



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES

William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

October 26, 2021

Mr. Kris G. Edmondson
VP, Power Operations, Coal
e-copy: kgedmondson@tva.gov

Subject: **Modification of NPDES Permit No. TN0005452**
Tennessee Valley Authority (TVA)
Kingston Fossil Plant (KIF)
Kingston, Roane County, Tennessee

Dear Mr. Edmondson:

Enclosed please find a draft copy of the modified NPDES Permit No. TN0005452 which the Division of Water Resources proposes to issue. This draft copy is furnished to you solely for your review of its provisions. No wastewater discharges are authorized by this modified permit. The issuance of an official modified permit is contingent upon your meeting all of the requirements of the Tennessee Water Quality Control Act and the Rules and Regulations of the Tennessee Water Quality, Oil and Gas Board.

The modification is due to revisions to Steam Electric Effluent Limitation Guidelines (ELGs) in 40 CFR Part 423, published by EPA on October 13, 2020. These ELGs contain similar content as the previous rule, but also include additional subcategories and reporting requirements for steam electric plants. The reconsideration rule includes modified limits for Flue Gas Desulfurization (FGD) discharges and a discharge allowance of up to 10 percent volumetric bottom ash purge water discharge (rather than an original no-discharge requirement). The update also changes the technology-basis for treatment of the waste streams, revises the voluntary incentives program for the FGD wastewater, adds subcategories for generating units, adjusts discharge limitations, and establishes new compliance dates. Considering process and wastewater treatment setup at KIF, BAT effluent limitations for FGD wastewater are applicable. Furthermore, considerations regarding Bottom Ash Transport Water (BATW), applicability date ranges and alternate compliance pathways provided in the revised rule necessitate this NPDES permit modification.

Also enclosed is a copy of the public notice that announces our intent to issue this permit. The notice affords the public an opportunity to review the draft permit and, if necessary,

request a public hearing on this issuance process. If you disagree with the provisions and requirements contained in the draft permit, you have thirty (30) days from the date of this correspondence to notify the division of your objections. If your objections cannot be resolved, you may appeal this permit upon issuance. This appeal should be filed in accordance with Section 69-3-110 of the Tennessee Code Annotated.

If you have questions, please contact the Nashville EFO at 1-888-891-TDEC; or, at this office, please contact me at (615) 532-0670 or by E-mail at Vojin.Janjic@tn.gov.

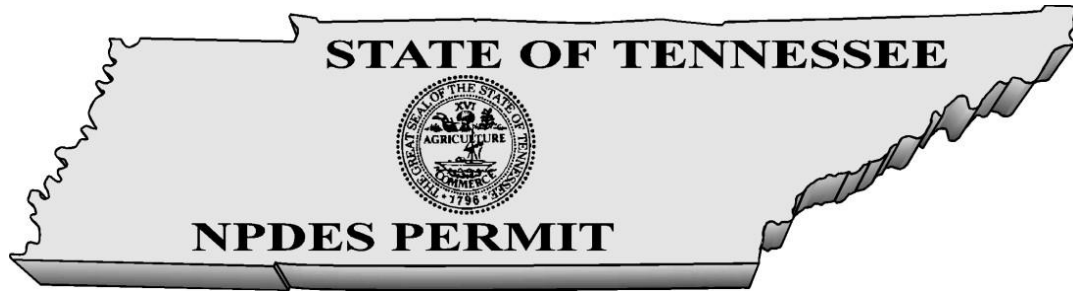
Sincerely,



Vojin Janjić
Manager, Water-Based Systems

Enclosure

cc: Permit File
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No. TN0005452 (Modification)

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

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

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

Discharger: **TVA – Kingston Fossil Plant**

is authorized to discharge: **treated ash pond effluent consisting of bottom ash transport water, coal yard runoff including coal storage area drainage, utility building area drainage, and fire protection flushes; combustion residual leachate; chemical and nonchemical metal cleaning wastes; ammonia storage area runoff; water treatment plant wastes including RO system reject and backwash; drainage from sluice line trench; station sump discharge including ash system leakage and boiler bottom overflow and fan bearing cooling water, equipment cooling and lubricating water, fire protection flushes, floor washing, roof drains and precipitator washdown, boiler water leakage, analytical process wastewater, basement boiler blowdown, and lab sample stations; stormwater from FGD area sump; and AAF area sump with precipitator wash and raw water leakage from Outfall 001; once-through condenser cooling water discharge plus flows from Outfall 001 from Outfall 002; boiler blowdown; discharge from underflow ponds with fire protection flushes, raw water leakage and transformer/switchyard runoff; intake screen backwash from Outfall 004 and FGD strainers; discharge from FGD stormwater pond IMP 01A; discharge of bottom ash transport water from IMP01C; and emergency overflow from pond at FGD dewatering facility an/landfill area only in probable maximum precipitation event, and discharge from Outfall 006 from Outfall 002; and operation of a cooling water intake structure**

from a facility located: **in Harriman, Roane County, Tennessee**

to receiving waters named: **Clinch River mile 2.9**

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

This permit shall become effective on:
This permit shall expire on:
Issuance date:

February 28, 2023

DRAFT

for Jennifer Dodd
Director

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PART I - EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

TVA-Kingston Fossil Plant is authorized to discharge to Clinch River at mile 2.9:

Location	Characteristics
Outfall 001	treated ash pond effluent consisting of bottom ash transport water, coal yard runoff including coal storage area drainage, utility building area drainage, and fire protection flushes; combustion residual leachate; chemical and nonchemical metal cleaning wastes; ammonia storage area runoff; water treatment plant wastes including RO system reject and backwash; drainage from sluice line trench; station sump discharge including ash system leakage and boiler bottom overflow and fan bearing cooling water, equipment cooling and lubricating water, fire protection flushes, floor washing, roof drains and precipitator washdown, boiler water leakage, analytical process wastewater, basement boiler blowdown, and lab sample stations; stormwater from FGD area sump; and AAF area sump with precipitator wash and raw water leakage
Outfall 002	once-through condenser cooling water discharge plus flows from Outfall 001; boiler blowdown; discharge from underflow ponds with fire protection flushes, raw water leakage and transformer/switchyard runoff; intake screen backwash from Outfall 004 and FGD strainers; discharge from FGD stormwater pond IMP 01A; and discharge from Outfall 006
Outfall 004	Intake screen backwash (raw river water)
Outfall 006	Electrical Control building AC condensate, fire protection flushes, and plant water leakage
IMP 01A	Pond at FGD dewatering facility and combustion residual leachate from peninsula area FGD and ash (combustion residual) landfill
IMP 01C	Bottom Ash Transport Water from Low Utilization Electric Generating Units (if applicable)
IMP 009	Future - Treated FGD wastewater from dewatering facility discharged on an interim basis at IMP 01A
Outfall 01B	Emergency overflow from pond at FGD/landfill only during probable maximum precipitation event
IMP 005	Metal Cleaning wastewater

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. APPLICABLE CATEGORIES AND SUBCATEGORIES

Effluent limitation guidelines (ELGs) applicable to the TVA-Kingston Fossil Plant (KIF) provide several compliance pathways. Compliance pathways are described in the ELGs as various categories, and will be addressed as such hereon:

- Generally Applicable;
- Low Utilization Electric Generating Units;
- Retirement Subcategory; and
- Voluntary Incentives Program.

Permit conditions and applicability dates associated with each category are specified below.

2. NOTICE OF PLANNED PARTICIPATION (NPP) DEADLINES

Requirements for **low utilization electric generating units**:

- (1) For sources seeking to qualify as a low utilization electric generating units, a Notice of Planned Participation (NPP) shall be submitted to the division no later than October 13, 2021.
- (2) The NPP shall identify the potential low utilization electric generating unit and include following information:
 - (A) A statement of at least two years' capacity utilization rating data for the most recent two years of operation of each low utilization electric generating unit; and
 - (B) A statement that the facility has a good faith belief that each low utilization electric generating unit will continue to operate at the required capacity utilization rating. Where the most recent capacity utilization rating does not meet the low utilization electric generating unit requirement, a discussion of the projected future utilization shall be provided, including material data and assumptions used to make that projection.
- (3) For sources seeking to qualify as a low utilization electric generating unit, an initial certification shall be made to the division no later than December 31, 2023. An annual recertification shall be made to the division within 60 days of submitting annual electricity production data to the Energy Information Administration.
- (4) A certification or annual recertification shall include copies of the underlying forms submitted to the Energy Information Administration, as well as any supplemental information and calculations used to determine the two year average annual capacity utilization rating.

Requirements for units that will achieve **permanent cessation of coal combustion (Retirement Subcategory)** by December 31, 2028:

- (1) A Notice of Planned Participation (NPP) shall be made to the division no later than October 13, 2021.

- (2) The NPP shall identify the electric generating units intended to achieve the permanent cessation of coal combustion and shall include:
 - (i) the expected date that each electric generating unit is projected to achieve permanent cessation of coal combustion;
 - (ii) whether each date represents a retirement or a fuel conversion;
 - (iii) whether each retirement or fuel conversion has been approved by a regulatory authority;
 - (iv) what the relevant regulatory body is;
 - (v) a copy of the most recent integrated resource plan for which the applicable regulatory agency approved the retirement or repowering of the unit; and
 - (vi) for each unit, a timeline to achieve the permanent cessation of coal combustion with interim milestones and the projected dates of completion.
- (3) A progress report shall be filed with the division on annual basis following the submission of the NPP. The annual progress report shall:
 - (i) detail the completion of any interim milestones listed in the NPP since the previous progress report;
 - (ii) provide a narrative discussion of any completed, missed, or delayed milestones, and
 - (iii) provide updated milestones.

Requirements for facilities **voluntarily meeting the limits:**

- (1) For sources opting to comply with the Voluntary Incentives Program requirements a Notice of Planned Participation (NPP) shall be made to the division no later than October 13, 2021.
- (2) The NPP shall identify the facility, specify what technology or technologies are projected to be used to comply with those requirements, and provide a detailed engineering dependency chart and accompanying narrative demonstrating when and how the system(s) and any accompanying disposal requirements will be achieved by December 31, 2028.
- (3) A progress report shall be filed with the division on annual basis following the submission of the NPP. The annual progress report shall:
 - (i) detail the completion of any interim milestones listed in the NPP since the previous progress report;
 - (ii) provide a narrative discussion of any completed, missed, or delayed milestones, and
 - (iii) provide updated milestones.
- (4) Where, prior to the effective date, the permittee has already provided a notice to the division of opting to comply with the Voluntary Incentives Program requirements, such notice will satisfy paragraph (1) of this section. However, where details required by paragraph (2) of this section were missing from the previously provided notice, those details must be provided in the first Annual Progress Report, no later than October 13, 2022.

3. QUALIFICATION DEADLINES

Deadline to qualify as a **low utilization electric generating unit** or to **permanently cease the combustion of coal (Retirement Subcategory)** is December 31, 2028, unless:

- (1) An emergency order is issued by the Department of Energy,
- (2) A reliability must run agreement issued by a Public Utility Commission, or
- (3) Any other reliability-related order or agreement issued by a competent electricity regulator which results in that unit operating in a way not contemplated when the certification was made; or
- (4) The operation of the unit was necessary for load balancing an area where exists:
 - (i) An "Emergency," or a "Major Disaster," and
 - (ii) That load balancing was due to the event that caused the "Emergency" or "Major Disaster" to be declared.

In the case that KIF facility is seeking the protections listed in paragraphs (1) to (4) above, the following reporting and recordkeeping requirements must be met:

- (1) For each instance of seeking the protection, a one-time certification statement shall be submitted to the division no later than:
 - (A) In the case of an order or agreement under paragraph (1) above, 30 days from receipt of the order or agreement pursuant to paragraph (2)(B) of this section; or
 - (B) In the case of an "Emergency" or "Major Disaster" under paragraph (2) above, 30 days from the date that a load balancing need arose.
- (2) A certification statement must include the following:
 - (A) The qualifying event description, the individual or entity that issued or triggered the event, and the date that such an event was issued or triggered.
 - (B) A copy of any documentation of the qualifying event, or, where such documentation does not exist, other documentation with information for the division to confirm the qualifying event.
 - (C) A demonstration that an electric generating unit would have qualified for the subcategory at issue absent the event detailed in paragraph (2)(A), including the material data, assumptions, and methods used.
- (3) For sources filing a certification statement under paragraph (1) above, and for each such certification statement, a one-time termination of need statement shall be submitted to the division no later than 30 days from when the source is no longer subject to increased production from the qualifying event.
- (4) A termination of need for protection must include a narrative discussion including the date the qualifying event terminated, or if it has not terminated, why the source believes the capacity utilization will no longer be elevated to a level requiring the protection.

4. CATEGORY TRANSFER DEADLINES

KIF may choose to transfer between applicable limitation categories, subject to eligibility requirements and upon timely notification to the division. KIF can become subject to the alternative limits (i.e., transfer from one category to another) under the following circumstances and deadlines:

- (1) The permittee must be in compliance with all of its currently applicable

- (2) requirements to become subject to a different set of applicable requirements.
If the permittee is currently subject to more stringent limitations than the limitations being sought, the permittee must continue to meet those more stringent limitations.

Transfer from	Transfer to	Notification: No Later than Date
Retirement	Low Utilization Units	December 31, 2023
Voluntary Incentives Program	Low Utilization Units	
General Applicability	Low Utilization Units	
Voluntary Incentives Program	Retirement	December 31, 2025
Retirement	Voluntary Incentives Program	
Retirement	General Applicability	
Low Utilization Units	General Applicability	
Low Utilization Units	Voluntary Incentives Program	
Low Utilization Units	General Applicability	
Low Utilization Units	Retirement	

For the purpose of this permit, ‘timely notification’ means a written notification submitted to the division no later than date listed in the table above and a corresponding description for desired “transfer from” and “transfer to” categories. The notification shall include a list of the electric generating units for which KIF intends to change compliance alternatives. For each electric generating unit, the notification shall:

- (i) list the specific provision under which this transfer will occur;
- (ii) the reason such a transfer is warranted; and
- (iii) a narrative discussion demonstrating that each electric generating unit will be able to maintain compliance with the relevant provisions.

Within 30 days of experiencing a material delay in the milestones set forth for permanent cessation of coal combustion or compliance with the voluntary incentives program limitations by December 31, 2028, KIF shall file a notice of material delay with the division. The notice shall include the reason for the delay, the projected length of the delay, and a proposed resolution to maintain compliance.

5. OUTFALL 001

This permit authorizes following discharges from Outfall 001: treated ash pond effluent consisting of bottom ash transport water, coal yard runoff including coal storage area drainage, utility building area drainage, and fire protection flushes; combustion residual leachate; chemical and nonchemical metal cleaning wastes; ammonia storage area runoff; water treatment plant wastes including RO system reject and backwash; drainage from sluice line trench; station sump discharge including ash system leakage and boiler bottom overflow and fan bearing cooling water, equipment cooling and lubricating water, fire protection flushes, floor washing, roof drains and precipitator washdown, boiler water leakage, analytical process wastewater, basement boiler blowdown, and lab sample stations; stormwater from FGD area sump; and AAF area sump with precipitator wash and raw water leakage.

Effluent limitations and monitoring requirements for effluent from Outfall 001 are presented in the table below and are applicable upon the permit effective date:

Description: External Outfall, Number: 001, Monitoring: Effluent Gross, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00530	Total Suspended Solids (TSS)	<=	29.9	mg/L	Grab	Monthly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	92	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	14.4	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	19.4	mg/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Monthly	Value
01007	Barium, total (as Ba)	Report	-	mg/L	Grab	Monthly	Value
01012	Beryllium, total (as Be)	Report	-	mg/L	Grab	Monthly	Value
01027	Cadmium, total (as Cd)	Report	-	mg/L	Grab	Monthly	Value
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Monthly	Value
01042	Copper, total (as Cu)	Report	-	mg/L	Grab	Monthly	Value
01045	Iron, total (as Fe)	Report	-	mg/L	Grab	Monthly	Value
01051	Lead, total (as Pb)	Report	-	mg/L	Grab	Monthly	Value
01059	Thallium, total (as Tl)	Report	-	mg/L	Grab	Monthly	Value
01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Monthly	Value
01077	Silver, total (as Ag)	Report	-	mg/L	Grab	Monthly	Value
01092	Zinc, total (as Zn)	Report	-	mg/L	Grab	Monthly	Value
01097	Antimony, total (as Sb)	Report	-	mg/L	Grab	Monthly	Value

01105	Aluminum, total (as Al)	Report	-	mg/L	Grab	Monthly	Value
01147	Selenium, total (as Se)	Report	-	mg/L	Grab	Monthly	Value
50050	Flow	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average
50050	Flow	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
71900	Mercury, total (as Hg)	Report	-	ng/L	Grab	Monthly	Value

Certification Statements for General Applicability and Low utilization Electric Generating Units

If bottom ash transport water is discharged from the KIF facility, initial certification statement shall be submitted to the division as soon as possible, but not later than December 31, 2023 for Low utilization Electric Generating Units and December 31, 2025 for General Applicability, and shall include following elements:

- (1) The certification statement must be signed and certified by a professional engineer.
- (2) An initial certification shall include the following:
 - (A) A statement that the professional engineer is a licensed professional engineer in the State of TN.
 - (B) A statement that the professional engineer is familiar with the regulation requirements.
 - (C) A statement that the professional engineer is familiar with the KIF facility.
 - (D) The primary active wetted bottom ash system volume.
 - (E) Material assumptions, information, and calculations used to determine the primary active wetted bottom ash system volume.
 - (F) A list of all potential discharges, the expected volume of each discharge, and the expected frequency of each discharge.
 - (G) Material assumptions, information, and calculations used to determine the expected volume and frequency of each discharge including a narrative discussion of why such water cannot be managed within the system and must be discharged.
 - (H) A list of all wastewater treatment systems at the facility currently, or otherwise required by a date certain under this section.
 - (I) A narrative discussion of each treatment system including the system type, design capacity, and current or expected operation.
 - (J) The best management practices plan.
 - (K) A statement that the best management practices plan is being implemented.

An annual recertification shall be made within 60 days of the anniversary of the original plan. An annual recertification shall include the following

- (A) Any updates to the best management practices plan.
- (B) An attachment of weekly flow measurements from the previous year.
- (C) The average amount of recycled bottom ash transport water in gallons per day.

- (D) Copies of inspection reports and a summary of preventative maintenance performed on the system.
- (E) A statement that the plan and corresponding flow records are being maintained at the office of the plant.

Bottom Ash Transport Water – Generally Applicable Category

There shall be no discharge of pollutants in bottom ash transport water after December 31, 2025, except as authorized below, unless the bottom ash transport water is used in the FGD scrubber. If bottom ash transport water is used in the FGD scrubber, it has to meet limitations for FGD wastewater.

The discharge of pollutants in bottom ash transport water from a properly installed, operated, and maintained bottom ash system is authorized under the following conditions, which must be met by December 31, 2025:

- (1) To maintain system water balance following storms exceeding a 10-year storm event of 24-hour or longer duration that cannot be managed by installed equipment; or
- (2) To maintain system water balance when regular inflows from wastestreams other than bottom ash transport water exceed the ability of the bottom ash system to accept recycled water and segregating these other wastestreams is not feasible; or
- (3) To maintain system water chemistry where installed equipment at the facility is unable to manage pH, corrosive substances, substances or conditions causing scaling, or fine particulates to below levels which impact system operation or maintenance; or
- (4) To conduct maintenance not mentioned above and not exempted from the definition of transport water in § 423.11(p), and when water volumes cannot be managed by installed equipment.

The total volume that may be discharged shall be reduced or eliminated to the extent achievable using control measures that are technologically available and economically achievable. The total volume of the discharge shall not exceed a 30-day rolling average of ten percent of the primary active wetted bottom ash system volume. The 30-day rolling average shall be calculated using actual flow measurements.

Bottom Ash Transport Water – Low Utilization Electric Generating Units

Bottom ash transport water generated by a low utilization electric generating unit must comply with limitations at Internal Monitoring Point 01C (see Table below) and shall incorporate the elements of a best management practices (BMP) plan.

Description: Internal Monitoring Point, Number: 01C, Monitoring: Effluent Gross, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum

The BMP plan for the recycle of the bottom ash transport water must include:

- (i) Identification of the low utilization coal-fired generating units that contribute bottom ash to the bottom ash transport system.
- (ii) A description of the existing bottom ash handling system and a list of system components (e.g., remote mechanical drag system, tanks, impoundments, chemical addition). Where multiple generating units share a bottom ash transport system, the plan shall specify which components are associated with low utilization generating units.
- (iii) A detailed water balance, based on measurements, or estimates where measurements are not feasible, specifying the volume and frequency of water additions and removals from the bottom ash transport system, including:
 - (A) Water removed from the bottom ash transport system:
 - (1) To the discharge outfall
 - (2) To the FGD scrubber system
 - (3) Through evaporation
 - (4) Entrained with any removed ash
 - (5) To any other mechanisms not specified above.
 - (B) Water entering or recycled to the bottom ash transport system:
 - (1) Makeup water added to the bottom ash transport water system.
 - (2) Bottom ash transport water recycled back to the system in lieu of makeup water.
 - (3) Any other mechanisms not specified above.
- (iv) Measures to be employed:
 - (A) Implementation of a comprehensive preventive maintenance program to identify, repair and replace equipment prior to failures that result in the release of bottom ash transport water.
 - (B) Daily or more frequent inspections of the entire bottom ash transport water system, including valves, pipe flanges and piping, to identify leaks, spills and other unintended bottom ash transport water escaping from the system, and timely repair of such conditions.
 - (C) Documentation of preventive and corrective maintenance performed.
- (v) Evaluation of options and feasibility, accounting for the associated costs, for eliminating or minimizing discharges of bottom ash transport water, including:

- (A) Segregation of bottom ash transport water from other process water.
 - (B) Minimization of the introduction of stormwater by diverting (e.g., curbing, using covers) storm water to a segregated collection system.
 - (C) Recycling bottom ash transport water back to the bottom ash transport water system.
 - (D) Recycling bottom ash transport water for use in the FGD scrubber.
 - (E) Optimization of existing equipment (e.g., pumps, pipes, tanks) and installing new equipment where practicable to achieve the maximum amount of recycle.
 - (F) Utilization of "in-line" treatment of transport water (e.g., pH control, fines removal) where needed to facilitate recycle.
- (vi) Description of the bottom ash recycle system, including all technologies, measures, and practices that will be used to minimize discharge.
- (vii) A schedule showing the sequence of implementing any changes necessary to achieve the minimized discharge of bottom ash transport water, including the following:
- (A) The anticipated initiation and completion dates of construction and installation associated with the technology components or process modifications specified in the plan.
 - (B) The anticipated dates that the discharger expects the technologies and process modifications to be fully implemented on a full-scale basis, which in no case shall be later than December 31, 2023.
 - (C) The anticipated change in discharge volume and effluent quality associated with implementation of the plan.
- (viii) Description establishing a method for documenting and demonstrating to the division that the recycle system is well operated and maintained.
- (ix) Performance of weekly flow monitoring for the following:
- (A) Make up water to the bottom ash transport water system.
 - (B) Bottom ash transport water sluice flow rate (e.g., to the surface impoundment(s), dewatering bins(s), tank(s), remote mechanical drag system).
 - (C) Bottom ash transport water discharge to surface water or POTW.
 - (D) Bottom ash transport water recycle back to the bottom ash system or FGD scrubber.

6. OUTFALL 002

This permit authorizes following discharges from Outfall 002: once-through condenser cooling water discharge plus flows from Outfall 001; boiler blowdown; discharge from underflow ponds with fire protection flushes, raw water leakage and transformer/switchyard runoff; intake screen backwash from Outfall 004 and FGD strainers; discharge from FGD stormwater pond IMP 01A; and discharge from Outfall 006. In addition, the thermal variance of 36.1 degrees C will be extended in the permit.

Description: External Outfall, Number: 002, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	<=	36.1	deg C	Calculated	Daily	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Monthly Average
71900	Mercury, total (as Hg)	<=	30	ng/l	Grab	Monthly	Value
78739	Chlorination duration	<=	120	min	Pump Log	Daily	Value
81381	Duration of discharge	<=	120	min	Pump Log	Daily	Value
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>=	100	%	Composite	Annual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas	>=	100	%	Composite	Annual	Minimum

Description: External Outfall, Number: 002, Monitoring: Intake from Stream, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	Report	-	deg C	Recorder	Continuous	Value

Description: External Outfall, Number: 002, Monitoring: See Comments, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
34044	Oxidants, total residual	<=	.011	mg/L	Grab	Weekly	Monthly Average
34044	Oxidants, total residual	<=	.019	mg/L	Grab	Weekly	Daily Maximum

Temperature Reporting: Monitoring procedures: Intake temperature is measured hourly (continuously) but reported as a daily average once per day. The daily average discharge

temperature shall be calculated for the cooling channel based on the 24-hour average intake temperature, 24-hour average unit load, and the 24-hour average flow through Outfall 002.

Total Residual Oxidant (TRO) monitoring shall be applicable when chlorine, bromine, or any other oxidants are added to the condenser cooling water. The acceptable methods for analysis of TRC are any methods specified in 40 CFR, Part 136. 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 shall have that documentation available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit.

In the event that the background concentration of mercury in the Clinch/Emory River exceeds 30 ng/L (as measured at the intake) and the discharge from Outfall 002 does not contribute to additional loading in the receiving stream, the permittee is not in violation of the permit. In such instances, TVA shall submit laboratory reports for intake mercury concentration for the associated discharge sample demonstrating elevated background mercury concentration.

7. OUTFALL 004

Intake screen backwash (raw river water)
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No numeric limits or reporting requirements are established; discharges of intake screen backwash are limited to material present in the raw water source.

8. OUTFALL 006

Electrical Control building air conditioning condensate, fire protection flushes, and plant water leakage

No numeric limits or reporting requirements are established.

9. INTERNAL MONITORING POINT (IMP) 01A

Process water from pond at FGD dewatering facility and combustion residual leachate from peninsula area FGD and ash (combustion residual) landfill.

a) INTERIM Permit requirements applicable upon the permit Effective Date.

Description: External Outfall, Number: 01A, Monitoring: Effluent Gross, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Value
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Value
71900	Mercury, total (as Hg)	Report	-	ng/L	Grab	Monthly	Value
50050	Flow	Report	-	MGD	Totalizer	Weekly	Monthly Average
50050	Flow	Report	-	MGD	Totalizer	Weekly	Daily Maximum

b) FINAL Permit requirements (include the Interim requirements above) as well as FINAL limitations for FGD wastewater are established at a new IMP 009.

Flue Gas Desulfurization (FGD) – Generally Applicable Category

Final Permit Limits for FGD wastewater at IMP 009, following construction/startup of new wastewater treatment and division approval of the initial operating period*, monthly reporting is established for these parameters. IMP 009 is established as the point of compliance for treated FGD wastewater ELGS prior to mixing with the discharge from the FGD landfill process water pond, which is designated IMP 01A.

***During the initial operating period, more frequent , i.e., weekly effluent monitoring is required for arsenic and mercury to document the treatment system's capabilities and to track effluent loading during a period of greater variability.** These data will be provided as part of the quarterly project updates. Any additional data collected during the initial operating period should be reported as well.

Description: Internal Monitoring Point, Number: 009, Monitoring: Effluent Gross, Season: All Year							
Effective: December 31, 2025							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
01002	Arsenic, total (as As)	<=	18	ug/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	<=	8	ug/L	Grab	Monthly	Monthly Average

50050	Flow	Report	-	MGD	Totalizer	Weekly	Monthly Average
50050	Flow	Report	-	MGD	Totalizer	Weekly	Daily Maximum
01027	Mercury, total (as Hg)	<=	103	ng/L	Grab	Monthly	Daily Maximum
01027	Mercury, total (as Hg)	<=	34	ng/L	Grab	Monthly	Monthly Average
01092	Nitrite plus Nitrate, total (as N)	<=	4	mg/L	Grab	Monthly	Daily Maximum
01092	Nitrite plus Nitrate, total (as N)	<=	3	mg/L	Grab	Monthly	Monthly Average
01147	Selenium, total (as Se)	<=	70	ug/L	Grab	Monthly	Daily Maximum
01147	Selenium, total (as Se)	<=	29	ug/L	Grab	Monthly	Monthly Average

Flue Gas Desulfurization – Low Utilization Electric Generating Units Category

Description: Internal Monitoring Point, Number: 009, Monitoring: Effluent Gross, Season: All Year							
Effective: December 31, 2023							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
01002	Arsenic, total (as As)	<=	11	ug/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	<=	8	ug/L	Grab	Monthly	Monthly Average
50050	Flow	Report	-	MGD	Totalizer	Weekly	Monthly Average
50050	Flow	Report	-	MGD	Totalizer	Weekly	Daily Maximum
01027	Mercury, total (as Hg)	<=	788	ng/L	Grab	Monthly	Daily Maximum
01027	Mercury, total (as Hg)	<=	356	ng/L	Grab	Monthly	Monthly Average

Flue Gas Desulfurization – Voluntary Incentive Category

Description: Internal Monitoring Point, Number: 009, Monitoring: Effluent Gross, Season: All Year							
Effective: December 31, 2028							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
01002	Arsenic, total (as As)	<=	5	ug/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	MGD	Totalizer	Weekly	Monthly Average
50050	Flow	Report	-	MGD	Totalizer	Weekly	Daily Maximum
01027	Mercury, total (as Hg)	<=	23	ng/L	Grab	Monthly	Daily Maximum
01027	Mercury, total (as Hg)	<=	10	ng/L	Grab	Monthly	Monthly Average
01092	Nitrite plus Nitrate, total (as N)	<=	2.0	mg/L	Grab	Monthly	Daily Maximum
01092	Nitrite plus Nitrate, total (as N)	<=	1.2	mg/L	Grab	Monthly	Monthly Average
01147	Selenium, total (as Se)	<=	10	ug/L	Grab	Monthly	Daily Maximum
70295	Total Dissolved Solids (TDS)	<=	306	mg/L	Grab	Monthly	Daily Maximum

70295	Total Dissolved Solids (TDS)	<=	149	mg/L	Grab	Monthly	Monthly Average
71870	Bromide (as Se)	<=	0.2	mg/L	Grab	Monthly	Daily Maximum

10. OUTFALL 01B

Emergency overflow from FGD stormwater pond (IMP 01A)

In circumstances resulting from a probable maximum precipitation event, TVA will collect and maintain records on the duration of the event, the amount of precipitation affecting the overflow, and results of an inspection of the pond for structural stability.

11. IMP 005

Chemical metal cleaning wastewater (non-hazardous portion)

Description: Internal Outfall, Number: IMP 005, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
01042	Copper	<=	1.0	mg/L	Grab	Monthly	Value
01045	Iron	<=	1.0	mg/L	Grab	Monthly	Value

12. Sampling of Raw Water Intake

Description: Internal Monitoring Point, Number: Intake Structure, Monitoring: Intake, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00900	Hardness, total (as CaCO3)	Report	-	mg/L	Grab	Annually	Value
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Annually	Value
01007	Barium, total (as Ba)	Report	-	mg/L	Grab	Annually	Value
01012	Beryllium, total (as Be)	Report	-	mg/L	Grab	Annually	Value
01027	Cadmium, total (as Cd)	Report	-	mg/L	Grab	Annually	Value
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Annually	Value
01042	Copper, total (as Cu)	Report	-	mg/L	Grab	Annually	Value
01045	Iron, total (as Fe)	Report	-	mg/L	Grab	Annually	Value
01051	Lead, total (as Pb)	Report	-	mg/L	Grab	Annually	Value
01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Annually	Value
01077	Silver, total (as Ag)	Report	-	mg/L	Grab	Annually	Value
01092	Zinc, total (as Zn)	Report	-	mg/L	Grab	Annually	Value
01097	Antimony, total (as Sb)	Report	-	mg/L	Grab	Annually	Value

01105	Aluminum, total (as Al)	Report	-	mg/L	Grab	Annually	Value
01147	Selenium, total (as Se)	Report	-	mg/L	Grab	Annually	Value
71900	Mercury, total (as Hg)	Report	-	ng/L	Grab	Monthly	Value

All metals shall be reported as Total Recoverable Metal; All samples reported as “Below Detection Level” shall be analyzed to the Required Detection Level (RDL) specified in Tennessee General Water Quality Criteria, Chapter 0400-40-3-.05(8) except for Mercury which shall be analyzed by EPA Method 1631 or 245.7. Samples shall be taken annually with at least 120 days between samples. Two copies of the monitoring results shall be submitted with the Discharge Monitoring Report in the month following sample collection.

Samples collected for analyses of total mercury at the KIF intake and at Outfall 002 shall be collected within 24 hours of one another.

Best Professional Judgement

Using available information to date, TDEC has determined that the cooling water intake structure used by the Kingston Fossil Plant represents the best technology available (BTA) to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326). Additional data required to be collected under the Compliance Schedule is described in Section N.

Additional monitoring requirements and conditions

Additional monitoring requirements and conditions applicable to Outfall 001 include:

There shall be no distinctly visible floating 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.

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.

In accordance with 40 CFR 423.12(b)(2) and 423.13(a), there shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Nothing in this permit authorizes take for the purposes of a facility’s compliance with the Endangered Species Act. (40 C.F.R. 125.98(b)(1))

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.

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated (biennially at a minimum) and maintained to ensure that the accuracy of the measurements is consistent with accepted capability of that type of device. Monitoring devices selected shall be capable of measuring flows with a maximum deviation of less than plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.

2. Sampling Frequency

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

3. Test Procedures

- a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.
- b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR Part 136, as amended, promulgated pursuant to Section 304 (h) of the Act.

In instances where permit limits established through implementation of applicable water criteria are below analytical capabilities, compliance with those limits will be determined using the detection limits described in the TN Rules, Chapter 0400-40-03-.05(8).

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 Resources.

C. DEFINITIONS

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.

A **bypass** is defined as the intentional diversion of waste streams from any portion of a treatment facility.

A **calendar day** is defined as the 24-hour period from midnight to midnight or any other 24-hour period that reasonably approximates the midnight to midnight time period.

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.

Continuous monitoring, for the purposes of this permit, is the measurement of flow, total dissolved solids, and turbidity at a frequency that will accurately characterize the nature of discharges from the site and water in the receiving stream. Samples collected continuously shall be at a frequency of not less than once every fifteen minutes for flow, and not less than once per hour for turbidity and total dissolved solids.

Cooling water means water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or processes used, or from auxiliary operations on the facility's premises.

Cooling water intake structure means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at which water is first withdrawn from waters of the United States up to, and including the intake pumps.

Actual Intake Flow (AIF) means the average volume of water withdrawn on an annual basis by the cooling water intake structures over the past three years.

Design intake flow (DIF) means the value assigned during the cooling water intake structure design to the maximum instantaneous rate of flow of water the cooling water intake system is capable of withdrawing from a source waterbody.

Entrainment- means the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system.

Impingement- means the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal.

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 **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.

“Degradation” means the alteration of the properties of waters by the addition of pollutants, withdrawal of water, or removal of habitat, except those alterations of a short duration.

“De Minimis” - Degradation of a small magnitude, as provided in this paragraph.

(a) Discharges and withdrawals

1. Subject to the limitation in part 3 of this subparagraph, a single discharge other than those from new domestic wastewater sources will be considered de minimis if it uses less than five percent of the available assimilative capacity for the substance being discharged.

2. Subject to the limitation in part 3 of this subparagraph, a single water withdrawal will be considered de minimis if it removes less than five percent of the 7Q10 flow of the stream.

3. If more than one activity described in part 1 or 2 of this subparagraph has been authorized in a segment and the total of the authorized and proposed impacts uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be de minimis. Where the total of the authorized and proposed impacts uses 10% of the assimilative capacity, or 7Q10 low flow, additional degradation may only be treated as de minimis if the Division finds on a scientific basis that the additional degradation has an insignificant effect on the resource.

(b) Habitat alterations authorized by an Aquatic Resource Alteration Permit (ARAP) are de minimis if the Division finds that the impacts, individually and cumulatively are offset by impact minimization and/or in-system mitigation, provided however, in ONRWs the mitigation must occur within the ONRW.

Discharge or “discharge of a pollutant” refers to the addition of pollutants to waters from a source.

Dry Weather Flow shall be construed to represent discharges consisting of process and/or non-process wastewater only.

An **ecoregion** is a relatively homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

The **geometric mean** of any set of values is the n^{th} root of the product of the individual values where "n" is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For the purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

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.

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.

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.

The **monthly average concentration**, other than for *E. coli* bacteria, is the arithmetic mean of all the composite or grab samples collected in a one-calendar month period.

A **one week period** (or **calendar-week**) is defined as the period from Sunday through Saturday. For reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

Pollutant means sewage, industrial wastes, or other wastes.

A **Qualifying Storm Event** is one which is greater than 0.1 inches and that occurs after a period of at least 72 hours after any previous storm event with rainfall of 0.1 inches or greater.

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.

A **rainfall event** is defined as any occurrence of rain, preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.

A **rationale** (or "fact sheet") is a document that is prepared when drafting an NPDES permit or permit action. It provides the technical, regulatory and administrative basis for an agency's permit decision.

A **reference site** means least impacted waters within an ecoregion that have been monitored to establish a baseline to which alterations of other waters can be compared.

A **reference condition** is a parameter-specific set of data from regional reference sites that establish the statistical range of values for that particular substance at least-impacted streams.

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.

A **subecoregion** is a smaller, more homogenous area that has been delineated within an ecoregion.

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.

The term, **washout** is applicable to activated sludge plants and is defined as loss of mixed liquor suspended solids (MLSS) of 30.00% or more from the aeration basin(s).

Waters means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through, or border upon Tennessee or any portion thereof except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine or effect a junction with natural surface or underground waters.

The **weekly 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 week when the measurements were made.

The **weekly average concentration** is the arithmetic mean of all the composite samples collected in a one-week period. The permittee must report the highest weekly average in the one-month period.

Wet Weather Flow shall be construed to represent storm water runoff which, in combination with all process and/or non-process wastewater discharges, as applicable, is discharged during a qualifying storm event.

D. ACRONYMS AND ABBREVIATIONS

1Q10 – 1-day minimum, 10-year recurrence interval
30Q5 – 30-day minimum, 5-year recurrence interval
7Q10 – 7-day minimum, 10-year recurrence interval
AAF – means American Air Filter precipitator equipment
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
FGD – Flue Gas Desulfurization
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
RO – Reverse Osmosis
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
WQC - Water Quality Criteria

E. REPORTING

1. *Monitoring Results*

Monitoring results shall continue to be recorded monthly and submitted monthly using NETDMR. Submittals shall be no later than 15 days after the completion of the reporting period. If NETDMR is not functioning, a completed DMR with an original signature shall be submitted to the following address:

**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
COMPLIANCE & ENFORCEMENT SECTION
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102**

If NETDMR is not functioning, a copy of the completed and signed DMR shall be mailed to Knoxville Environmental Field Office (EFO) at the following address:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION
Knoxville Environmental Field Office -
Division of Water Resources
3711 Middlebrook Pike,
Knoxville, TN 37921**

The first DMR is due on the 15th of the month following permit effectiveness.

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. You are encouraged to use "comment" section of the DMR form (or attach additional pages), in order to explain any potential outliers or dubious results.

F. SCHEDULE OF COMPLIANCE

Except for those provisions listed in this section, full compliance shall be attained from the effective date of this permit.

Biological Sampling to support the thermal variance:

The permittee will submit a Revised Biological Sampling Plan within 90 days of the Permit Effective Date. The Plan will update existing biological sampling methods and will provide details of additional monitoring to address extreme summer reservoir temperatures, data on chlorophyll during June-October when fish community samples are collected, and additional information on thermal tolerance for individual fish species found to date in the mixing zone.

Cooling Water Intake Structure Requirements

A schedule of compliance is granted for the 5-year period of the permit term to complete compliance requirements under Section 316(b) of CWA. Due to the number and complexity of studies, reports, and peer reviews to be conducted and the time needed to complete such efforts, this renewed permit establishes an alternate schedule for submittal of information specified in § 122.21 (r)(2) through § 122.21 (r)(13) no later than 180 days prior to the expiration date.

Seep Action Plan

TVA shall submit a Seep Action Plan within 90 days from the permit effective date in accordance with Part III of the Permit.

Technology-Based Limits and Steam Electric ELGs

Additional time is granted to achieve compliance with the TNWQCA, CWA, and applicable regulations. This schedule requires compliance by the permittee *as soon as possible*, but does not extend the date for final compliance beyond the dates established by the CWA.

Category	Wastestream	Applicability Date
Generally Applicable	FGD Wastewater	by December 31, 2025
	Bottom Ash Transport Water	by December 31, 2025
Low Utilization EGU Subcategory	FGD Wastewater	by December 31, 2023
	Bottom Ash Transport Water	by December 31, 2023
Retirement Subcategory	FGD Wastewater	Upon issuance
	Bottom Ash Transport Water	Upon issuance

In order to keep TDEC abreast of TVA's progress toward installing the necessary equipment to meet the wet FGD wastewater and bottom ash transport water limits, this permit requires TVA to provide TDEC with recurring reports:

- An annual report detailing progress achieved during the preceding calendar year. This report will be submitted by October 13 detailing project progress from the preceding year and identifying upcoming efforts needed to attain compliance.
- These reports can be structured similar to the existing update reports now being provided regarding ash pond closure.

It is recognized that the above compliance schedule is site-specific to allow completion of compliance actions beyond the term of this permit. TVA has provided sufficient information with the permit renewal application and supplemental information on TDEC request (included in the Rationale) to demonstrate that this schedule reflects the appropriate applicability dates and considers the factors identified in 40 CFR 423.11(t). TDEC has approved this schedule as meeting the "as soon as possible" requirement.

PART II – GENERAL PROVISIONS

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 Resources (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 Resources. 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-.09.

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:

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

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

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

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

4. Change of Mailing Address

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

C. NONCOMPLIANCE

1. Effect of Noncompliance

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

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate Environmental Field Office (EFO) within 24-hours from the time the permittee becomes aware of the circumstances. (The EFO 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. Sanitary Sewer Overflow

- a. "Sanitary Sewer Overflow" means the discharge to land or water of domestic wastewater from any portion of the sanitary sewer collection, transmission, or treatment system other than through permitted outfalls.
- b. Sanitary Sewer Overflows are prohibited.

- c. The permittee shall operate the sanitary sewer collection system so as to avoid sanitary sewer overflows.

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 down-time or preventative maintenance;
- iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate environmental field office 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.

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.

Bypass does not include diverting from one treatment unit of treatment facility to another for alternate treatment.

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 Resources in the appropriate Environmental Field Office within 24-hours by telephone. A written submission must be provided within 5 days. The washout must be noted on the discharge monitoring report. Each day of a washout is a separate violation.

D. LIABILITIES

1. Civil and Criminal Liability

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

2. Liability Under State Law

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

PART III - OTHER REQUIREMENTS

A. TOXIC POLLUTANTS

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

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. One hundred micrograms per liter (100 ug/l);
 - b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - c. Five (5) times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 122.21(g)(7); or
 - d. The level established by the Director in accordance with 122.44(f).
2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. Five hundred micrograms per liter (500 ug/l);
 - b. One milligram per liter (1 mg/L) for antimony;
 - c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 122.21(g)(7); or
 - d. The level established by the Director in accordance with 122.44(f).

B. REOPENER CLAUSE

If an applicable standard or limitation is promulgated under CWA 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.

As defined by EPA rules and Part I of the Permit, should any future rulemaking establish revised ELGs, the permit would be reopened.

C. PLACEMENT OF SIGNS

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

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

<p>TREATED INDUSTRIAL WASTEWATER «Permittee_Name» (Permittee's Phone Number) NPDES Permit NO. «PERMIT_NUMBER» TENNESSEE DIVISION OF WATER RESOURCES 1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - «EFO_Name»</p>

D. SEEPS

i. Seep Action Plan

TVA shall submit a Seep Action Plan describing inspection of the plant property containing inactive ash disposal areas and response to any findings of seeps. The Plan will be submitted for Division approval within 90 days of the permit effective date.

ii. Contents of Seep Action Plan

The Seep Action Plan should address the following, as a minimum:

- Inspection requirements of former ash disposal areas to identify seeps;
- Measures for expedited repairs of seeps upon discovery;
- Submission of an annual report of results of seep inspections, a listing of seep conditions, and remedial actions completed and in progress;
- Submission of the annual report by July 1 of each year.
- A protocol for assessing existing and/or newly identified seeps as to the potential for discharge to surface waters, methods used in assessing potential effects on surface waters, and duration and frequency (at least a quarterly) of the assessment methods.
- Design, and engineering and various construction approaches planned for use in repairing a range of seeps, to include collection and routing the seep flow to an existing treatment system/permitted outfall.
- A procedure whereby TVA will notify TDEC of proposed discharge worthy of requesting a modification to the NPDES permit for an additional permitted outfall.
- To ensure structural stability is maintained at repaired seeps, continued dike inspection procedures which are equivalent to requirements in the Dike Inspections section below.

- Measures to ensure compliance with applicable solid waste statutes and rules.

E. DIKE INSPECTIONS AT REPAIRED SEEPS FOR FORMER ASH DISPOSAL AREAS

1. Implement dike inspection requirements in accordance with the approved Seep Action Plan.
2. The permittee must repair seeps in a manner that protects the structural integrity of the former disposal area, and either:
 - a. Eliminate any discharge to surface waters from the seep, or,
 - b. Reroute any flow back to an approved treatment unit for discharge to surface waters through a permitted outfall, or
 - c. Repair the seep in a manner that protects the structural integrity of the former disposal area while allowing flow from the seep to continue. In this case, the permittee must:
 1. Notify the Department and receive approval for this repair; and,
 2. Repair the seep and collect all flow through the seep and return the wastewater to the wastewater treatment unit, or
 3. Demonstrate to the Department that the continued flow through the seep after the repair meets published TN water quality criteria, (and continues to meet WQC from assessments conducted at least quarterly) or,
 4. Request a modification to the NPDES permit for an additional permitted outfall comprised of the continued flow from the seep.

F. BIOMONITORING REQUIREMENTS, CHRONIC – OUTFALL 002

The toxicity tests at Outfall 002 specified herein shall be conducted annually during a period of biocide application. Reports will be attached to the monthly DMR.

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Test on the same samples of final effluent from Outfall 002.

The measured endpoint for toxicity will be the inhibition concentration causing 25% reduction (IC25) in survival, reproduction, or growth of the test organisms. The IC25 shall be determined based on a 25% reduction as compared to the controls. The average reproduction and growth responses will be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test.

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

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
Permit Limit (PL)	0.50 X PL	0.25 X PL	0.125 X PL	0.0625 X PL	Control
% effluent					
100	50	25	12.5	6.25	0

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

Toxicity will be demonstrated if the IC25 is less than or equal to the permit limit indicated for each outfall in the above table(s). However, if intake samples (tested concurrently with the effluent) are shown to be toxic enough to represent a test failure (100 percent effluent samples are statistically less than controls using t-tests and minnow growth or *C. dubia* 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 which is not consistent with the intake toxicity conditions specified above constitutes a violation of this permit. The permittee is allowed to treat samples collected for toxicity testing on *Pimephales promelas* with UV radiation only in accordance with written approval from the division.

When effluent toxicity is demonstrated and ambient samples run concurrently with effluent tests are also 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 less than controls), the test will be repeated and the failed effluent test will not be considered a permit violation. Effluent toxicity demonstrated by the tests specified here in which is not shown to be related to ambient conditions constitutes a violation of this permit.

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

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

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

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

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

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

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

G. BIOCIDES/CORROSION TREATMENT PLAN (B/CTP)

The use of toxic chemicals, biocides, and slimicides at the site for process and non-process flows shall be managed under a Biocide/Corrosion Treatment Plan (B/CTP). The B/CTP shall describe chemical applications and macroinvertebrate controls; include all material feed rates, and proposed monitoring schedule(s) to verify that effluent limitations are being met and water quality is being protected. The permittee shall conduct treatments of intake or

process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals in accordance with conditions approved and specified in the permit.

The permittee shall maintain the B/CTP at the facility and make the plan available to the permit issuing authority upon request. The permittee shall amend the B/CTP whenever there is a change in the application of the chemical additives or change in the operation of the facility that materially increases the potential for these activities to result in a discharge of significant amounts of pollutants. The division shall also be notified in writing within 30-days of any material changes that will change the active ingredients or quantities used of any such chemical additives.

H. RE-ROUTING FLOWS FOR MAINTENANCE PURPOSES

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

I. FACILITY INTAKE WATER QUALITY MONITORING REQUIREMENTS

The permittee shall monitor the facility intake water for the following effluent characteristics (in mg/l): Hardness (as CaCO_3), Aluminum, Antimony, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Selenium, Silver, and Zinc. All metals shall be reported as Total Recoverable Metal. **All samples reported as "Below Detection Level" shall be analyzed to the Required Detection Level (RDL) specified in Tennessee General Water Quality Criteria, Chapter 0400-40-3-.05(8) except for Mercury which shall be analyzed by EPA Method 1631 or 245.7.** Samples shall be taken annually and will be timed to coincide with sampling at Outfall 002 for mercury.

J. COMPLIANCE WITH CWA SECTION 316(A) – THERMAL DISCHARGES

TDEC will extend the thermal variance of 36.1 degrees C in the renewed permit.

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

- a. The permittee shall analyze previous and new data to determine whether significant changes have occurred in plant operation, reservoir operation or instream biology that would necessitate the need for changes in the thermal variance.
- b. TVA's Reservoir Fish Assemblage Index will be used to assess the overall health of the fish community in Watts Bar Reservoir. RFAI assessment includes reservoir benthic macroinvertebrate community monitoring, in addition to the fish community.
- c. Should the fish community, or particular populations fall significantly below expectations, further investigations will be proposed, and upon approval by the

Division of Water Resources and EPA Region 4, initiated to verify apparent declines and assist in the identification of possible sources of impairment.

- d. The permittee will submit a Revised Biological Sampling Plan within 90 days of the Permit Effective Date. The Plan will provide details of monitoring to address extreme summer reservoir temperatures, data on chlorophyll during June-October when fish community samples are collected, and additional information on thermal tolerance for individual fish species found to date in the mixing zone.

K. ANTIDEGRADATION

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06, titled "Tennessee Antidegradation Statement," which prohibits the degradation of exceptional Tennessee waters and the increased discharges of substances that cause or contribute to impairment, 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.

ADDENDUM TO RATIONALE
Tennessee Valley Authority (TVA)
PERMIT NO. TN0005452 - Kingston Fossil Plant

October 7, 2021

Addendum prepared by: Mr. Vojin Janjić

In letters dated January 8, 2021 and June 21, 2021, prepared by Mr. Paul J. Pearman, P.E., Senior Manager of Water Permitting, Compliance and Monitoring, TVA requested a modification of the above referenced NPDES permit for discharges from Kingston Fossil Plant (KIF). The modification request was based on revisions to Steam Electric Effluent Limitation Guidelines (ELGs) in 40 CFR Part 423, published by EPA on October 13, 2020. These ELGs contain similar content as the previous rule, but also include additional subcategories and reporting requirements for steam electric plants. The reconsideration rule includes modified limits for Flue Gas Desulfurization (FGD) discharges and a discharge allowance of up to 10 percent volumetric bottom ash purge water discharge (rather than an original no-discharge requirement). The update also changes the technology-basis for treatment of the waste streams, revises the voluntary incentives program for the FGD wastewater, adds subcategories for generating units, adjusts discharge limitations, and establishes new compliance dates. Guideline-specific (specialized) definitions from Steam Electric ELGs were included verbatim in the permit.

Considering process and wastewater treatment setup at KIF, BAT effluent limitations for FGD wastewater are applicable. Furthermore, considerations regarding Bottom Ash Transport Water (BATW), applicability date ranges and alternate compliance pathways provided in the revised rule necessitate this NPDES permit modification. TVA's compliance strategy under the generally applicable requirements would involve commissioning of a high recycle system by December 31, 2024.

A number of factors, most beyond the scope of NPDES permitting program, will have to be taken into account as TVA decides which compliance pathway is appropriate for each of their facilities. At the same time, facilities are expected to stay in compliance with new compliance dates and effluent limitations. Compliance pathways are described in the ELGs as various categories, and will be addressed as such hereon. Categories and subcategories of concern are:

- Generally Applicable (with or without voluntary incentive program)
- Low Utilization Electric Generating Units (EGUs)
- High Flow FGD Facility and
- Retirement Subcategory.

Consequently, this permit will be modified to incorporate alternative compliance pathways with corresponding compliance dates for all applicable categories, akin to establishing tiers for facilities that are subject to production-based ELGs. Summary of categories, largely based on the verbatim language of the rules, corresponding waste streams and applicability dates are provided below. Note that even if a category or waste stream may not be applicable at KIF, a comprehensive summary below is provided as a general reference.

General note - 40 CFR § 423.12(b)(10) states: "At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass-based limitations specified in paragraphs (b)(3) through (b)(7), and (b)(11), of this section. Concentration limitations shall be those concentrations specified in this section." Following the approach routinely implemented in all TVA facilities, the division decided to express effluent limitations in terms of concentration.

§ 423.12 The best practicable control technology currently available (BPT) limits

- (b)
- (11) The quantity of pollutants discharged in FGD wastewater, flue gas mercury control wastewater, combustion residual leachate, gasification wastewater, or bottom ash purge water shall not exceed the concentrations listed in the Table 1:

Table 1		
Pollutant or pollutant property	BPT effluent limitations	
	Maximum daily concentration (mg/L)	Average monthly concentration (mg/L)
TSS	100.0	30.0
Oil and grease	20.0	15.0

Applicability:

Existing permit limits for TSS and oil and grease are already more restrictive than BPT limits provided in Table 1. Therefore, effluent limitations or monitoring requirements will not have to be modified in this NPDES permit.

§ 423.13 The best available technology economically achievable (BAT) limits

- (g)
- (1)
- (i) The numerical limitations for **FGD wastewater** are listed in Table 2.

Deadline: as soon as possible beginning October 13, 2021, but no later than December 31, 2025.

Table 2		
Pollutant or pollutant property	BAT effluent limitations	
	Maximum daily concentration	Average monthly concentration
Arsenic, total (ug/L)	18	8
Mercury, total (ng/L)	103	34
Selenium, total (ug/L)	70	29
Nitrate/nitrite as N (mg/L)	4	3

Applicability:

These limits may be applicable at internal monitoring point 009.

(2)

(ii) For **high FGD flow facility**, numerical limitations for FGD wastewater are listed in the Table 3.

Deadline: as soon as possible beginning October 13, 2021, but no later than December 31, 2023.

Table 3		
Pollutant or pollutant property	BAT effluent limitations	
	Maximum daily concentration	Average monthly concentration
Arsenic, total (ug/L)	11	8
Mercury, total (ng/L)	788	356

Applicability:

These limits are not applicable to the KIF facility.

(iii) For **low utilization electric generating units**, numerical limitations for FGD wastewater are listed in Table 3 (above).

Deadline: as soon as possible beginning October 13, 2021, but no later than December 31, 2023.

Applicability:

These limits may be applicable at internal monitoring point 009.

(3)

(i) For dischargers who **voluntarily choose to meet the effluent limitations for FGD wastewater** generated on and after December 31, 2028, numerical limitations are listed in Table 4.

Deadline: December 31, 2028.

Table 4		
Pollutant or pollutant property	BAT effluent limitations	
	Maximum daily concentration	Average monthly concentration
Arsenic, total (ug/L)	5	NA
Mercury, total (ng/L)	23	10
Selenium, total (ug/L)	10	NA

Table 4		
Pollutant or pollutant property	BAT effluent limitations	
	Maximum daily concentration	Average monthly concentration
Nitrate/Nitrite (mg/L)	2.0	1.2
Bromide (mg/L)	0.2	NA
TDS (mg/L)	306	149

Applicability:

These limits may be applicable at internal monitoring point 009.

(k)

(1)

- (i) **Bottom ash transport water.** Except for those discharges to which paragraph (k)(2) of this section applies, or when the bottom ash transport water is used in the FGD scrubber, there shall be no discharge of pollutants in bottom ash transport water, even when it's mixed with any other process or waste stream.

If bottom ash transport water is used in the FGD scrubber, it has to meet limitations for FGD wastewater.

Deadline: as soon as possible beginning October 13, 2021, but no later than December 31, 2025.

(2)

(i)

- (A) The discharge of pollutants in bottom ash transport water from a properly installed, operated, and maintained bottom ash system is authorized under the following conditions:

- (1) To maintain system water balance following storms exceeding a 10-year storm event of 24-hour or longer duration that cannot be managed by installed equipment; or
- (2) To maintain system water balance when regular inflows from wastestreams other than bottom ash transport water exceed the ability of the bottom ash system to accept recycled water and segregating these other wastestreams is not feasible; or
- (3) To maintain system water chemistry where installed equipment at the facility is unable to manage pH, corrosive substances, substances or conditions causing scaling, or fine particulates to below levels which impact system operation or maintenance; or
- (4) To conduct maintenance not mentioned above and not exempted from the definition of transport water in § 423.11(p), and when water volumes cannot be managed by installed equipment.

- (B) The total volume that may be discharged shall be reduced or eliminated to the extent achievable using control measures that are technologically available and economically achievable. The total volume of the discharge **shall not exceed a 30-day rolling average of ten percent of the primary active wetted bottom ash system volume**. The 30-day rolling average shall be calculated using flow measurements.
- (iii) For bottom ash transport water generated by a **low utilization electric generating unit**, the quantity of pollutants discharged in bottom ash transport water shall not exceed the concentration for TSS listed in Table 5, and shall incorporate the elements of a **best management practices plan** as described in (k)(3) of this section.

Table 5		
40 CFR § 423.12(b)(4)		
Parameter	Daily Maximum	Monthly Average
TSS (mg/L)	100	30

- (3) Where required in paragraph (k)(2)(iii) of this section, the discharger shall prepare, implement, review, and update a **best management practices plan for the recycle of bottom ash transport water**, which must include:
- (i) Identification of the low utilization coal-fired generating units that contribute bottom ash to the bottom ash transport system.
- (ii) A description of the existing bottom ash handling system and a list of system components (e.g., remote mechanical drag system, tanks, impoundments, chemical addition). Where multiple generating units share a bottom ash transport system, the plan shall specify which components are associated with low utilization generating units.
- (iii) A detailed water balance, based on measurements, or estimates where measurements are not feasible, specifying the volume and frequency of water additions and removals from the bottom ash transport system, including:
- (A) Water removed from the bottom ash transport system:
- (1) To the discharge outfall
 - (2) To the FGD scrubber system
 - (3) Through evaporation
 - (4) Entrained with any removed ash
 - (5) To any other mechanisms not specified above.
- (B) Water entering or recycled to the bottom ash transport system:
- (1) Makeup water added to the bottom ash transport water system.
 - (2) Bottom ash transport water recycled back to the system in lieu of makeup water.
 - (3) Any other mechanisms not specified above.
- (iv) Measures to be employed by all facilities:
- (A) Implementation of a comprehensive preventive maintenance program to identify, repair and replace equipment prior to failures that result in the release of bottom ash transport water.
- (B) Daily or more frequent inspections of the entire bottom ash transport water system, including valves, pipe flanges and piping, to identify leaks, spills and other

- unintended bottom ash transport water escaping from the system, and timely repair of such conditions.
- (C) Documentation of preventive and corrective maintenance performed.
 - (v) Evaluation of options and feasibility, accounting for the associated costs, for eliminating or minimizing discharges of bottom ash transport water, including:
 - (A) Segregation of bottom ash transport water from other process water.
 - (B) Minimization of the introduction of stormwater by diverting (e.g., curbing, using covers) storm water to a segregated collection system.
 - (C) Recycling bottom ash transport water back to the bottom ash transport water system.
 - (D) Recycling bottom ash transport water for use in the FGD scrubber.
 - (E) Optimization of existing equipment (e.g., pumps, pipes, tanks) and installing new equipment where practicable to achieve the maximum amount of recycle.
 - (F) Utilization of “in-line” treatment of transport water (e.g., pH control, fines removal) where needed to facilitate recycle.
 - (vi) Description of the bottom ash recycle system, including all technologies, measures, and practices that will be used to minimize discharge.
 - (vii) A schedule showing the sequence of implementing any changes necessary to achieve the minimized discharge of bottom ash transport water, including the following:
 - (A) The anticipated initiation and completion dates of construction and installation associated with the technology components or process modifications specified in the plan.
 - (B) The anticipated dates that the discharger expects the technologies and process modifications to be fully implemented on a full-scale basis, which in no case shall be later than December 31, 2023.
 - (C) The anticipated change in discharge volume and effluent quality associated with implementation of the plan.
 - (viii) Description establishing a method for documenting and demonstrating to the division that the recycle system is well operated and maintained.
 - (ix) Performance of weekly flow monitoring for the following:
 - (A) Make up water to the bottom ash transport water system.
 - (B) Bottom ash transport water sluice flow rate (e.g., to the surface impoundment(s), dewatering bins(s), tank(s), remote mechanical drag system).
 - (C) Bottom ash transport water discharge to surface water or POTW.
 - (D) Bottom ash transport water recycle back to the bottom ash system or FGD scrubber.

Applicability:

These limits, restriction and BMP requirements may be applicable at IMP 01C.

Reporting and recordkeeping requirements

- (b) All certifications and recertifications required in this part must be signed and certified pursuant to 40 CFR 122.22.
- (c) Requirements for facilities discharging **bottom ash transport water**.
 - (1) Initial Certification Statement shall be submitted to the division by the “as soon as possible” date.

- (2) The certification statement must be signed and certified by a professional engineer.
- (3) An initial certification shall include the following:
 - (A) A statement that the professional engineer is a licensed professional engineer.
 - (B) A statement that the professional engineer is familiar with the regulation requirements.
 - (C) A statement that the professional engineer is familiar with the facility.
 - (D) The primary active wetted bottom ash system volume.
 - (E) Material assumptions, information, and calculations used to determine the primary active wetted bottom ash system volume.
 - (F) A list of all potential discharges, the expected volume of each discharge, and the expected frequency of each discharge.
 - (G) Material assumptions, information, and calculations used to determine the expected volume and frequency of each discharge including a narrative discussion of why such water cannot be managed within the system and must be discharged.
 - (H) A list of all wastewater treatment systems at the facility currently, or otherwise required by a date certain under this section.
 - (I) A narrative discussion of each treatment system including the system type, design capacity, and current or expected operation.

Applicability:

These reporting and recordkeeping requirements may be applicable at Outfall 001.

(d) Requirements for a **bottom ash best management practices plan**.

- (1) For sources required to develop and implement a best management practices plan, an initial certification shall be made within two years of October 13, 2021. An annual recertification shall be made within 60 days of the anniversary of the original plan.
- (2) The certification statement must be signed and certified by a professional engineer.
- (3) An initial certification shall include the following:
 - (A) A statement that the professional engineer is a licensed professional engineer.
 - (B) A statement that the professional engineer is familiar with the regulation requirements.
 - (C) A statement that the professional engineer is familiar with the facility.
 - (D) The best management practices plan.
 - (E) A statement that the best management practices plan is being implemented.
- (4) An annual certification shall include the following:
 - (A) Any updates to the best management practices plan.
 - (B) An attachment of weekly flow measurements from the previous year.
 - (C) The average amount of recycled bottom ash transport water in gallons per day.
 - (D) Copies of inspection reports and a summary of preventative maintenance performed on the system.
 - (E) A statement that the plan and corresponding flow records are being maintained at the office of the plant.

Applicability:

These BMP plan requirements may be applicable at Outfall 001.

(o) Transfer between applicable limitations in a permit

Transfer from	Transfer to	Citation	No Later than Date
Retirement	Low Utilization Units	§ 423.13(o)(1)(i)(A)	December 31, 2023
Voluntary Incentives Program	Low Utilization Units	§ 423.13(o)(1)(i)(B)	
General Applicability	Low Utilization Units	§ 423.13(o)(1)(i)(B)	
Voluntary Incentives Program	Retirement	§ 423.13(o)(1)(ii)(A)	December 31, 2025
Retirement	Voluntary Incentives Program	§ 423.13(o)(1)(ii)(B)	
Retirement	General Applicability	§ 423.13(o)(1)(ii)(B)	
Low Utilization Units	General Applicability	§ 423.13(o)(1)(ii)(C)	
Low Utilization Units	Voluntary Incentives Program	§ 423.13(o)(1)(ii)(D)	
Low Utilization Units	General Applicability	§ 423.13(o)(1)(ii)(D)	
Low Utilization Units	Retirement	§ 423.13(o)(1)(ii)(E)	

- (2) A facility must be in compliance with all of its currently applicable requirements to become subject to a different set of applicable requirements.
- (3) Where a facility seeking a transfer is currently subject to more stringent limitations than the limitations being sought, the facility must continue to meet those more stringent limitations.

Applicability:

Transfer deadlines are applicable to all wastestreams within KIF facility covered by ELGs.

§ 423.18 Permit conditions

Deadline to qualify as a **low utilization electric generating unit** or to permanently cease the combustion of coal is December 31, 2028, unless:

- (1) An emergency order is issued by the Department of Energy,
- (2) A reliability must run agreement issued by a Public Utility Commission, or
- (3) Any other reliability-related order or agreement issued by a competent electricity regulator which results in that unit operating in a way not contemplated when the certification was made; or
- (4) The operation of the unit was necessary for load balancing an area where exists:
 - (i) An “Emergency,” or a “Major Disaster,” and
 - (ii) That load balancing was due to the event that caused the “Emergency” or “Major Disaster” to be declared.

Reporting and recordkeeping requirements for facilities seeking the protections listed in paragraphs (1) to (4) above are as following:

- (1) For each instance of seeking the protection, a one-time certification statement shall be submitted to the division no later than:
 - (A) In the case of an order or agreement under paragraph (1) above, 30 days from receipt of the order or agreement pursuant to paragraph (2)(B) of this section; or
 - (B) In the case of an “Emergency” or “Major Disaster” under paragraph (2) above, 30 days from the date that a load balancing need arose.
- (2) A certification statement must include the following:
 - (A) The qualifying event description, the individual or entity that issued or triggered the event, and the date that such an event was issued or triggered.
 - (B) A copy of any documentation of the qualifying event, or, where such documentation does not exist, other documentation with information for the division to confirm the qualifying event.
 - (C) A demonstration that an electric generating unit would have qualified for the subcategory at issue absent the event detailed in paragraph (2)(A), including the material data, assumptions, and methods used.
- (3) For sources filing a certification statement under paragraph (1) above, and for each such certification statement, a one-time termination of need statement shall be submitted to the division no later than 30 days from when the source is no longer subject to increased production from the qualifying event.
- (4) A termination of need for protection must include a narrative discussion including the date the qualifying event terminated, or if it has not terminated, why the source believes the capacity utilization will no longer be elevated to a level requiring the protection.

§ 423.19 Reporting and recordkeeping requirements

- (a) Discharges subject to this part must comply with the following additional reporting requirements.
- (e) Requirements for **low utilization electric generating units**
 - (1) For sources seeking to qualify as a low utilization electric generating units, a Notice of Planned Participation (NPP) shall be submitted to the division no later than October 13, 2021.

- (2) The NPP shall identify the potential low utilization electric generating unit and include following information:
 - (A) A statement of at least two years' capacity utilization rating data for the most recent two years of operation of each low utilization electric generating unit; and
 - (B) A statement that the facility has a good faith belief that each low utilization electric generating unit will continue to operate at the required capacity utilization rating. Where the most recent capacity utilization rating does not meet the low utilization electric generating unit requirement, a discussion of the projected future utilization shall be provided, including material data and assumptions used to make that projection.
- (3) For sources seeking to qualify as a low utilization electric generating unit, an initial certification shall be made to the division no later than December 31, 2023. An annual recertification shall be made to the division within 60 days of submitting annual electricity production data to the Energy Information Administration.
- (4) A certification or annual recertification shall include copies of the underlying forms submitted to the Energy Information Administration, as well as any supplemental information and calculations used to determine the two year average annual capacity utilization rating.

Applicability:

All permit conditions presented in federal ELGs were included in the body of the permit.

- (f) Requirements for units that will achieve **permanent cessation of coal combustion** by December 31, 2028.
- (1) A Notice of Planned Participation (NPP) shall be made to the division no later than October 13, 2021. TVA submitted an NPP on October 6, 2021 to participate in the permanent cessation of coal combustion subcategory.
 - (2) The NPP shall identify the electric generating units intended to achieve the permanent cessation of coal combustion and shall include:
 - (i) the expected date that each electric generating unit is projected to achieve permanent cessation of coal combustion;
 - (ii) whether each date represents a retirement or a fuel conversion;
 - (iii) whether each retirement or fuel conversion has been approved by a regulatory authority;
 - (iv) what the relevant regulatory body is;
 - (v) a copy of the most recent integrated resource plan for which the applicable regulatory agency approved the retirement or repowering of the unit; and
 - (vi) for each unit, a timeline to achieve the permanent cessation of coal combustion with interim milestones and the projected dates of completion.
 - (3) A progress report shall be filed with the division on annual basis following the submission of the NPP. The annual progress report shall:
 - (i) detail the completion of any interim milestones listed in the NPP since the previous progress report;
 - (ii) provide a narrative discussion of any completed, missed, or delayed milestones, and
 - (iii) provide updated milestones.

- (h) Requirements for facilities **voluntarily meeting the limits** in 423.13(g)(3)(i).
- (1) For sources opting to comply with the Voluntary Incentives Program requirements a Notice of Planned Participation (NPP) shall be made to the division no later than October 13, 2021.
 - (2) The NPP shall identify the facility, specify what technology or technologies are projected to be used to comply with those requirements, and provide a detailed engineering dependency chart and accompanying narrative demonstrating when and how the system(s) and any accompanying disposal requirements will be achieved by December 31, 2028.
 - (3) A progress report shall be filed with the division on annual basis following the submission of the NPP. The annual progress report shall:
 - (i) detail the completion of any interim milestones listed in the NPP since the previous progress report;
 - (ii) provide a narrative discussion of any completed, missed, or delayed milestones, and
 - (iii) provide updated milestones.
 - (4) Where, prior to the effective date, a discharger has already provided a notice to the division of opting to comply with the Voluntary Incentives Program requirements, such notice will satisfy paragraph (h)(1) of this section. However, where details required by (h)(2) of this section were missing from the previously provided notice, those details must be provided in the first Annual Progress Report, no later than October 13, 2021.

- (i) Requirements for facilities seeking to **transfer between applicable limitations**.
 - (1) For sources which have filed a Notice of Planned Participation (NPP) and intend to make changes that would qualify them for a different set of requirements, a NPP shall be made to the division no later than the dates stated in § 423.13(o)(1).
 - (2) The NPP shall include a list of the electric generating units for which the source intends to change compliance alternatives. For each electric generating unit, the NPP shall:
 - (i) list the specific provision under which this transfer will occur;
 - (ii) the reason such a transfer is warranted; and
 - (iii) a narrative discussion demonstrating that each electric generating unit will be able to maintain compliance with the relevant provisions.

- (j) Notice of **material delay**
 - (1) Notice. Within 30 days of experiencing a material delay in the milestones set forth in paragraphs (f)(2) or (h)(2) of this section and where such a delay may preclude permanent cessation of coal combustion or compliance with the voluntary incentives program limitations by December 31, 2028, a facility shall file a notice of material delay with the division.
 - (2) Contents. The contents of such a notice shall include the reason for the delay, the projected length of the delay, and a proposed resolution to maintain compliance.

RATIONALE – OCTOBER 2017

Tennessee Valley Authority
NPDES PERMIT NO. TN0005452
Harriman, Roane County, TN

Permit Writer: Bob Alexander¹

I. DISCHARGER

TVA Kingston Fossil Plant
714 Swan Pond Rd.
Harriman, TN 37746

Official Contact Person: Mr. Terry E.
Cheek Senior Manager
TVA Water Compliance, Permits, and Monitoring
423-751-2201

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

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

TN0080870 Expired on September 30, 2013 TN0005452 Expired on August 31, 2008 Application for renewal received October 18, 2016

In April 2011, TVA entered into a Federal Facilities Compliance Agreement with EPA to resolve alleged violations of the Clean Air Act. As a condition of that agreement, TVA is required to submit updated NPDES applications for its plants that are equipped with wet flue gas desulfurization (FGD) systems to include legally-applicable requirements of the revised Effluent Limitations Guidelines related to wet FGD wastewaters within 12 months after publication on November 2, 2016.

Per a July 2016 Settlement Agreement for permit appeal between Sierra Club, et.al., TVA, and TDEC, TVA submitted the NPDES permit renewal application prior to November 2, 2016. An October 2017 revision to the Agreement states TDEC will place a draft NPDES permit on public notice by November 1, 2017.

¹ Contact Info – Robert.alexander@tn.gov, 615-532-0659

Watershed Scheduling	
Environmental Field Office: Knoxville	
Primary Longitude: - 84.504167	Primary Latitude: 35.904167
Hydrocode: TN06010207001-1000	Watershed Group: 5
Watershed Identification: Lower Clinch	
Target Reissuance Year: 2018	

III. FOSSIL PLANT OPERATIONAL DISCHARGES

A. Overview

The TVA-Kingston Fossil Plant (hereafter KIF) plant has 9 coal-fired units with a combined rated capacity of 1,700 megawatts. Wastewater originates from the process of generation of electric power from a fossil-fueled steam-electric plant and discharges to the Clinch River.

Location	Flow	Characteristics
Outfall 001	14 MGD	treated ash pond effluent consisting of bottom ash transport water, coal yard runoff including coal storage area drainage, utility building area drainage, and fire protection flushes; combustion residual leachate; chemical and nonchemical metal cleaning wastes; ammonia storage area runoff; water treatment plant wastes including RO system reject and backwash; drainage from sluice line trench; station sump discharge including ash system leakage and boiler bottom overflow and fan bearing cooling water, equipment cooling and lubricating water, fire protection flushes, floor washing, roof drains and precipitator washdown, boiler water leakage, analytical process wastewater, basement boiler blowdown, and lab sample stations; stormwater from FGD area sump; and AAF area sump with precipitator wash and raw water leakage
Outfall 002	999 MGD	once-through condenser cooling water discharge plus flows from Outfall 001; boiler blowdown; discharge from underflow ponds with fire protection flushes, raw water leakage and transformer/switchyard runoff; intake screen backwash from Outfall 004 and FGD strainers; discharge from FGD stormwater pond IMP 01A; and discharge from Outfall 006
Outfall 004	0.25 MGD	Intake screen backwash (raw river water)
Outfall 006	0.2 MGD	Elec. Control bldg. AC condensate, fire protection flushes, and plant water leakage
IMP* 01A	1.6 MGD	Pond at FGD dewatering facility and combustion residual leachate from peninsula area FGD and ash landfill
Outfall 01B	N/A	Emergency overflow from pond at FGD/landfill only during probable maximum precipitation event
IMP* 005	Variable	Metal Cleaning wastewater

*IMP = Internal Monitoring Point

Permit documents including the renewal application are available online at the DWR Dataviewer, http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34001 (search both for permit numbers TN0080870 and TN0005452 for the complete facility history).

Proposed significant changes to the previous permit

- Deletion of Outfall 007, former redwater seep from the ballfield area, which was redirected in 2015 to the process water basin/stilling pond influent channel;
- Deletion of Outfall 008, discharge from concrete-lined sluice trench, which has been rerouted to the process water basin /stilling pond influent channel; and
- This permit incorporates monitoring and effluent limitations from TN0080870 for IMP 01A, dealing with dewatered FGD wastewater and wastewater from the “peninsula” landfill.

B. Stormwater

Except for incidental rainfall on facility ponds and stormwater discharges summarized on the cover page of this permit, stormwater discharges associated with the industrial activity from this facility are covered by the Tennessee Multi-Sector General Storm Water Permit, tracking number TNR051787. For more information, see DWR Dataviewer at: http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34051::NO:34051:P34051_PERMIT_NUMBER:TNR051787.

C. Seeps

NPDES permit application identified seeps at 3 locations at the facility:

- at the stilling pond dike near the plant water intake on the Emory River; (The stilling pond is scheduled for closure in 2017-18.)
- near the cooling water intake on the intake channel at the sluice trench, and (Closure of the sluice trench is ongoing and scheduled for completion in 2017.)
- At the FGD process water basin dike on the Clinch River.

IV. RECEIVING WATER QUALITY

The Clinch River is a part of the TVA Watts Bar Reservoir, which extends upstream approximately 20 river miles on the Clinch River and 12 miles on the Emory River and downstream approximately 38 river miles to Watts Bar Dam. The ash pond/gypsum pond discharge mixes with approximately 1 billion gallons per day of fossil plant cooling water which is pumped from the Emory River/Clinch River embayment of the reservoir. As identified in TDEC in *2014 305(b) Report: Status of Water Quality in Tennessee*², waters of the Clinch River arm of Watts Bar Reservoir are assessed using all available monitoring data. A summary of the assessment information is presented in the table below:

TDEC Assessment	Classified Uses
Fully Supporting	Domestic Water Supply, Industrial Water Supply, Fish and Aquatic Life, Irrigation, and Livestock Watering and Wildlife
Not Supporting	Recreation (due to contaminated sediments and upstream industrial discharges from DOE Oak Ridge facilities, and from atmospheric deposition of mercury)

² This publication serves to satisfy the biennial report of the status of water quality in Tennessee required by The Clean Water Act, Section 305(b) (US Congress, 2002) and the Tennessee Water Quality Control Act (Tennessee Secretary of State, 1999). http://www.tn.gov/assets/entities/environment/attachments/wr_wq_report-305b-2014.pdf. Additional information on the stream assessment process is found in the 305b Report, Chapter 1, Water Quality Assessment Process at page 13, et. seq.

2017 Assessment, Clinch River arm of Watts Bar Reservoir

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Upstream pollutant sources are identified as industrial point sources and contaminated sediments primarily from upstream Department of Energy (DOE) facilities, and atmospheric deposition of mercury. A fish advisory is established for consumption of PCBs. The advisory states that “Catfish, striped bass and hybrid (striped bass-hybrid bass) should not be eaten. Precautionary advisory for white bass, sauger, carp, smallmouth buffalo, and largemouth bass” indicates “Children, pregnant women, and nursing mothers should not consume the fish species named. All other persons should limit consumption of the named species to one meal per month.”

Upstream sources including DOE facilities have been identified with elevated levels of mercury in fish tissue in waters immediately upstream of the Kingston plant. Mercury in fish tissue at levels > 0.3 ppm is documented in the Clinch River arm of Watts Bar Lake at mile 11.0 and in Poplar Creek, which enters the Clinch River at RM 12, due to legacy CERCLA releases.³

Additional information on the 303(d) list is found at:

http://www.tn.gov/assets/entities/environment/attachments/wr_wq_303d-2016-draft-revisions.pdf.

Water quality conditions described above, i.e., mercury and PCBs in fish tissue, have not been attributed in the past to TVA Kingston discharges described in this permit. Although discharges from the TVA site containing mercury potentially contribute to fish tissue levels, historic data points to legacy problems from upstream DOE sources. No means currently exists to differentiate mercury levels now found in fish tissue with respect to DOE and TVA loadings.

No Federally-listed threatened and endangered species or designated critical habitat are known to exist in the vicinity of the KIF cooling water intake. TDEC has not designated the receiving stream as Exceptional TN Waters, and the decision was based on:

- Review by the TN Natural Heritage Program and TDEC Div. of Natural Areas;
- Communications with USFWS and TN Wildlife Resources Agency.

Water Data updated from CERCLA Ash Spill Recovery Project, January 2017

Conditions for water column, biological community and habitat have returned to pre-ash spill conditions of 2008. Levels of Se in fish tissue of bluegills and red-ear sunfish are still detectably higher than the reference sites, but still well below levels of concern for fish health or human consumers. Similarly for benthic macroinvertebrates, levels of Se and As are higher than at the reference conditions, but pose no threat to biological community or recreation. Levels of ash-related metals in reservoir sediments are a little higher in some places than the reference sites, but nothing of concern to ecology or recreation, and nothing that would trigger the need for additional clean-up.

See <https://www.epa.gov/tn/epa-response-kingston-tva-coal-ash-spill> and <https://semspub.epa.gov/work/04/11015837.pdf> (biota monitoring data 2009-2014) for more information.

Summary of WQ and KIF Mixing Zone monitoring for metals

³USDOE 2015 Remediation Effectiveness Report for Oak Ridge Facilities, DOE/OR/01-2675&D2, page 7-11 available at <http://doeic.science.energy.gov/Uploads/A.0100.064.2384.pdf>

- **No exceedances** of published TDEC WQC for metals in the water column are evident in the mixing zone downstream of KIF at Clinch RM 2.3.
- Metals concentrations measured at the KIF intake of combined Emory and Clinch River waters **closely match upstream concentrations** at Clinch RM 10.0, which is the DWR ambient monitoring station.
- At Outfall 001, **notable reductions in metals loading** are evident in 2016 data as compared to 2008 data, from permit renewal application EPA Form 2C, due to TVA's cessation of sluicing fly ash in 2009.
- Period of TDEC data for mixing zone is shown from 2008-2010 during response to the ash spill ambient monitoring.

V. PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

Appendix 1 lists the permit limitations and monitoring requirements as defined in the previous permit. The previous (existing) permit is available from the DWR Dataviewer, available at http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34001. The permit document can be viewed in the eDocuments section by filtering for file type = "Permits."

VI. HISTORICAL MONITORING AND INSPECTION

The 2015 Compliance Inspection Report reported the facility to be in compliance with permit terms and conditions.

VII. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES (ELGS)

Overview

Under the revised ELG rule, TDEC must set limits on wastewater streams with applicability dates. The regulated wastewater streams include wet FGD wastewaters, fly ash transport waters, combustion residuals leachate, and bottom ash transport waters. These applicability dates must be "as soon as possible beginning November 1, 2018, but no later than December 31, 2023" for fly ash transport waters and "as soon as possible beginning November 1, 2020, but no later than December 31, 2023" for bottom ash transport waters and FGD wastewaters. Permit limits for ELGs for Coal Combustion Residuals [seepage and/or leakage from a combustion residual landfill or impoundment unit] must also be established in this permit.

Interim and final limits are discussed in Section VIII below for each wastewater stream at Outfalls 001 and IMP 01A. TVA provided updated information in October 2017 to support development of applicability dates – this information is attached to this Rationale in Appendix 3.

The compliance schedule in Part I of the permit establishes the applicable dates for compliance with interim limits until December 1, 2023. Where applicability dates for final limits extend beyond the 5-year permit term, EPA rules at § 122.47 and TDEC rules are equivalent to the "as soon as possible" requirement.

40 CFR rule citations are as follows.

- § 423.11(t): defines "as soon as possible" to be November 1, 2018, unless the permitting authority establishes a later date based on factors that include certain Clean Air Act regulations, the CCR rule, FGD wastewater treatment system optimization, and other factors "as appropriate."
- § 423.13(g)(1)(i): contains the BAT requirements for FGD wastewater, including the new limits for arsenic, mercury, selenium, and nitrate/nitrite.
- § 423.13(h)(1)(i): contains the BAT "no discharge" provision for fly ash transport water.
- § 423.13(i)(1)(i): contains the BAT "no discharge" provision for FGMC wastewater.
- § 423.13(j)(1)(i): contains the BAT limits for gasification wastewater.
- § 423.13(k)(1)(i): contains the "no discharge" provision for bottom ash transport water.

Background

On January 4, 2016, the EPA final rule for Effluent Limitation Guidelines for the Steam Electric Power Generating Point Source Category⁴ became effective. By a letter to the TDEC Commissioner dated April 11, 2017, the Administrator announced the EPA decision to consider two petitions to reconsider the final rule that amends the effluent limitation guidelines and standards for the steam electric point source category. The next day, the Administrator issued a letter announcing that EPA will reconsider the final rules. The letter also stated the agency was acting promptly to issue an administrative stay of compliance deadlines that had not yet passed and that it was intending to request a stay from the Fifth Circuit Court of Appeals for 120 days, by which time it intended to inform the court of the portions of the rule, if any, it intends to have remanded to the agency for further rulemaking. Lastly, Mr. Pruitt stated that because an administrative stay lasts only as long as the judicial review, EPA intended to conduct rulemaking during reconsideration of the rules to stay or amend compliance deadlines.

On April 24, 2017, the Fifth Circuit Court of Appeals⁵ granted EPA's motion to stay further proceedings. The court also granted EPA's motion to file a motion to govern further proceedings to inform the court if it wishes to seek a remand of any provisions of the rule by August 12, 2017.

In the April 25, 2017 *Federal Register* notice, EPA stated it was postponing the compliance dates that have not yet passed pending judicial review. 82 Fed. Reg. 19005. This postponement comes under Section 705 of the Administrative Procedures Act (APA), which allows an agency to postpone the effective date of action taken by it pending judicial review. The Agency continued by explaining that the postponement "will preserve the regulatory status quo with respect to wastestreams subject to the Rule's new, and more stringent limitations and standards, while litigation is pending and the reconsideration is underway." *Id.* at 19005.

On June 6, 2017, EPA issued a proposed rule in the Federal Register to postpone certain compliance dates in the ELGs and standards for the steam electric point source category. EPA reiterated that it intended to postpone specifically the compliance deadlines for the new best available technology economically achievable effluent limitations and pretreatment standards for fly ash transport water, bottom ash transport water, flue gas desulfurization wastewater, flue gas mercury control wastewater, and gasification wastewater. EPA intends to postpone these compliance dates until it completes reconsideration of the 2015 ELGs. The Agency made reference to the earlier Federal Register notice concerning postponement of these compliance dates pursuant to the APA and distinguished it as postponement of the effective date of an action pending judicial review. The rulemaking anticipated postponing the compliance dates in the event the litigation ended and the Agency undertook reconsideration of the rules. It was EPA's intent to postpone the compliance dates until it promulgated a final rule specifying compliance dates.

On August 22, 2017, the Fifth Circuit Court of Appeals granted EPA's motion to sever and hold in abeyance all judicial proceedings as to all issues relating to the portion of the 2015 Rule concerning the new, more stringent limitations and PSES applicable to (1) bottom ash transport water, (2) FGD wastewater, and (3) gasification wastewater pending Respondents' completion of further agency action.

On September 28, 2017, EPA published a Final Rulemaking that postponed compliance dates for the FGD and Bottom Ash Transport Water to November 2020 pending further EPA rulemaking⁶. The compliance date of 2023 remains in effect.

⁴ Published at 80 Fed. Reg. 67838 (November 3, 2015).

⁵ *Southwestern Elec. Power Co., et al. v. EPA, et al.*, No. 15-60821 (5th Cir

⁶ Updated and postponed dates are described at 82 Fed. Reg. 43,494 (September 28, 2017).

Reopener

As defined by EPA rules and Part I of the Permit, should any future rulemaking establish revised ELGs, the permit would be reopened. TDEC NPDES permit standard Reopener language is:

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. [40 CFR 122.62(7)].

2016 Settlement Agreement with Citizens Groups

In July 2016, TDEC, TVA, and citizens' groups entered into a settlement agreement concerning permit appeals for the TVA Bull Run, Kingston, and Kingston facilities. As part of that settlement, TDEC agreed to make permit decisions on the pending applications by December 31, 2017.

Furthermore, in the renewed permits, TDEC agreed to require TVA to implement the ELGs at the plants between November 1, 2018, and December 31, 2023. The settlement agreement provides, in part, that if there is a subsequent change in law, through voluntary action by EPA, that alters any of TDEC's obligations concerning the matters addressed in the Agreement, then the Agreement will be considered to have been amended to conform to such changes without further action of the parties. (Para. 8). In a revised Agreement of October 2017, TDEC will place the draft permits on public notice as follows: KIF on November 1, 2017, Bull Run Fossil on January 1, 2018, and Kingston Fossil on February 1, 2018.

FGD Wastewater

In addition to the BPT limits, the 2015 Steam Electric ELGs also established the first national BAT effluent limitation guidelines for FGD wastewater. These BAT limits are based on wastewater treatment using chemical precipitation followed by biological treatment. The new BAT standards for FGD wastewater, 40 C.F.R. § 423.13(g), state as follows:

40 CFR 423.(g)(1)

(i) FGD wastewater. Except for those discharges to which paragraph (g)(2) or (g)(3) of this section applies, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in the table following this paragraph (g)(1)(i). Dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023. These effluent limitations apply to the discharge of FGD wastewater generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph.

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Arsenic, total (ug/l)	11	8
Mercury, total (ng/l)	788	356
Selenium, total (ug/l)	23	12
Nitrate/Nitrite as N (mg/l)	17	4.4

(ii) For FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i), the quantity of pollutants discharged in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed for TSS in § 423.12(b)(11).

These effluent limitations provide the BAT standards that are applicable at KIF. Effective September 28, 2017, EPA delayed the applicability date of November 1, 2018 to November 1, 2020 pending further rulemaking. The compliance deadline of December 1, 2023 remains in effect.

Interim Limits for FGD Wastewater at Outfall 01A

For wastewaters generated prior to December 1, 2023, BAT effluent limits are based on BPT limits for TSS in 40 CFR 423.12(b)(11).

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0

Final Limits for FGD Wastewater – applicable December 1, 2023 – at IMP 009
Internal Monitoring Point (IMP) 009 will be established for documentation of compliance.

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Arsenic, total (ug/l)	11	8
Mercury, total (ng/l)	788	356
Selenium, total (ug/l)	23	12
Nitrate/Nitrite as N (mg/l)	17	4.4
TSS	100.0	30.0
Oil and grease	20.0	15.0

Bottom Ash Transport Water at Outfall 001

Interim limits are based on ELGs for Bottom Ash Transport Water. TSS and Oil and Grease BPT limits for bottom ash transport water have not changed. The 2015 ELGs at 40 CFR 423.13 (k)(1)(ii) place an interim limit equivalent to the TSS limit in 40 CFR 423.12 (b)(4) requirements.

40 CFR 423.12 (b)(4) states "The quantity of pollutants discharged in fly ash and bottom ash transport water shall not exceed the quantity determined by multiplying the flow of fly ash and bottom ash transport water times the concentration listed in the following table:

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0
Oil and grease	20.0	15.0

Monitoring frequency shall be monthly from a grab sample.

These interim limits apply to any discharge of bottom ash transport water that occurs *prior to* the final compliance deadline of December 1, 2023.

Final Limits for Bottom Ash Transport Water at Outfall 001

Bottom ash transport water. Except for those discharges to which paragraph 40 CFR (k)(2) applies, or when the bottom ash transport water is used in the FGD scrubber, **there shall be no discharge of pollutants in bottom ash transport water.**

Combustion Residual Leachate at Outfalls 001 and 01A

For KIF wastewaters, the rules were not proposed to be stayed for limits on coal combustion residual leachate. The ELGs from 1982 were unchanged in the revised 2015 ELGs and are currently applicable [423.12(b)(11)].

BPT Limits on combustion residual leachate (total suspended solids (TSS), oil and grease (O&G) and pH) apply on the effective date of issuance of this renewed permit and are shown below at the discussion of Outfall 001 and 01A. The BAT limit for TSS is equivalent to 423.13 (l).

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0
Oil and grease	20.0	15.0

Metal Cleaning Wastes at IMP 005

1. Limits for metal cleaning wastes are applicable on the effective date of the permit.
2. Limits on **chemical metal cleaning wastes** remain applicable for TSS, pH, O&G, copper and iron. [40 CFR 423.12 (b)(5)]

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0
Oil and grease	20.0	15.0
Copper, total	1.0	1.0
Iron	1.0	1.0

Limits on nonchemical metal cleaning wastes remain “Reserved” in the revised ELGs. In this permit renewal, limits are established based on the permit writer’s BPJ considering previous NPDES permit in which non-chemical metal cleaning wastes were treated as Low-Volume wastes subject to limits for TSS, pH, O&G.

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0
Oil and grease	20.0	15.0

Legacy Wastewater

Pursuant to the 2015 ELG Rule, there are limits that apply to the affected wastestreams . The Rule’s legacy wastewater provisions are not proposed to be stayed. The Rule defines “legacy wastewater” as “*FGD wastewater, fly ash transport water, bottom ash transport water, flue gas mercury control wastewater, or gasification wastewater generated prior to the date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023.*”⁷

According to the 2015 ELG Rule, the BAT legacy wastewater limits apply to wastewater generated before the applicability date set by the permit writer for the waste stream in question to meet the final BAT limits. Thus, the legacy wastewater BAT limits apply to wastewater generated before the applicability date.

The legacy wastewater provision for KIF wastestreams is listed in the table below.

⁷ 80 Fed. Reg. 67,838, 67,854 (Nov. 3, 2015).

Wastestream	Legacy Wastewater Provision Establishing BAT	Applicability Date
FGD Wastewater	§ 423.13(g)(1)(ii)	December 1, 2023
Fly Ash Transport Water	§ 423.13(h)(1)(ii)	November 1, 2018
Bottom Ash Transport Water	§ 423.13(k)(1)(ii)	December 1, 2023

SUMMARY

Applicability dates and technology-based permit limits for regulated wastewater streams are established in this permit. Should EPA rulemaking during the permit term create new compliance requirements, TDEC will reopen the permit to address ELGs in effect at that time.

TDEC grants TVA's requested applicability date and determines that, pursuant to the currently effective 40 CFR 423.13(k)(1)(i), the no-discharge limitation on pollutants in bottom ash transport waters should be applied on December 1, 2023. TDEC acknowledges that EPA is undertaking reconsideration of the no-discharge limit for bottom ash transport water. Regarding the selected applicability date, TDEC will take appropriate account of any changes to 40 CFR 423.13(k) or other relevant portions of 40 CFR Part 423 that result from EPA's reconsideration.

VIII. KINGSTON FOSSIL PLANT WASTEWATER

a. Bottom Ash Wastewater

Since 2009, TVA has converted the Kingston operations to dry ash handling except for bottom ash, for which a dewatering facility is being built. In conjunction with the dewatering project, TVA installed an interim tank-based bottom ash dewatering system in early fall of 2015 and is currently installing a remote submerged flight conveyor system and belt press system.

The filtrate from bottom ash dewatering discharges through the process water pond at Outfall 001 – see Outfall 001 description in Section VIII below.

b. FGD wastewater

FGD wastewater is generated from operation of two once-through, high-flow wet scrubbers, with an approximate flow of 0.92 MGD. Treatment of the filtrate from gypsum dewatering includes coagulation, flocculation, settling, neutralization prior to discharge to the IMP 01A which flows to the cooling water channel and Outfall 002.

As noted above, TDEC issued in 2009 a separate NPDES permit TN0080870 for the FGD discharge upon startup, and this renewed permit incorporates FGD wastewater provisions.

c. Fly Ash transport water

TVA has achieved compliance with the no-discharge ELG standard for fly ash transport water. Sluicing of KIF fly ash ended in 2009 with conversion to a dry fly ash handling system, reducing the wastewater flow by over 25 MGD. Dry fly ash is placed in the peninsula area landfill.

d. General Plant Flows

Fossil plant operations contributing wastewater flows are discharged through Outfalls 001 and 01A. The following supplementary information provided with the October 2016 permit application is relevant:

In addition to wet FGD wastewater and fly ash and bottom ash transport waters, the KIF facility includes a number of other general plant flows. TVA is using the term general plant flows to refer to several types of wastewater including coal pile runoff, low volume wastes, combustion residual leachate, and chemical and nonchemical metal cleaning wastes with established ELGs. The ELG does not allow the permitting authority to determine future applicability dates for these flows but they are included in this document for completeness.

Much of the plant's general plant flows are currently collected and treated in the site's [process water] ash pond that discharges via Outfall 001 to the plant intake and eventually to the Clinch River. In addition, some general plant flows are routed to the process water [stormwater] pond at the Gypsum Disposal Facility and discharged via IMP 01A. If necessary, additional WWT may be applied or augmented at these basins in the future such as pH control or polymer injection, with appropriate state approval of the additives and/or treatment.

Chemical metal cleaning wastes will be either collected in frac tanks and any hazardous portions will be disposed of as hazardous wastes, or they will be evaporated in the boilers if allowed. If collected and not evaporated, the non-hazardous fraction of chemical cleaning wastes will be discharged in accordance with limits in the NPDES permit on TSS, O&G, pH, copper, and iron.

[Note: the permit retains IMP 005 for Metal Cleaning Wastewaters. IMP005 formerly was the location for discharge from the Chem Ponds which were eliminated during the CERCLA project in 2009.]

Non-chemical metal cleaning wastes will continue to be discharged in accordance with historical limits in the NPDES permit. As established in the ELGs and prior NPDES permits, non-chemical metal cleaning wastes were formerly treated as low volume wastes subject only to TSS, O&G and pH limitations and not copper and iron limitations.

Effluent limits data sets for IMP 005 are shown in Section VIII below.

IX. NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

Parameters and permit limits for each outfall are described below. Biomonitoring requirements are discussed in Section IX.

A. OUTFALL 001 – PROCESS WATER BASIN

KIF discharges treated bottom ash sluice waters, chemical and nonchemical metal cleaning wastes, and general plant flows including pumping basin discharges with storm water runoff from the coal pile and utility building areas, water treatment plant wastes, station sump discharges including ash system leakage and boiler bottom overflow, floor washing wastewater, miscellaneous equipment cooling and lubricating water, boiler makeup water leakage, analytical process water, roof drains, and precipitator washdown water discharges. Treated wastewater discharges from Outfall 001 to the intake channel on Emory River.

Sluicing of fly ash into the ash pond was discontinued in 2009-10 such that some parameters, primarily ammonia nitrogen, from the previous permit are not applicable.

Non-chemical metal cleaning wastes, which have been historically managed as low- volume wastes and treated by impoundment, will continue to be managed in this manner. Reporting for TSS and Oil and Grease as applicable for ELGs for low-volume wastes are required at Outfall 001.

PARAMETERS TO BE INCLUDED AS INTERIM PERMIT LIMITS

Oil & Grease and Total Suspended Solids (TSS) – ELG limits apply

For Oil and Grease, daily maximum (20 mg/l) and monthly average (15 mg/l) limits apply. For TSS, daily maximum (100 mg/l) and monthly average (30 mg/l) limits apply.

pH

The pH range limit of 6.0 to 9.0 will be retained for the discharge from Outfall 001. This would ensure the protection of water quality and, likewise, follow the federal guidelines promulgated by the EPA in 40 CFR §423.12(b)(1) which states "The pH of all discharges, except for once through cooling water, shall be in the range of 6.0 to 9.0." pH monitoring frequency at Outfall 001 will be retained at once per week from the previous permit.

Ammonia, Nitrogen Total - deleted

Selective Catalytic Reduction (SCR) equipment is used at KIF in order to lower nitrogen oxide stack emissions, as mandated by the Tennessee Air Quality Board. Ammonia is injected into the stack gases and ammonia compounds were formerly exposed to fly ash sluice water discharged with the ash pond effluent.

Since TVA has converted KIF to dry fly ash handling and eliminated fly ash sluice water, ammonia concentrations in the ash pond effluent are reported at <0.17 mg/l in the 2016 renewal application. This is the same concentration as found in the intake water. Accordingly, monitoring and reporting for ammonia in the renewed permit is deleted.

Metals

The polishing pond receives wastewater flows which have been in contact with coal combustion residuals (CCR) which contain metals, such as bottom ash, CCR leachate, and miscellaneous general plant flow having a minor CCR component. As shown in the following spreadsheet, metals in flows do not represent reasonable potential for exceedance of WQC in the KIF intake channel.

Calculated effluent concentrations are shown which, if exceeded, would cause an exceedance in the mixing zone and would require numeric permit limits for the parameter. **None of the reported metals in Outfall 001 are greater than this calculated value⁸.** Effluent flow value of 14 MGD is mixed with the Minimum Flow of 654 MGD for the plant intake, as discussed below at Outfall 002.

⁸ Thallium has a WQC (0.24 ug/l) lower than available detection limits (1.0 ug/l) ; note that thallium concentration is Outfall 001 already meets the drinking water WQC as an end-of-pipe criterion.

In the renewed permit, reporting is required for effluent metals concentrations at Outfall 001 pending elimination of wastewater flows involving CCR. Metals monitoring must continue until elimination of discharges from bottom ash dewatering filtrate and/or until a statistically-valid data set exists to enable revision of monitoring frequency.

Upon further effluent characterization, TVA may request a permit modification to address metals monitoring.

Sheet 1 of 2

WATER QUALITY BASED EFFLUENT CALCULATIONS OUTFALL 001								
Hardness data: 130 mg/l Clinch RM 4.5 TDEC Ambient Sta.		Stream (1Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness as CaCO3	Stream Allocation	
		[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]	
		654.0	654.0	14.00	9	130	90	
EFFLUENT CHARACTERISTIC	1	2	3	4	5	6	7	8
	Stream Bckgrnd. Conc.***	Fish/Aqua. Life WQ Criteria		Effluent Fraction	Fish & Aquatic Life WQ Criteria (1Q10)			
		Chronic	Acute		In-Stream Allowable		Calc. Effluent Conc'n	
	[ug/l]	[ug/l]	[ug/l]	[Fraction]	Chronic	Acute	Chronic	Acute
					[ug/l]	[ug/l]	[ug/l]	[ug/l]
Aluminum	155	--	--		--	--	--	--
Antimony	2	--	--		--	--	--	--
Arsenic	2	150	340		150	340	6357	14516
Barium	39	--	--		--	--	--	--
Beryllium	1	--	--		--	--	--	--
Boron	102	--	--		--	--	--	--
Cadmium *	1	0.295	2.59	0.194	1.52	13.36	23	531
Calcium		--	--		--	--	--	--
Chromium *	0.5	706.3	33.8	0.084	8392	401	360368	17204
Cobalt	2	--	--		--	--	--	--
Copper *	0.2	11.21	17.21	0.220	51.0	78.3	2181	3354
Iron	179	--	--		--	--	--	--
Lead *	0.2	3.34	85.83	0.152	21.98	564	936	24214
Magnesium	11	--	--		--	--	--	--
Manganese	35	50	100	1.0	50.00	100	676	2823
Mercury, (T) **	0.004	0.770	1.4		0.77	1.40	33	60
Molybdenum	50	--	--		--	--	--	--
Nickel *	2	64.9	584.6	0.210	309	2784	13196	119483
Selenium	2.0	5	20	1.0	5	20	131	775
Silver *	0.5	--	5.051	1.0	--	5.05	--	196
Sodium		--	--		--	--	--	--
Thallium	2	--	--		--	--	--	--
Tin	50	--	--		--	--	--	--
Titanium	50	--	--		--	--	--	--
Vanadium		--	--		--	--	--	--
Yttrium		--	--		--	--	--	--
Zinc *	10	146.35	146.35	0.13	1136.38	1136.38	48379	48379
Cyanide (T)	7.0	5.2	22.0	1.0	5.2	22.0	-71	650

	9	10	11	12	13	14	
	Human Health Water Quality Criteria (30Q5)						Outfall
	In-Stream Criteria			Calc. Effluent Concentration			001
EFFLUENT CHARACTERISTIC	Organisms	Water/Organism	DWS	Organisms	Water/Organism	DWS	Conc'n
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	ug/l
Aluminum	--	--	--	--	--	--	895
Antimony	5.6	5.6	6.0	156	156	174	4.8
Arsenic	10.0	10.0	10.0	345	345	345	56
Barium	--	--	2000	--	--	84246	415
Beryllium	--	--	4.0	--	--	130	1.0
Boron	--	--	--	--	--	--	375
Cadmium *	--	--	5.0	--	--	173	0.30
Calcium	--	--	--	--	--	--	
Chromium III *	--	--	100.0	--	--	4273	9.50
Cobalt	--	--	--	--	--	--	5.5
Copper *	--	--	--	--	--	--	1.8
Iron	--	--	--	--	--	--	200
Lead *	--	--	5.0	--	--	206	2
Magnesium	--	--	--	--	--	--	12000
Manganese	--	50	100	--	675.6	2823	25.0
Mercury, (T) **	0.051	0.050	2.0	2.0	2.0	86	0.15
Molybdenum	--	--	--	--	--	--	65
Nickel *	4600	610	100	197453	26111	4210	4
Selenium	--	--	50.0	--	--	2063	16
Silver *	--	--	--	--	--	--	0.30
Sodium	--	--	--	--	--	--	
Thallium	0.47	0.24	2.0	-63.9	-73.8	2	1.5
Tin	--	--	--	--	--	--	46.0
Titanium	--	--	--	--	--	--	27.5
Vanadium	--	--	--	--	--	--	
Yttrium	--	--	--	--	--	--	
Zinc *	--	--	--	--	--	--	16.0
Cyanide (T)	140.0	140.0	200.0	5718	5718	NA	NA

NA = not applicable.

* 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.

** Chronic criterion for mercury is not converted to dissolved, as it addresses bioaccumulation rather than toxicity.

*** Stream background concentrations are taken from intake sample on 2016 permit application; except for manganese, which is upstream TDEC ambient data at RM 10.0, since app'n data considered outlier. [reported detection levels are used when no reportable concentration exists.]

OUTFALL 001 PERMIT LIMITS AND MONITORING REQUIREMENTS

Description: External Outfall, Number: 001, Monitoring: Effluent Gross, Season: All Year

<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00400	pH	>=	6	SU	Grab	Weekly	Minimum
00530	Total Suspended Solids (TSS)	<=	29.9	mg/L	Grab	Monthly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	92	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	14.4	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	19.4	mg/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01007	Barium, total (as Ba)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01012	Beryllium, total (as Be)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01027	Cadmium, total (as Cd)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01042	Copper, total (as Cu)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01045	Iron, total (as Fe)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01051	Lead, total (as Pb)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01059	Thallium, total (as Tl)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01077	Silver, total (as Ag)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01092	Zinc, total (as Zn)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01097	Antimony, total (as Sb)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01105	Aluminum, total (as Al)	Report	-	mg/L	Grab	Monthly	Daily Maximum
01147	Selenium, total (as Se)	Report	-	mg/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average
50050	Flow	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
71900	Mercury, total (as Hg)	Report	-	mg/L	Grab	Monthly	Daily Maximum

2. Final Limits – Outfall 001

FINAL Permit requirements include the Interim Permit Limits, as well as limitations for bottom ash transport water which are applicable December 1, 2023, as follows, pending modifications to 40 CFR Part 423 by EPA

Bottom ash transport water. Except for those discharges to which paragraph 40 CFR 423 (k)(2) applies, or when the bottom ash transport water is used in the FGD scrubber, **there shall be no discharge of pollutants in bottom ash transport water.**

The 2015 ELGs establish a no-discharge standard for bottom ash transport water, involving a dry handling or a closed-loop system that recycles flow from the dewatering process.

TVA is both currently installing a bottom ash dewatering system and conveyor system and also planning/designing to build the recirculation system separately. 34 These efforts are required in order to meet the Applicability Date for No-Discharge of December 1, 2023, per 40 CFR 423 (k)(1).

B. OUTFALL 002

Outfall 002 is comprised primarily of waters associated with the condenser cooling processes. From the updated permit application, the total cooling water flow is approximately 999.14 MGD which includes flow from Outfalls 001, 004, IMP005, IMP 01A FGD and landfill wastewater pond, and Outfall 006.

Total Residual Oxidants

Of particular interest with respect to this outfall is the consideration for Total Residual Oxidant, as Chlorine (Cl_2). Although KIF does not currently treat the CCW with chlorine as a biocide, the intake water may be treated with chemicals which contain bromides or other oxidants, permit limitations on the discharge of chlorine related pollutants are provided for “Total Residual Oxidants” (TRO) rather than “Total Residual Chlorine” in accordance with 40 CFR §423.11(a). Additionally, since TRO analysis methodology is not included in 40 CFR §136, for the purpose of this permit TRO measurements shall be made using the amperometric titration, DPD colorimetric, or specific ion electrode method for total residual chlorine as defined in 40 CFR §136.

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

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

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

ELGs for once-through cooling water at 40 CFR 423.13 (c)(1) establish the BAT-required discharge concentration for total residual oxidant (as Chlorine) is 0.2 mg/l, and is, therefore, less stringent than the water quality based calculations using the 3.5 to 1 dilution factor and EPA in-stream concentrations of 0.011 mg/l and 0.019 mg/l for the monthly average and daily maximum, respectively. **Consequently, water quality is determinative of the total residual oxidant limits in this new permit** (See reasonable potential worksheet below).

**WATER QUALITY BASED EFFLUENT CALCULATIONS
OUTFALL 002**

FACILITY: TVA Kingston Fossil Plant
PERMIT #: TN0005452

Stream (1Q10)	Stream (30Q2)	Waste Flow *	Ttl. Susp. Solids	Hardness (as CaCO3)	Stream Allocation
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
155.8	NA	654	10	50	90

	1	2	3	4	5	6	7	8
	Stream Bckgrnd. Conc.	Fish/Aqua. Life Water Quality Criteria		Effluent Fraction Dissolved	Fish & Aquatic Life Water Quality Criteria (1Q10)			
		Chronic	Acute		In-Stream Allowable		Calc. Effluent Concentration	
	[ug/l]	[ug/l]	[ug/l]	[Fraction]	Chronic	Acute	Chronic	Acute
EFFLUENT CHARACTERISTIC								
Total Residual Oxidant	0.000	11.000	19.000	1.000	11.000	19.000	13.6	23.5

	9	10	11	12	13	14
	Human Health Water Quality Criteria (30Q2)					
	In-Stream Criteria			Calc. Effluent Concentration		
	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]
EFFLUENT CHARACTERISTIC						
Total Residual Oxidant	NA	NA	NA	NA	NA	NA

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

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q2 flow.

Biomonitoring Requirements, Chronic

The discharge of cooling water from Outfall 002 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Tennessee Water Quality Standards criteria stipulates that *"The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions..."*.

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

The discharge is not expected to have toxic pollutants other than biocides containing oxidizers such as bromine. However, the size of the discharge has a potential for large impacts if pollutants entered the cooling water in significant amounts. Since the discharge (999 MGD)

exceeds the low flow value (1Q10=654 MGD) for the receiving stream, no significant dilution will be provided. Because of this, an IC₂₅ limitation of 100% effluent will be retained in the new permit.

Therefore, WET testing will be required on 100% effluent. **The toxicity tests at Outfall 002 specified herein shall be conducted annually during a period of biocide application.**

Biocide/Corrosion Treatment Plan

The use of toxic chemicals, biocides, and slimicides at the site for process and non- process flows shall be managed under a Biocide/Corrosion Treatment Plan (B/CTP). The B/CTP shall describe chemical applications and macroinvertebrate controls; include all material feed rates, and proposed monitoring schedule(s) to verify that effluent limitations are being met and water quality is being protected. The permittee shall conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals in accordance with conditions approved and specified in the permit.

The permittee shall maintain the B/CTP at the facility and make the plan available to the permit issuing authority upon request. The permittee shall amend the B/CTP whenever there is a change in the application of the chemical additives or change in the operation of the facility that materially increases the potential for these activities to result in a discharge of significant amounts of pollutants. The division shall also be notified in writing within 30-days of any material changes that will change the active ingredients or quantities used of any such chemical additives.

Total Mercury

As required by the TN Antidegradation Statement and by the TDEC determination that the Clinch River arm of Watts Bar Reservoir is unavailable waters for mercury, the renewed permit establishes a numeric mercury limit for Outfall 002. This is required to address the discharge of FGD wastewater from IMP 01A, which is tributary to Outfall 002.

Per TDEC 0400-40-05-.10(4), effluent discharges are required to meet the anti- degradation requirements of TDEC 0400-40-03-.06 to ensure that new or increased discharges do not cause measurable degradation of any parameter that is “unavailable.” Unavailable parameters exist where water quality is at, or fails to meet, the levels specified as water quality criteria in TDEC 0400-40-03-.03. Specifically:

“... nor will discharges be authorized if they cause additional loadings of unavailable parameters that are bioaccumulative.” [TDEC 0400-40-03-.06(2)(a)]

Accordingly, the “no additional loading” requirement applies to the WQ criterion for the Recreation use classification at end-of-pipe. At Outfall 002 the permit limit for Total Mercury is the water column concentration of 0.051 ug/l (or 51 ng/l), to be reported from a grab sample collected monthly.

Description: External Outfall, Number: 002, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature	<=	36.1	deg C	Calculated ⁹	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Monthly Average
71900	Mercury, total (as Hg)	<=	51	ng/L	Grab	Monthly	Daily Maximum
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>=	100	%	Composite	Annual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales	>=	100	%	Composite	Annual	Minimum
Description: External Outfall, Number: 002, Monitoring: Intake from Stream, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature	Report	-	deg C	Recorder – see note	Continuous – see note.	Daily Maximum
Description: External Outfall, Number: 002, Monitoring: See Comments, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
34044	Oxidants, total residual	<=	.011	mg/L	Grab	Weekly	Monthly Average
34044	Oxidants, total residual	<=	.019	mg/L	Grab	Weekly	Daily Maximum

Monitoring and reporting of TRO at Outfall 002 shall be conducted during a period of application of oxidizing biocides to the CCW.

C. OUTFALL 004 – INTAKE SCREEN BACKWASH

No numeric limits or reporting requirements are established; discharges of intake screen backwash are limited to material present in the raw water source.

D. OUTFALL 006 HVAC CONDENSATE

Outfall 006, conveys comparatively minor waste streams: Non-contact Cooling Water (no additives used), North Parking Area Drainage, including Precipitation, discharging into the facility's intake channel. Since there is very minor flow and minimal, if any, pollutant loading,

⁹ Intake temperature is measured hourly (continuously) but reported as a daily average once per day. The daily average discharge temperature shall be calculated for the cooling channel based on the 24-hour average intake temperature, 24 hour average unit load, and the 24-hour average flow through Outfall 002.

there will be no numeric effluent limitations or specific monitoring requirements established for discharges from Outfall 006.

E. IMP 01A –PROCESS WATER BASIN AT FGD DEWATERING/LANDFILL WASTEWATER

Permit requirements from IMP 01A are incorporated herein from Permit No. TN0080870, which will be terminated upon this permit's issuance.

IMP 01A discharges to condenser cooling water channel and then Outfall 002 to the Clinch River. The effluent consists of the filtrate from the FGD dewatering facility and discharge from the process water pond containing landfill wastewater pumped from the peninsula area FGD and ash landfill, combustion residual leachate from the landfill leachate collection system, plus precipitation.

Historical data is shown below taken from EPA-ICIS database for effluent metals at IMP 01A as required by the permit. These data indicate that most parameters (not selenium) comply with drinking water MCLs¹⁰ prior to 1000:1 dilution in the condenser cooling water channel at Outfall 002:

DMR data IMP 01A – NPDES Permit TN0080870 - Units – ug/l.

Limit	Arsenic	Selenium	Mercury	Cadmium	Copper	Nickel	Zinc
09/30/2014	ND	1290	0.17	ND	ND	21.8	412
10/31/2014	ND	1400		ND	ND	29.896	461.042
11/30/2014	ND	606.958		1.28	ND	42.7	777
12/31/2014	ND	733	0.94	1.425	ND	16.7	534
01/31/2015	ND	685		1.11	ND	22.65	682
02/28/2015	ND	819		1.63	ND	21.3	363
03/31/2015	ND	395	0.06	1.96	ND	25.9	694
04/30/2015	ND	689		ND	ND	22.1	511
05/31/2015	ND	663		ND	ND	13.7	288
06/30/2015	1.52	535	0.24	ND	ND	16.2	177
07/31/2015	ND	307		1.48	ND	19.9	389
08/31/2015	ND	921		1.39	ND	16.4	513
09/30/2015	ND	403	1.93	ND	ND	30.5	606
10/31/2015	ND	606		ND	ND	33.6	953.5
11/30/2015	ND	381		4.3	ND	41.9	1150
12/31/2015	ND	326	1.36	1.56	ND	42.7	586
01/31/2016	ND	203		ND	ND	32.7	499
02/29/2016	ND	205		3.84	ND	11.4	128
03/31/2016	38.6	76.6	0.55	16.8	ND	25.6	450
04/30/2016	ND	165		8.18	ND	38.4	778
05/31/2016	ND	166		10	ND	38.4	475
06/30/2016	2.595	96		18.05	ND	33.6	531
06/30/2016	2.92	128	0.94	22.7	2.83	53.85	810
07/31/2016	3.37	187.5		14.3	ND	64.4	888
08/31/2016	3.27	220		2.42	2	38.4	585
09/30/2016	2.35	303	0.44	1.39	10	24.6	706
10/31/2016	10	300		5	2	15.5	595
11/30/2016	10	284		5	2	18.1	606
12/31/2016	2	248	8.32	1	10	36.2	881

¹⁰ Clinch River classification for Domestic Water Supply, detection limits per EPA Method 200.8 or 200.9.

01/31/2017	10	374		5	2	21.4	650
2/28/2017	2	221		1	2	40.6	1420
03/31/2017	3.18	284	0.66	1.16	10	25.5	972
04/30/2017	10	221		5	10	30.9	663
05/31/2017	10	155		5	2	41.2	915
06/30/2017	2.52	290	0.26	1.21	44.4	36.8	1110

Accordingly, reporting of metals during Interim Limits is included at IMP 01A, however no numerical limits are established in the absence of reasonable potential for WQBELS or applicable ELGs for metals. Metals and related constituents are selected from Appendices III and IV of the CCR rules.

Monitoring of mercury is continued. FGD wastewater remains the only significant source of mercury in KIF wastewater following conversion to dry ash management. Numeric limits for TSS and O&G are applicable from ELGs for Combustion Residual Leachate as stated earlier.

PROPOSED INTERIM EFFLUENT LIMITS –IMP 01A.

INTERIM							
Description: External Outfall, Number: 01A, Monitoring: Effluent Gross, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
71900	Mercury, total (as Hg)	Report	-	ng/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	MGD	Instantaneous	Weekly	Monthly Average
50050	Flow	Report	-	MGD	Instantaneous	Weekly	Daily Maximum
	Boron	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Calcium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Chloride	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Fluoride	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Sulfate	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Total Dissolved Solids	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Antimony	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Arsenic	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Barium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Beryllium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Cadmium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Chromium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
	Cobalt	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum

Lead	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
Lithium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
Molybdenum	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
Selenium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
Thallium	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum
Radium226 and 228 combined	Report	-	ug/L	Instantaneous	Quarterly	Daily Maximum

FINAL LIMITS – FGD Wastewater at Internal Monitoring Point 009:

Final Permit Limits for FGD wastewater (i.e., ELGs) are applied at IMP 009. IMP 009 is established as the point of compliance for treated FGD wastewater ELGS prior to mixing with the discharge from the FGD landfill process water pond, designated IMP 01A. The limits are applicable following construction/startup of new wastewater treatment and division approval of the initial operating period. Monthly reporting is established for these parameters.

Description: Internal Monitoring Point, Number: Outfall 009, Monitoring: Effluent Gross, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	<=	11.0	ug/L	Grab	Monthly	Daily Maximum
01002	Arsenic, total (as As)	<=	8.0	ug/L	Grab	Monthly	Monthly Average
01027	Mercury, total (as Hg)	<=	788	ng/L	Grab	Monthly	Daily Maximum
01027	Mercury, total (as Hg)	<=	356	ng/L	Grab	Monthly	Monthly Average
01092	Nitrite plus Nitrate, total (as N)	<=	17.0	mg/L	Grab	Monthly	Daily Maximum
01092	Nitrite plus Nitrate, total (as N)	<=	4.4	mg/L	Grab	Monthly	Monthly Average
01147	Selenium, total (as Se)	<=	23.0	ug/L	Grab	Monthly	Monthly Average
01147	Selenium, total (as Se)	<=	12.0	ug/L	Grab	Monthly	Daily Maximum
50050	Flow	Report	-	MGD	Continuous	Monthly	Monthly Average
50050	Flow	Report	-	MGD	Continuous	Monthly	Daily Maximum

F. OUTFALL 01B – EMERGENCY OVERFLOW - - POND AT FGD DEWATERING/LANDFILL WASTEWATER

In circumstances resulting from a probable maximum precipitation event, TVA will collect and maintain records on the duration of the event, the amount of precipitation affecting the overflow, and results of an inspection of the pond for structural stability in accordance with Part III of the permit.

G. IMP 005 - METAL CLEANING WASTEWATER

PROPOSED EFFLUENT LIMITS – IMP 005

For Chemical Cleaning Wastes (non-hazardous portion)

Description: Internal Outfall, Number:IMP 005, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Grab	Weekly	Daily Maximum
00556	Oil & Grease	Report	-	mg/L	Grab	Weekly	Daily Maximum
01042	Copper	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
01045	Iron	<=	1.0	mg/L	Grab	Monthly	Daily Maximum

For **Non-Chemical** Cleaning Wastes

Description: Internal Outfall, Number:IMP 005, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
00530	Total Suspended Solids (TSS)	Report	-	mg/L	Grab	Weekly	Daily Maximum
00556	Oil & Grease	Report	-	mg/L	Grab	Weekly	Daily Maximum

H. SEEPS

1. Overview

Under revised EPA ELGs for the Steam Electric Power sector under 40 CFR Part 423, seeps are defined as Combustion Residual Leachate:

The term combustion residual leachate means leachate from landfills or surface impoundments containing combustion residuals. Leachate is composed of liquid, including any suspended or dissolved constituents in the liquid, that has percolated through waste or other materials emplaced in a landfill, or that passes through the surface impoundment's containment structure (e.g., bottom, dikes, berms). Combustion residual leachate includes seepage and/or leakage from a combustion residual landfill or impoundment unit.

2. Existing Seeps

In the KIF permit renewal application, TVA identified 3 seeps:

- Seep 1 at the FGD stormwater pond (CCR landfill) near the Watts Bar Lake shoreline;
- Seep 2 at the East Kike near the Intake Channel (inactive CCR landfill) approx. 600 feet east thereof;
- Seep 3 at the former Stilling Pond (former CCR impoundment) on the Emory River shoreline near the intake skimmer wall (no longer contains liquids). Current status of this seep is not available at this writing.

Under normal plant and reservoir operating conditions, any flow from Seeps 2 and 3 that would reach surface waters would discharge through Outfall 002, along with flow from Outfall 001.

[Note: The former red water seep, labelled Outfall 007 in the previous permit, has been redirected to the polishing pond/stilling pond influent channel.]

Seeps 1 and 3 are located in the portion of the FGD and Stilling Pond dikes which have been stabilized as part of dike structural integrity requirements undertaken following the Kingston Recovery Project. At Seep 2, a stability project is underway and, at this writing, is under review of design for construction in late 2017.

TVA describes these seeps as follows:

The flow rate of seepage from ash management unit embankments is generally so low that it is not measurable and, in any event, is significantly less than the permitted discharge from Outfall 001 of 14.03 million gallons per day as a long term average. Generally, seepage percolates through the embankment, is diffuse in nature, and is a nonpoint source from the ground surface lacking a discernible, confined, and discrete conveyance. Any additional pollutant loading from seeps would be de minimis and is expected to have an insignificant impact on surface water quality.

Since it is not feasible to measure potential seep-related impacts in surface waters in the reservoir due to the diffuse nature of seepage and the large volume of mixing, aquatic community assessments provide information on potential impacts. TVA has compiled aquatic and benthic community data upstream and downstream of the plant in 10 studies from 2001- 2015. These data demonstrate that seepage has not affected the maintenance of a balanced, indigenous population of aquatic life in the vicinity of the plant. Such monitoring will continue for the duration of the permit¹¹.

3. Reasonable Potential Analysis

Using the methodology to assess the potential for seeps to cause exceedances of water quality criteria (see procedures in Appendix 2), the following assumptions are made:

- The mixing zone for Seeps 2 and 3 coincides with that of Outfall 001, so these flows are mixed with the minimum stream flow through the intake channel.
 - o Flow from Outfall 001 from application = 14 MGD.
 - o Flow from Seeps 2 and 3 are assumed at 3 gpm each, based on the 2015 Annual Seep Inspection Report, with daily flow = $2 \times 1440 \div 10^{-6} \sim 0.03$ MGD
 - o Total Wastewater Flow = 14.03 MGD
- Minimum stream flow is based on the minimum operating conditions for the 9 generating units at this facility:
 - o operation of 1 unit running full open at 187 MGD, 2 similar units (187 MGD each) being operated at 50% of capacity, 4 of the smaller units (140 MGD each) being operated at 50% of capacity, and 2 smaller units (140 MGD each) being held in reserve.
 - o Minimum flow = $(187 \text{ MGD}) + 0.5 \times (187 \text{ MGD} \times 2) + 0.5 \times (140 \text{ MGD} \times 4) = 654 \text{ MGD}$

¹¹ TVA letter (Cheek) to DWR (Janjic), Subj: TVA-KIF TN0005452 and TN0080870 *Supplemental Information for Application*, 26 October 2016

- Stream background concentrations are from plant intake data shown on application Form 2C for Outfall 002, pp. V-1 to V-4.

Findings:

Calculations shown on following page indicate that seep discharges plus Outfall 001 are **not likely to cause exceedances of TN water quality criteria**, nor are numeric metals limits warranted, based on WQ conditions.

WATER QUALITY BASED EFFLUENT CALCULATIONS SEEPS 2 AND 3 + OUTFALL 001								
Hardness data: 130 mg/l Cinch RM 4.5 TDEC Ambient Sta.		Stream (1Q10) (MGD)	Stream (3Q05) (MGD)	Waste Flow (MGD)	Ttl. Susp. Solids (mg/l)	Hardness as CaCO3 (mg/l)	Stream Allocation (%)	
		654.0	654.0	14.03	9	130	90	
EFFLUENT CHARACTERISTIC	1 Stream Bckgmd. Conc.***	2 Fish/Aqua. Life WQ Criteria		4 Effluent Fraction Dissolved (Fraction)	5 Fish & Aquatic Life In-Stream Allowable		7 WQ Criteria (1Q10) Calc. Effluent Conc'n	
		Chronic (ug/l)	Acute (ug/l)		Chronic (ug/l)	Acute (ug/l)	Chronic (ug/l)	Acute (ug/l)
Aluminum	155	—	—	—	—	—	—	—
Antimony	2	—	—	—	—	—	—	—
Arsenic	2	150	340	—	150	340	6344	14488
Barium	39	—	—	—	—	—	—	—
Beryllium	1	—	—	—	—	—	—	—
Boron	102	—	—	—	—	—	—	—
Cadmium *	1	0.295	2.59	0.194	1.52	13.36	23	630
Calcium	—	—	—	—	—	—	—	—
Chromium *	0.5	706.3	33.8	0.084	8392	401	368813	17188
Cobalt	2	—	—	—	—	—	—	—
Copper *	0.2	11.21	17.21	0.220	51.0	78.3	2177	3347
Iron	179	—	—	—	—	—	—	—
Lead *	0.2	3.34	85.83	0.152	21.98	564	894	24163
Magnesium	11	—	—	—	—	—	—	—
Manganese	35	50	100	1.0	50.00	100	874	2817
Mercury, (T) **	0.004	0.770	1.4	—	0.77	1.40	33	60
Molybdenum	50	—	—	—	—	—	—	—
Nickel *	2	64.9	584.6	0.210	309	2784	13189	118233
Selenium	2.0	5	20	1.0	5	20	130	773
Silver *	0.5	—	5.051	1.0	—	5.05	—	186
Sodium	—	—	—	—	—	—	—	—
Thallium	2	—	—	—	—	—	—	—
Tin	50	—	—	—	—	—	—	—
Titanium	50	—	—	—	—	—	—	—
Vanadium	—	—	—	—	—	—	—	—
Yttrium	—	—	—	—	—	—	—	—
Zinc *	10	146.35	146.35	0.13	1136.38	1136.38	48278	48278
Cyanide (T) **	7.0	5.2	22.0	1.0	5.2	22.0	-71	648
EFFLUENT CHARACTERISTIC	9 Organisms (ug/l)	10 Organisms (ug/l)	11 DWS (ug/l)	12 Organisms (ug/l)	13 Organisms (ug/l)	14 DWS (ug/l)	Outfall 001 Concn (ug/l)	
	Human Health Water Quality Criteria (3Q05) In-Stream Criteria			Calc. Effluent Concentration				
Aluminum	—	—	—	—	—	—	895	
Antimony	5.6	5.6	6.0	168	168	173	4.8	
Arsenic	10.0	10.0	10.0	345	345	345	56	
Barium	—	—	2000	—	—	84070	415	
Beryllium	—	—	4.0	—	—	129	1.0	
Boron	—	—	—	—	—	—	375	
Cadmium *	—	—	5.0	—	—	172	0.30	
Calcium	—	—	—	—	—	—	—	
Chromium III *	—	—	100.0	—	—	4284	9.50	
Cobalt	—	—	—	—	—	—	5.5	
Copper *	—	—	—	—	—	—	1.8	
Iron	—	—	—	—	—	—	200	
Lead *	—	—	5.0	—	—	208	2	
Magnesium	—	—	—	—	—	—	12000	
Manganese	—	50	100	—	874.3	2817	25.0	
Mercury, (T) **	0.051	0.050	2.0	2.0	2.0	88	0.15	
Molybdenum	—	—	—	—	—	—	65	
Nickel *	4600	610	100	187040	28058	4201	4	
Selenium	—	—	50.0	—	—	2069	16	
Silver *	—	—	—	—	—	—	0.30	
Sodium	—	—	—	—	—	—	—	
Thallium	0.47	0.24	2.0	-63.8	-73.8	2	1.5	
Tin	—	—	—	—	—	—	46.0	
Titanium	—	—	—	—	—	—	27.5	
Vanadium	—	—	—	—	—	—	—	
Yttrium	—	—	—	—	—	—	—	
Zinc *	—	—	—	—	—	—	16.0	
Cyanide (T) **	140.0	140.0	200.0	6708	6708	NA	NA	

NA = not applicable.

* 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.

** Chronic criterion for mercury is not converted to dissolved, as it addresses bioaccumulation rather than toxicity.

*** Stream background concentrations are taken from intake sample on 2016 permit application;

except for manganese, which is upstream TDEC ambient data at RM 10.0, since apm data considered outlier.
[reported detection levels are used when no reportable concentration exists.]

4. Permitting Approach

i. Effluent Limitations Guidelines for Combustion Residual Leachate

As noted above, the term *combustion residual leachate* means leachate from landfill or surface impoundments containing combustion residuals. At KIF, the ELGs apply to seeps from any inactive ash landfills, such as the collection system for the East Dike Seepage project being treated at Outfall 001, and from the leachate collection system at the FGD landfill being treated and discharged at IMP 01A.

ELGs are defined under CCR Leachate provisions below:

40 CFR 423.12 (11) The quantity of pollutants discharged in FGD wastewater, flue gas mercury control wastewater, **combustion residual leachate**, or gasification wastewater shall not exceed the quantity determined by multiplying the flow of the applicable wastewater times the concentration listed in the following table:

Pollutant or pollutant property	BPT Effluent limitations	
	Maximum for any 1 day (mg/l)	Average of daily values for 30 consecutive days shall not exceed (mg/l)
TSS	100.0	30.0
Oil and grease	20.0	15.0

The BAT requirement mirrors BPT and the technology basis for CCR leachate is treatment by impoundment. The TSS and O&G limits are shown in the proposed permit limits for Outfall 001 and 01A above.

ii. No Existing Wastewater Impoundments Classed as Dams

In previous permits, TDEC addressed seeps from ash pond dikes by requiring weekly dam safety-related dike inspections for structural integrity.

With the closure of existing wastewater impoundments having earthen dikes, and construction of the new Process Water Ponds at Outfall 001, there are no wastewater impoundments that warrant dam safety considerations. Neither of the two Process Water Ponds (one at Outfall 001, and one at IMP 01A - FGD dewatering and landfill area) are considered as dams. Both impoundments are not defined as CCR impoundments and are constructed with liners such that seepage through earthen dikes has been minimized or eliminated. Inspections of the existing wastewater impoundments will be performed under the Permit's Part I requirements at Rule 0400-40-05-.07(2)© for proper operation and maintenance:

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit..

iii. Seep Action Plan

In this renewed permit, TVA shall submit a Seep Action Plan describing inspection of the plant property containing inactive ash disposal areas and response to any findings of seeps. The Plan will be submitted for Division approval within 90 days of the permit effective date.

iv. Content of Seep Action Plan

TDEC expects the Plan will address the following, as a minimum:

- Inspection requirements of former ash disposal areas to identify seeps;
- Measures for expedited repairs of seeps upon discovery;
- Submission of an annual report of results of seep inspections, a listing of seep conditions, and remedial actions completed and in progress;
- Submission of the annual report by July 1 of each year.
- A protocol for assessing existing and/or newly identified seeps as to the potential for discharge to surface waters, methods used in assessing potential effects on surface waters, and duration and frequency (at least a quarterly) of the assessment methods.
- Design, and engineering and various construction approaches planned for use in repairing a range of seeps, to include collection and routing the seep's flow to an existing treatment system/permitted outfall.
- A procedure whereby TVA will notify TDEC of proposed discharge worthy of requesting a modification to the NPDES permit for an additional permitted outfall.
- To ensure structural stability is maintained at repaired seeps, continued dike inspection procedures which are equivalent to Section I below.

I. DIKE INSPECTIONS AT REPAIRED SEEPS FOR FORMER ASH DISPOSAL AREAS

1. Dike inspection requirements on a weekly basis to assess the current condition of repaired seep(s).
2. The permittee must repair seeps in a manner that protects the structural integrity of the former disposal area, and either:
 - a. Eliminate any discharge to surface waters from the seep, or,
 - b. Reroute any flow back to an approved treatment unit for discharge to surface waters through a permitted outfall, or
 - c. Repair the seep in a manner that protects the structural integrity of the former disposal area while allowing flow from the seep to continue. In this case, the permittee must:
 1. Notify the Department and receive approval for this repair; and,
 2. Repair the seep and collect all flow through the seep and return the wastewater to the wastewater treatment unit, or
 3. Demonstrate to the Department that the continued flow through the seep after the repair meets published TN water quality criteria, (and continues to meet WQC from assessments conducted at least quarterly) or,
 4. Request a modification to the NPDES permit for an additional permitted outfall comprised of the continued flow from the seep.

G. DIKE INSPECTIONS FOR WASTEWATER IMPOUNDMENTS

Dike inspection requirements for wastewater impoundments are not retained in the renewed permit. These requirements were previously included to assess the structural stability of ash impoundments in accordance with TVA's Reservoir Operations Dam Safety Program.

Following dewatering and closure of the Stilling Pond, the only wastewater basins that remain at KIF are the two Process Water Ponds – one at Outfall 001 and one at IMP 01A serving the Gypsum processing and dewatering facility on the peninsula.

Depth of water in these ponds is approximately 4-5 feet, and, thus Dam Safety inspection provisions for structural stability are not applicable.¹² The conduct of routine dike inspections of these ponds will fall under permit requirements of proper operation and maintenance for wastewater treatment facilities (Rule 0400-40-05.07(2)), and is not a separate narrative requirement in the permit renewal.

H. COMPLIANCE WITH CWA SECTION 316

1. Section 316a Thermal Variance for Outfall 002

Outfall 002 is subject to compliance with certain Tennessee Water Quality Standards (the "TN Standards") for temperature. Section 0400-40-.03 of the TN Standards provides that heated water discharges shall not cause the maximum receiving water temperature to exceed 3°C relative to an upstream control point nor to exceed 30.5°C. This section also provides that the maximum rate of water temperature change shall not exceed 2°C per hour. .

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

In previous NPDES permits, TVA has provided information to support its request that a daily maximum condenser cooling water discharge temperature limitation of 36.1°C (97°F) be allowed under Section 316(a) of the Act. Since EPA issued it in 1976, NPDES permits have allowed alternative limitations on the thermal component of the facilities' condenser cooling water discharge and required that data be presented that ensures protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the Watts Bar Reservoir of the Tennessee, Clinch, and Emory Rivers.

TVA submitted biological monitoring data from Fall, 2015 as part of the application for NPDES permit renewal¹³. This report is available for viewing online at the DWR Permits Dataviewer http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34001.

¹² TN Safe Dams Rule 0400-45-07: impoundments of less than six (6) feet in depth of storage capacity of less than 15 acre-feet shall not be considered a dam.

¹³ TVA, *Biological Monitoring of the Clinch River Near Kingston Fossil Plant Discharge, Autumn 2015*, prepared by TVA River and Reservoir Compliance Monitoring, May 2016.

Biological monitoring data for the sites upstream and downstream of KIF were similar and within the acceptable range of variation such that these data met requirements of a balanced indigenous population. Based on the above factors and information, a determination has been made that continuation of the 316(a) variance, with an alternative thermal limit of 36.1°C is appropriate in the reissuance of this permit.

2. Section 316b - Cooling Water Intake Structure

a) Background

The section 316(b) Existing Facility Final Rule applies to the TVA-KIF cooling water intake structure which withdraws water from the Emory and Clinch Rivers. Since the facility meets the conditions specified below (from 40 CFR 125.91), it is subject to the rule.

The rule applies to owners and operators of existing facilities that meet all of the following criteria:

- The facility is a point source;
- The facility uses or proposes to use one or more cooling water intake structures with a cumulative design intake flow (DIF) of greater than 2 mgd to withdraw water from waters of Tennessee; and,
- Twenty-five percent or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes.

Generally, facilities that meet these criteria fall into two major groups: steam electric generating facilities and manufacturing facilities. The rule establishes national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that reflect the best technology available for minimizing the adverse environmental impact - impingement and entrainment – associated with the use of these structures. The rule requires several types of information collection as part of the NPDES permit application. In general, the information would be used to identify both how the facility plans to meet the rule requirements and if the facility is already meeting the rule requirements.

b) Specific data requirements with next permit application

Per 40 CFR 125.95(a)(2), the renewed permit establishes the following specific data requirements. Submission dates are discussed below.

- **Source water physical data** which shows the physical configuration of all source waterbodies used by the facility, identifies and characterizes the source waterbody's hydrological and geomorphological features, and provides location through maps §122.21(r)(2).
- **Cooling water intake structure data** which shows the configuration and location of cooling water intake structures, provides details on the design and operation of each cooling water intake structure, and diagrams showing flow distribution and water balance § 122.21(r)(3)1.
- **Source water baseline biological characterization data** that characterizes the biological community in the vicinity of the cooling water intake structure (CWIS) and characterizes the operation of the CWIS § 122.21(r)(4)1.

- **Cooling water system data** that, among other things, describes the operation of the cooling water system, its relationship to the CWIS, the proportion of the design intake flow used in the system, the number of days the cooling water system is operational and seasonal changes in operation, as well as design and engineering calculations to support these descriptions § 122.21(r)(5).
- Information that describes the facility's chosen **method of compliance with impingement mortality standards**; the specific requirements vary, depending on the compliance approach chosen by the facility. This information would be reflected in the facility's Impingement Technology Performance Optimization Study § 122.21 (r)(6).
- Description of any existing **entrainment performance studies** of biological survival conducted at the facility and a summary of any conclusions or results §122.21(r)(7).
- **Operational status** data that describes the operational status of each generating, production, or process unit §122.21(r)(8).
- An **entrainment characterization study** including data collection method, biological entrainment characterization, and analysis and supporting documentation per § 122.21 (r)(9) that has been peer reviewed per § 122.21 (r)(13).
- **Comprehensive Technical Feasibility and Cost Evaluation Study** of technical feasibility of closed-cycle cooling, fine mesh screens, and water reuse or alternate sources of cooling water; evaluation of entrainment control technologies; and cost evaluations per § 122.21 (r)(10).
- **Benefits Valuation Study** of candidate technologies and operations measures, basis for monetized values and discussion of mitigation per § 122.21 (r)(11).
- **Non-WQ Environmental and Other Impacts Study** addressing energy consumption, emissions levels, water consumptions, etc. per § 122.21 (r)(12).

c) Submission Dates

Based on the number and complexity of the studies, reports, and peer reviews to be conducted and the time needed to complete such efforts, this renewed permit establishes an alternate schedule for submittal of information specified in § 122.21 (r)(2) through § 122.21 (r)(13) no later than 180 days prior to the expiration date. Accordingly, the permit duration will include the full five year term to enable sufficient time to complete these requirements.

d) Best Professional Judgment analysis

Since November 10, 1977¹⁴, a determination was also made in accordance with Section 316(b) of the Act that the location, design, construction, and capacity of the facility's cooling water intake structure reflects the best technology available for minimizing adverse environmental impacts. That determination was based on the results of impingement and entrainment studies conducted by TVA during 1974 and 1975, and in subsequent permit rationale's prepared by the State of TN, the biological data has maintained that conclusion.

Based on information provided in the 2016 permit application and 40 CFR 125.98(b)(2)(ii)(6), the Division has determined that TVA-KIF condenser cooling water intake structure continues to reflect the best technology available, and no required changes to the intake are proposed at this time.

X. ELECTRONIC REPORTING

EPA published the National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, which modernized Clean Water Act reporting for municipalities, industries and other facilities. The rule was published in the Federal Register on October 22, 2015 and became effective on December 22, 2015. The rule replaced most paper-based NPDES reporting requirements with electronic reporting.

¹³ EPAR4 issued TVA fossil permits until TN was delegated authority to permit federal facilities in September 1986.

Since 2016, TVA-KIF has been submitting Discharge Monitoring Reports (DMRs) electronically through NetDMR.

XI. ANTIDEGRADATION

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.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 segment identified by the division as segment ID#:TN06010207001_0100. The division has assessed the Watts Bar Reservoir/Clinch River arm and found the receiving stream to be neither an exceptional nor outstanding national resource water.

Unavailable Conditions Waters (assessed as needing additional pollution controls)

Additionally, this portion of the Clinch River does not fully support designated recreational uses due to elevated concentrations in fish tissue of PCBs, mercury, and chlordane. Elevated levels of mercury in fish tissue have been historically related to upstream discharges from USDOE facilities on the Oak Ridge Reservation. TVA discharges of mercury in FGD wastewaters are discussed above. However, effects on fish tissue from these dual sources has not been specifically defined.

TVA discharges do not contain PCBs or chlordane; these pollutants also originate from upstream sources. The division, therefore, considers the potential for degradation to the receiving stream from permitted discharges to be negligible.

TMDLs have been developed and approved for the Lower Clinch watershed on the following parameters and dates:

<u>Parameter</u>	<u>TMDL Approval Date</u>
Pathogens	11/29/2005
Siltation and habitat alteration	03/29/2006
PCBs	03/18/2010
Melton Hill Reservoir - TMDL for chlordane and PCBs 08/09/2010	

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

XII. PERMIT DURATION

This permit expires in five years from the effective date. This time period is authorized to enable the permittee to compile required data and prepare required 122r reports and to complete projects required to attain compliance with ELGs identified in the Schedule of Compliance.

APPENDIX 1 - PROCEDURES FOR WATER-QUALITY-BASED LIMITS USING REASONABLE POTENTIAL CALCULATIONS (Feb. 2017)

The following procedure is used to calculate the allowable instream concentrations for permit limitations.

- a. The most recent background conditions of the receiving stream segment are compiled. This information includes:
 - * 1Q10 of receiving stream (654 MGD)
 - * Calcium hardness (25 mg/l, default)
 - * Total suspended solids (10 mg/l, default)
 - * Background metals concentrations (from plant intake data)
- b. The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.
- c. The acute water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel, zinc and silver. 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 and silver.
- d. The resulting allowable trivalent and hexavalent chromium concentrations are compared with the effluent values characterized as total chromium on permit applications. If reported total chromium exceeds an allowable trivalent or hexavalent chromium value, then the calculated value will be applied in the permit for that form of chromium unless additional effluent characterization is received to demonstrate reasonable potential does not exist to violate the applicable state water quality criteria for chromium.
- e. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of no more than 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:

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

is the percent "Stream Allocation".

Calculations for this permit have been done using a standardized spreadsheet, 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 TVA data from River Operations. Because the low flow values involve regulated flow conditions, the minimum flow value on a 1Q10 basis is used to calculate both Fish and Aquatic Life Protection and Recreation compliance.
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 value from plant intake data and Total Suspended Solids (TSS) of 10 mg/L. The minimum limit on the TSS value used for water quality calculations is 10 mg/L.
4. Background concentrations are determined from TVA measurements of raw water quality taken at the fossil plant intake. 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. 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 fifteen (15) 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 pollutants found in the effluent.

Column 2: The "Chronic" Fish and Aquatic Life Water Quality criteria. For cadmium, copper, trivalent chromium, 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:

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

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.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 criterion 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, trivalent chromium, 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:

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

Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.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. 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:

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

s = 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 calculated chronic water quality effluent concentrations from Column 7 should be compared, individually, to the values calculated in Columns 12, 13, and 14 in order to determine the most stringent chronic permit limitations. The calculated acute water quality effluent concentrations from Column 8 should then be compared, individually, to values equal to two (2) times the values presented in Columns 12, 13, and 14 in order to determine the most stringent acute permit limitations. These water quality based limits should then be compared to any technology based (CFR or Tennessee "Rules") effluent limitations, and/or any previous permit limitations, for final determination of the permit limits.

APPENDIX 2 - PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

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

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

PERMIT LIMITS

OUTFALL 002

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		Daily	Pump logs
pH ²	Range 6.0 to 9.0				1/Week	Grab
TEMPERATURE, Intake	--		Report		Continuous ³	Recorder
TEMPERATURE, Effluent	--		36.1°C (97.0°F)		Daily	Calculate ³
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁴	0.038	--	0.066	--	1/Week	Grab ⁶
TOTAL RESIDUAL OXIDANT (reported as chlorine) ⁵	0.011	--	0.019	--	1/Week	Grab ⁶
TIME OF OXIDANT ADDITION (minutes/day/unit)	--		120 ⁷		1/Day	Log Records
IC25	Survival, Reproduction, & Growth in 100% Effluent				See note 8	Composite ⁸

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

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

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

4 The limits depicted are applicable at flows of 654 MGD, and above, from Outfall 002. Only one (1) unit, with a flow rate of 187 MGD is allowed to be chlorinated at one time.

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

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

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

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

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

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

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

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

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

APPENDIX 3 – TVA Kingston ELG Applicability Date Proposal



Tennessee Valley Authority, 1101 Market Street, BR 4A, Chattanooga, Tennessee 37402-2801

October 2, 2017

Mr. Vojin Janjić
Division of Water Resources
Tennessee Department of Environment
and Conservation (TDEC)
William R. Snodgrass TN Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Dear Mr. Janjić:

TENNESSEE VALLEY AUTHORITY (TVA) – KINGSTON FOSSIL PLANT (KIF) – NPDES
PERMIT NO. TN0005452 – STEAM ELECTRIC EFFLUENT LIMITATION GUIDELINES (ELG)
APPLICABILITY DATE PROPOSAL

Please find enclosed TVA's proposed schedule and information to support development of
applicability dates under steam electric power generating point source category effluent
limitation guidelines.

If you have questions or need additional information, please contact Brad Love at
423-751-8518 or by email at bmlove@tva.gov.

Sincerely,

A handwritten signature in cursive script, reading "Michael B. Stifle".

Dr. Terry E. Cheek
Senior Manager
Water Permits, Compliance, and Monitoring

Enclosure

cc: Tennessee Department of Environment
and Conservation
Knoxville Environmental Field Office
Attn: Mr. Michael Atchley
3711 Middlebrook Pike
Knoxville, Tennessee 37921

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Tennessee Valley Authority (TVA) - Kingston Fossil Plant Proposed

Schedule and Information to Support Development of
Applicability Dates under Steam Electric Power Generating Point Source Category
Effluent Limitations Guidelines (ELGs)

EPA promulgated revised ELGs in 2015 for the steam electric power generating point source category.¹ The rule provides that the limits set for each wastestream will be applied to individual dischargers in the next NPDES permit issued after the rule's effective date of January 4, 2016. However, the specific applicability dates vary among different wastestreams:

- Limits on certain wastestreams, such as coal yard runoff, low volume wastes, and metal cleaning wastes, were unchanged in the revised ELGs and are currently applicable.
- Limits on combustion residual leachate will apply on the date of issuance of the next NPDES permit.²
- New, more stringent limits under the revised ELG requiring no discharge of fly ash transport waters will be applied to dischargers on a date to be set by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023.³ The rule provides that discharges of this wastestream before the chosen applicability date should be subject to limitations based on the previously promulgated BPT limitations or the plant's other applicable permit limitations (e.g., any water quality-based effluent limitations) until at least November 1, 2018, or later if dictated by the selected applicability date.⁴ In this interim time period until the selected applicability date, the rule also prescribes BAT limits on total suspended solids (TSS).⁵
- Due to a recent postponement rulemaking by EPA, new, more stringent limits under the revised ELG requiring no discharge of bottom ash transport waters (sometimes hereinafter, BATW), with few exceptions, will be applied to dischargers on a date to be set by the permitting authority that is as soon as possible beginning November 1, 2020, but no later than December 31, 2023.⁶ The rule provides that discharges of this wastestream before the chosen applicability date should be subject to limitations based on the previously promulgated BPT limitations or the plant's other applicable permit limitations (e.g., any water quality-based effluent limitations) until at least November 1, 2020, or later if dictated by the selected applicability date.⁷ In this interim time period until the selected applicability date, the rule also prescribes BAT limits on total suspended solids (TSS).⁸

¹ 80 Fed. Reg. 67,838 (Nov. 3, 2015).

² 80 Fed. Reg. at 67,882.

³ *Id.*

⁴ 80 Fed. Reg. at 67,883; see 40 C.F.R. § 423.12(b)(4).

⁵ 40 C.F.R. § 423.13(h)(1)(ii).

⁶ 82 Fed. Reg. 43,494 (Sept. 28, 2017).

⁷ 80 Fed. Reg. at 67,883; see 40 C.F.R. § 423.12(b)(4).

⁸ 40 C.F.R. § 423.13(k)(1)(ii).

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- Due to a recent postponement rulemaking by EPA, the new, more stringent limits under the revised ELG for wet flue gas desulfurization (FGD) wastewaters will be applied to dischargers on a date to be set by the permitting authority that is as soon as possible beginning November 1, 2020, but no later than December 31, 2023.⁹ The rule provides that discharges of this wastestream before the chosen applicability date should be subject to limitations based on the previously promulgated BPT limitations or the plant's other applicable permit limitations (e.g., any water quality-based effluent limitations) until at least November 1, 2020, or later if dictated by the selected applicability date.¹⁰ In this interim time period until the selected applicability date, the rule also prescribes BAT limits on total suspended solids (TSS).¹¹

TVA's Kingston Fossil Plant (KIF) is subject to the ELGs and the new limits for wet FGD wastewaters and fly ash and bottom ash transport waters. Other limitations such as those for low volume wastes, metal cleaning wastes, and combustion residual leachate also apply.

Under the revised ELG rule, the Tennessee Department of Environment and Conservation (TDEC) must set in the next renewal NPDES permit issued for the KIF facility stream-by-stream applicability dates for the identified limits on wet FGD wastewaters, fly ash transport waters, and bottom ash transport waters. As noted above, these applicability dates must be "as soon as possible beginning November 1, 2018, but no later than December 31, 2023" for fly ash transport waters and "as soon as possible beginning November 1, 2020, but no later than December 31, 2023" for bottom ash transport waters and FGD wastewaters.¹² The rule defines "as soon as possible" to mean November 1, 2018, for fly ash transport waters and November 1, 2020, for bottom ash transport waters and FGD wastewaters, unless TDEC establishes a later date, after receiving information from TVA, which reflects consideration of the following factors:

- Time to expeditiously plan (including to raise capital), design, procure, and install equipment to comply with the ELG;
- Changes being made or planned at the plant in response to emission guidelines for greenhouse gases from existing fossil-fueled electric generating units (i.e., the Clean Power Plan) or regulations that address the disposal of coal combustion residuals (CCR) as solid waste (i.e., the CCR Rule);
- For FGD wastewater requirements, an initial commissioning period for the treatment system to optimize the installed equipment; and
- Other appropriate factors.¹³

This document discusses the factors relevant to TVA and specifically applicable to the KIF facility that are intended to inform TDEC's determination of appropriate applicability dates for wet FGD wastewaters and fly ash and bottom ash transport waters at KIF to be implemented via the renewed NPDES permit. TVA is proposing applicability dates herein that reflect the complexity of the various projects and the potential issues that could hamper imposition of earlier dates.

⁹ 82 Fed. Reg. 43,494 (Sept. 28, 2017).

¹⁰ 80 Fed. Reg. at 67,883; 40 C.F.R. § 423.12(b)(11).

¹¹ 40 C.F.R. § 423.13(g)(1)(ii).

¹² 40 C.F.R. §§ 423.13(g)(1)(i), (h)(1)(i), (k)(1)(i) (as amended by 82 Fed. Reg. 43,494).

¹³ 40 C.F.R. § 423.11(i) (as amended by 82 Fed. Reg. 43,494).

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In setting applicability dates, it is also relevant to consider EPA's statements in its postponement rule related to implementation dates for the new, more stringent limits associated with BATW and FGD wastewaters. In that rulemaking, EPA stated that delaying the "as soon as possible" implementation date for these wastewater streams until November 1, 2020, at the earliest is intended to "prevent the potentially needless expenditure of resources during a rulemaking that may ultimately change the 2015 Rule in these respects."¹⁴ EPA acknowledged that some planning and capital expenditures may occur associated with activities undertaken in the near-term (e.g., engineering design, equipment acquisition, shipping, site preparation) that ultimately might not be necessary as a result of the reconsideration.¹⁵ However, EPA's intention expressed in the rulemaking is to "preserve the regulatory status quo" for these wastestreams "until the new rulemaking is complete" and not require utilities to expend more significant capital costs in the near-term that may ultimately be unnecessary as a result of EPA's reconsideration of the 2015 ELG Rule.

TVA uses a three-phase project process: Phase 1 is the study phase, Phase 2 is the design phase, and Phase 3 is the construction/implementation phase. Further details on the activities occurring in each phase are described below for the various wastewater streams.

I. TVA Fleet-wide Considerations & Early Activities

TVA initiated work to implement the ELGs on several fronts including initiating a Phase I study at a coal-fired site in Kentucky prior to the publication of the final ELGs in November 2015. TVA began the contracting process with wastewater treatment (WWT) engineering and design vendors for the other five remaining TVA coal-fired sites in late 2015 once the new ELGs were published. After preparing the workscopes for these sites, TVA then sent out requests for proposals (RFPs) for WWT engineering services in January 2016.

Other early work that TVA has been engaged in for ELG compliance has pertained to technology evaluations, initial wastewater characterization, and other preliminary engineering work. Technology assessments have focused primarily on selenium removal in wet FGD wastewater and have occurred mostly through active participation in projects conducted by the Electric Power Research Institute (EPRI) such as:

- Funding EPRI studies of GE ABMET efficacy for selenium treatment at a Powder River Basin coal-fired site;
- TVA-funded project for bench-scale testing Liberty Hydro (biological alternative treatment) for selenium removal at TVA's Paradise Fossil Plant in Kentucky;
- EPRI project to assess the existing physical-chemical WWT facilities at TVA's Kingston Fossil Plant for mercury and arsenic removal;
- Follow-on EPRI project at Kingston to evaluate biological treatment for selenium (in addition to installing a chemical precipitation pilot);

¹⁴ 82 Fed. Reg. at 43,496.

¹⁵ *Id.* at 43,497.

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- Participation in EPRI sampling project to assess water quality for bottom ash transport water at TVA's Bull Run Fossil Plant to determine suitability for wet FGD makeup;
- Participation in an EPRI sponsored test to evaluate a sulfite sensor to improve wet FGD process control at TVA's Cumberland Fossil Plant; and
- Participation in EPRI sponsored testing for changes in wet FGD wastewater due to the Mercury and Air Toxics Standards rule.

In order to meet the limits in the 2015 ELGs, TVA must evaluate and implement new WWT projects for several wastewaters at six coal sites planned to remain active, including KIF. The capital and operations and maintenance (O&M) expenditures for new WWT will be considerable.

There also will be a large number of WWT projects that will occur at approximately the same time as CCR Rule-related projects; these activities require careful coordination at the affected sites to ensure that one project's decisions do not adversely affect another project's outcome. Another factor for consideration in the development of these applicability dates is that, with the amount of industrial construction occurring on a near-simultaneous basis in the U.S. for various environmental projects, there is likely to be a significant shortage of skilled trades and labor craftsmen.

TVA is facing a fairly severe economic climate for fiscal year 2018 (FY18) that begins October 1, 2017, such that there is a need to defer certain projects in order to address these economic conditions and to accommodate the sheer number of ongoing projects at TVA. During FY18, there will be approximately 70 projects in the TVA Civil Projects group alone which include landfill development, pond closures, gypsum dewatering and continuation of progress in wet FGD wastewater treatment, etc. Additionally, TVA has made significant investments in new gas and renewables generation. There was also a major effort related to the February 2017 event at Cumberland in which there was a collapse of a coal storage silo; personnel were required to inspect 21 coal storage silos at Cumberland and silos of similar construction at Paradise Fossil Plant in Kentucky that resulted in extended outage durations at those sites. In addition to these known issues, there is still substantive and temporal uncertainty around implementation of the CCR Rule and Commissioner's Order OGC15-0177, including determining acceptable closure methodology and other corrective measures that will be implemented for closure of TVA's surface impoundments. TVA's capital spend plan would be drastically affected by implementation of closure-by-removal methodologies, which are much lengthier and costlier project approaches. TVA is also mindful of the difficulties associated with operation of the complex WWT technology required under the ELGs. (See "FirstEnergy Corp. has indefinitely shut down two of its three power generating units at Bruce Mansfield Power Station after encountering problems with its \$200 million dewatering facility.")

In proposing these applicability dates for KIF's wastestreams, TVA has carefully considered the significant capital requirements and associated annual cash flows. TVA's expansive project portfolio, including CCR pond closures and our commitment to conversion to dry CCR disposal, makes properly planning cash flows critical to fulfilling

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TVA's mission and keeping electric rates low. The ELGs allow consideration of this factor, which is a capital raising issue.¹⁶

The proposed applicability dates would allow TVA to conduct some design and construction activities associated with wet FGD WWT for selenium (i.e., biological or biological alternative treatment) in later fiscal years. At KIF, there are currently solids removal clarifiers to which some treatment chemicals are added. More near-term projects include optimization of the chemical feed systems to better address feed rates as well as further promoting redundancy. For the no discharge of bottom ash transport water limit/requirement, the proposed applicability date reflects the construction of the water recirculation portion of bottom ash transport water WWT projects in later fiscal years. TVA is committed to proceeding with the dewatering projects for bottom ash at KIF which is already in progress, allowing TVA to complete conversion to dry disposal of CCRs at KIF in 2018.

In addition, as work has progressed on wet FGD wastewater treatment and bottom ash dewatering studies, it has become more apparent that there are also new developments and technical issues to resolve in order to reliably meet the new ELGs for wet FGD WWT and no discharge of BATW. For example, more time is needed to resolve issues such as those presented in the study by EPRI published after the revised ELGs were finalized that indicated that Powder River Basin (PRB) coal is not amenable to biological treatment to achieve the 2015 ELGs. KIF is currently burning a blend of Illinois Basin and PRB coal, so the concerns raised by the EPRI report are relevant. Another critical technical issue to resolve, which EPRI is currently investigating, is instream process monitoring. Unfortunately, there are not yet robust, reliable methods to measure selenium and other constituents for process control to ensure that discharge concentrations will be in compliance with 2015 ELGs.

In a positive development, testing of the sulfite analyzer at Cumberland was shown to be very successful in mitigating oxidation of selenium to selenate. TVA is completing a Phase 1 study on installing the analyzers for process control at Cumberland. TVA recently began a project to evaluate the feasibility of using sulfite analyzers in the KIF FGD to improve FGD process control to improve efficacy of selenium treatment. Unfortunately, TVA was unable to complete this project, as described below, so additional analysis will be required for KIF.

In addition to the wet FGD WWT issues, there is uncertainty about the cycling up of constituents and the quantity of blowdown required to maintain cycle chemistry in the bottom ash transport no discharge loop. There are also concerns about whether the bottom ash transport water can be reused for wet FGD makeup since this may cause issues with wet FGD operation or wet FGD wastewater treatment. The other pre-approved use for bottom ash transport water blowdown is for ash conditioning. However, when fly ash is marketed for reuse, it is not typically wetted, and this is the case at KIF. Therefore, the amount of BATW needed to be blown down may exceed the amount needed for approved uses at KIF. It is not expected that wet FGD makeup will consume all amounts of bottom ash blowdown so advanced bottom ash WWT may be required in order to meet a no discharge requirement.

¹⁶ 40 C.F.R. § 423.11(t)(1).

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TVA is also somewhat unique compared to investor-owned utilities in that, as a federal agency, it is subject to the National Environmental Policy Act (NEPA). The Endangered Species Act and the National Historic Preservation Act also include sections with federal agency-specific requirements. TVA is planning to conduct much of the required environmental review under these statutes simultaneously with the detailed design stage (Phase 2) of WWT; however, projects can be subject to delays presented by the environmental review process itself or as a result of required mitigation that results from that process. For example, types of delays that can occur include avoiding construction during certain periods to protect threatened or endangered species such as bats or bird species. For this reason, TVA has included appropriate schedule contingency in each of the WWT facility project schedules to address potential delays due to environmental reviews or other construction delays, the specifics of which cannot be reasonably foreseen at this time.

II. Wastewater Treatment Facilities at Kingston

The types of wastewaters requiring new treatment or handling facilities for compliance with the 2015 ELGs, pending EPA's reconsideration and possible revision, include additional wet FGD wastewater treatment and completion of the conversion to a no discharge of bottom ash transport water system (while still allowing the limited exceptions provided for by EPA for FGD makeup and fly ash conditioning).

TVA has contracts with engineering firm(s) to establish workable preliminary conceptual schedules, costs, etc. to support proposed ELG applicability dates for the various wastewaters at KIF. Based on these preliminary schedules and TVA's assessment of other relevant factors such as environmental review requirements, appropriate minimum proof-of-concept testing schedules for wet FGD wastewaters as well as preferred overlapping test periods for vendors, TVA's proposed applicability dates and the associated justifications are presented below.

A. Wet FGD Scrubber Wastewaters

EPA determined that the best available technology (BAT) for treatment of wet FGD wastewater is chemical precipitation followed by biological treatment. New ELGs for wet FGD wastewater were established for arsenic, mercury, selenium, and nitrate/nitrite based on these basis technologies. (EPA does not, however, regulate the type of equipment required to be used to comply with ELGs.)

Kingston operates a once-through, high-flow wet FGD scrubber. The existing materials of construction in the KIF FGD limit the ability to recycle flow back to the scrubber absorber, which would reduce the overall volume of wastewater to be treated. The materials of construction are not resistant to chlorides which can concentrate in wet FGDs when water is recycled and cause accelerated corrosion. TVA considered recycling a portion of wet FGD blowdown up to the recommended maximum chlorides concentration for the materials of construction limitations or relining the FGD equipment with corrosion resistant materials in order to significantly reduce the volume of wastewater to treat. However, recycling increases the dissolved constituents and increases wastewater

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treatment complexity. The increase in dissolved constituents may inhibit the removal of the target metals regulated by the ELGs. Considerable effort will be required to determine the optimum holistic approach for wet FGD WWT at each wet-scrubbed site; respective advantages and disadvantages will be evaluated in Phase 1 (Study). Based on the evaluation of factors involved at KIF including impacts to gypsum marketability, TVA has decided to proceed with WWT without FGD recycle in order to avoid potential corrosion issues and WWT complexity.

Gypsum dewatering is a necessary first step for wet FGD WWT in order to separate the bulk of the wet FGD solids from this wastestream. KIF currently operates gypsum dewatering and some limited chemical precipitation WWT equipment. The chemical precipitation equipment at the gypsum dewatering plant was originally designed for TSS, oil and grease, and pH limitations that were in the previous steam electric ELGs and to support the dry disposal of wet FGD CCRs. TVA has evaluated the physical-chemical equipment performance at KIF and the targeted monthly average mercury concentration under the 2015 ELGs was not successfully met during that testing. During Phase I (Study), TVA will continue to evaluate the capabilities of the existing chemical precipitation equipment at KIF in achieving the ELGs for mercury and arsenic and for preparing the wastewater for advanced treatment using biological or biological alternative treatment for selenium and nitrate-nitrite.

There are significant concerns about the ability to reliably meet the ELGs for any site; thus TVA will continue to evaluate wet FGD WWT technology options along with the rest of the industry, particularly for selenium. Biological treatment for selenium is not as well-established as chemical precipitation as there are far fewer installations. Extensive site-specific proof-of-concept testing for selenium treatment is vital in making the best WWT decision at KIF in order to comply with very stringent wet FGD ELGs. Proof-of-concept testing for selenium WWT technologies is planned to occur during Phase 2 (Design). TVA, many other utilities, and various WWT engineering providers suggest active testing for each technology that spans a period of at least six months. This allows evaluation to occur over various operational conditions and seasons. It is also preferable to conduct side-by-side testing of various technologies to expose them to identical operating conditions in order to gauge their relative merits. In addition, the proof-of-concept testing must occur at each wet FGD site; one site's results cannot reliably be applied to another site. TVA has seen ample evidence of the unique properties of each wet FGD wastewater. This variability among sites can be due to the type of coals burned/blended, source water and limestone constituent contributions, and overall operational variability. Operational variability can be driven by how the generation units are dispatched (i.e., when and how operated) as well as the operational specifics for each wet FGD, such as the oxygen feed rates, blowdown frequencies, etc. (In fact, FGD operation can be vastly different between absorbers at the same plant due to the particular chemistry found in each absorber, even when the flue gas from all units enters a common exhaust duct and is then split between multiple FGD absorbers.)

Selenium and nitrate/nitrite removal pilot-scale units are likely to be in high demand by the industry. The supply of pilot units is likely to be woefully inadequate, which could potentially cause delays in completing planned proof-of-concept testing and completion of Phase 2 design. The desired side-by-side testing also can be problematic with limited pilot-scale unit availability, so there is additional time built into the schedule to accommodate side-by-side testing for at least part of the time.

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EPA also recognizes the need to allow time to optimize, tune, test, and adapt wet FGD WWT to

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ensure compliance with ELGs after installation of the WWT equipment in Phase 3 (Construct).¹⁷ TVA

believes this optimization step is warranted and has allocated a minimum of eight months in Phase 3 for testing and optimization in order to allow sufficient time to troubleshoot and retrofit with additional treatment as necessary.

Existing planned outage schedules must be taken into account when determining the ELG applicability date so that equipment tie-ins can occur during planned outages where feasible. Using planned outages versus requiring additional/special outages for tying in equipment ensures operations occur

according to the generation plan which helps maintain electric grid reliability. Consideration of this factor is allowed by and planned for in the ELGs.

Detailed below are the various activities that are expected to occur during each phase of the FGD WWT project and reasonably foreseeable potential difficulties that may impact project schedule.

The task descriptions below include

some actions that are in progress.

Project Phase 1 (Study)-

Approximately 22 months

Projected Activities: Develop approximate WWT footprint for additional treatment required and preliminary general arrangements, and propose and evaluate alternative treatment approaches and locations, including considerations of impacts presented in the EPRI reporting on PRB coals and WWT treatability using biological treatment. Evaluate feasibility of sulfite analyzer in FGD absorber to improve FGD process control that may impact WWT efficacy. Conduct siting and geotechnical studies for proposed sites as needed to ensure constructability. Develop performance specifications, conceptual budgets and refined schedules. Perform characterization of wet FGD wastewaters and conduct bench/treatability testing. Determine if existing physical-chemical treatment upgrades are needed or if additional secondary treatment for selenium and nitrate/nitrite will address deficiencies in physical-chemical treatment for arsenic and mercury. Conduct characterization of bottom ash transport water and determine suitability of bottom ash transport water for FGD makeup as part of the FGD WWT design group activities. Develop project planning document. Develop Request for Proposal (RFP) documents and initiate RFP process and evaluations to proceed to Phases 2 and 3. Obtain TVA Board approval for project.

Potential Schedule Issues: Delays in the RFP processes (i.e., required extensions, scope clarifications, best and final pricing requests, and contract negotiations) or other delays.

¹⁷ 40 C.F.R. § 423.11(1)(3).

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Project Phase 2 (Design, Proof-of-Concept Testing, and Long Lead Items)- Approximately 35 months

Projected Activities: Develop detailed design drawings/documents including power needs study for WWT. Conduct proof of concept testing for both physical- chemical treatment upgrades as well as biological treatment for wet FGD wastewater for a minimum of 6 months active testing with side-by-side evaluations of technologies. Allow for additional considerations for piloting systems for Powder River Basin (PRB) coal blend wastewater. If determined feasible and results in improved wet FGD process control, complete design for sulfite analyzer. (Note: sulfite analyzer testing was started but not completed during Phase 1 for this project because it was determined that sufficient turndown of oxidation air to the scrubber absorber was not possible; additional work will be needed for confirmatory testing of the sulfite analyzer at KIF during Phase 2.) Complete required environmental reviews (NEPA) and obtain construction stormwater and 404/401/other permits. Initiate the WWT plans approval process with TDEC after 90% design documents have been developed.

Potential Schedule Issues: Challenges to TVA's NEPA documents or permits. Delays in obtaining proof-of-concept equipment from vendors due to high demand. Failure of or difficulties with biological and/or other pilot systems to adequately address PRB-blend discharges. Scarcity or supplier bottlenecks for WWT equipment to be purchased as long lead item procurement could delay completion of Phase II and initiation/completion of Phase 3 (construction).

Project Phase 3 (Construct, Test, Train)-Approximately 38 months

Projected Activities: Wet FGD WWT site preparation and construction including planning for weather delays for construction, establishment of construction stormwater best management practices, installation of wet FGD WWT equipment, piping, power, controls. Start-up of WWT equipment, debugging of processes/controls/software. If test and design are successful for installation of the sulfite analyzer, install analyzers and reprogram controls. Testing and optimization of wet FGD WWT equipment; installation of additional/alternative treatment if necessary. Train operators; troubleshoot and respond to equipment design or reliability issues.

Potential Schedule Issues: Site construction delays due to weather, environmental related issues (e.g., potential "no construction" periods for bird and bat protection). Plant integration of controls, power, piping, etc., and dependence upon planned outages. Potential additional WWT testing due to PRB coal blend.

Proposed Applicability Date for Wet FGD Wastewater ELGs: December 1, 2023

B. Dry Fly Ash System

EPA's ELGs established a no-discharge standard for fly ash transport water for existing plants. KIF currently does not discharge fly ash transport water as defined by the ELGs. The dry fly ash handling system was upgraded in recent years to eliminate the possibility

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of wet sluicing the fly ash as a backup transport mechanism. This was accomplished in support of TVA's effort to eliminate wet disposal of CCRs. KIF has achieved compliance with the no-discharge standard for fly ash transport water. In accordance with the ELGs, the default applicability date for no discharge of fly ash transport water should be established as November 1, 2018.

C. Bottom Ash Transport Water Upgrades

The 2015 ELGs established a no-discharge standard for bottom ash transport water. EPA determined that BAT for this wastestream is a dry handling or a closed-loop system that recycles flow from the dewatering process.

For KIF, TVA installed an interim tank-based bottom ash dewatering system in order to eliminate the wet disposal of this CCR. This system was completed in early fall of 2015; however, it is not currently a no-discharge system and is planned to be replaced. TVA is currently installing a remote submerged flight conveyor system and will design and build the recirculation portion separately. TVA has separated the activities necessary to achieve the no-discharge standard into separate projects in order to balance project workload. These projects are separated into field activities for the construction of a dewatering facility and plant tie-ins to accommodate the recirculation/no discharge aspect. Both the dewatering and the recirculation pieces must be in place in order to achieve the no-discharge requirement of the ELGs.

EPA does allow certain uses for bottom ash transport water such as FGD makeup water and fly ash conditioning to prevent dusting. As part of completing the design to make the BATW system a no-discharge system, TVA will determine whether all flows could be used solely for bottom ash transport, or whether a portion of that water would have to be blown down and would be suitable for FGD makeup water or fly ash conditioning or other no discharge application as allowed by EPA. This determination will involve evaluating flows and characterizing chemical constituents to ensure that operational problems or system damage does not occur. Such problems could result from characteristics of the bottom ash transport water such as fines that could erode pipes or equipment or from chemical constituents that could interfere with scrubber operations or that could prevent gypsum crystals from forming. Another issue is that fly ash may not be wetted if it is marketed for reuse in cement; this eliminates fly ash conditioning as a potential "sink" for bottom ash transport blowdown. KIF currently markets its fly ash; therefore, bottom ash blowdown "disposal" as fly ash conditioning is not currently an option. After characterizing the bottom ash transport water, TVA will be able to determine the best reuse option.

Further evaluation is necessary at KIF since economizer ash is combined with the bottom ash stream. While this is permitted under the ELGs, it may make the bottom ash transport cycle chemistry more complex by introducing constituents that are prone to concentrate and are not amenable to primary treatment, which could cause issues with BATW system corrosion, etc. This issue combined with the potential lack of sufficient "sinks" for the blowdown may require advanced wastewater treatment (e.g., thermal evaporation or reverse osmosis or other volume reduction) or no discharge application in order to eliminate discharge of bottom ash transport waters. TVA will evaluate economizer ash inclusion to determine if projects to segregate handling of these

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materials from bottom ash should be initiated. TVA needs sufficient time to determine the impacts of inclusion of economizer ash.

Existing planned outage schedules must be taken into account when determining the applicability date so that the dewatering system can be tied into the powerhouse. Consideration of this factor is allowed by and planned for in the ELGs in order to maintain electric grid reliability. KIF is slightly more complex than some other bottom ash no discharge systems that TVA would have to install as KIF has 9 units to consider.

The task descriptions below include some actions that are in progress. Project Phase 1

(Study)-Approximately 15 months

Projected Activities: Conduct siting and geotechnical studies for proposed equipment. Develop vendor performance specifications, conceptual budgets and refined schedules. Develop project planning documents. Study inclusion of other streams in bottom ash transport water to determine if a segregation project should be implemented to improve cycle chemistry.

Potential Schedule Issues: Delays in the Request for Proposal processes (i.e., required extensions, scope clarifications, best and final pricing requests, and contract negotiations). Multiple vendors may be involved if segregation projects are determined to be the best solution.

Project Phase 2 (Design and Long Lead Items)-Approximately 18 months

Projected Activities: Develop detailed design drawings/documents including a power needs study for equipment. Complete environmental reviews as required by NEPA and obtain construction stormwater and 404/401/other permits based on design documents. Develop design documents for segregation of other streams as applicable.

Potential Schedule Issues: Delays in permitting, challenges to NEPA documents, and scarcity of long lead equipment or supplier bottlenecks for long lead equipment may cause delays. Interface between multiple vendors with different design tasks.

Project Phase 3 (Construct & Commission)-Approximately 58 months

Projected Activities: (Bottom ash dewatering project is already in progress, and the total duration reflects past activities.) Site preparation, construction including establishment of construction stormwater best management practices, installation of equipment, piping, power, controls. Complete plant tie-ins, working around planned outage schedules for 9 units, and (for the recirculation project) ensuring water balance supports no discharge. Perform start-up, testing, and optimization of system. Complete segregation projects for bottom ash water quality improvements if warranted. Installation of additional equipment if necessary to achieve no discharge ELG.

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Potential Schedule Issues: Site construction delays due to weather, environmental issues (e.g., potential "no construction" periods for bird and bat protection). Plant integration of controls, power, piping, etc., and dependence upon planned outages including for potential bottom ash segregation projects. There are 9 units at KIF, and as a result, planned outage tie-ins are more numerous.

Proposed Bottom Ash No-Discharge Applicability Date: December 1, 2023

D. Legacy Wastewater

The ELGs also address appropriate limits for legacy wastewater, which the rule defines as wet FGD wastewater, fly ash transport water, bottom ash transport water, and certain other wastewaters generated prior to the applicability date for the new limits determined by the permitting authority for each of these streams.¹⁸ Legacy wastewater at KIF will be subject to limits on total suspended solids (TSS), oil and grease (O&G) and pH that will apply to wet FGD wastewater, fly ash transport water, and bottom ash transport water generated before the new ELG applicability dates selected by TDEC for each of these wastestreams.¹⁹ Due to the CCR Rule, various impoundments are or will be subject to closure. TVA is evaluating remaining basins to be utilized for treatment of legacy wastewaters and general plant flows to the extent practicable.

E. General Plant Flows

In addition to wet FGD wastewater and fly ash and bottom ash transport waters, the KIF facility includes a number of other general plant flows. TVA is using the term general plant flows to refer to several types of wastewater including coal pile runoff, low volume wastes, combustion residual leachate, and chemical and nonchemical metal cleaning wastes with established ELGs. The ELG does not allow the permitting authority to determine future applicability dates for these flows, but they are included in this document for completeness.

Much of the plant's general plant flows are collected and treated in the site's clean water trench and Process Water Basin (PWB) that were recently constructed. These flows are routed to Outfall 001. In addition, some general plant flows are routed to the Process Water Basin (formerly named the stormwater pond) at the Gypsum Disposal Facility and discharge via Outfall 01A. Additional WWT may be necessary at these PWBs in the future; such as pH control or polymer injection. State approvals of the additives and/or treatment modifications are also required prior to implementation.

Chemical metal cleaning wastes will be collected in appropriate tanks and any hazardous portions will be disposed of as hazardous wastes. The non-hazardous fraction of chemical cleaning wastes will be discharged in accordance with limits in the NPDES permit on TSS, O&G, pH, copper, and iron.

¹⁸ 80 Fed. Reg. at 67,854-55.

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¹⁹ 80 Fed. Reg. at 67,854-55, 67,895-96; 40 C.F.R. §§ 423.13 (g)(1)(ii), (h)(1)(ii), (k)(1)(ii).

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Non-chemical metal cleaning wastes will continue to be discharged in accordance with historical limits in the NPDES permit. As established in the ELGs and prior NPDES permits, non-chemical metal cleaning wastes were formerly treated as low volume wastes (LVW) subject only to TSS, O&G and pH limitations and not copper and iron limitations. TVA believes that continuation of these current LVW limitations is appropriate.

III. Conclusion

The following table summarizes appropriate ELG applicability dates for each type of wastewater, accounting for all of the necessary planning, design, and implementation activities and other factors described above.

Table 1. ELG Applicability Date Summary

Wastewater Stream	Limits	Proposed applicability Date
Wet FGD Wastewater	Arsenic (8, 11 ug/L); Mercury (365, 788 ng/L); Se (12, 23 ug/L); N N (4.4, 17 mg/L) TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9)	December 1, 2023 Applicable now
Fly Ash Transport Water	No discharge	November 1, 2018
Bottom Ash Transport Water	No discharge; exceptions for wet FGD makeup, use for fly ash conditioning, and small quantities due to line repair TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9)	December 1, 2023 Applicable now
Combustion Residual Leachate	TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9)	Date of permit issuance
Low Volume Wastes	TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9)	Applicable now
Chemical metal cleaning wastes	TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9); Copper (1, 1 mg/L); Iron (1, 1 mg/L)	Applicable now
Nonchemical metal cleaning	TSS (30, 100 mg/L); O&G (15, 20 mg/L); pH (6-9)	Applicable now

These proposed applicability dates are based on EPA's latest actions with respect to the implementation of the ELG Rule. See 82 Fed. Reg. 43,494. Should EPA take subsequent action with respect to the limits or implementation timelines in the rule, those changes should be taken into account in the permitting of TVA's facilities.

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For example, should EPA revise its postponement decision between now and issuance of the final NPDES permit to provide for an indefinite postponement of the implementation of limits for bottom ash transport waters and/or FGD wastewaters while it is reconsidering those limits, TDEC should not impose an "as soon as possible" applicability date for those wastestreams in the renewal permits. In that situation, TDEC should impose only the applicable BPT limits on TSS, Oil and grease, and pH, as well as the interim BAT limits on TSS. EPA Region 1's plan for the NPDES permit at the Merrimack Station, which was released prior to EPA's ELG implementation postponement rule, reflects an appropriate course of action in the event of an indefinite postponement of implementation deadlines.²⁰ In its Statement of Substantial New Questions for Public Comment for the Merrimack Station NPDES Permit No. NH0001465, EPA stated:

[T]he new ELGs also establish less stringent BAT limits that apply to FGD wastewater discharges *prior to* the applicable deadline for compliance with the more stringent BAT limits. Specifically, for the discharges for FGD wastewater prior to the final BAT compliance deadlines, the 2015 Steam Electric ELGs set 'interim' BAT limits that address only TSS. These BAT limits for TSS match the BPT limits for TSS in 40 C.F.R. § 423.12(b)(11)." (internal citations omitted)²¹

EPA has postponed [the "as soon as possible" compliance deadline. . . . With the compliance date for the zero discharge limit postponed and the ELGs under reconsideration, 40 C.F.R. § 423.13(k)(1)(i), EPA cannot incorporate that limit into Merrimack Station's final permit. In the absence of the zero discharge limits, the 2015 Steam Electric ELGs prescribe the interim BAT effluent limits for TSS These interim BAT limits have not been postponed or stayed. Therefore, under the 2015 Steam Electric ELGs that are currently in effect, BAT limits equal to the TSS limits listed in § 423.12(b)(4) apply to bottom ash transport water discharges." (emphasis added; internal citations omitted)²²

In addition, because of the possibility for revision of the applicable technology-based limits and implementation deadlines due to EPA's reconsideration of the rule or other intervening EPA actions, TDEC should acknowledge in the KIF NPDES permit that these issues are in flux and should commit to reopening the permit to apply any new limits and implementation deadlines promulgated by EPA during the term of the permit.

In each case of new applicability dates as shown above, TVA is requesting these applicability dates be established at the beginning of a monitoring period due to sampling and discharge monitoring report (DMR) reporting considerations.

²⁰ EPA Region 1's Statement of Substantial New Questions for Public Comment for the Merrimack Station NPDES Permit No. NH0001465), <https://www3.epa.gov/region1/npdes/merrimackstation/pdfs/2017-statement-snqp.c.pdf>.

²¹ *Id.* at 50.
²² *Id.* at 60.

APPENDIX 4 – Stilling Pond Dewatering

From: [Love, Bradley Michael](#)
To: [Vojin Janjic](#); [Elizabeth Rorie](#)
Cc: [Robert Alexander](#); [Natalie Harris](#)
Subject: TVA - KIF - NPDES Permit No. TN0005452 - Stilling Pond Management Plan
Date: Wednesday, October 19, 2016 8:14:34 AM

*** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. ***

Mr. Janjic—

Please find attached notification of TVA's plans to perform drawdown in support of stilling pond closure at Kingston. Activities described in the attached letter are planned to begin as soon as construction of the new polishing pond is complete and placed in service. Based on the current project schedule, stilling pond drawdown could commence as early as the last week in November 2016. Please let me know if you have any question or comments on this communication.

Thanks,

Brad Love
Water Permits, Compliance & Monitoring
Tennessee Valley Authority
1101 Market Street, BR 4A | Chattanooga, TN 37402
☎ 423.751.8518 | 📠 423.751.7011 | ✉ bmllove@tva.gov

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Tennessee Valley Authority, 1101 Market Street, BR4A, Chattanooga, Tennessee 37402

October 19, 2016

Mr. Vojin Janjic
Division of Water Resources Tennessee
Department of Environment
and Conservation
William R. Snodgrass Tennessee Tower 312 Rosa
L. Parks Avenue, 11th Floor Nashville, Tennessee
37243

**TENNESSEE VALLEY AUTHORITY (TVA) - KINGSTON FOSSIL PLANT (KIF) - NPDES PERMIT
NO. TN0005452 - STILLING POND MANAGEMENT PLAN**

TVA is currently constructing a new polishing pond at KIF, which will take the place of the existing stilling pond, for final treatment of certain power plant wastewaters prior to discharging through NPDES Outfall 001. The polishing pond is expected to be complete and in service by December 31, 2016. Once the polishing pond has been placed in service, TVA plans to begin closure of the stilling pond.

To facilitate implementation of the closure plan design, TVA will begin preliminary activities as authorized in Paragraph VII.D.4 of Commissioner's Order OGC15-0177 as soon as the polishing pond becomes operational. Stilling pond drawdown flows will continue to be discharged through Outfall 001 and an operational pool lowering plan will be implemented during the activity to ensure wastewater discharges from Outfall 001 continue to maintain compliance with the NPDES permit and remain protective of in-stream water quality. The operational pool lowering plan will continue to be implemented until contact water within the stilling pond has been eliminated.

TVA collected water quality samples from within the stilling pond at two separate locations and depths. Samples were collected near the surface at an approximate depth of two feet and near the bottom at an approximate depth of 12 feet. The pond depth to top of sediment at each sampling location was approximately 14 feet. As a conservative approach, TVA utilized the maximum constituent concentrations detected from the sampling event and maximum expected discharge flow rate during regulated low flow conditions (1010) in the receiving stream to calculate the expected in-stream concentration during drawdown. Calculated in-stream constituent concentrations also take into account contributions from wastewaters which will continue to discharge from plant operations contributing to Outfall 001 and Outfall 01a. For additional conservatism, mixing and dilution provided by Outfall 002 flows are not included in the calculations. The results of the in-stream calculations are presented in Enclosure 1, which TVA believes demonstrates no appreciable impacts to in-stream water quality during the drawdown period.

Mr. Vojin Janjic Page 2
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Effluent from the stilling pond drawdown will be pumped into the lined sluice ditch where flows will comeingle with new power plant wastewaters and undergo treatment with approved coagulants, as necessary, prior to entering the polishing pond. Wastewaters will continue to discharge through the existing Outfall 001 into the KIF intake in accordance with existing limits. Stilling pond drawdown flows will be limited to ten million gallons per day. This maximum flow value for drawdown was used to calculate the expected in-stream concentration during low flow conditions found in Enclosure 1 and as a conservative measure to demonstrate protection of the receiving stream. The calculations in Enclosure 1 also take into account constituent loading from wastewaters during continued power plant operations discharging to Outfall 001 and Outfall 01a.

As part of the operational pool lowering plan, TVA will increase monitoring for parameters in the Outfall 001 NPDES permit limits table and begin monitoring for metals which will be reported with the monthly discharge monitoring reports to demonstrate compliance with the permit and applicable in-stream water quality standards. As a best management practice, water quality instrumentation will also be installed to provide continuous monitoring for turbidity and total dissolved solids (TDS) of the stilling pond drawdown effluent. The operational pool lowering plan will include action values based on data collected from the continuous water quality instrumentation to advise the project of treatment thresholds. Enclosure 2 includes a list and frequency of parameters which will be sampled during stilling pond drawdown. Consistent with the TDEC letter to TVA dated June 9, 2011, deleting the requirement to maintain and report the ash pond free water volume, TVA will manage the reduction of free water within the ash pond to meet NPDES permit limits at Outfall 001. For contingency planning, TVA may utilize filtration or approved coagulants to promote settling of solids prior to discharge, as necessary.

In summary, drawdown discharges from the stilling pond as described herein are comparable to and would have no greater impacts than normal operations under the KIF NPDES permit. Pollutants of concern are limited and will be monitored at an increased frequency during stilling pond drawdown and subsequent discharge at Outfall 001. TVA does not believe there will be appreciable impacts to the receiving stream during the drawdown period and that in-stream water quality standards will be protected.

If you have any questions or need any additional information, please contact Brad Love at (423) 751-8518 in Chattanooga, or by e-mail at bmlove@tva.gov.

Sincerely,

Senior Manager

Water Permits, Compliance, and Monitoring Enclosures

Enclosures

cc: Mr. Michael Atchley
Knoxville Environmental Field Office Tennessee
Department of Environment
and Conservation 3711
Middlebrook Pike
Knoxville, Tennessee 37921

Enclosure 1
TVA - Kingston Fossil Plant NPDES Permit
Number TN0005452
Calculated In-stream Constituent Concentrations Based on QIO Flows

Parameter	Measured Ash Pond Concentration (mg/L)	Outfall 001 Concentration ⁸ (mg/L)	Outfall 01a Concentration ⁹ (mg/L)	Intake Concentration ¹⁰ (mg/L)	Calculated In-stream Concentration (mg/L)	TN In-stream WQC (mg/L)
Mercury, Total	0.00000178	0.00000258	0.00193	0.00000385	0.0000207	0.00005
Aluminum	0.298	0.312	< 0.100 ³	0.155	< 0.174	0.750 ³
Copper, Total	0.00361	0.00342	< 0.020 ³	0.00201	< 0.0022	0.013 ⁶
Lead, Total	< 0.00200 ³	< 0.00200 ³	< 0.020 ³	< 0.00200 ³	< 0.0020	0.005
Selenium, Total	< 0.00200 ³	< 0.00200 ³	0.921	< 0.00200 ³	< 0.00914	0.050
Arsenic, Total	0.00466	0.00322	0.0386	< 0.00200 ³	< 0.00171	0.010
Cadmium, Total	< 0.00100 ³	< 0.00100 ³	0.0196	< 0.00100 ³	< 0.000669	0.005
Chromium, Total	< 0.00200 ³	< 0.00200 ³	0.0592	< 0.00200 ³	< 0.00151	0.1
Iron, Total	0.341	0.169	< 0.100 ³	0.179	< 0.186	1000 ⁷
Silver, Total	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200	0.0032 ⁶
Antimony	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200	0.0056
Barium	0.119	0.0706	0.193	0.0409	0.0488	2.00
Beryllium	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200 ³	< 0.00200	0.004
Nickel	< 0.00200 ³	< 0.00200 ³	0.0462	< 0.00200 ³	< 0.00140	0.100
Thallium	< 0.00200 ³	< 0.00200 ³	< 0.020 ³	< 0.00200 ³	< 0.00200	0.000240
Zinc	< 0.0250 ³	< 0.0250 ³	1.15	< 0.0250 ³	< 0.0224	0.120 ⁷
Cyanide	< 0.0100 ³	< 0.0100 ³	0.071	< 0.0100 ³	< 0.00558	0.140
Nitrate/Nitrite	0.256	< 0.0100 ³	5.81	0.13	< 0.178	10

1. Calculations are based on a maximum decant flow rate of 10 million gallons per day (MGD).
2. Low flow stream condition (QIO) is 15.8 MGD. Calculations do not take into account any mixing or dilution flow provided by Outfall 002.
3. For parameters which were not detected during the sampling period, half of the reporting level was used for calculating in-stream concentration.
4. Tennessee In-stream Water Quality Criteria from TN Chapter 0400-40-03.
5. EPA National Recommended Freshwater Criterion Maximum Concentration (acute) criterion.
6. Tennessee Criterion Maximum Concentration (acute) criterion.
7. EPA National Recommended Freshwater Chronic Continuous Concentration criterion.
8. Data for Outfall 001 is from 24-hour composite samples collected for Form 2C on June 29, 2016. The average flow of Outfall 001 (14 MGD) from January 2015 to July 2016 was utilized for calculation.
9. Data for Outfall 01a is from 24-hour composite samples collected for Form 2C on June 29, 2016. The maximum design flow of Outfall 01a (1.605 MGD) was utilized for calculation.
10. Data for the intake is from 24-hour composite samples collected for Form 2C on June 29, 2016.

Enclosure 2
TVA - Kingston Fossil Plant
NPDES Permit Number TN0005452
Stilling Pond Management Plan

Effluent monitoring during Stilling Pond drawdown will be conducted at Outfall 001 in accordance with the following:

Outfall 001		
Parameter	Measurement Frequency	Sample Type
Flow	1/Week	Measured
Oil and Grease	1/Week	Grab
pH	1/Week	Grab ²
Total Suspended Solids	1/Week	Grab
Mercury, Total	1/Week	Grab ³
Methyl Mercury	1/Week	Grab ³
Aluminum	1/Week	Grab
Hardness	1/Week	Grab
Copper, Total	1/Week	Grab
Lead, Total	1/Week	Grab
Selenium, Total	1/Week	Grab
Arsenic, Total	1/Week	Grab
Cadmium, Total	1/Week	Grab
Chromium III	1/Week	Grab
Chromium VI	1/Week	Grab
Chromium, Total	1/Week	Grab
Iron, Total	1/Week	Grab
Silver, Total	1/Week	Grab
Antimony	1/Week	Grab
Barium	1/Week	Grab
Beryllium	1/Week	Grab
Nickel	1/Week	Grab
Thallium	1/Week	Grab
Zinc	1/Week	Grab
Cyanide	1/Week	Grab
Ammonia (as N)	1/Week	Grab
Nitrate/Nitrite	1/Week	Grab

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

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

3 - Mercury monitoring will be performed in accordance with Title 40, CFR Part 136, using sufficiently sensitive methods.