



No. TN0005452

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 - Kingston Fossil Plant**
is authorized to discharge: **fly ash and bottom ash sluice water, storm water runoff, fire protection flushes and groundwater, coal yard runoff pond discharges including utility building drainage, coal pile and coal conveyor drainage, red water wetlands discharges, precipitator area washdown and roof drains, station sump discharges including boiler leakage, laboratory and analytical process water, boiler blowdown, miscellaneous equipment cooling and lubricating water, floor washing wastes, air conditioning cooling water, ID fan cooling water, ash system leakage and boiler bottom overflow, water treatment plant wastes, ammonia storage runoff, treated chemical and nonchemical metal cleaning wastes from Internal Monitoring Point 005 and nonchemical metal cleaning wastes from Outfall 001; once through condenser cooling water, storm water runoff, groundwater, raw water leakage and fire protection flushes, intake screen backwash, and boiler blowdown, from Outfall 002; storm water runoff, fire protection flushes, raw water leakage and noncontact cooling water from Outfall 006; storm water runoff and abandoned ash pond seepage from Outfall 007; drainage from sluice line trench from Outfall 008**
from a facility located: **in Harriman, Roane County, Tennessee**
to receiving waters named: **Clinch River at mile 2.9**
in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on: **October 1, 2003**

This permit shall expire on: **August 31, 2008**

Issuance date: **September 1, 2003**

Paul E. Davis, Director
Division of Water Pollution Control

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PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

TVA - Kingston Fossil Plant is authorized to discharge fly ash and bottom ash sluice water, storm water runoff, fire protection flushes and groundwater, coal yard runoff pond discharges including utility building drainage, coal pile and coal conveyor drainage, red water wetlands discharges, precipitator area washdown and roof drains, station sump discharges including boiler leakage, laboratory and analytical process water, boiler blowdown, miscellaneous equipment cooling and lubricating water, floor washing wastes, air conditioning cooling water, ID fan cooling water, ash system leakage and boiler bottom overflow, water treatment plant wastes, ammonia storage runoff, treated chemical and nonchemical metal cleaning wastes from Internal Monitoring Point 005 and nonchemical metal cleaning wastes from Outfall 001; once through condenser cooling water, storm water runoff, groundwater, raw water leakage and fire protection flushes, intake screen backwash, and boiler blowdown, from Outfall 002; storm water runoff, fire protection flushes, raw water leakage and noncontact cooling water from Outfall 006; storm water runoff and abandoned ash pond seepage from Outfall 007; drainage from sluice line trench from Outfall 008 to Clinch River at mile 2.9.

Outfall 001 (fly ash and bottom ash sluice water, storm water runoff, fire protection flushes and groundwater, coal yard runoff pond discharges including utility building drainage, coal pile and coal conveyor drainage, red water wetlands discharges, precipitator area washdown and roof drains, station sump discharges including boiler leakage, laboratory and analytical process water, boiler blowdown, miscellaneous equipment cooling and lubricating water, floor washing wastes, air conditioning cooling water, ID fan cooling water, ash system leakage and boiler bottom overflow, water treatment plant wastes, ammonia storage runoff, treated chemical and nonchemical metal cleaning wastes from Internal Monitoring Point 005 and nonchemical metal cleaning wastes) shall be limited and monitored by the permittee as

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		1/Week	Instantaneous
pH ²	--		Minimum of 6.0		1/Week	Grab
OIL & GREASE	14.4	--	19.4	--	1/Month	Grab
TOTAL SUSPENDED SOLIDS ³ (TSS)	29.9	--	92.0	--	1/Month	Grab
NITROGEN, AMMONIA TOTAL (at Skimmer Wall or comparable location)	--	--	Report	Report	2/Month	Grab
NITROGEN, AMMONIA TOTAL (Effluent)	--	--	Report	Report	2/Month	Grab
NITROGEN, AMMONIA TOTAL (Net Discharge)	--	--	Report ⁴	Report ⁴	2/Month	Calculated

¹ Flow shall be reported in Million Gallons per Day (MGD).

² pH analyses shall be performed within fifteen (15) minutes of sample collection.

³ The permittee shall take reasonable steps to prevent discharge of cenospheres other than in trace amounts from the outfall.

⁴ If a calculated value for net addition of ammonia as nitrogen exceeds an action concentration value of 2.85 mg/L, the permittee should investigate source(s) of ammonia, and proceed with a corrective action(s), if necessary. Furthermore, EAC -Knoxville shall be notified within 24 hours from the time the permittee receives results indicating that an action value of 2.85 mg/L was exceeded.

specified below:

TVA - Kingston Fossil Plant is authorized to discharge once through condenser cooling water, storm water runoff, groundwater, raw water leakage and fire protection flushes, intake screen backwash, and boiler blowdown from Outfall 002 to mile 2.9 of the Clinch River. Outfall 002 shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS						
OUTFALL 002						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		Daily	Pump logs
pH ²	Range 6.0 to 9.0				1/Week	Grab
TEMPERATURE, Intake	--		Report		Continuous ³	Recorder
TEMPERATURE, Effluent	--		36.1°C (97.0°F)		Daily	Calculate ³
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁴	0.038	--	0.066	--	1/Week	Grab ⁶
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁵	0.011	--	0.019	--	1/Week	Grab ⁶
TIME OF OXIDANT ADDITION (minutes/day/unit)	--		120 ⁷		1/Day	Log Records
IC25	Survival, Reproduction, & Growth in 100% Effluent				See note 8	Composite ⁸

1 Flow shall be reported in Million Gallons per Day (MGD).
 2 pH analyses shall be performed within fifteen (15) minutes of sample collection.
 3 Intake temperature is measured hourly (continuously) but reported as a daily average once per day. The daily average discharge temperature shall be calculated for the cooling channel based on the 24-hour average intake temperature, 24-hour average unit load, and the 24-hour average flow through Outfall 002.
 4 The limits depicted are applicable at flows of 654 MGD, and above, from Outfall 002. Only one (1) unit, with a flow rate of 187 MGD is allowed to be chlorinated at one time.
 5 The limits depicted are applicable at flows less than 654 MGD, in lieu of the limits shown in footnote 4.
 6 Flow weighted maximum shall be calculated from instantaneous measurements of the chlorinated discharges from a unit and adjusted for flow from the non-chlorinated units contributing to the discharge. The calculated flow-weighted maximum will be used for determination of compliance with the daily maximum limitation. Except for periods of macroinvertebrate control when oxidant addition is required (see Permit - Part III), samples shall be taken once at the beginning of the period of chlorination for one unit and once every 15 minutes thereafter. At the end of the period of chlorination for that unit, one sample shall be taken. Sampling for these oxidants is not required when there is no chlorine/bromine added during that day. TRC analyses shall be performed within fifteen (15) minutes of sample collection.
 7 Application of a oxidant (bromine/chlorine) beyond the 120 minutes per day will be allowed to facilitate nuisance macroinvertebrate control according to the Plan for such activities described in Permit - Part III.
 8 See Part III for sampling requirements and monitoring frequency of toxicity tests.

TVA - Kingston Fossil Plant is authorized to discharge chemical and nonchemical metal cleaning wastewaters from the batch treatment ponds through an internal monitoring point named Internal Monitoring Point (IMP) 005 to the ash pond. IMP 005 shall be limited and monitored by the permittee as specified below:

PERMIT LIMITS						
INTERNAL MONITORING POINT 005 Nonchemical and Chemical Metal Cleaning Wastes						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/Batch	Estimate *
IRON, TOTAL	1.0	--	1.0	--	**	Grab
COPPER, TOTAL	1.0	--	1.0	--	**	Grab

Metal cleaning wastes shall mean any cleaning compounds, rinse waters, or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning.

* Flow shall be based on beginning and ending staff gage readings of the pond and reported in Million Gallons per Day (MGD).

** Samples shall be taken at the beginning and end of a discharge event for each batch treated.

Outfalls 006, 007, and 008 convey comparatively minor waste streams: storm water runoff, fire protection flushes, raw water leakage and noncontact cooling water from Outfall 006; storm water runoff and abandoned ash pond seepage from Outfall 007; drainage from sluice line trench from Outfall 008. All three outfalls are discharging into the facility's intake channel which ultimately discharges via Outfall 002. The combined flow from all three discharges is 0.588 MGD, which constitutes approximately 0.045% of the total flow used for cooling and other purposes at the facility. Consequently, there will be no numeric effluent limitations or specific monitoring requirements established for discharges from Outfalls 006, 007 and 008.

Additional monitoring requirements and conditions applicable to all outfalls include:

There shall be no discharge of PCBs.

There shall be no distinctly visible floating scum, oil or other matter contained in the wastewater discharge. 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 which 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.

The permittee is further authorized to discharge intake screen backwash to the Clinch River via the plant's discharge channel (Outfall 002) without limitations or monitoring requirements. There shall be no discharge of materials other than those previously present in the intake water. The discharge shall not have a visible oil sheen.

For the purpose of evaluating compliance with the permit limits established herein, where certain limits are below the State of Tennessee published required detection levels (RDLs) for any given effluent characteristics, the results of analyses below the RDL shall be reported as below detection level (expressed as a numeric value), unless in specific cases other detection limits are demonstrated to be the best achievable because of the particular nature of the wastewater being analyzed.

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.

For Outfall 001, monitoring of the ash pond effluent shall be conducted after treatment, and prior to mixing with uncontaminated storm water runoff or the receiving stream.

For Outfall 002, monitoring shall be conducted as follows:

To demonstrate compliance with the Total Residual Oxidant, samples shall be taken after discharge from each of the cooling units and compliance with the limitations shall be calculated based on dilution, if any, from other nonchlorinated flows discharging through Outfall 002.

To demonstrate compliance with the Intake Temperature monitoring requirements, samples shall be taken at the plant intake.

To demonstrate compliance with the Discharge Temperature monitoring requirements, samples shall be calculated for the combined cooling water effluent prior to discharge or mixing with the receiving stream.

To demonstrate compliance with the pH and toxicity limitations, samples shall be taken at the barge mooring cell downstream on the left bank of the discharge channel.

For Internal Monitoring Point (IMP) 005, monitoring shall be conducted as follows:

To demonstrate compliance with the limits and conditions, monitoring shall be conducted after treatment, and prior to mixing with uncontaminated storm water runoff or the ash pond.

2. Sampling Frequency

If there is a discharge from a permitted outfall on any given day during the monitoring period, the permittee must sample and report the results of analyses accordingly, and the permittee should not mark the 'No Discharge' box on the Discharge Monitoring Report form.

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, promulgated pursuant to Section 304 (h) of the Act.

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.

A **Composite Sample**, for the purposes of this permit, is a sample collected continuously over a period of 24-hours at a rate proportional to the flow. Composite sample should be a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

A **Grab Sample**, for the purposes of this permit, is defined as a single effluent sample of at least 100 milliliters collected at a randomly selected time 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 for all facility Outfalls and Internal Monitoring Points shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) Forms supplied by the Division of Water Pollution Control or comparable forms supplied by the permittee. The top two copies of each report are to be submitted. A copy should be retained for the permittee's files.

Submittals of paper reports shall be made or postmarked no later than 15 days after the completion of the reporting period. Submittals made on computerized media may be submitted by the last working day of the month after the reporting period. Discharge Monitoring Reports or other communications regarding data submissions or compliance with the terms of the permit shall 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 will be accepted only if approved in writing by the division. For purposes of determining compliance with this permit, data submitted in electronic format will carry the same weight as 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 Results and/or Reports

Knowingly making any false statement on any report required by this permit or falsifying any result 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.

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 permittees 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 bypass 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 flow measurement industry 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 an overflow. 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 **only** 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 to the Division of Water Pollution Control in the appropriate Environmental Assistance Center within 24-hours by telephone. 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:

**TREATED INDUSTRIAL WASTEWATER, ASH POND DISCHARGES,
AND STORM WATER RUNOFF
TVA - Kingston Fossil Plant
(Permittee's Phone Number)
NPDES Permit NO. TN0005452
TENNESSEE DIVISION OF WATER POLLUTION CONTROL
1-888-891-8332 WPC ENVIRONMENTAL ASSISTANCE CENTER**

**CONDENSER COOLING WATER, BOILER BLOWDOWN, TREATED
INDUSTRIAL WASTEWATER FROM OUTFALL 001, AND STORM WATER
RUNOFF
TVA - Kingston Fossil Plant
(Permittee's Phone Number)
NPDES Permit NO. TN0005452
TENNESSEE DIVISION OF WATER POLLUTION CONTROL
1-888-891-8332 WPC ENVIRONMENTAL ASSISTANCE CENTER**

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 the same samples of final effluent from Outfall 002.

The measured endpoint for toxicity will 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 will 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					
Permit Limit (PL)	0.50 X PL	0.25 X PL	0.125 X PL	0.0625 X PL	Control
% effluent					
100	50	25	12.5	6.25	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 Water 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 or equal to the permit limit indicated for each outfall in the above table(s). However, if intake samples (tested concurrently with the effluent) are shown to be toxic enough to represent a test failure (100 percent samples statistically less than controls using t-tests and minnow growth 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 which is not consistent with the intake toxicity conditions specified above constitutes a violation of this permit. The permittee is allowed to treat samples collected for toxicity testing on *Pimephales promelas* with UV radiation only in accordance with subsequent written approval from the division.

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 shall be conducted Annually (1/Year) for Outfall 002 and begin no later than 90 days from the effective date of this permit. Every effort should be made to perform annual toxicity testing at different seasons during each of the monitoring periods for the term of this permit (5 years).

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 Water 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 Water 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:

**Environmental Assistance Center- Knoxville
Division of Water Pollution Control
2700 Middlebrook Pike, Suite 220
Knoxville, TN 37921-**

F. ASH POND VOLUME

Beginning on the effective date of this permit and lasting until the expiration date, the permittee shall provide and maintain a minimum free water volume in the ash pond of 102 million gallons. As needed, the permittee shall remove settled material from the pond, or otherwise enlarge the available storage capacity in order to maintain the required minimum free water volume. The permittee shall certify annually that the required volume is maintained and shall submit the report to the division with the monthly discharge monitoring report once per year. Certification shall be based upon physical surveys conducted every two years and estimates of ash volumes generated/removed in the intervening years.

G. DIKE INSPECTIONS

The permittee shall, as an internal monitoring procedure, visually inspect the ash pond dikes and toe areas at least quarterly for seepage. An annual report should be submitted to the division's Environmental Assistance Center – Knoxville, reporting the findings of these investigations and any remedial activities implemented.

H. USE OF TOXIC CHEMICALS

The permittee shall practice due diligence in evaluating any material that could potentially be discharged via the NPDES outfalls. The permittee shall evaluate the following:

1. Name and general composition of the chemical,
2. Frequency of use,
3. Quantities to be used,
4. Proposed discharge concentrations,
5. Existing 96-hour LC₅₀ toxicity data (including laboratory reports if available) for available aquatic species,
6. Product Data Sheet, and,
7. Product label or copy of the product label.

Discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream which may ultimately be released to lakes, rivers, streams or other surface waters of the State is prohibited unless authorized in writing by the division. This requirement is not applicable to products used for lawn and agricultural purpose. This requirement is also not applicable to herbicides used in accordance with labeled instructions and any applicable State permit. Discharge of chlorine from the use of chlorine gas, sodium hypochlorite, or other similar compounds for disinfection in plant potable and service water systems and in sewage treatment is authorized as are similar compounds in once-through cooling water.

I. MACROINVERTEBRATE CONTROL MEASURES

The permittee shall submit a plan to the division if biocides are to be used for macroinvertebrate control at the site. If this is implemented at this facility, the permittee will submit a plan to the division describing the macroinvertebrate controls to be utilized, material feed rate(s), and proposed monitoring schedule to verify that effluent limitations are being met and water quality is being protected. Use of biocides may warrant modification of this permit to include additional monitoring or permit limitations.

J. RE-ROUTING FLOWS FOR MAINTENANCE PURPOSES

The permittee shall be allowed to re-route flows past normal monitoring points as a temporary measure for maintenance activities. However, such re-routing must be done in such a way that permit limitations are still being met in the receiving waters and compliance with permit limitations is monitored and reported on the Discharge Monitoring Reports for the re-routed flows. The receiving waters must be the same for the re-routed flows as for the normal discharges.

PART IV

STORM WATER POLLUTION PREVENTION PLAN

Storm water runoff at the TVA - Kingston Fossil Plant that is not discharged through permitted outfalls as described in Part I.A. of this permit is authorized under the Tennessee Storm Water Multi Sector General Permit for Industrial Activities (TMSP), Permit Number TNR051787. The TMSP requires the permittee to prepare and implement a storm water pollution prevention plan (SWPPP) prior to November 30, 1997. The permittee shall ensure that the facility SWPPP incorporates appropriate pollution prevention measures that minimize the discharge of pollutants in stormwater routed through permitted outfalls. Any necessary plan modifications shall be completed within 180 days after the effective date of this permit.

ATTACHMENT I

**TVA - Kingston Fossil Plant
NPDES Permit TN0005452**

**RESULTS OF BIOLOGICAL MONITORING IN THE VICINITY
OF KINGSTON FOSSIL PLANT DURING AUTUMN 2001 IN
SUPPORT OF A CONTINUED 316(a) VARIANCE**

RATIONALE

TVA - Kingston Fossil Plant
NPDES PERMIT NO. TN0005452
Harriman, Roane County, Tennessee

Permit Writer: Mr. Vojin Janjic

I. DISCHARGER

TVA - Kingston Fossil Plant
714 Swan Pond Road
Harriman, Roane County, Tennessee

Official Contact Person:
Ms. Linda Campbell
Program Administrator (Environmental)
(865) 717-2157

Nature of Business:
fossil-fueled steam-electric generating plant with 9
coal-fired units with a combined rated capacity of
1,700 megawatts

SIC Code(s): 4911 (Electric, Gas, and Sanitary Services,
Electric Services subcategory)
Industrial Classification: Primary
Discharger Rating: Major

II. PERMIT STATUS

Application for renewal received December 23, 2002

Watershed Scheduling

Environmental Assistance Center: Knoxville
Primary Longitude: -84.505556 Primary Latitude: 35.904167
Hydrocode: 6010207 Watershed Group: 3
Watershed Identification: Clinch-Lower
Target Reissuance Year: 2008

III. FACILITY DISCHARGES AND RECEIVING WATERS

TVA - Kingston Fossil Plant discharges fly ash and bottom ash sluice waters, pumping basin discharges including storm water runoff from the coal pile and utility building areas, treated chemical and nonchemical metal cleaning wastes from Internal Monitoring Point 005, nonchemical metal cleaning wastes, water treatment plant wastes, station sump discharges including ash system leakage and boiler bottom overflow, floor washing wastewater, miscellaneous equipment cooling and lubricating water, boiler makeup water leakage, analytical process water, roof drains, precipitator washdown water, and redwater treatment wetlands discharges from Outfall 001, once through condenser cooling water, boiler blowdown water, lab sample station water, intake screen backwash, miscellaneous equipment cooling water and storm water runoff from Outfall 002, storm water and non-contact cooling water from Outfall 006, storm water runoff and abandoned ash pond area seepage from Outfall 007, and drainage from sluice line trench from Outfall 008 to Clinch River at mile 2.9. Internal Monitoring Point (IMP) 005 represents a combination of discharges from the copper and iron chemical metal cleaning waste ponds, prior to combination with the fly and bottom ash sluice wastewaters and the ash pond. Appendix 1 summarizes facility discharges and the receiving stream information for Outfalls 001 and 002, as well as the IMP 005.

Discharged wastewater originates from the process of generation of electric power from a fossil-fueled steam-electric plant. The plant has 9 coal-fired units with a combined rated capacity of 1,700 megawatts.

Storm water discharges associated with the industrial activity of this facility are covered by the Tennessee Multi-Sector General Storm Water Permit TNR051787. Storm water concerns associated with this facility are covered in this general permit and will, therefore, not be addressed in the new permit.

IV. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

The subject facility is classified under SIC code 4911, "Electric, Gas, and Sanitary Services", "Electric Services" subcategory. Best Practicable Control Technology (BPT) and Best Available Technology Economically Achievable (BAT) limitations for several effluent characteristics are given in sections §423.12 and §423.13 respectively for the following wastestreams: fly ash and bottom ash transport water, metal cleaning wastes, once through cooling water (main condensers), cooling tower blowdown, coal pile runoff, and low volume waste sources. Low volume waste sources are defined in §423.11(b) as "*...wastewater from all sources except those for which specific limitations are otherwise established...*".

Consequently, 40 CFR Part 423, "Steam Electric Power Generating Point Source Category" effluent guidelines are applicable to the process wastewater discharges from Outfalls 001 and 002, as well as the Internal Monitoring Point 005. Appendix 2 lists the various BPT and BAT effluent guidelines applicable to the various waste streams from these outfalls and internal monitoring points.

Of particular importance are §423.12(b)(12) and §423.13(h) which state that when regulated wastestreams are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in §423.12 and §423.13 attributable to each controlled waste source shall not exceed the specified limitation for that waste source. These sections were

interpreted in consideration of a USEPA Memorandum dated August 22, 1985 entitled "Guidance for NPDES Permits Issued to Steam Electric Power Plants." In view of the fact that the combined wastestreams of certain CFR limited discharges are combined and treated in the facility metal cleaning waste treatment ponds prior to discharge through Internal Monitoring Point 005 and eventually through Outfall 001, the effluent limits set forth in this permit for Internal Monitoring Point 005 have been established in accordance with the methods described in the guidance.

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, TVA - Kingston Fossil Plant did not have difficulty in meeting effluent limitations as outlined in the previous permit. One exceedance of IC-25 static renewal 7-day chronic biomonitoring limitation for Pimephales Promelas (16.7%) was reported in May 2001. According to the TVA letter from December 20, 2002, exceedance of chronic toxicity limitation appears to be associated with toxicity in the intake water. A summary of the data reported on Discharge Monitoring Report forms during the previous permit term is summarized in Appendix 4.

VII. NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

The proposed new permit limits have been selected by determining a technology-based limit and evaluating if that limit protects the water quality of the receiving stream. If the technology-based limit would cause violations of water quality, 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 maximum effluent limits for effluent limited segments per Rule 1200-4-5-.03(2); or by way of operational and/or treatability data. Furthermore, effluent limitations in this permit must comply with any approved Total Maximum Daily Load (TMDL) studies. Appendix 5 lists all proposed effluent limitations and monitoring requirements to be included in the new permit.

The following formulas are used to evaluate water quality protection:

$$C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

where:

C_m = resulting in-stream concentration after mixing
C_w = concentration of pollutant in wastewater
C_s = stream background concentration
Q_w = wastewater flow
Q_s = stream low flow

to protect water quality:

$$C_w \leq \frac{(S_A) [C_m (Q_s + Q_w) - Q_s C_s]}{Q_w}$$

where (S_A) is the percent "Stream Allocation".

Calculations for this permit have been done using a standardized worksheet titled "Water Quality Based Effluent Calculations." 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 water quality calculations are 25 mg/L and 400 mg/L respectively.

4. Background concentrations are determined from the division data base, 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 (C_w). 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:

$$CCC = (\exp \{ m_c [\ln (\text{stream hardness})] + b_c \}) (CCF)$$

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:

$$CMC = (\exp \{ m_a [\ln (\text{stream hardness})] + b_a \}) (ACF)$$

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:

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

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 chronic 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 acute 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 should then be compared to any technology based (CFR or Tennessee "Rules") effluent limitations, and/or any previous permit limitations, for final determination of the permit limits.

Internal Monitoring Point 005

Treated chemical and non-chemical metal cleaning wastes are discharged from Internal Monitoring Point (IMP) 005, which discharges its effluent via Outfall 001 to Clinch (Emory) River. Due to the additional treatment and large dilution provided by the ash pond (~6,418 to 1), compliance with some of the requirements of 40 CFR §423.12(b)(5) and §423.13(e) for facility metal cleaning wastes, specifically pH, TSS and Oil and Grease will be verified at Outfall 001. Monitoring at IMP 005 will be required for Flow, Total Copper, and Total Iron. Such effluent limitations are consistent with monitoring requirements contained in the previous permit. Furthermore, limits specified at Outfall 001 (ash pond discharge) for TSS and Oil & Grease are more stringent than those specified in §423.12(b)(5) and will therefore assure compliance with these regulations.

Considering the nature of an effluent collection and discharge system, the sample type for Total Copper and Total Iron will be grab. The monitoring frequency will be once per discharge. Samples shall be taken at the beginning and end of a discharge event for each batch treated. Flow shall be estimated from pump logs and reported in Million Gallons per Day (MGD).

Outfall 001

TVA - Kingston Fossil Plant discharges fly ash and bottom ash sluice waters, pumping basin discharges including storm water runoff from the coal pile and utility building areas, chemical and nonchemical metal cleaning wastes (monitored at Internal Monitoring Point 005), water treatment plant wastes, station sump discharges including ash system leakage and boiler bottom overflow, floor washing wastewater, miscellaneous equipment cooling and lubricating water, boiler makeup water leakage, analytical process water, roof drains, precipitator washdown water, and redwater treatment wetlands discharges from Outfall 001 to Clinch (Emory) River.

Oil & Grease and Total Suspended Solids (TSS)

40 CFR §423.12(b)(12) (the requirement in §423.13(h) is similar) states that: *"In the event waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (b)(1) through (11) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source."*

Guidance as to the implementation of these regulations is provided in "Guidance for Co-treatment Facilities at Steam Electric Power Plants" (Attachment to US EPA Memorandum dated August 22, 1985). Since Outfall 001 is comprised of a number of regulated and unregulated wastestreams which receive co-treatment in the ash pond prior to discharge, the

division will establish limits for TSS and Oil & Grease for the combined discharge according to the methods contained in this guidance.

For situations in which dry weather flows are combined with coal pile runoff and unregulated wet weather flows in a co-treatment facility (ash pond), permit limits are based on flow-weighted dry weather limitations when it can be demonstrated that the co-treatment facility has sufficient capacity to provide the specified minimum level of treatment to comply with BPT and BAT limitations. A co-treatment facility is considered to have sufficient capacity if the minimum free water volume (FWV) is in excess of the calculated required volume. This required volume is the sum of the following volumes:

1. Rainfall directly on the entire pond area (234.88 acres) resulting from a 10-year, 24-hour rainfall event (10y24h rainfall);
2. All rainfall related flows to the ash pond resulting from the 10y24h rainfall (81.9 acre coal yard and 28.1 acres of property designated as "Area F-15");
3. Maximum dry weather waste stream flows to the ash pond over a 24 hour period;
4. Solids added to the sediment level of the co-treatment facility during the term of the permit.

Free water volume required by the previous permit was 102 MG. The parameters used to determine the free water volume of the ash pond are very similar to the ones used during the previous permit issuance. Calculations of FWV, summarized in Appendix 5a, indicate that a required total required volume is 77.45 MG. The FWV of 77.45 MG was calculated from the maximum plant flow and runoff to the ash pond (not solids to be added). According to documents in the division's files, TVA monitors the FWV of all its coal burning plants, including TVA - Kingston Fossil Plant, on a regular basis. Taken into consideration during FWV monitoring are expected annual power generation and fuel consumption, the ash content of fuel, and dredging schedules. According to TVA, dredging operations are conducted in such a manner that the permit FWV is always maintained. It is, therefore, unnecessary to include the estimated amount of solids to be added to the ash pond in the permit FWV calculation.

TVA has agreed that dredging operations have and will be conducted in such a manner that this FWV is always maintained. In addition, annual surveys are conducted to support the maintained FWV. For these reasons, since the previous permit had a free water volume minimum stipulation of 102 MG, even though these calculations require a minimum of 77.45 MG, the new permit will maintain the previous permit requirement. Permit limits for TSS and Oil & Grease are therefore based on flow-weighted dry weather limitations (see Appendices 5b and 5c). There are no promulgated numerical water quality criteria for these parameters in Tennessee. The monitoring frequency for TSS and Oil & Grease at Outfall 001 will be retained at once per month from the previous permit.

pH

As a result of a previous correspondence with the permittee, and permit issuance experience from similar facilities across the State of Tennessee, the division concluded that the maximum pH limit at Outfall 001 of 9.0 is unnecessary since the low volume waste stream from Outfall 001 commingles with the condenser cooling water flow prior to discharge to Clinch (Emory) River. The condenser cooling water flow (>1,315 MGD) into the holding pond is considerably larger than the low volume wastes discharge, thereby affording significant dilution. It should be noted that the previous permits issued for the TVA - Kingston Fossil Plant did not set a maximum pH limit for Internal Monitoring Point 005 for this very reason.

Nevertheless, a pH range limit of 6.0 to 9.0 will be retained for the discharge from Outfall 002. This would ensure the protection of water quality and, likewise, follow the federal guidelines promulgated by the EPA in 40 CFR §423.12(b)(1) which states "The pH of all discharges, except for once through cooling water, shall be in the range of 6.0 to 9.0."

Again, in reference to the federal guidelines, the EPA has stated in a letter from the EPA Region IV National Expert to an EPA Environmental Engineer in Region II, dated February 24, 1986, that "It has always been my understanding that where low volume wastes from a steam electric power plant are commingled with once through cooling water prior to discharge to waters of the U.S., pH limitations for the commingled stream are applicable at the combined discharge point to waters of the U.S. This guideline is to be applied at the point of discharge to waters of the U.S. In developing the regulation, once through cooling water was not subject to a pH limitation since the pH of the intake water is virtually unchanged by passage through the condensers, even during chlorination. In the case of pH, ... combination of low volume wastes with once through cooling water ... produces chemical neutralization, utilizing ambient intake water chemicals instead of added chemicals."

The pH monitoring frequency at Outfall 001 will be retained at once per week from the previous permit.

Ammonia, Nitrogen Total

Selective Catalytic Reduction (SCR) equipment will be used at TVA - Kingston Fossil Plant in order to lower nitrogen oxide stack emissions, as mandated by the Tennessee Air Quality Board. Performance testing of a nitrous oxide (NO_x) control system at TVA - Kingston Fossil Plant was approved in the division's previous correspondence from January 2002. During the testing period, ammonia (and natural gas) were injected into Unit 9 boiler to remove NO_x from the air waste stream. Potentially affected were Outfalls 001 and 002. TVA is investigating various options to mitigate the ammoniated discharge once the NO_x-control technology is installed. Mitigation options include rerouting 001 discharge to the condenser cooling water discharge, installing a diffuser at the 001 discharge or modeling a submerged discharge at 001 to facilitate mixing.

Wastewater volume discharged from either outfall is not expected to change. However, the potential exists for effluent discharged from Outfall 001 to contain increased amounts of ammonia nitrogen. According to information TVA submitted with the permit application, worst case concentrations of ammonia introduced from NO_x-control technology are expected to be approximately 2.85 mg/L, assuming no biological uptake. Although such discharge is will not cause a measurable increase of ammonia concentration in the receiving stream, the proposed permit will incorporate monitoring at Outfall 001. Monitoring, on a report basis, will include inflow (sampled at the skimmer wall or at a comparable location) and effluent from Outfall 001. A net discharge will also be calculated and reported. In addition, the installation of diffusers for the pipes comprising Outfall 001 was selected as the appropriate mitigation technology and TVA is in the process of installation. If a calculated value for net addition of ammonia as nitrogen exceeds an action concentration value of 2.85 mg/L, the permittee should investigate source(s) of ammonia, and proceed with a corrective action(s), if necessary. Furthermore, EAC -Knoxville shall be notified within 24 hours from the time the permittee receives results indicating that an action value of 2.85 mg/L was exceeded. Monitoring will be performed on a 2/Month basis, using grab samples.

Outfall 002

Outfall 002 is comprised primarily of process wastewaters associated with the condenser cooling processes as outlined in Appendix 1. It should be noted that storm water runoff from the South Transformer Yard and the Switchyard are covered under the facility's TMSP Number TNR051787. From the table in Appendix 1, it can be determined that the total process waste flow is approximately 1296.627 MGD and the total of all flows is 1296.912 MGD. Accordingly, certain BPT/BAT effluent guidelines will be apportioned to the process flows and certain TN rules pursuant to Section 1200-4-5-.03 will be allocated to the nonprocess flows (see Appendix 5b). However, in this particular instance, Tennessee Water Quality Standards are more stringent than those promulgated by CFR guidelines. Consequently, the results of these water quality calculations are tabulated in Appendix 5c and are further referenced in more detail in the following discussion of Total Residual Oxidants.

Total Residual Oxidants

Of particular interest with respect to this outfall is the calculation of Total Residual Oxidant, as Chlorine (Cl_2). Since the intake water may contain bromides as well as chlorine, permit limitations on the discharge of chlorine related pollutants are provided for "Total Residual Oxidants" (TRO) rather than "Total Residual Chlorine" in accordance with 40 CFR §423.11(a). Additionally, since TRO analysis methodology is not included in 40 CFR §136, for the purpose of this permit TRO measurements shall be made using the amperometric titration, DPD colorimetric, or specific ion electrode method for total residual chlorine as defined in 40 CFR §136.

In calculating the total residual oxidant limitations promulgated in this permit, the division considered the estimated stream low flows as well as the estimates of flow conditions under various "unit" operations. For the purpose of this permit, the division has assumed that the minimum operating conditions at this facility would reflect the operation of 1 unit running full open at 187 MGD (being chlorinated accordingly), 2 similar units (187 MGD each) being operated at 50% of capacity, 4 of the smaller units (140 MGD each) being operated at 50% of capacity, and 2 smaller units (140 MGD each) being held in reserve. The calculation of this minimum operating volume is as follows:

$$\text{Minimum flow} = (187 \text{ MGD}) + 0.50 \times (187 \text{ MGD} \times 2) + 0.50 \times (140 \text{ MGD} \times 4) = 654 \text{ MGD}$$

In light of the recirculating flow conditions which this facility was designed to operate under, and the fact that the estimated low flow conditions in-stream of 155.8 MGD are substantially lower than the 654 MGD necessary to maintain minimum operating conditions, the division has decided to forego any attempts to reconcile the low flow conditions of the receiving stream with the minimum water volume necessary to sustain the operations at the facility. For this reason, the division is assuming that during periods when the facility is operating during minimum capacity, and under low flow conditions, the volume of water necessary to continue operations in a recirculating system is equal to 654 MGD. Furthermore, since only 187 MGD, or 1 unit, will be allowed to be chlorinated at one time, a dilution factor of 654 to 187, or 3.5 to 1, will be used in determining the total residual oxidant concentration allowable in the discharge from Outfall 002. Appendix 2 shows that the BAT required discharge concentration for total residual oxidant (as Chlorine) is 0.2 mg/l, and is, therefore, less stringent than the water quality based calculations using the 3.5 to 1 dilution factor and EPA in-stream concentrations of 0.011 mg/l and 0.019 mg/l for the monthly average and daily maximum, respectively. Consequently, water quality is determinative of the total residual oxidant limits in this new permit (See Appendix 5d). However, these new limits will only be in effect so long as the total flow from

Outfall 002 is equal to or exceeds 654 MGD. Should the discharge be less than this figure, the permittee will be required to meet total residual oxidant limits of 0.011 mg/l and 0.019 mg/l for the monthly average and daily maximum concentrations, respectively.

Thermal Discharges (316(a) and (b) Variance)

The thermal component of the facilities' condenser cooling water discharge through Outfall 002 is subject to compliance with certain Tennessee Water Quality Standards (the "TN Standards"). Section 1200-4-.03 of the TN Standards provides that heated water discharges shall not cause the maximum receiving water temperature to exceed 3°C relative to an upstream control point nor to exceed 30.5°C. This section also provides that the maximum rate of water temperature change shall not exceed 2°C per hour. Section 1200-3-.04 of the TN Standards provides for a mixing zone defined as 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 must be restricted in area and length and must neither prevent the free passage of fish, cause aquatic life mortality in the receiving waters, nor adversely affect nursery and spawning areas.

Notwithstanding these requirements, Section 316(a) of the Clean Water Act (the "Act") allows the permitting authority to impose alternative and less stringent thermal limitations after demonstration that the water quality standards limitations are more stringent than necessary to ensure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the receiving water. In addition, Section 316(b) of the Act requires that the location, design, construction, and capacity of a cooling water intake structure reflect the best technology available for minimizing environmental impacts.

As a part of permitting activities on the previous NPDES permit, TVA provided information to support its request that a daily maximum condenser cooling water discharge temperature limitation of 36.1°C (97°F) be allowed under Section 316(a) of the Act. A determination was made on April 30, 1976, that the permittee had submitted adequate information to demonstrate that such alternative limitations on the thermal component of the facilities' condenser cooling water discharge will ensure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the Watts Bar Reservoir of the Tennessee, Clinch, and Emory Rivers.

The aforementioned determination was based upon a review of the results of Watts Bar Reservoir biological studies which TVA conducted in the vicinity of the Kingston Fossil Plant from June, 1973 through September, 1975. These studies consisted of an examination of the phytoplankton, periphyton, zooplankton, benthic macroinvertebrate, aquatic macrophyte, and fish communities. The fish studies consisted of gill netting, shoreline seining, electrofishing, and an examination of cove rotenone data collected over a 20-year period to assess fish passage, abundance, reproduction, length to weight relationships, and growth.

TVA's investigations demonstrated that the amount of desirable habitat for benthic organisms is limited in the vicinity of the facility because of the bottom contour of the reservoir, but that available habitat is colonized by diverse communities of benthic organisms. No unusual distribution of the abundant zooplankton fauna was found to exist because of the facilities' thermal discharges, and no significant change in zooplankton biomass was found in the thermally influenced area. Phytoplankton communities were found to be dominated by diatoms and green algae, and blue-green algae were never present in nuisance levels. All species of fish present before the plant became operable were present in the 1974 sampling

period, the diversity of the fish community was found to be adequate, and young-of-the-year fish data suggested that fish reproduction is adequate.

On December 21, 1999, as part of its application for reissuance of the NPDES permit, TVA requested that the Section 316(a) variance be continued. To support its request, TVA has stated that no significant change in the operation of the facility has occurred which would increase the quantity or degree of heated water discharged to Watts Bar Reservoir. In addition, TVA has stated that to the best of its knowledge, no significant change has occurred to the aquatic biological community of Watts Bar Reservoir (Tennessee, Clinch, and Emory Rivers) in the vicinity of the facilities' outfall. The initial determination was reevaluated and confirmed by TVA in numerous studies of the reservoir system. The studies were prepared by the TVA's Division of Water Control Planning, Environmental Laboratory, Division of Environmental Planning, Division of Forestry, Fisheries, and Wildlife Development, and are dated November 1974 through August 1999. A copy of a summary of Aquatic Ecological Health Determinations for TVA Reservoirs, dated August 1999, was a part of the previous permit, and is available for review in the division's files. The report showed that in the Mainstream Reservoir Class, aquatic biological community of Watts Bar Reservoir (Tennessee, Clinch, and Emory Rivers) had received an Ecological Health Score of 67/100 (Fair).

A report named "Results of Biological Monitoring in the Vicinity of Kingston Fossil Plant during Autumn 2001 in Support of a Continued 316(a) Variance" was submitted as a part application for NPDES permit renewal. A copy of the report is included with this permit as Attachment I. The conclusion of the report was that the Kingston Fossil Plant effluent is not adversely impacting the resident fish community. Based on the above factors and information, a determination has been made that continuation of the 316(a) variance is appropriate in the reissuance of this permit.

On November 10, 1977, a determination was also made in accordance with Section 316(b) of the Act that the location, design, construction, and capacity of the facilities' cooling water intake structure reflects the best technology available for minimizing adverse environmental impacts. This determination was based on the results of impingement and entrainment studies conducted by TVA during 1974 and 1975. Therefore, it has been determined that the condenser cooling water intake structure continues to reflect the best technology available, and no required changes to the intake are proposed at this time.

Outfalls 006, 007, and 008

Outfalls 006, 007, and 008 convey comparatively minor waste streams: Non-contact Cooling Water (no additives used), North Parking Area Drainage and Abandoned Ash Pond Area Seepage (F15) and Drainage from Sluice Line Trench, including Precipitation and Intermittent discharge from ruptured ash sluice line. All three outfalls are discharging into the facility's intake channel. The combined flow from all three discharges is 0.288 MGD, which constitutes approximately 0.02% of the total flow used for cooling and other purposes at the facility. Consequently, there will be no numeric effluent limitations or specific monitoring requirements established for discharges from Outfalls 006, 007 and 008.

VIII BIOMONITORING REQUIREMENTS

The discharge of industrial wastewater from Outfall 002 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 stipulates that *"The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions..."*.

In accordance with EPA's recommendation (Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001), an effluent from Outfall 002 at Kingston Fossil Plant should retain its WET limit based on a demonstration of Reasonable Potential (RP) for excursions above the ambient water quality acute and chronic (CMC and CCC) criteria. This demonstration of RP was not due to toxicity observed in Outfall 001, but to insufficient flow in the Clinch River for mixing with the combined ash pond and condenser cooling water discharge to meet the CMC and CCC criteria of 0.3 TU_a and 1.0 TU_c, respectively.

As presented with the TVA's permit application, fish survival has been problematic in Outfall 002, the plant intake, and the Emory and/or Clinch River upstream. However, there seems to be little facility-induced toxicity associated with this discharge which usually mimics water quality in the intake and/or the Emory and/or Clinch River upstream. Due to the limited amount of facility-induced toxicity during the current permit cycle, TVA requested that WET biomonitoring be retained at a frequency of once per year.

The discharge is not expected to have toxic pollutants other than chlorine (see Rationale, Part VII). However, the size of the discharge has a potential for large impacts if pollutants entered the cooling water in significant amounts. Since the discharge (1,315.2 MGD) exceeds the low flow value (1Q₁₀=155.8 MGD) for the receiving stream, no significant dilution will be provided. Because of this, a IC₂₅ limitation of 100% effluent will be retained in the new permit.

Therefore, toxicity testing will be required on 100% effluent. TVA's request to retain monitoring frequency at once per year will be granted. Every effort should be made to perform annual toxicity testing at different seasons during each of the monitoring periods for the term of this permit (5 years). The details regarding biomonitoring methodology can be found in Part III of the permit.

IX 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 and appear on a list of impaired waters per Section 303(d) of the Clean Water Act.

The Division has made a stream tier determination of the receiving waters associated with the subject discharge(s) and has found both receiving streams to be neither a Tier 2 nor Tier 3 water, nor it appears on the 303(d) list. 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.

X. 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 Clinch-Lower watershed and following the directives for the Watershed Management Program initiated in January, 1996, the permit will be issued for a 5 year term.

APPENDIX 1

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 001	
LONGITUDE	LATITUDE
84-30-15	35-54-15

FLOW (MGD)	DISCHARGE SOURCE
0.180	Redwater wetlands
0.145	Coal yard runoff pond discharge
0.005	Chemical metal cleaning wastes (IMP005)
0.002	Nonchemical metal cleaning wastes
0.002	Ammonia storage runoff
6.814	Bottom ash sluice water and groundwater
25.178	Fly ash sluice wastewater
0.267	Water treatment plant wastes
7.712	Station sump discharge
0.574	Precipitation
-0.238	Evaporation
-0.170	Seepage to redwater wetland
0.012	AAF precipitator washdown
40.483	TOTAL DISCHARGE

RECEIVING STREAM			
DISCHARGE ROUTE			
Discharges from the ash pond to the Clinch (Emory) River at the facilities condenser intake channel.			
Treatment includes settling and neutralization in a 118 acre ash (treatment) pond. Ash and other solids remain in pond and are physically removed periodically.			
STREAM LOW FLOW (CFS)	7Q10	1Q10	30Q2
(MGD)	N/A	N/A	N/A

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

APPENDIX 1

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 002		RECEIVING STREAM			
LONGITUDE	LATITUDE	DISCHARGE ROUTE			
84-31-15	35-53-45	Discharges to mile 2.9 of the Clinch River. This discharge includes the discharges from Outfall 001 to the condenser intake channel. There is no treatment at this stage.			
FLOW (MGD)	DISCHARGE SOURCE	STREAM LOW FLOW (CFS)	7Q10	1Q10 *	30Q2
0.010	Transformer yard and switchyard runoff		N/A	241.0	N/A
0.014	Boiler blowdown				
1296.627	Once-through condenser cooling water		NA	155.8	NA
0.243	Intake screen backwash				
0.018	precipitator area runoff				
1296.912	TOTAL DISCHARGE				
STREAM USE CLASSIFICATIONS (WATER QUALITY)					
FISH	RECREATION	IRRIGATION	LW&W	DOMESTIC	
X	X	X	X	X	
INDUSTRIAL	NAVIGATION				
X	X				

* These low flows include contributions from Norris Dam (200 cfs), Emory River (.04 cfs), Poplar Creek (8.95 cfs), and East Fork Poplar Creek (32.2 cfs), for a total of 241 cfs at the 1Q10 low flow. Norris Dam is included since the discharge from Melton Dam is nothing more than a "pass-through" of the Norris Dam flow.

APPENDIX 2

FACILITY DISCHARGES AND RECEIVING WATERS

<table border="1"> <tr><th colspan="2">OUTFALL 006</th></tr> <tr><th>LONGITUDE</th><th>LATITUDE</th></tr> <tr><td>84-30-45</td><td>35-54-00</td></tr> </table>		OUTFALL 006		LONGITUDE	LATITUDE	84-30-45	35-54-00	<table border="1"> <tr><th colspan="5">RECEIVING STREAM</th></tr> <tr><th colspan="5">DISCHARGE ROUTE</th></tr> <tr><td colspan="5">Plant intake channel. There is no treatment at this stage.</td></tr> <tr><th>STREAM LOW FLOW (CFS)</th><th>7Q10</th><th>1Q10</th><th colspan="2">30Q2</th></tr> <tr><td></td><td>N/A</td><td>NA</td><td colspan="2">N/A</td></tr> <tr><th>(MGD)</th><th>NA</th><th>NA</th><th colspan="2">NA</th></tr> </table>				RECEIVING STREAM					DISCHARGE ROUTE					Plant intake channel. There is no treatment at this stage.					STREAM LOW FLOW (CFS)	7Q10	1Q10	30Q2			N/A	NA	N/A		(MGD)	NA	NA	NA				
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APPENDIX 2

FACILITY DISCHARGES AND RECEIVING WATERS

PERMIT LIMITS						
INTERNAL MONITORING POINT 005						
Nonchemical and Chemical Metal Cleaning Wastes						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC.	AVG. AMNT.	MAX. CONC.	MAX. AMNT.		
	(mg/l)	(lb/day)	(mg/l)	(lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/Batch	Estimate *
IRON, TOTAL	1.0	--	1.0	--	**	Grab
COPPER, TOTAL	1.0	--	1.0	--	**	Grab

Metal cleaning wastes shall mean any cleaning compounds, rinse waters, or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning.

* Flow shall be based on beginning and ending staff gage readings of the pond and reported in Million Gallons per Day (MGD).

** Samples shall be taken at the beginning and end of a discharge event for each batch treated.

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	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[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.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

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

EFFLUENT CHARACTERISTIC	Fly Ash & Bottom Ash Transport Water			
	§423.12(b)(4) - BPT		§423.13 - BAT	
	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[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 fly ash & bottom ash transport 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.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

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

EFFLUENT CHARACTERISTIC	Metal Cleaning Wastes			
	§423.12(b)(5) - BPT		§423.13(e) - BAT	
	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[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.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

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

EFFLUENT CHARACTERISTIC	Coal Pile Runoff			
	§423.12(b)(9) - BPT		§423.13 - BAT	
	Average of Daily Values for 30 Consecutive Days	Maximum Concentration for Any Time	Average of Daily Values for 30 Consecutive Days	Maximum for Any 1 Day
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
TSS	--	50.0	--	--
pH	6.0 - 9.0	6.0 - 9.0	--	--

- Note: 1. Any untreated flow from facilities designed, constructed, and operated to treat the volume of coal pile runoff which is associated with a 10 year, 24 hour rainfall event shall not be subject to the coal pile runoff limit for TSS.
2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

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

EFFLUENT CHARACTERISTIC	Once Through Cooling Water			
	§423.12(b)(6) - BPT		§423.13(b) - BAT	
	Average Concentration	Maximum Concentration	Average Concentration	Maximum Concentration
	[mg/l]	[mg/l]	[mg/l]	[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.

APPENDIX 2

APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

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

EFFLUENT CHARACTERISTIC	Cooling Tower Blowdown			
	§423.12(b)(7) - BPT		§423.13(d)(1) - BAT	
	Average Concentration	Maximum Concentration	Average Concentration	Maximum Concentration
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
Free Available Chlorine	0.2	0.5	0.2	0.5
126 Priority Pollutants **	--	--	No detectable amount *	

* The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium, Ttl. (0.2 mg/l as both Maximum Concentration and Average Concentration) and Zinc, Ttl. (1.0 mg/l as both Maximum Concentration and Average Concentration).

Note: The quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the concentration listed above.

APPENDIX 3

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		1/Week	Instantaneous
pH ²	--	--	Minimum of 6.0		1/Week	Grab
OIL & GREASE	14.4	--	19.4	--	1/Month	Grab
TOTAL SUSPENDED SOLIDS ³ (TSS)	29.9	--	92.0	--	1/Month	Grab

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

2 pH analyses shall be performed within fifteen (15) minutes of sample collection.

3 The permittee shall take reasonable steps to prevent discharge of cenospheres other than in trace amounts from the outfall.

APPENDIX 3

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
OUTFALL 002						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		Daily	Pump logs
pH ²	Range 6.0 to 9.0				1/Week	Grab
TEMPERATURE, Intake	--		Report		Continuous ³	Recorder
TEMPERATURE, Effluent	--		36.1°C (97.0°F)		Daily	Calculate ³
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁴	0.038	--	0.066	--	1 / Week	Grab ⁶
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁵	0.011	--	0.019	--	1 / Week	Grab ⁶
TIME OF OXIDANT ADDITION (minutes/day/unit)	--		120 ⁷		1 / Day	Log Records
IC25	Survival, Reproduction, & Growth in 100% Effluent				See note 8	Composite ⁸

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

2 pH analyses shall be performed within fifteen (15) minutes of sample collection.

3 Intake temperature is measured hourly (continuously) but reported as a daily average once per day. The daily average discharge temperature shall be calculated for the cooling channel based on the 24-hour average intake temperature, 24-hour average unit load, and the 24-hour average flow through Outfall 002.

4 The limits depicted are applicable at flows of 654 MGD, and above, from Outfall 002.

5 The limits depicted are applicable at flows less than 654 MGD, in lieu of the limits shown in footnote 4.

6 Flow weighted maximum shall be calculated from instantaneous measurements of the chlorinated discharges from a unit and adjusted for flow from the non-chlorinated units contributing to the discharge. The calculated flow-weighted maximum will be used for determination of compliance with the daily maximum limitation. Except for periods of macroinvertebrate control when oxidant addition is required (see Permit - Part III), samples shall be taken once at the beginning of the period of chlorination for one unit and once every 15 minutes thereafter. At the end of the period of chlorination for that unit, one sample shall be taken. Sampling for these oxidants is not required when there is no chlorine/bromine added during that day. TRC analyses shall be performed within fifteen (15) minutes of sample collection.

7 Application of a oxidant (bromine/chlorine) beyond the 120 minutes per day will be allowed to facilitate nuisance macroinvertebrate control according to the Plan for such activities described in Permit - Part III.

8 See Part III for sampling requirements and monitoring frequency of toxicity tests.

APPENDIX 3

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
INTERNAL MONITORING POINT 005						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/Batch	Estimate *
IRON, TOTAL	1.0	--	1.0	--	**	Grab
COPPER, TOTAL	1.0	--	1.0	--	**	Grab

Metal cleaning wastes shall mean any cleaning compounds, rinse waters, or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning.

* Flow shall be based on beginning and ending staff gage readings of the pond and reported in Million Gallons per Day (MGD).

** Samples shall be taken at the beginning and end of a discharge event for each batch treated.

APPENDIX 4

HISTORICAL MONITORING AND INSPECTION

Outfall 001

Parameter Code	Average Concentration	Maximum Concentration	Minimum Concentration	Average Amount	Maximum Amount
Outfall 001	mg/L	mg/L	mg/L	lb/day or MGD	lb/day or MGD
Flow StdDev				8.2	9.3
Flow Max				40.6	53
Flow Average				28.9	32.7
Flow Count				24	24
Oil and Grease StdDev	0	0			
Oil and Grease Max	5	5			
Oil and Grease Average	5	5			
Oil and Grease Count	24	24			
pH Min		7	6.5		
pH Max		7.9	8.1		
pH Count		2	24		
TSS StdDev	5.5	5.5			
TSS Max	24	24			
TSS Average	13.1	13.1			
TSS Count	24	24			

APPENDIX 4

HISTORICAL MONITORING AND INSPECTION - Outfall 002

Parameter Code	Average Concentration	Maximum Concentration	Minimum Concentration	Average Amount	Maximum Amount
Outfall 002	mg/L	mg/L	mg/L	lb/day or MGD	lb/day or MGD
Flow StdDev				73.5	45.9
Flow Max				1389	1389
Flow Average				1301.3	1354.7
Flow Count				24	24
pH Min			6.8		
pH Max		8.2			
pH Count		24	24		
Temperature StdDev		7.6			
Temperature Max		35.3			
Temperature Average		22.7			
Temperature Count		48			

APPENDIX 4

HISTORICAL MONITORING AND INSPECTION - IMP 005

Parameter Code	Average Concentration	Maximum Concentration	Average Amount	Maximum Amount
IMP 005	mg/L	mg/L	lb/day or MGD	lb/day or MGD
Cu (T) StdDev	0.03	0.03		
Cu (T) Max	0.066	0.066		
Cu (T) Average	0.043	0.0465		
Cu (T) Count	2	2		
Fe (T) StdDev	0.15	0.22		
Fe (T) Max	0.383	0.5		
Fe (T) Average	0.279	0.345		
Fe (T) Count	2	2		
Flow StdDev			2.12	2.12
Flow Max			6	6
Flow Average			4.5	4.5
Flow Count			2	2

APPENDIX 5a

CALCULATIONS OF NEW PERMIT LIMITS
Ash Pond Required Free Water Volume Calculations

Source	Volume (MGD)	
<u>DRY WEATHER VOLUME</u>		
Redwater wetlands	0.18	
Chemical metal cleaning wastes	0.005	
Nonchemical metal cleaning wastes	0.002	
Ash sluice wastewater	24.029	
Water treatment plant wastes	0.267	
Ash system, Boiler bottom overflow	3.921	
Misc. equipment cooling	3.082	
Floor washing wastes	0.025	
Boiler makeup water leakage	0.061	
Analytical process wastewater	0.0005	
TOTAL DRY WEATHER FLOW	31.5725	
<u>WET WEATHER VOLUME</u>		
	Est. Rainfall	Calculated Volume (MGD)
ASH POND (234.88 acres)	4.9 in./day	31.25
COAL YARD (81.9 acres)	4.9 in./day	10.90
ADJACENT DRAINAGE AREA (28.1 acres)	4.9 in./day	3.74
TOTAL WET WEATHER FLOW		45.8817
TOTAL DRY AND WET WEATHER FLOW		77.45
<p>NOTE: Since the previous permit had a free water volume minimum stipulation of 102 MG, even though these calculations require a minimum of 77.45 MG, the new permit will maintain the previous permits requirement.</p>		

APPENDIX 5b

Calculation of Flow Weighted Concentrations for TSS and O&G – Outfall 001

**Calculation of Flow Weighted Concentrations
 TVA - Kingston Fossil Plant - TN0005452
 Outfall 001**

Effluent Source	Flow [MGD]	Monthly Average		Daily Maximum	
		Allowable Concentration [mg/l]	Allowable Mass [lb/day]	Allowable Concentration [mg/l]	Allowable Mass [lb/day]
TSS					
Low Volume Wastes	7.43	30.0	1858.99	100.0	6196.62
Ash Transport Water	24.029	30.0	6012.06	100.0	20040.19
Metal Cleaning Wastewater	0.007	30.0	1.75	100.0	5.84
Coal Pile Runoff	0.11	--	--	50.0	45.87
Total	31.58	29.9	7872.79	99.8	26288.51
Oil & Grease					
Low Volume Wastes	7.43	15.0	929.49	20.0	1239.32
Ash Transport Water	24.029	15.0	3006.03	20.0	4008.04
Metal Cleaning Wastewater	0.007	15.0	0.88	20.0	1.17
Coal Pile Runoff	0.11	--	--	--	--
Total	31.576	14.9	3936.40	19.9	5248.53

APPENDIX 5c

Determination of Discharge Limitations for TSS and O&G – Outfall 001

DETERMINATION OF DISCHARGE LIMITATIONS				
TVA - Kingston Fossil Plant - TN0005452				
<u>Outfall 001</u>				
Monthly Average				
EFFLUENT CHARACTERISTIC	Effluent Guidelines	Previous Permit	Water Quality	New Permit
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
TSS	29.9	30.0	--	29.9
OIL & GREASE	14.9	14.4	--	14.4

Daily Maximum				
EFFLUENT CHARACTERISTIC	Effluent Guidelines	Previous Permit	Water Quality	New Permit
	[mg/l]	[mg/l]	[mg/l]	[mg/l]
TSS	99.8	92.0	--	92.0
OIL & GREASE	19.9	19.4	--	19.4

APPENDIX 5d

Water Quality Based Effluent Calculations – Outfall 002

WATER QUALITY BASED EFFLUENT CALCULATIONS OUTFALL 002							
FACILITY: TVA Kingston Fossil Plant PERMIT #: TN0005452							
Stream (1Q10)	Stream (3Q2)	Waste Flow *	Ttl. Susp. Solids	Hardness (as CaCO3)	Stream Allocation		
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]		
467	NA	187	10	50	100		
1	2	3	4	5	6	7	8
Stream Bckgrnd.	Fish/Aqua. Life Water Quality Criteria		Effluent Fraction	Fish & Aquatic Life Water Quality Criteria (1Q10)			
Conc.	Chronic	Acute	Dissolved	In-Stream Allowable		Calc. Effluent Concentration	
[ug/l]	[ug/l]	[ug/l]	[Fraction]	Chronic	Acute	Chronic	Acute
[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
EFFLUENT CHARACTERISTIC	0.000	11.000	19.000	1.000	11.000	19.000	38.5
Chlorine (T. Res.)	0.000	11.000	19.000	1.000	11.000	19.000	66.4
9	10	11	12	13	14		
Human Health Water Quality Criteria (3Q2)							
In-Stream Criteria				Calc. Effluent Concentration			
Organisms	Water/Organism	DWS	Organisms	Water/Organism	DWS		
[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]		
EFFLUENT CHARACTERISTIC	NA	NA	NA	NA	NA		
Chlorine (T. Res.)	NA	NA	NA	NA	NA		

* This flow was used for purposes of using a dilution factor of (654-187) to 187, or 3.5 to 1. In light of the recirculating flow conditions which this facility was designed to operate under, and the fact that the estimated low flow conditions in-stream of 155.8 MGD are substantially lower than the 654 MGD necessary to maintain minimum operating conditions, the division has decided to forego any attempts to reconcile the low flow conditions of the receiving stream with the minimum water volume necessary to sustain the operations at the facility. For this reason, the division is assuming that during periods when the facility is operating during minimum capacity, and under low flow conditions, the volume of water necessary to continue operations in a recirculating system is equal to 654 MGD. Furthermore, since only 187 MGD, or one (1) unit, will be allowed to be chlorinated at one time, a dilution factor of (654-187) to 187, or 3.5 to 1, will be used in determining the total residual oxidant concentration allowable in the discharge from Outfall 002.

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 3Q2 flow.

APPENDIX 6

NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

Outfall 001

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		1/Week	Instantaneous
pH ²	--	--	Minimum of 6.0		1/Week	Grab
OIL & GREASE	14.4	--	19.4	--	1/Month	Grab
TOTAL SUSPENDED SOLIDS ³ (TSS)	29.9	--	92.0	--	1/Month	Grab
NITROGEN, AMMONIA TOTAL (at Skimmer Wall or comparable location)	--	--	Report	Report	2/Month	Grab
NITROGEN, AMMONIA TOTAL (Effluent)	--	--	Report	Report	2/Month	Grab
NITROGEN, AMMONIA TOTAL (Net Discharge)	--	--	Report ⁴	Report ⁴	2/Month	Calculated

¹ Flow shall be reported in Million Gallons per Day (MGD).
² pH analyses shall be performed within fifteen (15) minutes of sample collection.
³ The permittee shall take reasonable steps to prevent discharge of cenospheres other than in trace amounts from the outfall.
⁴ If a calculated value for net addition of ammonia as nitrogen exceeds an action concentration value of 2.85 mg/L, the permittee should investigate source(s) of ammonia, and proceed with a corrective action(s), if necessary. Furthermore, EAC -Knoxville shall be notified within 24 hours from the time the permittee receives results indicating that an action value of 2.85 mg/L was exceeded.

APPENDIX 6

Outfall 002

PERMIT LIMITS						
OUTFALL 002						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		Daily	Pump logs
pH ²	Range 6.0 to 9.0				1/Week	Grab
TEMPERATURE, Intake	--		Report		Continuous ³	Recorder
TEMPERATURE, Effluent	--		36.1°C (97.0°F)		Daily	Calculate ³
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁴	0.038	--	0.066	--	1/Week	Grab ⁶
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁵	0.011	--	0.019	--	1/Week	Grab ⁶
TIME OF OXIDANT ADDITION (minutes/day/unit)	--		120 ⁷		1/Day	Log Records
IC25	Survival, Reproduction, & Growth in 100% Effluent				See note 8	Composite ⁸

¹ Flow shall be reported in Million Gallons per Day (MGD).
² pH analyses shall be performed within fifteen (15) minutes of sample collection.
³ Intake temperature is measured hourly (continuously) but reported as a daily average once per day. The daily average discharge temperature shall be calculated for the cooling channel based on the 24-hour average intake temperature, 24-hour average unit load, and the 24-hour average flow through Outfall 002.
⁴ The limits depicted are applicable at flows of 654 MGD, and above, from Outfall 002. Only one (1) unit, with a flow rate of 187 MGD is allowed to be chlorinated at one time.
⁵ The limits depicted are applicable at flows less than 654 MGD, in lieu of the limits shown in footnote 4.
⁶ Flow weighted maximum shall be calculated from instantaneous measurements of the chlorinated discharges from a unit and adjusted for flow from the non-chlorinated units contributing to the discharge. The calculated flow-weighted maximum will be used for determination of compliance with the daily maximum limitation. Except for periods of macroinvertebrate control when oxidant addition is required (see Permit - Part III), samples shall be taken once at the beginning of the period of chlorination for one unit and once every 15 minutes thereafter. At the end of the period of chlorination for that unit, one sample shall be taken. Sampling for these oxidants is not required when there is no chlorine/bromine added during that day. TRC analyses shall be performed within fifteen (15) minutes of sample collection.
⁷ Application of an oxidant (bromine/chlorine) beyond the 120 minutes per day will be allowed to facilitate nuisance macroinvertebrate control according to the Plan for such activities described in Permit - Part III.
⁸ See Part III for sampling requirements and monitoring frequency of toxicity tests.

APPENDIX 6

Internal Monitoring Point (IMP) 005

PERMIT LIMITS						
INTERNAL MONITORING POINT 005						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/Batch	Estimate *
IRON, TOTAL	1.0	--	1.0	--	**	Grab
COPPER, TOTAL	1.0	--	1.0	--	**	Grab

Metal cleaning wastes shall mean any cleaning compounds, rinse waters, or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning.

* Flow shall be based on beginning and ending staff gage readings of the pond and reported in Million Gallons per Day (MGD).

** Samples shall be taken at the beginning and end of a discharge event for each batch treated.