Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

August 26, 2005

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT - NPDES PERMIT NO. TN0026450 BIOCIDE/CORROSION TREATMENT APPROVED PLAN CHANGE

The enclosure provides the approved changes to SQN NPDES Permit No. TN0026450 Biocide/Corrosion Treatment Plan as required by SQN Environmental Technical Specification Section 5.5.2, Changes in Permits and Certifications.

If you have any questions concerning this matter, please call me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

for

P. L. Pace
Manager, Site Licensing and
Industry Affairs

Enclosure

E001

ENCLOSURE

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT (SQN)

NPDES PERMIT NO. TN0026450 BIOCIDE/CORROSION TREATMENT PLAN APPROVED CHANGE

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243-1534

July 29, 2005

Mr. J. Randy Douet
Site Vice President
TVA - Sequoyah Nuclear Plant
SB 2A, Sequoyah Access Road, P.O. Box 2000
Soddy Daisy, TN 37384-2000

Subject: **NPDES Permit No. TN0026450**
TVA - Sequoyah Nuclear Plant
Soddy Daisy, Hamilton County, Tennessee

Dear Mr. Douet:

In accordance with the provisions of the Tennessee Water Quality Control Act, Tennessee Code Annotated, Sections 69-3-101 through 69-3-120, the Division of Water Pollution Control hereby issues the enclosed NPDES Permit. The continuance and/or reissuance of this NPDES Permit is contingent upon your meeting the conditions and requirements as stated therein.

Please be advised that you have the right to appeal any of the provisions established in this NPDES Permit, in accordance with Tennessee Code Annotated, Section 69-3-110, and the General Regulations of the Tennessee Water Quality Control Board. If you elect to appeal, you should file a petition within thirty (30) days of the receipt of this permit.

If you have questions, please contact the division at the Chattanooga Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Ms. Pamala Myers at (615) 532-0654 or by E-mail at *Pamala.Myers@state.tn.us*.

Sincerely,

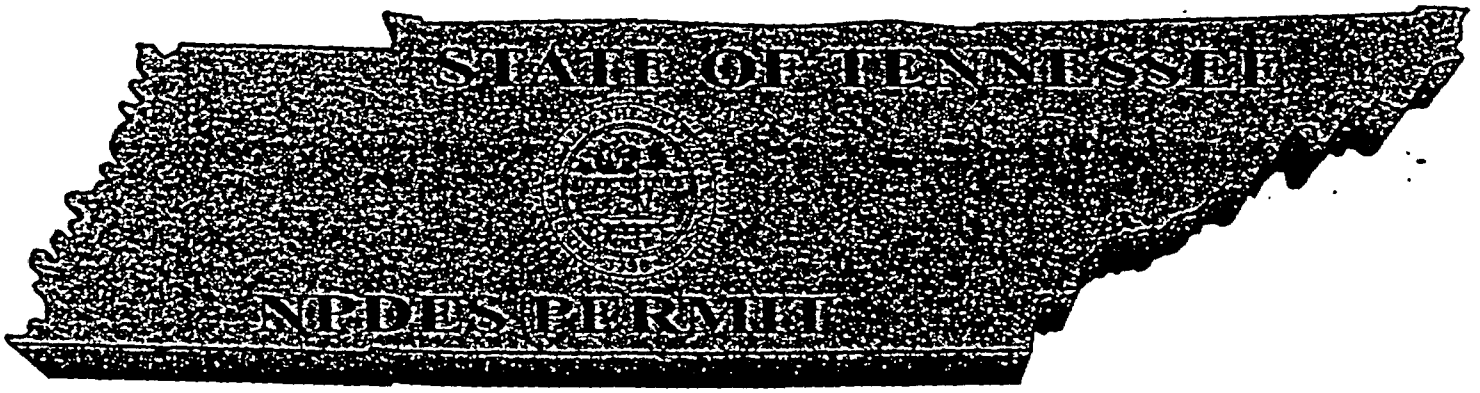
Edward M. Polk, Jr.

Edward M. Polk, Jr., P.E.
Manager, Permit Section
Division of Water Pollution Control

EMP/pm
P/WAT-3

Enclosure

cc: DWPC, Permit Section & Chattanooga Environmental Field Office
Ms. Stephanie Howard Environmental Engineer, TVA - Sequoyah Nuclear Plant, SB 2A, Sequoyah Access Road, P.O. Box 2000, Soddy Daisy, TN 37384
Ms. Ann Hurt, Environmental Engineer, TVA - Sequoyah Nuclear Plant, SB 2A, Sequoyah Access Road, P.O. Box 2000, Soddy Daisy, TN 37384
Ms. Connie A. Kagey, EPA Region IV, Sam Nunn Atlanta Federal Center, NPDES Permit Section, 61 Forsyth Street SW, Atlanta, GA 30303-3104



No. TN0026450

Authorization to discharge under the
National Pollutant Discharge Elimination System (NPDES)

Issued By

Tennessee Department of Environment and Conservation
Division of Water Pollution Control
401 Church Street
6th Floor, L & C Annex
Nashville, Tennessee 37243-1534

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger:	**TVA - Sequoyah Nuclear Plant**
is authorized to discharge:	**process and non-process wastewater through Outfalls 101, 103, 107, 110, 116, 117 and 118**
from a facility located:	**in Soddy Daisy, Hamilton County, Tennessee**
to receiving waters named:	**Tennessee River at mile 483.65 (Outfall 101), 484.85 (Outfall 116), 485.2 (Outfall 117), and 484.8 (Outfall 118)**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on:	**September 1, 2005**
This permit shall expire on:	**July 28, 2009**
Issuance date:	**July 29, 2005**

Edward M. Polk Jr.
for Paul E. Davis, Director
Division of Water Pollution Control

PART I

PAGE

PART II

APPENDICES

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

TVA - Sequoyah Nuclear Plant is authorized to discharge process and non-process wastewater through Outfall 101 to the Tennessee River at mile 483.65.

The discharge shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS

OUTFALL 101

Condenser Circulating Water, Essential Raw Cooling Water, Cooling Tower Blowdown, Raw Cooling Water, Low Volume Wastes, Metal Cleaning Waste, Sanitary Wastewater, Miscellaneous Low Volume Wastes, Including Various Facilities Drains and Sumps, A/C Condensate, Steam Generator Blowdown, High Pressure Fire Protection water, Regeneration Wastes From Condensate Demineralizer, and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	Monthly Average		Daily Maximum		Measurement Frequency	Sample Type
FLOW	–		Report (MGD)		Continuous	Recorder [1,2]
AMBIENT TEMP.	–		Report (Deg.C)		Continuous	Calculate [1,2]
RIVER TEMP.	–		30.5 Deg.C		Continuous	Modeled [1,2]
CHLORINE (Ttl.Res.)	0.10	–	0.10	–	5/Week	Calculate [2,4,5]
PCB's	NO DISCHARGE		NO DISCHARGE		Annually	Grab
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Week	Grab [4]
OIL AND GREASE	15	–	20	–	1/Month	Grab
TSS	30	–	100	–	1/Month	Grab
BORON, Total (as B)	Report		–		1/Quarter	Grab
IC25	Survival, Reproduction, & Growth In 45.2% Effluent				See Permit and Note [2]	Composite [3]

[1] Samples taken in compliance with the monitoring requirements specified above shall be taken as follows: Flow - sampled at diffuser gate prior to entry to the Tennessee River; Ambient Temperature - river side of the plant intake skimmer wall; River Temperature - river temperature , temperature rise, and rate of temperature change shall be determined by numerical model.

[2] See text below table for further information that applies to this outfall (101). WET testing frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP; monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or the electronic "Deemers" report (if being used) to reflect that monitoring is not required.

[3] See part III for further description of toxicity tests.

[4] pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.

[5] Total Residual Chlorine (TRC) monitoring shall be applicable when chlorine, bromine, or any other oxidants are added. The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/L unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit.

The following requirements also apply to discharges from Outfall 101:

- Compliance with the river limitations (river temperature, temperature rise, and rate of temperature change) shall be monitored by means of a numerical model that solves the thermohydrodynamic equations governing the flow and thermal conditions in the reservoir. This numerical model will utilize measured values of the upstream temperature profile and river stage; flow, temperature and performance

characteristics of the diffuser discharge; and river flow as determined from releases at the Watts Bar and Chickamauga Dams. In the event that the modeling system described here is out of service, an alternate method will be employed to measure water temperatures at least one time per day and verify compliance of the maximum river temperature and maximum temperature rise. Depth average measurements can be taken at a backup temperature monitor at the downstream end of the diffuser mixing zone (left bank Tennessee River mile 483.4) or by grab sampling from boats. Boat sampling will include average 5-foot depth measurements (average of 3, 5, and 7-foot depths). Sampling from a boat shall be made outside the skimmer wall (ambient temperature) and at quarter points and mid-channel at Tennessee River mile 483.4 (downstream temperature). The downstream reported value will be a depth (3, 5, and 7 foot) and lateral (quarter points and midpoint) average of the instream measurements. Monitoring in the alternative mode using boat sampling shall not be required when unsafe boating conditions occur.

- Compliance with river temperature, temperature rise, and rate of temperature change limitations shall be applicable at the edge of a mixing zone which shall not exceed the following dimensions: (1) a maximum length of 1500 feet downstream of the diffusers, (2) a maximum width of 750 feet, and (3) a maximum length of 275 feet upstream of the diffusers. The depth of the mixing zone measured from the surface varies linearly from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes and extends to the bottom downstream of the diffusers. When the plant is operated in closed mode, the mixing zone shall also include the area of the intake forebay.
- Information required by the numerical model and evaluations for the river temperature, temperature rise, and rate of temperature change shall be made every 15 minutes. The ambient temperature shall be determined at the 5-foot depth as the average of measurements at depths 3 feet, 5 feet, and 7 feet. The river temperature at the downstream end of the mixing zone shall be determined as that computed by the numerical model at a depth of 5 feet.
- Daily maximum temperatures for the ambient temperature, the river temperature at the downstream edge of the mixing zone, and temperature rise shall be determined from 24-hour average values. The 24-hour average values shall be calculated every 15 minutes using the current and previous ninety-six 15-minute values, thus creating a 'rolling' average. The maximum of the ninety-six observations generated per day by this procedure shall be reported as the daily maximum value. For the river temperature at the downstream edge of the mixing zone, the 1-hour average shall also be determined. The 1-hour average values shall be calculated every 15 minutes using the average of the current and previous four 15-minute values, again creating a rolling average.
- The daily maximum 24-hour average river temperature is limited to 30.5°C. Since the state's criteria makes exception for exceeding the value as a result of natural conditions, where the 24-hour average ambient temperature exceeds 29.4°C and the plant is operated in helper mode (full operation of one cooling tower, at least three lift pumps, per operating unit) the maximum temperature may exceed 30.5°C. In no case shall the plant discharge cause the 1-hour average river temperature at the downstream edge of the mixing zone to exceed 33.9°C without the consent of the permitting authority.
- The temperature rise is the difference between the 24-hour average ambient river temperature and the 24-hour average temperature at the downstream edge of the

mixing zone. The 24-hour average temperature rise shall be limited to 3.0 C° during the months of April through October. The 24-hour average temperature rise shall be limited to 5.0 C° during the months of November through March.

- The rate of temperature change shall be computed at 15-minute intervals based on the current 24-hour average ambient river temperature, current 24-hour average river flow, and current 15-minute values of flow and temperature of water discharging through the diffuser pipes. The 1-hour average rate of temperature change shall be calculated every 15-minutes by averaging the current and previous four 15-minute values. The 1-hour average rate of temperature change shall be limited to 2 C° per hour.
- During periods when the Essential Raw Cooling Water (ERCW) and/or Raw Cooling Water (RCW) systems are receiving applications of biocides, (oxidizing or non-oxidizing), chemical dispersants, or detoxicant chemical additives, the permittee shall implement the Biocide/Corrosion Treatment Plan (B/CTP), which was approved April 27, 2005, and all subsequent revisions as approved by the Division. The B/CTP [plan] for these activities describes the specific chemical additive, material feed rate, method detection level (MDL) for the active compound(s), and the allowable concentration and/or mass limits, and actions proposed to ensure compliance with established effluent limitations during application. The B/CTP refers to the NPDES permit for specific language associated with monitoring Total Residual Chlorine (TRC). Note: the term TRC will encompass all references to any oxidants (i.e. chlorine/bromine) in use at the SQN facility, therefore, the acronym "TRO" may be used interchangeably. WET frequency and results reporting will be governed by the B/CTP. The permit table for Outfall 101 will state that WET testing frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP; monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or the electronic "Deemers" report (if being used) to reflect that monitoring is not required.

- Total Residual Chlorine shall be sampled downstream of the chlorine injection points but prior to mixing with any other waste streams. TRC shall be calculated for the diffuser discharge (Outfall 101) based on these analyses and the proportional flows of the Condenser Circulating Water (CCW), ERCW, and RCW systems to indicate whether permit limits may be in danger of being exceeded. This calculation is a simple dilution calculation to project the maximum amount of chlorine that could be present at the discharge. The calculation will not allow for the decay of residual chlorine. If the CCW system is to be chlorinated or chlorination of the ERCW and/or RCW system is to occur while none of the units are discharging flow from the CCW system (i.e. zero CCW pumps in service), the B/CTP shall be revised and submitted to the Division for approval prior to initiation of the changes.

(Continue on next page.)

TVA-Sequoyah Nuclear Plant is authorized to discharge wastewater from the Low Volume Waste Treatment Pond through an internal monitoring point, Outfall 103 discharges into the Diffuser Pond, which finally discharges through Outfall 101.

This discharge shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS
Outfall 103
This is an internal monitoring point.
Condensate Demineralizer (CON DI), Turbine Building Sump, Treated Metal Cleaning Waste from Outfall 107, Essential Raw Cooling water, Raw Cooling water and Storm Water Runoff

EFFLUENT CHARACTERISTICS	PROBABILITY EFFLUENT LIMITATIONS (PELS)				MONITORING REQUIREMENTS	
	AVERAGE MONTHLY DISCHARGE		MAXIMUM DAILY DISCHARGE			
	Quantity	Concentration	Quantity	Concentration		
FLOW	Report (MGD)		Report (MGD)		Recorder	Totalizer
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		3/Week	Grab
OIL AND GREASE	15	190	20	250	1/Week	Grab
TSS	30	380	100	1250	1/Week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Treatment Pond discharge prior to mixing with other waste streams.

Note: In the event that the Turbine Building Sump is discharged directly to the CCW Channel or the yard drainage pond, TSS, Oil and Grease, and pH shall be monitored 5/Week.

TVA-Sequoyah Nuclear Plant is authorized to discharge metal cleaning wastewater and storm water from two wastewater ponds through an internal monitoring point, Outfall107 that discharges into the Low Volume Waste Treatment Pond (Outfall103).

This discharge shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS
Outfall 107
This is an internal monitoring point.
Metal Cleaning Wastewater and Storm Water Runoff to LVWTP (Outfall 103).

EFFLUENT CHARACTERISTICS	PROBABILITY EFFLUENT LIMITATIONS (PELS)				MONITORING REQUIREMENTS	
	AVERAGE MONTHLY DISCHARGE		MAXIMUM DAILY DISCHARGE			
	Quantity	Concentration	Quantity	Concentration		
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Day	Grab
OIL AND GREASE	--	--	15	--	1/Day	Grab
TSS	--	--	30	--	1/Day	Composite
COPPER (T)	--	--	1.0	--	1/Day	Composite
IRON (T)	--	--	1.0	--	1/Day	Composite
PHOSPHOROUS (P) [1]	--	--	1.0	--	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge from the individual pond(s) prior to mixing with any other waste stream.

[1] Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

Specific requirements for Outfall 107 include: In the event that metal-cleaning wastes must be processed through the liquid radwaste system, the limitations and monitoring requirements for Outfall 107 shall apply to the discharge from the liquid radwaste system prior to mixing with Cooling Tower Blowdown. The Division of Water Pollution Control shall be given notification of whether permit limits were met of such discharges through attachment of a report to the Discharge Monitoring Report (DMR).

TVA - Sequoyah Nuclear Plant is authorized to discharge backwash wastewater through Outfall 110, to the cooling channel and intake forebay. Note that Outfall 110 is not normally used in day-to-day operations of the plant. However, should conditions apply that require its use as the main discharge point in place of Outfall 101 the same requirements of Outfall 101 shall apply to Outfall 110 in addition to its normal limitations.

PERMIT LIMITS

OUTFALL 110

Condenser Circulating Water, Essential Raw Cooling Water, Raw Cooling Water, and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	30 DAYS MONTHLY AVG		7 DAYS DAILY MAX			
	AVG CONC	AVG AMOUNT	MAX CONC	MAX AMOUNT	FREQUENCY	SAMPLE TYPE
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/7	Grab
TEMPERATURE	--	--	38.3 Deg. C		1/Day	Multi Grabs **
CHLORINE (Total Residual)	--	--	0.10	--	1/7 *	Multi Grabs **

- Limitations and monitoring requirements are applicable only during periods of closed-mode operation.
- There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and/or other floating matter in other than trace amounts.
- Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): recycled cooling water flow prior to entering the Intake Forebay.

* Monitoring frequency shall be increased to 1/Day mutiple grab anay time the discharge is occuring and fish distress or fatality is observed in the Intake Forebay.

** Multiple Grabs shall consist of four grab samples collected during one shift each day.

TVA - Sequoyah Nuclear Plant is authorized to discharge backwash wastewater through Outfall 116 to the Tennessee River at mile 485.2 and through Outfall 117 to the Tennessee River at mile 484.85.

These discharges shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS

OUTFALLS 116 and 117
Outfall 116: Backwash from the Intake of the Condenser CirculatingWater
Outfall 117: Backwash from the Intake of the Essential Raw Cooling Water (ERCW) System

These discharges are permitted without chemical monitoring requirements.

There shall be no discharge of floating materials other than those previously present in the intake water.

The discharge shall not have a visible oil sheen.

The discharges shall be under the Best Management Practices to control trash and debris.

TVA - Sequoyah Nuclear Plant is authorized to discharge settling pond water and storm water runoff through Outfall 118 to the intake forebay at Tennessee River mile 484.8.

These discharges shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS

OUTFALL 118
Settling Pond for Dredged Material from Intake Forebay
(Only applicable when the pond is in service)

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING	
	MONTHLY AVG	DAILY MAX	MONTHLY AVG	DAILY MAX	SAMPLE FREQUENCY	SAMPLE TYPE
FLOW	Report (MGD)		Report MGD		1/Batch	Estimate
SETTLEABLE SOLIDS	--	--	1.0 ml/l	--	1/30	Grab [1]
TSS	--	--	100	--	2/7	Grab [1]
Dissolved Oxygen	--	--	2.0 Minimum	--	2/7	Grab [1]

There shall be no discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken of a discharge from the settling pond prior to mixing with the Intake Forebay.

[1] Grab samples shall be taken at these frequencies, including a grab sample to be taken immediately proir to termination of the batch discharge.

These effluent limitations and monitoring requirements only apply at times when this settling pond is in use as settling basin for dredged sediment. Best management practices shall be used to control runoff from the pond. Examples include vegetative cover, silt fences, and/or hay bales.

Additional monitoring requirements and conditions applicable to all Outfalls include:

Flow shall be reported in Million Gallons per Day (MGD)

No discharge of polychlorinated biphenyl compounds (PCB) is allowed under this permit.

There shall be no distinctly visible floating scum, solids, oil sheen, visible foam, and other floating matter discharged with the wastewater to the receiving stream. The wastewater discharge must not cause an objectionable color contrast in the receiving stream.

The wastewater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

Sludge or any other material removed by any treatment works must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required unless making application for new NPDES permit.

B. MONITORING PROCEDURES

1. Representative Sampling

Samples and measurements taken in compliance with the monitoring requirements specified herein shall be representative of the volume and nature of the monitored discharge, and shall be taken after treatment and prior to mixing with uncontaminated storm water runoff or the receiving stream.

2. Sampling Frequency

Where the permit requires sampling and monitoring of a particular effluent characteristic(s) at a frequency of less than once per day or daily, the permittee is precluded from marking the "No Discharge" block on the Discharge Monitoring Report if there has been any discharge from that particular outfall during the period which coincides with the required monitoring frequency, i.e. if the required monitoring frequency is once per month or 1/month, the monitoring period is one month, and if the discharge occurs during only one day in that period then the permittee must sample on that day and report the results of analyses accordingly.

3. Test Procedures

a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.

b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR, Part 136, as amended, and promulgated pursuant to Section 304 (h) of the Act.

c. The acceptable methods for analysis of TRC are any methods specified in Title 40, CFR Part 136. The method detection level (MDL) for TRC shall not exceed 0.05mg/L unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies

the higher MDL, and shall have that documentation available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit.

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date and time of sampling;

b. The exact person(s) collecting samples;

c. The dates and times the analyses were performed;

d. The person(s) or laboratory who performed the analyses;

e. The analytical techniques or methods used, and;

f. The results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Division of Water Pollution Control.

C. DEFINITIONS

The ***Daily Maximum Concentration*** is a limitation on the average concentration, in milligrams per liter (mg/L), of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

The ***Monthly Average Concentration***, a limitation on the discharge concentration, in milligrams per liter (mg/L), is the arithmetic mean of all daily concentrations determined in a one-month period. For the purpose of this definition, a frequency of 2/Month is representative of 2 separate daily samples, each sample having been collected on a separate day during the monitoring period.

The ***Monthly Average Amount***, a discharge limitation measured in pounds per day (lb/day), is the total amount of any pollutant in the discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by a permit, the monthly average amount shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made. For the purpose of this definition, a frequency of 2/Month is representative of 2 separate daily samples, each sample having been collected on a separate day during the monitoring period.

The ***Daily Maximum Amount***, is a limitation measured in pounds per day (lb/day), on the total amount of any pollutant in the discharge by weight during any calendar day.

The ***Instantaneous Concentration*** is a limitation on the concentration, in milligrams per liter (mg/L), of any pollutant contained in the discharge determined from a grab sample taken at any point in time.

For the purpose of this permit a ***Totalizer*** is a device or meter that continuously measures and calculates (adds) total flows in gallons, million gallons, cubic feet, or some other unit of volume measurement.

For the purposes of this permit, a ***Composite Sample**** for non-storm water discharges is a sample composed of equal aliquots collected at the rate of at least once per hour at regular time intervals over the period of discharge in a 24-hour period and combined into a single sample. A composite sample may also be a sample collected continuously over a period of 24 hours at a rate proportional to the flow. (*Except for sampling associated with Biomonitoring; use procedures for sampling from EPA-821-R-02-013, or most current edition.)

Continuous Discharge: A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

For the purpose of this permit a ***Recorder*** is a device that makes a graph or other automatic record of the stage, pressure, depth, velocity, or the movement or position of water controlling devices, usually as a function of time.

A ***Grab Sample***, for the purposes of this permit, is defined as a single effluent sample of at least 100 milliliters collected over a period not exceeding 15 minutes. The sample(s) shall be collected at the period(s) most representative of the total discharge.

For the purpose of this permit, a ***Calendar Day*** is defined as any 24-hour period.

For the purpose of this permit, a ***Quarter*** is defined as any one of the following three month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, or October 1 through December 31..

For the purpose of this permit, ***Semi-annually*** means the same as "once every six months." Measurements of the effluent characteristics concentrations may be made anytime during a 6 month period beginning from the issuance date of this permit so long as the second set of measurements for a given 12 month period are made approximately 6 months subsequent to that time, if feasible.

For the purpose of this permit, ***Annually*** is defined as a monitoring frequency of once every twelve (12) months beginning with the date of issuance of this permit so long as the following set of measurements for a given 12 month period are made approximately 12 months subsequent to that time.

D. REPORTING

1. Monitoring Results

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) forms supplied by the Division of Water Pollution Control or comparable forms provided by the permittee, and approved by the Division of Water Pollution Control. Submittals shall be postmarked no later than 15 days after the completion of the reporting period. The top two copies of each report are to be submitted. A copy should be retained for the permittee's files. DMRs and any communication regarding compliance with the conditions of this permit must be sent to:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
COMPLIANCE REVIEW SECTION
401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243-1534**

The first DMR is due on the fifteenth of the month following permit effectiveness.

DMRs and any other information or report must be signed and certified by a responsible corporate officer as defined in 40 CFR 122.22, a general partner or proprietor, or a principal municipal executive officer or ranking elected official, or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

The electronic submission of DMRs shall be accepted only if approved in writing by the division. For purposes of determining compliance with this permit, data submitted in electronic format is legally equivalent to data submitted on signed and certified DMR forms.

2. Additional Monitoring by Permittee

If the permittee monitors any pollutant specifically limited by this permit more frequently than required at the location(s) designated, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

3. Falsifying Reports

Knowingly making any false statement on any report required by this permit may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

4. Outlier Data

Outlier data include analytical results that are probably false. The validity of results is based on operational knowledge and a properly implemented quality assurance program. False results may include laboratory artifacts, potential sample tampering, broken or suspect sample containers, sample contamination or similar demonstrated quality control flaw.

Outlier data are identified through a properly implemented quality assurance program, and according to ASTM standards (e.g. Grubbs Test, 'h' and 'k' statistics). Furthermore, outliers should be verified, corrected, or removed, based on further inquiries into the matter. If an outlier was verified (through repeated testing and/or analysis), it should remain in the preliminary data set. If an outlier resulted from a transcription or similar clerical error, it should be corrected and subsequently reported.

Therefore, only if an outlier was associated with problems in the collection or analysis of the samples, and as such does not conform with the Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR §136), it can be removed from the data set and not reported on the Discharge Monitoring Report forms (DMRs). Otherwise, all results (including monitoring of pollutants more frequently than required at the location(s) designated, using approved analytical methods as specified in the permit) should be included in the calculation

and reporting of the values required in the DMR form. The permittee is encouraged to use "comment" section of the DMR form (or attach additional pages), in order to explain any potential outliers or dubious results.

E. SCHEDULE OF COMPLIANCE

Full compliance and operational levels shall be attained from the effective date of this permit.

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of Water Pollution Control (the "Director") no later than 180 days prior to the expiration date. Such applications must be properly signed and certified.

2. Right of Entry

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;

b. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and

c. To sample at reasonable times any discharge of pollutants.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Pollution Control. As required by the Federal Act, effluent data shall not be considered confidential.

4. Proper Operation and Maintenance

a. The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and

process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.

b. Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and or other technology-based effluent limitations such as those in State of Tennessee Rule 1200-4-5-.03.

5. Treatment Facility Failure

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility, until the facility is restored or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

8. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

2. Permit Modification, Revocation, or Termination

a. This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.

b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

c. If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.

d. The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.

3. Change of Ownership

This permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect the permit limits and conditions contained in the permit) by the permittee if:

a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittee's containing a specified date for transfer of permit responsibility, coverage, and liability between them; and

c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, its operations, or any other changes which might affect the permit limits and conditions contained in the permit.

4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Pollution Control in the appropriate Environmental Assistance Center within 24-hours from the time the permittee becomes aware of the circumstances. (The Environmental Assistance Center should be contacted for names and phone numbers of environmental response personnel).

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

i. A description of the discharge and cause of noncompliance;

ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a. above, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

3. Overflow

a. "***Overflow***" means the discharge to land or water of wastes from any portion of the collection, transmission, or treatment system other than through permitted outfalls.

b. Overflows are prohibited.

c. The permittee shall operate the collection system so as to avoid overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system.

d. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Assistance Center. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

e. In the event that more than five (5) overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Pollution Control EAC staff to petition for a waiver based on mitigating evidence.

4. Upset

a. "***Upset***" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the permittee can identify the cause(s) of the upset;

ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;

iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and

iv. The permittee complied with any remedial measures required under "Adverse Impact."

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6. Bypass

a. "***Bypass***" is the intentional diversion of wastewater away from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which would cause them to become inoperable, or substantial and permanent loss of natural resources, which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypasses are prohibited unless the following 3 conditions are met:

i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There are not feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, which occurred during normal periods of equipment down time or preventative maintenance;

iii. The permittee submits notice of an unanticipated bypass to the Division of Water Pollution Control in the appropriate environmental assistance center within 24-hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the Director, if possible, at least 10 days before the date of the bypass.

c. Bypasses not exceeding limitations are allowed <u>only</u> if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 6.b.iii, above.

7. Washout

a. For domestic wastewater plants only, a "***washout***" shall be defined as loss of Mixed Liquor Suspended Solids (MLSS) of 30.00% or more. This refers to the MLSS in the aeration basin(s) only. This does not include MLSS decrease due to solids wasting to the sludge disposal system. A washout can be caused by improper operation or from peak flows due to infiltration and inflow.

b. A washout is prohibited. If a washout occurs, the permittee must report the incident within 24-hours by telephone to the Division of Water Pollution Control in the appropriate Environmental Assistance Center. A written submission must be provided within 5 days. The washout must be noted on the discharge monitoring report. Each day of a washout is a separate violation.

D. LIABILITIES

1. Civil and Criminal Liability

Except as provided in permit conditions for "**Bypassing,**" "**Overflow,**" and "**Upset,**" nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

PART III

OTHER REQUIREMENTS

A. TOXIC POLLUTANTS

The permittee shall notify the Division of Water Pollution Control as soon as it knows or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. One hundred micrograms per liter (100 ug/l);

   b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   c. Five (5) times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 122.21(g)(7); or

   d. The level established by the Director in accordance with 122.44(f).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. Five hundred micrograms per liter (500 ug/l);

   b. One milligram per liter (1 mg/L) for antimony;

   c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 122.21(g)(7); or

   d. The level established by the Director in accordance with 122.44(f).

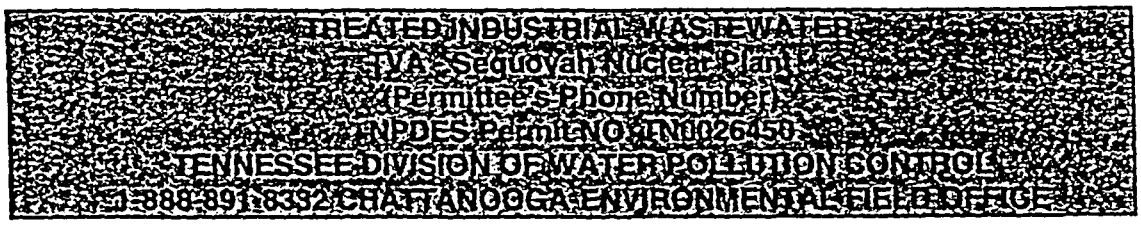
B. REOPENER CLAUSE

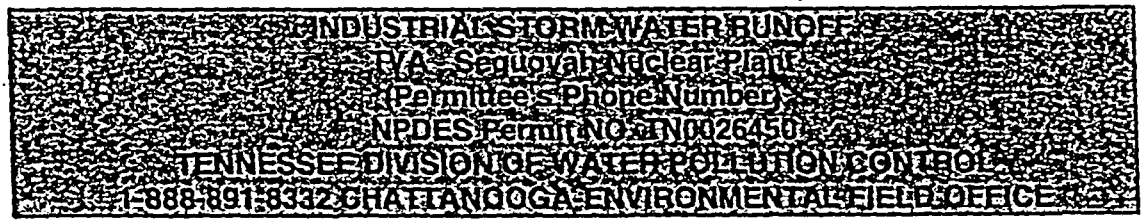
If an applicable standard or limitation is promulgated under Sections 301(b)(2)(C) and (D), 304(B)(2), and 307(a)(2) and that effluent standard or limitation is more stringent than any effluent limitation in the permit or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked and reissued to conform to that effluent standard or limitation.

C. PLACEMENT OF SIGNS

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign(s) at each outfall and any bypass/overflow point in the collection system. For the purposes of this requirement, any bypass/overflow point that has discharged five (5) or more times in the last year must be so posted. The sign(s) should be clearly visible to the public from the bank and the receiving stream or from the nearest public property/right-of-way, if applicable. The minimum sign size should be two feet by two feet (2' x 2') with one inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Pollution Control. The following is given as an example of the minimal amount of information that must be included on the sign:





D. ANTIDEGRADATION

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06, titled "Tennessee Antidegradation Statement," and in consideration of the Department's directive in attaining the greatest degree of effluent reduction achievable in municipal, industrial, and other wastes, the permittee shall further be required, pursuant to the terms and conditions of this permit, to comply with the effluent limitations and schedules of compliance required to implement applicable water quality standards, to comply with a State Water Quality Plan or other State or Federal laws or regulations, or where practicable, to comply with a standard permitting no discharge of pollutants.

E. BIOMONITORING REQUIREMENTS, CHRONIC

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow *(Pimephales promelas)* Larval Survival and Growth Test on samples of final effluent from Outfall 101. Sampling shall be representative of the discharges made. The permittee shall try to arrange some samples for the biomonitoring testing to coincide with the intermittent application of chemicals so that there are toxicity test results that reflect seasonal variations in chemical treatments.

The measured endpoint for toxicity shall be the inhibition concentration causing 25% reduction (IC25) in survival, reproduction, or growth of the test organisms. The IC25 shall be determined based on a 25% reduction as compared to the controls. The average reproduction and growth responses shall be determined based on the number of Ceriodaphnia dubia or Pimephales promelas larvae used to initiate the test. A separate statistical analysis based on survival information is not required.

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
100% Effluent	(100+PL)/2	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
100	72.6	45.2	22.6	11.3	0

The dilution/control water used will be a moderately hard water as described in Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013 (or the most current edition). Results from a chronic standard reference toxicant quality assurance test for each species tested shall be submitted with the discharge monitoring report. Reference toxicant tests shall be conducted as required in EPA-821-R-02-013 (or the most current edition). Additionally, the analysis of this multi-concentration test shall include review of the concentration-response relationship to ensure that calculated test results are interpreted appropriately.

Toxicity will be demonstrated if the IC25 is less than the permit limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein constitutes a violation of this permit. However, if raw water intake samples (tested concurrently with the effluent samples) are shown to be toxic enough to represent a test failure (100 percent samples statistically less than controls using t-tests and minnow growth or daphnid reproduction is 25 percent less than controls) and if effluent toxicity is not statistically greater than calculated intake toxicity, the effluent toxicity test in question will be considered invalid. In the event these two above described conditions occur, the toxicity test shall be repeated according to the schedule requirements for test failure. Effluent toxicity that is not consistent with the intake toxicity conditions specified above constitutes a violation of this permit.

All tests will be conducted using a minimum of three 24-hour flow-proportionate composite samples of final effluent (e.g., collected on days 1, 3 and 5). If, in any control more than 20% of the test organisms die in 7 days, the test (control and effluent) is considered invalid and the test shall be repeated within 30 days of the date the initial test is invalidated. Furthermore, if the results do not meet the acceptability criteria of section 4.9.1, EPA-821-R-02-013 (or the most current edition), or if the required concentration-response review fails to yield a valid relationship per guidance contained in Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing, EPA-821-B-00-004 (or the most current edition), that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

The toxicity tests specified herein for Outfall 101 shall be conducted according to the B/CTP and begin during the first chemical application requiring biomonitoring following the effective date of this permit. WET frequency and results reporting will be governed by the B/CTP. However, in order to efectively track WET monitoring, monthly reporting shall continue.

For monitoring periods when WET testing is not required by the approved B/CTP, monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or electronic "Deemers" report (if being used) to reflect that monitoring is not required.

In the event of a test failure, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. The follow-up test will not negate an initial failed test. In addition, **the failure of a follow-up test will constitute a separate permit violation, which must also be reported.**

In the event of 2 consecutive test failures or 3 test failures within a 12-month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. **During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months.** Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary to conduct further analyses. The final determination of any extension period will be made at the discretion of the division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. **During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.**

Test procedures, quality assurance practices, determinations of effluent survival/reproduction and survival/growth values, and report formats will be made in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, or the most current edition.

Results of all tests, reference toxicant information, copies of raw data sheets, statistical analysis and chemical analyses shall be compiled in a report. The report will be written in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013, or the most current edition.

Two copies of biomonitoring reports (including follow-up reports) shall be submitted to the division. One copy of the report shall be submitted along with the discharge monitoring report (DMR). The second copy shall be submitted to the local Division of Water Pollution Control office address:

Chattanooga-Environmental Field Office
Division of Water Pollution Control
540 McCallie Avenue, Suite 550
Chattanooga, TN 37402-2013

F. STUDIES RELATED TO EVALUATION OF CWA SECTION 316

Studies as outlined below shall be conducted by the permittee to confirm the performance of the SQN monitoring system and to verify that Section 316 of the Clean Water Act is being adequately met. The data from the studies shall be compiled with past data and reported to the Division of Water Pollution Control with a request for continuation of the thermal variance in the next permit application.

1. Section 316(a)

   (*The variance for this requirement will be public noticed with the permit.*)

   a. For Section 316(a), the permittee shall analyze previous and new data to determine whether significant changes have occurred in plant operation, reservoir operation or instream biology that would necessitate the need for changes in the thermal variance. The Reservoir Fish Assemblage Index will be used to annually assess the overall health of the fish community in Chickamauga Reservoir. If the fish community or particular populations fall significantly below expectations, further investigations will be proposed, and upon approval by the Division of Water Pollution Control, initiated to verify apparent declines and assist in the identification of possible sources of impairment.

   b. To determine the adequacy of measurements for ambient river temperature, TVA shall continue to study and evaluate the spatial distribution of water temperature in the overbank and main channel regions of Chickamauga Reservoir upstream of the plant diffuser. The study shall supplement data from previous evaluations, as needed, by measuring temperature profiles at selected sites in the reservoir. The study shall consider both winter and summer hydrothermal regimes, and both 1-hour and 24-hour averaging. The goal of the study is to determine the major factors contributing to the interaction between main channel and overbank flows, the impacts on water temperatures in the thermal mixing zone, and optimal location of monitors to record the ambient temperature.

   c. To determine the adequacy of mixing zone, TVA shall continue to conduct studies to evaluate behavior of thermal plume from the plant diffuser. The study shall examine the justification of the existing mixing zone and supplement data from previous evaluations, as needed, by measuring temperature profiles at selected sites in and about the mixing zone. The study shall consider both winter and summer hydrothermal regimes, and both 1-hour and 24-hour averaging. The goal of the study is to better determine the impact of hydro peaking operations on the behavior of the thermal plume, and to determine if there is any need to redefine the extent of the mixing zone. The study shall also consider the impact (if any) of the new Reservoir Operations Program.

2. Section 316(b)

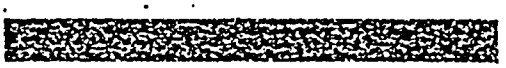
   a. EPA promulgated the rule to implement section 316(b) of the Clean Water Act on Friday, July 9, 2004 and made the regulation effective September 7, 2004. The final rule constitutes Phase II of the section 316(b) regulation development. 316(b) limitations for this facility are determined to be in compliance based on best professional judgment in accordance with 40 CFR 401.14 and 122.43. The permittee is required to expeditiously submit the comprehensive demonstration study and other information as required by 40 CFR 125.95 as expeditiously as possible but no later than January 7, 2008.

G. STUDY TO CONFIRM CALIBRATION OF NUMERICAL MODEL

The numerical model used to determine compliance with the temperature requirements for Outfall 101 shall be the subject of a calibration study once during the permit cycle. The study should be accomplished in time for data to be available for the next permit application for re-issuance of the permit., A report of the study will be presented to the Division of Water Pollution Control. Any adjustments to the numerical model to improve its accuracy will not need separate approval from the Division of Water Pollution Control, however, the Division will be notified when such adjustments are made.

The permittee shall calibrate the flow rate characteristics through the diffusers on a schedule of at least once every two years. For this permit period, such calibration shall be coordinated with the evaluation of the numerical modeling.

(Continue on next page.)



PART IV

STORM WATER POLLUTION PREVENTION PLAN

A. GENERAL CONDITIONS

Storm water runoff associated with industrial activity that is not discharged to the receiving stream through outfalls permitted in Part I of this permit is currently authorized under the Tennessee Storm Water Multi-Sector General permit for Industrial Activities (TMSP), Permit Number TNR050015. The TMSP requires development, implementation, and routine evaluation and updating of a storm water pollution prevention plan (SWPPP). The permittee shall also ensure that appropriate pollution prevention measures are identified in the SWPPP to minimize the discharge of pollutants in storm water or from ancillary activities via those outfalls described in Part I. Any necessary plan modifications shall be completed in accordance with the schedules set forth in the TMSP.

The discharger will develop, document and maintain a storm water pollution prevention plan (SWPPP) pursuant to the requirements as set forth in the Tennessee Multi-Sector General Permit for Industrial Activities, Sector O, "Storm Water Discharges Associated With Industrial Activity From Steam Electric Power Generating Facilities", Part 3, "Storm Water Pollution Prevention Plan Requirements", as included in the Attachment I of this permit. Also found at: http://www.state.tn.us/environment/wpc/stormh2o/pmt-o.pdf. The plan shall be signed by either a principal executive officer of a corporation, the owner or proprietor of a sole proprietorship, or a partner or general partner of a partnership.

B. BIOCIDE/CORROSION TREATMENT PLAN (B/CTP)

Previous permits addressed biocide and slimicide use at the site for process and non-process flows in the BMP program. A new program for managing the use of these products has been developed under the Biocide/Corrosion Treatment Plan (B/CTP). The permittee shall not conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals except in accordance with conditions specified under the written B/CTP [plan], which has been given prior approval* on April 27, 2005, or subsequent revisions, that are approved by the Division of Water Pollution Control. WET frequency and results reporting will be governed by the B/CTP.

C. DOCUMENTATION

The permittee shall maintain the SWPPP and the B/CTP plans at the facility and shall make the plans available to the permit issuing authority upon request.

D. SWPPP-B/CTP PLAN MODIFICATION

The permittee shall amend the SWPPP or B/CTP plan(s) plan whenever there is a change in the facility or change in the operation of the facility that materially increases the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.

E. MODIFICATION FOR INEFFECTIVENESS

If the SWPPP or B/CTP plan(s) prove(s) to be ineffective in achieving the general objective of preventing the release of significant amounts of pollutants to surface waters and the specific objectives and requirements under section B, the permit shall be subject to modification pursuant to 40 CFR 122.62 or 122.63 to incorporate revised SWPPP or B/CTP requirements. Any such permit modification shall be subject to review in accordance with the procedures for permit appeals set forth in accordance with 69-3-110, Tennessee Code Annotated.

F. COMPLIANCE SCHEDULE

The SWPPP and B/CTP* plan shall be maintained and the permittee shall begin implementation of any updates of the plan within six (6) months* after the effective date of this permit. (* The B/CTP plant shall be implemented as soon as approved by the Division.)

ATTACHMENT I

Sector O - Storm Water Discharges Associated With Industrial Activity From Steam Electric Power Generating Facilities, Including Coal Handling Areas

Found at:

http://www.state.tn.us/environment/wpc/stormh2o/pmt-o.pdf

RATIONALE

TVA - Sequoyah Nuclear Plant
NPDES PERMIT NO. TN0026450
Soddy Daisy, Hamilton County, Tennessee

Permit Writer: Ms. Pamala Myers

I. DISCHARGER

TVA, Sequoyah Nuclear Plant (SQN)
SB 2A, Sequoyah Access Road, P.O. BOX 2000
Soddy Daisy, Hamilton County, Tennessee

Contact Person
Stephanie Howard, Principal Environmental Engineer
423-843-6700

Nature of Business
Production of electric power by thermonuclear fission and other associated operations.

SIC Code(s): 4911 (Electric Services)
Industrial Classification: Primary - (PRIMARY INDUSTRY CATEGORY means any industry category listed in the NRDC Settlement Agreement (Natural Resources Defense Council, et al. v. EPA, 21 ERC 2120 (D.D.C. 1976), modified, 12 ERC 1833 (D.D.C. 1979)).
Discharger Rating - Major

II. PERMIT STATUS

NPDES Permit No. TN0026450 issued 07/31/01
NPDES Permit No. TN0026450 expired 12/31/03
Application for Renewal received at TDH-EFO: 7/01/03; NCO: 12/09/03

Watershed Scheduling

Environmental Field Office, Chattanooga
Primary Longitude: 85-05-14 Primary Latitude: 35-12-35
Hydrocode: 6020001 Watershed Groups: 3
Watershed Identification: Tennessee River (Hamilton Co. Except Chattanooga)
Target Reissuance Date: 2004
Target Watershed Evaluation Date: 2009

III. FACILITY DISCHARGES AND RECEIVING WATERS

TVA - Sequoyah Nuclear Plant discharges process and non-process wastewaters through Outfalls 101, IMP103, IMP107, 110, 116, 117 and 118 to Tennessee River. Appendix 1 summarizes facility discharges and the receiving stream information for all outfalls.

The Tennessee, Multi-Sector General Storm Water Permit TNR050015 covers storm water discharges associated with the industrial activity of this facility. Storm water concerns associated with this facility are covered in this general permit, so they will not be addressed in detail the individual NPDES permit.

IV. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

The Standard Industrial Classification (SIC) code for TVA - Sequoyah Nuclear Plant is 4911 (Electric Services). Process wastewater discharged through Outfall 101 is regulated by 40 CFR Part §423.12(b)(3)-BPT, and 40 CFR Part §423.13(d)(1)-BAT. Appendix 2 lists the applicable best available technology (BAT) and best conventional pollution control technology (BCT) effluent limitations guidelines. Certain variances are included in the permit to comply with Section 316(a) of the Clean Water Act.

V. PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

Appendix 3 lists the permit limitations and monitoring requirements as defined in the previous permit.

VI. HISTORICAL MONITORING AND INSPECTION

During the previous permit term there were no reported violations of the applicable effluent limitations. Data that was reported by TVA - Sequoyah Nuclear Plant on Discharge Monitoring Report forms during the previous permit term is summarized in Appendix 4, using the U.S.EPA database "Permit Compliance System" (PCS).

Division field personnel performed a recent (2004) Compliance Evaluation Inspection (CEI) at the facility however, no notable issues were revealed.

VII. NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

The proposed new permit limits have been selected by determining technology-based limits, then evaluating whether those limits protect the water quality of the receiving stream. If the technology-based limit would cause violations of water quality, then the water quality-based limit is chosen. The technology-based limit is determined from EPA effluent limitations guidelines if applicable (see Part IV); or from State of Tennessee effluent limits for effluent limited segments per Rule 1200-4-5-.03(2); or by way of operational and/or treatability data.

Note that in general, the term "anti-backsliding" refers to a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluents limits, permit conditions, or standards that are less stringent than those established in the previous permit.

Appendix 5 lists the proposed effluent limitations and monitoring requirements for all outfalls to be included in the new permit.

- **Outfall 101**

Outfall 101 is the largest volume discharge from the TVA-SQN facility that is primarily composed of once through cooling waters. It also contains water from internal monitoring points Outfall 103 and Outfall 107, and storm water runoff from the site. When the plant is in operating mode, the discharge volume will be more than a billion gallons per day. Discharge is by gravity feed to the two diffusers from the diffuser pond. The diffuser pond does not have a significant holding capacity for the discharges and the residence time for water in the pond is relatively short (several hours).

Flow

Flow shall be reported in Million Gallons per Day (MGD). Monitoring of flow quantifies the load of pollutants to the stream. The flow shall be continuously monitored and recorded, and reported on the monthly discharge report (DMR).

Oil and Grease

The limits for Oil and Grease per 40 CFR 423 (15 mg/l Monthly Average and 20 mg/l Daily Maximum) are applied here to meet the monitoring and compliance standards for low volume wastes. However to comply with antibacksliding provisions the previous permit limits will be retained. Oil and Grease will be monitored once per month by grab sample.

Total Suspended Solids (TSS)

The limits for Total Suspended Solids (TSS) per 40 CFR 423 (30 mg/l Monthly Average and 100 mg/l Daily Maximum) are applied here to meet the monitoring and compliance standards for low volume wastes. However to comply with antibacksliding provisions the previous permit limits will be retained. TSS will be monitored once per month by grab sample for Outfall 101. Grab sampling is used for this parameter because the size and volume of the discharge.

pH

According to the State of Tennessee Water Quality Standards [Chapter 1200-4-3-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours. The previous permit limits of 6.0 to 9.0 will be retained and were taken from EPA's Effluent Limitation Guidelines 40 CFR Part 423. The sample type will be grab and sampling will be once per week by grab sample.

Polychlorinated Biphenyls (PCB)

EPA's Effluent Limitation Guidelines in 40 CFR Part 423 requires that there shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. Therefore, **NO DISCHARGE of PCBs will be allowed.** Monitoring will be annually by grab sample. The facility has plans to remove all PCB from the site but there still may be some equipment with PCB in it on site.

Total Residual Chlorine

Technology-based (BAT) limits of 0.2 mg/L monthly average and 0.5 mg/L daily maximum limits apply to free available chlorine in cooling tower blowdown in accordance with 40 CFR, part 423, Subpart 423.13 (b) (1). The total residual chlorine test includes all chlorine species measured in the free available chlorine test as well as other chlorine compounds such as chloroamines. Thus the permit writer has substituted the total chlorine residual test in place of the free available chlorine test for compliance with the 40 CFR limitations.

Water quality limits of 0.035 mg/L monthly average and 0.060 mg/L daily maximum for total chlorine residual are calculated to protect water quality as shown in Appendix 5a based on the discharge flow of Outfall 101, 1597.2 MGD. The flow used in the calculation was the long-term average flow of the outfall based on data submitted in the permit application. Form 2C, Part II. However, NPDES effluent history data submitted with the application showed that the outfall has exhibited a number of months where average flows exceed 1601.0 MGD with a peak month of 1787.0 MGD.

The previous permit has a limit of 0.036 mg/L monthly average and 0.058 mg/L daily maximum for Outfall 101. The 0.036 mg/l concentration is greater than the acute criteria for TRC at 0.019 mg/l. Because of the large volume of water discharged by TVA there exists the potential for exposure of aquatic life to toxic concentrations of chlorine in the discharge. However, since chlorine (bromine) residual reacts and dissipates rapidly upon mixing into the ambient waters, the concentrations above the acute value should not exist for any significant area, or length of time. Thus the proposed 0.10mg/l concentration limit for TRC is considered to be protective of water quality in the Tennessee River at a flow from Outfall 101 of 1597.2 MGD.

The monthly average limit of 0.10 mg/L and the daily maximum limit of 0.10 mg/L for Total Residual Chlorine (TRC) shall be instituted in the new permit. The limits are based on the protection of water quality in the Tennessee River during periods when Outfall 101 exceeds its long-term average flow. These limits are also determined to be appropriate because the facility is discharging TRC in excess of 2 hours per day in accordance with the approved Biocide/Corrosion Treatment Plan.

It should be noted that the previous permit defined a required quantification level for TRC at 0.05 mg/L. Also specified were the acceptable methods for detection, as specified in 40 CFR Part 136, the amperometric titration, DPD colorimetric, starch end point direct, and specific ion electrode. The facility requested that the Minimum Level of Quantitation (ML) for TRC be established at 0.08 mg/L based on test data developed at the facility using EPA approved test methods and procedures for determining Method Detection Limit (MDL) under 40 CFR Part 136, Appendix B and subsequent adjustment to obtain an ML. The Division has not accepted the procedure for changing the ML and believes that the 0.05 mg/l quantification level remains appropriate. For the new permit, the reportable quantitation level for TRC shall be established at 0.05 mg/L. No specific test method is referenced. The Sampling at Outfall 101 for TRC/TRO shall be five times per week (only when chlorinating) by mass balance calculations as approved in the B/CTP.

Suspension of Sauger Monitoring Requirement (Comments provided by TVA; TN-WPC concurs.)

The previous permit identified that releases from Watts Bar Dam during April significantly impact spawning of sauger in Chickamauga Reservoir, and that a minimum continuous release in April from Watts Bar Dam of about 8,000 cfs is usually sufficient to produce an adequate year class of fish. Furthermore, the permit pointed out that in April of 2001, due to dry conditions, releases from Watts Bar Dam provided only 6,000 cfs for three weeks, rather than 8,000 cfs for the entire month. To determine the success of a lower spawning flow regime, a series of hourly gill net samples were planned by TVA for the winter of 2002. This sampling, however, was postponed until the winter of 2004. In general, the results show that the success of sauger spawning is unquestionably related to the magnitude and duration of Watts Bar releases during the spawning season. Flows for spawning were much better in 2002 and 2003, according to age class 1 and 2

fish found below Watts Bar Dam. Also, even though a release of 6,000 cfs in April 2001 did not produce a strong year class of sauger, the results suggest that this flow was sufficient to maintain the sauger population during dry conditions, according to creel data in 2000-2002 and gill netting data in 2004. In contrast, the sauger fishery suffered significant harm during the drought years of the late 1980s, which did not include special releases from Watts Bar Dam.

In general, since the major spawning areas for sauger in Chickamauga Reservoir are below Watts Bar Dam, 45 miles upstream of SQN, and since daily average discharges from SQN propagate only downstream, it is not possible for SQN to impact sauger spawning in Chickamauga Reservoir. As such, language concerning the continued studies of the success of sauger spawning in Chickamauga reservoir has been removed in this permit.

Boron, Total (as B)

The following comments are from TVA SQN personnel received via electronic mail on June 10, 2005: "Boron has never been included in SQN's NPDES permit but SQN pulls a monthly sample because of a letter written March 14, 1994 to Jim Mantooth from Stephen Letendre. SQN requests to discontinue monthly sampling for Boron. Since October 1996 (this is as far as my electronic database goes back), the highest boron value reported was 0.4mg/L at the Diffuser (Outfall 101) discharge."

The letter states that SQN adds boric acid to the secondary (nonradiological) systems as an intermittent addition to prevent stress cracking corrosion in the steam generators. From the Internet: Boron is a compound that occurs in nature. It is often found combined with other substances to form compounds called borates. Common borate compounds include boric acid, salts of borates, and boron oxide. No information is available on how long boron remains in air, water, or soil. Boron does not appear to accumulate in fish or other organisms in water. Boron accumulates in plants and is found in foods, mainly fruits and vegetables.

The division has reviewed the March 1994 letter and DMR/PCS data reported by TVA-SQN and believes that because historical monitoring has shown that there is a discharge of B from Outfall 101 this parameter (boron) should be included in the new permit. The division will set the frequency of monitoring to once per quarter, with no numerical limit. Report Total Boron (as B) only.

Outfall 101-Effluent Temperature

Note: Please see Part X of Rationale for discussion of thermal variance request.

The permit shall be written to meet State of Tennessee effluent temperature criteria except for the months of November through March when a variance is allowed for upstream to downstream rise in temperature to be as great as 5 C°. Otherwise, temperature shall be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 1200-4-3-.03(3)(e)]. It is recognized that the temperature of the cooling water discharge will be greater than the temperature of the water prior to its use for cooling or other purposes. This discharge shall not cause the temperature change in receiving stream to exceed 3°C relative to an upstream control point for the months of April through October. Also, this discharge shall not cause the temperature of receiving stream to exceed 30.5°C (except as a result

of natural causes), and this discharge shall not cause the maximum rate of temperature change in receiving stream to exceed 2°C per hour; except as a result of natural causes.

The calculated and measured temperatures of the effluent shall be reported on the monthly Discharge Monitoring Reports (DMRs). The temperature difference, rate of change, and receiving stream calculated-temperatures, shall also be limited and reported on the DMR's. The measured, reported, temperature of the effluent is not limited as such, and an exceedance of the above mentioned 30.5°C water quality criteria will not be considered a permit violation for measured effluent temperature. The 30.5°C value applies to the receiving stream, not the effluent. When background stream temperatures are warm and approach 30.5°C as a result of natural conditions the division understands that the plant is then operated in Helper Mode. Helper Mode is defined as: full operation of one cooling tower and at least three lift pumps per operating unit. The permit maximum of 30.5°C may be exceeded when the instream temperatures exceed 29.4°C and the plant operates in Helper Mode. In no circumstance shall a one-hour average maximum downstream river temperature exceed 33.9°C without consent of the permitting authority. **The division shall be notified by phone, facsimile, and/or electronic mail as soon as possible (within 12-hours of calculating these conditions) should these conditions present themselves.** Compliance with the 30.5°C maximum limit shall be determined from the 24-hour average.

The 24-hour average temperature rise in the receiving stream shall be calculated by taking measurements continuously (continuously is defined as measurements taken in 15 minute or less intervals). The 24-hour average value shall be determined using the current and previous ninety-six 15-minute measurements. Thus, every 15 minutes a 24-hour average value shall be calculated. The maximum of the ninety-six observations generated per day by this procedure shall be the daily maximum temperature rise for that day.

Instream river temperatures shall be averaged every 15 minutes in similar fashion to give a "rolling" 24-hour average. To determine compliance with the instream maximum limit of 30.5°C and the temperature difference between upstream and downstream temperatures, the 24-hour average shall be used.

Compliance with the 2 C° rate of temperature change shall also be determined every 15 minutes and shall be based on a 1-hour average of the current and previous four 15-minute values. The 15-minute values of the downstream temperature used to compute the rate of temperature change shall be based on the current 15-minute values of the flow and temperature of water discharging through the diffuser pipes and the current 24-hour average values of the river temperature and river flow.

Tennessee Rule 1200-4-3-.05 applies to temperature monitoring by including protection of the water quality in the mixing zone.

> "Mixing Zone - Mixing zone refers to that section of a flowing stream or impounded waters in the immediate vicinity of an outfall where an effluent becomes dispersed and mixed. Such zones shall be restricted in area and length and shall not (i) prevent the free passage of fish or cause aquatic life mortality in the receiving waters; (ii) contain materials in concentrations that exceed recognized acute toxicity levels for biota representative of the aquatic community in the receiving waters; (iii) result in offensive conditions; (iv) produce undesirable aquatic life or result in dominance of a nuisance species; (v) endanger the public health or welfare; or (vi) adversely affect the reasonable and necessary uses of the

area; (vii) create a condition of chronic toxicity beyond the edge of the mixing zone; and (viii) adversely affect nursery and spawning areas."

The mixing zone was established in the initial EPA-issued permit (April 1, 1983), and as defined, has been retained in Tennessee's reissuances of the permit. The definition of the mixing zone for the new permit is continued from the previous permit for the discharge at Outfall 101, which encompasses 1500 feet downstream of the diffusers to 275 feet upstream of the diffusers and 750 feet wide. Depth of the mixing zone includes the entire depth of the reservoir on the downstream side of the diffusers. On the upstream side of the diffusers the mixing zone extends in depth from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes. The initial mixing zone also included the intake forebay and diffuser pond when the plant operated in closed mode. The diffuser pond is not recognized as waters of the State, instead is considered part of the treatment system and therefore, is not part of the mixing zone for permit purposes. The intake forebay is recognized as waters of the State, but shall be included in the mixing zone only in circumstances when the plant operates in closed mode. The intake forebay connects to the river through openings at the bottom of the skimmer wall. In closed mode operation relatively little water is coming through the openings in the skimmer wall. Therefore, it makes sense to include the intake forebay in the mixing zone in these circumstances.

The mixing zone is needed for two reasons. It allows mixing for the thermal loading of the effluent before water quality criteria must be met. For compliance purposes, it allows a well-defined area to be used for actual instream assessments. The end-of-pipe is submerged and the discharge volume is so great that an end-of-pipe evaluation or flow measurement is impractical.

When both units are operational, the difference between the upstream and downstream temperatures is usually between 3 and 4 Celsius degrees during the winter months. The maximum for the period reviewed was 3.4°. Instream-maximum temperature has been greater than 30.5°C on relatively rare occasions (for example in June and July 1995), but generally the receiving-stream temperatures stay less than 30.5° in summer.

Permit limitations for effluent temperatures shall be retained from the previous permit. Sampling shall be continuous and shall be recorded for the effluent flow. The effluent limitations shall also be calculated by numerical model as described above for compliance with instream requirements.

- **Outfall 103**

Outfall 103 is an internal sampling point representing discharges from the Low Volume Waste Treatment Pond (LVWTP) and the Yard Drainage Pond. Wastewater from the Essential Raw Cooling Water (ERCW) system, the Raw Cooling Water (RCW) system, the Lined Metal Cleaning Waste Pond, and the Turbine Building Sump also discharge into the LVWTP. The diffuser pond discharges pass through the diffusers through Outfall 101, into the Tennessee River.

Flow

Flow shall be reported in Million Gallons per Day (MGD) and monitored at the time of sample collection. Monitoring of flow quantifies the load of pollutants to the stream. Flow will be recorded on a totalizer and reported 3 times per week.

Oil and Grease

The limits for oil and grease in the new permit will be required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 15 mg/l Monthly Average, 20 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the low volume waste sources shall not exceed the quantity determined by multiplying the flow of the low volume waste sources times the concentration listed in the [following] table." However to comply with antibacksliding provisions the previous permit limits will be retained. Sampling will be once per week by grab sample.

Total Suspended Solids (TSS)

The limits for TSS in the new permit will be required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 30 mg/l Monthly Average, 100 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the low volume waste sources shall not exceed the quantity determined by multiplying the flow of the low volume waste sources times the concentration listed in the [following] table." However to comply with antibacksliding provisions the previous permit limits will be retained. Sampling will be once per week by grab sample.

pH

According to the State of Tennessee Water Quality Standards [Chapter 1200-4-3-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours. The previous permit limits of 6.0 to 9.0 will be retained and were derived from EPA's Effluent Limitation Guidelines 40 CFR Part 423. The sample type will be grab and will be measured three times per week.

- **Outfall 107**

Outfall107 is an internal monitoring point to check compliance with permit limitations for the metal cleaning wastewaters which discharges to the Low Volume Waste Treatment pond (LVWTP). The LVWTP (Outfall 103) then discharges into the Diffuser Pond which discharges through Outfall 101 to the Tennessee River, and is monitored by parameters established for those discharged wastewaters.

Flow

Flow shall be reported in Million Gallons per Day (MGD) and monitored at the time of sample collection. Monitoring of flow quantifies the load of pollutants to the stream.

Oil and Grease

The limits for oil and grease in the new permit will be as required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 15 mg/l Monthly Average, 20 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the metal cleaning waste shall not exceed the quantity determined by multiplying the flow of the metal cleaning waste times the concentration listed in the [following] table." Sampling will be once per day by grab sample.

Total Suspended Solids (TSS)

The limits for TSS in the new permit will be as required by EPA's Effluent Limitation Guidelines (ELG) 40 CFR Part 423: 30 mg/l Monthly Average, 100 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the metal cleaning waste shall not exceed the quantity determined by multiplying the flow of the metal

cleaning waste times the concentration listed in the [following] table." Sampling will be once per day by composite sample.

pH

According to the State of Tennessee Water Quality Standards [Chapter 1200-4-3-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours. The previous permit limits of 6.0 to 9.0 will be retained and were derived from EPA's Effluent Limitation Guidelines 40 CFR Part 423. The sample type will be grab and will be measured once per day.

Total Copper

The limits for total copper in the new permit will be as required by EPA's Effluent Limitation Guidelines 40 CFR Part 423: 1.0 mg/l Monthly Average and 1.0 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the metal cleaning waste shall not exceed the quantity determined by multiplying the flow of the metal cleaning waste times the concentration listed in the [following] table." Sampling will be once per day by composite sample.

Total Iron

The limits for total iron in the new permit will be as required by EPA's Effluent Limitation Guidelines 40 CFR Part 423: 1.0 mg/l Monthly Average and 1.0 mg/l Daily Maximum. The ELG states: "The quantity of pollutants discharged in the metal cleaning waste shall not exceed the quantity determined by multiplying the flow of the metal cleaning waste times the concentration listed in the [following] table." Sampling will be once per day by composite sample.

Phosphorus as P

EPA effluent guidelines or water quality standards are not applicable to this parameter. Therefore, the previous permit limit of 1.0 mg/l Daily Maximum will be retained in the new permit. The operator has indicated that it may be necessary at times to add tri-sodium phosphate to the metal cleaning process. Consequently, the limitations and monitoring requirements for phosphorous, shall only apply during periods when phosphate-bearing solutions are added to the system and believed present in the wastewater.

- **Outfall 110 [Closed Mode Operations only]**

As described in the permit application, a discharge from Outfall 110 occurs only when the power plant operates in closed mode operation, which is infrequent. Operation in closed mode has been precluded because of operational restrictions that happen when the plant is operated in this [closed] mode; discharge from Outfall 110 is not anticipated to occur. Closed mode operation is when condenser-circulating water is cooled in the cooling towers and is then routed, via the cold-water return channel, to the intake forebay. Outfall 110 is a sampling point for water passing from the channel into the forebay. The discharge would consist of non-contact cooling water, including primarily condenser circulating water, the essential raw cooling water, and raw cooling water. Other waters would be from the liquid radwaste system, regeneration wastes from the condensate demineralizer, and steam generator blowdown.

Outfall 110 will be limited with the same permit limitations established for Outfall 101 when operated in closed mode only. If discharge occurs, the permittee will monitor and report on the discharge using the same sampling and analysis protocol(s) established for Outfall 101. When no discharge occurs, the permittee shall report "no discharge" on the Discharge Monitoring Report (DMR).

When the facility operates in closed mode, the mixing zone boundaries change to include the intake forebay. Mixing zone temperature compliance calculations only apply at Outfall 101, temperature will not be limited for Outfall 110 discharges.

- **Outfalls 116 and 117**

These discharges result from backwashing wastewater from the screens and strainers of the water intake for Condenser Circulating Water (CCW), (Outfall 116) and the intake for Essential Raw Cooling Water (ERCW) (Outfall 117).

Present permit conditions do not include numerical limitations or monitoring requirements, instead narrative requirements establish that no materials are discharged except material previously present in the intake water, and that there shall be no visible sheen in the discharges. The new permit will retain these permit conditions. Outfall 116 uses traveling screens where debris is impinged on the screens. Backwash water is discharged into a ditch that also conveys storm water back into the reservoir called the CCW Trash Sluice. The intake(s) for Outfall 117 are in the skimmer wall and it also backwashes directly back into its reservoir at a much smaller rate.

One problem for these discharges is dealing with the material that collects on the screens. Monitoring practices for discharge of backwash waters from Outfalls 116 and 117 will be included in best management practices for the site.

- **Outfall 118**

This outfall drains the Essential Raw Cooling Water dredge pond. Presently the pond is not in service and discharges small amounts of storm water are coming from its now-vegetated area.

The previous outfall limitations were established for discharges from the pond when it was in service, including limits and monitoring for settleable solids, TSS and dissolved oxygen. These limits became void after the pond was emptied of dredged water and vegetation established in the pond area.

The permit writer proposes that present permit limits be applied to discharges from the pond, if it is put back into service. Otherwise, no monitoring will be required.

- **Additional Limitations, Monitoring Requirements and Conditions**

In addition to the specific numerical limitations discussed above, there are a number of general requirements that will apply to outfalls 101, IMP 103, IMP 107, 110, 116, 117, and 118. These requirements are discussed as follows:

i. <u>Section 316(b)</u>

a. EPA promulgated the rule to implement section 316 of the Clean Water Act on Friday, July 9, 2004 and made the regulation effective September 7, 2004. The final rule constitutes Phase II of the section 316(b) regulation development. 316(b) limitations for this facility are determined to be in compliance based on best professional judgment in accordance with 40 CFR 401.14 and 122.43. The permittee is required to expeditiously submit the comprehensive demonstration study and other information as required by 40 CFR 125.95 as expeditiously as possible but no later than January 7, 2008.

ii. 40 CFR Part 423.12 (b) (2) (BPT) and Part 423.13 (a) (BAT) specify, "There shall be no discharge of polychlorinated biphenyl compounds (PCB) such as those commonly used for transformer fluid." This requirement was in the previous permit and will be retained in the new permit.

iii. 40 CFR Part 423.12 (b) (8) (BPT requirements, non wastewater source specific) states that "Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available chlorine or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination."

iv. 40 CFR Part 423.13 (b) (2) (BAT requirements, specific to once through cooling water) also states that for plants with a rated electric generating capacity of 25 or more megawatts that "Total residual chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for microinvertebrate control. Simultaneous multi-unit chlorination is permitted."

v. 40 CFR Part 423.13 (d) (2) (BAT requirements, specific to cooling tower blowdown) states "Neither free available nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination."

a. These requirements are potentially applicable to Outfalls 101 (and Outfall 110 in Closed Mode). Chlorine is not added to the Condenser Circulating Water System (once through cooling water), or to the high-pressure fire protection system, (when flushed), at the Sequoyah Nuclear Plant who's discharge is primarily through Outfall 101. With regard to cooling tower blowdown, TVA has made a demonstration to the Division that the facility cannot operate the cooling towers under these requirements without significant damage to the system potentially jeopardizing operational safety. These requirements were not in the previous permit and will not be included in the new permit.

vi. 40 CFR Part 423.13 (d) (1), BAT requirements for cooling tower blowdown, establishes monthly average and daily maximum effluent limitations for the 126 Priority Pollutants. The monthly average limit and the daily maximum limit (except for chromium and zinc) is "No Detectable Amount." However, Part 423.13 (d) (3) allows the permitting authority, at it's discretion, to utilize engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by analytical methods in 40 CFR Part 136. This requirement is potentially applicable to outfall 101. TVA has provided data that demonstrates that priority pollutants will not be added to the system in quantities that will be detectable in cooling tower blowdown. Also the data provided with the Form 2C permit application indicates that the priority pollutants were not present in detectable amounts. The following general statement will be added to the permit "Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required."

vii. Bromine products may be used at times in the raw water system. For purposes of measurement of Total Residual Chlorine (TRC) in the permit, analyses shall include residual bromine with the results reported as chlorine. Thus there is no separate test for residual bromine, but one test for situations where combinations of chlorine and bromine are being used.

viii. It is recognized that the permittee must use biocides and corrosion inhibitor products to properly operate the facility. Because the chemicals in these products may be detrimental to fish and aquatic life in the receiving stream, there is a need to evaluate the nature of the chemicals, the dosage to be used, the duration of use, the effluent concentration, and the need for treatment prior to discharge. Previous permits addressed biocide/slimicide and corrosion inhibitor products use at the site for process and non-process flows in the BMP program. A new program for managing the use of these products has been developed under the Biocide/Corrosion Treatment Plan (B/CTP). The permittee shall not conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals except in accordance with conditions specified under the written B/CTP [plan], which has been given prior approval on April 27, 2005 (or other revisions), by the Division of Water Pollution Control. The mechanism to alter these applications is by formally amending the B/CTP.

VIII. WATER QUALITY BASED CALCULATIONS FOR METALS AND TOXICS

The following procedure is used to calculate the allowable instream concentrations for metals and toxics permit limitations. If monitoring for a particular pollutant indicates that the pollutant is not present (i.e., consistently below detection level), then the division may drop the monitoring requirements in the reissued permit.

1. The most recent background conditions of the receiving stream segment for Outfall 101 were compiled using this information:
   * 1Q10 of receiving stream (3491 MGD)
   * Calcium hardness (measured ambient data (50 mg/L))
   * Total suspended solids (10 mg/l, default)
   * Background metals concentrations (measured ambient data)
   * Other dischargers impacting this segment
   * Downstream water supplies, if applicable

2. The chronic water quality criteria is converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.

3. The acute water quality criteria is converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel, zinc, silver and mercury. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel, silver and mercury.

4. The chronic criteria for Chromium (T) is given in the total recoverable form and is not converted to a dissolved lab condition or to the total recoverable ambient condition.

5. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of 90%.

The following equations are used to evaluate **water quality protection:**

$$\text{Eqn:} \quad Cm = \frac{QsCs + QwCw}{Qs + Qw}$$

where:

Cm = resulting in-stream concentration after mixing
Cw = concentration of pollutant in wastewater
Cs = stream background concentration
Qw = wastewater flow
Qs = stream low flow

to protect water quality:

$$\text{Eqn:} \quad Cw \leq \frac{(S_A)\,[Cm\,(Qs + Qw) - QsCs]}{Qw}$$

where: (S_A) = the percent "Stream Allocation".

Calculations for this permit have been made using a standardized worksheet titled "Water Quality Based Effluent Calculations", (APPENDIX 5a). Division policy dictates the following procedures in establishing these permit limits:

1. The critical low flow values are determined using USGS data:

   Fish and Aquatic Life Protection

   7Q10 - Low flow under natural conditions
   1Q10 - Regulated low flow conditions

   Other than Fish and Aquatic Life Protection

   30Q2 - Low flow under natural conditions

2. Fish & Aquatic Life water quality criteria for certain Metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.

3. For criteria that are hardness dependent, chronic and acute concentrations are based on a Hardness of 50 mg/L and Total Suspended Solids (TSS) of 10 mg/L unless STORET or Water Supply Intake data substantiate a different value. Minimum and maximum limits on the hardness value used for all water quality calculations are 25 mg/L and 400 mg/L respectively.

4. Background concentrations are determined from the Division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the

measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is replaced with the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (Cw). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the industrial source water is not the receiving stream. Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

Each worksheet has fourteen (14) data columns, all of which may not be applicable to any particular characteristic constituent of the discharge. A description of each column is as follows:

Column 1: The "Stream Background" concentrations of the effluent characteristics.

Column 2: The "Chronic" Fish and Aquatic Life Water Quality Criteria. For Cadmium, Copper, Lead, Nickel, and Zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Continuous Concentration (CCC) is calculated using the equation:

$$\text{Eqn:} \quad CCC = (\exp\{ m_C [\ln(\text{stream hardness})] + b_C \}) (CCF)$$

where: CCF = Chronic Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 1200-4-3-.03 and the EPA guidance contained *in The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no chronic criteria exists for silver. Published criteria are used for non-metal parameters.

Column 3: The "Acute" Fish and Aquatic Life Water Quality Criteria. For Cadmium, Copper, Lead, Nickel, Silver, and Zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Maximum Concentration (CMC) is calculated using the equation:

$$\text{Eqn: } CMC = (\exp\{ m_A [\ln(\text{stream hardness})] + b_A \}) (ACF)$$

where: ACF = Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 1200-4-3-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no acute criteria exists for Total Chromium. Published criteria are used for non-metal parameters.

Column 4: The "Translator" converts the value for dissolved metal at laboratory conditions (columns 2 & 3) to total recoverable metal at in-stream ambient conditions (columns 5 & 6). This factor is calculated using the linear partition coefficients found in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996) and the equation:

Eqn: $$\frac{C_{diss}}{C_{total}} = \frac{1}{1 + \{ [K_{po}] [ss^{(1+a)}] [10^{-6}] \}}$$

where: ss = in-stream suspended solids concentration [mg/l]

Linear partition coefficients for streams are used for unregulated (7Q10) receiving waters, and linear partition coefficients for lakes are used for regulated (1Q10) receiving waters. For those parameters not in the dissolved form in columns 2 & 3 (and all non-metal parameters), a Translator of 1 is used.

Column 5: The "Chronic" Fish and Aquatic Life Water Quality Criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 2 by the value in column 4.

Column 6: The "Acute" Fish and Aquatic Life Water Quality Criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 3 by the value in column 4.

Column 7: The "Chronic" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the Chronic limit.

Column 8: The "Acute" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the Acute limit.

Column 9: The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Organism Consumption (Recreation).

Column 10: The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Water and Organism Consumption. These criteria are only to be applied when the stream use classification for the receiving stream includes both "Recreation" and "Domestic Water Supply."

Column 11: The In-Stream Water Quality Criteria for the protection of Human Health associated with the stream use classification of Domestic Water Supply.

Column 12: The Calculated Effluent Concentration associated with Organism Consumption.

Column 13: The Calculated Effluent Concentration associated with Water and Organism Consumption.

Column 14: The Calculated Effluent Concentration associated with Domestic Water Supply.

NOTE: The calculated <u>chronic</u> water quality effluent concentrations from Column 7 should be compared, individually, to the values calculated in Columns 12, 13, and 14 in order to determine the most stringent chronic permit limitations. The calculated <u>acute</u> water quality effluent concentrations from Column 8 should then be compared, individually, to values equal to two (2) times the values presented in Columns 12, 13, and 14 in order to determine the most stringent acute permit limitations. These water quality based limits are compared to any technology based (CFR or Tennessee "Rules") effluent limitations, and/or any previous permit limitations, for final determination of the permit limits. TVA has demonstrated that Priority Pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the Priority Pollutants will not be required.

IX. STORM WATER

The Tennessee Multi-Sector General Storm Water Permit (TMSP) No.TNR050015 covers storm water discharges associated with the industrial activity of this facility. Storm water concerns associated with this facility are covered in this general permit, so they will not be addressed in detail in the individual NPDES permit.

Since it is the intent of the division that the permittee institutes a Storm Water Pollution Prevention Plan (SWPPP) in order to minimize the discharge of pollutants from storm water outfalls. It is the opinion of the division that the best method for dealing with potential pollution associated with storm water discharges from the TVA-Sequoyah Nuclear Plant facility is through implementation of an aggressive SWPPP coupled with the TMSP to verify SWPPP discharge monitoring effectiveness.

In order to assist the permittee in the evaluation of the effectiveness of the SWPPP, benchmark values developed for the TMSP for Industrial Activities are provided herein for comparison. These benchmark values (cut-off concentrations) were developed by the EPA and the State of Tennessee and are based on data submitted by similar industries for the development of the multi-sector general storm water permit. The cut-off concentrations are target values and should not be construed to represent permit limits.

Parameters of Concern	Cut-Off Concentration [mg/L]
Total Suspended Solids (TSS)	*200*
Oil & Grease	*15*
Iron, TOTAL	*5.0*
pH (range)	*5.0 - 9.0*

Note: Sample values are from the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities, Rationale, Part III, Table III-A: *Parameter Benchmark Values.*

The new permit will contain a requirement that a Storm Water Pollution Prevention Plan be developed and maintained to regulate storm water runoff. This SWPPP is meant to ensure that runoff from the facility site is not a significant source of pollution to the receiving stream. The discharger will develop, document and maintain the SWPPP pursuant to the requirements as set forth in the Tennessee's Storm Water Multi-Sector General Permit for Industrial Activities, Sector O, "*Storm Water Discharges Associated with Industrial Activity from* Steam Electric Power Generating Facilities, Including Coal Handling Areas", Part 3, "Storm Water Pollution Prevention Plan Requirements", as included in the ATTACHMENT I of this permit also found at http://www.state.tn.us/environment/wpc/stormh2o/pmt-o.pdf . The effectiveness of this SWPPP will be examined by requiring storm water monitoring data be submitted of the combined process/storm water discharges. At that time, should the results so dictate, the division maintains the authority to institute specific numeric limitations for the monitored parameters.

X. Thermal variance request [Background retained from previous permit.]

A. Existing Thermal Variance and Proposed Variance Expansion

On August 30, 1989, TVA requested a thermal variance for the Sequoyah Nuclear Plant from Tennessee's criteria for temperature under Section 316(a) of the Clean Water Act. The request was approved prior to issuance of a permit in 1993. The variance involved allowing a temperature rise of 5.0°C for the winter operation months, November through March. Section 316(a) allows variance of temperature criteria as long as permit conditions "require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into

which the discharge is to be made." The determination has been made that the shellfish, fish and wildlife are being protected.

The variance was granted to prevent expensive repairs to the cooling towers from wintertime operations in freezing weather. TVA estimated in the 1989 information the economic impact of the variance would be either additional yearly costs of $0.5 to $1.5 million for annual repairs to the cooling towers to repair ice damage under one scenario, or, under another option, a one-time construction cost of about $20 million for modifications to the design of the towers. The purpose of the 1989 request was to prevent degradation and destruction of cooling tower equipment during adverse circumstances, which, in turn, allows that equipment to be available during the rest of the year when the weather is more favorable for operation.

Based on temperature information during the last permit period, it appears that the 3C° temperature difference will not be met in winter conditions without running the cooling towers and creating a situation where the towers are potentially damaged by icy conditions during these months. For the period February 1997 to February 2001, there were 6 winter months that would have met the requirement without violation of the 3C°. Approximately 75% of the time the facility would either be in violation or putting the cooling tower systems at risk of damage for the winter months. The need for a variance still exists at the site. The Division will continue the existing variance during the term of the reissued permit.

B. 1997 Request for Expansion of Variance

By submittal dated January 21, 1997, TVA requested changes and expansions to the existing thermal variance through a study and proposal with a publication date of December 1996. The Division made public notice and solicited comments on March 9, 1998. No final action has been taken on the 1997 variance request. TVA summarizes the request as follows (Page numbers refer to the page of the TVA document that is quoted.):

> "TVA is requesting changes in the thermal criteria at SQN for: (1) the period of averaging for river temperature data, (2) the duration of the winter operation limit for the river temperature rise from upstream to downstream of the plant, and (3) the limit for the rate of river temperature change downstream of the plant. In the first case, a change is requested to include 24-hour averaging of temperature data. In the second case, a change is requested to include April and May in the period of winter operation. In the third case, a variance is requested to increase the limit for the rate of temperature change. These alternative criteria are sought collectively due to operational issues that have arisen for both SQN and TVA Reservoir System Operations (RSO) since presentation of the original 316(a) demonstration. Those for the plant are related to use of cooling towers to control short-term, temperature-limit events. For RSO, operational issues are related to procedures for filling and maintaining reservoir water levels in TVA's Lake Improvement Plan (see TVA, 1990)." Page 1

TVA estimates its power generation operations would realize a cost savings of $93,000 annually for the 1997 variance request. Most of the savings are gained by not running the cooling towers. Subsequent to the initial proposal, TVA has noted that most important consideration to the facility is its ability to operate in a way that makes it a reliable source of power. Another advantage of the 1997 requested variance is that it would simplify operational decision making on the part of both the reservoir and plant operations. No dollar figure is associated with this simplification, but it is certainly worth consideration. In general, the request for the variance to the criteria allows normal TVA operations for the reservoir system and nuclear plant without having violations in the stream criteria. The difficulties of maintaining the temperature affect both the nuclear plant and the operation of the nearest dams, Watts Bar Dam and Chickamauga Dam. Reservoir operation restrictions for the two dams also affect the upstream and downstream reservoirs. The operational restrictions on Chickamauga are

exacerbated by the work that has restored the initial turbine capacity of 45,000 cubic feet per second (cfs) of discharge instead of the 38,000 cfs that has been the maximum since Sequoyah was started up. TVA estimates cost of operating without expanding the variance will be about $2,300,000 per year.

The 1997 request is based upon concerns raised by both the nuclear plant operations as well as the reservoir system operations. It needs to be noted that the permit to the nuclear plant is the only permit that is affected by any variance that has been or will be granted. Releases from dams are not permitted through the NPDES permit program.

C. Relevant State Water Quality Criteria

Tennessee's criteria for temperature for the various classified uses of the Tennessee River in this stretch of river are as listed below.

Domestic Water Supply - The maximum water temperature change shall not exceed 3°C relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2°C per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet or mid-depth, whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

Industrial Water Supply - The maximum water temperature change shall not exceed 3C° relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2C° per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet or mid-depth, whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

Fish and Aquatic Life - The maximum water temperature change shall not exceed 3C° relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2C° per hour. The temperature of recognized trout waters shall not exceed 20°C. There shall be no abnormal temperature changes that may affect aquatic life unless caused by natural conditions. The temperature of impoundments where stratification occurs will be measured at mid-depth in the epilimnion for warm water fisheries and mid-depth in the hypolimnion for cold water fisheries. In the case of large impoundments (100 acres or larger) subject to stratification and recognized as trout waters, the temperature of the hypolimnion shall not exceed 20°C. The temperature in flowing streams shall be measured at mid-depth.

Recreation - The maximum water temperature change shall not exceed 3C° relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2C° per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet, or mid- depth whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

Irrigation - The temperature of the water shall not interfere with its use for irrigation purposes.

Livestock Watering and Wildlife. - The temperature of the water shall not interfere with its use for livestock watering and wildlife.

Navigation. – No temperature criteria are specified.

D. Rationale for the Expansion of Thermal Variance and Division Response

TVA's arguments and the Division's responses are summarized below.

The text below uses the following definitions:

Td = Maximum daily temperature instream;
ΔT = The instream temperature rise from upstream to downstream; and
dTd/dt = Rate of change in degrees per hour.

1. TVA: For 24 hour averaging for calculation of Td and ΔT

"Twenty-four hour averaging is needed to distinguish water temperature events that *do provide* timely relief for aquatic habitat from those that *do not provide* timely relief Depending on meteorology, hydrology, and other operational goals of the river system (e.g., reservoir filling, minimum flows, mosquito control, peaking operations), water temperatures that reach the limits for Td or ΔT often encounter these extremes only for a short part of the day. These temperatures can be controlled, in part, by SQN cooling tower operation. However, the cooling tower lift pumps are not designed to be cycled on and off for only a few hours. As a result, the cooling towers often are operated around-the-clock to control events that occur for only a short time. When river temperatures are such that the limits for Td or ΔT occur in this manner, the aquatic habitat typically obtains relief from the event within several hours by natural mechanisms of heat dissipation (e.g., evening cooling for Td and daytime peak/high river flows for ΔT). When temperatures reach the limits for Td or ΔT for periods as long as 24 hours, timely relief is not available and action is needed to mitigate the excess water temperature. In general, 24-hour averaging is more "synchronous" with the response time needed to implement methods to control temperatures, that is, operation of cooling towers, alteration of river flows, or curtailment of SQN generation." Pages 15,16.

TN Water Pollution Control Reply:

The Division will allow 24-hour averaging because it is appropriate to this particular situation. Diurnal changes in the temperature are present in this situation as well as in other waters of the state. Natural causes are excluded from the application of temperature criteria. The difficulty of this situation is that thermal warming and changes in the reservoir flows lead to transient effects instream. Further, the position of the plant's discharge location is at a bend in the river, which makes for a much more complex mixing situation to be hydrodynamically modeled. Compliance of the permit discharges with the permit limits is evaluated through computer modeling. Averaging the stream data over 24 hours is used in the model. Diurnal variations are a characteristic of the receiving waters. The nuclear plant is operated as a base-load plant and has little variation in heat loading and less temperature variation than the receiving waters during normal operations. Using a 24-hour average for maximum and the temperature rise from upstream to downstream is acceptable to the Division. Calculation of the rate of temperature change is tied to the change over an hour. This cannot be averaged over 24 hours. Therefore, the rate of change will be evaluated by a numerical model, that uses the one-hour averages of effluent temperature and flow and uses a 24-hour average of river temperature and flow. This approach emphasizes changes in the discharge. It minimizes changes in the receiving waters that may be coming from other sources during the course of a day. It ties the compliance to the heat load coming from the plant. Because of diurnal variations in instream temperatures from other sources, the criteria may not always be met.

The determination of compliance with permit limits will be set to use 24-hour averaging. A revision to the way compliance is calculated for the permit does not

constitute a variance of the water quality criteria since the criteria will be met. The averaging involved with the permit compliance data is not a variance of criteria and therefore will not be considered part of a variance of criteria.

2. TVA: For ΔT

"During the months of April and May, the hydrothermal condition of Chickamauga Reservoir is characterized by a water column with temperatures typically less than 20°C (68°F), and little or no stratification. As part of its goal to be environmentally responsible, and in accord with the Lake Improvement Plan, TVA currently curtails river flows during this period to aggressively fill the reservoirs. At low flows, however, dilution and mixing of the thermal plume from SQN is reduced. In combination with a cool, uniformly mixed water column, this increases the plant ΔT. To maintain the 3.0 C° compliance limit, high river flow and/or extensive use of the cooling towers are required. In this manner, the demand for high flow is in direct conflict with the desire to fill the reservoirs."

"From the standpoint of power supply, April and May also are periods of low demand for TVA hydro operations. As a result, it is desirable during this time to perform maintenance at the dams. However, tasks that require the hydroturbines to be shut down, such as work on trash racks, are difficult to perform because of the potential impact on the ΔT limit at SQN. Altogether, therefore, increasing the duration of the wintertime ΔT limit to include the months April and May will permit TVA to better fulfill the goals of the Lake Improvement Plan without excessively constraining operations at SQN and/or the neighboring hydropower facilities." Page 24

TN Water Pollution Control Reply:

Cooling towers can be operated during these activities at this time of year without harm to cooling tower equipment. It may be that the cooling towers need to be run during those periods when the river flows are curtailed for filling the reservoir. TVA does not see a need to meet the state's criteria if a balanced population of aquatic life is being supported. The cooling towers were designed and put in place to be conservative and be protective. TVA feels the application of these conservative restraints is not necessary. The Division of Water Pollution Control disagrees and thinks use of the Cooling towers is appropriate.

Under proposed permit limits, TVA may have to factor the NPDES permit limits into goals of reservoir operations. We believe that there are ways for TVA to accommodate the described situations and meet instream temperature criteria the great majority of the time. Constraints on the nuclear power plant operations may be appropriate for during these times when power usage is usually lessened. The Division does not necessarily agree that any such constraints in plant operation are excessive.

TVA has noted that the nuclear plant is operated most efficiently as a constant base load plant and that it is operationally unfeasible to operate it as a plant that follows the power demands through the day. Further, if the plant is cut back, power will have to be supplied from other sources, such as the hydro units which complicates the integration of other reservoir operations such as for navigation and recreation. However, the Division still believes that the constraints on the system are not excessive and options are available other than expansion of the variance of criteria.

3. TVA: For dTd/dt (Plots A,B, and C referred to in the text are not reproduced here.)

"Unsteady operation of SQN and/or unsteady operation of Chickamauga Reservoir can cause events for the rate of temperature change. Since SQN generation normally is steady, almost all observed dTd/dt events are caused by the latter (i.e., in

conjunction with the heat discharged by SQN). Typical conditions creating these events can be described using the data shown in Figure 6. Unsteady flows are initiated at Watts Bar and Chickamauga Dams. The hydroturbines at these sites are routinely shut down during periods of low power demand, reducing the flow at SQN (Plot A). Under these conditions, the heated discharge from the plant collects in a thermal "pancake" in the mixing zone, increasing the downstream temperature Td (Plot B) and causing a positive dTd/dt event (Plot C). When peaking operations resume at Watts Bar and Chickamauga Dams, flow in the river quickly accelerates and flushes the SQN thermal "pancake" downstream, promptly decreasing Td and causing a negative dTd/dt event (Plot C)." Page 27

TN Water Pollution Control Reply:

Use of 24-hour averaging will help with the variations in flow and natural diurnal heat inputs by smoothing out these effects. TVA has noted that natural effects (solar warming, cold air temperatures, rainfall runoff/flooding) alone will not cause the criteria to be exceeded in this reservoir situation. But these factors contribute to the situation. The major controls are the heat load from the plant and the reservoir releases. The permittee seems to be able to meet the criteria requirement most of the time. TVA cannot dynamically operate the nuclear plant to control rate-of-temperature-change violations. The plant can significantly reduce the generation but this is at the cost of producing reliable power for customers. Alternatively, TVA is forced to restrict the hydro operations (*e.g.*, Chickamauga Dam will be under restriction about 183 days per year by the latest TVA estimate). TVA states that preventing a rate of temperature change violation is not going to provide additional protection to the balanced indigenous population of shellfish, fish and wildlife.

The Division will not approve the variance for the rate of change criteria. The Division of Water Pollution Control believes the [rate of change] criteria is one that should be met.

E. Summary and Conclusion

TVA believes that short-term (less than a day) maximum temperature and changes in temperature from upstream to downstream that exceed the state criteria have no adverse impact on the aquatic life that is in Chickamauga Reservoir. TVA has stated that the rate of temperature change can be kept to the level specified in the criteria either by reducing power generation at the base-load Sequoyah Nuclear Plant or by restricting the operation of the dams. Both of these options are onerous since TVA believes the variance of criteria for this situation will have no discernable adverse impact to the population of aquatic life in Chickamauga Reservoir.

The Division does not believe it has a sound or proper basis to grant the 1997-requested variance. Several factors weigh against granting an expansion to the variance as requested in 1997:

i. the State water quality standards should be upheld except in rare situations where there is an extreme or impossible set of circumstances;

ii. it is reasonable for TVA to operate cooling towers to prevent or mitigate excursions of temperature criteria;

iii. the number of days of violations are relatively few and TVA is able to meet the criteria most of the time;

iv. temperature excursions in the Tennessee River at this point are not only the result of SQN discharges but also reservoir operations combined with natural

effects. The rate of temperature change criteria is not met by operation of cooling towers, but other options exist for managing the situation.

The Division proposes that the existing variance be continued as it was in the 2001 permit and that the variance requested as in 1997 permit application again be denied. The Division will continue to allow the use of the 24-hour averaging for purposes of determining compliance with instream temperature requirements. The Division does not see use of 24-hour averages for the instream evaluation as an issue that fits under a variance request.

XI. BIOMONITORING REQUIREMENTS, CHRONIC

The discharge of industrial wastewater from Outfall 101 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Tennessee Water Quality Standards criteria stipulate that "*The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions...*".

Where the stream is the source, calculation of toxicity limits follows:

$$\text{Dilution Factor} = \frac{Qs}{Qw} = DF$$

where: **Qw** is a wastewater flow (Qw = 1597 MGD) and **Qs** is a receiving stream low flow (1Q10, estimated at 3491 MGD). Please refer to Appendix 1 for specific details regarding facility discharge and receiving stream.

Therefore, IWC is Instream Waste Concentration and is calculated using the following formula:

$$IWC = \frac{Qw}{Qs} X\ 100 = \text{Instream Waste Concentration}$$

Where: $IWC \leq 1.0\ X\ IC25$; or,

INHIBITION CONCENTRATION, 25% ≥ IWC

Specifically:

Stream is Source
1Q10*
Chickamaugua Lake is "restricted low".

Stream Flow [MGD]	Wastewater Flow [MGD]	Total Flow [MGD]
3491.1	1579.2	3491.1

Station #146 is continuous read
* values shown are from flow book page 66.

DF	2.2
IC 25 >	45.2

WET testing will now be required on 45.2% effluent based on new flow data provided with this permit renewal application. Toxicity demonstrated in any of the effluent samples as specified above will constitute a violation of this permit.

The toxicity tests specified herein for Outfall 101 shall be conducted according to the B/CTP and begin during the first chemical application requiring biomonitoring following the effective date of this permit. WET frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring, monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP, monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or electronic "Deemers" report (if being used) to reflect that monitoring is not required.

XII. OTHER REQUIREMENTS

A. BEST MANAGEMENT PRACTICES

Best management practices will be included for the permit. Best management practices will apply to the facility site activity that is likely to cause or contribute to pollution of the state's waters. The best management practices under this permit may be combined into a single document with the storm water pollution prevention plan (SWPPP) required under the TMSP general permit TNR050015 if the permittee wishes.

Liquid radwaste is treated by a Liquid Radwaste System and discharged into the cooling channel. The water discharged is mixed with the cooling water and discharged through Outfall 101. Liquid radwaste treatment is to collect and treat those liquids, which are radioactive or potentially radioactive. The treatment typically includes activated carbon, cation exchange resins and a mixed bed resin. Chemical pollutant concerns are minimal, for this waste. Past data and process knowledge indicate that the effluent requirements for low volume wastes are met for this system. The liquid radwastes will be handled according to the TVA-SQN best management practices (BMP) plan.

Best management practices will be included for toxics and hazardous materials control as well as pollutants defined under the Tennessee Water Quality Control Act. The BMP plan shall also include:

1. Biocide treatments for in-plant systems, and an approved mechanism for notification and Division approval that should not delay changes needed to protect both the systems of the facility and all manner of plant and aquatic life in waters of the State. This shall be accomplished by amending the B/CTP, but should not delay the process.
2. Construction and repairs with potential for pollution contributions that are not routed to an appropriate treatment system.
3. Housekeeping and maintenance standard practices manuals.
4. Minimization of pollutants that could result from the backwash activities at Outfall 116 and Outfall 117.

B. CWA Section 316 APPLICATIONS and STUDIES

Section 316(a) allows temperature variance where balanced populations are being protected. Section 316(b) Rule (September 7, 2004) requires that intake designs be implemented to minimize adverse impacts on the aquatic life. Both of these aspects will be addressed in the permit including a re-evaluation of the mixing zone used in the permit.

C. DISCHARGE MODEL CALIBRATION

Diffuser discharges are modeled and the model results used to determine compliance. The characteristics of the model and discharge situation may vary with time. Therefore, calibration of the diffuser flows and the model will continue to be conducted as in the previous permit.

XIII. ANTIDEGRADATION

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06. This statement outlines the criteria for the two types of high quality waters. Outstanding National Resource Waters (ONRWs), as designated by the Water Quality Control Board, are commonly referred to as Tier 3 waters. Other high quality waters, as identified by the division, are commonly referred to as Tier 2 waters. Other surface waters not specifically identified and/or designated as high quality are referred to as Tier 1 waters. Some Tier 1 waters may be identified by the division as not meeting existing criteria.

The Division has made a stream tier determination of the receiving waters associated with the subject discharge(s) and has found the receiving stream to be neither a Tier 2 nor Tier 3 water. Additionally, this water is fully supporting its designated uses. The Department has maintained, and shall continue to assess, the water quality of the stream to assure that the water quality is adequate to protect the existing uses of the stream fully, and to assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

XIV. PERMIT DURATION

The proposed limitations meet the requirements of Section 301(b)(2)(A), (C), (D), (E), and (F) of the Clean Water Act as amended. It is the intent of the Division to organize the future issuance and expiration of this particular permit such that other permits located in the same watershed and group within the State of Tennessee will be set for issuance and expiration at the same time. In order to meet the target reissuance date for the Tennessee River (Hamilton Co.

Except Chattanooga) watershed and following the directives for the Watershed Management Program initiated in January 1996, the permit will be issued for a four (4) year term to expire in the year 2009.

APPENDIX 2

FACILITY DISCHARGES AND RECEIVING WATERS

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 101	
LONGITUDE	LATITUDE
85-05-14	35-12-35

FLOW (MGD)	DISCHARGE SOURCE
1553.4604	Condenser Circulating Water ("Open" mode)
40.3200	Essential Raw Cooling Water (ERCW)
2.1360	Yard Drainage Pond (9.5 Mil Gal)
	(incl. bldg. sumps, misc. air conditioner cooling water
	auxiliary bldg. cooling water, misc. waters, and
	storm water runoff from 186.4 acres of property)
1.1371	Low Volume Waste Treatment Pond
	(10 Mil Gal. Pond; Outfall 103)
37.1794	Raw Cooling Water
1634.2329	TOTAL DISCHARGE*

RECEIVING STREAM DISCHARGE ROUTE			
Tennessee River at mile 483.65			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	6250.000	5400.000	8490.000
(MGD)	4040.6	3491.1	5488.8

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X	X			

Outfall 101 identifies discharge from the Diffuser Pond to the Tennessee River and is the primary discharge of the facility.
*Note that the total discharge value may differ slightly from the schematic provided with the application, and the number used for other calculations.
The Diffuser Pond receives discharges from IMP 103 and IMP 107.

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 110	
LONGITUDE	LATITUDE
85-05-09	35-13-23

FLOW (MGD)	DISCHARGE SOURCE
1516.252	Condenser circulating water
40.320	Essential raw cooling water
37.1794	Raw cooling water
0.750	Steam generator blowdown
	Liquid radwaste, regeneration wastes from
	condensate demineralizer
1594.5014	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Discharges to intake forebay			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	NA		
(MGD)	NA	0.000	0.000

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	
INDUSTRIAL	NAVIGATION			

Discharge at Outfall 110 would occur if plant operates in "closed" mode, during which time several water systems would discharge via Outfall 110 to the plant's intake forebay. In closed mode operation, water recirculates back to the intake forebay and is pulled back into the plant intakes. Closed mode operation is not used under normal plant operations.

APPENDIX 1 (continued)

FACILITY DISCHARGES AND RECEIVING WATERS

Internal Monitoring Point

OUTFALL 103	
LONGITUDE	LATITUDE

RECEIVING STREAM DISCHARGE ROUTE			
Discharge to Diffuser pond (Outfall 101) to the Tennessee River			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
(MGD)	0.0	0.0	0.0

FLOW (MGD)	DISCHARGE SOURCE
1.1371	Condensate Demineralizer (Con DI)
	demineralizer, turbine, building sump
	and storm water runoff
1.1371	TOTAL DISCHARGE

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Varies from none to neutralization. Final treatment is provided by sedimentation and oil skimming in a 10 million gallon pond

* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Outlaw and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority, Nashville, Tennessee, 1996.

FACILITY DISCHARGES AND RECEIVING WATERS

Internal Monitoring Point

OUTFALL 107	
LONGITUDE	LATITUDE

RECEIVING STREAM DISCHARGE ROUTE			
Water is pumps into condenser circulating water channel which drains to the Diffuser Pond (Outfall 101) or is pumped to Low Volume Waste Treatment Pond (Outfall 103) which drains into the Diffuser Pond and then to the Tennessee River			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
(MGD)	NA	NA	NA

FLOW (MGD)	DISCHARGE SOURCE
0.0025	Metal cleaning wastewater and storm water
	runoff
0.0025	TOTAL DISCHARGE

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Sedimentation, neutralization, aeration and chemical precipitation into one-million gallon pond series

* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Outlaw and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority, Nashville, Tennessee, 1996.

APPENDIX 1 (continued)

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 116	
LONGITUDE	LATITUDE
85-05-13	35-13-33

FLOW (MGD)	DISCHARGE SOURCE
0.060	Washwater from the
	Condenser Circulating Water Trash Sluice
0.0600	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE
Discharges to an embayment of Chickamauga Reservoir at Tennessee River mile 485.3.

STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X	X			

This is an intermittent discharge from the backwash of debris from screen and strainers of the Condenser Cooling Water system to an embayment of the Tennessee River north of the power plant.

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 117	
LONGITUDE	LATITUDE
85-05-03	35-13-32

FLOW (MGD)	DISCHARGE SOURCE
0.0140	Backwash of the Essential Raw Water
	Intake Screen and Strainer
0.0140	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE
Discharges to Tennessee River at mile 484.9.

STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X	X			

This is an intermittent discharge from the backwash of debris from screen and strainers of the Essential Raw Cooling Water system to the Tennessee River.

APPENDIX 1 (continued)

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 118	
LONGITUDE	LATITUDE
85-05-03	35-13-32

FLOW (MGD)	DISCHARGE SOURCE
n/a	Storm water runoff only, from the inactive
	ERCW dredge pond; no industrial activity present.
0.0000	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Discharges to intake forebay			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X	X			

Discharge from the Essential Raw Cooling Water dredge pond is inactive, except for storm water runoff from the vegetated area.
This pond could be used for temporary disposal of sediment dredged from intake channel providing water to the plant. Such dredging would be conducted when there is need to restore the channel depth to acceptable level.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES
STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

EFFLUENT CHARACTERISTIC	Low Volume Waste Sources			
	§423.12(b)(3) - BPT		§423.13 - BAT	
	Average of Daily Values for 30 Consecutive Days (mg/l)	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days (mg/l)	Maximum for Any 1 Day (mg/l)
TSS	30.0	100.0	--	--
Oil & Grease	15.0	20.0	--	--
pH	6.0 - 9.0	6.0 - 9.0	--	--

Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.

2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES (CONTINUED)

40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES
STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

	Chemical Metal Cleaning Wastes*			
	§423.12(b)(5) - BPT		§423.13(e) - BAT	
EFFLUENT CHARACTERISTIC	Average of Daily Values for 30 Consecutive Days (mg/l)	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days (mg/l)	Maximum for Any 1 Day (mg/l)
TSS	30.0	100.0	--	--
Oil & Grease	15.0	20.0	--	--
Copper (T)	1.0	1.0	1.0	1.0
Iron (T)	1.0	1.0	1.0	1.0
pH	6.0 - 9.0	6.0 - 9.0	--	--

* Applicable to chemical metal cleaning wastes.

Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.

2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

3. §423.12 refers to metal cleaning wastes while §423.13 refers to chemical metal cleaning wastes only.

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES (CONTINUED)

40 CFR PART 423 EFFLUENT LIMITATION GUIDELINES
STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

	[redacted]			
	§423.12(b)(6) - BPT		§423.13(b) - BAT	
EFFLUENT CHARACTERISTIC	Average Concentration (mg/l)	Maximum Concentration (mg/l)	Average Concentration (mg/l)	Maximum Concentration (mg/l)
Free Available Chlorine	0.2 *	0.5 *	0.2 *	0.5 *
Total Residual Chlorine	--	--	--	0.20 **

* §423.12 is applicable to all plants. §423.13 is applicable to plants with a total rated electric generating capacity of less than 25 megawatts only. Neither free available chlorine nor total residual chlorine may be discharged from any single generating unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the permitting authority that the units in a particular location cannot operate at or below this level of chlorination.

** Plant with a total rated electric generating capacity of 25 or more megawatts only. Total residual chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

Note: 1. The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of once through cooling water times the concentration listed. At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified. Concentration limitations shall be those specified above.

2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

[redacted]

APPENDIX 5

PREVIOUS PERMIT LIMITS

PERMIT LIMITS

OUTFALL 101

Condenser Cooling Water, Essential Raw Cooling Water, Cooling Tower Blowdown, Raw Cooling Water, Low Volume Wastes, Metal Cleaning Waste, Sanitary Wastewater, Miscellaneous Low Volume Wastes, Including Various Facilities Drains and Sumps, A/C Condensate, Steam Generator Blowdown, High Pressure Fire Protection water, Regeneration Wastes From Condensate Demineralizer, and Storm Water Runoff

	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY			
EFFLUENT CHARACTERISTIC	AVG CONC (mg/l)	AVG AMNT (lb/day)	MAX CONC (mg/l)	MAX AMNT (lb/day)	MSRMNT FRQNCY.	SAMPLE TYPE
FLOW	–		Report (MGD)		Continuous	Recorder [1]
AMBIENT TEMP.	–		Report (Deg.C)		Continuous	Calculated
RIVER TEMP.	–		30.5 Deg.C		Continuous	Modeled [2]
CHLORINE (mg/l)	0.20	41.7	0.50	104.2	2/Week	Calculated
PCB's	NO DISCHARGE		NO DISCHARGE		Annually	Grab
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Week	Grab
OIL AND GREASE	15	–	20	–	1/Week	Grab
TSS (mg/l)	30	6256	100	20854	1/Week	Grab
IC25	Survival, Reproduction, & Growth in 43.9% Effluent				1/Quarter	Composite [3]

Samples taken in compliance with the monitoring requirements specified above shall be taken as follows: Flow - sampled at diffuser gate prior to entry to the Tennessee River; Ambient Temperature - river side of the plant intake skimmer wall; River Temperature - river temperature , temperature rise, and rate of temperature change shall be determined by numerical model.

[1] Measurements shall be made every 15 minutes at the 1-meter, 1.5-meter, and 2-meter depths and the data transmitted to the plant. Temperatures at the three depths shall be avecaged every 15 minutes to give a temperature at the 1.5 -meterdepth. Both 1-hour and 24-hour averages shall be determined every 15 minutes for the Ambient Temperature and River Temperature (i.e., running averages). The 1-hour average shall be computed by averaging the current value and the previous four 15-minute values. The 24-hour average shall be computed by averaging 15-minute values over 24 hours.

[2] See text below table for further information.

[3] See part III for further description of toxicity tests.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

PERMIT LIMITS

OUTFALL 103

Demineralizer Regeneration from Plant 2 Demineralizer, Turbine Building Sump, Treated Metal Cleaning Waste from Outfall 107 and Storm Water Runoff

	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY			
EFFLUENT CHARACTERISTIC	AVG CONC (mg/l)	AVG AMNT (lb/day)	MAX CONC (mg/l)	MAX AMNT (lb/day)	FREQUENCY	SAMPLE TYPE
FLOW	Report (MGD)		Report (MGD)		Recorder	Totalizer
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		5/Week	Grab
OIL AND GREASE	15	190	20	250	1/Week	Grab
TSS	80	980	100	1250	1/Week	24 Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Treatment Pond discharge prior to mixing with other waste streams.

Note: In the event that the Turbine Building Sump is discharged directly to the CCW Channel or the yard drainage pond, TSS, Oil and Grease, and pH shall be monitored 5/Week.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

PERMIT LIMITS

OUTFALL 107

Metal Cleaning Wastewater and Storm Water Runoff

	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY			
EFFLUENT CHARACTERISTIC	AVG CONC (mg/l)	AVG AMNT (lb/batch)	MAX CONC (mg/l)	MAX AMNT (lb/batch)	MSRMNT. FRQNCY.	SAMPLE TYPE
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0-9.0		Range 6.0-9.0		1/Day	Grab
OIL AND GREASE	–	–	15	–	1/Day	Grab
TSS			30		1/Day	Composite
COPPER (T)	–	–	1.0	–	1/Day	Composite
IRON (T)			1.0		1/Day	Composite
PHOSPHOROUS (P) [1]	–	–	1.0	–	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge from the individual pond(s) prior to mixing with any other waste stream.

[1] Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

PERMIT LIMITS

OUTFALL 110

Condenser Cooling Water, Essential Raw Cooling Water, Raw Cooling Water, Misc.

	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY			
EFFLUENT CHARACTERISTIC	AVG CONC (mg/l)	AVG AMNT (lb/batch)	MAX CONC (mg/l)	MAX AMNT (lb/batch)	MSRMNT. FRQNCY.	SAMPLE TYPE
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0-9.0		Range 6.0-9.0		1/Day	Grab
OIL AND GREASE	–	–	15	–	1/Day	Grab
TSS	30		100		1/Day	Composite
COPPER (T)	–	–	1.0	–	1/Day	Composite
IRON (T)	1.0		1.0		1/Day	Composite
PHOSPHOROUS (P) [1]	–	–	1.0	–	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge from the individual pond(s) prior to mixing with any other waste stream.

[1] Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

PERMIT LIMITS

OUTFALLS 116 and 117
Outfall 116: Backwash from the Intake for Condenser Cooling Water
Outfall 117: Backwash from the Intake for Emergency Raw Cooling Water Screen.

These discharges are permitted without chemical monitoring requirements.

There shall be no discharge of floating materials other than those previously present in the intake water.

The discharge shall not have a visible oil sheen.

The discharges shall be under the Best Management Practices to control trash and debris.

PERMIT LIMITS

OUTFALL 118
Settling Pond for Dredged Material from Intake Forebay
(Only applicable when the pond is in service)

	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY			
EFFLUENT CHARACTERISTIC	AVG CONC (mg/l)	AVG AMNT (lb/batch)	MAX CONC (mg/l)	MAX AMNT (lb/batch)	MSRMNT FRQNCY	SAMPLE TYPE
FLOW	Report (MGD)		Report MGD		Each Batch	Estimate
SETTLEABLE SOLIDS	–	–	1.0 ml/l	–	1/30	Grab[1]
TSS			100		1/7	Grab[1]
Dissolved Oxygen	–	–	2.0 Minimum	–	2/7	Grab[1]

There shall be no discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken of a discharge from the settling pond prior to mixing with the Intake Forebay.

[1] Grab samples shall be taken at these frequencies, including a grab sample to be taken immediately prior to termination of the batch discharge.

These effluent limitations and monitoring requirements only apply at times this settling pond contains is in use as settling basin for dredged sediment. Best management practices shall be used to control runoff from the pond. Examples include vegetative cover, silt fences, and/or hay bales.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

Previous Permit Language

Compliance with the river limitations (river temperature, temperature rise, and rate of temperature change) shall be monitored by means of a numerical model that solves the thermohydrodynamic equations governing the flow and thermal conditions in the reservoir. This numerical model will utilize measured values of the upstream temperature profile, flow and temperature of the diffuser discharge, releases at Watts Bar and Chickamauga Dams, and the diffuser performance characteristics. In the event that the modeling system described here is out of service, an alternate method will be employed to measure water temperatures at least one time per day. Depth average measurements can be taken at a downstream backup temperature monitor (left bank Tennessee River mile 483.4) or by grab sampling from boats. Boat sampling will include average 5-foot depth measurements (average of 3, 5, and 7-foot depths). Sampling from a boat shall be made outside the skimmer wall and at quarter points and mid-channel at downstream Tennessee river mile 483.4. Sampling from boats will be used to verify compliance with temperature rise and maximum river temperature limits. The downstream reported value will be a depth (3, 5, and 7 foot) and lateral (quarter points and midpoint) average of instream measurements. Monitoring in the alternative mode using boat sampling shall not be required when unsafe boating conditions occur.	Compliance with river temperature, temperature rise, and rate of temperature change limitations shall be applicable at the edge of a mixing zone which shall not exceed the following dimensions: (1) a maximum length of 1500 feet downstream of the diffusers, (2) a maximum width of 750 feet, and (3) a maximum length of 275 feet upstream of the diffusers. The depth of the mixing zone measured from the surface varies linearly from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes and extends to the bottom downstream of the diffusers. When the plant is operated in closed mode, the mixing zone shall also include the area of the intake forebay. Daily maximum temperatures for the ambient temperature upstream of the discharge, the downstream river temperature at the edge of the mixing zone, and temperature rise shall be determined from 24-hour average values. The average temperature shall be calculated every 15 minutes using the previous 24 hours of data, thus creating a 'rolling' average. The maximum of the ninety-six averaged observations generated by this procedure shall be reported as the daily maximum value. The maximum 24-hour average river temperature is limited to 30.5°C as a daily maximum. Since the state's criteria makes exception for exceeding the value as a result of natural conditions, where the 24-hour average ambient temperature exceeds 29.4°C and the plant is operated in helper mode (full operation of one cooling tower, at least three lift pumps, per operating unit) the maximum temperature may exceed 30.5°C. In no case shall the plant discharge cause the 1-hour average downstream river temperature to exceed the temperature of 33.9°C without the consent of the permitting authority.

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS (CONTINUED)

Previous Permit Language

The 24-hour average temperature rise shall be computed ninety-six times at 15 minute intervals. The temperature rise is the difference between the upstream ambient 24-hour average river temperature and the 24-hour average downstream temperature at the edge of the mixing zone for that 15-minute interval. The 24-hour average temperature rise shall be limited to 3.0 C° during the months of April through October. The 24-hour average temperature rise shall be limited to 5.0 C° during winter operation months of November through March. The rate of temperature change instream shall be computed at 15-minute intervals based on the current 24-hour average ambient temperature, current 24-hour-hour average river flow, and current values of flow and temperature of water discharging through the diffuser pipes (recorded every 15 minutes). The 1-hour average rate of temperature change shall be calculated for each 15-minute interval by averaging that 15-minute value with the previous four 15-minute values. The 1-hour average rate of temperature change shall be limited to 2 C° per hour.	During periods when the Essential Raw Cooling Water (ERCW) and/or Raw Cooling Water (RCW) and/or High Pressure Fire Protection (HPFP) systems are being chlorinated, the Total Residual Chlorine shall be sampled downstream of the chlorine injection points but prior to mixing with any other waste streams. Total Residual Chlorine shall be calculated for the diffuser discharge (Outfall 101) based on these analyses and the proportional flows of the Condenser Cooling Water (CCW), ERCW, RCW, and HPFP systems to indicate whether permit limits may be in danger of being exceeded. This calculation is a simple dilution calculation to project the maximum amount of chlorine that could be present at the discharge. The calculation will not allow for the decay of residual chlorine. If the condenser cooling water (CCW) system is chlorinated or none of the units are discharging flow from the CCW system, grab samples shall be collected at the diffuser gate and analyses performed not less than three days per week with four grab samples collected during one shift per day. Under no circumstances, other than that listed above, shall the results of the diffuser gate sampling be reported in lieu of the Total Residual Chlorine calculations noted herein. If continuous application of a biocide other than the chlorine/bromine mixture (longer than 2 hours per day) or use of currently approved quaternary ammonium compounds is to be utilized, the permittee will submit to the Division a plan as part of the Best Management Practices (see Part IV). The BMP plan for this activity shall describe the biocide, material feed rate, and actions proposed to ensure compliance with established effluent limitations during biocide application.

APPENDIX 4

HISTORICAL MONITORING AND INSPECTION

TVA-SQN OUTFALL 101

Parameter Code	Average Concentration	Maximum Concentration	Minimum Concentration	Maximum Amount
	mg/L	mg/L	mg/L	lb/day or MGD
BORON TOTAL (AS B) StdDev	0.0098			
BORON TOTAL (AS B) Min	0.2000	0.2		
BORON TOTAL (AS B) Max	0.2500	0.2		
BORON TOTAL (AS B) Average	0.2019	0.2		
BORON TOTAL (AS B) Count	26	1		
Flow StdDev				137.0564
Flow Min				858.0000
Flow Max				1787.0000
Flow Average				1601.0698
Flow Count				43
IC25 STATRE 7DAY CHRCERIODAPHNIA StdDev			0	
IC25 STATRE 7DAY CHRCERIODAPHNIA Min			100	
IC25 STATRE 7DAY CHRCERIODAPHNIA Max			100	
IC25 STATRE 7DAY CHRCERIODAPHNIA Average			100	
IC25 STATRE 7DAY CHRCERIODAPHNIA Count			4	
IC25 STATRE 7DAY CHRPIMEPHALES StdDev			0	
IC25 STATRE 7DAY CHRPIMEPHALES Min			100	
IC25 STATRE 7DAY CHRPIMEPHALES Max			100	
IC25 STATRE 7DAY CHRPIMEPHALES Average			100	
IC25 STATRE 7DAY CHRPIMEPHALES Count			3	
Oil and Grease StdDev	0	0		
Oil and Grease Min	5	5		
Oil and Grease Max	5	5		
Oil and Grease Average	5	5		
Oil and Grease Count	43	43		
pH StdDev		0.21	0.18	
pH Min		7.3	7	
pH Max		8	7.6	
pH Average		7.62	7.33	
pH Count		43	43	
POLYCHLORINATED BIPHENYLS (PCBS) StdDev	0			
POLYCHLORINATED BIPHENYLS (PCBS) Min	0			
POLYCHLORINATED BIPHENYLS (PCBS) Max	0			
POLYCHLORINATED BIPHENYLS (PCBS) Average	0			
POLYCHLORINATED BIPHENYLS (PCBS) Count	3			
TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG.C StdDev		0.7		
TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG.C Min		0.3		
TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG.C Max		3.4		
TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG.C Average		2.1		
TEMP. DIFF. BETWEEN SAMP. & UPSTRM DEG.C Count		43		
Temperature StdDev		9.7		
Temperature Min		9.2		
Temperature Max		43.7		
Temperature Average		27.3		
Temperature Count		82		
TEMPERATURE RATE OF CHANGE DEG. C/HR StdDev	0	0.1		0.2
TEMPERATURE RATE OF CHANGE DEG. C/HR Min	0.2	0.1		0
TEMPERATURE RATE OF CHANGE DEG. C/HR Max	0.2	0.2		1
TEMPERATURE RATE OF CHANGE DEG. C/HR Average	0.2	0.2		0.3
TEMPERATURE RATE OF CHANGE DEG. C/HR Count	2	10		46
TRC StdDev	0.004	0.007		
TRC Min	0.005	0.012		
TRC Max	0.018	0.05		
TRC Average	0.011	0.021		
TRC Count	40	40		
TSS StdDev	1.88	4.41		
TSS Min	4	5		
TSS Max	14	28		
TSS Average	5.95	8.37		
TSS Count	43	43		

HISTORICAL MONITORING AND INSPECTION (CONTINUED)

TVA-SQN OUTFALL 103

Parameter Code	Average Concentration	Maximum Concentration	Minimum Concentration	Maximum Amount
	mg/L	mg/L	mg/L	lb/day or MGD
Flow StdDev				0.585
Flow Min				1.053
Flow Max				2.813
Flow Average				1.721
Flow Count				20
Oil and Grease StdDev	0	0		26.0
Oil and Grease Min	5	5		40
Oil and Grease Max	5	5		117
Oil and Grease Average	5	5		68.5
Oil and Grease Count	20	20		20
pH StdDev		0.19	0.14	
pH Min		8.4	6.9	
pH Max		9	7.4	
pH Average		8.8	7.1	
pH Count		20	20	
TSS StdDev	3.5	5.5		83.9
TSS Min	6	11		107
TSS Max	18	35		495
TSS Average	12.6	17.85		190.4
TSS Count	20	20		20

HISTORICAL MONITORING AND INSPECTION (CONTINUED)

THERE WAS NO U.S.EPA-PCS DATA AVAILABLE FOR TVA-SQN OUTFALL 107.
THERE WAS NO U.S.EPA-PCS DATA AVAILABLE FOR TVA-SQN OUTFALL 110.
THERE WAS NO U.S.EPA-PCS DATA AVAILABLE FOR TVA-SQN OUTFALL 116.
THERE WAS NO U.S.EPA-PCS DATA AVAILABLE FOR TVA-SQN OUTFALL 117.
THERE WAS NO U.S.EPA-PCS DATA AVAILABLE FOR TVA-SQN OUTFALL 118.

APPENDIX 5a

NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

WATER QUALITY BASED EFFLUENT CALCULATIONS

WATER QUALITY BASED EFFLUENT CALCULATIONS
OUTFALL 101

FACILITY: Sequoyah Nuclear Plant
PERMIT #: TN0026450

Stream (1Q10)	Stream (3Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Stream Allocation
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
3483.0	7740.0	1597.2	10	50	90

	1	2	3	4	5	6	7	8
	Stream	Fish/Aqua. Life		Effluent	Fish & Aquatic Life Water Quality Criteria (1C20)			
	Bckgrnd.	Water Quality Criteria		Fraction	In-Stream Allowable		Calc. Effluent Concentration	
EFFLUENT CHARACTERISTIC	Conc.	Chronic	Acute	Dissolved	Chronic	Acute	Chronic	Acute
	[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
Chlorine (T. Res.)	0.000	11.000	19.000	1.000	11.000	19.000	35.0	60.4

	9	10	11	12	13	14
	Human Health Water Quality Criteria (3OC2)					
	In-Stream Criteria			Calc. Effluent Concentration		
EFFLUENT CHARACTERISTIC	Organisms	Water/Organism	DWS	Organisms	Water/Organism	DWS
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
Chlorine (T. Res.)	NA	NA	NA	NA	NA	NA

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

APPENDIX 5B

COMPARISON OF DISCHARGE LIMITATIONS

COMPARISON OF DISCHARGE LIMITATIONS FOR OUTFALL 101

MONTHLY AVERAGE LIMITS

EFFLUENT CHARACTERISTIC	CFR RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC. (mg/l)
FLOW	--	--	--	Report
AMBIENT TEMP.	--	--	--	Report
RIVER TEMP.	--	see below *	--	--
CHLORINE (Ttl.Res.)	--	0.035	0.036	0.1**
PCB's	--	--	No Discharge	No Discharge
pH	--	--	6 - 9	6 - 9
OIL AND GREASE	--	--	15	15
TSS	--	--	30	30
IC25	--	45.2	43.9%	45.2%

DAILY MAXIMUM LIMITS

EFFLUENT CHARACTERISTIC	CFR RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC. (mg/l)
FLOW	--	--	Report	Report
AMBIENT TEMP.	--	--	Report	Report
RIVER TEMP.	--	see below *	30.5° C	30.5° C
CHLORINE (Ttl.Res.)	0.200	0.060	0.058	0.1 **
PCB's	--	--	No Discharge	No Discharge
pH	--	--	6 - 9	6 - 9
OIL AND GREASE	--	--	20	20
TSS	--	--	100	100
IC25	--	--	43.9%	45.2%

* Discharge must not cause the temperature change in receiving stream to exceed 3°C relative to an upstream control point. Also, this discharge must not cause the temperature of receiving stream to exceed 30.5°C (except as a result of natural causes), and this discharge must not cause the maximum rate of temperature change in receiving stream to exceed 2°C per hour (except as a result of natural causes).

** See note in permit (Part I, Section B., 3., c., Test Procedures) about use of MDL = 0.05 mg/L.

COMPARISON OF DISCHARGE LIMITATIONS (CONTINUED)

COMPARISON OF DISCHARGE LIMITATIONS for Outfall 103

MONTHLY AVERAGE LIMITS

EFFLUENT CHARACTERISTIC	CFR * RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC.** (mg/l)
FLOW	–	–	Report	Report
pH	6.0 - 9.0	N/A	6.0 - 9.0	Range 6 - 9
OIL AND GREASE	15.000	Narrative	15 mg/L (190 Lbs/day)	15 mg/L (190 Lbs/day)
TSS	30.000	Narrative	30 mg/L (380 Lbs/day	30 mg/L (380 Lbs/day

DAILY MAXIMUM LIMITS

EFFLUENT CHARACTERISTIC	CFR * RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC.** (mg/l)
FLOW	–	–	Report	Report
pH	6.0 - 9.0	N/A	6.0 - 9.0	Range 6 - 9
OIL AND GREASE	20.000	Narrative	20 mg/L (250 Lbs/day)	20 mg/L (250 Lbs/day)
TSS	100.000	Narrative	100 mg/L (1250 Lbs/day)	100 mg/L (1250 Lbs/day)

*Note: O&G and TSS numerical limits were removed from the TN Rule 1200-4-3 when revised January 2004.
** Loading limits will change because of difference in flow reported on application.

COMPARISON OF DISCHARGE LIMITATIONS (CONTINUED)

COMPARISON OF DISCHARGE LIMITATIONS for Outfall 107

MONTHLY AVERAGE LIMITS

EFFLUENT CHARACTERISTIC	CFR** RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC.*** (mg/l)
FLOW	--	--	--	Report
pH	6.0 - 9.0	--	--	6- 9
OIL AND GREASE	15.000	--	--	--
TSS	30.000	--	--	--
COPPER (T)	1.000	--	--	--
IRON (T)	1.000	--	--	--
PHOSPHOROUS (P)	--	--	--	--

DAILY MAXIMUM LIMITS

EFFLUENT CHARACTERISTIC	CFR ** RULES AVG.CONC. (mg/l)	WATER QUALITY AVG.CONC. (mg/l)	PREVIOUS PERMIT AVG.CONC. (mg/l)	NEW LIMITS AVG.CONC.*** (mg/l)
FLOW	--	--	Report	Report
pH	6.0 - 9.0	--	6- 9	6- 9
OIL AND GREASE	20.000	--	15.000	15
TSS	100.000	--	30.000	30
COPPER (T)	1.000	--	1.000	1.0
IRON (T)	1.000	--	1.000	1.0
PHOSPHOROUS (P)	--	--	1.0 *	1.0 *

* Applies when phosphating solutions are part of the metal cleaning waste stream.
**Note: O&G and TSS numerical limits were removed from the TN Rule 1200-4-3 when revised January 2004.
*** Loading limits will change because of difference in flow reported on application.

APPENDIX 5C

NEW PERMIT LIMITS

PERMIT LIMITS

OUTFALL 101

Condenser Circulating Water, Essential Raw Cooling Water, Cooling Tower Blowdown, Raw Cooling Water, Low Volume Wastes, Metal Cleaning Waste, Sanitary Wastewater, Miscellaneous Low Volume Wastes, Including Various Facilities Drains and Sumps, A/C Condensate, Steam Generator Blowdown, High Pressure Fire Protection water, Regeneration Wastes From Condensate Demineralizer, and Storm Water Runoff

EFFLUENT CHARACTERISTICS	MAXIMUM DAILY EFFLUENT CONCENTRATIONS (Unless Noted)		MAXIMUM MONTHLY AVERAGE CONCENTRATIONS (Unless Noted)		MONITORING REQUIREMENTS	
	CONCENTRATIONS (Unless Noted)	LOADINGS (lbs/day)	CONCENTRATIONS (Unless Noted)	LOADINGS (lbs/day)	FREQUENCY	SAMPLE TYPE
FLOW	–		Report (MGD)		Continuous	Recorder [1,2]
AMBIENT TEMP.	–		Report (Deg.C)		Continuous	Calculate [1,2]
RIVER TEMP.	–		30.5 Deg.C		Continuous	Modeled [1,2]
CHLORINE (Tl.Res.)	0.10	–	0.10	–	5/Week	Calculate [2,4,5]
PCB's	NO DISCHARGE		NO DISCHARGE		Annually	Grab
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Week	Grab [4]
OIL AND GREASE	15	–	20	–	1/Month	Grab
TSS	30	–	100	–	1/Month	Grab
BORON, Total (as B)	Report		–		1/Quarter	Grab
IC25	Survival, Reproduction, & Growth In 45.2% Effluent				See Permit and Note [2]	Composite [3]

[1] Samples taken in compliance with the monitoring requirements specified above shall be taken as follows: Flow - sampled at diffuser gate prior to entry to the Tennessee River; Ambient Temperature - river side of the plant intake skimmer wall; River Temperature - river temperature , temperature rise, and rate of temperature change shall be determined by numerical model.

[2] See text below table for further information that applies to this outfall (101). WET testing frequency and results reporting will be governed by the B/CTP. However, in order to effectively track WET monitoring monthly reporting shall continue. For monitoring periods when WET testing is not required by the approved B/CTP; monitoring not required, or "MNR" shall be reported on the discharge monitoring report (DMR) or the electronic "Deemers" report (if being used) to reflect that monitoring is not required.

[3] See part III for further description of toxicity tests.

[4] pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.

[5] Total Residual Chlorine (TRC) monitoring shall be applicable when chlorine, bromine, or any other oxidants are added. The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/L unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit.

NEW PERMIT LIMITS (CONTINUED)

PERMIT LIMITS
Outfall 103
This is an internal monitoring point.
Condensate Demineralizer (CON DI), Turbine Building Sump, Treated Metal Cleaning Waste from Outfall 107, Essential Raw Cooling water, Raw Cooling water and Storm Water Runoff

EFFLUENT CHARACTERISTICS	MONTHLY AVG	DAILY MAX	MONTHLY AVG	DAILY MAX	MONITORING REQUIREMENTS	
	Lbs/Day	Lbs/Day	mg/l	mg/l	Measurement Frequency	Sample Type
FLOW	Report (MGD)		Report (MGD)		Recorder	Totalizer
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		3/Week	Grab
OIL AND GREASE	15	190	20	250	1/Week	Grab
TSS	30	380	100	1250	1/Week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Treatment Pond discharge prior to mixing with other waste streams.

Note: In the event that the Turbine Building Sump is discharged directly to the CCW Channel or the yard drainage pond, TSS, Oil and Grease, and pH shall be monitored 5/Week.

PERMIT LIMITS
Outfall 107
This is an internal monitoring point.
Metal Cleaning Wastewater and Storm Water Runoff to LVWTP (Outfall 103).

EFFLUENT CHARACTERISTICS	MONTHLY AVG	DAILY MAX	MONTHLY AVG	DAILY MAX	MONITORING REQUIREMENTS	
	Lbs/Day	Lbs/Day	mg/l	mg/l	Measurement Frequency	Sample Type
FLOW	Report (MGD)		Report (MGD)		1/Day	Calculation
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/Day	Grab
OIL AND GREASE	–	–	15	–	1/Day	Grab
TSS	–	–	30	–	1/Day	Composite
COPPER (T)	–	–	1.0	–	1/Day	Composite
IRON (T)	–	–	1.0	–	1/Day	Composite
PHOSPHOROUS (P) [1]	–	–	1.0	–	1/Day	Composite

Metal cleaning waste shall mean any cleaning compounds, rinse waters or any other waterborne residues derived from cleaning any metal process equipment.

Metal cleaning waste shall not be discharged into a pond(s) before all non-metal cleaning liquids have been removed to the extent practical without discharging previously removed solids.

In the event that metal cleaning wastes must be processed and discharged through the liquid radwaste system, the limitations and monitoring requirements above shall apply to the discharge from the liquid radwaste system prior to mixing with the Cooling Tower Blowdown.

There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge from the individual pond(s) prior to mixing with any other waste stream.

[1] Limitations and monitoring requirements shall apply only if phosphorous bearing cleaning solutions are used.

NEW PERMIT LIMITS (CONTINUED)

PERMIT LIMITS

OUTFALL 110

Condenser Circulating Water, Essential Raw Cooling Water, Raw Cooling Water, and Storm Water Runoff

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	DAILY MINIMUM	DAILY MAXIMUM	DAILY MINIMUM	DAILY MAXIMUM		
pH	Range 6.0 - 9.0		Range 6.0 - 9.0		1/7	Grab
TEMPERATURE	–	–	38.3 Deg. C		1/Day	Multi Grabs **
CHLORINE (Total Residual)	–	–	0.10	–	1/7 *	Multi Grabs **

- Limitations and monitoring requirements are applicable only during periods of closed-mode operation.
- There shall be no distinct discharge of floating scum, solids, oil sheen, visible foam, and/or other floating matter in other than trace amounts.
- Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): recycled cooling water flow prior to entering the Intake Forebay.

* Monitoring frequency shall be increased to 1/Day mutiple grab anay time the discharge is occuring and fish distress or fatality is observed in the Intake Forebay.

** Multiple Grabs shall consist of four grab samples collected during one shift each day).

NEW PERMIT LIMITS (CONTINUED)

PERMIT LIMITS

OUTFALLS 116 and 117
Outfall 116: Backwash from the Intake of the Condenser CirculatingWater
Outfall 117: Backwash from the Intake of the Essential Raw Cooling Water (ERCW) System

These discharges are permitted without chemical monitoring requirements.

There shall be no discharge of floating materials other than those previously present in the intake water.

The discharge shall not have a visible oil sheen.

The discharges shall be under the Best Management Practices to control trash and debris.

PERMIT LIMITS

OUTFALL 118
Settling Pond for Dredged Material from Intake Forebay
(Only applicable when the pond is in service)

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MAXIMUM DAILY		AVERAGE MONTHLY			
	DISCHARGE		DISCHARGE			
	Concentration	Loading	Concentration	Loading	Measurement Frequency	Sample Type
FLOW	Report (MGD)		Report MGD		1/Batch	Estimate
SETTLEABLE SOLIDS	--	--	1.0 ml/l	--	1/30	Grab [1]
TSS	--	--	100	--	2/7	Grab [1]
Dissolved Oxygen	--	--	2.0 Minimum	--	2/7	Grab [1]

There shall be no discharge of floating scum, solids, oil sheen, visible foam, and other floating matter in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken of a discharge from the settling pond prior to mixing with the Intake Forebay.

[1] Grab samples shall be taken at these frequencies, including a grab sample to be taken immediately proir to termination of the batch discharge.

These effluent limitations and monitoring requirements only apply at times when this settling pond is in use as settling basin for dredged sediment. Best management practices shall be used to control runoff from the pond. Examples include vegetative cover, silt fences, and/or hay bales.