



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

**401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243**

JUL 01 2011

Mr. Don Grissette
Site Vice President
TVA Watts Bar Nuclear Plant
1260 Hwy 68, Nuclear Plant Rd.
Spring City, TN 37381

Subject: **NPDES Permit No. TN0020168
TVA - Watts Bar Nuclear Plant
Spring City, Rhea County, Tennessee**

Dear Mr. Grissette:

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

Please be advised that a petition for permit appeal may be filed, pursuant to T.C.A. Section 69-3-105, subsection (i), by the permit applicant or by any aggrieved person who participated in the public comment period or gave testimony at a formal public hearing whose appeal is based upon any of the issues that were provided to the commissioner in writing during the public comment period or in testimony at a formal public hearing on the permit application. Additionally, for those permits for which the department gives public notice of a draft permit, any permit applicant or aggrieved person may base a permit appeal on any material change to conditions in the final permit from those in the draft, unless the material change has been subject to additional opportunity for public comment. Any petition for permit appeal under this subsection (i) shall be filed with the board within thirty (30) days after public notice of the commissioner's decision to issue or deny the permit.

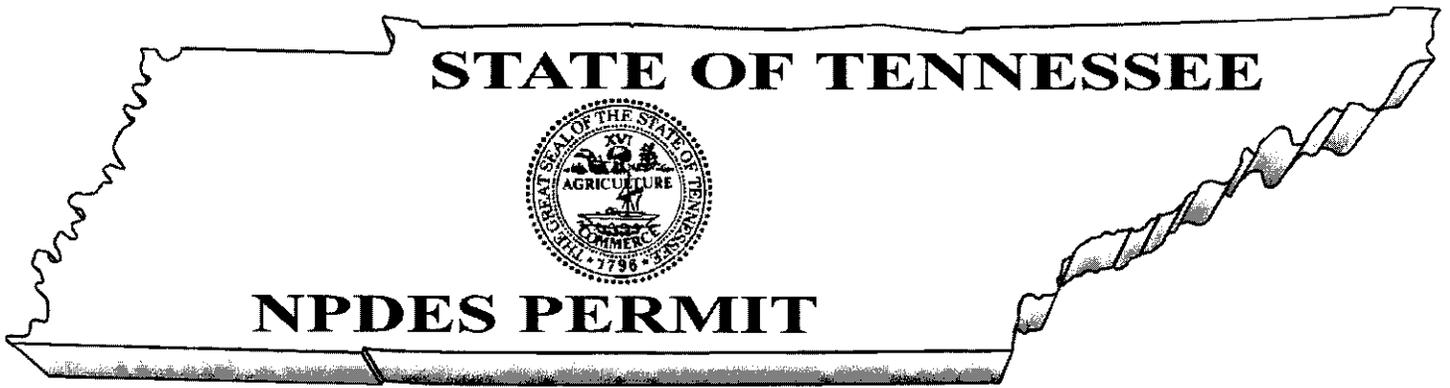
If you have questions, please contact the Division of Water Pollution Control at your local Field Office at 1-888-891-TDEC; or, at this office, please contact Ms. Souraya Fathi at (615) 532-0485 or by E-mail at Souraya.Fathi@tn.gov.

Sincerely,

Vojin Janjić
Manager, Permit Section
Division of Water Pollution Control

P/WAT-3
Enclosure
cc:

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No. TN0020168

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 - Watts Bar Nuclear Plant**

is authorized to discharge: **process wastewater, cooling water and storm water runoff from Outfalls 101 and 102, turbine building sump water, alum sludge supernatant, reverse osmosis reject water, drum dewatering water, water purification plant water, and Supplemental Condenser Cooling Water (noncontact) from Outfall 113**

from a facility located: **in Spring City, Rhea County, Tennessee**

to receiving waters named: **Tennessee River at mile 527.9 (Outfall 101), Tennessee River at mile 527.2 (Outfall 102), and Tennessee River at mile 529.2 (Outfall 113)**

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

This permit shall become effective on: **August 1, 2011**

This permit shall expire on: **June 29, 2016**

Issuance date: **June 30, 2011**



Paul E. Davis, Director
Division of Water Pollution Control

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PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

TVA - Watts Bar Nuclear (WBN) Plant is authorized to discharge process wastewater, cooling water and storm water to the Tennessee River (Outfalls 101,102, and 113) associated with nuclear electric power generation as described in the Rationale and permit application. These discharges and three internal discharge locations (Outfalls 103, 107, and 114) shall be limited and monitored by the permittee as follows.

This TN-NPDES permit also constitutes the State's certification under Section 401 of the Clean Water Act for the purpose of obtaining any federal license for activities resulting in the discharges covered under the TN-NPDES permit.

TVA Watts Bar Nuclear Plant is authorized to discharge low volume wastewater, noncontact-cooling water, cooling tower blowdown, boiler blowdown water, storm water, and other process and nonprocess wastewater as described in the permit Rationale and application. **Outfall 101** discharges through a dual-pipe diffuser to the Tennessee River at mile 527.9. These discharges shall be limited and monitored as specified below:

Description : External Outfall, Number : 101, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Chlorine, total residual (TRC) (2,3)	<=	0.1	mg/L	Grab (2,3)	Five Per Week	Monthly Average
Chlorine, total residual (TRC) (2,3)	<=	0.1	mg/L	Grab (2,3)	Five Per Week	Daily Maximum
Chromium, total (as Cr)	<=	2	mg/L	Grab	Waived (6)	Daily Maximum
Chromium, total (as Cr)	<=	2	mg/L	Grab	Waived (6)	Monthly Average
Certification of in-stream flow 3,500 cfs or greater when required (7)	Report	-	Y=1;N=0	Operation Records	Monthly	Total
Flow (1)	Report	-	Mgal/d	Recorder	Continuous	Monthly Average
Flow (1)	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
Oil & Grease *	<=	20	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease *	<=	15	mg/L	Grab	Monthly	Monthly Average
Temperature, water deg. C (4)	<=	35	deg C	Operation Records	Continuous	Daily Maximum
Total Suspended Solids (TSS) *	<=	100	mg/L	Grab	Monthly	Daily Maximum
Total Suspended Solids (TSS) *	<=	30	mg/L	Grab	Monthly	Monthly Average
Zinc, total (as Zn)	<=	1	mg/L	Grab	Twice Per Month	Monthly Average
Zinc, total (as Zn)	<=	1	mg/L	Grab	Twice Per Month	Daily Maximum
pH (2) *	>=	6.0	SU	Grab	Twice Per Month	Minimum
pH (2) *	<=	9.0	SU	Grab	Twice Per Month	Maximum

Description : External Outfall, Number : 101, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
IC25 Static Renewal 7 Day Chronic Ceriodaphnia (5)	>=	2.8	%	Composite	2/Year	Minimum
IC25 Static Renewal 7 Day Chronic Pimephales (5)	>=	2.8	%	Composite	2/Year	Minimum

- 1) Flow shall be reported in Million Gallons per Day (MGD). In the event that the continuous flow monitor is out of service, flow monitoring shall be estimated by intake pump logs or the behavior (e.g., the rate of filling and emptying) of the yard holding pond.
 - 2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
 - 3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B. Monitoring Procedures, subsection 3. Test Procedures, paragraph b.
 - 4) When the temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore the temperature recorder to operation as soon as possible. See Part III for further temperature requirements.
 - 5) Sampling and analysis required only if discharge is operated 30 days or more during the semi-annual periods January through June or July through December and if all toxicity testing requirements have not already been completed for Outfall 101. See Part III for methodology.
 - 6) Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(I). See Rationale for more comments.
 - 7) Certification shall be made during any month that a discharge occurs from this outfall.
- * monitoring for pH, total suspended solids, and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required.

Note: There shall be no discharge of PCBs.

Discharges from Outfall 101 are authorized only during periods when the flow in the receiving stream is at a minimum of 3,500 cubic feet per second (cfs) or greater. Compliance with the minimum in-stream flow requirement of 3,500 cubic feet per second shall be certified monthly with the submission of Discharge Monitoring Reports submitted to the Division for this outfall. Records concerning the instream flow shall be maintained and available upon request.

TVA Watts Bar Nuclear Plant is authorized to discharge low volume wastewater, once through condenser cooling water, noncontact cooling water, steam generator blowdown water, storm water, and other process and nonprocess wastewater as described in the permit Rationale and application. Discharge is authorized through **Outfall 102** to the Tennessee River at mile 527.2. These discharges shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 102, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Chlorine, total residual (TRC) (2,3)	<=	0.1	mg/L	Grab	Five Per Week	Monthly Average
Chlorine, total residual (TRC) (2,3)	<=	0.1	mg/L	Grab	Five Per Week	Daily Maximum
Chromium, total (as Cr)	<=	2	mg/L	Grab	Waived (6)	Daily Maximum
Chromium, total (as Cr)	<=	2	mg/L	Grab	Waived (6)	Monthly Average
Certification of in-stream flow 3,500 cfs or greater when required (7)	Report	-	Y=1;N=0	Operation Records	Monthly	Total
Flow (1)	Report	-	Mgal/d	Instantaneous	Daily	Monthly Average
Flow (1)	Report	-	Mgal/d	Instantaneous	Daily	Daily Maximum
Oil & Grease *	<=	20	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease *	<=	15	mg/L	Grab	Monthly	Monthly Average
Temperature, water deg. C (4)	<=	35	deg C	Grab	Daily	Daily Maximum
Total Suspended Solids (TSS) *	<=	100	mg/L	Grab	Monthly	Daily Maximum
Total Suspended Solids (TSS) *	<=	30	mg/L	Grab	Monthly	Monthly Average
Zinc, total (as Zn)	<=	1	mg/L	Grab	Twice Per Month	Monthly Average
Zinc, total (as Zn)	<=	1	mg/L	Grab	Twice Per Month	Daily Maximum
pH (2) *	>=	6.0	SU	Grab	Twice Per Month	Minimum
pH (2) *	<=	9.0	SU	Grab	Twice Per Month	Maximum

Description : External Outfall, Number : 102, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
IC25 Static Renewal 7 Day Chronic Ceriodaphnia (5)	>=	2.8	%	Composite	2/Year	Minimum
IC25 Static Renewal 7 Day Chronic Pimephales (5)	>=	2.8	%	Composite	2/Year	Minimum

- (1) Flow shall be reported in Million Gallons per Day (MGD). In the event that the continuous flow monitor is out of service, flow monitoring shall be estimated by intake pump logs or the behavior (e.g., the rate of filling and emptying) of the yard holding pond.
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B. Monitoring Procedures, subsection 3. Test Procedures, paragraph b.
- (4) When the temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore the temperature recorder to operation as soon as possible. See Part III for further temperature requirements.
- (5) See Part III for methodology.
- (6) Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(I). See Rationale for more comments.
- (7) Certification shall be made during any month that a discharge occurs from this outfall.

* monitoring for pH, total suspended solids and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required.

Note: There shall be no discharge of PCBs.

Additional monitoring requirements and conditions applicable to Outfall 102 include:

Discharge through Outfall 102 (emergency overflow) is permitted only under emergency situations. This includes times when the diffuser pipe system is isolated as a result of diffuser maintenance and other emergency situations to preserve the integrity of the yard holding pond dikes such as in the event of a catastrophic storm event. All reasonable efforts shall be taken to resume normal discharge through Outfall 101 as soon as possible.

TVA Watts Bar Nuclear Plant is authorized to discharge turbine building sump water, alum sludge supernate, R.O. reject water, drum dewatering water, water purification plant water, and storm water through **Outfall 103**, the Low Volume Waste Pond, an internal monitoring point as described in the Rationale and the permit application. These discharges shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 103, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Flow (1)	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
Flow (1)	Report	-	Mgal/d	Recorder	Continuous	Monthly Average
Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
Oil & Grease	<=	15	mg/L	Grab	Monthly	Monthly Average
Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
pH (2)	>=	6.0	SU	Grab	Monthly	Minimum
pH (2)	<=	9.0	SU	Grab	Monthly	Maximum

- (1) Flow shall be reported in Million Gallons per Day (MGD).
 (2) pH analyses shall be performed within fifteen (15) minutes of sample collection.
-

TVA Watts Bar Nuclear Plant is authorized to discharge metal cleaning wastewater, turbine building station sump water, diesel generator coolant, intermittent micro-filtered condenser tube cleaning discharges, and storm water through **Outfall 107**, the Lined and Unlined Ponds, an internal monitoring point as described in the Rationale and permit application. These discharges shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 107, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u> 	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Copper, total (as Cu)	<=	1	mg/L	Grab	Once Per Batch	Daily Maximum
Copper, total (as Cu)	<=	1	mg/L	Grab	Once Per Batch	Monthly Average
Flow (1)	Report	-	Mgal/d	Calculated	Once Per Batch	Monthly Average
Flow (1)	Report	-	Mgal/d	Calculated	Once Per Batch	Daily Maximum
Iron, total (as Fe)	<=	1	mg/L	Grab	Once Per Batch	Monthly Average
Iron, total (as Fe)	<=	1	mg/L	Grab	Once Per Batch	Daily Maximum
Oil & Grease	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
Oil & Grease	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
Phosphorus, total (as P) (3)	<=	1	mg/L	Grab	Once Per Batch	Monthly Average
Phosphorus, total (as P) (3)	<=	1	mg/L	Grab	Once Per Batch	Daily Maximum
Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Once Per Batch	Daily Maximum
Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
pH (2)	Report	-	SU	Grab	Once Per Batch	Minimum
pH (2)	Report	-	SU	Grab	Once Per Batch	Maximum

- (1) Flow shall be reported in Million Gallons per Day (MGD) for each batch discharge. If a batch discharge extends for more than a 24-hour period, flow measurement shall be obtained and reported for each 24 hour period.
 - (2) pH analyses shall be performed within fifteen (15) minutes of sample collection.
 - (3) Sampling for phosphorus is required only when metal cleaning chemicals containing phosphorus are being used.
-

TVA Watts Bar Nuclear Plant is authorized to discharge supplemental condenser cooling water through **Outfall 113** to the Tennessee River at mile 529.2 as described in the Rationale and permit application. These discharges shall be limited and monitored by the permittee as specified below:

Description : External Outfall, Number : 113, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Chlorine, total residual (TRC) (2, 3, 5)	<=	0.09	mg/L	Grab	Monthly	Monthly Average
Chlorine, total residual (TRC) (2, 3, 5)	<=	0.158	mg/L	Grab	Monthly	Daily Maximum
Certification of in-stream flow 3,500 cfs or greater when required	Report	-	Y=1;N=0	Operation Records	Monthly	Total
Flow (1)	Report	-	Mgal/d	Recorder (6)	Continuous	Monthly Average
Flow (1)	Report	-	Mgal/d	Recorder (6)	Continuous	Daily Maximum
Oxygen, dissolved (DO)	Report	-	mg/L	Grab	Monthly	Minimum
Temperature, water deg. C	Report	-	deg C	Recorder (6)	Hourly	Daily Maximum
Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
pH (2)	>=	6.0	SU	Grab	Monthly	Minimum
pH (2)	<=	9.0	SU	Grab	Monthly	Maximum

Description : External Outfall, Number : 113, Monitoring : Instream Monitoring, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Temperature rise, upstream to downstream	<=	3.0	deg C	Calculated (6)	Hourly	Daily Maximum
Temperature rate of change	<=	2.0	deg C/hr	Calculated (6)	Hourly	Daily Maximum
Temperature, edge of mixing zone	<=	30.5	deg C	Recorder (6)	Hourly	Daily Maximum

Description : External Outfall, Number : 113, Monitoring : See Comments, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
Temperature, receiving stream bottom	<=	33.5	deg C	Recorder	Hourly	Daily Maximum

Description : External Outfall, Number : 113, Monitoring : Effluent Gross, Season : All Year

<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
IC25 Static Renewal 7 Day Chronic Ceriodaphnia (4)	>=	6.7	%	Composite	2/Year	Minimum
IC25 Static Renewal 7 Day Chronic Pimephales (4)	>=	6.7	%	Composite	2/Year	Minimum

- (1) Flow shall be reported in Million Gallons per Day (MGD).
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B. Monitoring Procedures, subsection 3. Test Procedures, paragraph b.
- (4) See Part III for methodology
- (5) Sampling for TRC shall be 5/Week during periods when the Supplemental Condenser Cooling Water (SCCW) system is in operation.
- (6) See additional (bulleted) comments in permit.

TVA Watts Bar Nuclear Plant is authorized to discharge SCCW intake screen backwash to surface water through **Outfall 114**, an internal monitoring point as described in the Rationale and permit application. These discharges shall be limited and monitored by the permittee as specified below:

<p>PERMIT LIMITS FOR OUTFALL 114</p> <p><u>TVA-Watts Bar Nuclear</u></p> <p>Supplemental Condenser Cooling Water Intake Screen Backwash water</p> <p>1.) No numerical monitoring limitations are applied to this outfall.</p>
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Additional limitations, conditions, and monitoring requirements applicable to Outfalls 101, 102, 103, 107, and 113 include:

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.

For the purpose of evaluating Total Residual Chlorine/Total Residual Oxidant (TRC/TRO) as required in this permit, analyses shall include any residual bromine with results reported as chlorine, i.e., one test shall be used for situations where combinations of chlorine and bromine are used. The permittee shall sample the effluent when chemical additives are used resulting in TRC/TRO pollutants in the discharge as stipulated in the preceding permit limits tables.

For batch discharges the monitoring and reporting of measurements of FLOW, the "Monthly Avg." shall be the total flow volume during the reporting period divided by the number of calendar days in that period. The "Daily Max." shall be the total flow volume for the day with the greatest amount of discharge during the reporting period. Example: 3 discharges of 15,000 gallons/day and 1 discharge of 20,000 gallons/day during a 1-month period result in a Monthly Avg. of 65,000 gallons/30 days, or 2,166 gallons/day (to be reported as 0.002166 MGD). The Daily Max to be reported for this example is 20,000 gallons/day or 0.020 MGD.

There shall be no discharge of PCB. With regard to PCB sampling, the permittee will have the opportunity to conduct additional tests, as necessary, to establish the existence of any PCBs in the effluent if they exist. The results of these additional tests and any conclusions drawn must be submitted to the Division within fifteen (15) days along with the monthly discharge monitoring report. The Division shall maintain the exclusive determination of the

validity of the additional tests and any conclusions to be drawn from them regarding the possibility of matrix interferences, or the need for additional monitoring. The decision of the division in this matter shall be final.

Priority Pollutants contained in chemicals added for cooling tower maintenance except for zinc, shall not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136.

The use of water treatment chemicals containing chromium is prohibited under this permit. Chromium monitoring is waived by authority of 40 CFR 122.44 (a)(2)(i), where application sample results demonstrated no Cr pollutant discharged from these outfalls (101 and 102).

Discharges are authorized for Outfall 101 only during periods when flow in the receiving stream is at a minimum of 3,500 cfs. All changes to the flow rate of the SCCW discharge (Outfall 113) shall be done during periods when flow in the receiving waters is at a minimum of 3,500 cfs. This includes periods of start-up, shutdown as well as other similar abrupt flow rate changes of the SCCW. When thermally loaded effluent is discharged through Outfall 102, all reasonable efforts shall be made to keep flow to a minimum of 3500 cfs in the receiving waters. If such flow is absent, the permittee shall verify protection of water quality by taking instream temperature measurements. Compliance with flow requirements for 3,500 cfs flow instream for Outfalls 101, 102 and 113 discharges shall be certified monthly with the submission of Discharge Monitoring Reports submitted to the Division for these outfalls. Records concerning the instream flow shall be maintained and available upon request.

The thermal mixing zones for Outfall 113 remain unchanged from the previous permit (see diagram in Appendix 5h). The discharge from Outfall 113 shall be limited and monitored by the permittee as specified below:

- In recognition of the dynamic behavior of the thermal effluent in the river, monitoring shall be required for an active mixing zone and a passive mixing zone as described in the permit rationale.
- The passive mixing zone includes the following dimensions: (1) a maximum width of from bank to bank in the river, and (2) a maximum length of 1000 feet downstream of the outfall. It has been documented that there is a zone of (cool water) refuge in the bottom layer to allow for fish and other species to pass below the thermal plume.
- Compliance for the passive mixing zone shall be by two instream temperature surveys, one conducted during winter ambient conditions and one during summer ambient conditions. The surveys shall be performed while the SCCW system is thermally loaded with low river flow conditions and shall include temperature profiles at a sufficient number of locations across the downstream edge of the passive mixing zone to locate the effluent plume. The measurements shall be compared with the results from the thermal plume model and shall be summarized in a report to the division semiannually. Survey requirements for the passive mixing zone shall be waived if unexpected events do not safely allow the establishment of a zero flow condition in the river (e.g., flood operation).
- Compliance with TEMPERATURE, Edge of Mixing zone; TEMPERATURE, Rise Upstream to Downstream; and TEMPERATURE, Rate of Change shall be applicable at the edge of the active mixing zone.

- Daily maximum temperatures for the TEMPERATURE, effluent; TEMPERATURE, Edge of Mixing zone; TEMPERATURE, Rise Upstream to Downstream; and TEMPERATURE, Rate of Change shall be determined from 1-hour average values. The average values shall be calculated every 15 minutes using the current and previous four 15-minute values, thus creating a rolling average.
- As demonstrated by monitoring at the edge of the active mixing zone, the maximum temperature shall not exceed 30.5°C (except as a result of natural causes), the maximum change in temperature relative to the upstream control point shall not exceed 3°C (except as a result of natural causes), and the maximum temperature rate of change shall not exceed 2°C per hour (except as a result of natural causes).
- The upstream ambient river temperature (control point) for determining the TEMPERATURE, Rise Upstream to Downstream for the active mixing zone shall be determined by sensors positioned in the discharge from the powerhouse at Watts Bar Dam. The upstream ambient river temperature shall be determined by the first sensor at or below a depth of 5 feet. This monitor shall also be used for ambient river temperature for the passive mixing zone surveys.
- The river temperature for determining the TEMPERATURE, Edge of Mixing Zone and TEMPERATURE, rate-of-change shall be by two floating water temperature stations at the downstream edge of the active mixing zone. One station shall be located near the right-hand shoreline of the river (facing downstream) and one station shall be located near the center of the river. At each station, the water temperature at the 5-foot depth shall be determined as the average of sensors at three depths—3 feet, 5 feet, and 7 feet. The downstream river temperature and temperature rate of change shall be determined by the average temperature of the two floating water temperature stations.
- Compliance with TEMPERATURE, Receiving Stream Bottom shall be applicable at the edge of a square mussel relocation zone located on the bottom of the river at the outfall and having a side dimension not less than 150 feet. The temperature shall be determined by a sensor located along the edge of the mussel relocation zone.
- The daily maximum value for the TEMPERATURE, Receiving Stream Bottom shall be determined from 15-minute values. The 1-hour average value shall be calculated every 15 minutes using the current and previous four 15-minute values, thus creating a rolling average. The temperature shall be reported on the Discharge Monitoring Reports as the daily maximum (highest value for a day) and monthly average value (average of all four monitors).

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.

The permittee shall maintain a capability for composite sampling of Outfall 101 discharges. Temporary or mobile equipment may be used for this since the sampling protocol

instituted does not utilize standard sample collection equipment to collect the samples. TVA shall ensure sampling protocol conforms to 40 CFR 136 procedures.

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 (sample volumes <100 milliliters are allowed when specified per standard methods, latest edition) 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. ACRONYMS AND ABBREVIATIONS

1Q10 – 1-day minimum, 10-year recurrence interval
30Q20 – 30-day minimum, 20-year recurrence interval
7Q10 – 7-day minimum, 10-year recurrence interval
BAT – best available technology economically achievable
BCT – best conventional pollutant control technology
BDL – below detection level
BOD₅ – five day biochemical oxygen demand
BPT – best practicable control technology currently available
CBOD₅ – five day carbonaceous biochemical oxygen demand
CEI – compliance evaluation inspection
CFR – code of federal regulations
CFS – cubic feet per second
CFU – colony forming units
CIU – categorical industrial user
CSO – combined sewer overflow
DMR – discharge monitoring report
D.O. – dissolved oxygen
E. coli – *Escherichia coli*
EFO – environmental field office
LB(lb) - pound
IC₂₅ – inhibition concentration causing 25% reduction in survival, reproduction and growth of the test organisms
IU – industrial user
IWS – industrial waste survey
LC₅₀ – acute test causing 50% lethality
MDL – method detection level
MGD – million gallons per day
MG/L(mg/l) – milligrams per liter
ML – minimum level of quantification
ml – milliliter
MLSS – mixed liquor suspended solids
MOR – monthly operating report
NODI – no discharge
NOEC – no observed effect concentration
NPDES – national pollutant discharge elimination system
PL – permit limit
POTW – publicly owned treatment works
RDL – required detection limit
SAR – semi-annual [pretreatment program] report
SIU – significant industrial user
SSO – sanitary sewer overflow
STP – sewage treatment plant
TCA – Tennessee code annotated
TDEC – Tennessee Department of Environment and Conservation
TIE/TRE – toxicity identification evaluation/toxicity reduction evaluation
TMDL – total maximum daily load

TRC – total residual chlorine
TSS – total suspended solids
WQBEL – water quality based effluent limit

E. REPORTING

1. Monitoring Results

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

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

A copy of the completed and signed DMR shall be mailed to the Chattanooga Environmental Field Office (EFO) at the following address:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
CHATTANOOGA ENVIRONMENTAL FIELD OFFICE
540 MCCALLIE AVENUE, SUITE 550
CHATTANOOGA TN 37402**

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

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

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

2. Additional Monitoring by Permittee

If the permittee monitors any pollutant specifically limited by this permit more frequently than required at the location(s) designated, using approved analytical methods as specified herein,

the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

3. Falsifying 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.

4. Outlier Data

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

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

Therefore, only if an outlier was associated with problems in the collection or analysis of the samples, and as such does not conform with the Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR §136), it can be removed from the data set and not reported on the Discharge Monitoring Report forms (DMRs). Otherwise, all results (including monitoring of pollutants more frequently than required at the location(s) designated, using approved analytical methods as specified in the permit) should be included in the calculation and reporting of the values required in the DMR form. The permittee is encouraged to use "comment" section of the DMR form (or attach additional pages), in order to explain any potential outliers or dubious results.

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

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

2. Right of Entry

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

- a.** To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;
- b.** To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and
- c.** To sample at reasonable times any discharge of pollutants.

3. Availability of Reports

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

4. Proper Operation and Maintenance

- a.** The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.
- b.** Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and or other technology-based effluent limitations such as those in State of Tennessee Rule 1200-4-5-.03.

5. Treatment Facility Failure

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

6. Property Rights

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

7. Severability

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

8. Other Information

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

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

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

- a.** The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
- b.** The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

2. Permit Modification, Revocation, or Termination

- a.** This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.
- b.** The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- c.** If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.

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

3. Change of Ownership

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

- a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;
- b. The notice includes a written agreement between the existing and new permittee's containing a specified date for transfer of permit responsibility, coverage, and liability between them; and
- c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, it's 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 shall be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

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

2. Reporting of Noncompliance

a. 24-Hour Reporting

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

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

- i. A description of the discharge and cause of noncompliance;
- ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
- iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. Scheduled Reporting

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

3. Overflow

- a. "**Overflow**," means the discharge to land or water of wastes from any portion of the collection, transmission, or treatment system other than through permitted outfalls.
- b. Overflows are prohibited.
- c. The permittee shall operate the collection system so as to avoid overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic overflows (greater than 5 events per year) or would otherwise overload any portion of the system.
- d. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow

and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the local TDEC Environmental Assistance Center. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

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

4. Upset

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

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

- i. An upset occurred and that the permittee can identify the cause(s) of the upset;
- ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
- iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
- iv. The permittee complied with any remedial measures required under "Adverse Impact."

5. Adverse Impact

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

6. Bypass

- a. "**Bypass**" is the intentional diversion of wastewater away from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which would cause them to become inoperable, or substantial and permanent loss of natural resources, which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- b. Bypasses are prohibited unless the following 3 conditions are met:
 - i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
 - ii. There are not feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. 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 downtime 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 shall 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;
- d. 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 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:

<p style="text-align: center;">TREATED INDUSTRIAL WASTEWATER and STORM WATER RUNOFF TVA - Watts Bar Nuclear Plant (Permittee's Phone Number) NPDES Permit NO. TN0020168 TENNESSEE DIVISION OF WATER POLLUTION CONTROL 1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - CHATTANOOGA</p>

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 Outfalls 101, 102, and 113.

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

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

Outfalls 101 & 102					
Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
4 X PL	2 X PL	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
11.2	5.6	2.8	1.4	0.7	0

Outfall 113					
Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
4 X PL	2 X PL	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
26.8	13.4	6.7	3.4	1.68	0

The dilution/control water used shall 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 the permit limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein constitutes a violation of this permit. However, if raw water intake samples (tested concurrently with the effluent samples) are shown to be toxic enough to represent a test failure (100 percent samples statistically less than controls using t-tests and minnow growth or daphnid reproduction is 25

percent less than controls) and if effluent toxicity is not statistically greater than calculated intake toxicity, the effluent toxicity test in question will be considered invalid. In the event these two above described conditions occur, the toxicity test shall be repeated according to the schedule requirements for test failure. Effluent toxicity that is not consistent with the intake toxicity conditions specified above constitutes a violation of this permit. If pathogens are demonstrated to be the source of toxicity to *Pimephales promelas* in the intake water, the permittee may be allowed to treat effluent samples for toxicity testing on *Pimephales promelas* with UV radiation only in accordance with prior 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 twice a year (2/Year) for Outfalls 101, 102, and 113, and frequency and results reporting will be governed by the TDEC-approved Biocide/Corrosion Treatment Plan (B/CTP).

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

F. BIOCIDES/CORROSION TREATMENT PLAN

The permittee shall not conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals except in accordance with conditions specified under the written B/CTP [plan] which has been given prior approval by the Division of Water Pollution Control (DWPC) prior to the effective date of this permit, or subsequent revisions that are approved by the DWPC. WET frequency and results reporting will be governed by the B/CTP.

G. 316(B)

EPA published a draft of the revised Phase II 316(b) regulations on April 20, 2011 which is scheduled to be final not later than July 2012. This permit may be reopened to address new 316(b) compliance requirements upon issuance of a final rule or guidance by EPA.

PART IV

STORM WATER POLLUTION PREVENTION PLAN

Storm water runoff associated with industrial activity that is not discharged to the receiving stream through Outfalls 101 and 102 are currently authorized under the Tennessee Storm Water Multi-Sector General permit for Industrial Activities (TMSP), Permit Number TNR051343. The TMSP requires development, implementation, and routine evaluation and updating of a storm water pollution prevention plan (SWPPP). The permittee shall ensure that the appropriate pollution prevention measures are identified in the SWPPP to also minimize the discharge of pollutants in storm water or from ancillary activities via Outfalls 101 and 102. Any necessary plan modifications shall be completed in accordance with the schedules set forth in the TMSP.

The discharger will develop, document and maintain a storm water pollution prevention plan (SWPPP) pursuant to the requirements as set forth in the Tennessee Multi-Sector General Permit for Industrial Activities, Sector O, "Storm Water Discharges Associated With Industrial Activity From Steam Electric Power Generating Facilities", Part 3, "Storm Water Pollution Prevention Plan Requirements." The plan shall be signed by either a principal executive officer of a corporation, the owner or proprietor of a sole proprietorship, or a partner or general partner of a partnership.

**ADDENDUM TO RATIONALE
TVA - Watts Bar Nuclear Plant
PERMIT NO. TN0020168**

June 17, 2011

Addendum prepared by: Ms. Souraya Fathi

This Rationale has been revised since it was public noticed on April 18, 2011, to incorporate comments received by EPA and TVA – Watts Bar Nuclear Plant.

In a letter prepared by Ms. Cynthia M. Anderson, TVA, dated May 9, 2011, TVA - Watts Bar Nuclear Plant submitted comments on the draft NPDES Permit No. TN0020168. These comments have been addressed in the final permit and also been incorporated into the Rationale. Most all of the comments were minor changes and were either typographical errors or an oversight from the permit writer.

EPA's comments on the draft were received electronically on April 19, 2011, and were addressed and incorporated in the final permit.

SEF

Permit Addendum TN0020168.DOC

RATIONALE

TVA - Watts Bar Nuclear Plant
NPDES PERMIT NO. TN0020168
Spring City, Rhea County, Tennessee

Permit Writers: Ms. Souraya Fathi

I. DISCHARGER

TVA - Watts Bar Nuclear Plant
Hwy 68 Nuclear Plant Road
Spring City, Rhea County, Tennessee

Official Contact Person:
Mr. Don Grissette
Vice President – Watts Bar Nuclear Plant
(423) 751-3361

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

SIC Code(s): 4911
Industrial Classification: Primary
Discharger Rating: Major

II. PERMIT STATUS

Issued: June 04, 2010
Last modified February 08, 2005
Expired: December 31, 2011
Application for Modification Received: August 18, 2010

Watershed Scheduling

Environmental Assistance Center: Chattanooga
Primary Longitude: -84.785833 Primary Latitude: 35.593333
Hydrocode: 6020001 Watershed Group: 3
Watershed Identification: Tennessee River (Meigs & Rhea County)
Target Reissuance Year: 2011

III. FACILITY DISCHARGES AND RECEIVING WATERS

TVA - Watts Bar Nuclear Plant discharges cooling water, storm water and other treated wastewaters to the Tennessee River (Chickamauga Reservoir) just downstream of Watts Bar Dam. The facility also discharges treated sanitary wastewater, storm water and other treated wastewaters to the Yellow Creek embayment of Chickamauga Reservoir.

WBN is located on the right descending (west) bank of upper Chickamauga Reservoir at Tennessee River Mile (TRM) 528 approximately 1.9 miles downstream of Watts Bar Hydroelectric Dam (WBH; TRM 529.9) and one mile downstream of the idled Watts Bar Fossil Plant (Figure 1). Commercial operation of WBN Unit 1 began on May 27, 1996 and is designed for a net electrical output of 1,160 megawatts (MW; gross electrical output of 1,218 MW). A startup and operation of Unit 2 is planned in the fall of 2011 with minimal changes to the original plant design.

Cooling water flows from Chickamauga Reservoir through the plant intake channel to the intake pumping station (IPS) located approximately 1.9 miles downstream of Watts Bar Dam at TRM 528. WBN Unit 1 and proposed Unit 2 use closed-cycle cooling such that the cooling water withdrawn at the intake pumping station is to make-up for evaporation and cooling tower blowdown. The intake channel leading to the pumping station has a cross-sectional area of approximately 1,650 ft² at a Chickamauga Reservoir winter pool elevation of 675 ft mean sea level (msl), and 3,150 ft² at a summer pool elevation of 682.5 ft msl. This produces average water velocities between approximately 0.03 feet per second (fps) (high pool) and 0.05 fps (low pool) in the intake channel. The IPS includes four gated openings containing a combined gross flow area of approximately 360 ft², producing an average intake velocity (in front of screen) of about 0.2 fps. At the traveling water screens, the combined unobstructed through-screen area of the flow corresponding to the gated openings is reduced to approximately 140 ft², producing an average through-screen velocity of approximately 0.6 fps. The average flowrate at the IPS for WBN Unit 1 is approximately 80 cubic feet per second (cfs), or 0.3% of the long-term average river flow (27,000 cfs) past the plant.

With the operation of both Unit 1 and proposed Unit 2, intake (in front of screen) and through-screen velocities are projected to be 0.3 fps and 0.8 fps, respectively. The average flowrate at the IPS during operation of both units is expected to be approximately 116 cfs, or 0.4% of the long-term average river flow past the plant of approximately 27,000 cfs.

Appendix 1 summarizes facility discharges and the receiving stream information for seven outfalls, numbered 101, 102, 103, 107, 113, and 114. There are three (3) main outfalls (Nos. 101, 102, and 113) which discharge directly to waters of the state. Two (2) other outfalls (Nos. 103 and 107) are internal discharges that contribute to the main outfalls, and outfalls 101 and 102 also provide stormwater runoff relief. Internal discharge Outfall 114 is designated as the supplemental condenser cooling water (SCCW) traveling screen backwash outfall. Each of the six (6) outfalls is discussed in more detail as follows:

Outfall 101

Outfall 101 receives wastewater from two primary sources, the Cooling Tower Blowdown Line (45.773 MGD) and the Yard Holding Pond (1.371 MGD). The Watts Bar Nuclear facility utilizes natural draft cooling towers, which recirculate cooling water. In

order to control build up of dissolved solids, a portion of the recirculated water must be discharged, i.e., cooling tower blowdown. Cooling tower blowdown, at 45.773 MGD, represents the majority of the flow through the Cooling Tower Blowdown Line (due to the nature of the plant operation, this line may also contain once through cooling water from the supplemental condenser cooling water system). The remaining portion (as seen from Appendix 1) is made up of low volume wastes and metal cleaning wastes.

The Yard Holding Pond receives low volume wastes and stormwater runoff from numerous sources and is designed to provide oil skimming, neutralization, and sedimentation treatment. The pond has a volume of approximately 40 million gallons. However, at times the pond is used as an alternative route to discharge emergency raw cooling water and cooling tower blowdown.

The Cooling Tower Blowdown Line and the Yard Holding Pond discharge conduit are combined and discharged through a pipeline feeding a diffuser located in the Tennessee River at approximate mile 527.9. Discharge through the diffuser is only allowed when there is a minimum of 3500 cubic feet per second (cfs) flow from Watts Bar Dam.

Outfall 102

This outfall represents the emergency discharge overflow weir for the Yard Holding Pond. The overflow weir operates only in the event of an emergency which prevents the use of the blowdown line and diffuser or in the event that the blowdown line and/or diffuser require maintenance. Based on information from the plant permit application, this outfall has not been used in the last three years. In the event of a discharge, the flow would enter an unnamed tributary and flow for approximately 3000 feet to the Tennessee River at mile 527.2. Wastewater sources are the same as for Outfall 101.

Outfall 103 (Internal Monitoring Point)

This outfall represents the discharge from the Low Volume Waste Treatment Pond. The outfall does not discharge directly to waters of the state, but rather discharges to the Yard Holding Pond (Outfall 101). The Low Volume Waste Treatment Pond receives low volume wastes, storm water, and water leakage wastes as described in Appendix 1. This Pond has a total volume of approximately 17 million gallons, but normally is maintained at about 5 million gallons of wastewater. Treatment is provided by oil skimming, sedimentation, and neutralization. The outfall has been established as an internal monitoring point to verify treatment effectiveness and compliance with 40 CFR Part 423 effluent guidelines for low volume wastes.

Outfall 107 (Internal Monitoring Point)

This outfall represents the combined batch release from two holding/treatment ponds known as the Lined Pond and the Unlined Pond. These ponds are used to collect and treat wastes from periodic metal cleaning operations, and a small portion of storm water, diesel generator coolant, and drum rinsing water. Treatment may be provided by chemical addition (when necessary to meet limits) and recirculation/aeration to reduce concentrations of copper, iron, and/or phosphorus prior to discharge to the Yard Holding Pond (Outfall 101). The Lined Pond has an approximate volume of 0.91 million gallons and the Unlined Pond has an approximate volume of 6.5 million gallons. Following

treatment, the typical scenario is for the Lined Pond to be pumped to the Unlined Pond and the Unlined Pond discharged through Outfall 101. Batch releases are normally confined to periods of 24 hours or less. Records from February 2006 through February 2011 indicate that about 3 discharges per year occur. The long term average flow from the ponds (including days of zero flow) is 1.94 MGD, however, actual flow during discharge is between 2 and 3 MGD. This internal outfall has been established to verify treatment effectiveness and compliance with 40 CFR Part 423 effluent guidelines for metal cleaning wastes.

Outfall 113

This outfall represents the discharge of Supplemental Condenser Cooling Water, which is primarily non-contact, once through cooling water (due to the nature of the operation of the plant this line can also contain cooling tower blowdown). The flow is the largest discharge from the facility averaging 148.895 MGD. The water is routed to a former discharge point of the TVA - Watts Bar Fossil Plant and discharged at the surface of the Tennessee River at approximate mile 529.2.

Current operation of WBN Unit 1 utilizes the SCCW system through constant gravity flow from above WBH. Completion and operation of Unit 2 will not significantly alter or increase the thermal effluent from the SCCW outfall.

Two hydrothermal surveys and flow pattern surveys were conducted in the vicinity of WBN during May and August 2010, when there were no releases from upstream WBH through generators or spillways to characterize attributes of the SCCW thermal plume. Water temperatures were recorded upstream and downstream of the SCCW discharge during this test to characterize the thermal aspects of the plume. Drogues, devices designed to drift with surface currents, were deployed at and near the SCCW outfall to track flow patterns and compare flow paths during normal and no generation from Watts Bar Dam.

The conclusion was that maximum temperatures recorded during the May and August no-flow surveys were 74.8°F and 82.7°F, respectively. These maximum seasonal temperatures were lower than the Tennessee State WQC for temperature 86.9°F (30.5°C)

Outfall 114 (Internal Monitoring Point)

This outfall consists of traveling screen backwash from the supplemental condenser cooling water intake. The discharge from the outfall consists only of screen reject and raw water. Flow is estimated at 0.019 MGD.

Tennessee River

The TVA - Watts Bar Nuclear Plant has three direct discharges to the Tennessee River (Outfalls 101, 102, and 113). The plant withdraws cooling water and most other water used for industrial processes through the Intake Pumping Station located at Tennessee River mile 528.0. However, the Supplemental Condenser Cooling Water (145.0 MGD discharged through Outfall 113) is withdrawn from above Watts Bar Dam and is discharged to the River below the dam, but above the Plant Intake Pumping Station.

For purposes of protecting water quality, the Tennessee River below Watts Bar Dam is designated for fish and aquatic life use, recreation use, irrigation use, livestock watering and wildlife use, domestic water supply use, industrial water supply use, and navigation use. The flow of the river is controlled by the Tennessee Valley Authority (TVA) Watts Bar Dam and minimum flows at this location have been developed by the USGS as presented in Appendix 1.

Yellow Creek

The Yellow Creek embayment of Chickamauga Lake is designated for fish and aquatic life use, recreation use, irrigation use, and livestock watering and wildlife use. Low flow conditions in this stream are assumed to be zero.

IV. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

The Standard Industrial Classification (SIC) code for TVA - Watts Bar Nuclear Plant is 4911, establishments engaged in generation, transmission, and/or distribution of electric energy for sale. Process wastewater discharged through Outfalls 101, 102, 103, 107, and 113 is regulated by 40 CFR Part 423, Steam Electric Power Generating Point Source Category. This regulation is applicable to discharges resulting from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution or sale which results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium.

Appendix 2 lists the applicable best available technology (BAT) and best conventional pollution control technology (BPT) effluent limitations guidelines from 40 CFR Part 423.12 and 423.13. The guideline numeric limitations are listed for four specific wastewater sources, low volume wastes, metal cleaning wastes, cooling tower blowdown, and once through cooling water. In determining which guideline sources are attributable to each of the seven (7) outfalls, the Part 423.11, Specialized Definitions were used as follows:

The term Low Volume Wastes means, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this part. Low Volume Waste sources include, but are not limited to: wastewaters from wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes and recirculating house service water systems. Sanitary and air conditioning wastes are not included.

The term chemical Metal Cleaning Wastes means any wastewater resulting from cleaning [with or without chemical cleaning compounds] any metal process equipment including, but not limited to, boiler tube cleaning.

The term Once Through Cooling Water means water passed through the main cooling condensers in one or two passes for the purpose of removing waste heat.

The term Recirculating Cooling Water means water that is passed through the main condensers for the purpose of removing waste heat, passed through a cooling device for purpose of removing such heat from the water and then passed again, except for blowdown, through the main condenser.

The term Blowdown means the minimum discharge of recirculating water for the purpose of discharging materials contained in the water, the further buildup of which would cause concentration in amounts exceeding limits established by best engineering practices.

The above definitions specifically exclude sanitary wastewater and air conditioning wastes. For sanitary wastes, Tennessee Effluent Guidelines from Rule 1200-4-5-03 (1) and/or best professional judgment have been applied.

The effluent limitations presented in 40 CFR 423 (see Appendix 2) are normally to be established in the permit as mass limitations by multiplying the flow of the specific waste source times the applicable concentration limit. However, 40 CFR, Part 423.12 (b) (11) and Part 423.13 (g) allow the permitting authority, at its discretion, to substitute concentration limits instead of the mass limitations. For the TVA-Watts Bar Nuclear Plant permit, only concentration limits will be established.

Also in developing guideline limitations for each outfall, EPA Rule Part 423.12 (12) and Part 423.13(12) is applicable as follows:

In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in the BPT/BAT limitation tables attributable to each controlled source shall not exceed the specified limitation for that source.

Utilizing these definitions and the waste source identification provided in the permit application (see summary tables in Appendix 1), the following waste sources and proportions are applied to each outfall as follows:

Guideline Waste Sources and Flows for Two Unit Operations by Outfall			
Outfall No	Contributing BPT/BAT Waste Source	Waste Source Flow	
		Flow MGD	% Outfall Total
101	Yard Holding Pond (Metal Cleaning Waste)	1.371	2.4%
	Misc. Cooling Waters (Low Volume Wates)	10.62	18.4%
	<u>Cooling Tower Blowdown</u>	45.773	79.2%
	Total Outfall Flow	57.764	
102	Yard Holding Pond (Metal Cleaning Waste)	1.371	2.4%
	Misc. Cooling Waters (Low Volume Wates)	10.62	18.4%
	<u>Cooling Tower Blowdown</u>	45.773	79.2%
	Total Outfall Flow	57.764	
103	Low Volume Wastes	0.3619	100.0%
107	Metal Cleaning Wastes	0.0310	100.0%
113	Once Through Coling Water	148.895	100.0%
114	Supplemental Condenser Cooling Water Intake Screen backwash	0.019	100.0%

Note: Outfall 114 is backwash water and is not considered in the monitoring requirements for this permit.

Where the effluent limitation guideline concentration limits include the same parameter(s) for each source, the allocation of guideline limits by flow is straightforward. However, where a parameter is limited for one source and not limited for another, some judgment must take place. The approach taken has been to assure that each source complies with its parameter guideline concentration without that source being diluted by other wastewater source(s) for which the parameter is not limited. One means to accomplish this is to utilize internal outfalls, which enable monitoring at a location that is source specific. This approach has been utilized at the Watts Bar Nuclear Plant for Outfalls 103, and 107.

Using the above guidance, the 40 CFR guidelines have been applied to the plant outfalls as shown in Appendix 2 and described as follows:

Outfall 101

Cooling tower blowdown represents approximately 79% of the outfall flow and Low Volume wastes represent 20.8%. Thus the guidelines for Cooling Tower Blowdown and Low Volume Waste will be applied to the total waste stream. The total suspended solids limit and the oil and grease limit applicable to the low volume waste sources is considered applicable to the cooling tower blowdown source as well. Because the metal cleaning wastes represent only 0.1% of the flow, the guideline limits for this source will not be applied to Outfall 101. Rather, compliance with metal cleaning waste limits will be handled by employing an internal monitoring point (Outfall 107). The applicable BPT and BAT limits are given in Appendix 2.

The flow from Outfall 101 is monitored at Watts Bar Dam, and includes the instrumentation that River Operations uses to measure the discharge through the hydro turbines. A control loop between Watts Bar Dam and WBN automatically closes the Outfall 101 diffuser valves when the hydro discharge at Watts Bar Dam drops below 3500 cfs.

Outfall 102

Since this is an emergency discharge for Outfall 101, the same guidelines apply as for Outfall 101. The limitations are presented in Appendix 2.

Outfall 103

This outfall receives Low Volume Wastes exclusively; therefore, the Low Volume Waste guideline limitations will apply. The limitations are presented in Appendix 2.

Outfall 107

This outfall receives 99.9% Metal Cleaning Wastes and 1% Low Volume Wastes. Therefore the Metal Cleaning Waste limitations will be applied as shown in Appendix 2.

Outfall 113

This outfall receives noncontact supplemental condenser cooling water. The wastewater is defined by 40 CFR 423 as Once Through Cooling Water. Thus Outfall 113 will be subject to the effluent limitations for the Once Through Cooling Water Source given in 40 CFR Part 423.12 (6) and Part 423.13 (b) (1&2) and shown in Appendix 2.

Outfall 114

This outfall has no monitoring requirements, consists of traveling screen backwash from the supplemental condenser cooling water intake.

V. PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

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

VI. HISTORICAL MONITORING AND INSPECTION

During the previous permit term, TVA - Watts Bar Nuclear Plant did not have any appreciable difficulty in meeting effluent limitations as outlined in the previous permit. The self monitoring data reported on Discharge Monitoring Report forms during the previous permit term are summarized in Appendix 4.

Any violations of permit limitations that occurred are shown in the tables found in Appendix 4. This information is downloaded from the EPA ICIS database, and statistically summarized.

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. For this facility the technology-based limit is determined from EPA effluent limitations guidelines applicable to the steam electric power generating point source category (see Part IV); 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. Water quality calculation procedures are explained in this section under the heading: Metals and Toxics.

Appendix 5a through 5e presents the water quality calculations, Appendix 5f presents a comparison of the different limitations, and Appendix 5g lists all proposed effluent limitations and monitoring requirements to be included in the new permit.

The results of the water quality calculations are compared to the effluent guideline limitations in Appendix 5f and the proposed final permit limitations are presented in Appendix 5g. The effluent characteristics limited in the permit and monitoring requirements are discussed

individually by outfall as follows as well as certain other permit conditions for the facility that are not outfall specific:

Outfall 101

Flow

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in Million Gallons per Day (MGD). Measurement frequency shall be continuous by recorder. These requirements are unchanged from the previous permit.

Oil and Grease

An oil and grease limitation is applied to this outfall because of the significant presence of low volume wastes. The limits are established at 15 mg/l monthly average and 20 mg/l daily maximum in accordance with BPT technology-based limits from 40 CFR Part 423.12 (b) (3).

According to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 1200-4-3-.03(3) (c)], there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream. The permit writer is selecting technology-based limits for oil and grease of 15 mg/L as a monthly average concentration and 20 mg/L as a daily maximum concentration. In addition, the permit shall contain language prohibiting visible floating scum, oil or other matter in the wastewater discharge. Sample type shall be grab. These limits are unchanged from the previous permit. Monitoring frequency in the new permit shall remain at once per month, however, monitoring for oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required. Sample type shall be grab.

Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and shall be limited in this permit. The technology-based limit of 30 mg/l monthly average and 100 mg/l daily maximum is taken from 40 CFR Part 423, Subpart 423.12 (b) (3), the BPT limitations applicable to low volume wastes.

The State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 1200-4-3-.03(3) (c)] state there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The permit writer believes the limit of 30 mg/L monthly average, and 100 mg/L daily maximum concentrations shall provide protection of water quality in the receiving stream. The sampling frequency shall be once per month, however, monitoring for TSS apply only when the turbine building sump is aligned to bypass Internal Monitoring

Points 103 and 107 where monitoring these parameters is required. Sample type shall be grab.

pH

Technology-based BPT effluent limitations from 40 CFR, Part 423, Subpart 423.12 (b) (1) establish a pH limitation of 6.0 to 9.0 for all discharges from this facility.

According to the State of Tennessee Water Quality Standards [Chapter 1200-4-3-.03(3) (b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24-hours. Appendix 5d presents calculations that show that the combined discharge from Outfalls 101 and 113 will not cause the pH of the Tennessee River to fall below the 6.5 minimum pH standard. Considering that the receiving stream will provide pH buffering, effluent limitations for pH shall be retained in a range 6.0 to 9.0. The sampling frequency shall be once per month, however, monitoring for pH apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required. The sample type shall be grab.

Total Residual Chlorine

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

The previous permit has a limit of 0.1 mg/L monthly average and 0.1 mg/L daily maximum for Outfall 101. The 0.1 mg/l concentration is greater than the acute criteria for TRC at 0.019 mg/l. Because of the large volume of water discharged by TVA there exists the potential for exposure of aquatic life to toxic concentrations of chlorine in the discharge. However, since chlorine residual reacts and dissipates rapidly upon mixing into the ambient waters, the concentrations above the acute value should not exist for any significant area. Thus the 0.1 mg/l concentration limit for TRC is considered to be protective of water quality in the Tennessee River at a flow from Outfall 113 of 148.958 MGD and from Outfall 101 of 57.76 MGD.

The monthly average limit of 0.10 mg/L and the daily maximum limit of 0.10 mg/L for Total Residual Chlorine (TRC) shall be retained in the new permit. The limits are based on the protection of water quality in the Tennessee River during periods when Outfall 101 and Outfall 113 exceed their long term average flow and based on antibacksliding provisions of 40 CFR Part 122.44 (l). These limits are also determined to be appropriate because the facility is discharging TRC in excess of 2 hours per day in accordance with the approved Biocide/Corrosion Treatment Plan.

Chromium

Outfall 101 is primarily composed of cooling tower blowdown. 40 CFR Part 423.13 provides BAT effluent limitations for total chromium applicable to the discharge of cooling tower blowdown wastewater discharges. The limits are 0.2 mg/L monthly

average and 0.2 mg/L daily maximum. The Watts Bar Nuclear Plant does not use corrosion control chemicals or biocides containing chromium at the facility. Sampling data submitted with the application demonstrated that chromium could not be detected in the effluent at a detection limit of 0.001 mg/L. Thus chromium will be included as a permit limit however, monitoring for chromium is waived per 40 CFR Part 122.44 (a)(2)(i). A statement shall be placed in the permit as follows: The use of water treatment chemicals containing chromium is prohibited under this permit.

Zinc

Outfall 101 is primarily composed of cooling tower blowdown. 40 CFR Part 423.13 provides BAT effluent limitations for total zinc applicable to cooling tower blowdown wastewater discharges. The limits are 1.0 mg/L monthly average and 1.0 mg/L daily maximum. The TVA - Watts Bar Nuclear Plant utilizes zinc in corrosion inhibitors for treatment of raw water. TVA's policy is to control the feed of zinc containing chemicals to limit the discharge concentration to 0.2 mg/L or less.

The zinc limit of 1.0 mg/L daily average and 1.0 mg/L daily maximum shall be continued in the new permit. The corrosion inhibiting chemicals are added to the raw water system, and are recirculated through the condensers and the cooling towers. Thus the concentration of zinc is not expected to be highly variable with time. Therefore, a measurement frequency of 2/month and sample type of grab should be adequate to characterize zinc in this outfall.

Effluent Temperature

Temperature shall be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 1200-4-3-.03(3)(e)]. It is recognized that the temperature of the cooling water discharge will be greater than the temperature of the water prior to its use for cooling or other purposes. This discharge must not cause the temperature change in the receiving stream to exceed 3°C relative to an upstream control point. Also, this discharge must not cause the temperature of the receiving stream to exceed 30.5°C (except as a result of natural causes), and this discharge must not cause the maximum rate of temperature change in the receiving stream to exceed 2°C per hour (except as a result of natural causes).

The elevated temperature water of outfall 101 is mixed with the Tennessee River receiving water by being discharged through a diffuser. Instream temperature criteria must be met at the edge of the mixing zone. The mixing zone is defined for this discharge as being a maximum width of 240 feet (the width of the diffuser) and extending 240 feet downstream. An operational requirement of the plant is that the diffuser is only operated when 3500 cubic feet per second (CFS) flow is present from the dam. Mathematical modeling of the temperature during mixing was carried out by TVA and was submitted in a report in June 2007 (Completion and Operation of Watts Bar Nuclear Plant Unit 2). The report was based on the 24-hour average for discharge evaluation as specified in the NPDES permit issued in 1993. The modeling assumed both nuclear units in operation and concluded that a steady-state discharge of 38.3 °C under worst case conditions, which included 1) full thermal load from the fossil plant, 2) the worst meteorology and 3) no operation of Watts Bar Hydro facility, would still protect the water quality based on modeling using daily averaging. A daily average value of 35°C was proposed to include a margin of safety. A continuous discharge at the temperature maximum of 35°C will not exceed water quality outside of the mixing zone

based on past modeling. The Division approved a one-hour averaging period for evaluating compliance with temperature criteria in the receiving stream.

A numeric effluent limitation of 35°C shall continue as the daily maximum that can be discharged. Measurement frequency shall be continuous and sample type shall be by recorder. These limits are unchanged from the previous permit.

The designs of the diffusers and mixing zone were based on the operation of both Unit 1 and Unit 2; therefore, no changes are anticipated for accommodating the operation of Unit 2. However, TVA will perform studies similar to those performed for Unit 1 to confirm the performance of the diffusers with the operation of two units.

Toxicity Testing

Raw water used at the facility is treated with corrosion inhibitors and biocide products. These products, which can become concentrated in the cooling tower system, are discharged through Outfall 101. The chemical makeup of the products used can change during the permit period and the combined toxicity effect of the chemicals is not known. Thus it is not feasible to control toxicity only by the application of chemical specific effluent limits to the discharge. Toxicity testing of sensitive aquatic species (coupled with evaluation of new chemical products before they are used) is a reasonable method to evaluate the toxicity impacts of the products in the effluent. Therefore a whole effluent toxicity testing requirement shall remain in the permit. The calculations of the appropriate dilutions for the test are given in Appendix 5e of the Rationale and Part III of the permit.

The new permit shall require IC25 testing at a wastewater dilution of 2.8%. Monitoring frequency shall be semi-annual, one during oxidizing biocide treatment and one during non-oxidizing biocide treatment. Sample type shall be composite.

Outfall 102

Outfall 102 is an emergency discharge used when the Outfall 101 diffuser cannot be used. Thus the limits for this outfall shall be the same as for Outfall 101. The new permit limitations for this outfall are unchanged from the previous permit. Sampling frequency and sample type are adjusted for flow and temperature to reflect that continuous monitoring equipment would not be available during an emergency discharge. When thermally loaded effluent is discharged through Outfall 102, all reasonable efforts shall be made to keep flow to a minimum of 3500 cubic feet per second in the receiving waters. If such flow is absent, the permittee shall verify protection of water quality by taking instream temperature measurements.

The new permit shall require IC25 testing at a wastewater dilution of 2.8%. Monitoring frequency shall be semi-annual, only if discharge operated \geq 30 days from Jan. – Jun., or Jul. – Dec. if all toxicity testing has not been completed for Outfall. Sample type shall be composite.

Monitoring for pH, total suspended solids and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required.

Outfall 103

This outfall is an internal monitoring point receiving low volume wastes. Thus the Low Volume Waste technology-based limitations apply.

Flow

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in Million Gallons per Day (MGD) and monitored continuously by recorder.

pH

Technology-based BPT effluent limitations from 40 CFR, Part 423.12 (b) (1) establish a pH limitation of 6.0 to 9.0 for all discharges from this facility. Therefore a pH limitation of 6.0 to 9.0 shall apply. Sampling shall be once per month and sample type shall be grab.

Oil and Grease

An oil and grease limitation is applied to this outfall because of the significant presence of low volume wastes, which are subject to 40 CFR Part 423 guidelines. The limits are established at 15 mg/l monthly average and 20 mg/l daily maximum in accordance with BPT technology-based limits from 40 CFR Part 423.12 (b) (3).

The permit writer is selecting technology-based limits for oil and grease of 15 mg/L as a monthly average concentration and 20 mg/L as a daily maximum concentration. The mass limits shall not be retained. Sampling shall be once per month and sample type shall be grab.

Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and shall be limited in this permit. The technology-based limit of 30 mg/l monthly average and 100 mg/l daily maximum is taken from 40 CFR Part 423.12 (b) (3), the BPT limitations applicable to Low Volume Wastes. Sampling shall be once per month and sample type shall be grab.

Outfall 107

This outfall is an internal monitoring point incorporated to evaluate compliance with guideline limitations for metal cleaning wastes. These wastes are subject to technology based BPT and BAT guidelines for metal cleaning wastes under 40 CFR Part 423.12(b)(5) and 423.13 (e).

Flow

The flow from this outfall occurs as a controlled batch discharge from the Lined and Unlined Ponds. Flow duration is typically about 24 hours. Historical batch discharge frequency has been about 4 times per year. The flow is calculated by determining change in stage of the ponds.

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in Million Gallons per Day (MGD) and monitored each time there is a batch discharge from the ponds through the outfall. Flow frequency shall be once per batch and type measurement shall be calculated.

pH

Technology-based BPT effluent limitations from 40 CFR, Part 423.12 (b) (1) establish a pH limitation of 6.0 to 9.0 for all discharges from this facility. Ph shall be monitored once per batch and sample type shall be grab.

Oil and Grease

An oil and grease limitation is applied to this outfall because of the significant presence of metal cleaning wastes. Concentration limits are established at 15 mg/l monthly average and 20 mg/l daily maximum in accordance with BPT technology-based limits from 40 CFR Part 423.12 (b) (5). The previous permit imposed a monthly average limit of 15 mg/L and a daily maximum limit of 15 mg/L.

Because the wastewater discharging to this outfall is batch treated, it is the permit writer's judgment that each batch can be treated to meet the 15 mg/L concentration. The average of monthly average values and the maximum value reported from the previous permit monitoring data (see Appendix 4) indicate a consistent value of <5.0 mg/l. Thus the 40 CFR guideline daily maximum limit of 20 mg/l shall not apply and the previous permit limit shall be retained at 15 mg/l monthly average and daily maximum. Sampling shall be once per batch discharge, and sample type shall be grab.

Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and shall be limited in this permit. The technology-based limit of 30 mg/l monthly average and 100 mg/l daily maximum is taken from 40 CFR Part 423.12 (b) (3), the BPT limitations applicable to metal cleaning wastes.

The previous permit provided a monthly average concentration limit of 30 mg/L and a daily maximum concentration limit of 30 mg/L. Sampling frequency shall be once per batch and sample type shall be grab.

Copper, Total Recoverable

Technology-based BAT limits are established for copper at 40 CFR Part 423, Subpart 423.13 (e). The limits are 1.0 mg/L as a monthly average and 1.0 mg/L as a daily maximum. The previous permit contained concentration limits for copper at 1.0 mg/L as monthly average and as a daily maximum.

The new permit shall have a 1.0 mg/L total recoverable copper limit as both the monthly average and daily maximum in accordance with the technology-based guidelines. The mass limits shall not be retained the permit. Sampling frequency shall be once per batch. Because the wastewater comes from large ponds, which should have relatively good equalization of concentration, and to be consistent with other outfall sampling requirements, the sample type shall be grab.

Iron, Total Recoverable

Technology-based BAT limits are established for iron at 40 CFR Part 423.13 (e). The limits are 1.0 mg/L as a monthly average and 1.0 mg/L as a daily maximum. The previous permit contained concentration limits for iron at 1.0 mg/L as monthly average and as a daily maximum.

The new permit shall have a 1.0 mg/L total recoverable iron limit as both the monthly average and daily maximum in accordance with the technology-based guidelines. Because the wastewater comes from large ponds, which should have relatively good equalization of concentration and to be consistent with other outfall sampling requirements, the sample type shall be grab.

Phosphorus, Total

Phosphorus is not limited by technology-based guidelines, however it is of water quality concern because of its potential to be used in metal cleaning and its ability to contribute to nuisance aquatic growth in receiving water bodies. The previous permit established a 1.0 mg/L monthly average and a 1.0 mg/L daily maximum concentration and required that phosphorus be monitored once per week only during periods when phosphate cleaning solutions are used. During the past five-year permit period, no phosphorus monitoring was reported at the facility. Because phosphate and phosphate chemicals are listed in the permit application as chemicals added to wastewaters reaching Outfall 107 the limits in the previous permit shall be retained.

Monitoring frequency shall be once per batch discharge only during periods when phosphate cleaning solutions are added. Because the wastewater comes from large ponds, which should have relatively good equalization of concentration and to be consistent with other outfall sampling requirements, the sample type shall be grab.

Outfall 113

Outfall 113 discharges Supplemental Condenser Cooling Water (SCCW), which is noncontact, once through cooling water. Once through cooling water is subject to BPT and BAT technology-based limitations under 40 CFR Part 423. A portion of the water discharged through Outfall 113 enters the plant through the intake pumping station (IPS) and is treated with corrosion inhibitors and biocide. The remaining portion is obtained by gravity flow through the intake for the old TVA - Watts Bar Fossil Plant, which withdraws water from Watts Bar Reservoir above Watts Bar Dam. The proportion of flow from the IPS ranges from approximately 50 to 75 MGD and the remaining portion from Watts Bar Reservoir varies from approximately zero to 110 MGD. The water withdrawn from Watts Bar Lake may be passed through the condensers as once through cooling water, or by using a bypass valve arrangement, may be routed directly to Outfall 113.

Flow

The previous permit required flow to be measured on a continuous basis using a recorder. This language shall be retained in the new permit. Should the continuous flow monitoring equipment fail or need to be taken off line for repairs or calibration, the flow shall be measured by staff gage as a backup method until the flow monitoring

system is brought back on line. The permittee shall take reasonable steps to restore the flow monitoring as soon as possible.

Sudden changes in thermal loading at the plant, i.e., start-up or shutdown, should not be made unless there is discharge from Watts Bar Dam (the exception being changes necessary due to concern for human safety or the environment).

pH

The discharge is covered under 40 CFR Part 423 guidelines, which require that the pH be maintained between 6.0 and 9.0. Calculations given in Appendix 5d show that pH within this range will protect the water quality of the Tennessee River. Thus pH limitations shall remain 6.0 to 9.0 in the new permit. Sampling frequency shall be once per month and sample type shall be grab.

Total Suspended Solids (TSS)

TSS was included in the previous permit as a monitoring only requirement on a once per month basis. There are no technology based limits or numeric water quality criteria for this parameter. According to Tennessee Water Quality Criteria for the protection of fish and aquatic life [Chapter 1200-4-3-.03(3)], there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to aquatic life in the receiving stream. Monitoring of TSS was required during the previous permit period and the data (see Appendix 4) indicated that the long-term average was 4.0 mg/L. Because the facility is considering adding bentonite to this waste stream as a method of detoxifying biocides, suspended solids monitoring shall remain in the permit. Sampling frequency shall be once per month and sample type shall be grab.

Chlorine, Total Residual

Total chlorine residual was limited in the previous permit at 0.092 mg/L as a monthly average and 0.158 as a daily maximum. These limits were based on compliance with instream water quality criteria at a previous permit flow of 192 MGD. Water quality calculations (presented in Appendix 5b) were performed using the long-term average combined flow of Outfalls 101 and 113 from the current permit application. These calculations indicate that a monthly average of 0.15 mg/l and a daily maximum of 0.259 mg/L are necessary to comply with water quality criteria. In the case of the daily maximum value, the 0.2 mg/L BAT limit is more restrictive. Monitoring data from the previous permit period indicates that the long-term average and the maximum TRC concentration have been well below the permit limit (see Appendix 4). The WBN plant does not add chlorine to the Supplemental Condenser Cooling Water, however chlorine/bromine is potentially present in the outfall due to commingling of cooling tower blowdown. The previous permit limits shall be retained in the permit to comply with the antibacksliding provisions of 40 CFR Part 122.44 (l) and as part of the justification for the exceedance of the 2 hour per day guideline maximum for discharge of TRC (see discussion in Rationale under Additional Limitations, Conditions and Monitoring Requirements). Monitoring frequency shall be retained at once per month and sample type shall be grab.

Dissolved Oxygen. (DO)

Outfall 113 discharges Supplemental Condenser Cooling Water (SCCW), which is noncontact, once through cooling water to the Tennessee River via a diffuser a mile 529.2. State water quality criteria for this stream requires that dissolved oxygen be 5.0 mg/L or greater. However, because of the high flow of the discharge from this Outfall and the receiving stream the narrative limit to "Report the minimum DO" shall be retained in the new permit. Monitoring frequency shall be once per month and sample type shall be grab.

Toxicity Testing

The new permit limit calculations indicate required chronic toxicity testing, IC25, at a dilution factor of 14.8 and a new limit of 6.7%. Measurement frequency shall be retained at semi-annual, one during oxidizing biocide treatment and one during non-oxidizing biocide treatment. Sample type shall be composite.

Temperature, General

Tennessee water quality criteria for temperature contains three parts, (1) the discharge shall not cause the temperature of the receiving waters to exceed 30.5 °C instream after mixing, (2) the discharge shall not cause an upstream to downstream temperature change of more than 3 °C, and (3) the discharge shall not cause a rate of temperature change more than 2 °C per hour. All of these conditions must be met at the edge of the mixing zone for the discharge. Further the extent of the mixing zone should be such that fish and aquatic life are not harmed by the discharge.

TVA, as part of a previous permit application process, presented dilution model results, which indicated that the mixing zone of this discharge would allow the free passage of fish while avoiding bottom dwelling species. During periods of Watts Bar dam releases, the heated plume is predicted to stay near the right bank (looking downstream) and extend downstream for a distance of approximately 1000 feet. During periods of dam shutoff, the heated plume is predicted to extend across the entire width of the river. Normally a "bank to bank" mixing zone is not allowable; however; in this case, only near the surface does the "passive" mixing zone extend across the width of the river.

Temperature and Area of Mixing Zone

The dynamic nature of the river operations in the vicinity of the Outfall 113 discharge and the fact that this channel is not a natural stream lead to issues with defining an appropriate mixing zone. It is recognized that the temperatures occurring in the Tennessee River at the location of the discharge are the result of a complex set of variables defining the mixing hydrodynamics and heat balance. Many of the variables, such as meteorological inputs, dam turbine releases, dam leakage, flow direction, and reservoir stage are beyond the control of the Watts Bar Nuclear Plant. It is further recognized that applying instantaneous criteria is problematic because of the dynamic nature of the receiving stream (barge traffic, dam operations, rapidly changing plume location, etc.). For this reason, the Division has determined that compliance with the temperature criteria should not be applied on an instantaneous basis instead compliance will be implemented with the following changes.

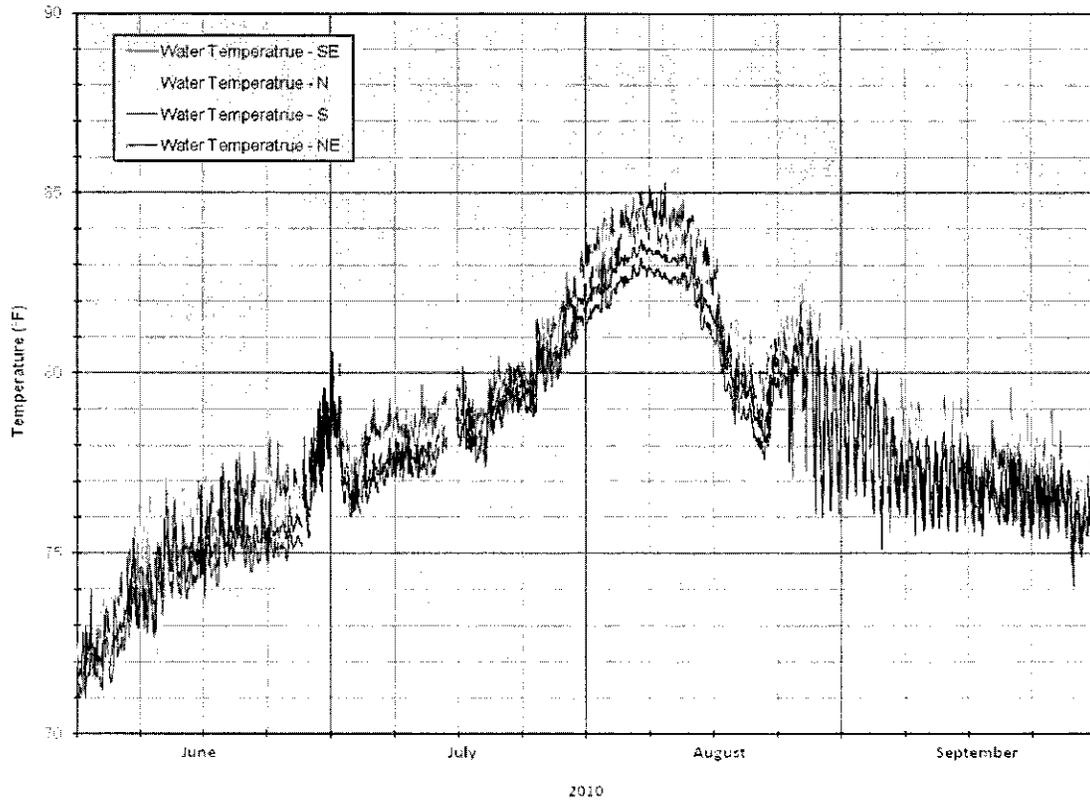
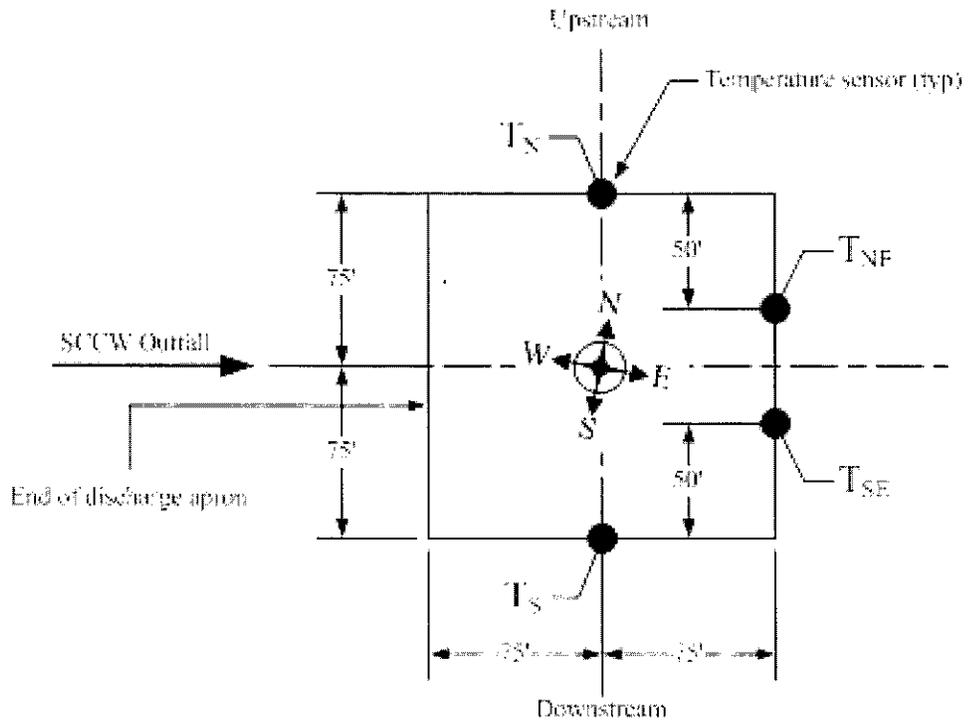
The approach to the mixing zone in this permit will be to define both an active and a passive mixing zone of approximately the same overall size. (See Mixing Zone Diagram, Appendix 5h.) In the passive mixing zone case, corresponding to dam shutoff, the mixing zone geometry will be defined as before. The passive mixing zone extends across the entire width of the river and extends downstream approximately 1000 feet. The active mixing zone will apply to other conditions where the plume tends to reside in the right hand side of the river (facing downstream). Monitoring to establish compliance for the active mixing zone will occur 2000 feet downstream of Outfall 113 in the right hand side of the river. This monitoring will utilize two stations that will be placed after determining the best locations to capture, as much as possible, the true temperature in the plume. Temperature recorder station #33 and recorder station #34 are shown on the general locations on the mixing zone diagram. The data from the two stations will be reported as the average of the temperatures for the two stations. This average will allow better tracking of the plume.

The modeling that predicted the previously described passive mixing zone will be [physically] verified by an instream thermal survey conducted semiannually. This passive mixing zone that was described in the previous permit has been verified by instream modeling and instream thermal surveys.

The permittee shall maintain a bottom temperature sensor in the Mussel Relocation Zone to ensure protection of bottom dwelling species and a zone of fish passage. The limit for the four existing monitors in the relocation zone will remain at 33.5°C (92.3°F) as the instantaneous maximum value previously established to protect those bottom dwelling species. The permittee shall record this data on the DMRs, where exceedences of the limit will be considered a permit violation.

Outfall 113 is a near-surface discharge, and computations and measurements confirm that the effluent disperses in the surface region of the water column providing ample room for fish passage. TVA is not proposing any changes to the dimensions of the Outfall 113 mixing zones with the completion and startup of Unit 2.

Mussel Relocation Zone Temperature Sensors and Data for Summer 2010



Temperature, Effluent

It is recognized that the temperature of the discharge, after use for cooling purposes, will be higher than that of the intake water. The previous permit did not establish a maximum effluent temperature but rather required reporting of effluent temperature. Sampling frequency was hourly and sample type was grab. This sampling requirement shall be retained in the new permit.

The temperature at the edge of the mixing zone must not exceed 30.5 °C as a daily maximum. Instream temperature monitors shall be employed at the downstream edge of the active mixing zone to demonstrate compliance. Measurement frequency shall be hourly and sample type shall be recorder.

Temperature, Rise Upstream to Downstream

In order to demonstrate compliance with the 3 °C maximum rise upstream to downstream, the permittee shall conduct automated instream temperature monitoring. Monitoring locations shall include an upstream point (just below Watts Bar Dam) and a downstream point at the downstream edge of the mixing zone (as described above).

Additional Limitations, Conditions, and Monitoring Requirements

In addition to the specific numerical limitations discussed above, there are a number of general requirements that shall apply to outfalls 101, 102, 103, 107, and 113. These requirements are discussed as follows:

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

These requirements are potentially applicable to Outfalls 101, 102 and 113. Chlorine is not added to the Supplemental Condenser Cooling Water System (once through cooling water) at the Watts Bar Nuclear Plant; however, it is present in all Outfalls due to commingling of cooling tower blowdown. TVA has made a demonstration to the Division that the Watts Bar Nuclear Plant cannot operate under these "two hour per day" requirements without significant damage to the system potentially jeopardizing operational safety. No limit was placed on the hours of chlorine use in the previous permit and no such limit shall be included in the new permit.

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

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

for more than two hours is required for microinvertebrate control. Simultaneous multi-unit chlorination is permitted.”

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

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

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

The language in the previous permit shall be retained restricting start-up, shutdown and abrupt flow changes when the flow is below 3,500 cubic feet per second.

It is recognized that the permittee must use biocides and corrosion inhibitor products to protect plant piping systems and assure safety in the event of a shutdown. Because the chemicals in these products may be detrimental to fish and aquatic life in the receiving stream, there is a need to evaluate the nature of the chemicals, the dosage to be used, the duration of use, the effluent concentration, and the need for treatment prior to discharge. The previous permit required that a biocide treatment plan be submitted for approval by the Division and that subsequent changes to that plan during the permit period also be submitted for approval. It is also recognized that biocide and corrosion inhibitor products will change during the course of the NPDES permit period and that there is need for a mechanism to evaluate these changes relative to water quality impacts. Thus language has been incorporated into the permit to allow modification of the biocide and corrosion inhibitor plan based on pre-approval of the modifications by the Division.

The quantities of chemicals used for treatments of intake or process waters must be conducted in accordance with a TDEC-approved Biocide/Corrosion Treatment Plan (B/CTP). WBN’s current B/CTP was approved in 2009. This provision will continue in this permit and TVA must submit a revised B/CTP which addresses the changes in chemical treatments of ERCW and RCW and Towerbrome® treatments of CCW for two unit operations at WBN.

VIII. METALS AND TOXICS

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

1. The most recent background conditions of the receiving stream segment are compiled. This information includes:
 - * 7Q10 of receiving stream
 - * Calcium hardness (measured ambient data, or 80.6 mg/L default)
 - * Total suspended solids (measured ambient data, or 8.4 mg/L, default)
 - * Background metals concentrations (measured ambient data, or ½ chronic water quality criteria)
 - * Other dischargers impacting this segment
 - * Downstream water supplies, if applicable
2. The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.
3. The acute water quality criteria is converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, lead, nickel, zinc, silver and mercury. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel, silver and mercury.
4. The chronic criteria for Chromium (T) is given in the total recoverable form and is not converted to a dissolved lab condition or to the total recoverable ambient condition.
5. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of 90%.

The following 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 25 mg/l and Total Suspended Solids (TSS) of 10 mg/l unless ambient stream data 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. The minimum limit on the TSS value used for water quality calculations is 10 mg/l.
4. Background concentrations are determined from the division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is used in lieu of 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.

The spreadsheet 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 "Fraction Dissolved" 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:

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

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.

The most stringent water quality effluent concentration from Columns 7, 8, 12, 13, and 14 is applied if the receiving stream is designated for domestic water supply. Otherwise, the most stringent effluent concentration is chosen from columns 7, 8, and 12 only.

The calculations are presented in Appendix 5b. One calculation has been made for the Tennessee River and one for Yellow Creek. Because of the close proximity of the outfalls and large flow of the discharges, Outfalls 101 and 113 have been combined for purposes of the water quality calculations in the Tennessee River. Background water quality in the Tennessee River has been taken from the Division of Water Pollution Control monitoring station at river mile 529.5. This data is presented in Appendix 5a.

Separate water quality calculations are presented for ammonia and pH in Appendix 5c and 5d respectively. In the case of ammonia, Outfalls 101 and 113 were combined for purposes of determining the discharge concentration allowable for the Tennessee River. Based on the calculations it was determined that limiting ammonia to prevent toxicity was not necessary.

Storm Water

The following table gives a summary of storm water discharges at the TVA - Watts Bar Nuclear Plant:

Storm Water Outfall Summary					
E/SW PPP Area No.	Drainage Area acres	Impervious Area acres	Pond(s) Included in Drainage Area	Outfall Designation	Permit Coverage
1	42	34	YHP	101	NPDES
2	49	47	YHP	101	NPDES
3	144	5	None	To be re-evaluated for TMSP	
4	92	3	None	SW-1	TMSP
5	37	22	YHP	101	NPDES
6	29	1	None	SW-5	TMSP
7	18	7	LVWP+	103	NPDES
8	27	8	None	SW-2	TMSP
9	45	11	None	SW-3	TMSP
10	41	4	None	To be covered under TMSP	
11	77	18	None	To be covered under TMSP	
12	163	1	None	SW-4	TMSP
13	166	35	CRHP	To be re-evaluated for TMSP	
14	42	30	CRHP	To be re-evaluated for TMSP	
15	8	0	None	No industrial activity	
Total	980	226			

Outfalls that contain only storm water and other discharges allowed by the TMSP have been permitted under the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities (TMSP). Outfalls SW-1 through SW-5 fall into this category and thus are not addressed in this individual permit. Outfalls that contain storm water commingled with process and/or cooling wastewater are covered under this individual NPDES permit. This includes

Outfall 101(or 102). The total flow from Outfall 101 (and 102 when in use) contains approximately 2.1% storm water based on the average annual flow. Storm runoff pollutants from this discharge shall be controlled via the Storm Water Pollution Prevention Plan (SWPPP) required by this permit (see Part IV of the Permit).

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

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

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

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

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

IX. BIOMONITORING REQUIREMENTS, CHRONIC

The discharge of industrial wastewater from Outfall 101, 102, and 113 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Tennessee Water Quality Standards criteria stipulate that "*The*

waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions...".

Since the permittee discharges to streams with low critical flow conditions, there is a concern for toxicity effects of the discharge on the receiving stream that is relatively unknown. Biomonitoring will provide information relative to the toxicity of the discharge. Chronic biomonitoring is designed to evaluate extended exposure effects of toxicants to growth and/or reproduction of sensitive aquatic species. Calculations of chronic toxicity limits are as follows:

For situations where water is withdrawn from the stream and then discharged back to the stream

$$DF = \frac{Q_s}{Q_w}$$

and for situations where water is not withdrawn from the stream

$$DF = \frac{Q_s + Q_w}{Q_w} = \text{Dilution Factor,}$$

Where **Q_w** is the wastewater flow and **Q_s** is a receiving stream low flow (7Q₁₀ or 1Q₁₀),). Please refer to Appendix 5e for details regarding facility wastewater flow and receiving stream low flow. Where the calculated dilution factor is less than 100:1, and assuming immediate and complete mixing, protection of the stream from chronic effects requires:

$$IWC \leq 1.0 \times IC_{25}; \text{ or,}$$

$$INHIBITION \text{ CONCENTRATION, } 25\% \geq IWC,$$

Where IWC is Instream Waste Concentration and is calculated as a percent of the total flow using the following formula:

For situations where water is withdrawn from the stream and then discharged back to the stream

$$IWC = \frac{Q_w}{Q_s} \times 100$$

and for situations where water is not withdrawn from the stream

$$IWC = \frac{Q_w}{Q_s + Q_w} \times 100$$

The following table gives the calculated chronic test values for the four outfalls:

Calculation of Chronic and Acute Biomonitoring Requirements Watts Bar Nuclear Plant, Outfalls 101, 102, and 113								
Calculation of Chronic Biomonitoring Requirements								
Outfall	Receiving Stream	Rec. Stream Flow, Qs mgd	Outfall Waste Flow, Qw mgd	Withdrawing from Rec. Strm.	Dilution Factor, DF		Instream Wastewater Conc. (IWC)	
					Withdrawing Qs/Qw	Not Withdrawing (Qs + Qw)/Qw	Withdrawing (Qw/Qs)	Not Withdrawing (Qw/(Qw+Qs))
Chronic Requirements, if DF \leq 100								
101	TN River	2062	57.76	Yes	35.7		2.80%	
102	TN River	2062	57.76	Yes	35.7		2.80%	
113	TN River	2062	148.895	No		14.8		6.73%

As seen from the table, WET testing shall be required on all three Outfalls. If toxicity is demonstrated in any of the effluent samples specified above, this shall constitute a violation of this permit.

The toxicity tests specified herein shall be conducted twice a year (2/Year) and begin no later than 90 days from the effective date of this permit for Outfalls 101, 102, and 113.

X. ANTIDegradation

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06. It is the purpose of Tennessee's standards to fully protect existing uses of all surface waters as established under the Act.

Stream determinations for this permit action are associated with the waterbody segments identified by the division as segment ID# **TN06020001020_1000, and TN06010201001_1000.**

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

Additionally, this water partially support(s) designated uses due to polychlorinated biphenyls (contaminated sediments). The discharge from Outfall 113 does not contain significant amounts of these effluent characteristics (consists only cooling water/storm water runoff and does not represent an increase in flow). The division, therefore, considers the potential for degradation to the receiving stream from these discharges to be negligible.

TMDLs have been developed and approved for this waterbody segment on the following parameters and dates:

<u>Parameter</u>	<u>TMDL Approval Date</u>
PCBs	03/18/2010

The proposed terms and conditions of this permit comply with the wasteload allocations of these TMDLs.

The withdrawal rate for the intake pumping station located in Chickamauga Reservoir will increase from approximately 52 MGD to approximately 75 MGD and SCCW intake withdrawal rate will remain approximately 174 MGD is consumptive (primarily cooling tower evaporation) with the remainder to the stream via permitted outfalls. The consumption amounts to only 1.3% of the 7Q10 stream flow (3173.3 MGD). Therefore, water withdrawal will continue to be *de minimus* as described in Rule 1200-4-3.04.

No thermal degradation is proposed or anticipated. TVA has performed an extensive hydrothermal analysis of the WBN heat dissipation system. This analysis indicates that the near—field (and thus far-field) thermal impacts are insignificant and can be managed within the limitations of the current NPDES permit.

XI. 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 shall be set for issuance and expiration at the same time. In order to meet the target reissuance date for the Tennessee River (Meigs & Rhea County) watershed and following the directives for the Watershed Management Program initiated in January 1996. This permit will expire in 2016.

APPENDIX 1 – FACILITY DISCHARGES AND RECEIVING WATERS

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FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL (OSN) 102	
LONGITUDE	LATITUDE
-84.791667	35.595833

FLOW (MGD)	DISCHARGE SOURCE
0.0000	Yard Holding Pond Overflow Weir (emergency outfall) - Provides an alternate discharge path for the diffuser discharge point (OSN 101)
0.0000	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Unnamed tributary entering Chickamauga Reservoir (Tennessee River Mile 527.2)			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	4910	3190	8580
(MGD)	3173.3	2061.7	5545.3

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

Treatment: Biocide, sedimentation, neutralization, and oil skimming, mixing by submerged multiport diffuser.

* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Law and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority. Nashville, Tennessee, 1996. p.57.

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL (IMP) 103	
LONGITUDE	LATITUDE
-83.20694	35.59722

FLOW (MGD)	DISCHARGE SOURCE
	Low Volume Waste Holding Pond
0.0053	Precipitation, Less Evaporation
0.0250	Alum Sludge Supernate
0.2600	Vendor Water Ppurification (RO reject water)
0.0716	Turbine Building Station Sump
0.3619	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Internal monitoring point that discharges through the Yard Holding Pond			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	0.0	0.0	0.0
(MGD)	0.0	0.0	0.0

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

Treatment: Oil skimming, sludge thickening, and neutralization

* No low stream flow assigned to the internal monitoring point which discharges to the Yard Holding Pond

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL (IMP) 107	
LONGITUDE	LATITUDE
-84.7955	35.6048

RECEIVING STREAM DISCHARGE ROUTE			
Internal monitoring point which discharges through the Yard Holding Pond			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	0.0	0.0	0.0
(MGD)	0.0	0.0	0.0

FLOW (MGD)	DISCHARGE SOURCE
	Metal Cleaning Waste Ponds (LP and ULP)
0.0003	Metal Cleaning Waste
0.0001	Storm Water Runoff
0.0001	Drum Rinsing
0.0001	Drum Dewatering
0.0001	Diesel Generator Coolant
0.0303	Turbine Station Sump W/Metal Cleaning Waste
0.0310	TOTAL DISCHARGE

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

Treatment: Oil skimming, sludge thickening, and neutralization

* No low stream flow assigned to the internal monitoring point which discharges to the Yard Holding Pond

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL (OSN) 113	
LONGITUDE	LATITUDE
-84.785833	35.593333

RECEIVING STREAM DISCHARGE ROUTE			
Discharge via diffuser to Chickamauga Reservoir (Tennessee River Mile 529.2)			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	4910	3190	8580
(MGD)	3173.3	2061.7	5545.3

FLOW (MGD)	DISCHARGE SOURCE
148.895	Supplemental Condenser Cooling Water (Noncontact)
148.895	TOTAL DISCHARGE

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

Treatment: Thermal Mixing

* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Law and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority. Nashville, Tennessee, 1996, p.57.

FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL (OSN) 114	
LONGITUDE	LATITUDE
-83.21667	35.62083

FLOW (MGD)	DISCHARGE SOURCE
0.019	Supplemental Condenser Cooling Water (SCCW) - (Intake screen backwash)
0.019	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Discharge via Tennessee River @ mile 529.8			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q2
	4910	3190	8580
(MGD)	3173	2062	5545

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

Treatment: Screens

* Reference: Flow Duration and Low Flows of Tennessee Streams through 1992 by George S. Law and Jess D. Weaver. Water Resources Investigations Report 95-4293 prepared by the U.S. Geological Survey in Cooperation with the Tennessee Department of Environment and Conservation and the Tennessee Valley Authority. Nashville, Tennessee, 1996, p.57.

APPENDIX 2 – APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

**SIC GROUP 4911, 40 CFR PART 423
 STEAM ELECTRIC POWER GENERATING CATEGORY GUIDELINES**

LOW VOLUME WASTE SOURCES				
EFFLUENT CHARACTERISTIC	BPT		BAT	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Total Suspended Solids	30	100	--	--
Oil and Grease	15	20	--	--
pH	6.0-9.0		--	--
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

METAL CLEANING WASTES				
EFFLUENT CHARACTERISTIC	BPT		BAT	
	SUBPART 423.12		SUBPART 423.13	
	MONTHLY	DAILY	MONTHLY	DAILY
AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	
Total Suspended Solids	30	100	--	--
Oil and Grease	15	20	--	--
pH	6.0-9.0		--	--
Copper, Total	1.0	1.0	1.0	1.0
Iron, Total	1.0	1.0	1.0	1.0
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

**SIC GROUP 4911, 40 CFR PART 423
 STEAM ELECTRIC POWER GENERATING CATEGORY GUIDELINES**

EFFLUENT CHARACTERISTIC	COOLING TOWER BLOWDOWN			
	BPT		BAT	
	SUBPART 423.12		SUBPART 423.13	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Chlorine, Free Available*	0.2	0.5	0.2	0.5
pH	6.0-9.0		--	--
Chromium, Total	--	--	0.2	0.2
Zinc, Total	--	--	1.0	1.0
Priority Pollutants (126) contained in chemicals added for cooling tower maintenance, except Chromium and Zinc	No Detectable Amount			
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

EFFLUENT CHARACTERISTIC	ONCE THROUGH COOLING WATER			
	BPT		BAT	
	SUBPART 423.12		SUBPART 423.13	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Chlorine, Free Available	0.2	0.5	--	--
Chlorine, Total Residual*	--	--	--	0.2
pH	6.0-9.0		--	--
Chromium, Total	--	--	0.2	0.2
Zinc, Total	--	--	1.0	1.0
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

* Limitation applies to once through cooling water from plants with a total rated electric generating capacity of 25 or more megawatts.

APPENDIX 3 – PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
TVA-Watts Bar Nuclear						
OUTFALL 101						
Cooling Water, Storm Water and Process Wastewater						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MONIT. FREQNCY.	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		Continuous	Recorder ¹
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month	Operation Records
pH ²	Range 6.0 - 9.0				2/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
OIL & GREASE	15.0	--	20.0	--	1/Month	Grab
CHROMIUM, TOTAL	0.2	--	0.2	--	WAIVED ⁶	Grab
ZINC, TOTAL	1.0	--	1.0	--	2/Month	Grab
CHLORINE, TOTAL RESIDUAL (TRC) ^{2,3}	0.10	--	0.10	--	5/Week	Grab ^{2,3}
TEMPERATURE, Effluent ⁴	--	--	35 °C	--	Continuous	Recorder
IC25 ⁵	25% Inhibition Concentration shall be \geq 3.3% effluent				2/year	Composite ⁵

There shall be no discharge of PCBs.

¹ Flow shall be reported in Million Gallons per Day (MGD). In the event that the continuous flow monitor is out of service, flow monitoring shall be estimated by intake pump logs.

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

³ The acceptable methods for analysis of TRC are any methods specified in 40 CFR Part 136.

⁴ When the temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore the temperature recorder to operation as soon as possible. See Part III for further temperature requirement.

⁵ See Part III for methodology.

⁶ Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(i). See Rationale for more comments.

PERMIT LIMITS

TVA-Watts Bar Nuclear

OUTFALL 102

Cooling water, Stormwater runoff and Process Wastewater

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. FREQCY.	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/Day	Instantaneous
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month ⁵	Operation Records
pH ²	Range 6.0 - 9.0				2/Month ⁶	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month ⁶	Grab
OIL & GREASE	15.0	--	20.0	--	1/Month ⁶	Grab
CHROMIUM, TOTAL	2.0	--	2.0	--	Waived ⁷	Grab
ZINC, TOTAL	1.0	--	1.0	--	2/Month ⁶	Grab
CHLORINE, TOTAL RESIDUAL (TRC) ^{2,3}	0.10	--	0.10	--	5/Week	Grab ^{2,3}
TEMPERATURE, Effluent	--	--	35° C	--	1/Day	Grab
IC25 ⁴	25% Inhibition Concentration shall be \geq 3.3% effluent				2/year ⁴	Composite ⁴

There shall be no discharge of PCBs.

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

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

³ The acceptable methods for analysis of TRC are any methods specified in 40 CFR Part 136.

⁴ Sampling and analysis required only if discharge is operated 30 days or more during the semi-annual periods January through June or July through December and if all toxicity testing requirements have not already been completed for Outfall 101. See Pa

⁵ Certification shall be made during any month that a discharge occurs from this outfall.

⁶ If there is discharge during 1 or more days from this outfall, sampling is required to comply with the maximum daily limit. If there are two or more separate days of discharge, or a continuous discharge during 5 or more consecutive days from this outfall then one sample is required from that "batch" discharge in order to report the monthly average limit.

⁷ Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(i). See Rationale for more comments.

PERMIT LIMITS						
TVA-Watts Bar Nuclear						
OUTFALL 103 (Internal Monitoring Point Low Volume Waste Holding Pond)						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. 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		Continuous ¹	Recorder
pH²	Range 6.0 - 9.0				1/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
OIL & GREASE	15.0	--	20.0	--	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.

PERMIT LIMITS						
TVA-Watts Bar Nuclear						
OUTFALL 113 Supplemental Condenser Cooling Water						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. 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		Continuous	Recorder
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month	Operation Records
pH²	Range 6.0 - 9.0				1/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
CHLORINE, TOTAL RESIDUAL (TRC)^{2, 3, 6}	0.092	--	0.158	--	1/Month ⁶	Grab
DISSOLVED OXYGEN (D.O.)	--	--	Report Min.	--	1/Month	Grab
TEMPERATURE, Effluent	Report Effluent Temperature ⁴				Hourly	Recorder ⁷
TEMPERATURE, Edge of Mixing Zone	--	--	30.5 °C	--	Hourly	Recorder ⁷
TEMPERATURE, Rise Upstream to Downstream	--	--	3 °C	--	Hourly	Calculated ⁷
TEMPERATURE, Rate of Change, °C per hour	--	--	2 °C/Hour	--	Hourly	Calculated ⁷
TEMPERATURE, Receiving Stream Bottom	--	--	33.5 °C	--	Hourly	Recorded
IC25⁵	25% Inhibition Concentration shall be ≥8% effluent				Semi-annual	Composite ⁵

¹ Flow shall be reported in Million Gallons per Day (MGD).
² pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
³ The acceptable methods for analysis of TRC are any methods specified in 40 CFR Part 136.
⁴ See text below table for requirements.
⁵ See Part III for methodology.
⁶ Sampling for TRC shall be 5/Week during periods when the Supplemental Condenser Cooling Water (SCCW) system is in operation.
⁷ See additional (bulleted) comments in permit. Begins on page 8 of 27.

PERMIT LIMITS

TVA-Watts Bar Nuclear

**OUTFALL 107 (Internal Monitoring Point)
 Metal Cleaning Wastewater**

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. FREQCY.	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/Batch ¹	Calculated
pH ²	Report		Report		1/Batch ²	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	30.0	--	1/Batch	Grab
OIL & GREASE	15.0	--	15.0	--	1/Batch	Grab
COPPER, TOTAL RECOVERABLE	1.0	--	1.0	--	1/Batch	Grab
IRON, TOTAL RECOVERABLE	1.0	--	1.0	--	1/Batch	Grab
PHOSPHORUS, TOTAL ³	1.0	--	1.0	--	1/Batch	Grab

¹ Flow shall be reported in Million Gallons per Day (MGD) for each batch discharge. If a batch discharge extends for more than a 24-hour period, flow

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

³ Sampling for phosphorus is required only when metal cleaning chemicals containing phosphorus are being used.

PERMIT LIMITS FOR OUTFALL 114

TVA-Watts Bar Nuclear

Supplemental Condenser Cooling Water Intake Screen Backwash water

1.) No numerical monitoring limitations are applied to this outfall.

APPENDIX 4 – HISTORICAL MONITORING DATA

OUTFALL 101

Date	Discharge event observation	Flow		Total Suspended Solids		O&G		Zinc, total (as Zn)		Whole Effluent Toxicity (WET) Testing		Total Residual Chlorine		Temperature, Effluent	pH	
		Effluent	Effluent	M Ave	D Max	M Ave	D Max	M Ave	D Max	Ceriodaphnia	Pimephates	Daily Max. Conc. mg/L	Daily Max. Conc. mg/L		Daily Max. C	Daily Min. Conc.
	Event	Monthly Average MGD	Daily Max. MGD	Effluent Conc. mg/L	Effluent Conc. mg/L	Effluent Conc. mg/L	Effluent Conc. mg/L	Effluent Conc. mg/L	Effluent Conc. mg/L	%	%					
02/28/2006	1	43.19	80.97	4.0	4.0	5.0	5.0	0.02	0.03			0.05	0.05	18	7.9	8
03/31/2006	1	41.32	66.46	8.0	8.0	5.0	5.0	0.01	0.01			0.05	0.05	22	7.6	8.2
04/30/2006	1	37.28	62.96	8.0	8.0	5.0	5.0	0.01	0.01			0.05	0.05	24	8.4	8.4
05/31/2006	1	31.37	52.72	6.0	6.0	5.0	5.0	0.06	0.11			0.05	0.09	28	8.3	8.4
06/30/2006	1	51.20	70.66	8.0	9.0	5.0	5.0	0.13	0.15			0.05	0.07	28	6.9	6.6
07/31/2006	1	42.34	61.19	8.0	10.0	5.0	5.0	0.03	0.05			0.05	0.05	31	7.6	9
08/31/2006	1	38.17	65.05	10.0	13.0	5.0	5.0	0.02	0.03			0.05	0.05	31	7.3	8.7
09/30/2006	1	37.21	54.10	9.0	9.0	5.0	5.0	0.16	0.21			0.05	0.05	30	7.9	8.4
10/31/2006	1	41.73	71.95	8.0	8.0	5.0	5.0	0.10	0.19			0.05	0.08	24	7.4	7.4
11/30/2006	1	26.42	60.89	4.0	4.0	5.0	5.0	0.02	0.02			0.05	0.05	17	7.6	7.8
12/31/2006	1	32.56	50.74	5.0	5.0	5.0	5.0	0.02	0.02			0.05	0.05	18	7.6	7.8
01/31/2007	1	48.64	79.24	8.0	8.0	5.0	5.0	0.02	0.02			0.05	0.05	23	7.6	7.7
02/28/2007	1	44.74	72.71	3.0	3.0	5.0	5.0	0.01	0.01			0.05	0.05	19	7.7	7.8
03/31/2007	1	26.56	72.18	7.0	6.0	5.0	5.0	0.01	0.01			0.05	0.05	27	7	7.6
04/30/2007	1	29.24	56.03	6.0	6.0	6.0	6.0	0.02	0.03			0.05	0.05	25	7.7	7.9
05/31/2007	1	35.33	57.64	3.0	3.0	5.0	5.0	0.03	0.03			0.05	0.06	27	7.7	7.6
06/30/2007	1	34.13	56.49	5.0	5.0	5.3	5.3	0.09	0.14			0.05	0.05	31	7.7	7.6
07/31/2007	1	27.13	51.01	6.0	6.0	5.6	5.6	0.03	0.04			0.05	0.06	29	7.8	8
08/31/2007	1	29.28	53.29	5.0	6.0	5.4	5.4	0.07	0.09					32	7.7	7.8
09/30/2007	1	26.26	61.97	6.0	6.0	5.6	5.6	0.04	0.04			0.05	0.06	31	7.8	7.9
10/31/2007	1	26.13	53.67	8.0	8.0			0.03	0.04					29	7.9	8
11/30/2007	1	27.72	55.74	8.0	8.0	5.6	5.6	0.04	0.04			0.05	0.05	24	7.4	7.8
12/31/2007	1	20.11	68.59	15.0	15.0	5.3	5.3							23	7.7	7.9
01/31/2008	1	28.57	66.91	3.0	3.0	5.0	5.0	0.01	0.01			0.05	0.05	18	7.5	7.6
02/29/2008	1	40.78	71.09	9.0	9.0	1.9	1.9	0.02	0.02			0.05	0.05	24	7.9	8.4
03/31/2008	1	43.03	83.77	7.1	7.1	5.0	5.0	0.01	0.01			0.05	0.09	22	7.9	8.3
04/30/2008	1	37.11	84.78	9.1	9.1	5.0	5.0	0.03	0.03			0.05	0.05	26	7.7	8.1
05/31/2008	1	43.19	87.67	12.0	12.0	5.5	5.5	0.11	0.18			0.05	0.07	23	7.6	7.8
06/30/2008	1	47.82	94.13	4.4	4.4	5.3	5.3	0.06	0.07			0.05	0.05	32	8	8
07/31/2008	1	50.67	82.48	9.5	9.5	5.6	5.6	0.06	0.10			0.05	0.07	31	7.8	8
08/31/2008	1	66.61	102.94	7.3	7.3	5.2	5.2	0.12	0.12			0.05	0.07	32	7.6	7.9
09/30/2008	1	63.84	108.11	11.0	11.0	5.2	5.2	0.06	0.09			0.05	0.07	31	7.6	7.7
10/31/2008	1	48.74	93.13	4.4	4.4	5.0	5.0	0.14	0.20			0.05	0.05	28	7.6	7.9
11/30/2008	1	36.65	83.77	8.1	8.1	5.0	5.0	0.04	0.04			0.05	0.05	23	8	8.3
12/31/2008	1	30.60	73.52	4.0	4.0	5.5	5.5	0.04	0.05			0.05	0.05	23	7.8	8.4
01/31/2009	1	23.69	65.15	7.4	7.4	5.3	5.3	0.01	0.01	19.2	19.2	0.05	0.05	20	7.7	7.9
02/28/2009	1	19.11	36.31	8.2	8.2	5.3	5.3	0.09	0.13			0.05	0.05	21	8	8
03/31/2009	1	20.99	48.50	7.3	7.3	5.3	5.3	0.10	0.10			0.05	0.07	23	7.9	8.1
04/30/2009	1	24.33	50.45	8.1	8.1	5.6	5.6	0.13	0.22			0.05	0.05	27	8	8.4
05/31/2009	1															
06/30/2009	1	34.79	60.50	8.4	8.4	5.3	5.3	0.08	0.10					33	8.1	8.4
07/31/2009	1	31.01	55.97	10.7	10.7	5.6	5.6	0.14	0.20	19.2	19.2			31	8.6	8.7
08/31/2009	1	29.15	54.34	6.4	6.4	5.6	5.6	0.04	0.04			0.05	0.05	32	7.7	8.7
09/30/2009	1	32.02	67.64	11.0	11.0	5.5	5.5	0.10	0.17			0.05	0.05	29	7.4	8.6
10/31/2009	1	32.33	70.70	11.0	11.0	5.5	5.5	0.04	0.05					24	8	8.2
11/30/2009	1	33.63	53.80	8.9	8.9	5.2	5.2	0.09	0.16			0.05	0.05	22	7.4	8.1
12/31/2009	1	29.62	55.42	9.2	9.2	5.3	5.3	0.06	0.07					18	7.6	8.4
01/31/2010	0	22.55	50.75	4.7	4.7	5.3	5.3	0.01	0.01	19.2	19.2	0.05	0.05	20	8.2	8.4
02/28/2010	1	19.73	46.71	8.8	8.8	5.3	5.3	0.03	0.05					19	8.3	8.4
03/31/2010	1	22.07	35.33	4.5	4.5	5.3	5.3	0.02	0.02					21	8.5	8.6
04/30/2010	1	23.64	33.56	3.4	3.4	5.5	5.5	0.01	0.02			0.05	0.05	26	7.8	8.2
05/31/2010	1	32.63	63.06	9.6	9.6	5.2	5.2	0.02	0.02			0.05	0.05	29	8	8.5
06/30/2010	1	37.20	63.60	6.9	6.9	5.5	5.5	0.04	0.04					31	8	8.1
07/31/2010	1	39.11	53.53	3.7	3.7	5.5	5.5	0.04	0.04			0.05	0.05	32	8	8.1
08/31/2010	1	37.58	67.36	7.6	7.6	5.5	5.5	0.04	0.04					33	7.9	8.6
09/30/2010	1	36.16	62.21	6.6	6.6	5.3	5.3	0.03	0.04			0.05	0.05	30	8	8
10/31/2010	1	30.10	44.96	7.5	7.5	5.3	5.3	0.05	0.06					27	8	8.1
11/30/2010	1	22.85	52.17	11.5	11.5	5.5	5.5	0.02	0.02					22	7.7	7.9
12/31/2010	1	23.18	52.45	8.0	8.0	5.3	5.3	0.01	0.01	13.2	13.2			20	7.7	7.8
01/31/2011																
02/28/2011	1	27.25	59.21	9.9	9.9	5.6	5.6	0.01	0.02					22	7.7	8
Minimum	0.0	19.11	33.56	3.0	3.0	1.5	1.9	0.01	0.01	13.2	13.2	0.05	0.05	16	6.9	7.4
Maximum	1.0	66.61	108.11	15.0	15.0	6.0	6.0	0.16	0.22	19.2	19.2	0.06	0.09	33	8.6	9.0
Average	1.0	34.42	63.96	7.4	7.5	5.2	5.2	0.05	0.07	17.7	17.7	0.05	0.06	26	7.8	8.1
Permit Limit	...	...	...	30	100	15	20	1.0	1.0	3.3	3.3	0.011	0.019	35°C	6.0	9.0
Count	59	59	59	59	59	58	58	58	58	4	4	44	44	59	59	59

OUTFALL 107

Date	Flow		Total Suspended Solids		O&G		Iron, total (as Fe)		Phosphorus, total (as P)		pH	
	Effluent		M Ave	D Max	M Ave	D Max	M Ave	D Max	M Ave	D Max	Daily Max. Conc.	Daily Min. Conc.
	Monthly Average	Daily Max.	Effluent Conc.	Effluent Conc.	Effluent Conc.	Effluent Conc.	Effluent Conc.	Effluent Conc.	Effluent Conc.	Effluent Conc.		
	MGD	MGD	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
02/28/2006	2.35	2.35	4	4	5	5	0.1	0.1	0.1	0.1	8.3	8.3
03/31/2006												
04/30/2006												
05/31/2006												
06/30/2006	3.15	3.15	4	4	5	5	0.1	0.1	0.2	0.2	8.4	8.4
07/31/2006												
08/31/2006												
09/30/2006	0	0	7	7	5	5	0.3	0.3	0.1	0.1	8.6	8.6
10/31/2006	1.44	1.44	8	8	5	5	0.0	0.0	0.2	0.2	8.2	8.2
11/30/2006												
12/31/2006												
01/31/2007												
02/28/2007												
03/31/2007												
04/30/2007												
05/31/2007												
06/30/2007												
07/31/2007												
08/31/2007												
09/30/2007												
10/31/2007												
11/30/2007	1.23	1.23	1	1	5.6	5.6	0.1	0.1	0.7	0.7	8.1	8.1
12/31/2007												
01/31/2008												
02/29/2008												
03/31/2008	2.5	2.5	1.3	1.3	5	5	0.2	0.2	0.1	0.1	8.4	8.5
04/30/2008												
05/31/2008												
06/30/2008												
07/31/2008												
08/31/2008												
09/30/2008												
10/31/2008												
11/30/2008												
12/31/2008												
01/31/2009												
02/28/2009												
03/31/2009	2.55	2.55	11	11	5.8	5.9	0.1	0.1	5.5	5.5	8.4	8.4
04/30/2009												
05/31/2009												
06/30/2009												
07/31/2009												
08/31/2009												
09/30/2009	2.55	2.55	6.9	6.9	5	5	0.2	0.2	0.5	0.5	7.2	7.2
10/31/2009												
11/30/2009	2.6	2.6	11	11	5.5	5.6	0.3	0.3	0.2	0.2	8.1	8.2
12/31/2009												
01/31/2010												
02/28/2010												
03/31/2010												
04/30/2010												
05/31/2010	1.7	1.7	9.6	9.6	5.6	5.6	0.3	0.3	0.3	0.3	8.1	8.1
06/30/2010												
07/31/2010												
08/31/2010												
09/30/2010												
10/31/2010												
11/30/2010												
12/31/2010												
01/31/2011												
02/28/2011	1.3	1.3	15	15	5.3	5.3	0.2	0.2	0.3	0.3	7.9	7.9
Minimum	0.00	0.00	1.0	1.0	5.0	5.0	0.0	0.0	0.1	0.1	7.2	7.2
Maximum	3.15	3.15	15.0	15.0	5.8	5.9	0.3	0.3	5.5	5.5	8.6	8.6
Average	1.94	1.94	7.2	7.2	5.3	5.3	0.2	0.2	0.7	0.7	8.2	8.2
Permit Limit	--	--	30.0	30.0	15.0	15.0	1.0	1.0	1.0	1.0	--	--
Count	11	11	11	11	11	11	11	11	11	11	11	11

Outfall 107 discharges as a batch discharge. All data presented as historical data. Additional intermittent discharge from condenser tube cleaning wastewater. Filtered to 5 microns for asbestos.

OUTFALL 113

Date	Discharge event observation	Flow		Total Suspended Solids		Dissolved Oxygen	Whole Effluent Toxicity (WET) Testing		Total Residual Chlorine		Temperature, Effluent	Temperature, Effluent	Temperature, Effluent	Temperature, Effluent	pH	
		Effluent		N Ave	D Max	Daily Min. Conc.	Ceriodaphnia	Pimephales	Daily Max. Conc.	Daily Max. Conc.	Daily Max.	Daily Max.	Daily Max.	Daily Max.	Daily Max. Conc.	Daily Min. Conc.
		Monthly Average	Daily Max.	Effluent Conc.	Effluent Conc.	mg/L	%	%	mg/L	mg/L	C	C	C	C	Conc.	Conc.
		MGD	MGD	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	C	C	C	C	Conc.	Conc.
02/28/2006	1	99.95	133.76	6	6	8.3			0.05	0.05	10.7	9.8	1	2	0	8
03/31/2006	1	102.32	128.03	5	5	9			0.05	0.05	13.2	13.1	1	1	8.2	8.2
04/30/2006	1	112.78	137.66	4	4	7.6			0.05	0.05	19.9	19.7	2	1	8.3	8.3
05/31/2006	1	100.04	148.74	3	3	7.9			0.05	0.05	21.4	21.1	1	1	7.8	7.8
06/30/2006	1	64.26	117.31	5	5	7.4			0.05	0.05	26.7	26.3	1	1	8.4	8.4
07/31/2006	1	155.86	222.97	4	4	7.2			0.05	0.05	26.5	28.1	1	1	8.3	8.3
08/31/2006	1	219.29	235.77	3	3	6.6			0.05	0.05	29.2	28.7	1	0	8.4	8.4
09/30/2006	1	98.66	233.66	3	3	6			0.05	0.05	28.4	27.9	0	0	8.2	8.2
10/31/2006	1	7.18	28.99	1	1	7.2			0.05	0.05	22.9	22.8	0	0	7.6	7.6
11/30/2006	1	146.81	182.73	3	3	11.7			0.05	0.05	16.9	16.7	1	0	7.6	7.6
12/31/2006	1	156.23	189.48	4	4	9			0.05	0.07	13.1	12.6	2	1	7.6	7.6
01/31/2007	1	135.66	169.02	4	4	10.3			0.05	0.05	12.1	11.3	1	1	7.4	7.4
02/28/2007	1	126.85	143.74	2	2	8.1			0.05	0.05	10.1	7.8	1	1	7.7	7.7
03/31/2007	1	160.19	188.17	4	4	7.7			0.05	0.07	14.4	13.8	2	1	7.5	7.7
04/30/2007	1	129.86	129.71	5	5	9.2			0.05	0.06	16.7	16	1	1	7.4	7.4
05/31/2007	1	196.93	205.98	5	5	7.4			0.05	0.05	21.9	21.9	1	1	7.7	7.6
06/30/2007	1	202.43	213.74	4	4	6.4			0.05	0.05	26.4	26.3	1	1	7.8	7.8
07/31/2007	1	206.95	220.48	6	6	7.3			0.05	0.05	27	26.7	1	1	7.9	7.9
08/31/2007	1	212.2	222.11	3	3	7.2					28.5	28.3	1	1	7.9	7.9
09/30/2007	1	283.67	216.97	2	2	7.7			0.05	0.05	27.9	27.9	1	0	8	8
10/31/2007	1	187.63	211.44	3	3	8.4					26.1	26.5	1	1	7.7	7.7
11/30/2007	1	187.36	212.83	7	7	8.8			0.05	0.05	20.8	21.6	1	1	7.6	7.6
12/31/2007	1	136.54	174.73	5	5	9.1					13.7	14.1	1	1	8	8
01/31/2008	1	149.66	164.83	3	3	7.9			0.05	0.05	10.2	12.4	2	1	7.6	7.6
02/29/2008	1	53.86	176.61	4	4	8.4			0.05	0.05	8.4	10.6	1	1	7.6	7.6
03/31/2008	1	29.55	157.6	8.5	8.5	7.9			0.05	0.05	14.9	12.3	1	1	7.2	7.2
04/30/2008	1	158.01	166.35	3.6	3.6	7.8			0.05	0.06	17.2	18.2	1	1	8	8
05/31/2008	0	176.93	194.86	3.2	3.2	7.6			0.05	0.05	21.1	20.9	1	1	8	8
06/30/2008	1	184.55	193.15	2.9	2.9	7.6			0.05	0.05	26.3	26.3	1	2	7.9	7.9
07/31/2008	1	181.63	190.01	2.5	2.5	8			0.05	0.05	27.3	27.2	1	0	8.1	8.1
08/31/2008	1	167.99	185.69	2.7	2.7	7.4			0.05	0.05	28.2	28.3	1	0	7.9	7.9
09/30/2008	1	175.13	187.03	5.4	5.5	8			0.05	0.05	26.2	26.6	1	1	8	8
10/31/2008	1	159.95	184.67	5.5	5.5	8.1			0.05	0.05	24.8	25.1	1	0	7.9	7.9
11/30/2008	1	122.02	174.79	5.4	5.4	9.2			0.05	0.05	18.3	26	1	0	8.4	8.4
12/31/2008	1	151.09	162.15	3.9	3.9	9			0.05	0.06	11.6	26	1	1	8.4	8.4
01/31/2009	1	151.32	171.26	5.4	5.4	9.8	30.4	30.4	0.05	0.05	8.9	10.1	1	0	8	8
02/28/2009	1	135.72	174.64	6.6	6.6	10			0.05	0.05	6.5	26	1	0	8	8
03/31/2009	1	140.4	156.56	6.5	6.5	8.6			0.05	0.05	12.6	28	1	0	8.1	8.1
04/30/2009	1	161.15	169.56	4.9	4.9	8.1			0.05	0.05	16	29	1	1	8.2	8.2
05/31/2009	1	172.61	184.45	7	7	8.8					21.4	30	1	1	8.4	8.4
06/30/2009	1	179.39	186.8	4	4	7.6					25.9	26.4	2	1	8.2	8.2
07/31/2009	1	182.82	191.36	5.8	5.8	7.5	100	100			25.9	27.1	1	1	8.5	8.5
08/31/2009	1	177.13	188.34	2.6	2.6	7.3					27.3	28.7	1	0	8.2	8.2
09/30/2009	1	126.06	187.55	4.2	4.2	5.4			0.05	0.06	25.1	26.7	1	0	8.6	8.6
10/31/2009	1	62.26	182.21	6.3	6.3	6.3					23	22.8	1	0	7.8	7.8
11/30/2009	1	38.83	181.93	1	1	8.5			0.05	0.05	16.8	24	0	0	7.3	7.3
12/31/2009	1	91.42	169.68	3.5	3.5	8.7					13.1	24	0	0	7.6	7.6
01/31/2010	1	137.61	171.92	3.5	3.5	8.7	30.4	30.4	0.05	0.05	7.6	23	2	1	8.3	8.3
02/28/2010	1	138.84	166.48	8.5	8.5	9.8					6.2	23	1	0	6.3	6.3
03/31/2010	1	127.33	143.6	4.2	4.2	7.7					10.8	26	1	1	8.4	8.4
04/30/2010	1	150.51	168.15	2.1	2.1	8					15.7	15.9	1	1	8.1	8.1
05/31/2010	1	150.14	180.15	6.2	6.2	7.3					22.2	31	2	1	7.8	7.8
06/30/2010	1	184.78	190.09	4.1	4.1	7.6					25.3	33	1	1	7.9	7.9
07/31/2010	1	182.75	192.84	2.6	2.6	7.2			0.05	0.05	28.8	27.7	1	0	7.9	7.9
08/31/2010	1	186.1	208.36	3	3	7.1					29.7	29.5	2	1	7.8	7.8
09/30/2010	1	182.49	209.17	3.8	3.8	7.4			0.05	0.05	27.8	26.7	1	1	8.2	8.2
10/31/2010	1	181.15	193.39	5.5	5.5	8.1			0.05	0.05	24.9	24.1	1	1	7.8	7.8
11/30/2010	1	158.97	192.03	6.1	6.1	9.1					20.1	18.7	0	0	7.9	7.9
12/31/2010	1	148.6	181.29	5.4	5.4	10.1					14.2	13.2	1	0	8	8
01/31/2011																
02/28/2011	1	185.72	144.36	5.2	5.2	11.9					12.3	9.3	1	1	8	8
Minimum	0.0	7.18	29.99	1.0	1.0	5.4	30.4	30.4	0.05	0.05	6.2	7.8	0.0	0.0	7.2	5.6
Maximum	1.0	219.29	235.77	8.5	8.8	11.9	100.0	100.0	0.05	0.07	29.7	33.0	2.0	2.0	8.6	8.8
Average	1.0	145.75	179.21	4.4	4.4	8.1	53.6	53.6	0	0	19.7	22.2	1.1	0.7	8.0	7.9
Permit Limit	...	...	...	30	100	mg/L	8.0	8.0	0.052	0.158	32.5°C	30.5°C	3°C	2°C	5.0	9.0
Count	60	60	60	60	60	60	3	3	42	42	60	60	60	60	60	60

APPENDIX 5a – AMBIENT MONITORING DATA

AMBIENT MONITORING DATA TENNESSEE RIVER MILE 629.5 WPC STATION ID TENN0629.5RH
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Parameter	Units	Sampling Date												Avg.
		05-21-2007	07-02-2007	08-16-2007	09-09-2007	09-21-2007	11-02-2007	07-29-2008	02-09-2009	11-14-2009	01-15-2010	05-15-2010	02-15-2010	
pH	Std Units	7.7	8.26	7.9	7.66	7.71	7.78		7.3	7.7	7.71	7.55	8.37	7.74
Field Conductivity	µmho	172	179	214	171	126	194		171.6	203	166.2	115	174	170
DO	mg/L	6.35	15.83	6.53	6.33	11.74	3.65		12.9	3.4	6.42	7.12		6.53
Temperature	°C	19.44	7.86	25.09	19.42	8.56	17.43			6.1	16.7	26.75	19.3	16.6
E Coli	CFU/100ml			1 U	1 Q		1 Q	1 QU		1 QU	1 Q	1 QU	1 Q	1 QU
Suspended Resid	mg/L	10 U	10 U	12	10 U	10 U	10 U	10 U	10	10 U	10 U	10 U	10 U	10.28
Total Hardness	mg/L	86	29	92	71	44	107	79	72	86	103	74	65.2	79.4
COD	mg/L	3 U	5.1	6.4	5 U	3 U	10	5 U	5 U	33.4	28.8	5 U	5 U	19.7
Ammonia as N	mg/L	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	0.02 U	0.07	0.04	0.02 U	0.03
Nitrate + Nitrite	mg/L	0.005 U	0.29	0.006 U	0.2	0.36	0.22	0.23	0.4	0.17	0.12	0.19	5.4	0.73
Total Kjeldahl N	mg/L	0.15 U	0.15 U	0.15 U	0.15	0.52	0.15 U	0.15 U	0.23	0.18	0.1 U	0.25	0.21	0.21
Total Phosphorus	mg/L	0.01 J	0.02	0.01 U	0.03	0.02 U	0.02 U	0.28	0.03	0.006	0.042	0.004 U	0.02	0.05
Arsenic	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1	1 U	1	1 U	1 U	1.00
Cadmium	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.00
Copper	µg/L	2.4	1 U	1 U	3	2	3	2	2	3	2	2	1 U	2.10
Chromium	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1.00
Lead	µg/L	1 U	1 U	1 U	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.00
Mercury	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.20
Nickel	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10.0
Zinc	µg/L	2.4 U	1 U	1 U		8	25	2	8	25	7	4	1 U	9.0

Qualifiers:

- Q = Recovered out of holding time
- U = Analyte requested but not detected
- J = Estimated value result is less than sample quantitation limit but greater than zero

APPENDIX 5b – WATER QUALITY BASED EFFLUENT CALCULATIONS

WATER QUALITY BASED CALCULATIONS FOR METALS AND OTHER TOXIC SUBSTANCES
OUTFALLS 101 and 113 Combined

FACILITY: Watts Bar Nuclear Plant
 PERMIT #: TN0020168

Stream (7Q10)	Stream (30Q5)	Waste Flow	Ttl Susp Solids	Hardness (as CaCO ₃)	Stream Allocation
(MGD)	(MGD)	(MGD)	(mg/l)	(mg/l)	(%)
2062.00	5545.00	206.66	8.4	80.6	90

EFFLUENT CHARACTERISTIC	1	2	3	4	5	6	7	8	9	10	11	12	13	1a
	Stream Backgnd Conc ***	Fish/Aqua. Life Water Quality Criteria		Effluent Fraction	Fish & Aquatic Life Water Quality Criteria (7Q10)				Human Health Water Quality Criteria (30Q5)					
					In-Stream Allowable		Calc. Effluent Concentration		In-Stream Criteria			Calc. Effluent Concentration		
	(ug/l)	Chronic	Acute	Dissolved	Chronic	Acute	Chronic	Acute	Organisms	Water/Organisms	DYS	Organisms	Water/Organisms	DYS
	(ug/l)	(ug/l)	(ug/l)	(Fraction)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Antimony	0.000	NA	NA	1.000	NA	NA	NA	NA	640.0	5.6	6.0	16031.0	140.3	150.3
Arsenic	5.000	150.000	340.000	1.000	150.000	340.000	1437.1	3314.3	10.0	10.0	10.0	129.7	129.7	129.7
Cadmium *	0.106	0.212	1.633	0.248	0.853	6.578	7.5	64.0	NA	NA	5.0	NA	NA	122.7
Chlorine (T. Res.)	0.000	11.000	19.000	1.000	11.000	19.000	120.8	208.6	NA	NA	NA	NA	NA	NA
Chromium III	1.000	62.114	477.511	0.204	304.140	2338	2995.9	23091	NA	NA	100.0	NA	NA	2480.7
Chromium VI	5.500	11.000	16.000	1.000	11.000	16.00	59.3	109	NA	NA	100.0	NA	NA	2372.0
Copper *	1.600	7.448	10.968	0.358	20.817	30.653	191.3	288.5	NA	NA	NA	NA	NA	NA
Cyanide (T) **	2.600	5.200	22.000	1.000	5.200	22.000	28.0	194.0	140.0	140.0	200.0	3444.0	3444.0	4946.9
Lead *	0.994	1.988	51.026	0.189	10.510	269.705	94.9	2655.7	NA	NA	5.0	NA	NA	101.2
Mercury, (T) **	0.025	0.770	1.400	1.000	0.770	1.400	7.38	13.6	0.051	0.05	2.0	0.7	0.6	49.5
Nickel *	10.000	43.333	390.143	0.451	96.141	865.592	860.1	8462.2	4900.0	610.0	100.0	114981.0	15038.0	2263.4
Selenium	2.500	5.000	20.000	1.000	5.000	20.000	26.9	175.1	NA	NA	50.0	NA	NA	1192.0
Silver *	0.000	NA	2.220	1.000	NA	2.220	N/A	21.9	NA	NA	NA	NA	NA	NA
Thallium	0.000	NA	NA	1.000	NA	NA	NA	NA	0.47	0.2	2.0	11.773	6.0	50.1
Zinc *	10.000	98.408	97.610	0.299	329.462	326.788	3165.3	3138.9	NA	NA	NA	NA	NA	NA

* Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness. The Fish & Aquatic Life criteria for this metal are in the dissolved form at laboratory conditions. The in-stream allowable criteria and calculated effluent concentrations are in the total recoverable form.

** The criteria for these parameters are in the total form.

*** Background concentrations are established from ambient stream data. Where ambient data is unavailable or insufficient, the background concentration is established as 1/2 of the chronic water quality criteria or 1/2 of the human health criteria, whichever is smaller.

(1): Expected flow rate for Outfalls 101 and 113 for two unit operations (57.76 + 148.895 = 206.66 MGD)

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

APPENDIX 5c – AMMONIA WATER QUALITY BASED CALCULATIONS

**Watts Bar Nuclear Plant
 Outfalls 101 and 113 Combined
 Ammonia as Nitrogen Calculations**

The State utilizes the EPA document, 1999 Update to Ambient Water Quality Criteria for Ammonia and assumed temperatures of 25°C and 15°C and stream pH of 8 to derive an allowable instream protection value. A mass balance with plant and stream flows and this allowable value determines the monthly average permit limit. Seasonal limits may also be allowed due to ambient temperature variations between the summer and winter seasons.

Winter				Summer				
Temp (°C)=	15			Temp (°C)=	25			East TN- 25°C 15'
pH=	8			pH=	8			Middle TN- 27°C 1'
Min (2.85 - 1.45*10 ⁻⁴ 0.028*(25-T))	2.76	2.85	2.76	Min (2.85 - 1.45*10 ⁻⁴ 0.028*(25-T))	1.45	2.85	1.45	West TN- 30°C 20'

$$CCC = \left(\frac{0.0577}{1 \cdot 10^{\frac{7.663 - pH}{10}}} + \frac{2.467}{1 \cdot 10^{\frac{pH - 7.686}{10}}} \right) \cdot \text{Min} (2.85 - 1.45 \cdot 10^{-4} \cdot 0.028 \cdot (25 - T))$$

CCC= **2.36**

CCC= **1.24**

CCC - Continuous Chronic Criterion Allowable instream NH3 concentration [mg/l]

$$CCC = \frac{(\text{Critical Low Flow [MGD]} \cdot \text{Background Ammonia [mg/L]} + (\text{Design Flow [MGD]} \cdot \text{Effluent Concentration [mg/L]})}{(\text{Critical Low Flow [MGD]} + (\text{Design Flow [MGD]})}$$

where: 3173.0 Critical Low Flow [MGD] (typically a 7Q10 value)
 0.1 Background Ammonia Concentration [mg/L]
 208.7 Discharge long-term average flow [(57.76 + 148.895)MGD]

For the case where the discharger withdraws water from the stream.

The Allowable **Effluent Concentrations** and corresponding **Amounts** in winter and summer are.

Winter	Summer
34.8 Concentration [mg/L]	17.57 Concentration [mg/L]
59967.8 Amount [lb/day]	30290.7 Amount [lb/day]

Calculation of the Criterion Maximum Concentration where salmonoid fish are absent

Note 1 - the CMC is independent of temperature and is based on a one hour average exposure concentration.

$$CMC = [0.411 / (1 + 10^{(7.204 - pH)})] + [(58.4) / (1 + 10^{(pH - 7.204)})]$$

pH= 8

CMC= **8.4** mg/L as N

Allowable effluent Concentration is: **127.7** mg/l as N
220014.3 Amount [lbs/day]

A pH value of 8 (instead of historically used 7) was chosen for two reasons: 1.) ambient monitoring in west TN showed that a pH often exceeds 7.5, and is up to 8 sometimes 2.) this assumption is more conservative.

Note 2 - Where the source of ammonia is a biological treatment plant, the permit writer may establish the maximum daily concentration at 2 times the 30 day average instead of the value calculated from the CMC. The factor of 2 is a ratio of daily maximum to monthly average considered typical for a well operated biological treatment plant.

APPENDIX 5d – WATER QUALITY CALCULATIONS FOR pH

Calculation of Instream pH Resulting From the Combined Discharges of Outfall 101 and 113

(This spreadsheet may be used to calculate allowable discharge pH by trial and error)

Note: WPC/EPA policy requires all discharges to be within the range of 6.0 to 9.0
 TN fish and aquatic life criteria require the stream pH to be within 6.5 to 9.0
 This calculation is to determine if a discharge pH at 6.0 can cause the stream pH to fall below 6.5
 The calculation is only applicable to cases where the discharge flow is significant relative to the stream flow

Enter stream background pH	--->	<input type="text" value="7.3"/>	minimum from ambient data (see Appendix 5a)
Enter stream flow in MGD	--->	<input type="text" value="2062.0"/>	use 1Q10
Enter discharger minimum pH	--->	<input type="text" value="6.0"/>	
Enter discharger flow, MGD	--->	<input type="text" value="206.7"/>	
Combined strm/discharge pH	=	<input type="text" value="Unknown"/>	
Combined strm/disch flow, MGD	=	<input type="text" value="2268.7"/>	

pH = -log [H+], where [H+] is the hydrogen ion concentration in moles per liter

[H+] = 10^{-(pH)} = moles per liter of H+ (1 gram mole per liter of H+ is 1.0080 grams of hydrogen/liter)

Moles H+ (Combined) = Moles H+ (Background) + Moles H+ (Discharge)

Note that this is a simple conservation of H⁺ mass formula that does not account for any reactions or buffering that might occur when the discharge and stream mix.

Stream background Moles/Liter H+	=	10 ^{-(pH)}	=	<input type="text" value="5.012E-08"/>
Discharger Moles/Liter H+	=	10 ^{-(pH)}	=	<input type="text" value="1.00E-06"/>

Combined moles/L H+ = $\frac{(\text{Strm moles/L H}^+) \times (\text{Strm MGD}) + (\text{Disch moles/L H}^+) \times (\text{Disch MGD})}{(\text{Stream MGD} + \text{Discharge MGD})}$

Combined moles/L H+ =

Combined Stream pH =

If this pH is below 6.5, the discharger minimum pH must be raised, therefore recalculate until 6.5 is reached

Because the calculated pH is above 6.5, a minimum discharge pH limit of 6.0 for Outfall 101 and 113 will allow compliance with water quality criteria in the Tennessee River.

APPENDIX 5e – BIOMONITORING DILUTION FACTORS

**Watts Bar Nuclear Plant
 Calculation of Dilution Factors for Biomonitoring**

Dilution factor when receiving stream is the source of water at the facility		
Outfall 101 and 102		
Stream Flow 1Q10 [MGD]	Wastewater Flow [MGD] ¹	Total Flow [MGD]
2062.0	57.76	2062
Dilution Factor	35.7	
LC50 >	9.3	% Conc.
IC 25 >	2.8	% Conc.
Dilution factor when receiving stream is not the source of water at the facility		
Outfall 113		
Stream Flow 1Q10 [MGD]	Wastewater Flow [MGD] ¹	Total Flow [MGD]
2062.0	148.895	2210.9
Dilution Factor	14.8	
LC50 >	22.4	% Conc.
IC 25 >	6.7	% Conc.
¹ Because of the large volume of flow from these Outfalls and the criteria that chronic toxicity not exist instream during any 30 day period, the maximum historic 30 day average discharge flow was used to calculate dilution.		

APPENDIX 5f – COMPARISON OF DISCHARGE LIMITATIONS

COMPARISON OF DISCHARGE LIMITATIONS

Outfall 101

EFFLUENT CHARACTERISTIC	Monthly Average					
	Effluent Guidelines		Previous Permit	Water Quality		New Permit
	BPT* (mg/L)	BAT* (mg/L)		Fish (mg/L)	Hum. Heal. (mg/L)	
TSS	30	--	30	NA	NA	30
OIL & GREASE	15	--	15	NA	NA	15
pH	6.0-9.0	--	--	6.5-9.0	6.0-9.0	6.0-9.0
Chromium, Total	--	0.2	--	2.99	2.48	**
Zinc, Total	--	1.0	--	3.16	NA	1.0
Total Chlorine Residual	--	--	0.1	0.120	NA	0.10
Free Available Chlorine	0.2	0.2	--	0.120	NA	--

EFFLUENT CHARACTERISTIC	Daily Maximum					
	Effluent Guidelines*		Previous Permit	Water Quality		New Permit
	BPT (mg/L)	BAT (mg/L)		Fish (mg/L)	Hum. Heal. (mg/L)	
TSS	100	--	100	NA	NA	100
OIL & GREASE	20	--	20	NA	NA	20
pH	6.0-9.0	--	6.0-9.0	6.5-9.0	6.5-9.0	6.0-9.0
Chromium, Total	--	0.2	--	NA	NA	**
Zinc, Total	--	1.0	--	3.14	NA	1
Total Chlorine Residual	--	0.2	0.1	0.208	NA	0.10
Free Available Chlorine	0.5	0.5	--	0.208	NA	NA

* Outfall 101 primarily receives wastes characterized as low volume wastes and cooling tower blowdown. Thus this discharge is subject BPT/BAT limitations for all parameters applicable to these waste sources as presented in Appendix 2

** The use of water treatment chemicals containing chromium is prohibited.

COMPARISON OF DISCHARGE LIMITATIONS

Outfall 113

EFFLUENT CHARACTERISTIC	Monthly Average					
	Effluent Guidelines*		Previous Permit	Water Quality		New Permit
	BPT (mg/L)	BAT (mg/L)		Fish (mg/L)	Hum. Heal. (mg/L)	
TSS	NA	NA	Report	NA	NA	Report
OIL & GREASE	15	--	15	NA	NA	15
pH	6.0-9.0	--	--	6.5-9.0	6.0-9.0	6.0-9.0
Dissolved Oxygen (D.O.)	--	--	--	NA	NA	Report Min.
Total Chlorine Residual	--	--	0.092	0.120	NA	0.092
Free Available Chlorine	0.2	--	--	0.12	NA	--

EFFLUENT CHARACTERISTIC	Daily Maximum					
	Effluent Guidelines		Previous Permit	Water Quality		New Permit
	BPT (mg/L)	BAT (mg/L)		Fish (mg/L)	Hum. Heal. (mg/L)	
TSS	NA	NA	100	NA	NA	100
OIL & GREASE	NA	NA	20	NA	NA	20
pH	6.0-9.0	--	--	6.5-9.0	6.0-9.0	6.0-9.0
Total Chlorine Residual	--	0.2	0.158	0.208	NA	0.158
Free Available Chlorine	0.5	--	--	0.208	NA	--

* Outfall 113 receives wastes characterized as once through cooling water. Thus this discharge is subject BPT/BAT limitations for all parameters applicable to once through cooling water sources as presented in Appendix 2.

APPENDIX 5g – New Permit Limits

PERMIT LIMITS						
TVA-Watts Bar Nuclear						
OUTFALL 101						
Cooling Water, Storm Water and Process Wastewater						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. 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		Continuous	Recorder ¹
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month	Operation Records
pH²	Range 6.0 - 9.0				2/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
OIL & GREASE	15.0	--	20.0	--	1/Month	Grab
CHROMIUM, TOTAL	2.0	--	2.0	--	WAIVED ²	Grab
ZINC, TOTAL	1.0	--	1.0	--	2/Month	Grab
CHLORINE, TOTAL RESIDUAL (TRC)^{2,3}	0.10	--	0.10	--	5/Week	Grab ^{2,3}
TEMPERATURE, Effluent⁴	--	--	35 °C	--	Continuous	Recorder
IC25⁵	25% Inhibition Concentration shall be ≥2.8% effluent				2/Year	Composite ⁵

There shall be no discharge of PCBs.

¹ Flow shall be reported in Million Gallons per Day (MGD). In the event that the continuous flow monitor is out of service, flow monitoring shall be estimated by intake pump logs.

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

³ The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B, Monitoring Procedures, subsection 3, Test Procedures, paragraph b.

⁴ When the temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore the temperature recorder to operation as soon as possible. See Part III for further temperature requirements.

⁵ See Part III for methodology.

² Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(i). See Rationale for more comments.

Monitoring for pH, total suspended solids and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required.

PERMIT LIMITS

TVA-Watts Bar Nuclear

OUTFALL 102

Cooling water, Stormwater runoff and Process Wastewater

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRINT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		1/Day	Instantaneous
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month ⁵	Operation Records
pH ²	Range 6.0 - 9.0				2/Month ⁶	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month ⁶	Grab
OIL & GREASE	15.0	--	20.0	--	1/Month ⁶	Grab
CHROMIUM, TOTAL	2.0	--	2.0	--	WAIVED ⁷	Grab
ZINC, TOTAL	1.0	--	1.0	--	2/Month ⁶	Grab
CHLORINE, TOTAL RESIDUAL (TRC) ^{2,3}	0.10	--	0.10	--	5/Week	Grab ^{2,3}
TEMPERATURE, Effluent	--	--	35° C	--	1/Day	Grab
IC25 ⁴	25% Inhibition Concentration shall be \geq 2.8% effluent				2/Year ⁴	Composite ⁴

There shall be no discharge of PCBs.

- ¹ Flow shall be reported in Million Gallons per Day (MGD);
- ² pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection
- ³ *** The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B, Monitoring Procedures, subsection 3, Test Procedures, paragraph b.
- ⁴ Sampling and analysis required only if discharge is operated 30 days or more during the semi-annual periods January through June or July through December and if all toxicity testing requirements have not already been completed for Outfall 101. See Part III for methodology.
- ⁵ Certification shall be made during any month that a discharge occurs from this outfall.
- ⁶ If there is discharge during 1 or more days from this outfall, sampling is required to comply with the maximum daily limit. If there are two or more separate days of discharge or a continuous discharge during 5 or more consecutive days from this outfall, 2 samples are required to comply with the measurement.
- ⁷ Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(ii). See Rationale for more comments.

Monitoring for pH, total suspended solids and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points 103 and 107 where monitoring these parameters is required.

PERMIT LIMITS

TVA-Watts Bar Nuclear

OUTFALL 103 (Internal Monitoring Point)
 Low Volume Waste Holding Pond

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. 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		Continuous ¹	Recorder
pH ²	Range 6.0 - 9.0				1/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
OIL & GREASE	15.0	--	20.0	--	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.

PERMIT LIMITS

TVA-Watts Bar Nuclear

OUTFALL 107 (Internal Monitoring Point)
 Metal Cleaning Wastewater

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. 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/Batch ¹	Calculated
pH ²	Report		Report		1/Batch ²	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Batch	Grab
OIL & GREASE	15.0	--	20.0	--	1/Batch	Grab
COPPER, TOTAL RECOVERABLE	1.0	--	1.0	--	1/Batch	Grab
IRON, TOTAL RECOVERABLE	1.0	--	1.0	--	1/Batch	Grab
PHOSPHORUS, TOTAL ³	1.0	--	1.0	--	1/Batch	Grab

- ¹ Flow shall be reported in Million Gallons per Day (MGD) for each batch discharge. If a batch discharge extends for more than a 24-
- ² pH analyses shall be performed within fifteen (15) minutes of sample collection.
- ³ Sampling for phosphorus is required only when metal cleaning chemicals containing phosphorus are being used.

PERMIT LIMITS

TVA-Watts Bar Nuclear

OUTFALL 113

Supplemental Condenser Cooling Water

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MONIT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMT. (lb/day)		
FLOW	Report (MGD) ¹		Report (MGD) ¹		Continuous	Recorder
Certification of Instream Flow of 3,500 cfs when required	--		Report as Yes/No		1/Month	Operation Records
pH ²	Range 6.0 - 9.0				1/Month	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30.0	--	100.0	--	1/Month	Grab
CHLORINE, TOTAL RESIDUAL (TRC) ^{2,3,6}	0.092	--	0.158	--	1/Month ⁵	Grab
DISSOLVED OXYGEN (D.O.)	--	--	Report Min.	--	1/Month	Grab
TEMPERATURE, Effluent	Report Effluent Temperature ⁴				Hourly	Recorder ⁷
TEMPERATURE, Edge of Mixing Zone	--	--	30.5 °C	--	Hourly	Recorder ⁷
TEMPERATURE, Rise Upstream to Downstream	--	--	3 °C	--	Hourly	Calculated ⁷
TEMPERATURE, Rate of Change, °C per hour	--	--	2 °C/Hour	--	Hourly	Calculated ⁷
TEMPERATURE, Receiving Stream Bottom	--	--	33.5 °C	--	Hourly	Recorded
IC25 ⁵	25% Inhibition Concentration shall be \geq 6.7% effluent				Semi-annual	Composite ⁵

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

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

³ The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B, Monitoring Procedures, subsection 3, Test Procedures, paragraph b.

⁴ See text below table for requirements

⁵ See Part III for methodology

⁶ Sampling for TRC shall be 5/Week during periods when the Supplemental Condenser Cooling Water (SCCW) system is in operation

⁷ See additional (bulleted) comments in permit.

PERMIT LIMITS FOR OUTFALL 114

TVA-Watts Bar Nuclear

Supplemental Condenser Cooling Water Intake Screen Backwash water

- 1.) No numerical monitoring limitations are applied to this outfall.

APPENDIX 5h – MRZ

