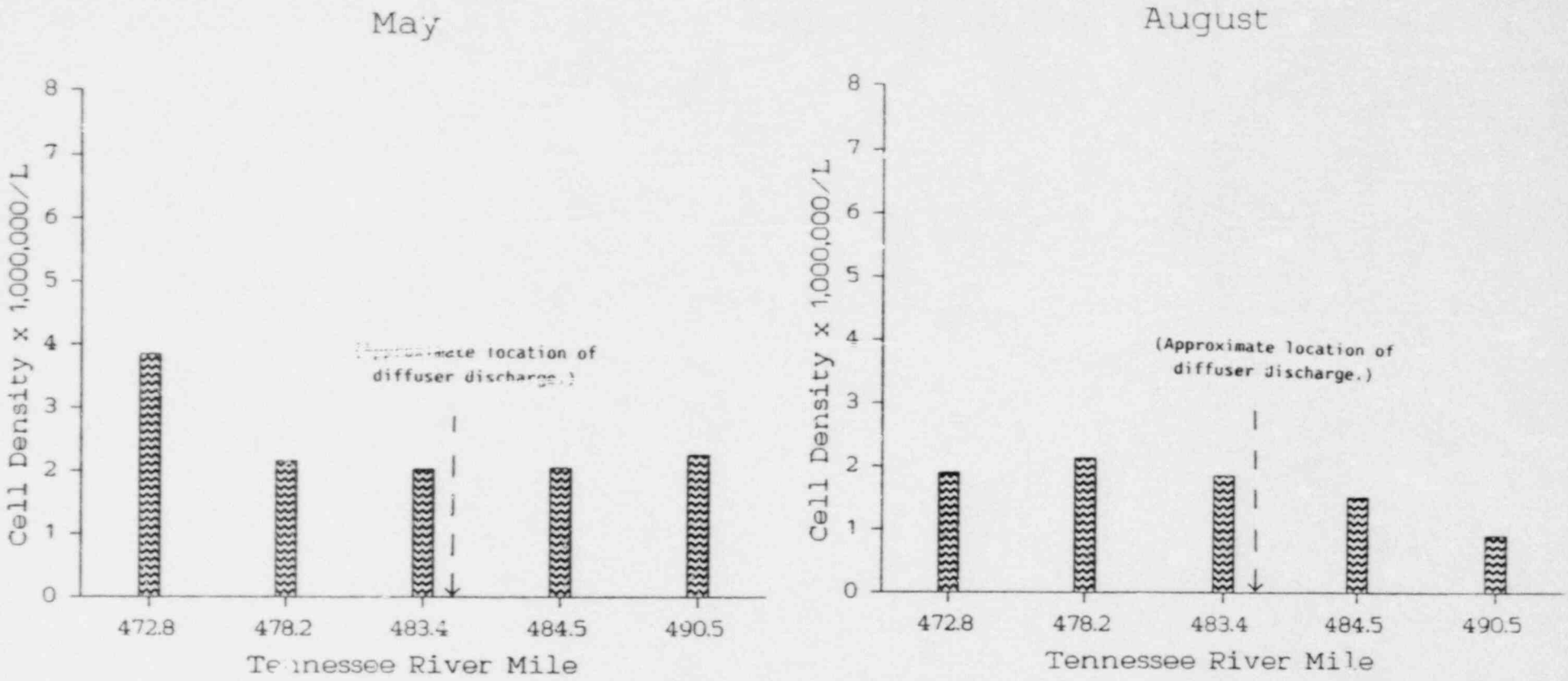



Figure 4. Mean Total Photoplankton Cell Density at Each Collection Site on Chickamauga Reservoir in May and August 1986 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant

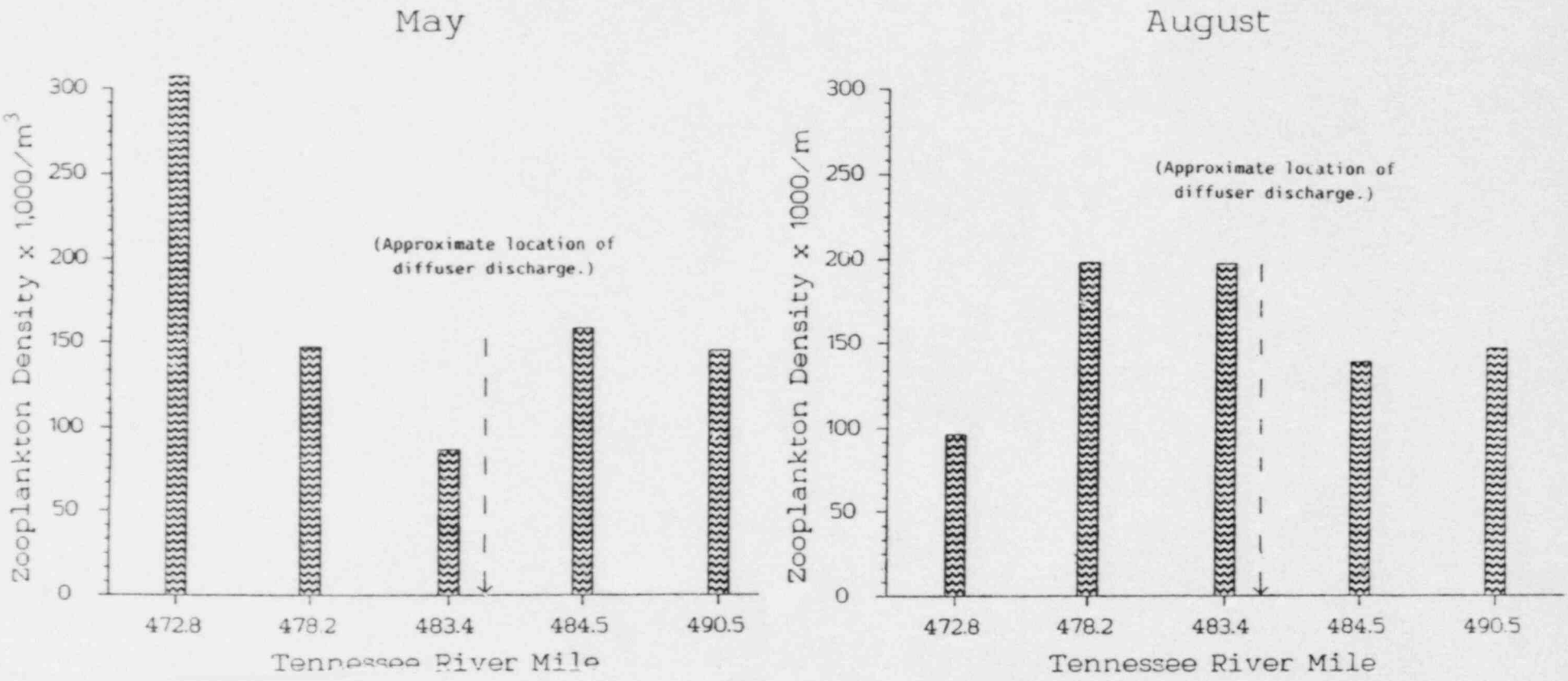
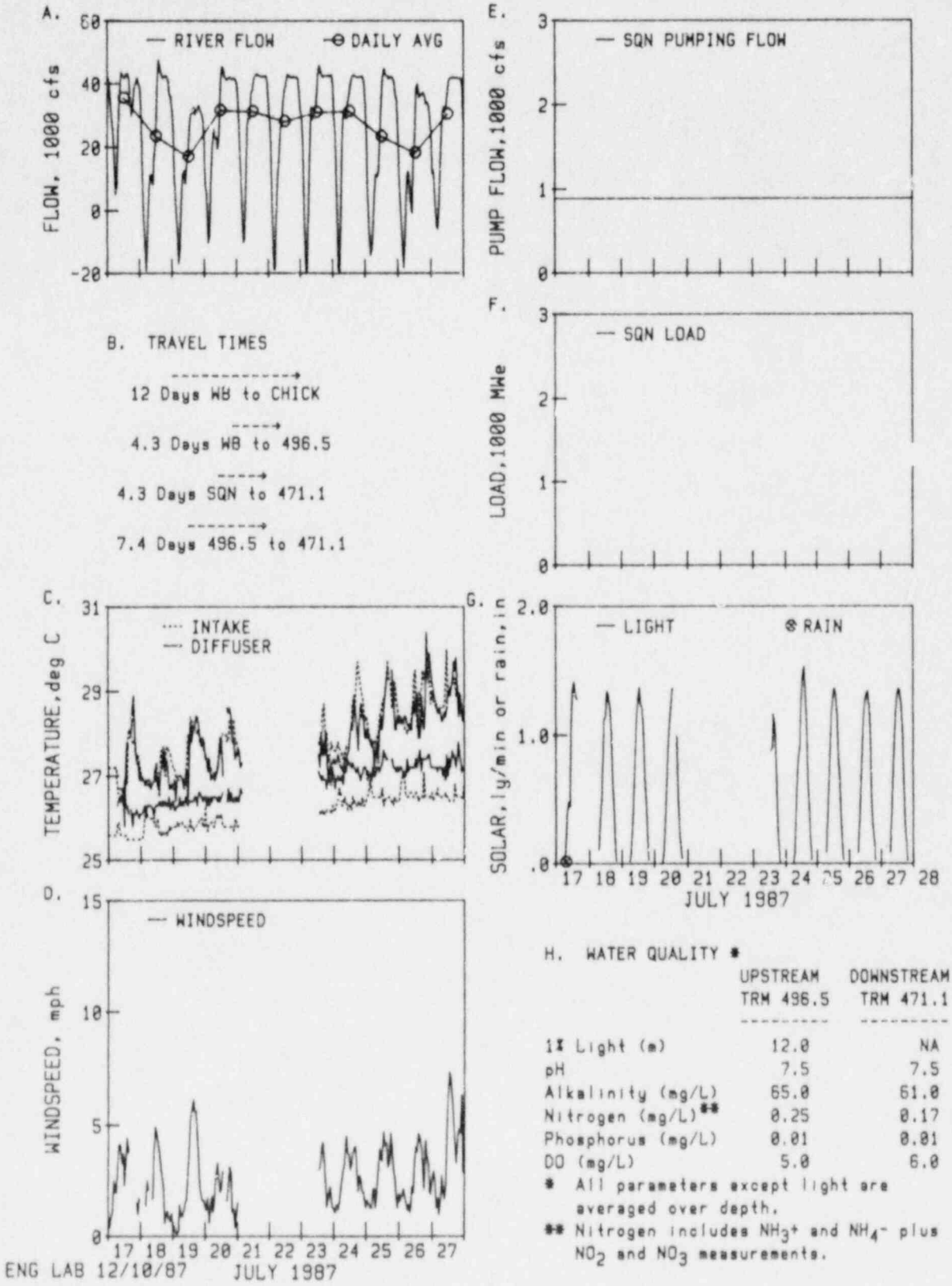



Figure 5. Mean Total Zooplankton Density at Each Collection Site on Chickamauga Reservoir in May and August 1986 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.


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.



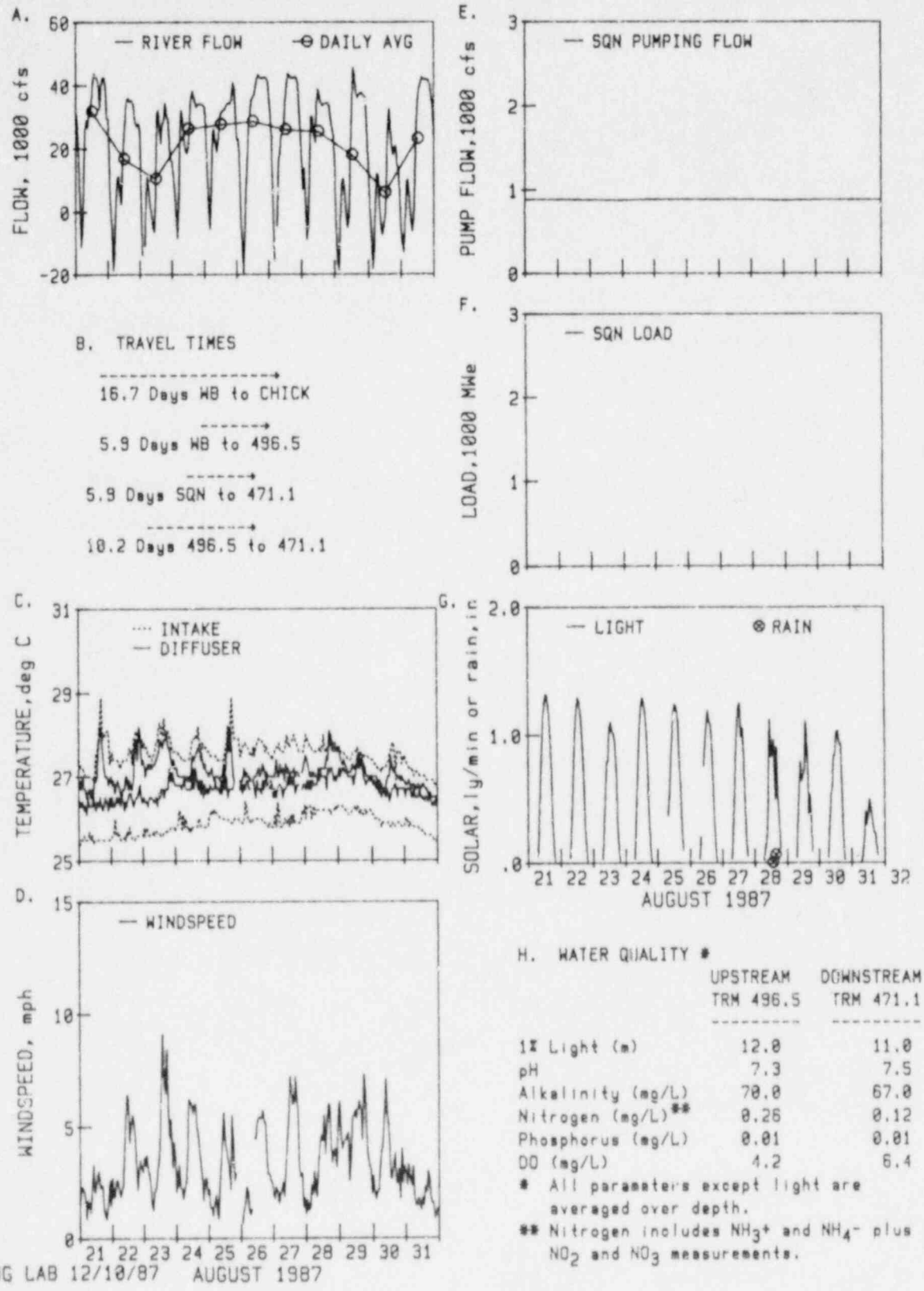

H. WATER QUALITY *

| | UPSTREAM TRM 496.5 | DOWNSTREAM TRM 471.1 |
|---|---|---|
| 1% Light (m) | 12.0 | NA |
| pH | 7.5 | 7.5 |
| Alkalinity (mg/L) | 65.0 | 61.0 |
| Nitrogen (mg/L)** | 0.25 | 0.17 |
| Phosphorus (mg/L) | 0.01 | 0.01 |
| DO (mg/L) | 5.0 | 6.0 |

* All parameters except light are averaged over depth.

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

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.

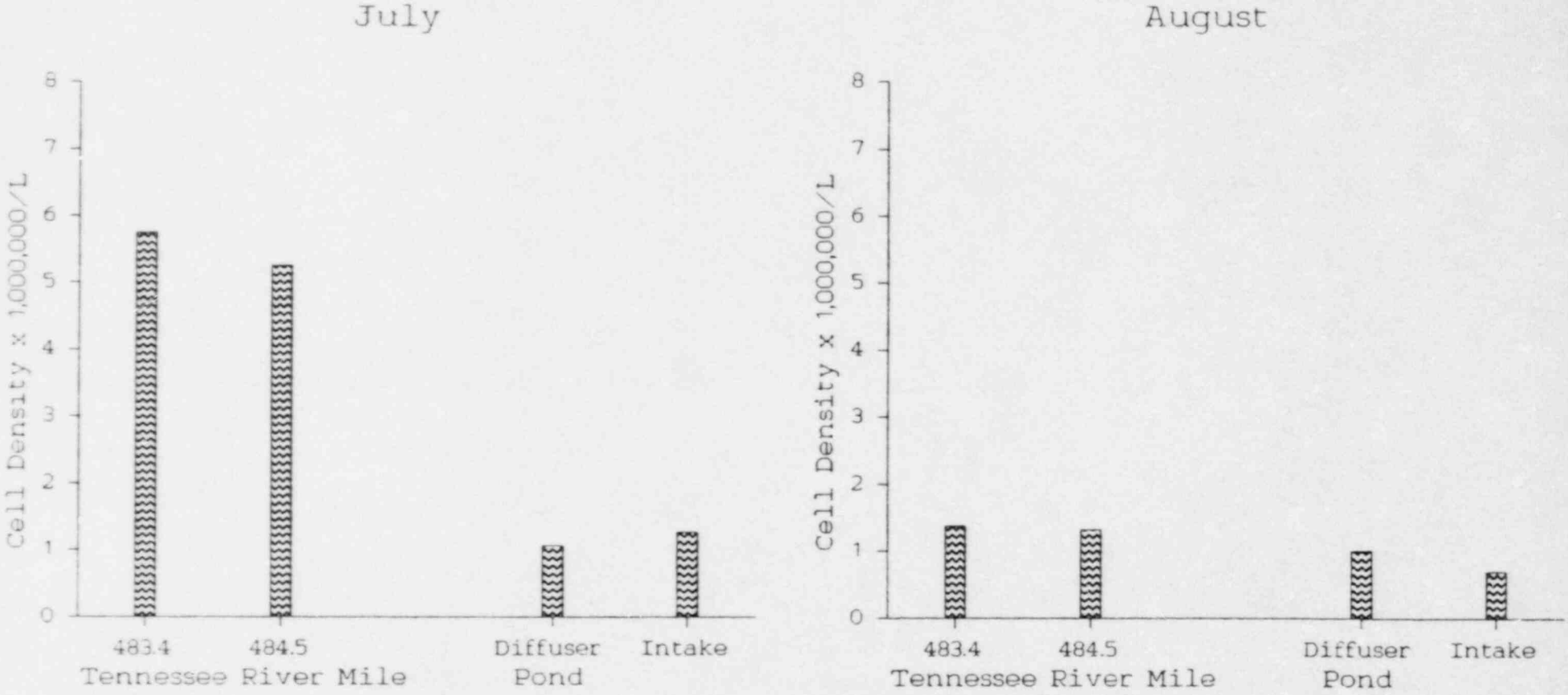



Figure 9. Mean Total Phytoplankton Cell Density at Each Collection Site in July and August 1987 Associated with Aquatic Monitoring Program for Sequoyah Nuclear Plant.

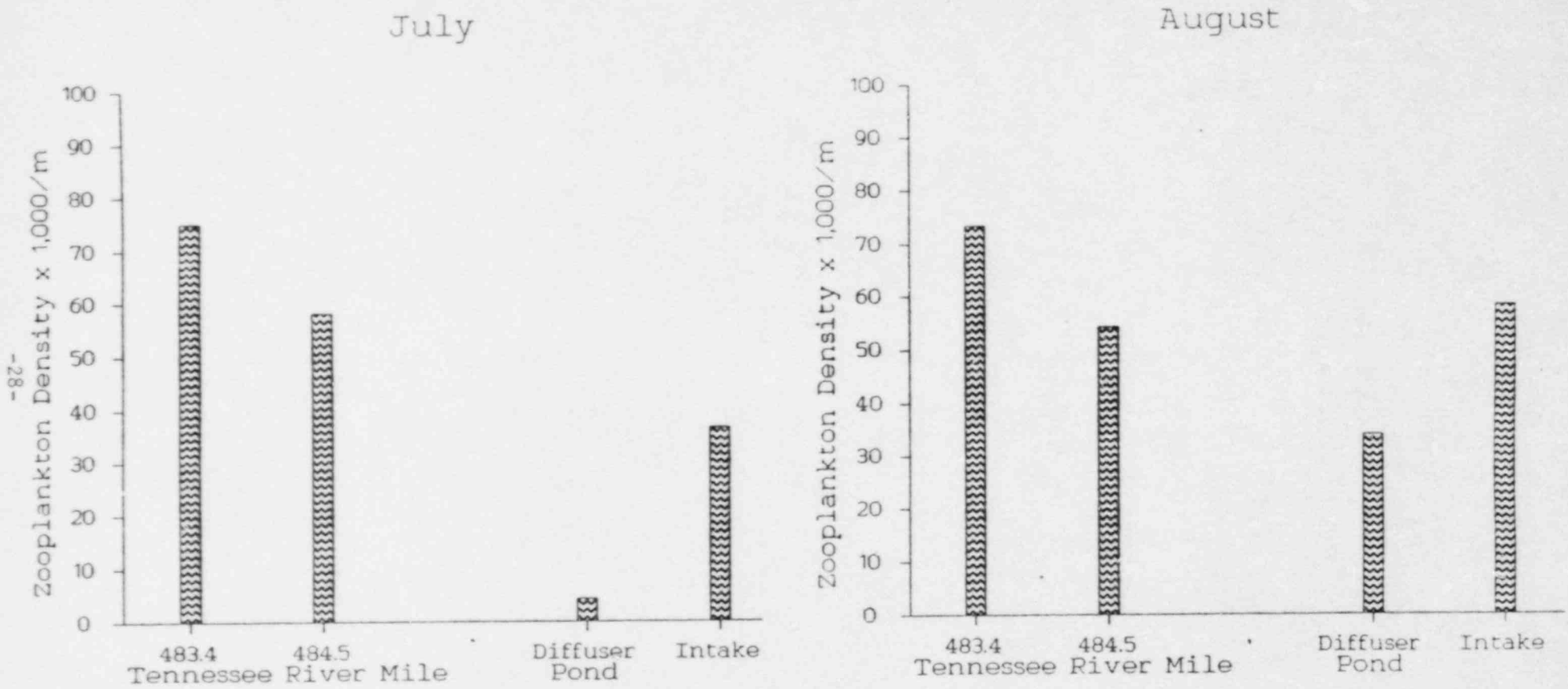



Figure 10. Mean Total Zooplankton Density at Each Collection Site in July and August 1987 Associated with Aquatic Monitoring for Sequoyah Nuclear Plant.

## REFERENCES


Tennessee Valley Authority. 1978. "Zooplankton Entrainment at TVAs Fossil-Fired Steam Plants." Muscle Shoals, Alabama: Water Quality and Ecology Branch. September 1978.

Tennessee Valley Authority. 1982. "Aquatic Environmental Conditions in Chickamauga Reservoir During Operation of Sequoyah Nuclear Plant, First Annual Report (1980 and 1981)." Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONR/WRF-82/4(a).

Tennessee Valley Authority. 1983. "Aquatic Environmental Conditions in Chickamauga Reservoir During Operation of Sequoyah Nuclear Plant, Second Annual Report (1982)." Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONR/WRF-83/12(a).

Tennessee Valley Authority. 1984. "Aquatic Environmental Conditions in Chickamauga Reservoir During Operation of Sequoyah Nuclear Plant, Third Annual Report (1983)." Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONR/WRF-84/5(a).

Tennessee Valley Authority. 1985. "Aquatic Environmental Conditions in Chickamauga Reservoir During Operation of Sequoyah Nuclear Plant, Fourth Annual Report (1984)." Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONRED/WRF-85/1(b).

Tennessee Valley Authority. 1986. "Aquatic Environmental Conditions in Chickamauga Reservoir During Operation of Sequoyah Nuclear Plant, Fifth Annual Report (1985)." Knoxville, Tennessee: Division of Air and Water Resources. TVA/ONRED/WRF-86/5(a).

# 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 PG/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 | 32215 PHEOPHTN A UG/L | 74041 WQF SAMPLE UPDATED | 82079 TURBICTY LAB NTU | 84068 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< | 1.600< | 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 | AE |
| 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 | 7.650 | 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 | 1.250< | 2.100< | 3.80 | 870212 | 3.9 | A AW |
| 860827 | 0829 | 5 | | | | | | | | 860919 | | |
| 860827 | 0831 | 10 | 0.03 | 0.01 | 4.9 | 7.500 | 1.[illegible]< | 1.000< | 2.80 | 870212 | 4.7 | A. |
| 860827 | 0833 | 16 | 0.04 | 0.01 | 4.7 | 7.600 | 1.[illegible] | 1.000< | 1.95< | 870212 | 3.8 | 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 | 0.04 | 0.01 | 4.9 | 12.400 | 1.250< | 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 | 10.662 | 11.615 | 38.66 | 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 | 15597568 | 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 | 12.9 | 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 478.19

| DATE | TIME | 00003 DEPTH FEET | 00002 HSAMPLOC X FRGM RT BANK | 00008 LAB IDENT. NUMBER | 00010 WATER TEMP CENT | 00094 CNDUCTVY FIELD MICROMHO | 00098 VSAMPLOC 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 | 0920 | 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 | 0.08 |
| 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 | 0.28 | 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 | 27.8 | 216 | 3.0 | 4.98 | 7.6 | 71 | 0.29 | 0.01 | 0.09 |
| 860827 | 0833 | 16 | 74 | 37693 | 27.8 | 216 | 5.0 | 92 | 7.6 | 66 | 0.23 | 0.02 | 0.09 |
| 860827 | 0835 | 26 | 74 | | 27.8 | 216 | 8.0 | 5.00 | 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 | 520 | 1.81 | 0.23 | 0.66 |
| SUM SQ. | | 15252 | | | 11172.3 | 769454 | 1427.9 | 593.32 | 971.3 | 33928 | 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 | 18 | 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 | 54.01 | 14.12 |
| LOG MEAN | | 11 | | | 24.5 | 206 | 3.4 | 4.96 | 7.3 | 65 | 0.22 | 0.02 | 0.08 |
| 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 MG/L | 32211 CHLRPHYL A UG/L CORRECTD | 32212 CHLRPHYL B UG/L | 32214 CHLRPHYL C UG/L | 32218 PHEOPHTN A UG/L | 74041 WQX SAMPLE UPDATED | 82079 TURBIDITY LAB NTU | 84058 SERIES CODE ALPHA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 860827 1020 | 33 | | | | | | | | 860919 | | |
| 860520 | | | | | | | | | | | |
| NUMBER | 16 | 8 | 8 | 8 | 8 | 9 | 8 | 8 | 16 | 8 | 16 |
| MAXIMUM | 33 | 0.04 | 0.02 | 3.7 | 24.950 | 1.000< | 1.150< | 2.65 | 870212 | 8.5 | 0.00 |
| MINIMUM | 1 | 0.03 | 0.01< | 2.6 | 4.500 | 1.000< | 1.000< | 1.00< | 860718 | 4.2 | 0.00 |
| SUM | 211 | 0.28 | 0.09 | 25.7 | 96.200 | 8.000 | 8.200 | 11.45 | 13782920 | 49.5 | 0.00 |
| SUM SQ. | 4733 | 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 | 0.00 |
| VARIANCE | 130 | 0.00 | 0.00 | 0.1 | 75.063 | 0.000 | 0.003 | 0.44 | 5522500 | 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 | 0.00 |
| 860827 | | | | | | | | | | | |

STATION - 475265 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 490.47

| DATE | TIME | 00003 DEPTH FEET | 00002 %SAMPLOC FROM RT BANK | 00008 LAB IDENT. NUMBER | 00010 WATER TEMP CENT | 00094 CNDUCTVY FIELD MICROMHO | 00098 VSAMPLOC 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 | 0.12 | 0.03 |
| 860520 | 1117 | 3 | 85 | 33022 | 22.9 | 193 | 1.0 | 8.05 | 7.7 | 61 | 0.38 | 0.12 | 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 | 0.13 | 0.04 |
| 860520 | 1123 | 16 | 85 | 33024 | 22.7 | 202 | 5.0 | 6.80 | 7.5 | 60 | 0.27 | 0.15 | 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 | 0.15 | 0.11 |
| 860827 | 1007 | 2 | 85 | | | | 0.5 | | | | | | |
| 860827 | 1008 | 3 | 85 | 37683 | 27.6 | 222 | 1.0 | 4.36 | 7.4 | 66 | 0.21 | 0.14 | 0.10 |
| 860827 | 1010 | 5 | 85 | | 27.5 | 222 | 1.5 | 4.29 | 7.3 | | | | |
| 860827 | 1012 | 10 | 85 | 37684 | 27.6 | 223 | 3.0 | 4.35 | 7.4 | 66 | 0.28 | 0.15 | 0.11 |
| 860827 | 1014 | 16 | 85 | 37685 | 27.6 | 223 | 5.0 | 4.27 | 7.4 | 67 | 0.34 | 0.14 | 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 | 8 | 8 | 9 | 8 |
| MAXIMUM | | 33 | | | 27.6 | 223 | 10.0 | 8.48 | 7.7 | 68 | 0.38 | 0.15 | 0.11 |
| MINIMUM | | 1 | | | 20.9 | 156 | 0.3 | 4.13 | 7.1 | 60 | 0.21 | 0.12 | 0.03 |
| SUM | | 211 | | | 376.7 | 3168 | 69.1 | 81.62 | 111.8 | 511 | 2.36 | 0.37 | 0.89 |
| SUM SQ. | | 4733 | | | 9570.2 | 671394 | 434.9 | 483.76 | 839.1 | 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. | | 11 | | | 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 | 00003 DEPTH FEET | 00665 PHOS-TOT MG/L P | 00666 PHOS-DIS MG/L P | T | 00680 ORG 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 GF 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< | 860718 | 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 | 7.2 | AJ |
| 860520 | 1123 | 16 | 0.03 | 0.01< | | 2.6 | 9.200 | 1.000< | 1.000< | 2.65 | 860718 | 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 | ADC< |
| 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 T ORG C MG/L P | 00680 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 | 94053 SERIES CODE ALPHA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 860520 | 0555 | 1 | 0.01 | 0.01< | 2.8 | 15.900 | 1.000< | 1.050 | 1.00< | 860718 | 5.4 | AQJW |
| 860520 | 0556 | 1 | 0.03 | 0.01< | 2.9 | | | | | 860718 | 5.8 | A*<<D |
| 860520 | 0557 | 3 | 0.01 | 0.01< | 2.6 | 17.350 | 1.350< | 1.500 | 1.00< | 860718 | 5.7 | AS |
| 860520 | 0559 | 5 | | | | | | | | 860718 | | |
| 860520 | 1001 | 10 | 0.02 | 0.01< | 4.2 | 17.500 | 1.000< | 1.000< | 1.75< | 860718 | 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 | AFJW |
| 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 | | | | | | | | 860919 | | |
| 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 | 239.0 | 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 | 25.903 | 0.015 | 0.031 | 0.31 | 15597568 | 0.6 | 0.00 |
| | STD.DEV. | 18 | 0.01 | 0.00 | 0.6 | 5.090 | 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 %SAMPLOC FROM RT BANK | 00008 LAB IDENT. NUMBER | 00010 WATER TEMP CENT | 00094 CNDUCTVY FIELD MICROMHO | 00098 %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 | 0955 | 1 | 17 | 33025 | 22.5 | 197 | 0.3 | 8.13 | 7.6 | 61 | 0.21 | 0.02 | 0.06 |
| 860520 | 0956 | 1 | 17 | 33042 | | | 0.30 | | | | 0.16 | 0.02 | 0.06 |
| 860520 | 0957 | 3 | 17 | 33026 | 22.5 | 197 | 1.0 | 7.86 | 7.6 | 60 | 0.21 | 0.02 | 0.06 |
| 860520 | 0959 | 5 | 17 | | 22.5 | 198 | 1.5 | 7.66 | 7.6 | | | | |
| 860520 | 1001 | 10 | 17 | 33027 | 22.5 | 197 | 3.0 | 7.55 | 7.5 | 60 | 0.24 | 0.03 | 0.06 |
| 860520 | 1002 | 16 | 17 | 33028 | 22.3 | 198 | 5.0 | 6.04 | 7.3 | 60 | 0.24 | 0.03 | 0.07 |
| 860520 | 1005 | 26 | 17 | | 21.8 | 197 | 8.0 | 5.85 | 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 | 0906 | 1 | 17 | 37686 | 27.7 | 215 | 0.3 | 4. | 7.6 | 68 | 0.28 | 0.02 | 0.12 |
| 860827 | 0907 | 2 | 17 | | | | 0.5 | | | | | | |
| 860827 | 0908 | 3 | 17 | 37687 | 27.7 | 215 | 1.0 | 4.58 | 7.4 | 68 | 0.21 | 0.01 | 0.12 |
| 860827 | 0910 | 5 | 17 | | 27.7 | 215 | 1.5 | 4.50 | 7.4 | | | | |
| 860827 | 0912 | 10 | 17 | 37688 | 27.7 | 215 | 3.0 | 4.41 | 7.5 | 68 | 0.21 | 0.01 | 0.12 |
| 860827 | 0914 | 16 | 17 | 37689 | 27.7 | 216 | 5.0 | 4.41 | 7.5 | 69 | 0.24 | 0.01 | 0.12 |
| 860827 | 0916 | 26 | 17 | | 27.7 | 216 | 8.0 | 4.43 | 7.5 | | | | |
| 860827 | 0918 | 39 | 17 | | 27.7 | 216 | 12.0 | 4.39 | 7.5 | | | | |
| 860827 | 0920 | 49 | 17 | | 27.7 | 216 | 15.0 | 4.39 | 7.5 | | | | |
| 860827 | 0922 | 52 | 17 | | 27.7 | 217 | 16.0 | 4.39 | 7.5 | | | | |
| 860520 | | | | | 17 | 17 | 19 | 17 | 17 | 8 | 9 | 9 | 9 |
| | NUMBER | 19 | | | 27.7 | 217 | 16.0 | 8.13 | 7.6 | 69 | 0.28 | 0.03 | 0.12 |
| | MAXIMUM | 52 | | | 21.3 | 197 | 0.3 | 4.14 | 6.9 | 60 | 0.16 | 0.01 | 0.06 |
| | MINIMUM | 1 | | | 426.2 | 3519 | 108.4 | 92.04 | 126.2 | 514 | 2.00 | 0.17 | 0.79 |
| | SUM | 353 | | | 10819.1 | 729875 | 1197.0 | 532.30 | 937.6 | 33154 | 0.45 | 0.00 | 0.00 |
| | SUM SQ. | 12637 | | | 25.1 | 207 | 5.7 | 5.41 | 7.4 | 64 | 0.22 | 0.02 | 0.09 |
| | MEAN | 19 | | | 8.4 | 90 | 32.1 | 2.12 | 0.0 | 19 | 0.00 | 0.00 | 0.00 |
| | VARIANCE | 340 | | | 2.9 | 9 | 5.7 | 1.46 | 0.2 | 4 | 0.03 | 0.01 | 0.03 |
| | 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 | 14.29 | 41.39 | 35.21 |
| | COEF VAR | 99 | | | 24.9 | 207 | 2.6 | 5.25 | 7.4 | 64 | 0.22 | 0.02 | 0.08 |
| | LOG MEAN | 9 | | | | | | | | | | | |
| 860827 | | | | | | | | | | | | | |

STATION - 475300 CHICKAMAUGA RESERVOIR TENNE VER 472.30

| DATE | TIME | 00003 DEPTH FEET | 00032 MSAMPLOC % FROM RI BANK | 00008 LAB IDENT. NUMBER | 00010 WATER TEMP CENT | CN FI MI | 00098 VSAMPLOC DEPTH METERS | 00300 DO MG/L | 00400 PH SU | +31 K LD G/L | 00605 ORG N 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 | 8.20 | | 61 | 0.12 | 0.03 | 0.06 |
| 860520 | 0847 | 3 | 85 | 33034 | 22.3 | | 1.0 | 8.00 | .5 | 61 | 0.15 | 0.03 | 0.06 |
| 860520 | 0849 | 5 | 85 | | 22.3 | | 1.5 | 7.82 | 7.6 | | | | |
| 860520 | 0851 | 10 | 85 | 33035 | 22.3 | | 3.0 | 7.70 | 7.4 | 60 | 0.16 | 0.02 | 0.05 |
| 860520 | 0852 | 16 | 85 | 33036 | 22.4 | | 5.0 | 7.45 | 7.3 | 59 | 0.14 | 0.02 | 0.05 |
| 860520 | 0855 | 26 | 85 | | 21.9 | 15 | 8.0 | 6.10 | 7.1 | | | | |
| 860520 | 0857 | 39 | 85 | | 20.6 | 196 | 12.0 | 3.46 | 6.8 | | | | |
| 860520 | 0859 | 49 | 85 | | 19.9 | 196 | 0 | 3.39 | 6.8 | | | | |
| 860827 | 0755 | 1 | 85 | 37694 | 27.8 | 216 | | 4.60 | 7.5 | 70 | 0.35 | 0.01 | 0.12 |
| 860827 | 0756 | 1 | 85D | 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 | 0803 | 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 | 15.0 | 28 | 7.1 | | | | |
| 860520 | | | | | | | | | | | | | |
| NUMBER | | 17 | | | 15 | 15 | 17 | | 15 | 8 | 9 | 9 | 9 |
| MAXIMUM | | 52 | | | 28.4 | 222 | 16.0 | 8. | 7.7 | 70 | 0.35 | 0.03 | 0.13 |
| MINIMUM | | 1 | | | 19.9 | 195 | 0.3 | 3.2 | 6.8 | 59 | 0.12 | 0.01 | 0.05 |
| SUM | | 265 | | | 369.4 | 3084 | 81.4 | 82.88 | 109.9 | 512 | 2.11 | 0.17 | 0.82 |
| SUM SQ. | | 8765 | | | 9246.8 | 635940 | 828.0 | 504.49 | 806.1 | 32904 | 0.57 | 0.00 | 0.08 |
| MEAN | | 16 | | | 24.6 | 206 | 4.8 | 5.53 | 7.3 | 64 | 0.23 | 0.02 | 0.05 |
| VARIANCE | | 290 | | | 10.7 | 139 | 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 | 0.03 |
| 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 | 38.20 |
| LOG MEAN | | 8 | | | 24.4 | 205 | 2.3 | 5.25 | 7.3 | 64 | 0.22 | 0.02 | 0.05 |
| 860827 | | | | | | | | | | | | | |

| 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 | 32213 CHLRPHYL C UG/L | 32218 PHEOPHTN A UG/L | 74041 WOF SAMPLE UPDATED | 82079 TURBIDITY LAB NTU | 84059 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< | 860715 | 4.8 | AKKK |
| 860520 | 0849 | 5 | | | | | | | | 860718 | | |
| 860520 | 0851 | 10 | 0.03 | 0.01< | 2.6 | 18.150 | 1.000< | 1.200 | 1.14< | 860718 | 7.8 | AKKK |
| 860520 | 0852 | 16 | 0.02 | 0.01< | 2.9 | 17.100 | 1.000< | 1.300< | 1.80< | 860718 | 6.4 | AKKK |
| 860520 | 0855 | 26 | | | | | | | | 860719 | | |
| 860520 | 0857 | 39 | | | | | | | | 860719 | | |
| 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 RR |
| 860827 | 0756 | 1 | 0.04 | 0.01 | 4.5 | | | | | 870212 | 6.5 | AY D |
| 860827 | 0756 | 2 | | | | | | | | 861002 | | |
| 860827 | 0757 | 3 | 0.03 | 0.02 | 4.0 | 5.050 | 1.000< | 1.000< | 1.45 | 870212 | 4.0 | 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 /OIR TENNESSEE RIVER 472.80

| DATE TIME | 00003 DEPTH FEET | 00665 PHOS-TOT MG/L P | 00666 PHOS-DIS MG/L P | 00680 TOC L | 32211 CHLRPHYL A UG/L CORRECTD | 32212 CHLRPHYL B UG/L | 32214 CHLRPHYL C UG/L | 70218 PHEOPHTN A UG/L | 74041 WQF SAMPLE UPDATED | 82079 TURBIDITY LAB NTU | 84058 SERIES CODE ALPHA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 860827 0803 | 16 | 0.04 | 0.01 | .6 | 6.250 | 1.000< | 1.000< | 1.95< | 870212 | 3.4 | A ## |
| 860827 0805 | 26 | | | | | | | | 860919 | | |
| 860827 0807 | 52 | | | | | | | | 860919 | | |
| 860520 | | | | | | | | | | | |
| NUMBER | 17 | 9 | 9 | | 8 | 8 | 8 | 8 | 17 | 9 | 17 |
| MAXIMUM | 52 | 0.05 | 0.02 | 4.. | 9.150 | 1.000< | 1.550 | 1.80 | 870212 | 7.8 | 0.00 |
| MINIMUM | 1 | 0.02 | 0.01< | 2.5 | .500 | 1.000< | 1.000< | 1.00< | 860718 | 3.4 | 0.00 |
| SUM | 265 | 0.29 | 0.10 | 33.0 | 550 | 8.000 | 9.200 | 10.74 | 14680363 | 45.9 | 0.00 |
| SUM SQ. | 8765 | 0.01 | 0.00 | 128.4 | 1. 12 | 8.000 | 10.855 | 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 | 0.9 | 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.. | 1.136 | 1.32 | 863546 | 4.9 | 0.00 |
| 860827 | | | | | | | | | | | |

STATION - 475023 CHICKAMAUGA RESERVOIR TENNESSEE RIVER 444.5

| DATE | TIME | 00003 DEPTH FEET | 00002 %SAMPLOC FROM RT BANK | 00000 LAB IDENT. NUMBER | 00010 WATER TEMP CENT | 00094 CNDUCTVY FIELD MICROMHO | 00093 %SAMPLOC DEPTH METERS | 00300 DO MG/L | 00400 PH SU | C0431 T ALK FIELD MG/L | 00605 ORG N PG/L | 00610 NH3+NH4- N TOTAL MG/L | 00630 NO2&NO3 N-TOTAL MG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 860520 | 1030 | 1 | 85 | 33037 | 22.5 | 198 | 0.3 | 7.52 | 7.5 | 60 | 0.15 | 0.05 | 0.06 |
| 860520 | 1032 | 3 | 85 | 33038 | 22.6 | 198 | 1.0 | 7.28 | 7.5 | 60 | 0.15 | 0.05 | 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 | 0.05 | 0.06 |
| 860520 | 1038 | 16 | 85 | 33040 | 22.6 | 198 | 5.0 | 7.13 | 7.4 | 60 | 0.19 | 0.05 | 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 | 0530 | 1 | 85 | 37698 | 27.7 | 219 | 0.3 | 4.65 | 7.5 | 68 | 0.27 | 0.01 | 0.12 |
| 860827 | 0531 | 2 | 85 | | | | 0.5 | | | | | | |
| 860827 | 0532 | 3 | 85 | 37699 | 27.8 | 218 | 1.0 | 4.59 | 7.5 | 70 | 0.27 | 0.01 | 0.12 |
| 860827 | 0534 | 5 | 85 | | 27.8 | 218 | 1.5 | 4.55 | 7.5 | | | | |
| 860827 | 0536 | 10 | 85 | 37700 | 27.8 | 217 | 3.0 | 4.49 | 7.4 | 68 | 0.24 | 0.01 | 0.12 |
| 860827 | 0538 | 16 | 85 | 37701 | 27.8 | 218 | 5.0 | 4.47 | 7.4 | 67 | 0.23 | 0.02 | 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 | 0.05 | 0.12 |
| MINIMUM | | 1 | | | 21.2 | 197 | 0.3 | 3.38 | 7.3 | 60 | 0.15 | 0.01 | 0.06 |
| SUM | | 258 | | | 373.3 | 3108 | 79.1 | 84.54 | 111.3 | 513 | 1.74 | 0.25 | 0.72 |
| SUM SQ. | | 8176 | | | 9401.3 | 645512 | 767.9 | 507.76 | 825.1 | 33037 | 0.39 | 0.01 | 0.07 |
| MEAN | | 16 | | | 24.9 | 207 | 4.9 | 5.64 | 7.4 | 64 | 0.22 | 0.03 | 0.05 |
| VARIANCE | | 284 | | | 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 | | 3 | | | 24.7 | 207 | 2.6 | 5.45 | 7.4 | 64 | 0.21 | 0.02 | 0.09 |
| 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 | 32218 PHEOPHTN A UG/L | 74041 WQF SAMPLE UPDATED | 82079 TURBIDITY LAB NTU | 84068 SERIES CODE ALPHA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 860520 | 1030 | 1 | 0.03 | 0.01< | 2.9 | 13.600 | 1.050< | 1.050< | 1.70 | 860718 | 5.8 | A<< |
| 860520 | 1032 | 3 | 0.03 | 0.01 | 2.9 | 12.950 | 1.000< | 1.050< | 2.55< | 860719 | 5.8 | A<< |
| 860520 | 1034 | 5 | | | | | | | | 860718 | | |
| 860520 | 1036 | 10 | 0.04 | 0.01 | 2.9 | 13.750 | 3.900 | 4.350 | 5.80 | 860718 | 4.3 | A0<< |
| 860520 | 1038 | 16 | 0.04 | 0.01< | 3.1 | 13.750 | 1.000< | 1.000< | 1.70< | 860718 | 4.8 | A<<< |
| 860520 | 1040 | 26 | | | | | | | | 860718 | | |
| 860520 | 1042 | 39 | | | | | | | | 860718 | | |
| 860520 | 1044 | 49 | | | | | | | | 860718 | | |
| 860827 | 0530 | 1 | 0.05 | 0.03 | 5.2 | 7.600 | 1.000< | 1.000< | 1.00< | 870212 | 4.2 | AC |
| 860827 | 0531 | 2 | | | | | | | | 860919 | | |
| 860827 | 0532 | 3 | 0.03 | 0.01 | 6.5 | 8.250 | 1.300< | 1.000< | 1.25< | 870212 | 4.5 | AH |
| 860827 | 0534 | 5 | | | | | | | | 860919 | | |
| 860827 | 0536 | 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 | 5.0 | 4.400 | 1.000< | 1.000< | 4.00 | 870212 | 6.2 | AT |
| 860827 | 0540 | 26 | | | | | | | | 860919 | | |

STATION - 47502* 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 | 74041 WQF SAMPLE UPDATED 860919 | 82079 TURBIDTY LAB NTU | 84059 SERIES CODE ALPHA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 860827 0942 | 46 | | | | | | | | | | |
| 860520 | | | | | | | | | | | |
| NUMBER | 16 | 8 | 8 | 8 | 8 | 8 | 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 | 258 | 0.30 | 0.10 | 33.6 | 80.700 | 10.950 | 11.450 | 19.80 | 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 | 4.2 | 10.087 | 1.369 | 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 | 17791000 | 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 | 4.0 | 9.358 | 1.193 | 1.216 | 2.10 | 863127 | 5.0 | 0.00 |
| 860827 | | | | | | | | | | | |

# 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 | 478.2 | 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 | 15550 | 9336 | 12448 | 4401 | 35 |
| 5.0 | 9336 | 18672 | 14004 | 6602 | 47 | 6224 | 9336 | 7780 | 2201 | 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) | IRM 484.5 Sample 1 | Sample 2 | Mean | STD | CV | IRM 490.5 Sample 1 | Sample 2 | Mean | STD | 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 | 11003 | 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 | 563272 | 620844 | 81419 | 13 | 634848 | 603728 | 619288 | 22005 | 4 | 634848 | 538376 | 586612 | 68216 | 12 |
| 3.0 | 566384 | 563272 | 564828 | 2201 | 0 | 653520 | 560166 | 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 | 308088 | 258296 | 283192 | 35208 | 12 | 220952 | 211616 | 216284 | 6602 | 3 |
| 3.0 | 273856 | 214728 | 244292 | 41810 | 17 | 286304 | 233400 | 259852 | 37409 | 14 | 311200 | 304976 | 308088 | 4401 | 1 |
| 5.0 | 171160 | 149376 | 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 | 25452 | 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 | 1478?00 | 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 | 138633 | 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 | 230288 | 233400 | 231844 | 2201 | 1 |
| **Chrysophyta** | | | | | | | | | | |
| 0.3 | 349544 | 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 | 1668052 | 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 | 0.0001* | 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 3 4 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 | 5[illegible] | 97 | 93 | 113 | 0 | 0 | 39 | 175 | 163 |
| Ankistrodesmus | 253 | 198 | 657 | 506 | 622 | 31 | 187 | 128 | 105 | 54 |
| Botryococcus | 0 | 0 | 0 | [illegible] | 0 | 0 | 0 | 0 | 0 | 31 |
| Characium | 0 | 4 | 0 | 16 | 0 | 0 | 9 | 0 | 0 | 0 |
| Chlamydomonas | 311 | 121 | 66 | 78 | 148 | 167 | [illegible]22 | 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 | 109 | 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 | 202 | 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 | 16 | 31 | 31 | 4 | 0 | 0 | 47 | 0 |
| Treubaria | 0 | 0 | 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 | 1797 | 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 | 1789 |

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 | 72 |
| | 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 | 63 |
| | 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 B-8. Chlorophyll a Concentrations, Phaeophytin a Concentrations, and Phaeophytin Index Values at Each Sample Location During Operational Monitoring (1986), Sequoyah Nuclear Plant, Chickamauga Reservoir

| | | | TRM 472.8 | | | TRM 478.2 | | | TRM 483.4 | | | TRM 484.5 | | | TRM 490.5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Depth (M) | Sample No. | Chl a Mg/M3 | Pheo a Mg/M3 | Pheo Index | Chl a Mg/M3 | Pheo a Mg/M3 | Pheo Index | Chl a Mg/M3 | Pheo a Mg/M3 | Pheo Index | Chl a Mg/M3 | Pheo a Mg/M3 | Pheo Index | Chl Mg/M3 | Pheo a Mg/M3 | 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 | 1.00 | 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 | 16.50 | 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 | 4.40 | 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 = 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 = 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 4-12. 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 | 37.61 | 2 | 4 | 3 | 5 | 1 |
| | 1.0 | 43.66 | 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 | 59040 | 47398.4 | 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 | 8708.9 | 46.39 |
| | | Copepoda | 71800 | 42511 | 57156 | 20710.5 | 36.24 |
| | | Rotifera | 13325 | 8641 | 10983 | 3316.1 | 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 | [illegible] | [illegible] | [illegible] |
| | | 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 | 753 | 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 | 0 | 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 | 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 | 57 |
| | 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]
35 13 32.2 085 4 59.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060501
TENNESSEE RIVER 484.5
131TVAC 852FIT 06020001022 0010.630 0N
0000 FEET DEPTH

| DATE FROM TO | TIME OF DAY | MEDIUM | SMK 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 | 190 | 8.6 | 8.50 | 61 | 2.0 | .23 | .03 |
| 87/07/27 | 1205 | WATER | 3 | 1.0 | 80 | 28.6 | 191 | 8.6 | 8.50 | 61 | 2.0 | .23 | .01 |
| 87/07/27 | 12[illegible] | WATER | 5 | 1.5 | 80 | 28.3 | 191 | 7.6 | 8.25 | | | | |
| 87/07/27 | 12[illegible] | WATER | 7 | 2.0 | 80 | 28.0 | 192 | 6.7 | 7.79 | | | | |
| 87/07/27 | 121[illegible] | WATER | [illegible] | 2.5 | 80 | 28.0 | 192 | 6.4 | 7.75 | | | | |
| 87/07/27 | 1210 | WATER | 10 | 3.0 | 80 | 27.8 | 192 | 6.2 | 7.68 | 61 | 2.0 | .15 | .01K |
| 87/07/27 | 1212 | WATER | 15 | 4.5 | 60 | 27.7 | 192 | 5.6 | 7.57 | 61 | | | |
| 87/07/27 | 1215 | WATER | 25 | 5.0 | 80 | | | | | | 2.0 | .15 | .03 |
| 87/07/27 | 1216 | WATER | 20 | 6.0 | 80 | 27.2 | 192 | 4.7 | 7.42 | | | | |
| 87/07/27 | 1217 | WATER | 25 | 7.5 | 80 | 27.1 | 192 | 4.4 | 7.36 | | | | |
| 87/07/27 | 1219 | WATER | 32 | 9.0 | 80 | 27.0 | 192 | 4.3 | 7.32 | | | | |
| 87/07/27 | 1219 | WATER | 34 | 10.5 | 80 | 26.9 | 192 | 4.0 | 7.29 | | | | |
| 87/07/27 | 1220 | WATER | 39 | 12.0 | 80 | 26.9 | 193 | 4.0 | 7.26 | | | | |
| 87/07/27 | 1221 | WATER | 44 | 13.5 | 80 | 26.9 | 192 | 4.0 | 7.22 | | | | |
| 87/07/27 | 1222 | WATER | 45 | 13.9 | 80 | 26.9 | 191 | 3.9 | 7.21 | | | | |
| 87/[illegible]/31 | 12[illegible] | WATER | 1 | .3 | 80 | 26.5 | 195 | 5.7 | 7.40 | 70 | 1.6 | .14 | .02 |
| 87/[illegible]/31 | 1203 | WATER | 1 | .30 | 80 | | | | | | 1.5 | .10 | .02 |
| 87/[illegible]/31 | 1205 | WATER | 5 | 1.0 | 80 | 26.5 | 195 | 5.7 | 7.40 | 70 | 1.7 | .14 | .02 |
| 87/[illegible]/31 | 12[illegible] | WATER | 5 | 1.5 | 80 | 26.5 | 195 | 5.7 | 7.40 | | | | |
| 87/[illegible]/31 | 121[illegible] | WATER | 10 | 3.0 | 80 | 26.5 | 195 | 5.7 | 7.40 | 70 | 1.6 | .19 | .02 |
| 87/[illegible]/31 | 1215 | WATER | 15 | 5.0 | 80 | 26.5 | 195 | 5.7 | 7.40 | 70 | 1.7 | .15 | .01 |
| 87/[illegible]/31 | 1217 | WATER | 26 | 8.0 | 80 | 26.5 | 195 | 5.6 | 7.40 | | | | |
| 87/[illegible]/31 | 1219 | WATER | 36 | 11.0 | 80 | 26.5 | 198 | 5.6 | 7.50 | | | | |
| 87/[illegible]/31 | 1221 | WATER | 46 | 14.0 | 80 | 26.5 | 196 | 5.7 | 7.50 | | | | |

475 01
35 15 30.0 085 4 54.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060801
TENNESSEE RIVER 464.5
131TVAC 450-10 06020001022 0010.630 ON
0001 TEST 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 TRG C C MG/L | 32211 CHLRPHYL A UG/L CORRECTD | 32212 CHLRPHYL B UG/L | 32214 CHLRPHYL C UG/L | 32218 PHECPHTN A UG/L | 01022 BORON B,TOT UG/L | 01027 CADMIUM CD,TOT UG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77/07/27 | 1201 | WATER | 1 | .06 | .03 | .01K | | 3.6 | 4.30A | 1.00K | 1.55A | 1.75A | | |
| 77/07/27 | 1215 | WATER | 3 | .06 | .04 | .01 | | 3.7 | 5.40A | 1.35A | 1.70A | 1.75A | | |
| 77/07/27 | 1230 | WATER | 5 | | | | | | | | | | 50K | .1 |
| 77/07/27 | 1301 | WATER | 10 | .06 | .04 | .01K | | 3.4 | 11.75A | 1.40A | 2.30A | 1.65A | | |
| 77/07/27 | 1315 | WATER | 16 | .12 | .03 | .02 | | 3.1 | 14.20A | 1.35A | 2.05A | 1.35A | | |
| 77/08/31 | 1201 | WATER | 1 | .13 | .01K | .01K | | 1.5 | 4.90A | 1.00K | 1.00K | 1.60A | | |
| 77/08/31 | 1201 | WATER | 1 | .13 | .01K | | | 1.2 | | | | | | |
| 77/08/31 | 1205 | WATER | 3 | .13 | .01 | .01K | | 1.4 | 5.30A | 1.05K | 1.00K | 1.70A | | |
| 77/08/31 | 1211 | WATER | 5 | | | | | | | | | | 50K | .1K |
| 77/08/31 | 1218 | WATER | 10 | .13 | .02 | .01K | | 1.3 | 5.05A | 1.00K | 1.00K | 1.65A | | |
| 77/08/31 | 1215 | WATER | 16 | .13 | .01K | .01K | | 1.3 | 5.20A | 1.00K | 1.00K | 1.00K | | |

/TYPE/AMBNT/STREAM

35 15 30.0 085 04 54.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040601
TENNESSEE RIVER 444.5
131TVAC 450810 06020001022 0010.630 ON
0000 FEET DEPTH

| 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 | 00079 TRANSP SECCHI METERS | 84002 CODE GENERAL REMARKS | 00008 LAB IDENT. NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1207 | WATER | 1 | | | | | | 9593 |
| 87/07/27 | 1209 | WATER | 3 | | | | | | 9594 |
| 87/07/27 | 1206 | WATER | 5 | 1K | 2 | 50K | | | 9595 |
| 87/07/27 | 1210 | WATER | 10 | | | | | | 9595 |
| 87/07/27 | 1211 | WATER | 16 | | | | | | 9596 |
| 87/08/31 | 1203 | WATER | 1 | | | | 1.50 | 01 | 11353 |
| 87/08/31 | 1201 | WATER | 1 | | | | | 02 | 11354 |
| 87/08/31 | 1205 | WATER | 3 | | | | | | 11355 |
| 87/08/31 | 1204 | WATER | 5 | 2 | 2 | 50K | | | 11350 |
| 87/08/31 | 1210 | WATER | 10 | | | | | | 11356 |
| 87/08/31 | 1213 | WATER | 16 | | | | | | 11357 |

475304 1035
35 12 45.7 085 05 29.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040801
TENNESSEE RIVER 483.40
131TVAC 06020001022 0009.050 ON
0001 FEET DEPTH

| DATE FROM TO | TIME OF DAY | MEDIUM | SMK OR DEPTH (FT) | 00019 VSAMPLDC DEPTH METERS | 00022 HSAMPLDC % 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 % MG/L | 00610 NH3+NH4- % TOTAL MG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1201 | WATER | 1 | .3 | 17 | 29.4 | 180 | 9.6 | 8.71 | 59 | 2.0 | .23 | .01 |
| 87/07/27 | 1201 | WATER | 1 | .30 | 170 | | | | | | 2.0 | .19 | .01 |
| 87/07/27 | 1205 | WATER | 3 | 1.0 | 17 | 29.4 | 180 | 9.6 | 8.70 | 59 | 2.0 | .28 | .01 |
| 87/07/27 | 1208 | WATER | 5 | 1.5 | 17 | 29.3 | 180 | 9.7 | 8.70 | | | | |
| 87/07/27 | 1210 | WATER | 10 | 3.0 | 17 | 29.3 | 180 | 9.5 | 8.66 | 60 | 2.0 | .22 | .02 |
| 87/07/27 | 1212 | WATER | 13 | 4.0 | 17 | 29.0 | 181 | 8.6 | 8.48 | | | | |
| 87/07/27 | 1213 | WATER | 16 | 5.0 | 17 | 28.8 | 181 | 7.8 | 8.24 | 62 | 2.0 | .18 | .02 |
| 87/07/27 | 1216 | WATER | 18 | 5.5 | 17 | 28.4 | 182 | 6.9 | 7.91 | | | | |
| 87/07/27 | 1217 | WATER | 23 | 6.0 | 17 | 28.6 | 183 | 5.6 | 7.59 | | | | |
| 87/07/27 | 1218 | WATER | 22 | 6.5 | 1. | 27.8 | 182 | 5.4 | 7.48 | | | | |
| 87/07/27 | 1219 | WATER | 26 | 8.0 | 17 | 27.6 | 182 | 5.0 | 7.44 | | | | |
| 87/07/27 | 1220 | WATER | 31 | 9.5 | 17 | 27.3 | 182 | 4.7 | 7.35 | | | | |
| 87/07/27 | 1221 | WATER | 36 | 11.0 | 17 | 27.3 | 181 | 4.6 | 7.31 | | | | |
| 87/07/27 | 1222 | WATER | 41 | 12.5 | 17 | 27.2 | 182 | 4.5 | 7.26 | | | | |
| 87/07/27 | 1225 | WATER | 46 | 14.0 | 17 | 27.2 | 183 | 4.5 | 7.25 | | | | |
| 87/07/27 | 1224 | WATER | 51 | 15.5 | 17 | 27.3 | 182 | 4.5 | 7.24 | | | | |
| 87/07/27 | 1225 | WATER | 56 | 17.0 | 17 | 27.2 | 182 | 4.5 | 7.23 | | | | |
| 87/07/27 | 1226 | WATER | 57 | 17.4 | 17 | 27.2 | 181 | 4.5 | 7.23 | | | | |
| 87/08/31 | 1200 | WATER | 1 | .3 | 17 | 26.6 | 196 | 5.7 | 7.10 | 74 | 1.6 | .18 | .02 |
| 87/08/31 | 1205 | WATER | 3 | 1.0 | 17 | 26.6 | 196 | 5.7 | 7.10 | 72 | 1.6 | .16 | .02 |
| 87/08/31 | 1207 | WATER | 5 | 1.5 | 17 | 26.6 | 196 | 5.6 | 7.20 | | | | |
| 87/08/31 | 1210 | WATER | 10 | 3.0 | 17 | 26.6 | 196 | 5.6 | 7.30 | 67 | 1.6 | .11 | .02 |
| 87/08/31 | 1215 | WATER | 16 | 5.0 | 17 | 26.6 | 196 | 5.6 | 7.30 | 69 | 1.5 | .16 | .01 |
| 87/08/31 | 1216 | WATER | 25 | 8.0 | 17 | 26.5 | 196 | 5.6 | 7.30 | | | | |
| 87/08/31 | 1217 | WATER | 33 | 11.0 | 17 | 26.6 | 196 | 5.6 | 7.30 | | | | |
| 87/08/31 | 1217 | WATER | 46 | 14.0 | 17 | 26.6 | 194 | 5.6 | 7.30 | | | | |
| 87/08/31 | 1219 | WATER | 56 | 17.0 | 17 | 26.6 | 195 | 5.4 | 7.30 | | | | |
| 87/08/31 | 1220 | WATER | 59 | 18.0 | 17 | 26.6 | 195 | 5.3 | 7.30 | | | | |

/TYPE/AMOUNT/LTR/GAP

CHICKAMAUGA RESERVOIR
47.46 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040801
TENNESSEE RIVER 483.4C
131TVAC 06020001022 0009.050 ON
0007 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 | 00667 T KJEL C MG/L | 32211 CHLRPHYL A UG/L CORRECTD | 32212 CHLRPHYL B UG/L | 32213 CHLRPHYL C UG/L | 32216 PHECPHTN A UG/L | 01022 BORON B,TOT UG/L | 01027 CADMIUM CD,TOT UG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1200 | WATER | 1 | .03 | .04 | .01K | 4.4 | 12.30 | 1.20 | 2.10 | 1.00K | | |
| 87/07/27 | 1201 | WATER | 1 | .03 | .04 | .01K | 3.5 | 13.10 | 1.10 | 1.80 | 1.00K | | |
| 87/07/27 | 1205 | WATER | 3 | .04 | .04 | .01K | 3.6 | 13.65A | 1.60A | 2.45A | 1.30A | | |
| 87/07/27 | 1206 | WATER | 5 | | | | | | | | | | |
| 87/07/27 | 1210 | WATER | 10 | .04 | .04 | .01 | 3.3 | 11.75A | 1.45A | 2.20A | 2.00A | 50K | .1 |
| 87/07/27 | 1215 | WATER | 16 | .05 | .03 | .01K | 2.9 | 12.55A | 1.40A | 2.35A | 1.15A | | |
| 87/08/31 | 1200 | WATER | 1 | .13 | .01K | .01K | 1.4 | 5.45A | 1.00K | 1.00K | 1.45K | | |
| 87/08/31 | 1205 | WATER | 3 | .13 | .02 | .01K | 1.0 | 4.25A | 1.00K | 1.00K | 2.25A | | |
| 87/08/31 | 1207 | WATER | 5 | | | | | | | | | | |
| 87/08/31 | 1211 | WATER | 10 | .13 | .06 | .01K | 1.2 | 4.60A | 1.10K | 1.15K | 1.35A | 50K | .1K |
| 87/08/31 | 1215 | WATER | 16 | .13 | .02 | .01K | 1.2 | 4.40A | 1.00K | 1.00K | 1.85A | | |

/TYPE/NAME,ID/TRAN

475312 1035
35 12 45.0 085 15 29.0 2
CHICKAMAUGA RESERVOIR
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040901
TENNESSEE RIVER 483.40
1311TVAC 06020001022 0009.050 ON
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 | 84002 CODE GENERAL REMARKS | CODE LAB IDENT. NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1200 | WATER | 1 | | | | | 01 | 9588 |
| 87/07/27 | 1201 | WATER | 1 | | | | | 02 | 9589 |
| 87/07/27 | 1205 | WATER | 5 | | | | | | 9590 |
| 87/07/27 | 1210 | WATER | 9 | 1 | 1 | 60 | | | 9586 |
| 87/07/27 | 1210 | WATER | 10 | | | | | | 9591 |
| 87/07/27 | 1215 | WATER | 15 | | | | | | 9592 |
| 87/08/31 | 1200 | WATER | 1 | | | | 1.50 | | 11358 |
| 87/08/31 | 1205 | WATER | 5 | | | | | | 11359 |
| 87/08/31 | 1207 | WATER | 9 | 1K | 2 | 50K | | | 11351 |
| 87/08/31 | 1210 | WATER | 10 | | | | | | 11360 |
| 87/08/31 | 1215 | WATER | 15 | | | | | | 11361 |

/TYPE/AMBIENT/STREAM

477 52
35 13 25.0 085 07 17.0 2
SEQUOYAH NUCLEAR PLANT INTAKE POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040802
ADJACENT TO TENNESSEE RIVER 484.5
1317VAC 871024 06020001
0000 FEET DEPTH

| DATE FROM TO | TIME OF DAY | MEDIUM | DNR CD DEPTH (FT) | 00094 WSAMPLDC DEPTH METERS | 00002 HSAMPLDC & 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 TURBIDITY LAB NTU | 00605 ORG N N MG/L | 00610 NH3+NH4- N TOTAL MG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1122 | WATER | 1 | .3 | | 27.4 | 183 | 4.4 | 7.14 | | | | |
| 87/07/27 | 1123 | WATER | 3 | 1.0 | | 27.4 | 183 | 4.4 | 7.14 | | | | |
| 87/07/27 | 1124 | WATER | 7 | 2.0 | | 27.2 | 183 | 4.3 | 7.13 | | | | |
| 87/07/27 | 1125 | WATER | 13 | 4.0 | | 27.2 | 183 | 4.3 | 7.12 | | | | |
| 87/07/27 | 1125 | WATER | 16 | 5.0 | | | | | | | | | |
| 87/07/27 | 1126 | WATER | 20 | 6.0 | | 27.2 | 182 | 4.3 | 7.13 | | | | |
| 87/07/27 | 1127 | WATER | 26 | 8.0 | | 27.2 | 182 | 4.2 | 7.13 | | | | |
| 87/07/27 | 1128 | WATER | 33 | 10.0 | | 27.2 | 182 | 4.2 | 7.15 | | | | |
| 87/07/27 | 1129 | WATER | 36 | 10.9 | | 27.2 | 182 | 4.2 | 7.15 | | | | |
| 87/08/31 | 1038 | WATER | 1 | .3 | | 26.6 | 183 | | 7.32 | | | | |
| 87/08/31 | 1039 | WATER | 3 | 1.0 | | 26.6 | 183 | | 7.33 | | | | |
| 87/08/31 | 1040 | WATER | 7 | 2.0 | | 26.6 | 183 | | 7.33 | | | | |
| 87/08/31 | 1041 | WATER | 10 | 3.0 | | 26.5 | 183 | | 7.33 | | | | |
| 87/08/31 | 1042 | WATER | 16 | 5.0 | | 26.6 | 183 | | 7.33 | | | | |
| 87/08/31 | 1043 | WATER | 23 | 7.0 | | 26.6 | 183 | | 7.33 | | | | |
| 87/08/31 | 1044 | WATER | 30 | 9.0 | | 26.6 | 184 | | 7.33 | | | | |
| 87/08/31 | 1044 | WATER | 34 | 10.3 | | 26.6 | 183 | | 6.93 | | | | |

477052
35 13 26.0 085 18 17.0 2
SEQUOYAH NUCLEAR PLANT INTAKE POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040502
ADJACENT TO TENNESSEE RIVER 464.5
1311WAC 871024 06020001
0000 FEET DEPTH

| DATE FROM TO | TIME OF DAY | MEDIUM | SMK DP DEPTH (FT) | 00630 NO3&NO2-N TOTAL MG/L | 00665 PHOS-TOT MG/L P | 00666 PHOS-DIS MG/L P | T ORG C 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 870727 | 1125 | WATER | 16 | | | | | 2.80A | 1.00K | 1.00K | 1.20A | | |
| 870731 | 1042 | WATER | 14 | | | | | 4.40A | 1.00K | 1.00K | 1.20K | | |

/TYPA/AMB=I/STREAM

477552
35 13 2[illegible] 085 05 17.0 2
SEQUOYAH NUCLEAR PLANT INTAKE POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040802
ADJACENT TO TENNESSEE RIVER 484.5
131TVAC 871024 06020091
0000 FEET DEPTH

| 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 | 84602 CODE GENERAL REMARKS | 00038 LAB IDENT. NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1125 | WATER | 16 | | | | | | 9609 |
| 87/08/31 | 1042 | WATER | 16 | | | | | | 11371 |

/TYP=A/IND/TRATD/ELTFL/NONAM=/PIPE/IPPRMT

477.51
35 13 04.0 085 15 29.0 2
SEWBOYAR NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 0408C2
ADJACENT TO TENNESSEE RIVER 493.4
131TWAC 871024 06020001
0030 FEET DEPTH

| DATE FROM TO | TIME OF DAY | MEDIUM | SMK OR DEPTH (FT) | 00058 VSAMPLOC DEPTH METERS | 00002 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 | 1405 | WATER | 1 | .3 | | 28.2 | 183 | 5.4 | 7.20 | | | | |
| 87/07/27 | 1406 | WATER | 3 | 1.0 | | 28.1 | 183 | 5.2 | 7.20 | | | | |
| 87/07/27 | 1407 | WATER | 10 | 3.0 | | 28.2 | 184 | 5.1 | 7.10 | | | | |
| 87/07/27 | 1407 | WATER | 11 | 3.5 | | | | | | | | | |
| 87/07/27 | 1408 | WATER | 16 | 5.0 | | 27.9 | 183 | 4.9 | 7.10 | | | | |
| 87/07/27 | 1409 | WATER | 20 | 6.0 | | 27.8 | 184 | 4.8 | 7.10 | | | | |
| 87/08/31 | 1219 | WATER | 1 | .3 | | 26.7 | 182 | | 7.04 | | | | |
| 87/08/31 | 1220 | WATER | 3 | 1.0 | | 26.7 | 183 | | 7.07 | | | | |
| 87/08/31 | 1221 | WATER | 7 | 2.0 | | 26.7 | 183 | | 7.08 | | | | |
| 87/08/31 | 1222 | WATER | 10 | 3.0 | | 26.7 | 184 | | 7.09 | | | | |
| 87/08/31 | 1222 | WATER | 11 | 3.5 | | | | | | | | | |
| 87/08/31 | 1223 | WATER | 12 | 3.6 | | 26.7 | 183 | | 7.08 | | | | |

/TYPA/INC/IPCATD/CUTFL/NONAMR/PIPE/IMPCNT

477151
35 13 04.0 085 05 28.0 2
SEQUOYAH NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 060802
ADJACENT TO TENNESSEE RIVER 483.4
1311WAC 871024 06020001
0000 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 | 32218 PHECPHTN A UG/L | 01022 BORON B,TOT UG/L | 01027 CADMIUM CD,TOT UG/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1405 | WATER | 1 | | | | | | | | | | 50K | .3 |
| 87/07/27 | 1407 | WATER | 11 | | | | | | 2.70A | 1.00K | 1.10K | 1.65A | | |
| 87/08/31 | 1219 | WATER | 1 | | | | | | | | | | 50K | .1K |
| 87/08/31 | 1222 | WATER | 11 | | | | | | 4.50A | 1.00K | 1.00K | 1.80A | | |

/TYPA/INC/TRIATO/CUTFL/AMAMA/PIPE/IMPONT

477.51
35 13 04.0 085 15 24.0 2
SEQUOYAH NUCLEAR PLANT DIFFUSER POND
47065 TENNESSEE HAMILTON
TENNESSEE RIVER BASIN 040802
ADJACENT TO TENNESSEE RIVER 483.4
1511TVAC 871024 06020001
0008 FEET DEPTH

| 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 | C0008 LAB IDENT. NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| 87/07/27 | 1405 | WATER | 1 | 4 | 4 | 110 | | | 9587 |
| 87/07/27 | 1417 | WATER | 11 | | | | | | 9608 |
| 87/09/31 | 1215 | WATER | 1 | 1 | 2 | 50K | | | 11352 |
| 87/09/31 | 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 Pond | 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 | 5675240 | 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 | 33008 | 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)

| Depth (M) | Sample 1 | Sample 2 | Mean | STD | CV | Sample 1 | Sample 2 | Mean | STD | CV |
|---|---|---|---|---|---|---|---|---|---|---|
| | TRM 483.4 | | | | | TRM 484.5 | | | | |
| | | | | 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 | 81419 | 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 | 46211 | 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 Data | Total Phytoplankton | Chlorophyta | Chrysophyta | Cyanophyta |
| July 1987 | | | | |
| Station | 0.0792 | 0.2703 | 0.7060 | 0.0008* |
| Depth | 0.0502* | 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* | - | 0.0008 | - | 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 483.4 | 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. X 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 | 153 | 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 | 307 | 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 (spiral) | 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 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 |
|---|---|---|---|---|---|---|---|---|
| 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 | 1.46 | 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.[illegible] | 7 | 3.50 | 1.30 | 1.48 |
| | 2 | 4.00 | 1.[illegible] | 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* | P>F 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: 08:08 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 | |
| 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): 484.5
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 | 41.00 | 0.512 | |
| 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: 08:08 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 | |

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 | Survey Date: 08/31/87
Lake Elevation: ----- | Time Collected: 0950
Collector: RNB/NWM | Start Analyses (Time): 1315
Analyst: JDR | 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 @ (mg/m³) = 5.5 |
| 1.0 | 3.2 | 10.00 | 7.4 | 10.00 | 10.11 | 23.38 | 0.568 | -Corrected Chloro @ (mg/m³) = 4.3 |
| 3.0 | 2.8 | 10.00 | 7.2 | 10.00 | 8.85 | 22.75 | 0.611 | -Corrected Chloro @ (mg/m³) = 4.8 |
| 5.0 | 3.0 | 10.00 | 7.4 | 10.00 | 9.48 | 23.38 | 0.595 | -Corrected Chloro @ (mg/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 | Survey Date: 08/31/87
Lake Elevation: ----- | Time Collected: 1100
Collector: RNB/NWM | Start Analyses (Time): 1520
Analyst: JDR | 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 @ (mg/m³) = 4.9 |
| 1.0 | 3.8 | 10.00 | 3.0 | 3.16 | 12.01 | 30.00 | 0.600 | -Corrected Chloro @ (mg/m³) = 5.3 |
| 3.0 | 3.3 | 10.00 | 7.8 | 10.00 | 10.43 | 24.65 | 0.577 | -Corrected Chloro @ (mg/m³) = 5.1 |
| 5.0 | 3.1 | 10.00 | 7.9 | 10.00 | 9.80 | 24.96 | 0.608 | -Corrected Chloro @ (mg/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/NWM
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 Chloro â (mg/m³) = 4.8 |
| 5.0 | 2.6 | 10.00 | 6.4 | 10.00 | 8.22 | 20.22 | 0.594 | -Corrected Chloro â (mg/m³) = 4.0 |
| 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 | 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): DIFFUSER
Lake Elevation: -----
Collector: RNB/NWM
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 |
|---|---|---|---|---|---|---|---|---|
| 2.5 | 2.4 | 10.00 | 6.4 | 10.00 | 7.58 | 20.22 | 0.625 | -Correcte-Corrected Chloro â (mg/m³) = 4.5 |
| 3.5 | 2.8 | 10.00 | 6.2 | 10.00 | 8.85 | 19.59 | 0.548 | -Correcte-Corrected Chloro â (mg/m³) = 4.5 |
| 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 | |

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 | 12705 | 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 urceclaris | 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.

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

JAN 29 1988

Mr. Ralph M. Sinclair
Manager, Permit Section
Division of Water Pollution Control
Tennessee Department of Health
and Environment
TERRA Building
150 Ninth Avenue North
Nasvhille, Tennessee 37219-5404

Dear Mr. Sinclair:

SEQUOYAH NUCLEAR PLANT (SQN) - NPDES PERMIT NO. TN0026450 - PLANKTON STUDIES

As committed to in the May 27, 1987, letter from Martin E. Rivers to you, enclosed is the annual status report on plankton studies at SQN. In addition to reporting the 1986 data, we have also incorporated results of our 1987 plankton sampling. Recommendations for future plankton investigations are contained in this report.

Sincerely,

for Ralph H. Brooks, Director
Environmental Quality

Enclosure
cc (Enclosure):
Mr. Billy H. Adams, Chief
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for Inspection Programs
TVA Projects Division
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