VPDES PERMIT PROGRAM FACT SHEET

This document gives pertinent information concerning the VPDES permit listed below. This permit is being processed as a major industrial permit. The industrial and municipal discharges result from the operation of an electric generating plant which consists of two 242 Megawatt gas-fired generating units, and their associated facilities. Additionally, industrial discharges will result from the dewatering of coal-ash Pond 1A/1B in preparation for the final closure of the coal-ash pond.

The permit process consists of: developing permit limitations based upon the EPA Steam Electric Effluent Guidelines, the State Water Quality Standards and stormwater guidelines.

1. Facility Name and Address: SIC Code: 4911

Appalachian Power Company
Clinch River Plant
3464 Power Plant Road
Cleveland, VA 24225

Location: The Appalachian Power Company Clinch River Plant is located on State Route 665 in Russell County, VA, near the community of Carbo. A location map is included as **Attachment A**.

36° 55' 58"N, 82° 12' 00"W Carbo, VA 7.5' Quadrangle

2. VPDES Permit No: VA0001015 Expiration Date: September 14, 2015 (administratively continued)

3. Owner Contact:

Alan R. Wood, Manager
Water & Ecological Resource Services
American Electric Power
1 Riverside Plaza
Columbus, OH 43215
Telephone No.: (614) 716-1233

Facility Contact:

R. L. Chafin, Plant Manager
Clinch River Plant
3464 Power Plant Road
P.O. Box 370
Cleveland, VA 24225
Telephone No.: (276) 889-7323

4. Application Processing:

Application Complete:	March 13, 2015		
Initial Draft Permit Date:	March 31, 2016		
DEQ Regional Office:	Southwest Regional Office		
Initial Draft Permit Prepared by:	David Nishida	Date:	March 31, 2016

Revised Draft Permit Prepared by:	David Nishida	Date: June 6, 2016
Reviewed by:	Mark Trent	Date: June 6, 2016
Reviewed by:	Steve Artrip	Date: June 6, 2016

Comment Period:	From: April 1, 2016	To:	May 19, 2016
Public Hearing:	May 4, 2016		
SWCB Meeting:	June 27, 2016		

5. Receiving Waters Classifications:

a.

Receiving Stream:	Clinch River
Basin:	Tennessee - Big Sandy
Subbasin:	Clinch River
Section:	2
Class:	IV
Special Standards:	x
Tidal?	No
On 303(d) list?	Yes
1-Day, 10-Year Low Flow:	25 MGD
7-Day, 10-Year Low Flow:	29 MGD
30-Day, 10-Year Low Flow:	38 MGD
30-Day, 5-Year Low Flow:	43 MGD
Harmonic Mean Flow:	155 MGD

b.

Receiving Stream:	Dumps Creek
Basin:	Tennessee - Big Sandy
Subbasin:	Clinch
Section:	2
Class:	IV
Special Standards:	None
Tidal?	No
On 303(d) list?	Yes
1-Day, 10-Year Low Flow:	1.84 MGD
7-Day, 10-Year Low Flow:	2.11 MGD
30-Day, 10-Year Low Flow:	2.53 MGD
30-Day, 5-Year Low Flow:	2.89 MGD
Harmonic Mean Flow:	9.05 MGD

6. Licensed Operator Requirements:
Class II

7. Reliability Class:
III (Outfall 008)

8. Permit Characterization:

(X) Private ( ) Federal ( ) State ( ) POTW

( ) Possible Interstate Effect ( ) Interim Limits in Other Document

9. Facility / Treatment Description:

The Clinch River Plant is an electric generating station owned by the Appalachian Power Company. The facility is currently in the process from converting from coal-fired generation to natural gas-fired generation. Previously the facility utilized three 235 Megawatt (MW) coal-fired generators. Once the conversion is complete the facility will utilize two 242 MW gas-fired generators to produce electricity for its distribution system.

The two units are equipped with Selective Non-Catalyst Reduction (SNCR) for Nitrogen Oxide (NOx) control and mechanical draft cooling towers for cooling the circulating waters. The main plant site is located on Kiser Bend along the Clinch River. The facility also utilizes areas adjacent to plant site for waste storage and disposal.

The SNCR process involves injecting urea, $(NH_2)_2CO$ into the firebox of the boiler to react with the nitrogen oxides formed in the combustion process. Urea is a nitrogen containing compound which is often used as a component of commercial fertilizer because it is highly soluble in water, and can readily hydrolyze into ammonia and carbon dioxide. The reaction for NOx reduction is: $4NO + 2(NH_2)2CO + O_2 \rightarrow 4N_2 + 4H_2O + 2CO_2$. The results of the reaction are diatomic nitrogen and water. The temperature window for efficient SNCR operation typically occurs between 900°C and 1,100°C. Any products from the reaction, as well as any un-reacted nitrogen compounds (i.e. ammonia slip) should be discharged through the emission stack in a gaseous form.

The facility had utilized five cooling towers to remove waste heat from the system; however, once the conversion to natural gas is complete, only four will be utilized. The cooling water from the condensers is directed to the cooling towers where it is cooled and re-circulated to the plant. Occasionally, a portion of the cooling water is "blown down" in order to control mineralization and the buildup of solids. All cooling water blow down is directed to Sump 004, and ultimately treated in the advanced wastewater treatment plant (AWWTP).

Chemical treatment of the cooling water is necessary to prevent biofouling of the cooling towers and condensers. Each tower is shock treated for about 90 minutes per day with a biocide containing bromine and chlorine. The facility also used a commercial surfactant in the cooling towers to control bio-fouling. During the period while the cooling water is being treated with halogens, all water is recycled and no discharge to the wastewater system is allowed. After sufficient contact time, the cooling water is de-chlorinated with a sodium bi-sulfite solution, and the discharge from the cooling towers is allowed to resume only after testing of the water confirms that de-chlorination is complete.

Water used in the boiler circuit is treated using a reverse osmosis system and is recycled and reused to the greatest extent possible. However, a portion of the water in these circuits must also be discharged or "blown-down" occasionally in order to maintain acceptable concentration of dissolved solids. As with the cooling water, the boiler blow down, and the wastewater from the reverse osmosis treatment system is also directed to the wastewater treatment plant and treated before being discharged.

All water for the site is supplied by two sources. Municipal water connection provides the facility with potable water supply. All plant process water used on site is provided by surface waters withdrawn from the Clinch

River.

The company estimates that the facility will withdraw approximate maximum of 9.416 MGD from an intake in the river once the conversion to gas is complete. About 1.136 MGD of the withdrawal will be returned directly to the river to backwash the intake screens, and the remainder (8.280 MGD) will be utilized in the plant processes. This represents a significant decrease in water withdrawals as compared to the previous coal-fired operations at the plant (approximately 14 MGD).

The plant will utilize raw water from the river in three systems:

1) as make-up water for the cooling towers (6.347 MGD);
2) as a raw water source for a water treatment plant which provides high quality water to the boilers and other process systems (0.245 MGD); and
3) as a source of cooling water and other miscellaneous water in the plant (1.689 MGD).

A schematic diagram of the water flow through the facility is included as **Attachment B**.

Prior to the conversion to natural gas, the plant received coal via truck and rail carriers and stored it at a coal stockpile area at the southern portion of the plant site. The coal was transported into the plant by conveyer, where it was crushed and used to fire the three boilers. While the plant will no longer utilize coal at the facility, the permittee will continue to maintain a coal pile at the facility to serve as a distribution stockpile for other facilities.

Also prior to the conversion to natural gas the boiler furnaces produced two forms of solid waste: fly ash and bottom ash. Fly ash was the waste that is carried out of the furnace by the gas stream and is collected by the electrostatic precipitators. Bottom ash was the larger ash component which drops out of the gas stream inside the furnace. The fly ash was collected from the precipitators, stored in a silo adjacent to the plant, and was ultimately placed in a captive industrial waste landfill. The bottom ash was collected from the bottom of the furnace and mixed with water. The resulting slurry was pumped to the ash storage pond located along Dumps Creek. While coal ash will no longer be generated at the facility, all potential discharges and stormwater associated with the long term disposal sites will continue to be addressed under the VPDES permit.

Facility Modifications Since last Reissuance:

As mentioned above, this facility is currently in the process of converting from a coal-fired plant to a natural gas-fired plant. A natural gas pipeline was installed from the Castlewood area to the facility in 2015. The conversion will also involve decommissioning of the electrostatic precipitator, one of the three boilers/generators and one of the five cooling towers. Since the plant will no longer be burning coal, coal combustion residuals will no longer be generated at the site. As such the ash transport system has been decommissioned, negating the need to sluice ash to Ash Pond 1A/1B. During the upcoming permit term, the CCR landfill and Pond 1A/1B will be closed and capped. For the long-term, water usage and overall waste water discharge from the primary Outfall (003) will decrease. For the short-term, during the closure of Pond 1A/1B, the permittee will be conducting dewatering activities to prepare the pond for capping. The wastewater stream associated with the dewatering operation will be treated by the plant's advanced wastewater treatment plant prior to discharging to the Clinch River. Any potential discharges and stormwater associated with the long term disposal sites will continue to be addressed under this permit.

10. Residual Management and Disposal:

Prior to the conversion to natural gas the plant produced two types of solid waste at the facility: boiler ash and fly ash. Collectively these wastes are called coal combustion residuals or CCR. The facility utilized three areas for the disposal of the CCRs – solid waste landfill (SWP 223), Ash Pond 1A/1B (SWP 620), and Ash Pond 2. Since CRRs will no longer be generated at the facility, the permittee has submitted a closure proposal for the Ash Pond 1A/1B for approval under the Virginia Solid Waste Management regulations. DEQ has received a closure proposal for the solid waste landfill. Pond 2 was decommissioned in 1997 and was capped with a PVC geomembrane in 2014. Leachate from the solid waste landfill will continue to be addressed under this VPDES permit. Additionally, as discussed in Section 22 Pond Closure of this factsheet, this VPDES permit will address the necessary dewatering of Pond 1A/1B for closure.

In addition to the disposal sites referenced above, the permittee constructed a fourth CCR disposal site referred to as the Possum Hollow Landfill located south of the power plant (SW Permit 607). This disposal site was constructed prior to the decision to convert the facility from coal-fired generation to gas-fired generation. To date, the Possum Hollow Landfill has not received CCRs and the permittee has indicated that they do not intend to utilize this constructed landfill in the future.

Sewage Sludge Use or Disposal:

The facility also operates a small (12,000 gpd) activated sludge treatment plant to treat the domestic sewage from the sanitary facilities at the plant. This treatment process produces approximately 3200-6500 gallons per year of wet sludge which must be removed from the facility. This material is periodically removed from the treatment system and transported to the Town of St. Paul Sewage Treatment Plant where it is incorporated into their waste stream for ultimate disposal. The St. Paul plant is operated under the regulatory provisions of VPDES Permit No. VA0026221.

11. Discharge Description:

Wastewater is produced at many locations along the process, but primarily consists of: boiler blow-down; cooling tower blow-down; discharges from collection sumps within the buildings which collect miscellaneous low volume waste streams; wastewater from the sanitary facilities; leachate from CCR disposal areas and stormwater runoff. Additionally, during the upcoming permit term, the dewatering of Ash Pond 1A/1B will be addressed. The reissuance application addresses the following existing discharge locations:

001 - Outfall 001 is the emergency overflow point of the ash water reclaim pond located near the plant entrance. Prior to the conversion to natural gas, the boiler ash was transported in slurry to Ash Pond 1A/1B located along the eastern and western banks of Dumps Creek. The supernatant from Ash Pond 1A/1B was directed to the ash water reclaim pond for re-use in the ash transport system. Now that ash transport activities have ceased at the plant, water from the ash water reclaim pond will no longer be re-used.

During the dewatering of Ash Pond 1A/1B the ash water reclaim pond will serve as a temporary holding pond for the dewatering operation prior to treatment in the wastewater treatment plant (WWTP) and the advanced wastewater treatment plant (AWWTP) before discharging via Outfall 003. Once Ash Pond 1A/1B is dewatered the reclaim pond will continue to collect all discharges from the closed Ash Pond 1A/1B and the CCR landfill to be directed to the treatment systems prior to discharge.

The overflow point on the ash water reclaim pond is identified as a potential discharge location. Excess water from the reclaim water system is normally diverted to the wastewater treatment plant (WWTP) and the advanced wastewater treatment plant (AWWTP) prior to its discharge via Outfall 003; however, in the unlikely event that the storage capacity of the reclaim pond is exceeded, a discharge from Outfall 001 will occur.

003 - Outfall 003 is the final discharge from the advanced wastewater treatment plant. The AWWTP was placed into service in 1993, and was designed to provide an additional level of treatment to waters discharged from the existing conventional wastewater treatment plant. The AWWTP also receives the cooling tower blow-down and other miscellaneous waste waters which were previously discharged from outfalls 004, 005, 009, 010, 011, and 012. Additionally, the AWWTP will treat the supernatant generated during the dewatering operation associated with the closure of Ash Pond 1A/1B.

The AWWTP was initially designed to remove copper from the wastewater using an iron adsorption/co-precipitation process. However in 1997, the plant converted the treatment system to utilize an aqueous solution of polymer and a sodium hydroxide salt, along with a cationic polymer. The system also uses caustic to maintain pH in the process.

The plant is designed as a dual train unit, sized with sufficient capacity to ensure that either train could handle the total anticipated flow. The treatment process consists of adding the polymer solutions and a pH adjusting chemical (sodium hydroxide) to the wastewater, and directing it through a conventional physical/chemical treatment process. In this process, the copper and other metals are adsorbed onto the polymer induced "floc" and are precipitated from solution. Currently, the precipitants from the treatment process are disposed of in Pond 1A/1B. However, prior to the closure of Pond 1A/1B, a filter press will be installed and the precipitants will be disposed of at the municipal landfill.

003A - Outfall 003A is an alternative discharge point for the AWWTP clearwell. The company proposes to discharge through 003A during periods when high river levels (greater than 1506 feet above MSL) at 003 prevent normal gravity discharge from the clearwell. During these times, the effluent will discharge from the clearwell at outfall 003A. Any discharge at 003A will receive complete treatment by the AWWTP.

005 - Outfall 005 is the former discharge location of the low volume waste streams. This outfall was completely removed during the recent installation of the buried natural gas distribution line. This outfall is no longer functional and has been removed from the permit.

007 - Outfall 007 is the discharge which results from rainfall runoff from the coal stockpile area. All runoff from the coal storage area and surrounding plant areas is collected in a sump and pumped to a treatment facility on the southern end of the site. The treatment facility consists of two sedimentation ponds in series. The discharge from each cell in the treatment system is controlled by a manually operated shut off valve. The wastewater from each cell is manually decanted, which results in intermittent batch discharges of the treated wastewater.

008 - Outfall 008 is the discharge from the sewage treatment plant which receives all sanitary waste waters. The plant is an extended aeration type activated sludge plant with a design capacity of 12,000 gallons per day. The plant consists of a 6,120 gallon aerated surge tank; a 3,000 gallon sludge holding tank; a 12,000 gallon aeration chamber; a 5,200 gallon clarifier; a 1,000 gallon

dosing tank; a tertiary treatment unit, and; an ultraviolet disinfection unit.

014 - Outfall 014 is the discharge from the basins located at the toe of the landfill. The basins collect surface water runoff and leachate from the fly ash disposal area. The basins are designed to contain all leachate and the volume of runoff that would result from a 25-year, 24-hour storm event. All water from these ponds is proposed to be pumped to the WWTP and ultimately to the AWWTP for treatment and discharge at outfall 003. In the event that a storm event exceeding the capacity of the pumps should occur, the ponds would discharge to the Clinch River via Outfall 014. The outfall has not discharged in the last thirty years.

015 - Outfall 015 is identified as the collective discharge from groundwater discharges along the toe of the embankment of the area which was previously used as Ash Pond 2. These discharges extend along the banks of Dumps Creek for about 1200 feet along the face of the dike. Although the permit had once proposed 015 as an outfall in accordance with the ash transport effluent guidelines of 40 CFR 423.12, AEP did not agree with this classification, and submitted a document to EPA which requests that alternative permit limits be set due to Fundamentally Different Factors (FDF) being present in the system, and requested that EPA rule regarding the applicability of the guidelines to this source. DEQ has found that such factors are present and EPA has provided no objection. The ash pond was capped in 2014 with an impermeable membrane, therefore, the source of water for these groundwater discharges has significantly diminished.

The applicant has identified the following stormwater discharge locations within the power plant facility:

701 - Outfall 701 is the outlet of a vegetated swale which receives runoff from the area adjacent to cooling tower No. 1. The area consists of approximately 3.1 acres which are mostly covered with vegetation. A small portion of the watershed for 701 is used for material storage. No treatment is provided for runoff discharged at outfall 701.

727 - Outfall 727 is the discharge from a sediment basin located on the western edge of the plant site. The basin collects all drainage from a 17.9 acre watershed which includes drainage from: 1) the main entrance area of the plant; 2) the area surrounding the stacks, precipitators, and ash silo; 3) the paved parking areas; 4) the area surround the salt storage basins, and; 5) the shipping and receiving areas adjacent to the plant warehouse. Runoff collected in the basin will be manually discharged in batch via a knife gate valve.

731 - A small drainage area (approximately 0.9 acres) adjacent to the coal pile is collected in a catch basin which enters a storm drain which discharges to the Clinch River at Outfall 731. No treatment is provided.

All stormwater discharges from the active disposal area of the coal combustion by-products landfill are directed to the leachate collection ponds at the toe of the fill, and ultimately treated in the AWWTP. The runoff from the vegetated outslopes, the haul roads, and the support areas are directed to the following five stormwater discharge locations:

736 - Outfall 736 conveys stormwater from the eastern slope of the landfill. The watershed area for this conveyance also includes a material storage area used by the contractor which hauls the waste ash from the plant site. The area contains an office trailer, storage shed and equipment fueling area, to support the operation and maintenance of the heavy equipment used in the transport and disposal of waste ash. The watershed area for this outfall is approximately 14.8

acres.

737 - Outfall 737 conveys runoff from the southernmost outslopes of the ash fill. The watershed area for this outfall is approximately 6.2 acres.

738 - Outfall 738 conveys runoff from area between the two leachate collection ponds on the southern outslopes of the ash fill. The watershed area for this outfall is approximately 8.2 acres.

739 - Outfall 739 conveys runoff from area adjacent to leachate pond No. 2. The watershed area for this outfall is approximately 8.2 acres.

740 - Outfall 740 conveys runoff from the northern-most outslopes of the fill area. The conveyance also receives drainage from undisturbed areas adjacent to the landfill operation. The watershed area for this outfall is approximately 94.1 acres.

There are four stormwater outfalls associated with Ash Ponds 1 and 2.

501 - Outfall 501 is located on the southwestern corner of the now capped Ash Pond 2. This outfall receives stormwater from the cap surface and surrounding area, and discharges to Dumps Creek. This outfall was previously permitted under the Industrial Stormwater General Permit VAR052112 but will be incorporated into this permit upon reissuance. The watershed area for this outfall is approximately 21.9 acres.

502 - Outfall 502 is located on the northeastern corner of the now capped Ash Pond 2. This outfall receives stormwater from the cap surface and surrounding area, and discharges to Dumps Creek. This outfall was previously permitted under the Industrial Stormwater General Permit VAR052112, but will be incorporated into this permit upon reissuance. The watershed area for this outfall is approximately 21.9 acres.

503 - Outfall 503 is located on the southwestern corner of Ash Pond 1A/1B. The outfall services a stormwater diversion system constructed around Ash Pond 1A/1B under a directive from Virginia DCR Dam Safety Program. Construction of the diversion system was completed in 2015. The diversion system consists of a berm and channel that intercept stormwater runoff from offsite tributary areas and convey it around Ash Pond 1A/1B to a discharge point on the Clinch River. The Outfall 503 drainage area is approximately 53.6 acres. A legacy ash disposal site occupies approximately 8 acres of the drainage area, and the remainder is offsite wooded terrain. The ash fill site has protective cover and well-established vegetation that is regularly mowed and visually inspected. The diversion system consists partially of a concrete collection channel and energy dissipater basin totaling approximately 1 acre of impervious surface area. It is proposed that when Ash Pond 1A/1B is closed, surface runoff and non-contact infiltration from the cap will also discharge via Outfall 503.

504 - Outfall 504 is a proposed outfall to be located on the southeastern edge of Ash Pond 1A/1B. This outfall will be constructed concurrently with the closure of Ash Pond 1A/1B. The outfall will receive stormwater from the proposed cap and surrounding area, and discharge to Dumps Creek via an existing tunnel under the adjacent road and railroad track. Outfall 504 drainage area is approximately 8.7 acres.

There are three stormwater outfalls associated with the Possum Hollow Landfill area. This landfill has been

constructed as discussed above but has not been utilized for CCR disposal. The permittee has indicated they have no intention to use this landfill in the future:

801 - Outfall 801 is the discharge point from the pond identified as the Haul Road Pond. It collects stormwater runoff primarily from the asphalt haul road via a roadside ditch. Approximately 25.12 acres drain to the Haul Road Pond, which was sized to handle the water quality volume specified by the VSMP regulations. The outlet of the pond is considered Outfall 801 and discharges to Possum Hollow, a tributary of the Clinch River.

802 - Outfall 802 is the discharge point for the stormwater pond identified as the North Pond. It collects runoff from a portion of the asphalt haul road via a roadside ditch, as well as runoff from vegetated areas around the landfill (North landfill buttress). Groundwater interceptor drains also drain into the North Pond. The tributary area is approximately 50.6 acres and the pond was sized to handle the water quality volume specified by the VSMP regulations. Outfall 802 also discharges to Possum Hollow.

803 - Outfall 803 is the discharge point from the pond known as the South Pond. It collects stormwater runoff from vegetated areas around the landfill (South landfill buttress). Groundwater interceptor drains also drain into the South Pond. Approximately 15.8 acres drain to the South Pond, which was sized to handle the water quality volume specified by the VSMP regulations. This outfall discharges to an unnamed tributary with no surface connection to waters of the United States.

A discharge locations are identified in the Location Map included as **Attachment A.**

12. Material Storage:

The facility currently utilizes above ground petroleum storage tanks ranging in size from 235 gallons to 110,000 gallons. The cumulative capacity of all storage units is less than 1MG. The facility submitted an Oil Discharge Contingency Plan to DEQ which outlines the procedures employed to prevent the stored material from reaching State waters. A copy of the approved plan is on file at the Southwest Regional Office. (FC-01-0020)

Also, other chemicals and potential pollutants are stored onsite including Sodium Nitrite, Sulfuric Acid, dust suppressant CoalTrol-60, salt, and Urea/Ammonia. The chemical storage locations are documented in the application and management practices and for potential spill and leaks are addressed in the current pollution prevention plan required by the permit.

13. Ambient Water Quality Information:

All but seven of the discharges from the facility are directed to the Clinch River between river mile 266 and 268. Outfalls 015, 501, 502, and 504 discharge into Dumps Creek, a tributary of the Clinch River. Outfalls 801 and 802 discharge to Possum Hollow, a tributary to the Clinch River. Outfall 803 discharges to an unnamed tributary with likely subsurface connection to Mill Creek, a tributary to the Clinch River.

The low flow characteristics of the receiving streams were estimated from gauging stations nearby. A copy of the low flow determination is on file at the DEQ regional office. The flow estimates for the outfalls to the Clinch River below the plant intake were adjusted by 8.280 MGD (estimated maximum withdrawal rate post conversion to natural gas) to account for the maximum reported withdrawal at the intake. The critical flow values used in

the evaluation of the permit are listed below:

Clinch River above the Intake (701)

1Q10	31 MGD
7Q10	36 MGD
1Q10 (high flow)	48 MGD
7Q10 (high flow)	61 MGD
30Q5	48 MGD
Harmonic Mean	154 MGD

Clinch River below Dumps Creek (001, 003, 003A, 005, 007, 008, 014)

1Q10	25 MGD
7Q10	29 MGD
1Q10 (high flow)	43 MGD
30Q5	43 MGD
30Q10	38 MGD
30Q10 (high flow)	97 MGD
Harmonic Mean	155 MGD

Dumps Creek (015)

1Q10	1.84 MGD
7Q10	2.11 MGD
1Q10 (high flow)	2.85 MGD
7Q10 (high flow)	3.59 MGD
30Q5	2.89 MGD
Harmonic Mean	9.06 MGD

The Clinch River at Carbo is designated as waters which contain endangered or threatened species as identified by the United States Fish and Wildlife Service. A previous permit action required AEP to conduct studies of the Clinch River in order to assess the plant's impact to the downstream endangered species populations. The studies were designed to assess the extent of impact to three endangered species of unionid mussels, and to identify the sources of toxicant. The studies generated toxicity data on 15 Clinch River species and surrogates. The company submitted the final report of the studies in 1989. The results of their studies indicated that certain discharges (003, 004 & 005) from the facility had an adverse impact to the Clinch River biota, and that copper was identified as the primary toxicant. The report provided data to support the calculation of a site specific copper criteria.

The company submitted the final report on the site specific copper criteria on February 19, 1991. The report determined that five mollusk species and a mayfly species had exhibited chronic effects from copper concentrations at levels lower that the existing chronic criteria level (16.9 µg/l). As a result of the AEP research, the Board amended the Water Quality Standards on May 5, 1992 to adopt a special site specific standard (680-21-08.15). The modification reflects an in-stream acute standard for total recoverable copper of 19.5 µg/l, and a chronic standard for total recoverable copper of 12.4 µg/l.

As a consequence of the results of these studies, the SWCB required that water quality based limits be implemented for copper. The permit for the facility included final limits for copper and a compliance schedule to achieve the limits by June 1, 1993. In order to comply with the proposed limits, the company built the advanced wastewater treatment plant (AWWTP) and consolidated all wastewater discharges which were identified to contain elevated levels copper. This eliminated discharges 004, 009, 010, 011, and 012, and transformed discharge 005 into an emergency overflow (bypass) discharge point.

Construction of the AWWTP was completed and the copper removal facility was put into full operation on April 16, 1993, and the company was able to achieve compliance with the final limits. Subsequent monitoring for the effluent limitations indicates that the facility continues to achieve compliance with the limits.

As an ongoing component of the assessment of water quality conditions, DEQ conducts sampling of many waters throughout the state to determine the ambient conditions. Although there are several monitoring sites along the main stem of the Clinch River, the following three sites are in relatively close proximity to the plant and may be utilized to estimate conditions at the plant:

Site ID:	Location Description
6BCLN271.50	Clinch River near Cleveland 3.70 miles upstream
6BCLN264.27	Clinch River approximately 3.53 miles downstream

A review of the data collected from these sites during the last five years indicates that the segment continues to comply with the water quality standards assigned to the waters. Analysis results presented below are maximum values:

Potential Pollutant	Upstream Analysis Results (6BCLN271.50)	Downstream Analysis Results (6BCLN264.27)	Acute Standard	Chronic Standard	H. Health Standard
Antimony, Dissolved (ug/L as Sb)	<0.5	<0.5	NA	NA	640
Arsenic, Dissolved (ug/L as As)	0.64	0.67	340	150	NA
Barium, Dissolved (ug/L as Ba)	53	58.7	NA	NA	NA
Cadmium, Dissolved (ug/L as Cd)	<0.1	<0.1	4.9	1.4	NA
Chloride, Dissolved (mg/L)	13.9	No Data	860	230	NA
Chromium, Dissolved (ug/L as Cr)	3.39	4.4	NA	NA	100
Copper, Dissolved (ug/L as Cu)	1.3	1.51	19.5	12.4	NA
Iron, Dissolved (ug/L as Fe)	<50	<50	NA	NA	NA
Lead, Dissolved (ug/L as Pb)	0.12	0.12	150	18	NA
Manganese, Dissolved (ug/L as Mn)	11.78	12.59	NA	NA	NA
Mercury TL, Filtered Water, Ultratrace Method (ug/L)	0.0029	0.0024	1.4	0.77	NA
Nickel, Dissolved (ug/L as Ni)	1.5	1.90	220	24	4600
Nitrogen, Ammonia, Total (mg/L as N)	<0.04	0.14	4.29	0.766	NA
Selenium, Dissolved (ug/L as Se)	<0.5	0.75	20	5	4200
Silver, Dissolved (ug/L as Ag)	<0.10	<0.10	4.9	NA	NA
Thallium, Dissolved (ug/L as Tl)	<0.10	<0.10	NA	NA	0.47
Zinc, Dissolved (ug/L as Zn)	3.04	2.62	140	140	26000

The results of the ambient downstream monitoring does not indicate that the discharges from the facility have had an adverse effect to the water quality of the Clinch River.

Dumps Creek is listed a 303(d) impaired water for not supporting aquatic life use (benthic) with TSS and TDS identified as the likely stressors. DEQ does not have a nearby monitoring station on Dumps Creek for which metals data has been collected; however, during the previous permit term the permittee collected upstream and downstream metals data on Dumps Creek (quarterly for total of 10 sampling events) in lieu of groundwater monitoring in support of the closure of Ash Pond 2. Analysis results presented below are maximum values:

Potential Pollutant	Maximum Upstream Analysis Results	Maximum Downstream Analysis Results	Acute Standard	Chronic Standard	H. Health Standard
Antimony (ug/L)	0.16	0.14	NA	NA	640
Arsenic (ug/L)	0.82	0.82	340	150	NA
Barium (ug/L)	94.8	95.7	NA	NA	NA
Beryllium (ug/L)	<0.30	<0.30	NA	NA	NA
Cadmium (ug/L)	<0.05	0.14	5.6	1.5	NA
Chromium (ug/L)	0.2	0.4	NA	NA	100
Copper (ug/L)	0.92	0.82	18	12	NA
Lead (ug/L)	0.367	0.838	180	20	NA
Mercury (ug/L)	<2[1]	<2[1]	1.4	0.77	NA
Molybdenum (ug/L)	1.50	8.33	NA	NA	NA
Selenium (ug/L)	0.5	2.4	20	5.0	4,200
Thallium (ug/L)	<0.05	<0.05	NA	NA	0.47
Uranium (ug/L)	0.933	0.932	NA	NA	NA
Vanadium (ug/L)	<2	<2	NA	NA	NA
Boron (mg/L)	0.117	0.095	NA	NA	NA
Lithium (mg/L)	0.046	0.054	NA	NA	NA
Strontium (mg/L)	0.582	0.627	NA	NA	NA
Chloride (mg/L)	15.7	15.8	860,000	230,000	NA
Total Dissolved Solids (mg/L)	497	495	NA	NA	NA
Conductivity (umho/cm)	797	786	NA	NA	NA

Notes:
[1]: All samples were less than quantification level. Highest QL utilized was 2 ug/L. Lowest QL utilized was 0.002 ug/L.

The results of the monitoring conducted by the permittee does not indicate that the discharges from the facility have had an adverse effect to the water quality of Dumps Creek.

14. Anti-Degradation Review:

Clinch River: Tier 2
Dumps Creek: Tier 1

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9VAC25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. Because this segment of the Clinch River watershed currently meets all water quality standards, with the exception of bacteria, the receiving waters are considered to be high quality waters, and the segment is classified as “Tier 2” waters.

Since the quality of Tier 2 waters is better than required by the standards, the regulations mandate that no significant degradation of the existing quality will be allowed. In order to comply with the above restrictions, it

is necessary to establish anti-degradation baselines at the time the water is assigned to the Tier 2 category. This baseline identifies the quality that must be maintained by the current proposal as well as all future proposals, and is defined as the difference between the existing water quality and the lower quality allowed by the standards.

The application for reissuance proposes no new or increased discharges of pollutants, and the existing water quality based effluent limitation for copper is proposed to be maintained at its existing level. Therefore, this permit action will maintain the existing water quality and support the existing uses of the stream, and complies with the anti-degradation policy established by 9 VAC 25-260-30.

The staff proposes a staged approach in evaluating Outfall 003 with respect to antidegradation baselines and developing effluent limits. One stage represents the discharge from Outfall 003 during normal operations. A second stage represents the discharge from Outfall 003 during the enhanced dewatering of Pond 1A/1B. Because there was no proposed expansion or change in the nature of the discharge from Outfall 003 during non-enhanced dewatering operations, antidegradation baselines were not calculated for any toxic parameters at Outfall 003.

Because the proposed enhanced dewatering of Pond 1A/1B represents a change in nature of the discharge for Outfall 003 during the enhanced dewatering operations, antidegradation baselines were calculated for the process wastewater discharges. The antidegradation baselines are presented in the MSTRANTI spreadsheet that can be found in Appendix H. The baselines were calculated for all toxic parameters as not more than 25% of the unused assimilative capacity of the criteria for the protection of aquatic life (acute and chronic) and not more than 10% for the protection of human health. The unused assimilative capacity is defined as the difference between existing water quality and the criterion for a specific pollutant.

Dumps Creek is determined to be a Tier 1 waterbody. This determination is based on the fact that Dumps Creek is listed a 303(d) impaired water for not supporting aquatic life use (benthic) with TSS and TDS identified as the likely stressors.

15. Site Inspection:

Date: September 30, 2015 Performed By: Allen Cornett, Jason McCroskey, and David Nishida

A comprehensive site inspection was conducted within the past year. The inspection reviewed all aspects of the operation with respect to the permit requirements. No deficiencies or violations of the permit requirements were noted.

A site inspection for ISWGP VAR052112 was conducted on January 11, 2016 by Chad Quesenberry and David Nishida. No deficiencies or violations of the permit requirements were noted.

On October 21, 2015, a site visit was conducted with USFWS and DEQ to discuss 316(b) requirements. On February 3, 2016, a site visit was conducted with DEQ Solid Waste staff to discuss pond closure requirements.

16. Effluent Screening: See Appendix A – F, and I

17. Anti-Backsliding:

Because the effluent limitations included in the draft permit are at least as restrictive to those in the existing permit, the proposed action conforms to the anti-backsliding provision of the regulations.

18. Compliance Schedules:

There are no compliance schedules in the permit.

19. 303(d) Listed Segments (TMDL):

The majority of the discharges from the operation of the facility are directed to the Clinch River, which is listed as an impaired water for *E. coli*, and the subject of the *Bacteria TMDL Development for the Middle Clinch River and Tributaries in Virginia*, approved by EPA on January 17, 2014 and the SWCB on June 30, 2014. The TMDL assigned an annual allocated load of 6.27E+10 cfu and daily allocated load of 1.72E+08 cfu to the facility, both of which equates to a permitted concentration of 126 cfu/100mL. The proposed permit proposes a monthly average limit of 126 cfu/100mL (geometric mean), which is in compliance with the TMDL. A review of DMR data submitted demonstrates the facility's compliance with both the permitted effluent limit and load allocations of the TMDL.

A small portion of water from this facility discharges directly to Dumps Creek via a number of small groundwater discharges along the toe of the embankment of the capped Ash Pond 2. The cumulative discharge from the discharges is identified as Outfall 015 in the permit. Additionally, two stormwater outfalls (Outfalls 501 and 502) associated with the capped Ash Pond 2 and a proposed new stormwater outfall (Outfall 504) associated with Pond 1A/1B discharge to Dumps Creek. Dumps Creek was placed on the Commonwealth of Virginia's 1994 303(d) List of Impaired Waters for not supporting the state's aquatic life use. EPA approved the Dumps Creek TMDL on June 03, 2004 for this segment. A modification to the TMDL was approved by EPA on October 13, 2010, that added this permit (along with other facilities) to the list of point sources within the Dumps Creek watershed. The impairment to Dumps Creek is primarily attributed to total dissolved solids and total suspended solids resulting from historical mineral extraction. According to the approved TMDL… "*the potential sources contributing to the impairment include both nonpoint source contributions and point sources. The primary nonpoint source in the Dumps Creek watershed is abandoned mine lands (AML), which include, mine spoils, benches, and disturbed areas.*" The discharges along Dumps Creek which are addressed in this permit are a very minor potential source of pollutants into the mouth of Dumps Creek, and have a negligible impact upon the receiving water. The TMDL references this permit with a Wasteload Allocation 2,536 kg of total suspended sediment per year. However, in reviewing the DMR data for Outfall 015 and the DMR data for Outfalls 501 and 502 under Industrial Stormwater General Permit VAR052112 under which the outfalls are currently authorized, these three outfalls do not appear to be significant sources of suspended sediment. As such, effluent limits or further monitoring for Outfalls 501and 502 is unwarranted. Outfall 015 will continue to be sampled for TSS in this proposed permit, however, effluent limits for TSS are unwarranted.

20. Whole Effluent Toxicity (WET) Program:

Earlier permit actions initiated whole effluent toxicity testing at the facility to determine the potential toxicity of discharges 003 and 007. The initial toxic management program (TMP) required that the company conduct four semi-annual acute toxicity tests on grab samples of effluent from 007, and four quarterly acute and chronic toxicity tests on 24-hour composite samples from outfall 003. The permit specified that sampling at outfall 007 was to begin immediately following the 1990 reissuance of the permit, and sampling at outfall 003 was to start upon completion of the copper removal treatment facility AWWTP.

The company initiated the biological and chemical monitoring of outfall 007 in 1990. APCO completed the construction of the AWWTP in April 1993, and initiated the TMP testing at outfall 003 in August, 1993. This initial screening at 003 and 007 passed the criteria necessary to demonstrate no actual or potential toxicity, as described by the regulations and the toxic management guidelines, and the treated discharges were considered to

be non-toxic.

Since that time, the facility has routinely conducted additional testing of the effluent to confirm the continued compliance with initial results. During the 2010 permit reissuance, acute Whole Effluent Toxicity sampling was added to Outfall 727 on a quarterly basis.

The previous permit established evaluation criteria which defined potential acute toxicity from outfalls 007 and 727 as an LC_{50} of less than 100% effluent, and defined potential chronic toxicity test from outfall 003 as an NOEC of less than the drought flow in-stream waste concentration (IWC) of 18%. A review of the submitted data reveals that all of the whole effluent toxicity results from the quarterly/annual compliance testing pass the evaluation criteria, and the treated wastewater from these discharges is considered non-toxic to the test species.

The guidelines for toxicity testing recommend annual compliance monitoring for Outfall 003 and 007 resume for the duration of the permit. Because the operation is a major facility with a significant discharge to the receiving waters, the staff recommends continued biological testing to monitor the continued compliance with the water quality standards of the receiving stream for Outfalls 003 and 007.

Given that projected effluent flows form Outfall 003 have decreased, and that projected drought flows have increased as a result of decreases in water withdrawal rates, the staff reevaluated Outfalls 003 and 007 using WETLimit10.xls with the current assumptions. Evaluation of Outfall 003 with WETLimit10.xls indicated that an appropriate acute screening endpoint is an LC_{50} of 1.00 TU_a and an appropriate chronic screening endpoint is an NOEC of 10.00 TU_c. Evaluation of Outfall 007 with WETLimit10.xls indicated that an appropriate acute screening endpoint is an LC_{50} of 2.70 TU_a. Since Outfall 007 is a batch discharge from a treatment pond, chronic WET testing has not been required, and will not be required by this permit.

The WET testing results from 10 quarterly sampling events for Outfall 727 (batch stormwater discharge) has indicated the discharge is non-toxic. Evaluation of the outfall with WETLimit10.xls indicated that an appropriate acute screening endpoint would be an LC_{50} of 5.55 TU_a. WET testing during the previous permit term resulted in LC_{50} values < 1 TU_a for all sampling events. Furthermore, with the decommissioning of the ash transport system, the potential pollutant sources within the drainage area have been minimized. As such, the staff recommends discontinuing WET testing on Outfall 727. The permit will continue to require to monitoring for pH, oil/grease, and TSS at Outfall 727.

The staff recommends requiring WET testing during the Ash Pond 1A/1B dewatering operation that will discharge through Outfall 003 after treatment in the AWWTP. WET testing will be required once during the first week of dewatering, once during the second week of dewatering, and monthly thereafter. This approach is in response to public comments to assess toxicity early in the dewatering operation. Evaluation of the dewatering operation through Outfall 003 with WETLimit10.xls indicated that an appropriate acute effluent limit is an NOAEC of 100% and an appropriate chronic effluent limit is an NOEC of 3.12 TU_c.

This monitoring scenario is consistent with current DEQ guidelines, and is sufficient to monitor the potential impact to the receiving stream, with the current wastewater sources and existing level of treatment. Information regarding the development of these endpoints/limits can be found in Appendix F.

21. Stormwater Discharges Associated with Industrial Activity:

The VPDES Permit regulations 9 VAC 25-31-10 establish requirements for dischargers of stormwater associated with industrial activity. According to these regulations, the definition of stormwater associated with industrial activity includes:

1) Landfills, land application sites, and open dumps that receive or have received industrial wastes, including those subject to regulation under subtitle D of RCRA, and;

2) Steam electric power generating facilities, including coal handling sites;

Therefore, all outfalls from the facility which contain stormwater runoff from these categories of discharges will be subject to the stormwater provisions of the VPDES program. The stormwater runoff from the active portions of the landfill is directed to the landfill leachate collection system, and is ultimately treated in the AWWTP which is directed to outfall 003. Commingled discharges, such as outfall 003, which receive both process waters and stormwater runoff must also conform to the stormwater provisions of the permit. However, storm event monitoring will not apply at Outfall 003, since its stormwater component is but a minor portion of the entire wastewater stream. The remaining stormwater discharges associated with the landfill discharge runoff from the vegetated outslopes of the fill, and do not contact the waste material. Consequently, they are not assigned landfill sector specific monitoring requirements.

For routine stormwater monitoring purposes, the permit has addressed the discharges from the main plant area and the areas used for coal storage and handling. The applicant submitted results of stormwater discharge monitoring as required by the Part I.A monitoring requirements for 007 and 727, and the EPA Form 2C and 2F application requirements. The results of their monitoring and application screening have identified no pollutants at concentrations which would potentially contravene the water quality standards, or necessitate further review. For example, current implementation of the stormwater regulations would require additional monitoring and the development of pollutant specific control strategies for any pollutant at concentrations greater than or equal to two times the acute water quality standard for the stream. Since all pollutants were determined to be below this "action level" no pollutant specific stormwater special conditions are included in the permit for any of the discharge locations.

The permit includes all applicable stormwater monitoring and management requirements as established by 9 VAC 25-31-10 and is consistent with the requirements of 9 VAC-25-151-10. Specific monitoring requirements will address outfall 007 that are based upon the coal pile runoff recommendations. However, the sampling requirements have been changed to grab samples, because the discharges from both of these locations are batch discharges that are manually decanted. Therefore, the discharges are not directly the result of a rainfall event, and the standard stormwater sample requirements are unnecessary. Outfall 727 will continue to be monitored for pH, oil and grease, TSS and iron.

The management and control of all stormwater discharges is governed by the stormwater management provisions proposed in Part I.F of the draft permit. These requirements are based on the General VPDES Permit for discharges of stormwater associated with industrial activity as required by 9 VAC 25-151-10, and include quarterly visual examinations; a prohibition of non-stormwater discharges, and; the implementation of a stormwater pollution prevention plan.

22. Ash Pond Closure:

Historically, the bottom ash from the Clinch River plant was handled using two impounded areas identified as Pond 1 and Pond 2. The ponds are located along Dumps Creek in an area north of the power plant. Pond 1 is located on the western side of Dumps Creek, and Pond 2 was located on the eastern side of Dumps Creek. The ponds received ash from the furnaces which were hydraulically transported from the plant. Decant water from both ponds were directed into the Reclaim Pond near the entrance to the plant site and recycled for use in the ash transport stream. All blow down or excess water from the ash transport system was pumped from the reclaim pond and directed to the wastewater treatment system serving Outfall 003.

Pond 2 was taken out of service in 1997 and had remained dry for many years. On March 21, 2012, APCO submitted plans for closure of the Pond 2 structure. The closure of Ash Pond 2 was accomplished by re-grading the surface of the remaining dry ash and installing an impermeable cap with a vegetative cover. The DEQ SWRO approved the proposal in a letter dated June 1, 2012 under provisions of the VPDES permit.

Construction began in 2013 and the dry pond surface was re-graded to achieve a gently sloping surface to promote surface water runoff. The re-graded ash surface was covered with a 30 mil PVC flexible membrane liner covered by a geo-composite drainage layer and 2-feet of soil fill. The surface soil was seeded and mulched to promote the growth of a vegetative cover, and some of the surfaces were covered with sod to hasten re-vegetation. All offsite run-on of stormwater has been conveyed around the facility by means of diversion ditches that are designed to convey runoff from a 50-year storm. The reclaimed site is sloped such that non contact runoff from the capped areas is directed into one of two collection channels and conveyed to Dumps Creek as non-contact stormwater which is addressed in the VPDES permit as Outfalls 501 and 502.

Clinch River Plant ceased burning coal for power generation on September 2, 2015. Consequently, Pond 1 stopped receiving coal combustion residuals prior to October 19, 2015, the effective date of the federal CCR rule. The pond is considered an inactive surface impoundment under the federal coal combustion residuals rule (40 CFR 257.53) and subject to closure under the DEQ regulation 9 VAC 20-81 which became effective January 27, 2016.

DEQ received the Closure Plan for Pond 1 on January 11, 2016. The closure plan is under review by the DEQ Division of Land Protection and Revitalization under the solid waste management regulations and EPA's 2015 final rule on the disposal of coal combustion residuals. The closure and post closure activities will be subject to the DEQ solid waste permit number SWP620. Although ash generation has ceased and the plant will remain idle until the conversion to gas is complete, the ponds have continued to receive wastewater from the water treatment process.

The closure plan proposes to reclaim the site by re-grading the dried surface and installing an impermeable PVC liner on the top of the ash. A drainage layer will be installed above the liner, followed by a soil cover and vegetative cover. The drainage network will collect water which infiltrates the soil cover above the liner and direct it into the non-contact post-construction stormwater conveyance.

All ash-contact stormwater runoff during the construction phase of operations will be directed into the reclaim pond and treated at the AWWTP and discharged with process water at Outfall 003.

Pond 1 consists of two distinct sub-areas which are bisected by a causeway for vehicle access to the north side of the pond. The two pond sections are connected via a pipe underneath the causeway. The portion of the pond at the western end of the pond is referred to as Pond 1A, and the lower (i.e. downstream) portion of the pond is referred to as Pond 1B. The total upper surface of the Pond 1A/1B complex consists of approximately 20 acres. Ash transport water was discharged into the head of Pond 1A, which has a surface area of approximately 13 acres. The Pond 1B portion lies on the north eastern end of the diked area and is approximately 5 acres in size and contains the decant structure which is located is at the eastern end adjacent to the hillside on the northeast end of the pond. Over the life of the operation, normal operations of the Pond 1 system included routine removal of ash for disposal at the adjacent landfill or for beneficial uses off site. Normal operations also included adjustment of the pond level and placement of ash within the pond to direct water flow and minimize short-cutting of the discharge route.

A site visit to the site on February 3, 2015 confirmed that the entire surface of Pond 1A was essentially dry. Upon cessation of coal use, the wastewater discharges into pond one was moved from the head of Pond 1A to the

head of the Pond 1B. The volume of flow which is directed to the pond has been significantly reduced since it consists solely of water from the AWWTP underflow. At the time of the site visit, the portion of the pond which contains free standing water is limited to approximately 2 acres adjacent to the outlet structure.

The facility intends to remove the Pond 1A/1B complex from the wastewater treatment system in the upcoming months. The facility proposes to install a de-watering screw press to receive the only remaining wastewater currently directed into the Pond 1A/1B system. The press will produce a solid waste which will be removed from the site and placed in an off-site commercial or municipal landfill. The wastewater produced from the dewatering press will be redirected in the head works of the treatment system, thus eliminating any future discharge to the inactive surface impoundment. The dewatering press is intended to be in operation by late 2016; however, all process discharges to Pond 1 are to be eliminated by early to mid 2016 once DEQ grants approval to dewater the pond. The permittee proposes to utilize in the interim a vendor-supplied system consisting of vacuum boxes with 250 micron filter liners to capture and dewater wastewater treatment solids. The filtrate from the interim system will be re-circulated back into the AWWTP.

As stated above, all overflow of the Pond 1A/1B continues to be directed to the reclaim pond near the entrance to the plant. This wastewater is ultimately pumped to the AWWTP for treatment and is ultimately discharged at Outfall 003. During the proposed closure of the pond system, any remaining waters in the surface impoundment will be pumped into the existing decant system which is directed into the reclaim pond. Once the material is sufficiently dry, the surface will be re-graded to establish an appropriate drainage and fully capped as described above.

In the original application the company estimated that the total volume of water remaining in Pond 1 is 4.31 MG based on a November 2014 bathymetric survey. However, a recent 2016 bathymetric survey indicates that the volume of water remaining in Pond 1 is actually approximately 2.7 MG. To initiate dewatering they propose to place a mechanical pump at or near the existing decant structure and pump the liquid contents into the existing decant piping. The company estimates that the maximum rate of discharge will be approximately 0.18 MGD from the dewatering operation, and will be conducted over a period of 24 working days.

The dewatering activities and the management of the produced wastewater may be controlled both by the rate of flow from the dewatering pump, and the rate of pumping from the reclaim pond to the AWWTP. There is significant free board maintained in the reclaim pond such that any variation in decant flow would be equalized by the basin. Therefore, the company estimates that the potential increase in flow to the AWWTP resulting from the dewatering activities would be 0.18 MGD. The AWWTP has a maximum design flow capacity of 8 MGD. The anticipated maximum flow from the AWWTP is approximately 4.84 MGD with both generation Units 1 and 2 in service. Units 1 and 2 are currently undergoing conversion, and it is anticipated that one or both of the units will be out of service during the dewatering operation. Given the anticipated reduced flows to the AWWTP associated with the out-of-service unit(s), the addition of approximately 0.18 MGD associated with the dewatering of Pond 1 combined with other influent flows to the AWWTP will be well within the maximum flow of 4.84 MGD presented in the application and utilized in the evaluation of the effluent.

Once the discharges from the dewatering activities are complete, all stormwater discharges from the active working face of the ash will be directed to the reclaim pond and subsequently to the AWWTP for treatment.

23. Raw Water Intake and Section 316(b) requirements:

VPDES Permit Regulation 9VAC25-31-165.C requires existing facilities with cooling water intake structures to meet the requirements under §316(b) of the Clean Water Act (CWA) determined by the department on a case-by-case, best professional judgment basis. DEQ staff have determined the permitted facility to be subject to the

§316(b) requirements because it is a point source that uses or proposes to use one or more cooling water intake structures that withdraws waters of the U.S. for cooling purposes.

The facility operates an intake structure on the banks of the Clinch River which provides raw water for the plant operation. The plant began operation in 1958 and the intake has served the facility continuously since that time. During its operation as a coal fired facility, the intake provided water for boiler water, cooling water, ash transport water and similar process water needs. The intake structure has two 7' - 2" wide intake openings and has a trash rack in the opening to the river and two conventional traveling screens. Each basket frame in the traveling screens has screened openings of 10.3 square feet each with 3/8" inch square openings created by 0.080 inch diameter mesh wire. The bottoms of the screens are located at elevation 1484 feet above MSL. The low water pool elevation is approximately 1488 feet and the normal pool elevation of the segment is estimated to be 1,490 feet.

When in operation as a coal fired facility the station had three generating units. The intake is fitted with 3 pumps each rated at 6,500 gallons per minute. When operated as a coal fired facility, normal water demands routinely utilized two of the pumps and the third was held in reserve. Although this results in an intake design flow capacity of 18.36 MGD (12,750 gpm), actual monthly flow figures for the period of 2010 to 2013 ranged from 7.03 MGD to a maximum of 13.69 MGD.

The company indicates that approximately 65% of the intake water is used for cooling purposes. The Clinch River Plant has five mechanical draft cooling towers in a closed loop system to remove excess heat from the system. The company indicates that the towers operate on two to five cycles of concentration and provide a flow reduction of at least 97% compared to a once-through cooling system.

During the conversion to gas fueled operation, changes in the plant operation are anticipated to have significant reduction in make-up water needs. The Unit 3 furnace and the #5 cooling tower were decommissioned and taken out of service in May 2015. Units 1 and 2 are being converted to utilize natural gas, and make-up water for ash transport is no longer required for any of the units. Consequently, the company estimates that the intake flow necessary for operation can be met by a single pump operation and the flow will be reduced to 6,500 GPM (9.36 MGD). This represents a 49% reduction in design flow from the previous operation.

On August 14, 2014 the Environmental Protection Agency published the final rule which established requirements for cooling water intake structures at existing facilities that are designed to withdraw at least 2 million gallons per day of cooling water. The new regulations were to be implemented in the existing VPDES permits. It requires that existing facilities that withdraw at least 25% of their water from an adjacent water body exclusively for cooling purposes reduce fish impingement. This rule includes a national performance standard as the "best technology available (BTA)" to address impingement mortality at existing cooling water intake structures.

The regulations provided seven options for meeting BTA requirements for reducing impingement. The identified options included four technologies (closed-cycle recirculation systems, reduced design intake velocity, reduced actual intake velocity, and existing offshore velocity caps) that will generally comply with the BTA impingement mortality standard.

Included as Appendix H of the VPDES application for reissuance, APCO provided information required by the 316(b) final rule. Their report included information regarding the design and operation of the intake system, a description and characterization of the source water including biological survey reports and threatened and endangered species screening, as well as other site specific technical data required by the rule. The findings of their report indicated that the facility complies with the standards for the "best technology available" (i.e. BTA) for the following reasons:

a) The Clinch River Plant utilizes a closed cycle cooling system;
b) The flow reductions achieved through the retirement of unit 3 and the subsequent fuel conversion of Unit 1 and Unit 2 reduces the through-screen velocity to 0.5 fps and thereby conforms to impingement mortality reduction standard.

The company asserts that the facility operations are consistent with the 316(b) rule for existing facilities and that no further control measures are necessary.

In accordance with the implementation memorandum issued by the USEPA on December 11, 2014, (See Fact Sheet Appendix J.4) the DEQ-SWRO forwarded the application materials to the USFWS (service) for review and comment. Under the provisions of the program, the service has the opportunity to recommend that DEQ require site specific and species specific control measures and monitoring requirements.

In a letter dated July 16, 2015 the service asserted that the existing intake has the potential to impinge and entrain federally listed fish (i.e yellowfin madtom) and larval mussels, which they assert would result in an unauthorized take of federal listed species, and expressed concern about the mesh size, intake velocities and the lack of a specific plan to monitor impingement and entrainment. Although the service acknowledges that the facility meets one and potentially two of the compliance alternatives established by the 316(b) rule, they recommended the following additional measures to ensure protection of listed species:

a) A reduction in the intake screen mesh size from the existing 3/8" mesh to a 1mm;
b) A reduction in through screen velocity to 0.25 feet per second, and;
c) The implementation of a monitoring program to monitor impingement and entrainment.

The company provided a response to the service's comments in letters dated August 27, 2015 and December 4, 2015. The text of their responses is included as Fact Sheet Appendix J.2 and J.3. In summary, the APCo contends that:

a) The current configuration and proposed operation of the units satisfies the requirements of both 40 CFR 125.94(c)(1) and 40 CFR 125.94(c)(1) to minimize impingement mortality.
b) Typical "through screen" velocities at normal pool elevations is about 0.15 fps. The anticipated higher "through screen" velocities of 0.5 fps would potentially occur during low pool elevations which usually occur in the fall which corresponds to lower peak energy demands and less water usage. Reductions of the velocities to comply with the 0.25 fps recommendation would potentially double the size of the intake, and;
c) Modification of the intake structure to accommodate a 1mm mesh would necessitate a significant change in the design of the intake structure.

According to the preamble of the regulations for CWIS facilities, the recommendations that may be made by the Services to the facility and the Director are measures to minimize incidental take. EPA expects that any measures the Services recommend to minimize incidental take will be consistent with ESA regulations and guidance concerning reasonable and prudent measures. As stated in the ESA regulations under 50 CFR 402.14(i)(2), ''Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes.''

The company contends that the recommendations exceed what is considered "reasonable and prudent" because implementing the modifications would require significant alterations to the design of the system. Therefore, the Department has proposed no special conditions in the permit which require modifications of the intake structure.

The Department has included special conditions in the permit (Part I.E) to ensure continued compliance with the 316(b) rule and the VPDES permit regulations. The special conditions include a monitoring requirement (Part I.E.5) designed to assess the impact to Federally listed species.

The Department considers that the facility has complied with interim BTA in accordance with the federal 316(b) rule. Given that the Department has not adopted the 316(b) provisions in its regulation, no determination of final BPA may be made at this point. Under the provisions of our VPDES program, the proposed draft permit and supporting documentation will be sent to the EPA for their review and concurrence.

24. Effluent Limitations:

001 - Outfall 001 is the emergency overflow point of the ash water reclaim pond located near the plant entrance. The outfall is identified as a potential discharge location in Part I.B.11 of the permit, but is not authorized as discharge location, and no effluent limitations are proposed.

003 - Outfall 003 is the discharge from the advanced wastewater treatment plant. The permit reflects effluent limitations for pH, TSS, total chromium, total recoverable copper, total zinc, total residual chlorine, and oil and grease as was required in the previous permit. The reasonable potential analysis conducted during this evaluation has indicated that Outfall 003 requires a new limit on ammonia. Additionally, since the facility has a metal cleaning waste stream (non-chemical) that contributes to the Outfall 003 waste discharge, a technology based limit for iron has been added to this permit.

Appendix A contains an evaluation of the existing effluent data to determine the VPDES permit limits based upon the water quality standards for potentially toxic metals.

A review of the monitoring data submitted during the last permit term indicates that the facility has consistently achieved compliance with the permit limit.

The limitations for pH, TSS, Total Chromium, Total Zinc, Total Iron, and Oil and Grease are technology-based limits from the effluent guidelines (40 CFR Part 423) published for the steam electric category of discharges. The limits for Ammonia, Total Recoverable Copper and Total Residual Chlorine are based upon the water quality standards. Given that the recent data collected at 003 appears to be in compliance with the proposed effluent limits, no compliance schedule is included in the permit.

003A - Because outfall 003A is an alternative discharge location for the AWWTP clearwell, the effluent limitations and monitoring requirements will be identical to outfall 003, and would be reported on the DMR for 003.

D003 Dewatering - This permit addresses the enhanced dewatering of Pond 1A/1B to support the eventual capping and closure of the impoundment.

The decanting and treatment of the surface waters from the ash pond has historically been a component of the wastewater sources treated in the AWWTP and is authorized by the existing VPDES permit. Additionally, the routine management of ash in Pond 1 over the years has frequently varied the water surface level within the operational ranges of the existing spillway as

necessary for the removal ash for disposal and placement/relocation of internal dikes within the pond. However, past permits have not addressed enhanced dewatering operations (utilizing pumps and excavated sumps) that have the potential for increased interaction with interstitial waters (i.e. pore waters) that may result in differing influent quality and may present an additional load to the AWWTP. As such, the staff proposes a tiered approach for Outfall 003 during the enhanced dewatering operation for which a separate set of limits and monitoring requirements have been developed to incorporate expected pollutants associated with coal ash. The approach utilized in this permit is based on the approach utilized in other VPDES permits addressing the dewatering of coal ash ponds. Effluent screening and limit development discussion can be found in Appendix B.

005 - Outfall 005 was an emergency overflow and was identified as a potential discharge location in Part I.B.11 of the Initial Draft Permit. However, during the public comment period, the permittee brought to DEQ's attention that this outfall has been decommissioned during the installation of the buried natural gas distribution line. This outfall no longer serves as a potential discharge point for Sump 004 and has been removed from the Revised Draft Permit.

007 - The existing permit contains technology-based effluent limitations for discharges from the coal pile run-off. Part I.A also includes monitoring of Oil and Grease to reflect current stormwater monitoring requirements of coal pile runoff. Because the discharge is controlled by a gate valve, the stormwater sampling procedures have been modified to reflect the batch discharges. No changes are proposed from the existing permit requirements for outfall 007. Effluent screening and limit development discussion can be found in Appendix C.

008 - Outfall 008 is the discharge from the sewage treatment plant which receives all sanitary waste waters. The effluent limitations and monitoring requirements are based upon current guidelines for small sewage treatment plants, and a description of the basis for the limitations at outfall 008 is included in Appendix I.

The permittee requested a decrease in monitoring for pH from 6 days per week to 4 days per week for Outfall 008. A review of the DMR data supported a reduction in pH monitoring for this outfall. Rather than requiring pH monitoring 4 days per week, the staff reduced the monitoring requirements further to once per week. Additionally, review of the DMR data prompted the staff to reduce monitoring for BOD_5 and TSS from once per month to once per quarter.

014 - Under normal conditions, wastewater at this source is directed to the treatment system for Outfall 003. Since the basins are designed to contain the volume of runoff that would result from a 25-year, 24-hour storm event without pumping, no routine discharge is anticipated. The outfall is considered an emergency overflow and is identified as a potential discharge location in Part I.B.11 of the permit.

015 - Part I.A of the existing permit contains monitoring requirements for the groundwater discharge along the toe of the fill which was previously used as an ash pond. The staff has evaluated the constituents in the discharges from outfall 015 to determine if limitations are needed based upon the Water Quality Standards, and this review did not indicate a need for water quality based limitations. This finding is supported by the instream sampling conducted by the permittee which indicate that the discharges are causing no excursions from the water quality numeric criteria.

Given that the ash pond has been eliminated, and the facility has reclaimed the area associated

with its previous use as an ash handling area, no additional monitoring requirements or effluent limitations are proposed. Effluent screening and discussion can be found in Appendix D.

501 - This outfall was previously permitted under the Industrial Stormwater General Permit VAR052112, but will be incorporated into this permit upon reissuance. Sampling data was provided in Form 2F for this outfall. A screening level equal to 2 times the acute toxicity water quality criteria for each pollutant was utilized to determine whether a Stormwater Management Evaluation is necessary. All pollutant concentrations were below the screening levels, therefore no further evaluation is necessary. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

502 - This outfall was previously permitted under the Industrial Stormwater General Permit VAR052112, but will be incorporated into this permit upon reissuance. Sampling data was provided in Form 2F for this outfall. A screening level equal to 2 times the acute toxicity water quality criteria for each pollutant was utilized to determine whether a Stormwater Management Evaluation is necessary. All pollutant concentrations were below the screening levels, therefore no further evaluation is necessary. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

503 - This outfall was previously permitted under the Industrial Stormwater General Permit VAR052112, but will be incorporated into this permit upon reissuance. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

504 - Outfall 504 is a proposed outfall to be located on the southeastern edge of Ash Pond 1A/1B. This outfall will be constructed concurrently with the closure of Ash Pond 1A/1B. The outfall will receive stormwater from the proposed cap and surrounding area, and discharge to Dumps Creek via an existing tunnel under the adjacent road and railroad track. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

701 - The watershed for outfall 701 is a mostly vegetated area adjacent to the plant that is not directly related to the material handling and storage activities attendant to the power generation facility. Because the area does not have a significant potential for contributing pollutants to the discharges of stormwater, Part I.A contains no specific monitoring requirements. However, the outfall is subject to other stormwater provisions contained in Part I.F of the permit.

727 - Because outfall 727 controls stormwater runoff from the main plant area, Part I.A reflects monitoring requirements in accordance with the Department's recommendations for the steam electric category of stormwater discharges. However, the sample type and timing of collection have been modified from the standard because the basin is designed to be manually decanted and will not necessarily discharge as a direct result of a particular rainfall event. Since all discharges will be batch discharges, the proposed sample type is a grab sample.

During the previous permit term, the discharge from Outfall 727 has ranged from 6.33 to 9.6 SU. The high pH values reported were likely associated with the fly ash handling system. Since the fly ash handling system has been decommissioned with the conversion to natural gas, it is anticipated that elevated pH discharges will no longer occur. The permittee will be required to continue monitoring pH in the next permit cycle.

This facility falls under Industrial Sector O – Steam Electric Generating Facilities. Sector O facilities are required to conduct Benchmark Monitoring requirements for Iron with a benchmark target value of 1 mg/L. While this benchmark monitoring requirement was waived in the previous permit based on < QL levels of iron reported in the previous application, it will be required in the current permit since the reported value in the current application was 0.382 mg/L. The permittee will be required to sample for iron annually.

Effluent screening and limit development discussion can be found in Appendix E.

731 - No monitoring is proposed for the stormwater discharges from this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

736 - No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

737 - No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

738 - No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

739 - No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

740 - No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

801 - Outfall 801 will be the discharge point for the sedimentation basin identified in the application as the Haul Road Pond. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

802 - Outfall 802 is the discharge from sedimentation basin identified as the North Pond. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

803 - Outfall 803 is the discharge from the sedimentation basin identified as the South Pond. No monitoring is proposed for this outfall. The outfall is subject to stormwater provisions contained in Part I.F of the permit.

The effluent limitations and monitoring requirements are summarized in Appendices A through F.

25. Special Conditions:

The permit contains a standard industrial re-opener in the permit which provides a mechanism to re-open the permit if necessary due to changes in effluent limitations or other requirements approved under Section 307(a)(2) of the Clean Water Act. This is required by 9VAC25-31-220.B.1 (Part I.B.1).

The permit contains a special condition which requires that any debris collected on the intake trash racks not be returned to the waterway. This condition is continued verbatim from the existing permit. (Part I.B.2)

The permit contains a special condition which prohibits the discharge of Polychlorinated Biphenyl compounds. This condition is based upon 40 CFR Part 423 and is continued from the existing permit. (Part I.B.3)

The permit contains a special condition which prohibits the use of cooling water additives which contain any of the 126 priority pollutants. The condition is based upon the requirements of 40 CFR Part 423 and 9VAC25-196-70. This condition has been updated. (Part I.B.4)

This contains a special condition which prohibits the discharge of any wastes into State waters unless authorized by permit. 9VAC25-31-50 and the Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste. (Part I.B.5)

The permit includes a special condition which provides an exclusion of the TSS and pH limitations for outfall 007 (coal pile discharge) during periods of runoff from a 10-year, 24 hour rainfall event. This condition is taken from 40 CFR Part 423.12(b)(9) and (10), and is continued from the existing permit. (Part I.B.6)

A special condition is included in the permit which addresses the blow-down and de-chlorination procedures for the cooling tower blow-down wastewater. (Part I.B.7 and Part I.B.8)

The permit contains a special condition which requires that all wastewater collected in the leachate collection system for the landfill be pumped to the treatment system serving outfall 003. (Part I.B.9)

The permit includes special conditions which define the Total Residual Chlorine (TRC) Effluent Limitations and Monitoring Requirements for Outfall 003. (Part I.B.10)

The permit contains a special condition which designates Outfall 001 and Outfall 014 as potential discharge locations. The Initial Draft Permit also included Outfall 005 as a potential discharge location; however, this outfall has been decommissioned and therefore removed from the Revised Draft Permit. (Part I.B.11)

The permit includes a special condition which requires the permittee to notify the Department if they discharge certain toxic pollutants above established concentrations. This is required by 9VAC25-31-200.A for all manufacturing, commercial, mining, and silvicultural dischargers. (Part I.B.12)

The permit includes a licensed operator requirement as a special condition in the permit. The condition is required by 9 VAC 25-31-200D and the Code of VA 54.1-2300. A Class II operator is required for facilities which utilize physical and/or chemical methods and have capacities greater than 0.5 MGD but less than 5.0 MGD. (Part I.B.13)

The permit includes special conditions which specify additional monitoring and reporting requirements for Part I.A pollutants. These conditions are necessary when toxic and conventional pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. Quantification Levels were calculated in accordance with the current VPDES Permit Manual in the Initial Draft Permit. However, based on public comment, DEQ reduced the QLs in the Revised Draft Permit to levels consistent with other similar permits across the state. This condition is authorized by 9VAC25-31-190.J.4 and 9VAC25-31-220.I. (Part I.B.14)

The permit includes a special condition which requires the maintenance of a current Operations and Maintenance Manual. Required by Code of Virginia § 62.1-44.16; VPDES Permit Regulation, 9VAC25-31-190 E, and 40 CFR 122.41(e) requiring proper operation and maintenance of the permitted facility. Compliance with an O&M

manual ensures compliance with those regulations. (Part I.B.15).

A TMDL Re-opener is included as a special condition to the permit. (Part I.B.16).

The permit includes a condition to limit the rate at which Pond 1A/1B is dewatered into the reclaim pond. This limit is based on the proposed dewatering rates established by the permittee. (Part I.B.17)

The permit includes a condition requiring the permittee to notify DEQ prior to the commencement of enhanced dewatering of Pond 1A/1B. The State Water Control Law 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. (Part I.B.18)

The permit includes a condition requiring water quality criteria monitoring. State Water Control Law Section 62.144.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit. (Part I.B.19)

The permit includes a condition requiring the permittee cease dewatering Pond 1A/1B upon receipt of monitoring results indicating permit limitations have been exceeded. This condition is included to ensure that any discharge during closure activities that exceeds established effluent limitations is ceased as soon as possible once the exceedance(s) is discovered. §62.1-44.15.8.a grants the Board authority to "issue special orders to owners who are permitting or causing pollution (as defined by §62.1-44.3) of state waters to cease and desist." §62.1-44.5 prohibits discharges except in compliance with the permit. 9VAC25-31-210 allows on a case-by-case basis any conditions required to assure compliance with applicable requirements of the law, the CWA, and regulations. Because the characterization of the discharge during closure activities cannot be fully known in advance, it is appropriate to include this condition to protect water quality. (Part I.B.20)

The permit includes a whole effluent toxicity effluent limitations and monitoring requirement as special conditions of the permit. VPDES Permit Regulation, 9VAC25-31-210 and 220.I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. (Part I.C)

The permit includes special conditions applicable to Outfall 008 serving the on-site sewage treatment plant. The rationale behind the special conditions associated with Outfall 008 can be found in Appendix I of the fact sheet. (Part I.D)

This permit contains the following special conditions which apply to the cooling water intake structure. (Part I.E)

1. <u>Interim §316(b) Best Technology Available (BTA)</u>
   The permit includes a special condition which requires the facility to maintain compliance with the interim BTA measures by continuation of the closed loop system of cooling.

   VPDES Permit Regulation 9VAC25-31-165.C requires existing facilities with cooling water intake structures to meet the requirements under §316(b) of the Clean Water Act (CWA) determined by the department on a case-by-case, best professional judgment basis. DEQ staff have determined the permitted facility to be subject to the §316(b) requirements because it is a point source that uses or proposes to use one or more cooling water intake structures that withdraws waters of the U.S. for cooling purposes.

   Federal regulations at 40 CFR §§125.98(b)(5) and (b)(6) mandate that for permits issued before

July 14, 2018, for which an alternate schedule has been established for the submission of information required by 40 CFR §122.21(r), must include interim BTA requirements in the permit based on best professional judgment on a site-specific basis. This special condition outlines interim BTA practices to minimize impingement and entrainment (I&E) mortality and adverse impacts to aquatic organisms.

2. Impingement and Entrainment Control Technology Preventative Maintenance:
VPDES Permit Regulation 9VAC25-31-190.E requires the permittee, at all times, to 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 the permit.

3. Alternate Schedule for Submittal of 40 CFR §122.21(r) Information:

The revised permit contained a special condition which establishes an alternate schedule to complete submission of data required by 40CFR §§122.21(r)(2) through (r)(9). Based on discussion with AEP, this condition was modified in the final permit to the following language to address AEP's concerns about the informational requirements:

> *The permittee shall, by no later than 180 days prior to the expiration date of this permit, submit to the DEQ Southwest Regional Office all applicable information described in 40 CFR §§122.21(r)(2) through (r)(8). In addition, the submission shall include information described in 40 CFR §122.21(r)(9).*

VPDES Permit Regulation 9VAC25-31-165.C requires existing facilities with cooling water intake structures to meet the requirements under §316(b) of the Clean Water Act (CWA) determined by the department on a case-by-case, best professional judgment (BPJ) basis. Federal regulations at 40 CFR §125.95(a)(2) allow for owners or operators of a facility whose permit expires prior to July 14, 2018 to request the Director establish an alternate schedule for the submission of the information required in 40 CFR §122.21(r) when making application for this permit. If the owner or operator of the facility demonstrates that it could not develop the required information by the applicable date of submission, DEQ must establish an alternate schedule for the submission of the required information.

Federal regulations at 40 CFR §125.98(a) requires the review, for completeness, of the materials submitted by the applicant under 40 CFR §122.21(r) at the time of any application for a subsequent permit. To facilitate a determination of a timely and complete reissuance application in compliance with Part II.M of this permit, the Alternate Schedule for this facility has been established to require submission of the 40 CFR §122.21(r) information to the DEQ-Regional Office by no later than 180 days prior to the expiration date of this permit.

4. Visual or Remote Inspections
VPDES Permit Regulation 9VAC25-31-210.A authorizes the Board to establish permit conditions to provide for and assure compliance with all applicable requirements of the law, the CWA and regulations. Federal regulations at 40 CFR §125.96(e) requires visual inspections or the employment of remote monitoring devices to be conducted at least weekly during the period any cooling water intake structure is in operation to ensure any technologies operated are maintained and operated to function as designed, including those installed to protect Federally-listed threatened or endangered species or designated critical habitat.

40 CFR §125.96 authorizes DEQ to establish monitoring requirements, and specific protocols, as appropriate. Provisions for inspection waivers, adverse weather conditions, and deficiency discoveries were developed, using as a foundation, comparable provisions found in the VPDES General Permit for Stormwater Discharges Associated with Industrial Activity, 9 VAC 25-151-70, Part I.A.2.e, A.3. and A.6.b.

5. Annual Certification Statement Requirements
VPDES Permit Regulation 9VAC25-31-210.A authorizes the Board to establish permit conditions to provide for and assure compliance with all applicable requirements of the law, the CWA and regulations. Federal regulations at 40 CFR §125.97(c) requires the permittee to annually submit a certification statement signed by a responsible corporate officer reporting whether there have been substantial modifications to the operation at any unit at the facility that impacts cooling water withdrawals or operation of the cooling water intake structures, or if information contained in the previous year's annual certification remains pertinent.

6. Measures to protect Federally-listed Threatened or Endangered (T&E) species, designated critical habitat, and fragile species or shellfish
VPDES Permit Regulation 9VAC25-31-330 authorizes the board to include conditions in the permit in response to advice submitted in writing to the DEQ from the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, or any other state or federal agency with jurisdiction over fish, wildlife, or public health that the imposition of specified conditions are necessary to avoid substantial impairment of fish, shellfish, or wildlife resources and to the extent the board determines the conditions are necessary to carry out the provisions of the regulation, the law and of the CWA.

In addition, VPDES Permit Regulation 9VAC25-31-165.C requires existing facilities with cooling water intake structures to meet requirements under section 316(b) of the Clean Water Act determined by the department on a case-by-case, best professional judgment (BPJ) basis. 40 CFR §§125.94(a)(1), 125.94(g), 125.96(g), and 125.97(g) authorize DEQ to establish additional control measures, monitoring, and reporting requirements in the permit designed to minimize incidental take, reduce or remove more than minor detrimental effects to Federally-listed threatened or endangered species or designated critical habitat, or avoid jeopardizing Federally-listed species or destroying or adversely modifying designated critical habitat (e.g. prey base).

40 CFR §125.96(g) mandates that DEQ require monitoring associated with any additional measures designed to minimize incidental take, reduce or remove more than minor detrimental effects to Federally-listed threatened or endangered species or designated critical habitat, or avoid jeopardizing Federally-listed species or destroying or adversely modifying designated critical habitat (e.g. prey base) pursuant to 40 CFR §125.94(g). While a specific monitoring protocol is not required by DEQ, the permittee is required to provide an annual report to include a compilation of any federally-listed threatened or endangered species found to have been impinged or entrained during the reporting year, including the total number and type of organisms (listed by taxa), and life stage cycle (egg, larva, juvenile, adult) impacted by injury or death.

State Water Control Law §62.1-44.5.A.3 and VPDES Permit Regulation 9VAC25-31-50.A.2 prohibits the alteration of the physical, chemical or biological properties of State waters and making them detrimental to animal or aquatic life, except in compliance with a permit issued by

the Board. In addition, VPDES Permit Regulation 9VAC25-31-190.E requires the permittee, at all times, to 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 the permit.

State Water Control Law §62.1-44.21 and VPDES Permit Regulation 9VAC25-31-190.H authorizes the Board to require owners to furnish plans, specifications, and other pertinent information as may be necessary to accomplish the purposes of the State Water Control Law. In addition, federal regulations at 40 CFR §125.94(g) and §125.97(e) authorize DEQ to establish additional permit monitoring and reporting requirements. Information provided by the permittee under this special condition may be used as a foundation to address other reporting requirements of 40 CFR §125.98(k).

7. Federal Endangered Species Act Compliance
State Water Control Law §62.1-44.5.A.3 and VPDES Permit Regulation 9VAC25-31-50.A.2 prohibits the alteration of the physical, chemical or biological properties of State waters and making them detrimental to animal or aquatic life, except in compliance with a permit issued by the Board.

In addition, VPDES Permit Regulation 9VAC25-31-210.A authorizes the Board to establish permit conditions to provide for and assure compliance with all applicable requirements of the law, the CWA and regulations. 40 CFR §125.98(j) stipulates that nothing in Subpart J of Part 125 of the Code of Federal Regulations authorizes the take, as defined at 16 U.S.C. 1532(19), of threatened or endangered species of fish or wildlife. Such take is prohibited under the Endangered Species Act unless it is exempted pursuant to 16 U.S.C 1536(o) or permitted pursuant to 16 U.S.C 1539(a). Absent such exemption or permit, any facility must not take threatened or endangered species. 40 CFR §125.98(b)(1) requires all NPDES permits for facilities subject to §316(b) of the Clean Water Act to include as a permit condition the specific language of this special condition.

The permit includes a Stormwater Management Program as special conditions of the permit. VPDES Permit Regulation 9VAC25-31-10 defines discharges of stormwater from industrial activity in 9 industrial categories. 9VAC25-31-120 requires a permit for these discharges. The Stormwater Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of stormwater associated with industrial activity, 9VAC25-151-10 et seq. VPDES Permit Regulation, 9VAC25-31-220.K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law. (Part I.F)

Conditions Applicable To All VPDES Permits. VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed. (Part II)

26. NPDES Permit Rating Worksheet:

The staff has completed the NPDES Permit Rating Worksheet and has determined that the facility meets the criteria to be classified as a major source. The completed worksheet is on file at the regional office.

Total Score: **600**

27. Changes in the Permit:

A. **Owner Requested Modifications**:

In its application for reissuance, AEP requested an exclusion from the Clean Water Act Section 311 liability for sodium nitrate and sulfuric acid (See Appendix 5 of the Application materials). Section 311 of the CWA addresses pollution from oil and hazardous substance releases, providing EPA and delegated states with the authority to establish a program for preventing, preparing for, and responding to releases that occur in waters of the U.S. When the amount of a substance exceeds a certain quantity, the release must be reported to the proper State authorities. Reportable quantities for hazardous substances are established in 40 CFR 117 and 40 CFR 300.

Sulfuric acid and sodium nitrate are included as two of the potentially hazardous substances listed in Section 311, and are used at the Clinch River Plant in quantities that exceed the reportable thresholds. Sodium nitrate is used as a rust inhibitor in the cooling water system, and sulfuric acid is used for pH control of the circulating water. The discharge which receives any wastewater streams which contain these chemicals is authorized by the permit as outfall 003, and is in compliance with the existing VPDES permit and the established stream standards. Furthermore, the transfer, storage and handling of the chemicals are regulated under the material handling provisions of Part I.B and Part I.G of the proposed permit. The Department acknowledges the use of these chemicals, and approves their use within the provisions imposed by the effluent limitations and special conditions of the permit.

The permittee requested that stormwater Outfalls 501, 502, and 503 associated with the now capped Pond 2 previously permitted under ISWGP VAR052112 be incorporated into this permit upon reissuance. These outfalls have been incorporated into this permit. Additionally, upon review of the Closure Plan for Pond 1A/1B, it became apparent that a new stormwater outfall (Outfall 504) will be established upon closure of Pond 1A/1B that will convey both up gradient stormwater flow and stormwater from the cap to Dumps Creek. This stormwater outfall has also been incorporated into this permit.

The permittee requested a decrease in monitoring for pH from 6 days per week to 4 days per week for Outfall 008. A review of the DMR data supported a reduction in pH monitoring for this outfall; however the staff reduced the monitoring requirements further to once per week. Additionally, review of the DMR data prompted the staff to reduce monitoring for BOD_5 and TSS from once per month to once per quarter.

The permittee requested a discontinuation of WET testing for Outfalls 003, 007, and 727. The staff has agreed to remove WET testing from Outfall 727 based on past testing results. However, WET testing for Outfalls 003 and 007 will remain in the permit.

The permittee noted that with the conversion from coal powered generation to natural gas powered generation that the water withdrawal rates will significantly decrease. DEQ incorporated this decrease in withdrawal rates into the calculations for drought flows used in effluent screening and limit development.

The permittee noted in the application that in the absence of coal combustion, process waters will no longer come into contact with coal combustion byproducts (CCBs) other than solid waste landfill leachate from previously disposed CCBs. Water flows related to CCB handling and the operation of Unit 3 will be eliminated, including:

- Fly ash and bottom ash sluice water

- Water used in the fly ash silo mixer
- Ash tank overflows
- Decanted water from the ash settling ponds (following pond closure)
- Cooling Tower 5 blowdown

These changes were taken into account in reviewing the applicable portions of the Federal Effluent Guidelines for the facility.

The permittee provided a draft water balance diagram depicting expected flows post gas conversion. This diagram was utilized in the effluent screening and limit development for the facility.

B. **DEQ Proposed Modifications**:

The following changes from the existing VPDES permit were proposed in the Initial Draft Permit:

- Added a water quality based ammonia limit to Outfall 003 based on RPA of past monitoring. (Part I.A.1)
- Added a technology based iron limit to Outfall 003 based on ELG requirements for non-chemical metal cleaning waste waters. (Part I.A.1)
- Added a tiered set of effluent limits and monitoring for Outfall 003 to be applied during enhanced dewatering of Ash Pond 1A/1B. This set of effluent limits and monitoring is to be applied until the conclusion of pond closure activities. (Part I.A.2)
- Reduced monitoring frequency at Outfall 008 (Sewage Treatment Plant) for pH, BOD_5, and total suspended solids. (Part I.A.4)
- Removed WET monitoring requirements for Outfall 727 (stormwater runoff, main plant area) based on favorable results of past monitoring. (Part I.A.6)
- Added new stormwater Outfalls 501, 502, 503, and 504 associated with Ponds 1 and 2. (Part I.A.7)
- Updated Part I.B.4 to include informational requirements necessary when requesting a change of chemical additives in the cooling tower blow-down discharges. (Part I.B.4)
- Removed the special condition prohibiting the discharge of metal cleaning waste. As noted above, technology based effluent limit for iron was added to the permit to accommodate the addition of non-chemical metal cleaning waste waters. (Part I.B.5 of the 2010 VPDES permit)
- Added the standard Materials Handling/Storage special condition in accordance with the current VPDES Permit Manual. (Part I.B.5)
- Updated the description of outfalls 001, 005, and 014 to identify these outfalls as “potential discharge locations” as opposed to “by-pass locations”. The permittee is not authorized to discharge from these outfalls. (Part I.B.11)
- Updated effluent parameters and quantification levels to reflect changes in effluent limitations and monitoring requirements within the permit. (Part I.B.14)
- Removed the special condition addressing the transition of coverage for Outfalls 801, 802, and 803 (Possum Hollow Landfill stormwater outfalls) from the construction stormwater general permit to the VPDES individual permit. These outfalls are now fully incorporated into this permit. (Part I.B.15 of the 2010 VPDES permit)
- Added the standard O&M Manual condition to reflect the recommendations of the current VPDES Permit Manual. (Part I.B.15)
- Removed the special condition requiring monitoring for ammonia-nitrogen, since Part I.A.1 and 2 now have established an effluent limitation for ammonia-nitrogen. (Part I.B.17 of the 2010 VPDES permit)

- Added a special condition limiting the rate of flow of the dewatering operation from Pond 1A/1B to the reclaim pond. (Part I.B.17)
- Removed the requirement to conduct a special study for mercury at Outfalls 003, 007, and 727. (Part I.B.18 of the 2010 VPDES permit)
- Added a special condition requiring notification of initiation of enhanced dewatering for Pond 1A/1B. (Part I.B.18)
- Added a special condition requiring cessation of Pond 1A/1B dewatering activities in the event that an exceedance of effluent limitation occurs. (Part I.B.20)
- Revised the Whole Effluent Toxicity Testing requirements associated with the permit. (Part I.C)
- Updated the language of the Special Conditions Applicable to Outfall 008. Added a condition requiring increased monitoring frequencies for Outfall 008 in the event a Notice of Violation is issued for pH, BOD_5, and TSS. (Part I.D)
- Added Cooling Water Intake Structure Requirements to the permit to address issues related to Clean Water Act §316(b). (Part I.E)
- The Stormwater Management conditions have been changed to reflect current regulation and agency guidance. (Part I.F)
- The following portions of Part II were updated to in accordance with current regulation:

  A.1.c. Added VELAP special condition which requires samples to be analyzed in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Laboratories per VPDES Permit Manual IN-1, A.4, page 15, updated 3/27/2014.

  A.2. States that any pollutant specifically addressed by this permit that is sampled or measured at the permit designated or approved location more frequently than required by this permit shall meet the requirements in A 1 a through c of this section of the permit and the results of this monitoring shall be included in the calculations and reporting required by this permit.

  A.3. Clarified that operational or process control samples or measurements do not need to follow procedures approved under Title 40 Code of Federal Regulations Part 136 or be analyzed in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

  I.3. Added language which allows for the Reporting of Non-Compliance activities to be submitted online in addition to reporting them by means of a telephone call.

C. **Changes to the Permit in Response to Public / Applicant Comments:** See Attachment A of the Memo submitted to the members of the State Water Control Board.

28. Variances/ Alternative Limits or Conditions:

A. There are no proposed variances from standard regulatory requirements

B. The sample type for stormwater sampling at outfall 007 and 727 is designated as a single grab instead of the standard recommended stormwater sample conditions because the discharges from the basins are batch discharges under operator control.

29. Public Notice Information:

In accordance with 9 VAC 25-31-290, a public notice will be published once per week for two consecutive weeks in a newspaper of general circulation in the area affected by the discharge. Additionally, a public hearing is scheduled for May 4, 2016, during the comment period. A copy of the public notice and all pertinent information is on file, and may be inspected or copied by contacting David Nishida at:

Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210
Phone: (276) 676-4800
E-mail address: david.nishida@deq.virginia.gov

Persons may comment in writing or by email to the DEQ on the proposed permit action during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered.

During the comment period, a public hearing will be held on May 4, 2016, at 7:00 p.m. at the Russell County Conference Center, located at 139 Highland Drive, Lebanon, VA. Additionally, an informational briefing will be held on May 4, 2016, from 6:00 p.m. to 6:45 p.m. at the same location. Staff will be available to answer questions during the informational briefing. Persons may provide written and oral comments during the public hearing. To make an oral statement at a public hearing, the commenter will be required to write their name on a sign-up sheet available before the hearing. Individuals will only be allowed to sign up for themselves. The time allowed for each statement is set by the hearing officer.

Following the comment period and public hearing, the Board will make a determination regarding the proposed permit action. The public may review the draft permit and application at the DEQ Southwest Regional Office by appointment.

Public Notice Beginning Date: April 1, 2016

Public Hearing Date: May 4, 2016

Public Notice End Date: May 19, 2016

30. Additional Comments:

A. **Previous Board Action**: The permit was submitted for review by the SWCB for the June 27, 2016 SWCB Meeting. On June 27, 2016, DEQ staff made a presentation for the reissuance of the permit. Staff provided background information on the project, discussed public participation in the permitting process, summarized the major areas of concern, and presented DEQ responses and proposed changes to the draft permit.

Rick Chafin, the Plant Manager of the Appalachian Power Company – Clinch River Plant, provided

comments supporting the reissuance of the permit. Bradford T. McLane (Southern Environmental Law Center) presented comments in opposition to the permit reissuance and offered a suggested modification. Following the oral comments, Rich Chafin (APCO) responded to further questions raised by the Board.

The staff then recommended the Board:

1. Find that:

   a. The permit has been prepared in conformance with all applicable statues, regulations, and agency practices;

   b. The effluent limits and conditions in the permit have been established to protect instream beneficial uses and fish and wildlife resources; and

   c. All public comments relevant to the permit have been considered.

2. Approve the permit and conditions as presented; and

3. Authorize the Director to issue the permit as approved by the Board.

The Board, based on the Board book material and presentations at the meeting, voted unanimously in favor of staff's recommendation.

B. **Staff Comments:** None

C. **Other Agency Comments:** For agency comments received during the public comment period refer to Attachments B and C of the Memo submitted to the members of the State Water Control Board. For agency comments received prior to the public comment period see below.

USFWS Comments:

On May 22, 2015, in accordance with 40CFR §125.98(h) and the protocols for Threatened and Endangered Species coordination established under the EPA Phase II §316(b) Rule for VPDES facilities with cooling water intake structures (CWIS), the DEQ-SWRO forwarded the application for reissuance to the U.S. Fish and Wildlife service for comment. On July 16, 2015 the Service provided comments regarding the information in the application (See Appendix J.1). Although the Service acknowledged that the facility meets two of the compliance alternatives cited in the 316(b) rule, they made recommendations for the following additional measures to protect the known federally listed species:

a) a reduction in the intake screen mesh size from the existing 3/8” mesh to a 1mm;
b) a reduction in through screen velocity to 0.25 feet per second, and;
c) the implementation of a monitoring program to monitor impingement and entrainment.

On August 5, 2015, the DEQ-SWRO forwarded the USFWS comments to the applicant for their consideration, and on August 31, 2015 the applicant provided a technical response to their comments. (Appendix J.2). DEQ coordinated a meeting between DEQ, USFWS and APCo staff members to discuss the any unresolved issues and comments regarding the 316(b) requirements. On December 4, 2015, APCo submitted a letter outlining their response to the USFWS comments (See Appendix J.3). In this response, the company indicated that the facility utilizes “best

available technology" in accordance with the rule. Furthermore, the company contends that modifications to the intake to meet the recommended screen size and intake velocities would require significant changes in the design, and go beyond the "reasonable and prudent measures" described in the final rule.

D. **Applicant Comments:** For a summary of the applicant comments refer to Attachments B and C of the Memo submitted to the members of the State Water Control Board.

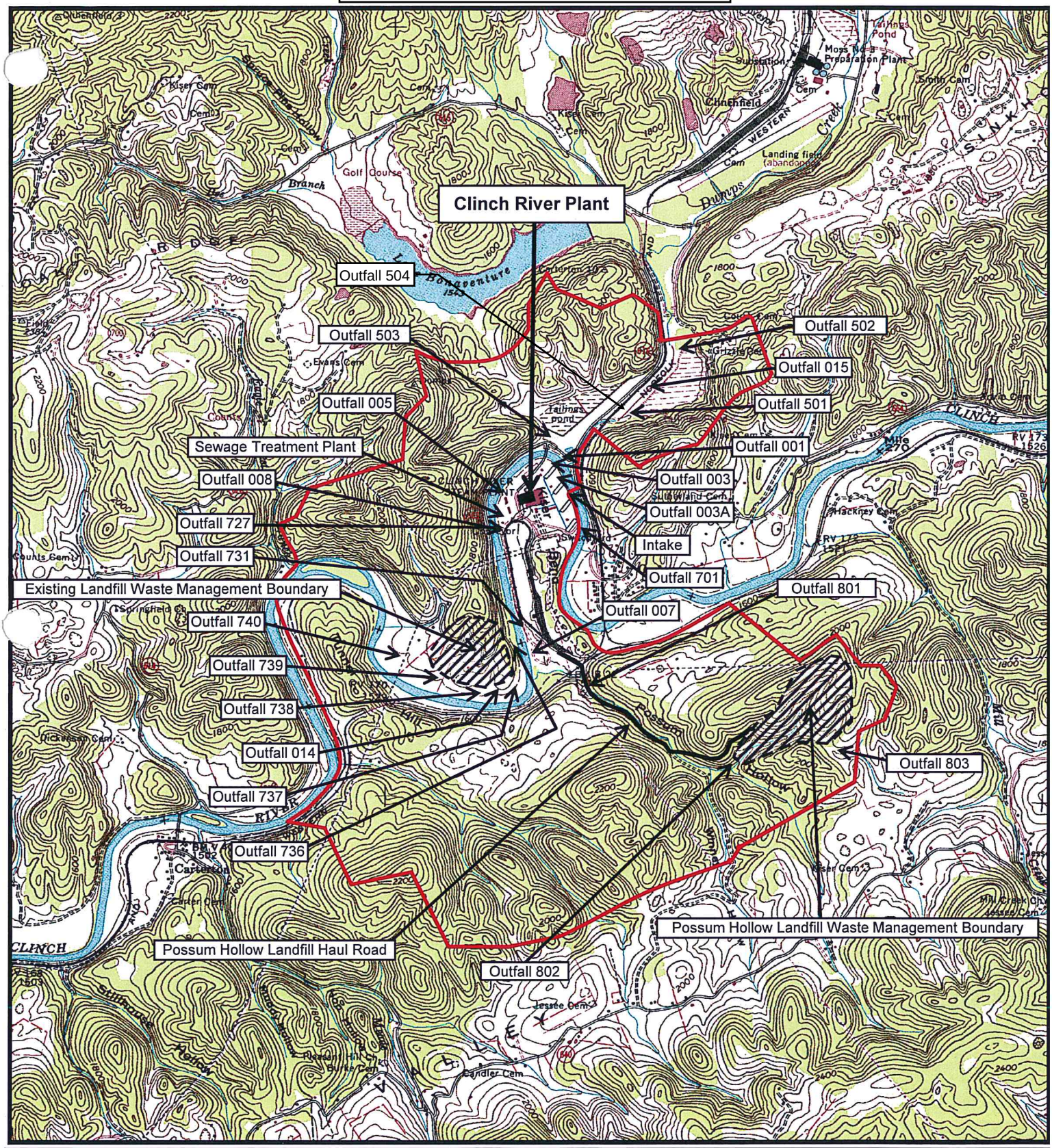
E. **Public Notice Comments**: For a summary of the public comments refer to Attachments B and C of the Memo submitted to the members of the State Water Control Board.

31. Response to Comments: For the detailed response to comments refer to Attachment B of the Memo submitted to the members of the State Water Control Board.

List of Attachments

1. Attachment A – Location Map
2. Attachment B – Water Schematic
3. Appendix A – Outfall 003 Effluent Limitation Development
4. Appendix B – Outfall D003 Dewatering Operation Effluent Limitation Development
5. Appendix C – Outfall 007 Effluent Limitation Development
6. Appendix D – Outfall 015 Effluent Limitation Development
7. Appendix E – Outfall 727 Effluent Limitation Development
8. Appendix F – WET Testing Evaluation
9. Appendix G – Mixing Zone Evaluation
10. Appendix H – MSTRANTI Sheets
11. Appendix I – Outfall 008 Sewage Treatment Plant Discussion
12. Appendix J – Correspondence Related to 316(b)

ATTACHMENT A
VA0001015 FACT SHEET



N

Carbo, VA Quadrangle
USGS Topographic Map

02.16.15

0 ½ 1mi

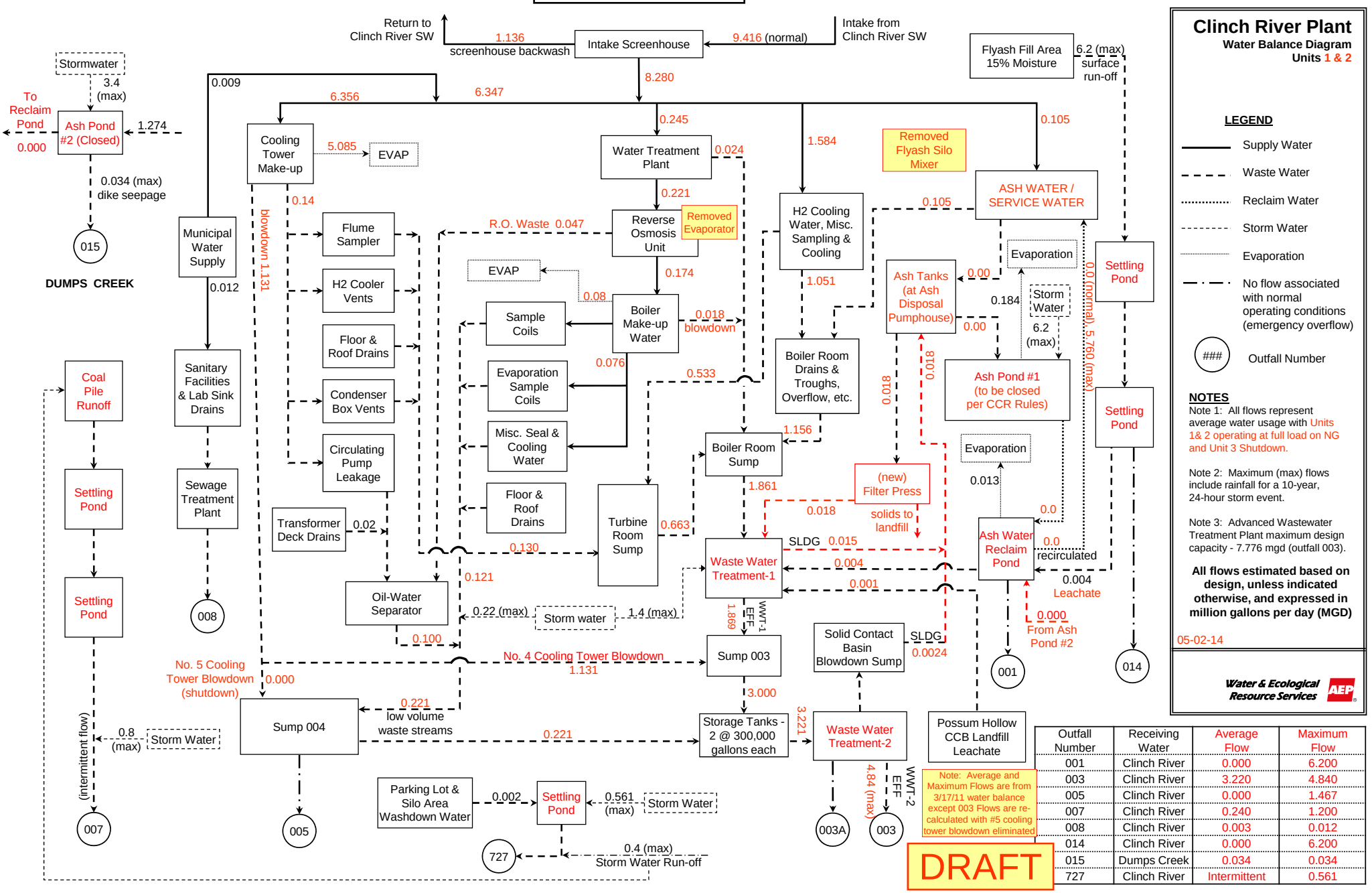
Plant Boundary (not actual survey, for general info only)

Appalachian Power Company
Clinch River Plant
VPDES Permit No. VA0001015
Outfall Location Map

Plant Latitude 36° 55' 58"
Plant Longitude 82° 11' 59"

AEP

ATTACHMENT B
VA0001015 FACT SHEET



Clinch River Plant

Water Balance Diagram
Units 1 & 2

LEGEND

- Supply Water
- Waste Water
- Reclaim Water
- Storm Water
- Evaporation
- No flow associated with normal operating conditions (emergency overflow)
- ### Outfall Number

NOTES

Note 1: All flows represent average water usage with Units 1& 2 operating at full load on NG and Unit 3 Shutdown.

Note 2: Maximum (max) flows include rainfall for a 10-year, 24-hour storm event.

Note 3: Advanced Wastewater Treatment Plant maximum design capacity - 7.776 mgd (outfall 003).

All flows estimated based on design, unless indicated otherwise, and expressed in million gallons per day (MGD)

05-02-14

Water & Ecological Resource Services

Outfall Number	Receiving Water	Average Flow	Maximum Flow
001	Clinch River	0.000	6.200
003	Clinch River	3.220	4.840
005	Clinch River	0.000	1.467
007	Clinch River	0.240	1.200
008	Clinch River	0.003	0.012
014	Clinch River	0.000	6.200
015	Dumps Creek	0.034	0.034
727	Clinch River	Intermittent	0.561

APPENDIX A

EVALUATION OF DISCHARGES FROM OUTFALL 003 (Advanced Wastewater Treatment Plant)

A comparison of technology and water quality-based limits was performed, and the most stringent limits were selected. The selected limits are summarized in the table below.

Outfall 003 (AWWTP) **Final Limits** **Maximum Projected Flow: 4.84 MGD**

PARAMETER	BASIS FOR LIMIT	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	Continuous	Measured
		Monthly Average	Daily Maximum		
Total Suspended Solids (mg/L)	3	30	100	1/ 3Months	24HC
Total Recoverable Copper (ug/L)	2	37	37	1/Month	24HC
Ammonia N (mg/L)	2	7.6	7.6	1/Month	24HC
Oil and Grease (mg/L)	3	15	20	1/Year	Grab
Total Chromium (mg/L)	3	0.2	0.2	1/Year	24HC
Total Zinc (mg/L)	3	1.0	1.0	1/Year	24HC
Total Iron (mg/L)	3	1.0	1.0	1/Year	24HC
Total Residual Chlorine (TRC)(µg/L)	2,3	40	40	1/Week	Grab
Total Selenium	2	NL	NL	1/Month	24HC
Acute WET, *Ceriodaphnia dubia*	2	NL	NL	1/Year	24HC
Chronic WET, *C.dubia* (TU_c)	2	NL	NL	1/Year	24HC
Acute WET, *Pimephales promelas*	2	NL	NL	1/Year	24HC
Chronic WET, *Pimephales promelas* (TU_c)	2	NL	NL	1/Year	24HC
		Minimum	Maximum		
pH	2,3	6.0 SU	9.0 SU	1/Week	Grab

NL = No Limitation, monitoring required *NA = Not Applicable*

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Water Quality Standards (9VAC25-260)
3. Federal Effluent Limitation Guidelines – Steam Electric Power Generating Point Source Category (40 CFR Part 423)
4. Best Professional Judgment

EFFLUENT LIMITATIONS GUIDELINES (ELGs)

The final rule dated September 30, 2015 that became effective on November 29, 2015 for the Steam Electric Power category was utilized.

ELGs for Best Available Technology Economically Achievable (BAT) for Cooling Tower Blowdown in 40 CFR Part 423.13(d)(1), (2) and (3) are as follows:

Pollutant or pollutant property	BAT effluent limitations	
	Maximum concentration (mg/l)	Average concentration (mg/l)
Free available chlorine	0.5	0.2

Pollutant or pollutant property	Maximum for any 1 day –(mg/l)	Average of daily values for 30 consecutive days shall not exceed = (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except:	([1])	([1])
Chromium, total	0.2	0.2
Zinc, total	1.0	1.0

[1]No detectable amount.

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

(3) At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.

ELGs for Best Available Technology Economically Achievable (BAT) for Combustion Residual Leachate in 40 CFR Part 423.13(l) is as follows:

Combustion residual leachate. The quantity of pollutants discharged in combustion residual leachate shall not exceed the quantity determined by multiplying the flow of combustion residual leachate times the concentration for TSS listed in §423.12(b)(11).

Table §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
TSS	100.0	30.0
Oil and grease	20.0	15.0

ELGs for Best Practicable Control Technology Currently Available (BPT) for all discharges other than once through cooling water in 40 CFR Part 423.12(b)(1) is as follows:

The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.

ELGs for Best Practicable Control Technology Currently Available (BPT) for discharges from low volume waste sources in 40 CFR Part 423.12(b)(3) is as follows:

The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources 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

ELGs for Best Practicable Control Technology Currently Available (BPT) for metal cleaning wastes in 40 CFR Part 423.12(b)(5) is as follows:

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, total	1.0	1.0

EVALUATION OF MIXING

Based on comments received during the public comment period with regard to mixing zone assumptions utilized in the Initial Draft Permit to generate wasteload allocations and the effects those assumptions may have on threatened and endangered species, DEQ has determined it appropriate to apply the 350 foot regulatory mixing zone to the normal operations (non-dewatering) calculation of wasteload allocations for the Revised Draft Permit. This is the same mixing assumption approach utilized in the evaluation of wasteload allocations in the Initial Draft Permit for the dewatering tier of effluent limits. See Appendix B for a description of the mixing zone analysis with regard to the application of a regulatory mixing zone.

This reevaluation resulted in reductions to the copper and ammonia limits associated with normal operation discharges as described below. The reevaluation also resulted in lower wasteload allocations for selenium, necessitating monthly monitoring to determine if a selenium limit is appropriate.

EVALUATION OF THE EFFLUENT – CHLORINE

Although the water quality standards (9 VAC 25 260-110) currently prohibit the use of halogens in waters containing endangered species, an exception to this rule is provided for facilities which intermittently chlorinate (not more than two hours in any eight hour period) if the discharger can employ procedures and best management practices which assure that any discharge of chlorine meets the water quality standards.

The effluent limitation for chlorine is required at Outfall 003 because the facility uses halogens in the cooling water circuit to control biological growth in the re-circulated cooling water, and on the surfaces of the cooling towers. The biocide treatment is conducted for a maximum of two hours per day as required by the permit special conditions. The permit also requires that all cooling water be re-circulated within the cooling tower system, so that no discharge to the wastewater system is allowed during the biocide treatment. The special conditions also further require that the cooling water be de-chlorinated prior to resuming discharge to the wastewater stream which is ultimately treated in the AWWTP, and discharge from Outfall 003. Because the permit requires de-chlorination to non-detectable levels, **prior** to incorporation into the wastewater stream which is further treated by the AWWTP, there were no recorded levels of TRC during the most recent permit term exceeding the limitation in the discharge from Outfall 003.

The previous permit utilized a Water Quality Based Effluent Limit for TRC of 40ug/L for both the monthly average and daily maximum, which is more limiting than the ELG limitations for chlorine. A TRC limit was developed utilizing the decrease in maximum effluent flow anticipated with the conversion to gas, and the increase in drought flows predicted based on the facility's decrease water withdrawal rates. This yielded an average monthly limit of 43 ug/L and daily maximum of 63 ug/L. In accordance with the anti-backsliding requirements of the regulation, the staff found it appropriate to carry forward the TRC limits of the previous permit of 40ug/L for both the monthly average and daily maximum.

EVALUATION OF THE EFFLUENT – COPPER

The effluent limit for copper proposed in the Initial Draft Permit was carried forward from the 2010 VPDES Permit for the facility. However, as discussed above, in response to public comments the staff reevaluated the wasteload allocations for normal operations (non-dewatering) utilizing mixing assumptions associated with the application of a 350 foot regulatory mixing zone. The monthly average and daily maximum effluent limit for copper changed from 39 ug/L as proposed in the Initial Draft Permit to 37 ug/L now proposed in the Revised Draft Permit.

EVALUATION OF THE EFFLUENT – AMMONIA

As discussed above, in response to public comments the staff reevaluated the wasteload allocations for normal operations (non-dewatering) utilizing mixing assumptions associated with the application of a 350 foot regulatory mixing zone. The Initial Draft Permit proposed a monthly average effluent limit of 11 mg/L and a daily maximum effluent limit of 15 mg/L for ammonia. The Revised Draft Permit proposes a monthly average and daily maximum effluent limit of 7.6 mg/L.

EVALUATION OF THE EFFLUENT – SELENIUM

As discussed above, in response to public comments the staff reevaluated the wasteload allocations for normal operations (non-dewatering) utilizing mixing assumptions associated with the application of a 350 foot regulatory mixing zone. Additionally, in response to comments from USFWS, the background concentration of selenium utilized in calculating wasteload allocations was modified from 0.5 ug/L to 0.63 ug/L to account for selenium loading in the Clinch River from Dumps Creek. Reasonable potential analysis conducted during the development of the Initial Draft Permit indicated that a selenium effluent limit was not necessary. However, reasonable potential analysis under the reevaluation of wasteload allocations indicate that a limit may be required based on past data. That being said, the presence of selenium in the effluent at Outfall 003 is a result of CCR contact. Once the dewatering operation is complete, DEQ does not anticipate significant contributions of selenium to the outfall. As such, the Revised Draft Permit requires monitoring for selenium to be conducted to validate this assumption. If future data (post dewatering) indicates that a limit for selenium is necessary, DEQ will modify the permit accordingly.

EVALUATION OF THE EFFLUENT – PCBS

The permit special condition that there shall be no discharge of PCBs transformer fluids in an amount equal to or greater than that detectable by EPA Method 608 has been carried forward from the previous permit.

EVALUATION OF CONVENTIONAL POLLUTANTS

The applicant submitted testing results for the conventional parameters pH, BOD_5, TSS, and Oil & Grease. Based on a review of the DMR results, the facility appears to be in compliance with the BAT requirements for TSS and Oil and Grease, and BPT requirements (40 CFR Part 423.12(b)(1)) and WQS for pH. The pH limits of 6.0 SU to 9.0 SU have been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Input parameters for instream WQC and WLAs

Stream: A Flow Frequency Determination for the receiving stream is included in Section 13 of the Fact Sheet. Water quality data for mean hardness, temperature, and pH for the receiving stream were obtained from Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. The ambient station is located 3.7 river miles upstream of the facility.

Stream Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	147	mg/L
90^{th} Percentile Temperature =	24.34	°C
90^{th} Percentile Maximum pH =	8.34	SU
10^{th} Percentile Maximum pH =	8.04	SU

Background in-stream water quality conditions were established for antimony, arsenic, barium, cadmium, chloride, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc using DEQ's data collected at Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. 90^{th} Percentile values were calculated from five years of data.

Discharge: Hardness data for the effluent was not available, therefore a conservative value of 100 mg/L was utilized in the evaluation. The temperature value utilized is from Form 2C Part V of the application. The pH values utilized were calculated from five years of DMR data.

Effluent Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	100	mg/L
90^{th} Percentile Temperature =	14.1	°C
90^{th} Percentile Maximum pH =	8.3	SU
10^{th} Percentile Maximum pH =	7.4	SU

WQC and WLAs were calculated for all WQS parameters. Those WQC and WLAs are presented in the MSTRANTI spreadsheet that can be found in Appendix H. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- Chromium VI: No limit determined to be necessary.
- Selenium: No limit determined to by necessary. Monitoring required
- Ammonia: A limit is necessary.

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit.

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1 If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.

   B.2 If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1 If the evaluation indicates that no limits are needed, then no further monitoring is required.

   C.2 If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.

C.3 (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

Parameter (ug/L unless noted)	Wasteload Allocations			Attachment A from Application	Form 2 Part V (Daily Max)
	Acute	Chronic	HH		
Acenapthene	--	--	3.0E+03	<0.27	<0.27
Acrolein	--	--	2.8E+01	<2.6	<2.6
Acrylonitrile[C]	--	--	1.6E+01	<0.55	<0.55
Aldrin [C]	5.8E+00	--	3.1E-03	<0.033	<0.033
Ammonia-N (mg/l) (Yearly)	8.71E+00	2.67E+00	--		28
Ammonia-N (mg/l) (High Flow)	4.71E+00	1.52E+00	--		28
Anthracene	--	--	1.2E+05	<0.18	<0.18
Antimony	--	--	1.9E+03	1.42	2.58
Arsenic	6.5E+02	3.2E+02	--	0.5	7.42
Barium	--	--	--	0.079	121
Benzene [C]	--	--	3.2E+03	<0.11	<0.11
Benzidine[C]	--	--	1.2E-02	<44	<44
Benzo (a) anthracene [C]	--	--	1.1E+00	<0.34	<0.34
Benzo (b) fluoranthene [C]	--	--	1.1E+00		
Benzo (k) fluoranthene [C]	--	--	1.1E+00	<0.28	<0.29
Benzo (a) pyrene [C]	--	--	1.1E+00	<0.26	<0.26
Bis2-Chloroethyl Ether [C]	--	--	3.3E+01	<0.29	<0.29
Bis2-Chloroisopropyl Ether	--	--	2.0E+05	<0.22	<0.22
Bis 2-Ethylhexyl Phthalate [C]	--	--	1.4E+02	<2	23
Bromoform [C]	--	--	8.7E+03	<1.0	<1.0
Butylbenzylphthalate	--	--	5.8E+03		<2.0
Cadmium	9.4E+00	2.8E+00	--	<0.01	0.14
Carbon Tetrachloride [C]	--	--	9.9E+01	<0.14	<0.14
Chlordane [C]	4.6E+00	9.2E-03	5.0E-02	<0.066	<0.066
Chloride	1.6E+06	4.8E+05	--	23500	
TRC	3.6E+01	2.4E+01	--		
Chlorobenzene	--	--	4.9E+03	<0.14	<0.14
Chlorodibromomethane[C]	--	--	8.1E+02	<0.14	<0.14
Chloroform	--	--	3.4E+04	<0.17	<0.17
2-Chloronaphthalene	--	--	4.9E+03	<0.3	<0.28
2-Chlorophenol	--	--	4.6E+02	<2.1	<2.1
Chlorpyrifos	1.6E-01	8.8E-02	--	<0.097	
Chromium III	1.3E+03	1.9E+02	--	5.9	
Chromium VI	3.1E+01	2.4E+01	--	5.3	
Chromium, Total	--	--	--		15
Chrysene [C]	--	--	1.1E-01	<0.29	<0.29
Copper	3.7E+01	2.6E+01	--	0.58	37
Cyanide, Free	4.2E+01	1.1E+01	4.9E+04	<2.5	<0.01
DDD [C]	--	--	1.9E-02	<0.025	<0.027
DDE [C]	--	--	1.4E-02	<0.030	<0.032
DDT [C]	2.1E+00	2.1E-03	1.4E-02	<0.028	<0.030
Demeton	--	2.1E-01	--	<0.16	
Diazinon	3.3E-01	3.6E-01	--		
Dibenz(a,h)anthracene [C]	--	--	1.1E+00	<0.25	<0.25
1,2-Dichlorobenzene	--	--	4.0E+03	<0.15	<0.15
1,3-Dichlorobenzene	--	--	2.9E+03	<0.11	<0.11

1,4-Dichlorobenzene	--	--	5.8E+02	<0.21	<0.21
3,3-Dichlorobenzidine[C]	--	--	1.7E+00	<1.4	<1.4
Dichlorobromomethane [C]	--	--	1.1E+03	<0.13	<0.13
1,2-Dichloroethane [C]	--	--	2.3E+03	<0.21	<0.21
1,1-Dichloroethylene	--	--	2.2E+04	<0.30	<0.30
1,2-trans-dichloroethylene	--	--	3.0E+04	<0.17	
2,4-Dichlorophenol	--	--	8.8E+02	<0.62	<0.62
2,4-Dichlorophenoxy acetic acid (2,4-D)	--	--	--		
1,2-Dichloropropane[C]	--	--	9.3E+02	<0.095	<0.095
1,3-Dichloropropene [C]	--	--	1.3E+03	<0.33	
Dieldrin [C]	4.6E-01	1.2E-01	3.4E-03	<0.031	<0.033
Diethyl Phthalate	--	--	1.3E+05	<2.7	<2.7
2,4-Dimethylphenol	--	--	2.6E+03	<1.6	<1.6
Dimethyl Phthalate	--	--	3.4E+06	<1.7	<1.7
Di-n-Butyl Phthalate	--	--	1.4E+04	<2.2	<2.2
2,4 Dinitrophenol	--	--	1.6E+04	<23	
2-Methyl-4,6-Dinitrophenol	--	--	8.5E+02	<14	
2,4-Dinitrotoluene [C]	--	--	2.1E+02	<2	<2
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	--	--	1.6E-07		
1,2-Diphenylhydrazine[C]	--	--	1.2E+01	<1.1	<1.1
Alpha-Endosulfan	4.2E-01	1.2E-01	2.7E+02	<0.035	<0.038
Beta-Endosulfan	4.2E-01	1.2E-01	2.7E+02	<0.037	<0.039
Alpha + Beta Endosulfan	4.2E-01	1.2E-01	--		
Endosulfan Sulfate	--	--	2.7E+02	<0.022	<0.023
Endrin	1.6E-01	7.7E-02	1.8E-01	<0.036	<0.039
Endrin Aldehyde	--	--	9.1E-01	<0.034	<0.036
Ethylbenzene	--	--	6.4E+03	<0.23	<0.23
Fluoranthene	--	--	4.3E+02	<0.20	<0.20
Fluorene	--	--	1.6E+04	<0.22	<0.22
Foaming Agents	--	--	--		
Guthion	--	2.1E-02	--	<0.11	
Heptachlor [C]	1.0E+00	8.1E-03	4.9E-03	<0.037	<0.040
Heptachlor Epoxide[C]	1.0E+00	8.1E-03	2.4E-03	<0.037	<0.039
Hexachlorobenzene[C]	--	--	1.8E-02	<0.56	<0.56
Hexachlorobutadiene[C]	--	--	1.1E+03	<0.87	<0.87
Hexachlorocyclohexane Alpha-BHC[C]	--	--	3.0E-01	<0.025	
Hexachlorocyclohexane Beta-BHC[C]	--	--	1.1E+00	<0.038	
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	1.8E+00	--	1.1E+01	<0.030	
Hexachlorocyclopentadiene	--	--	3.4E+03		<1.3
Hexachloroethane[C]	--	--	2.0E+02	<1.3	<1.3
Hydrogen Sulfide	--	4.3E+00	--	<53	
Indeno (1,2,3-cd) pyrene [C]	--	--	1.1E+00	<0.40	<0.40
Iron	--	--	--	9	762
Isophorone[C]	--	--	6.0E+04	<0.68	<0.68
Kepone	--	0.0E+00	--	<0.74	
Lead	3.0E+02	3.8E+01	--	0.01	0.493
Malathion	--	2.1E-01	--	<0.10	
Manganese	--	--	--	13.7	14.6
Mercury	2.7E+00	1.6E+00	- -	0.0003	0.4
Methyl Bromide	--	--	4.6E+03	<0.31	<0.31
Methylene Chloride [C]	--	--	3.7E+04	<0.13	<0.28

Methoxychlor	--	6.4E-02	--	<0.034	
Mirex	--	0.0E+00	--	<0.018	
Nickel	4.1E+02	5.1E+01	1.4E+04	0.95	4.75
Nitrate (as N)	--	--	--		
Nitrobenzene	--	--	2.1E+03	<1.4	<1.4
N-Nitrosodimethylamine[C]	--	--	1.9E+02	<1.1	<1.1
N-Nitrosodiphenylamine[C]	--	--	3.7E+02	<1.1	<1.1
N-Nitrosodi-n-propylamine[C]	--	--	3.2E+01	<0.46	<0.46
Nonylphenol	5.4E+01	1.4E+01	--		
Parathion	1.2E-01	2.8E-02	--	<0.15	
PCB Total[C]	--	3.0E-02	4.0E-03	<0.16	
Pentachlorophenol [C]	3.1E+01	2.7E+01	1.9E+02	<4.6	<4.6
Phenol	--	--	2.6E+06	<0.51	<0.51
Pyrene	--	--	1.2E+04	<0.21	<0.21
Radionuclides	--	--	--		
Gross Alpha Activity (pCi/L)	--	--	--	<2.62	<2.62
Beta and Photon Activity (mrem/yr)	--	--	--	<4.00	
Radium 226 + 228 (pCi/L)	--	--	--		
Uranium (ug/l)	--	--	--		
Selenium, Total Recoverable	3.8E+01	1.0E+01	1.3E+04	23.00	25.7
Silver	9.3E+00	--	--	<0.003	0.088
Sulfate	--	--	--	58800	214000
1,1,2,2-Tetrachloroethane[C]	--	--	2.5E+02	<0.20	<0.20
Tetrachloroethylene[C]	--	--	2.0E+02	<0.15	<0.15
Thallium	--	--	1.2E+00	0.07	0.1
Toluene	--	--	1.8E+04	<0.15	<0.15
Total dissolved solids	--	--	--	422000	
Toxaphene [C]	1.4E+00	4.3E-04	1.7E-02	<0.07	<0.74
Tributyltin	8.8E-01	1.5E-01	--		
1,2,4-Trichlorobenzene	--	--	2.1E+02	<0.79	<0.79
1,1,2-Trichloroethane[C]	--	--	9.9E+02	<0.20	<0.20
Trichloroethylene [C]	--	--	1.9E+03	<0.14	<0.14
2,4,6-Trichlorophenol [C]	--	--	1.5E+02	<2.8	<2.8
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	--	--	--		
Vinyl Chloride[C]	--	--	1.5E+02	<0.23	<0.23
Zinc	2.7E+02	3.0E+02	7.9E+04	3.80	8

Note: The Wasteload Allocations in the this table have been revised from the Initial Draft Permit to the Revised Draft Permit with values reflecting the application of the 350 foot Regulatory Mixing Zone.

STAT.exe Output Ammonia

Facility = VA0001015
Chemical = Ammonia - RMZ
Chronic averaging period = 30
WLAa = 8.71
WLAc = 2.67
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:
observations = 60
Expected Value = 2.73986
Variance = 70.8921
C.V. = 3.073047
97th percentile daily values = 16.0081
97th percentile 4 day average = 11.8556
97th percentile 30 day average= 5.63139
< Q.L. = 4
Model used = delta lognormal

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 7.58988346115564
Average Weekly limit = 7.58988346115563
Average Monthly LImit = 7.58988346115563

The data are:

19	0.2	0.24	0.2	2.28	1.02
5.8	24	6.07	0.33	3.2	0.2
28	2	0.6	0.2	0.54	0.19
20	0.1	0.28	0.2	3.7	0.51
25	0.05	0.2	0.26	0.2	1.33
6	0.2	0.2	0.2	0.2	1.55
3	0.3	0.2	0.2	0.2	3.2
0.174	3.27	0.65	1.67	0.64	3.1
3	0.61	0.29	2.14	0.2	3.87
1	0.2	0.55	0.97	0.75	0.54

STAT.exe Output Chromium VI

Facility = VA0001015
Chemical = Chromium VI - RMZ
Chronic averaging period = 4
WLAa = 31
WLAc = 24
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:
observations = 8
Expected Value = 8.1925
Variance = 24.1621
C.V. = 0.6
97th percentile daily values = 19.9357
97th percentile 4 day average = 13.6306
97th percentile 30 day average= 9.88059
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
10
10
10
7.24
6.4
6.3
10.3
5.3

STAT.exe Output Copper

Facility = VA0001015
Chemical = Copper - RMZ - Clinch Criteria
Chronic averaging period = 4
WLAa = 37
WLAc = 26
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:
observations = 1
Expected Value = 37
Variance = 492.84
C.V. = 0.6
97th percentile daily values = 90.0364
97th percentile 4 day average = 61.5602
97th percentile 30 day average= 44.6239
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 37
Average Weekly Limit = 37
Average Monthly Limit = 37

The data are:
37

STAT.exe Output Selenium

Facility = VA0001015
Chemical = Selenium - RMZ
Chronic averaging period = 4
WLAa = 38
WLAc = 10
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:
observations = 15
Expected Value = 14.3854
Variance = 108.892
C.V. = 0.725393
97th percentile daily values = 38.7024
97th percentile 4 day average = 25.0211
97th percentile 30 day average= 17.7214
< Q.L. = 3
Model used = delta lognormal

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 15.4679093066202
Average Weekly Limit = 15.4679093066202
Average Monthly Limit = 15.4679093066202

The data are:
8.1
5.9
1.7
22
21.1
8.5
17.4
23
22.8
26.5
19
14.4
1
4.6
5.4

APPENDIX B

PROCESS WASTEWATER FROM DEWATERING ACTIVITIES

Outfall D003 **Final Limits** **Flow: 4.84 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	Continuous	Measured
TSS (mg/L)	3	30.0	100.0	1/Month	24 HC
Oil & Grease (mg/L)	3	15.0	20.0	1/Month	24 HC
Total Recoverable Iron (mg/L)	3	1.0	1.0	1/Month	24 HC
Total Chromium (mg/L)	3	0.2	0.2	1/Month	24 HC
Total Residual Chlorine (ug/L)	2,3	40	40	1/Week	24 HC
Total Recoverable Antimony (ug/L)	2,4	630	630	3/Week	4 HC
Total Recoverable Arsenic (ug/L)	2,4	210	380	3/Week	4 HC
Total Recoverable Cadmium (ug/L)	2,4	2.0	3.6	3/Week	4 HC
Total Recoverable Chromium III (ug/L)	2,4	140	250	3/Week	4 HC
Total Recoverable Chromium VI (ug/L)	2,4	14	25	3/Week	4 HC
Total Recoverable Copper (ug/L)	2,4	16	30	3/Week	4 HC
Total Recoverable Lead (ug/L)	2,4	29	53	3/Week	4 HC
Total Recoverable Mercury (ug/L)	2,4	1.0	1.9	3/Week	4 HC
Total Recoverable Nickel (ug/L)	2,4	37	67	3/Week	4 HC
Total Recoverable Selenium (ug/L)	2,4	6.6	12	3/Week	4 HC
Total Recoverable Silver (ug/L)	2,4	5.1	9.3	3/Week	4 HC
Total Recoverable Thallium (ug/L)	2,4	0.47	0.47	3/Week	4 HC
Total Recoverable Zinc (ug/L)	2,4	130	240	3/Week	4 HC
Total Recoverable Aluminum (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Barium (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Beryllium (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Boron (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Cobalt (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Molybdenum (ug/L)	4	NL	NL	3/Week	4 HC
Total Recoverable Vanadium (ug/L)	4	NL	NL	3/Week	4 HC
Chloride (mg/L)	2,4	310	570	3/Week	4 HC
Ammonia-N (mg/L)	2,4	2.2	7.6	3/Week	4 HC
Hardness (mg/L as $CaCO_3$)	2,4	NL	NL	3/Week	4 HC
		Minimum	Maximum		
pH	2,3	6.0 SU	9.0 SU	1/Week	Grab
Acute WET, *Ceriodaphnia dubia* (%)	2,4	100	NA	1/Week - 1/Month	24 HC
Chronic WET, *Ceriodaphnia dubia* (TU_c)	2,4	NA	3.12	1/Week - 1/Month	24 HC
Acute WET, *Pimephales promelas* (%)	2,4	100	NA	1/Week - 1/Month	24 HC
Chronic WET, *Pimephales promelas* (TU_c)	2,4	NA	3.12	1/Week - 1/Month	24 HC

NL = No Limitation, monitoring required NA = Not Applicable 4HC = 4-Hour Composite 24HC =24-Hour Composite
Refer to permit footnotes regarding parameters with 3/Week and 1/Month monitoring frequencies

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Water Quality Standards (9VAC25-260)
3. Federal Effluent Limitation Guidelines (Steam Electric Power Generating Point Source Category – 40 CFR Part 423)
4. See rationale below

Ash dewatering water (pore water within the coal combustion residuals mass) and contact stormwater (stormwater that has contacted the coal combustion residuals) are process wastewater from dewatering activities.

Discharges associated with Coal Combustion Residual Impoundment Closure: Effluent Screening and Limitation Development

Effective October 2015, the U.S. Environmental Protection Agency (EPA) adopted a final Rule that will regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act. Coal combustion residuals (otherwise known as coal ash) may include fly ash, bottom ash, boiler slag, and other low volume waste materials and are generated from burning coal for the purposes of generating electrical power. Disposal of the CCRs at this facility has historically been accomplished in a solid waste landfill and coal ash impoundments located on site. Ash Pond 2 has been inactive since 1997 and was capped in 2014. Ash Pond 1A/1B became inactive in October 2015 and is planned for dewatering and capping in 2016. Ash Pond 1 includes surface waters originating from precipitation, stormwater runoff into the impoundments, and comingled process wastewaters. Interstitial, or pore, waters, also exist within the bottom residual mass of the impoundment. Due to its direct contact and exposure to the coal ash materials, the pollutant concentrations of the coal ash interstitial waters may pose a reasonable potential to exceed established water quality criteria. In response to EPA's 2015 CCR Rule, the permittee plans to remove and discharge the accumulated waters to dry the ash and residuals that have settled to the bottom of the impoundment. This process is expected to involve the disturbance, movement, or re-suspension of the bottom residuals. Drying the ash and bottom residuals will facilitate the construction of a closure cap over the impoundment system.

To identify and evaluate constituents of potential concern (COPC) associated with the removal of waters from the coal ash ponds, DEQ relied upon work previously performed by the EPA and documented in the following: 1) 40CFR Part 423 federal effluent limitation guidelines (ELGs) for the "Steam Electric Power Generating Point Source Category;" 2) a June 7, 2010 EPA memorandum titled, "National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residual (CCR) Impoundments at Steam Electric Power Plants;" and 3) a 2015 final Rule (commonly referred to as the "CCR Rule") that amended 40 CFR §§257.50 – 257.107, "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments."

In its June 2010 memo,[1] EPA identified 37 chemical parameters that had the potential to exist in relatively high concentrations in CCR effluent. Several years later, in the preamble to the 2015 CCR Rule, EPA identified 35 "Table 1"[2] chemical parameters that represented a hazard potential because they were characteristic of releases from coal combustion impoundments and may pose a toxicity risk potential. EPA performed further probabilistic analyses of the potential risks to human health and ecological receptors from the 35 Table 1 constituents and narrowed the list down to 23 "Table 2"[3] parameters (List of Chemical Constituents Retained for Probabilistic Analysis). These parameters include Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chloride, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Lithium, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium and Zinc.

Although the parameters listed in the CCR Rule Table 2 represent potential risks from CCR leachate releases, a conservative assumption was made that the probabilistic risks associated with leachate releases would be comparable to concerns associated with the release of CCR pore water. These 23 Table 2 constituents and all other constituents were classified in one of 4 categories for consideration.

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1 United States Environmental Protection Agency, June 7, 2010 Memorandum from James A. Hanlon, Director, Office of Wastewater Management to Water Division Directors Regions 1 – 10; "National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residual (CCR) Impoundments at Steam Electric Power Plants," Attachment B, Water Quality-Based Effluent Limits, Coal Combustion Waste Impoundments; Appendix A, Steam Electric 2007/2008 Detailed Study Report, Ash Pond Effluent Concentrations.

2 Federal Register, Vol. 80, No. 74, Friday, April 17, 2015, "Table 1 – List of Chemical Constituents Evaluated in the CCR Risk Assessment," page 21449.

3 Federal Register, Vol. 80, No. 74, Friday, April 17, 2015, "Table 2 – List of Chemical Constituents Retained for Probabilistic Analysis," page 21450.

- **Category 1 - Table 2 constituents for which water quality criteria have been adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** Water quality based effluent limitations were developed for these parameters regardless of whether or not the existing data for the facility demonstrated a reasonable potential to exceed the water quality criteria. Effluent limitations were developed in this fashion for Antimony, Arsenic, Cadmium, Chloride, Chromium (III and VI), Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. There are no water quality criteria that are applicable to the aquatic life designation for Antimony or Thallium. For these parameters, the effluent limitation is equal to the most limiting allocation for human health.

- **Category 2 – Table 2 constituents for which water quality criteria have not be adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** A Whole Effluent Toxicity limitation was established in the absence of an applicable Virginia numeric water quality criterion. This approach is consistent with EPA's Technical Support Document for Water Quality-based Toxics Control and the June 7, 2010 EPA memorandum. Parameters included in this category include Aluminum, Barium, Beryllium, Boron, Cobalt, Molybdenum and Vanadium. Appendix F details the derivation of the calculated WET limitations that will be included with this permit action. In addition, 1/Month monitoring of these parameters, to be done concurrently with WET test monitoring, is required. In that way, data are available for analysis in the event that WET tests indicate toxicity.

- **Category 3 – Constituents not listed in Table 2 for which water quality criteria have been adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** A reasonable potential analysis was performed to determine the need for water-quality based effluent limitations on a case-by-case basis. This was done for Ammonia-N and total residual chlorine based on DMR data produced during normal operations.

- **Category 4 – Federal Effluent Guidelines:** Technology-based effluent limits were assigned to applicable constituents addressed by the Federal Effluent Guidelines and not otherwise controlled by a more restrictive water quality-based effluent limitation. Constituents limited under this category include Iron, total Chromium, TSS, Oil & Grease, and pH.

For purposes of evaluating the parameters above, the discharge flow of 4.84 MGD was utilized. This value is the maximum anticipated flow from Outfall 003 as depicted in the water balance diagram provided in the application. The permittee has stated that during the enhanced dewatering operation, discharge rates from Outfall 003 will be at or below 4.84 MGD.

The dewatering wastewaters are to be pumped to the reclaim pond for temporary holding, and then pumped from the reclaim pond to the AWWTP prior to discharging to the Clinch River via Outfall 003.

EFFLUENT LIMITATIONS GUIDELINES (ELGs)
See Appendix A

EVALUATION OF THE EFFLUENT – CHLORINE
See Appendix A

EVALUATION OF THE EFFLUENT – PCBS
See Appendix A

EVALUATION OF CONVENTIONAL POLLUTANTS
See Appendix A

EVALUATION OF THE EFFLUENT – COPPER

Effluent limits for copper were based on the special standard for copper in the Clinch River using an anti-degradation baselines as was done for the other metals.

EVALUATION OF THE EFFLUENT – SELENIUM

The effluent limitations for selenium proposed in the Initial Draft Permit utilized background concentration values from DEQ's data collected at Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. The Initial Draft Permit utilized a background concentration of 0.5 ug/L. In response to USFWS comments, the background concentration for selenium was modified to 0.63 ug/L to take into account selenium loading from Dumps Creek into the Clinch River. This resulted in a minor decrease in the monthly average selenium limit.

EVALUATION OF THE EFFLUENT – AMMONIA

The effluent limitations for ammonia proposed in the Initial Draft Permit for the dewatering operation were based on the limits proposed for normal operations using standard mixing assumptions. However, based on public comment expressing concern over the potential effects of the discharge on threatened and endangered species, the 350 foot regulatory mixing zone (discussed below) was applied to the calculation of ammonia wasteload allocations. As such, the effluent limitations proposed in the Revised Draft Permit have reduced compared to the proposed limits in the Initial Draft Permit.

EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Input parameters for instream WQC and WLAs

Stream: A Flow Frequency Determination for the receiving stream is included in Section 13 of the fact sheet. Water quality data for mean hardness, temperature, and pH for the receiving stream were obtained from Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. The ambient station is located 3.7 river miles upstream of the facility.

Stream Parameter	Value	Units
Mean Hardness (as CaCO3) =	147	mg/L
90th Percentile Temperature =	24.34	°C
90th Percentile Maximum pH =	8.34	SU
10th Percentile Maximum pH =	8.04	SU

Background in-stream water quality conditions were established for antimony, arsenic, barium, cadmium, chloride, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc using DEQ's data collected at Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. 90th Percentile values were calculated from five years of data.

Discharge: Hardness data for the effluent was not available; therefore, a conservative value of 100 mg/L was utilized in the evaluation. The temperature value utilized is from Outfall 003 Form 2C Part V of the application. The pH values utilized were calculated from five years of DMR data.

Discharge Parameter	Value	Units
Mean Hardness (as CaCO3) =	100	mg/L
90th Percentile Temperature =	14.1	°C
90th Percentile Maximum pH =	8.3	SU
10th Percentile Maximum pH =	7.4	SU

WQC and WLAs were calculated for all WQS parameters. Those WQC and WLAs are presented in the MSTRANTI spreadsheet that can be found in Appendix H. The Category 1 parameters were analyzed per the protocol above. The Category 3 parameters were evaluated per the protocol below.

Mix Evaluation for Process Wastewater from Dewatering Activities: The mix.exe evaluation shown in Appendix G predicts the distance for at which a complete mix assumption is appropriate and also shows the percent of the stream flow that can be used for that complete mix situation. This mixing approach is typically used for the evaluation of toxic pollutants in accordance with Guidance Memo No. 00-2011.

During the public comment period for other similar VPDES permits across the state addressing coal ash pond dewatering, comments were received expressing concern about the length of the mixing zone allowed in the permit. To address those concerns, a regulatory mixing zone (RMZ) of five times the width of the receiving stream at the point of discharge was established for the dewatering operations at those facilities. The percent of stream flow available for mixing at the RMZ was calculated by dividing the RMZ by the predicted distance for complete mix as shown in Appendix G. The staff utilized that same protocol during the evaluation of mixing for the ash pond dewatering operation at the Clinch River Plant with the following results:

Drought Flow Regime	RMZ Based on 5x Stream Width (ft.)	Modeled Mixing Length from MIX.exe (ft.)	% Stream Flow Available
7Q10	350*	1839	19.03
30Q10	350*	1615	21.67
1Q10	350*	1969	17.78
30Q5	350*	1519	23.04
Harmonic Mean	650**	3995	16.27

* Based on approximate stream width under drought conditions.

**Based on approximate stream width under normal flow conditions.

The results of the mixing evaluation shown in Appendix G were compared to those shown above and the most conservative values were used.

STAT.EXE OUTPUT

```
Facility = VA0001015 - Dewatering
Chemical = Arsenic
Chronic averaging period = 4
WLAa  =  520
WLAc  =  260
Q.L.      = 150
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 260
Variance       = 24336
C.V.           = 0.6
97th percentile daily values = 632.688
97th percentile 4 day average = 432.585
97th percentile 30 day average= 313.573
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 380.26944385384
Average Weekly limit = 278.145688979608
Average Monthly LImit = 207.18218336132

The data are:
260
***********************************************

Facility = VA0001015 - Dewatering
Chemical = Cadmium
Chronic averaging period = 4
WLAa  =  8.7
WLAc  =  2.5
Q.L.      = 1
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 8.7
Variance       = 27.2484
C.V.           = 0.6
97th percentile daily values = 21.1707
97th percentile 4 day average = 14.4749
97th percentile 30 day average= 10.4926
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 3.65643696013308
Average Weekly limit = 2.67447777865008
Average Monthly LImit = 1.99213637847423

The data are:
8.7
```

```
Facility = VA0001015 - Dewatering
Chemical = Chloride
Chronic averaging period = 4
WLAa = 1300
WLAc = 390
Q.L.     = 1
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 1300
Variance       = 608400
C.V.           = 0.6
97th percentile daily values = 3163.44
97th percentile 4 day average = 2162.92
97th percentile 30 day average= 1567.86
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 570.40416578076
Average Weekly limit = 417.218533469412
Average Monthly LImit = 310.77327504198

The data are:
1300
************************************************

Facility = VA0001015 - Dewatering
Chemical = Chromium III
Chronic averaging period = 4
WLAa = 1200
WLAc = 170
Q.L.     = 100
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 170
Variance       = 10404
C.V.           = 0.6
97th percentile daily values = 413.680
97th percentile 4 day average = 282.844
97th percentile 30 day average= 205.029
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 248.637713289049
Average Weekly limit = 181.864488948205
Average Monthly LImit = 135.465273736248

The data are:
170
```

```
Facility = VA0001015 - Dewatering
Chemical = Chromium VI
Chronic averaging period = 4
WLAa  =  25
WLAc  =  19
Q.L.      = 10
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 19
Variance       = 129.96
C.V.           = 0.6
97th percentile daily values = 46.2349
97th percentile 4 day average = 31.6120
97th percentile 30 day average= 22.9150
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Acute Toxicity
Maximum Daily Limit   = 25
Average Weekly limit = 18.2860924980417
Average Monthly LImit = 13.6207488341446

The data are:
19
************************************************

Facility = VA0001015 - Dewatering
Chemical = Lead
Chronic averaging period = 4
WLAa  =  280
WLAc  =  36
Q.L.      = 20
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

# observations = 1
Expected Value = 36
Variance       = 466.56
C.V.           = 0.6
97th percentile daily values = 87.6030
97th percentile 4 day average = 59.8964
97th percentile 30 day average= 43.4179
# < Q.L.       = 0
Model used     = BPJ Assumptions, type 2 data


A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 52.6526922259163
Average Weekly limit = 38.5124800125611
Average Monthly LImit = 28.6867638500289

The data are:
36
```

Facility = VA0001015 - Dewatering
Chemical = Mercury
Chronic averaging period = 4
WLAa = 2.2
WLAc = 1.3
Q.L. = 0.7
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 1.3
Variance = .6084
C.V. = 0.6
97th percentile daily values = 3.16344
97th percentile 4 day average = 2.16292
97th percentile 30 day average= 1.56786
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.9013472192692
Average Weekly limit = 1.39072844489804
Average Monthly LImit = 1.0359109168066

The data are:
1.3
****

Facility = VA0001015 - Dewatering
Chemical = Nickel
Chronic averaging period = 4
WLAa = 370
WLAc = 46
Q.L. = 20
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 46
Variance = 761.76
C.V. = 0.6
97th percentile daily values = 111.937
97th percentile 4 day average = 76.5343
97th percentile 30 day average= 55.4784
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 67.2784400664487
Average Weekly limit = 49.2103911271614
Average Monthly LImit = 36.6553093639259

The data are:
46

Facility = VA0001015 - Dewatering
Chemical = Selenium - Dumps Creek Loading
Chronic averaging period = 4
WLAa = 30
WLAc = 8.3
Q.L. = 5
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 31
Variance = 345.96
C.V. = 0.6
97th percentile daily values = 75.4359
97th percentile 4 day average = 51.5774
97th percentile 30 day average= 37.3876
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 12.1393707076418
Average Weekly limit = 8.87926622511826
Average Monthly LImit = 6.61389277653445

The data are:
31
****

Facility = VA0001015 - Dewatering
Chemical = Silver
Chronic averaging period = 4
WLAa = 9.3
WLAc =
Q.L. = 3
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9.3
Variance = 31.1364
C.V. = 0.6
97th percentile daily values = 22.6307
97th percentile 4 day average = 15.4732
97th percentile 30 day average= 11.2162
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 9.3
Average Weekly limit = 6.80242640927152
Average Monthly LImit = 5.06691856630179

The data are:
9.3

Facility = VA0001015
Chemical = Zinc
Chronic averaging period = 4
WLAa = 240
WLAc = 270
Q.L. = 90
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 270
Variance = 26244
C.V. = 0.6
97th percentile daily values = 657.022
97th percentile 4 day average = 449.223
97th percentile 30 day average= 325.634
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 240
Average Weekly limit = 175.546487981201
Average Monthly LImit = 130.759188807788

The data are:
270

****
Facility = VA0001015 - Dewatering
Chemical = Copper
Chronic averaging period = 4
WLAa = 29.6
WLAc = 21
Q.L. = 10
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 29.6
Variance = 315.417
C.V. = 0.6
97th percentile daily values = 72.0291
97th percentile 4 day average = 49.2481
97th percentile 30 day average= 35.6991
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 29.6
Average Weekly limit = 21.6507335176814
Average Monthly LImit = 16.1269666196272

The data are:
29.6

Facility = VA0001015 - Dewatering
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 8.71
WLAc = 2.67
Q.L. = .2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 60
Expected Value = 2.73986
Variance = 70.8921
C.V. = 3.073047
97th percentile daily values = 16.0081
97th percentile 4 day average = 11.8556
97th percentile 30 day average= 5.63139
< Q.L. = 4
Model used = delta lognormal

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 7.58988346115564
Average Weekly limit = 6.01377641972045
Average Monthly LImit = 2.1676662520385

The data are:

19	0.2	0.24	0.2	2.28	1.02
5.8	24	6.07	0.33	3.2	0.2
28	2	0.6	0.2	0.54	0.19
20	0.1	0.28	0.2	3.7	0.51
25	0.05	0.2	0.26	0.2	1.33
6	0.2	0.2	0.2	0.2	1.55
3	0.3	0.2	0.2	0.2	3.2
0.174	3.27	0.65	1.67	0.64	3.1
3	0.61	0.29	2.14	0.2	3.87
1	0.2	0.55	0.97	0.75	0.54

APPENDIX C

EVALUATION OF DISCHARGES FROM OUTFALL 007 (Coal Pile Runoff)

A comparison of technology and water quality-based limits was performed, and the most stringent limits were selected. The selected limits are summarized in the table below.

Outfall 007 (Coal Pile Runoff) **Final Limits** **Maximum Projected Flow: 1.20 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	2/Month	Estimate
		Monthly Average	Daily Maximum		
Total Suspended Solids (mg/L)	3	NA	50	2/Month	24HC
Oil and Grease (mg/L)	4	NL	NL	1/6Months	Grab
Whole Effluent Toxicity (TU_c)	4	NL	NL	1/Year	24HC
		Minimum	Maximum		
pH	2,3	6.0 SU	9.0 SU	2/Month	Grab

NL = No Limitation, monitoring required *NA = Not Applicable*

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Water Quality Standards (9VAC25-260)
3. Federal Effluent Limitation Guidelines – Steam Electric Power Generating Point Source Category (40 CFR Part 423)
4. Best Professional Judgment

EFFLUENT LIMITATIONS GUIDELINES (ELGs)

The final rule dated September 30, 2015 that became effective on November 29, 2015 for the Steam Electric Power category was utilized.

ELGs for Best Practicable Control Technology Currently Available (BPT) for all discharges other than once through cooling water in 40 CFR Part 423.12(b)(1) is as follows:

The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.

ELGs for Best Practicable Control Technology Currently Available (BPT) for discharges from coal pile runoff in 40 CFR Part 423.12(b)(9) and (10) is as follows:

(9) Subject to the provisions of paragraph (b)(10) of this section, the following effluent limitations shall apply to the point source discharges of coal pile runoff::

Pollutant or pollutant property	BPT effluent limitations Maximum concentration for any time (mg/l)
TSS	50

(10) Any untreated overflow from facilities designed, constructed, and operated to treat the volume of coal pile runoff which is associated with a 10 year, 24 hour rainfall event shall not be subject to the limitations in paragraph (b)(9) of this section.

EVALUATION OF THE EFFLUENT – PCBS

The permit special condition that there shall be no discharge of PCBs transformer fluids in an amount equal to or greater than that detectable by EPA Method 608 has been carried forward from the previous permit.

EVALUATION OF CONVENTIONAL POLLUTANTS

The applicant submitted testing results for the conventional parameters pH, BOD_5, TSS, and Oil & Grease. Based on a review of the DMR results, the facility appears to be in compliance with TSS and Oil and Grease with the BAT requirements (40 CFR Part 423.12(b)(1)) and BPT and WQS for pH. The pH limits of 6.0 SU to 9.0 SU have been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Input parameters for instream WQC andWLAs

Stream: A Flow Frequency Determination for the receiving stream is included in Section 13 of the Fact Sheet. Water quality data for mean hardness, temperature, and pH for the receiving stream were obtained from Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. The ambient station is located 3.7 river miles upstream of the facility.

Stream Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	147	mg/L
90^{th} Percentile Temperature =	24.34	°C
90^{th} Percentile Maximum pH =	8.34	SU
10^{th} Percentile Maximum pH =	8.04	SU

Background in-stream water quality conditions were established for antimony, arsenic, barium, cadmium, chloride, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc using DEQ's data collected at Ambient Water Quality Monitoring Station 6BCLN271.50 on the Clinch River. 90^{th} Percentile values were utilized in MSTRANTI calculated from five years of background data.

Discharge: Hardness data for the effluent was not available, therefore a conservative value of 100 mg/L was utilized in the evaluation. The temperature value utilized is from Form 2C Part V of the application. The pH values utilized were calculated from five years of DMR data.

Effluent Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	100	mg/L
90^{th} Percentile Temperature =	15.1	°C
90^{th} Percentile Maximum pH =	8.4	SU
10^{th} Percentile Maximum pH =	7.4	SU

WQC and WLAs were calculated for all WQS parameters. Those WQC and WLAs are presented in the MSTRANTI spreadsheet that can be found in Appendix H. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix. All pollutant concentrations reported were at least an order of magnitude below the WLAs generated in MSTRANTI; as such, further evaluation using STAT.exe was not warranted.

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit.

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1 If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
   B.2 If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1 If the evaluation indicates that no limits are needed, then no further monitoring is required.
   C.2 If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
   C.3 (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

Parameter (ug/l unless noted)	Wasteload Allocations			Form 2C Part V
	Acute	Chronic	HH	
Acenapthene	--	--	3.6E+04	<0.28
Acrolein	--	--	3.4E+02	<2.6
Acrylonitrile[C]	--	--	3.3E+02	<0.55
Aldrin [C]	2.7E+01	--	6.5E-02	
Ammonia-N (mg/l) (Yearly)	3.91E+01	2.50E+01	--	0.08
Ammonia-N (mg/l) (High Flow)	1.60E+02	6.21E+01	--	
Anthracene	--	--	1.5E+06	<0.18
Antimony	--	--	2.4E+04	0.25
Arsenic	3.1E+03	3.8E+03	--	0.7
Barium	--	--	--	71.6
Benzene [C]	--	--	6.6E+04	<0.11
Benzidine[C]	--	--	2.6E-01	<46
Benzo (a) anthracene [C]	--	--	2.3E+01	<0.35
Benzo (b) fluoranthene [C]	--	--	2.3E+01	
Benzo (k) fluoranthene [C]	--	--	2.3E+01	<0.29
Benzo (a) pyrene [C]	--	--	2.3E+01	<0.27
Bis2-Chloroethyl Ether [C]	--	--	6.9E+02	<0.30
Bis2-Chloroisopropyl Ether	--	--	2.4E+06	<0.23
Bis 2-Ethylhexyl Phthalate [C]	--	--	2.9E+03	<4.2
Bromoform [C]	--	--	1.8E+05	<0.19
Butylbenzylphthalate	--	--	7.0E+04	<2.1
Cadmium	5.2E+01	3.6E+01	--	<0.01
Carbon Tetrachloride [C]	--	--	2.1E+03	<0.14
Chlordane [C]	2.2E+01	1.1E-01	1.1E+00	
Chloride	7.7E+06	5.5E+06	--	
TRC	1.7E+02	2.8E+02	--	
Chlorobenzene	--	--	5.9E+04	<0.14
Chlorodibromomethane[C]	--	--	1.7E+04	<0.14
Chloroform	--	--	4.1E+05	<0.17
2-Chloronaphthalene	--	--	5.9E+04	<0.30
2-Chlorophenol	--	--	5.5E+03	<2.2
Chlorpyrifos	7.6E-01	1.0E+00	--	
Chromium III	6.9E+03	2.5E+03	--	
Chromium VI	1.5E+02	2.8E+02	--	
Chromium, Total	--	--	--	0.2
Chrysene [C]	--	--	2.3E+00	<0.30
Copper	1.7E+02	2.9E+02	--	0.97
Cyanide, Free	2.0E+02	1.3E+02	5.9E+05	<10
DDD [C]	--	--	4.0E-01	
DDE [C]	--	--	2.9E-01	

DDT [C]	1.0E+01	2.5E-02	2.9E-01	
Demeton	--	2.5E+00	--	
Diazinon	1.5E+00	4.3E+00	--	
Dibenz(a,h)anthracene [C]	--	--	2.3E+01	<0.26
1,2-Dichlorobenzene	--	--	4.8E+04	<0.15
1,3-Dichlorobenzene	--	--	3.5E+04	<0.11
1,4-Dichlorobenzene	--	--	7.0E+03	<0.21
3,3-Dichlorobenzidine[C]	--	--	3.6E+01	<1.4
Dichlorobromomethane [C]	--	--	2.2E+04	<0.13
1,2-Dichloroethane [C]	--	--	4.8E+04	<0.21
1,1-Dichloroethylene	--	--	2.6E+05	<0.30
1,2-trans-dichloroethylene	--	--	3.7E+05	
2,4-Dichlorophenol	--	--	1.1E+04	<0.65
2,4-Dichlorophenoxy acetic acid (2,4-D)	--	--	--	
1,2-Dichloropropane[C]	--	--	2.0E+04	<0.095
1,3-Dichloropropene [C]	--	--	2.7E+04	
Dieldrin [C]	2.2E+00	1.4E+00	7.0E-02	
Diethyl Phthalate	--	--	1.6E+06	<9.6
2,4-Dimethylphenol	--	--	3.1E+04	<1.6
Dimethyl Phthalate	--	--	4.1E+07	<1.8
Di-n-Butyl Phthalate	--	--	1.7E+05	<2.3
2,4 Dinitrophenol	--	--	2.0E+05	
2-Methyl-4,6-Dinitrophenol	--	--	1.0E+04	
2,4-Dinitrotoluene [C]	--	--	4.4E+03	<2.1
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	--	--	1.9E-06	
1,2-Diphenylhydrazine[C]	--	--	2.6E+02	<0.28
Alpha-Endosulfan	2.0E+00	1.4E+00	3.3E+03	
Beta-Endosulfan	2.0E+00	1.4E+00	3.3E+03	
Alpha + Beta Endosulfan	2.0E+00	1.4E+00	--	
Endosulfan Sulfate	--	--	3.3E+03	
Endrin	7.8E-01	9.1E-01	2.2E+00	
Endrin Aldehyde	--	--	1.1E+01	
Ethylbenzene	--	--	7.7E+04	<0.23
Fluoranthene	--	--	5.2E+03	<0.20
Fluorene	--	--	2.0E+05	<0.23
Foaming Agents	--	--	--	
Guthion	--	2.5E-01	--	
Heptachlor [C]	4.7E+00	9.6E-02	1.0E-01	
Heptachlor Epoxide[C]	4.7E+00	9.6E-02	5.1E-02	
Hexachlorobenzene[C]	--	--	3.8E-01	<0.59
Hexachlorobutadiene[C]	--	--	2.3E+04	<0.90
Hexachlorocyclohexane Alpha-BHC[C]	--	--	6.4E+00	

Hexachlorocyclohexane Beta-BHC[C]	--	--	2.2E+01	
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	8.6E+00	--	2.3E+02	
Hexachlorocyclopentadiene	--	--	4.1E+04	<1.3
Hexachloroethane[C]	--	--	4.3E+03	<1.3
Hydrogen Sulfide	--	5.0E+01	--	
Indeno (1,2,3-cd) pyrene [C]	--	--	2.3E+01	<0.42
Iron	--	--	--	34
Isophorone[C]	--	--	1.2E+06	<0.71
Kepone	--	0.0E+00	--	
Lead	1.7E+03	5.4E+02	--	0.058
Malathion	--	2.5E+00	--	
Manganese	--	--	--	5.5
Mercury	1.3E+01	1.9E+01	- -	<0.004
Methyl Bromide	--	--	5.5E+04	<0.31
Methylene Chloride [C]	--	--	7.7E+05	<0.13
Methoxychlor	--	7.6E-01	--	
Mirex	--	0.0E+00	--	
Nickel	2.2E+03	6.7E+02	1.7E+05	0.37
Nitrate (as N)	--	--	--	<0.02
Nitrobenzene	--	--	2.5E+04	<1.4
N-Nitrosodimethylamine[C]	--	--	3.9E+03	<1.1
N-Nitrosodiphenylamine[C]	--	--	7.8E+03	<1.2
N-Nitrosodi-n-propylamine[C]	--	--	6.6E+02	<0.48
Nonylphenol	2.5E+02	1.7E+02	--	
Parathion	5.9E-01	3.3E-01	--	
PCB Total[C]	--	3.5E-01	8.3E-02	
Pentachlorophenol [C]	2.0E+02	4.5E+02	3.9E+03	<4.8
Phenol	--	--	3.2E+07	<2.3 or <0.53
Pyrene	--	--	1.5E+05	<0.22
Radionuclides	--	--	--	
Gross Alpha Activity (pCi/L)	--	--	--	<1.76
Beta and Photon Activity (mrem/yr)	--	--	--	1.57
Radium 226 + 228 (pCi/L)	--	--	--	<0.565
Uranium (ug/l)	--	--	--	
Selenium, Total Recoverable	1.8E+02	1.1E+02	1.5E+05	1.3
Silver	5.6E+01	--	--	<0.003
Sulfate	--	--	--	39000
1,1,2,2-Tetrachloroethane[C]	--	--	5.2E+03	<0.20
Tetrachloroethylene[C]	--	--	4.3E+03	<0.15
Thallium	--	--	1.4E+01	0.034
Toluene	--	--	2.2E+05	<0.15
Total dissolved solids	--	--	--	

Toxaphene [C]	6.6E+00	5.0E-03	3.6E-01	
Tributyltin	4.2E+00	1.8E+00	--	
1,2,4-Trichlorobenzene	--	--	2.6E+03	<0.82
1,1,2-Trichloroethane[C]	--	--	2.1E+04	<0.20
Trichloroethylene [C]	--	--	3.9E+04	<0.14
2,4,6-Trichlorophenol [C]	--	--	3.1E+03	<2.9
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	--	--	--	
Vinyl Chloride[C]	--	--	3.1E+03	<0.23
Zinc	1.4E+03	4.0E+03	9.6E+05	<1

APPENDIX D

EVALUATION OF DISCHARGES FROM OUTFALL 015 (Ash Pond 2 Groundwater Discharge)

Outfall 015 (Ash Pond 2) **Maximum Projected Flow: 0.025 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	1/ 3Months	Estimate
		Monthly Average	Daily Maximum		
Total Suspended Solids (mg/L)	NA	NL	NL	1/ 3Months	Grab
Oil and Grease (mg/L)	NA	NL	NL	1/ 3Months	Grab
		Minimum	Maximum		
pH	NA	NL	NL	1/ 3Months	Grab

NL = No Limitation, monitoring required *NA = Not Applicable*

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Water Quality Standards (9VAC25-260)
3. Federal Effluent Limitation Guidelines – Steam Electric Power Generating Point Source Category (40 CFR Part 423)
4. Best Professional Judgment

EVALUATION OF THE EFFLUENT – PCBS

The permit special condition that there shall be no discharge of PCBs transformer fluids in an amount equal to or greater than that detectable by EPA Method 608 has been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – pH

The discharge indentified as Outfall 015 has had consistently elevated pH levels. While these values have been consistently elevated, given the de minimis contribution of the ground water to the overall flow within Dumps Creek and the monitoring data results collected at the downstream Ambient Water Quality Monitoring Station 6BDUM000.04, it does not appear this discharge has resulted in an excursion from the numeric criteria of 6.0 – 9.0 SU in the receiving stream. The below table summarizes the results of the pH monitoring from Outfall 015 and Ambient Water Quality Monitoring Station 6BDUM000.04 since January 2010.

	pH (SU)	
	Outfall 015	**6BDUM000.04**
Maximum	12.05	8.6
90th Percentile	11.70	8.45
Average	11.36	8.17
10th Percentile	10.90	7.88
Minimum	9.52	7.50

The staff does not propose to establish a limit for pH on Outfall 015. The permittee will be required to continue monitoring pH levels from this discharge.

EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Input parameters for instream WQC and WLAs

Stream: A Flow Frequency Determination for the receiving stream is included in Section13 of the Fact Sheet. Water quality data for temperature and pH for the receiving stream were obtained from five years of data collection at Ambient Water Quality Monitoring Station 6BDUM000.04 on Dumps Creek. The ambient station is located 0.3 river miles downstream of Ash Pond 2. Hardness data was obtained from a 2014 special study titled "Dumps Creek Biological Monitoring Report at Station 6BDUM00.23" prepared by D.R. Allen and Associates for Dickenson-Russell Coal Company.

Stream Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	138	mg/L
90^{th} Percentile Temperature =	21.54	°C
90^{th} Percentile Maximum pH =	8.45	SU
10^{th} Percentile Maximum pH =	7.88	SU

Background in-stream water quality conditions were established for antimony, arsenic, barium, cadmium, chloride, chromium, copper, lead, mercury, selenium, silver, and thallium using maximum upstream data collected by the permittee on a quarterly basis for a total of 10 sampling events during the previous permit cycle.

Discharge: Hardness data for the effluent was not available, therefore a conservative value of 100 mg/L was utilized in the evaluation. The temperature value utilized is from Form 2C Part V of the application. The pH values utilized were calculated from DMR data dating back to February 2000. The flow value utilized for the evaluation is the maximum post-cap flow reported in the DMR data (0.025 MGD).

Effluent Parameter	Value	Units
Mean Hardness (as $CaCO_3$) =	100	mg/L
90^{th} Percentile Temperature =	15.3	°C
90^{th} Percentile Maximum pH =	11.89	SU
10^{th} Percentile Maximum pH =	11.12	SU

Given that Dumps Creek is a relatively high gradient channel with turbulent high velocity flow and the groundwater discharge from Pond 2 is spread across numerous locations along the bank of Dumps Creek, it is appropriate to assume a complete and rapid mix for this discharge.

WQC and WLAs were calculated for all WQS parameters. Those WQC and WLAs are presented in the MSTRANTI spreadsheet that can be found in Appendix H. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- Selenium: No limits were determined to be necessary.

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh}

exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit.

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1 If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
   B.2 If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1 If the evaluation indicates that no limits are needed, then no further monitoring is required.
   C.2 If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
   C.3 (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

Appendix D
Evaluation of Effluent
Outfall 015

Parameter (ug/l unless noted)	Wasteload Allocations			Form 2C Part V	Special Study by Permittee
	Acute	Chronic	HH		
Acenapthene	--	--	1.15E+05	<0.28	
Acrolein	--	--	1.08E+03	<2.6	
Acrylonitrile[C]	--	--	9.08E+02	<0.55	
Aldrin [C]	2.24E+02	--	1.82E-01		
Ammonia-N (mg/l) (Yearly)	2.60E+02	7.68E+01	--		
Ammonia-N (mg/l) (High Flow)	4.01E+02	1.78E+02	--		
Anthracene	--	--	4.66E+06	<0.18	
Antimony	--	--	7.46E+04	0.34	0.34
Arsenic	2.53E+04	1.27E+04	--	5.75	5.75
Barium	--	--	--	177	177
Benzene [C]	--	--	1.85E+05	<0.11	
Benzidine[C]	--	--	7.26E-01	<46	
Benzo (a) anthracene [C]	--	--	6.53E+01	<0.35	
Benzo (b) fluoranthene [C]	--	--	6.53E+01		
Benzo (k) fluoranthene [C]	--	--	6.53E+01	<0.29	
Benzo (a) pyrene [C]	--	--	6.53E+01	<0.27	
Bis2-Chloroethyl Ether [C]	--	--	1.92E+03	<0.30	
Bis2-Chloroisopropyl Ether	--	--	7.58E+06	<0.23	
Bis 2-Ethylhexyl Phthalate [C]	--	--	7.99E+03	<4.2	
Bromoform [C]	--	--	5.08E+05	<0.19	
Butylbenzylphthalate	--	--	2.22E+05	<2.1	
Cadmium	4.15E+02	1.20E+02	--	0.28	0.28
Carbon Tetrachloride [C]	--	--	5.81E+03	<0.14	
Chlordane [C]	1.79E+02	3.67E-01	2.94E+00		
Chloride	6.42E+07	1.96E+07	--		11.5
TRC	1.42E+03	9.39E+02	--		
Chlorobenzene	--	--	1.87E+05	<0.14	
Chlorodibromomethane[C]	--	--	4.72E+04	<0.14	
Chloroform	--	--	1.28E+06	<0.17	
2-Chloronaphthalene	--	--	1.87E+05	<0.30	
2-Chlorophenol	--	--	1.75E+04	<2.2	
Chlorpyrifos	6.19E+00	3.50E+00	--		
Chromium III	5.52E+04	8.22E+03	--		
Chromium VI	1.19E+03	9.39E+02	--		
Chromium, Total	--	--	--	<0.2	<0.2
Chrysene [C]	--	--	6.53E+00	<0.30	
Copper	1.29E+03	9.27E+02	--	0.8	0.8
Cyanide, Free	1.64E+03	4.44E+02	1.87E+06	<10	
DDD [C]	--	--	1.13E+00		

DDE [C]	--	--	7.99E-01		
DDT [C]	8.21E+01	8.54E-02	7.99E-01		
Demeton	--	8.54E+00	--		
Diazinon	1.27E+01	1.45E+01	--		
Dibenz(a,h)anthracene [C]	--	--	6.53E+01	<0.26	
1,2-Dichlorobenzene	--	--	1.52E+05	<0.15	
1,3-Dichlorobenzene	--	--	1.12E+05	<0.11	
1,4-Dichlorobenzene	--	--	2.22E+04	<0.21	
3,3-Dichlorobenzidine[C]	--	--	1.02E+02	<1.4	
Dichlorobromomethane [C]	--	--	6.17E+04	<0.13	
1,2-Dichloroethane [C]	--	--	1.34E+05	<0.21	
1,1-Dichloroethylene	--	--	8.28E+05	<0.30	
1,2-trans-dichloroethylene	--	--	1.17E+06		
2,4-Dichlorophenol	--	--	3.38E+04	<0.65	
2,4-Dichlorophenoxy acetic acid (2,4-D)	--	--	--		
1,2-Dichloropropane[C]	--	--	5.45E+04	<0.095	
1,3-Dichloropropene [C]	--	--	7.62E+04		
Dieldrin [C]	1.79E+01	4.78E+00	1.96E-01		
Diethyl Phthalate	--	--	5.13E+06	<2.9	
2,4-Dimethylphenol	--	--	9.91E+04	<1.6	
Dimethyl Phthalate	--	--	1.28E+08	<1.8	
Di-n-Butyl Phthalate	--	--	5.25E+05	<2.3	
2,4 Dinitrophenol	--	--	6.18E+05		
2-Methyl-4,6-Dinitrophenol	--	--	3.26E+04		
2,4-Dinitrotoluene [C]	--	--	1.23E+04	<2.1	
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	--	--	5.95E-06		
1,2-Diphenylhydrazine[C]	--	--	7.26E+02	<0.28	
Alpha-Endosulfan	1.64E+01	4.78E+00	1.04E+04		
Beta-Endosulfan	1.64E+01	4.78E+00	1.04E+04		
Alpha + Beta Endosulfan	1.64E+01	4.78E+00	--		
Endosulfan Sulfate	--	--	1.04E+04		
Endrin	6.42E+00	3.07E+00	7.00E+00		
Endrin Aldehyde	--	--	3.50E+01		
Ethylbenzene	--	--	2.45E+05	<0.23	
Fluoranthene	--	--	1.63E+04	<0.20	
Fluorene	--	--	6.18E+05	<0.23	
Foaming Agents	--	--	--		
Guthion	--	8.54E-01	--		
Heptachlor [C]	3.88E+01	3.25E-01	2.87E-01		
Heptachlor Epoxide[C]	3.88E+01	3.25E-01	1.42E-01		
Hexachlorobenzene[C]	--	--	1.05E+00	<0.59	
Hexachlorobutadiene[C]	--	--	6.53E+04	<0.90	

Hexachlorocyclohexane Alpha-BHC[C]	--	--	1.78E+01		
Hexachlorocyclohexane Beta-BHC[C]	--	--	6.17E+01		
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	7.09E+01	--	6.53E+02		
Hexachlorocyclopentadiene	--	--	1.28E+05	<1.3	
Hexachloroethane[C]	--	--	1.20E+04	<1.3	
Hydrogen Sulfide	--	1.71E+02	--		
Indeno (1,2,3-cd) pyrene [C]	--	--	6.53E+01	<0.42	
Iron	--	--	--	<5	
Isophorone[C]	--	--	3.48E+06	<0.71	
Kepone	--	0.00E+00	--		
Lead	1.33E+04	1.70E+03	--	0.665	0.665
Malathion	--	8.54E+00	--		
Manganese	--	--	--	<0.1	
Mercury	1.0E+02	6.6E+01	--	<0.2	<2
Methyl Bromide	--	--	1.75E+05	<0.31	
Methylene Chloride [C]	--	--	2.14E+06	<0.13	
Methoxychlor	--	2.56E+00	--		
Mirex	--	0.00E+00	--		
Nickel	1.78E+04	2.27E+03	5.36E+05	7.84	
Nitrate (as N)	--	--	--	560.00	
Nitrobenzene	--	--	8.05E+04	<1.4	
N-Nitrosodimethylamine[C]	--	--	1.09E+04	<1.1	
N-Nitrosodiphenylamine[C]	--	--	2.18E+04	<1.2	
N-Nitrosodi-n-propylamine[C]	--	--	1.85E+03	<0.48	
Nonylphenol	2.09E+03	5.64E+02	--		
Parathion	4.85E+00	1.11E+00	--		
PCB Total[C]	--	1.20E+00	2.32E-01		
Pentachlorophenol [C]	1.59E+03	1.39E+03	1.09E+04	<4.8	
Phenol	--	--	1.00E+08	<10 OR …<0.53	
Pyrene	--	--	4.66E+05	<0.22	
Radionuclides	--	--	--		
Gross Alpha Activity (pCi/L)	--	--	--	<3.00	
Beta and Photon Activity (mrem/yr)	--	--	--		
Radium 226 + 228 (pCi/L)	--	--	--	<0.41	
Uranium (ug/l)	--	--	--		
Selenium, Total Recoverable	1.46E+03	3.85E+02	4.90E+05	164	150
Silver	4.45E+02	--	--	<0.003	
Sulfate	--	--	--	188000	
1,1,2,2-Tetrachloroethane[C]	--	--	1.45E+04	<0.20	

Tetrachloroethylene[C]	--	--	1.20E+04	<0.15	
Thallium	--	--	4.90E+01	<0.05	<0.05
Toluene	--	--	7.00E+05	<1.0	
Total dissolved solids	--	--	--		
Toxaphene [C]	5.45E+01	1.71E-02	1.02E+00		
Tributyltin	3.43E+01	6.15E+00	--		
1,2,4-Trichlorobenzene	--	--	8.16E+03	<0.82	
1,1,2-Trichloroethane[C]	--	--	5.81E+04	<0.20	
Trichloroethylene [C]	--	--	1.09E+05	<0.14	
2,4,6-Trichlorophenol [C]	--	--	8.71E+03	<2.9	
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	--	--	--		
Vinyl Chloride[C]	--	--	8.71E+03	<0.23	
Zinc	1.14E+04	1.32E+04	3.03E+06	<1	

STAT.exe Output

Facility	VA0001015 - Outfall 015
Chemical	Selenium
Chronic averaging period	4
WLAa	1500
WLAc	380
Q.L.	0.5
# samples/mo.	1
# samples/wk.	1

Summary of Statistics:	
# observations	11
Expected Value	144.570
Variance	83.3630
C.V.	6.315504
97th percentile daily values	162.463
97th percentile 4 day average	153.338
97th percentile 30 day average	147.705
# < Q.L.	0
Model used	lognormal

No Limit is required for this material

The data are:

138
142
134
130
143
143
146
150
150
150
164

APPENDIX E

EVALUATION OF DISCHARGES FROM OUTFALL 727 (Plant Site Stormwater Outfall)

Outfall 727 (Plant Site Stormwater) **Maximum Projected Flow: 0.561 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NL	1/Year	Estimate
		Monthly Average	Daily Maximum		
Total Suspended Solids (mg/L)	NA	NL	NL	1/Year	Grab
Oil and Grease (mg/L)	NA	NL	NL	1/Year	Grab
Iron (mg/L) (Benchmark Monitoring)	NA	1	1	1/Year	Grab
		Minimum	Maximum		
pH	NA	NL	NL	1/Year	Grab

NL = No Limitation, monitoring required *NA = Not Applicable*

EFFLUENT LIMITATIONS GUIDELINES (ELGs)

There are no Federal Effluent Guidelines that apply to industrial stormwater discharges.

EVALUATION OF BENCHMARK MONITORING REQUIREMENTS

This facility falls under Industrial Sector O – Steam Electric Generating Facilities. Sector O facilities are required to conduct Benchmark Monitoring requirements for Iron with a benchmark target value of 1 mg/L. While this benchmark monitoring requirement was waived in the previous permit based on < QL levels of iron reported in the previous application, it will be required in the current permit since the reported value in the current application was 0.382 mg/L. The permittee will be required to sample iron annually.

EVALUATION OF THE EFFLUENT – PCBS

The permit special condition that there shall be no discharge of PCBs transformer fluids in an amount equal to or greater than that detectable by EPA Method 608 has been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – pH

During the previous permit term, the discharge from Outfall 727 has ranged from 6.33 to 9.6 SU. The high pH values reported were likely associated with the fly ash handling system. Since the fly ash handling system has been decommissioned with the conversion to natural gas, it is anticipated that elevated pH discharges will no longer occur. The permittee will be required to continue monitoring pH in the next permit cycle.

EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

The permittee evaluated the batch stormwater discharge from Outfall 727 for a number of pollutants as seen in the below table. A screening level equal to 2 times the acute toxicity water quality criteria for each pollutant was utilized to determine whether a Stormwater Management Evaluation is necessary. For pollutants with no acute toxicity water quality criteria, the concentration was compared against the human health water quality criteria. All pollutant concentrations were below the screening levels, therefore no further evaluation is necessary.

Parameter (ug/L)	Water Quality Criteria			Form 2F Part VII
	Acute	Chronic	HH	
Aluminum	--	--	--	638
Antimony	--	--	640.00	0.69
Arsenic	340.00	150.00	--	4.88
Barium	--	--	--	35.7
Beryllium	--	--	--	0.081
Boron	--	--	--	56
Cadmium	5.41	1.48	--	<0.05
Chromium, Total	--	--	--	2.6
Cobalt	--	--	--	0.482
Copper	19.5	12.4	--	3.91
Iron	--	--	--	382
Lead	170.84	20.79	--	1.68
Magnesium	--	--	--	2880
Manganese	--	--	--	16.9
Mercury	1.40	0.77	--	<0.01
Molybdenum	--	--	--	7.49
Nickel	232.01	26.99	4600.00	1.49
Selenium, Total Recoverable	20.00	5.00	4200.00	3.8
Silver	5.63	--	--	<0.003
Thallium	--	--	0.47	<0.045
Tin	--	--	--	<5
Titanium	--	--	--	20.4
Zinc	149.14	157.38	26000.00	49.9

APPENDIX F

WHOLE EFFLUENT TOXICITY (WET) EVALUATION

Applicability of Toxics Management Program:

The applicability criteria for a facility to perform toxicity testing is contained in the Departments Guidance Memo No. 00-2012, Toxics Management Program Implementation Guidance, 08/24/00, Part IV. The Standard Industrial Code (SIC) for BPS is 4911, Electrical Generation, which is included in Appendix A of the TMP Guidance. In addition, the Instream Waste Concentration (IWC) is greater than or equal to 33% for the dewatering operation (GM 00-2012, Sections IV.1.A. and IV.1.B, respectively).

Summary of Toxicity Testing:

- Outfall 003: The previous permit required annual chronic testing using *Ceriodaphnia dubia* and *Pimephales promelas* at Outfall 003. Table 1 contains summaries of the toxicity testing results for this outfall during the term of the permit.

- Outfall 007: The previous permit required annual acute testing using *Ceriodaphnia dubia* and *Pimephales promelas* at Outfall 007. Table 3 contains a summary of the toxicity testing results for this outfall during the term of the permit.

- Outfall 727: The previous permit required quarterly-to-annual acute testing using *Ceriodaphnia dubia* and *Pimephales promelas* at Outfall 727. Table 3 contains a summary of the toxicity testing results for this outfall during the term of the permit. The staff recommends discontinuing WET testing for this outfall based on the favorable past testing results, and upon the fact after the conversion to natural gas fueling, the watershed area for this outfall no longer contains coal haulage or ash handling activities.

Rationale for Acute versus Chronic Toxicity Testing:

- Outfall 003 (AWWTP): As shown in Table 4, the IWC_a is 29.95%. Since the $IWC_a < 33\%$, the acute tests require the determination of a LC_{50}. Additionally, Outfall 003 is a continuous discharge with a IWC_c of 14.30%. Since the IWC_c › 1%, Outfall 003 must also be assessed for chronic toxicity.

- Outfall 007 (Coal Pile Runoff): As shown in Table 5, the IWC_a is 10.99%. Since the IWC_a ‹ 33%, the acute tests require the determination of a valid LC_{50}. The IWC_c is 3.97%. The IWCc › 1%, which ordinarily would trigger the need for chronic testing; however, the staff has determined that chronic is not necessary for this discharge since it is an intermittent batch discharge controlled manually with a shutoff valve.

- Outfall 003 Dewatering Operation: As shown in Table 6, the IWC_a is 52.13%. Since the IWCa › 33%, the acute tests require the determination of a valid NOAEC. The IWC_c is 46.72 %. Since the IWCc › 1%, Outfall 003during the dewatering operation must also be assessed for chronic toxicity.

Sample Type:

- Outfall 003 (AWWTP): A 24-hour flow proportioned composite sample is representative of the discharge at Outfall 003.

- Outfall 007: Grab samples are considered representative for Outfall 007 since this is a batch discharge from a series of settling basins with ample equalization.

- Outfall 003 Dewatering Operation: 24-hour flow proportioned composite samples are required since that is the sample type for the chemical parameters during this operation.

Monitoring Frequency:

- Outfall 003 (AWWTP): Monitoring shall be performed annually based on an evaluation of the toxicity testing.

- Outfalls 007 (Coal Pile Runoff): The monitoring frequency is annual based on an evaluation of the toxicity testing.

- Outfall 003 Dewatering Operation: The WET testing for the dewatering operation has been modified from the Initial Draft Permit to the Revised Draft Permit. The monitoring frequency proposed in the Initial Draft Permit was monthly during the ash pond dewatering activities. During the public comment period, commenters expressed concern that monthly WET testing was inadequate to evaluate the discharge. Commenters also suggested that the WET testing be stacked towards the initiation of the dewatering operation so that toxicity issues could be identified early in the operation prior to the majority of the dewatering discharges had occurred. DEQ determined that is was appropriate to require WET testing once during the first week, once during the second week, and monthly thereafter.

Calculation of WLAs: Acute and chronic WLAs were generated from the WETLimit10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows.

Dilution Series:
The recommended dilution series for chronic tests are shown in italics in:

- Table 4 for Outfall 003
- Table 5 for Outfall 007
- Table 6 for Outfall 003 Dewatering Operation

The recommended dilution series for acute tests for all outfalls and stages is the standard 0.5 series. The only exception to this is for dewatering activities where a limit of 100% minimum applies; then only the control and 100% dilution are required.

Limit Evaluation:
Outfall 003 (AWWTP): The summary of the chronic toxicity testing data are shown in Table 1. Based on the evaluation of the chronic toxicity data, a WET Limit is not required at this time. The endpoints have been identified as LC_{50} = 1.0 TU_a and NOEC = 10.0 TU_c.

Outfall 007: No chronic toxicity testing data are available for analysis. The summary of the acute toxicity testing data (Table 2) shows that the LC_{50} in every test was >100%. Based on the acute toxicity data all showing no toxicity, no acute limit was determined to be necessary. The endpoint has been identified as LC_{50} = 1.0 TU_a.

WET Limits for Dewatering Activities: Acute and chronic WET limits were established for the period when the dewatering activities are occurring. The acute WET limit of NOAEC = 100% and chronic WET limit of 3.12 TU_c are shown on Table 6.

Table 1

	Outfall 003 Effluent				Influent	
	Toxicity endpoint	Permit Limits	*P. promelas*	*C. dubia*	*P. promelas*	*C. dubia*
2010	48-hour LC50	100%	>100%	>100%	>100%	>100%
	NOEC Value - Survival	18%	100%	100%	<100%	100%
	NOEC Value - Growth/Reproduction	18%	50%	50%	<100%	100%
	TUc (NOEC)	5.8	2.0	2.0	>1.0	1.0
	IC25	Report Only	62.5%	69.9%		
2011	48-hour LC50	100%	>100%	>100%	>100%	>100%
	NOEC Value - Survival	18%	100%	100%	<100%	100%
	NOEC Value - Growth/Reproduction	18%	100%	100%	<100%	100%
	TUc (NOEC)	5.8	1.0	1.0	>1.0	1.0
	IC25	Report Only	>100%	>100%		
2012	48-hour LC50	100%	>100%	>100%	>100%	>100%
	NOEC Value - Survival	18%	100%	100%	100%	100%
	NOEC Value - Growth/Reproduction	18%	100%	100%	100%	100%
	TUc (NOEC)	5.8	1.0	1.0	1.0	1.0
	IC25	Report Only	>100%	>100%		
2013	48-hour LC50	100%	>100%	>100%	>100%	>100%
	NOEC Value - Survival	18%	100%	100%	100%	100%
	NOEC Value - Growth/Reproduction	18%	100%	100%	100%	100%
	TUc (NOEC)	5.8	1.0	1.0	1.0	1.0
	IC25	Report Only	>100%	>100%		
2014	48-hour LC50	100%	>100%	>100%	>100%	>100%
	NOEC Value - Survival	18%	100%	100%	100%	100%
	NOEC Value - Growth/Reproduction	18%	100%	50%	100%	100%
	TUc (NOEC)	5.8	1.0	2.0	1.0	1.0
	IC25	Report Only	>100%	25.2%		

Table 2

Outfall 007 Effluent			
	Toxicity endpoint	*P. promelas*	*C. dubia*
2010	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2012	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2013	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2014	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%

Table 3

Outfall 727 Effluent			
	Toxicity endpoint	*P. promelas*	*C. dubia*
Oct - Dec 2010	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0	0
Jan - March* 2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0.2	0.3
Jan - March* 2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	5%	0%
Apr - June 2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	35%	0%
July-Sept 2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	45%	0%
Oct - Dec 2011	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
Jan - March 2012	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
Apr - June 2012	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
July - Sept** 2012	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2013	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%
2014	48-hr LC50 Value (TUa)	>100% (<1.0 TUa)	>100% (<1.0 TUa)
	Percent Mortality in 100% Effluent	0%	0%

**Note: Split sample.*

***Note: Testing frequency requirement reduced from 1/3 mo. To 1/year effective 8/21/2012.*

Table 4
Outfall 003

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			**Acute Endpoint/Permit Limit**			**Use as LC_{50} in Special Condition, as TUa on DMR**					
	Revision Date: 12/13/13											
	File: WETLIM10.xls			**ACUTE**	**1.00180788**	**TUa**	**LC_{50} =**	**100**	% Use as	**1.00**	**TUa**	
	(MIX.EXE required also)											
				ACUTE WLAa		**1.00180785**	Note: Inform the permittee that if the mean of the data exceeds					
							this TUa:	**1.0**	a limit may result using STATS.EXE			
				Chronic Endpoint/Permit Limit			**Use as NOEC in Special Condition, as TUc on DMR**					
				CHRONIC	**10.0180788**	**TU_c**	**NOEC =**	**10**	% Use as	**10.00**	**TU_c**	
				BOTH*	**10.0180788**	**TU_c**	**NOEC =**	**10**	% Use as	**10.00**	**TU_c**	
	Enter data in the cells with blue type:			**AML**	**10.0180788**	**TU_c**	**NOEC =**	**10**	% Use as	**10.00**	**TU_c**	
	Entry Date:	02/16/16		**ACUTE WLAa,c**		**10.0180785**			Note: Inform the permittee that if the mean			
	Facility Name:	Clinch River Plant		**CHRONIC WLAc**		**6.99173554**			of the data exceeds this TUc:		**4.11687608**	
	VPDES Number:	**VA0001015**		* Both means acute expressed as chronic					a limit may result using STATS.EXE			
	Outfall Number:	**3**										
				% Flow to be used from MIX.EXE					**Diffuser /modeling study?**			
	Plant Flow:	**4.84**	MGD						Enter Y/N	**n**		
	Acute 1Q10:	**25**	MGD	**45.29**	%				Acute	**1**	:1	
	Chronic 7Q10:	**29**	MGD	**100**	%				Chronic	**1**	:1	
	Are data available to calculate CV? (Y/N)			**N**	(Minimum of 10 data points, same species, needed)						Go to Page 2	
	Are data available to calculate ACR? (Y/N)			**N**	(NOEC<LC50, do not use greater/less than data)						Go to Page 3	
	IWC_a	29.94586234	%	Plant flow/plant flow + 1Q10			**NOTE: If the IWCa is >33%, specify the**					
	IWC_c	14.30260047	%	Plant flow/plant flow + 7Q10			**NOAEC = 100% test/endpoint for use**					
	Dilution, acute	3.339359504		100/IWCa								
	Dilution, chronic	6.991735537		100/IWCc								
	WLA_a	1.001807851		Instream criterion (0.3 TUa) X's Dilution, acute								
	WLA_c	6.991735537		Instream criterion (1.0 TUc) X's Dilution, chronic								
	$WLA_{a,c}$	10.01807851		ACR X's WLA_a - converts acute WLA to chronic units								
	ACR -acute/chronic ratio	10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)								
	CV-Coefficient of variation	0.6		Default of 0.6 - if data are available, use tables Page 2)								
	Constants eA	0.4109447		Default = 0.41								
	eB	0.6010373		Default = 0.60								
	eC	2.4334175		Default = 2.43								
	eD	2.4334175		Default = 2.43 (1 samp)	No. of samples	1	**The Maximum Daily Limit is calculated from the lowest					
							LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**					
	$LTA_{a,c}$	4.116876269		WLAa,c X's eA								
	LTA_c	4.20229385		WLAc X's eB							Rounded NOEC's	%
	MDL** with $LTA_{a,c}$	10.01807876	TU_c	NOEC =	9.981954	(Protects from acute/chronic toxicity)					NOEC =	10 %
	MDL** with LTA_c	10.22593539	TU_c	NOEC =	9.779057	(Protects from chronic toxicity)					NOEC =	10 %
	AML with lowest LTA	10.01807876	TU_c	NOEC =	9.981954	Lowest LTA X's eD					NOEC =	10
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a											
											Rounded LC50's	%
	MDL with $LTA_{a,c}$	1.001807876	TU_a	LC50 =	99.819539	%					LC50 =	100 %
	MDL with LTA_c	1.022593539	TU_a	LC50 =	97.790565	%					LC50 =	98

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	24.3	4.116876		
Dilution series to use for limit			10	10
Dilution factor to recommend:	0.4928515		0.3162278	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	49.3	2.03	31.6	3.16
	24.3	4.12	10.0	10.00
	12.0	8.35	3.2	31.62
	5.90	16.95	1.0	100.00
Extra dilutions if needed	2.91	34.39	0.3	316.23
	1.43	69.78	0.1	1000.00

Table 5
Outfall 007

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97		**Acute Endpoint/Permit Limit**			**Use as LC_{50} in Special Condition, as TUa on DMR**					
	Revision Date: 12/13/13										
	File: WETLIM10.xls		**ACUTE**	**2.73062507**	**TUa**	**LC_{50} =**	**37**	% Use as	**2.70**	**TUa**	
	(MIX.EXE required also)										
			ACUTE WLAa		**2.730625**	Note: Inform the permittee that if the mean of the data exceeds					
						this TUa:	**1.0**	a limit may result using STATS.EXE			
			Chronic Endpoint/Permit Limit			**Use as NOEC in Special Condition, as TUc on DMR**					
			CHRONIC	**27.3062507**	**TU_c**	**NOEC =**	**4**	% Use as	**25.00**	**TU_c**	
			BOTH*	**27.3062507**	**TU_c**	**NOEC =**	**4**	% Use as	**25.00**	**TU_c**	
	Enter data in the cells with blue type:		**AML**	**27.3062507**	**TU_c**	**NOEC =**	**4**	% Use as	**25.00**	**TU_c**	
	Entry Date:	02/16/16	**ACUTE WLAa,c**		**27.30625**		Note: Inform the permittee that if the mean				
	Facility Name:	Clinch River Plant	**CHRONIC WLAc**		**25.1666667**		of the data exceeds this TUc:		**11.2213582**		
	VPDES Number:	**VA0001015**	* Both means acute expressed as chronic				a limit may result using STATS.EXE				
	Outfall Number:	**7**									
			% Flow to be used from MIX.EXE				**Diffuser /modeling study?**				
	Plant Flow:	**1.2**	MGD				Enter Y/N	**n**			
	Acute 1Q10:	**25**	MGD	**38.89**	%		Acute	1	:1		
	Chronic 7Q10:	**29**	MGD	**100**	%		Chronic	1	:1		
	Are data available to calculate CV? (Y/N)		**N**	(Minimum of 10 data points, same species, needed)					Go to Page 2		
	Are data available to calculate ACR? (Y/N)		**N**	(NOEC<LC50, do not use greater/less than data)					Go to Page 3		
	IWC_a	10.98649577	%	Plant flow/plant flow + 1Q10		**NOTE: If the IWCa is >33%, specify the**					
	IWC_c	3.973509934	%	Plant flow/plant flow + 7Q10		**NOAEC = 100% test/endpoint for use**					
	Dilution, acute	9.102083333		100/IWCa							
	Dilution, chronic	25.16666667		100/IWCc							
	WLA_a	2.730625	Instream criterion (0.3 TUa) X's Dilution, acute								
	WLA_c	25.16666667	Instream criterion (1.0 TUc) X's Dilution, chronic								
	$WLA_{a,c}$	27.30625	ACR X's WLA_a - converts acute WLA to chronic units								
	ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)								
	CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)								
	Constants eA	0.4109447	Default = 0.41								
	eB	0.6010373	Default = 0.60								
	eC	2.4334175	Default = 2.43								
	eD	2.4334175	Default = 2.43 (1 samp)	No. of samples	1	****The Maximum Daily Limit is calculated from the lowest**					
						LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.					
	$LTA_{a,c}$	11.22135871	WLAa,c X's eA								
	LTA_c	15.12610538	WLAc X's eB						Rounded NOEC's		%
	MDL** with $LTA_{a,c}$	27.30625067	TU_c	NOEC =	3.662165	(Protects from acute/chronic toxicity)			NOEC =	4	%
	MDL** with LTA_c	36.80812955	TU_c	NOEC =	2.716791	(Protects from chronic toxicity)			NOEC =	3	%
	AML with lowest LTA	27.30625067	TU_c	NOEC =	3.662165	Lowest LTA X's eD			NOEC =	4	
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a										
									Rounded LC50's		%
	MDL with $LTA_{a,c}$	2.730625067	TU_a	LC50 =	36.621652	%			LC50 =	37	%
	MDL with LTA_c	3.680812955	TU_a	LC50 =	27.167911	%			LC50 =	28	

	DILUTION SERIES TO RECOMMEND				
	Table 4.	Monitoring		Limit	
		% Effluent	TUc	% Effluent	TUc
	Dilution series based on data mean	8.9	11.22136		
	Dilution series to use for limit			4	25
	Dilution factor to recommend:	0.2985226		0.2	
	Dilution series to recommend:	100.0	1.00	100.0	1.00
		29.9	3.35	20.0	5.00
		8.9	11.22	4.0	25.00
		2.7	37.59	0.8	125.00
		0.79	125.92	0.2	625.00
	Extra dilutions if needed	0.24	421.81	0.0	3125.00
		0.07	1412.98	0.0	15625.00

Table 6
Outfall 003 Dewatering Operation

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR					
	Revision Date: 12/13/13											
	File: WETLIM10.xls			ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa	
	(MIX.EXE required also)			ACUTE WLAa		0.57551653	Note: Inform the permittee that if the mean of the data exceeds					
							this TUa:	1.0	a limit may result using STATS.EXE			
				Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR					
				CHRONIC	3.13024223	TU_c	NOEC =	32	% Use as	3.12	TU_c	
				BOTH*	5.75516543	TU_c	NOEC =	18	% Use as	5.55	TU_c	
	Enter data in the cells with blue type:			AML	3.13024223	TU_c	NOEC =	32	% Use as	3.12	TU_c	
	Entry Date:	02/18/16		ACUTE WLAa,c	5.75516529		Note: Inform the permittee that if the mean					
	Facility Name:	Clinch River Plant		CHRONIC WLAc	2.14022727		of the data exceeds this TUc:			1.28635636		
	VPDES Number:	VA0001015		* Both means acute expressed as chronic			a limit may result using STATS.EXE					
	Outfall Number:	3										
				% Flow to be used from MIX.EXE			Diffuser /modeling study?					
	Plant Flow:	4.84	MGD				Enter Y/N	n				
	Acute 1Q10:	25	MGD	17.78	%		Acute	1	:1			
	Chronic 7Q10:	29	MGD	19.03	%		Chronic	1	:1			
	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)					Go to Page 2		
	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3		
	IWC_a	52.1270867	%	Plant flow/plant flow + 1Q10			NOTE: If the IWCa is >33%, specify the					
	IWC_c	46.72400977	%	Plant flow/plant flow + 7Q10			NOAEC = 100% test/endpoint for use					
	Dilution, acute	1.91838843		100/IWCa								
	Dilution, chronic	2.140227273		100/IWCc								
	WLA_a	0.575516529	Instream criterion (0.3 TUa) X's Dilution, acute									
	WLA_c	2.140227273	Instream criterion (1.0 TUc) X's Dilution, chronic									
	$WLA_{a,c}$	5.755165289	ACR X's WLA_a - converts acute WLA to chronic units									
	ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)									
	CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)									
	Constants eA	0.4109447	Default = 0.41									
	eB	0.6010373	Default = 0.60									
	eC	2.4334175	Default = 2.43									
	eD	2.4334175	Default = 2.43 (1 samp)	No. of samples	1		**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.					
	$LTA_{a,c}$	2.365054673	WLAa,c X's eA									
	LTA_c	1.286356421	WLAc X's eB							Rounded NOEC's		%
	MDL** with $LTA_{a,c}$	5.75516543	TU_c	NOEC =	17.375695	(Protects from acute/chronic toxicity)				NOEC =	18	%
	MDL** with LTA_c	3.130242227	TU_c	NOEC =	31.946409	(Protects from chronic toxicity)				NOEC =	32	%
	AML with lowest LTA	3.130242227	TU_c	NOEC =	31.946409	Lowest LTA X's eD				NOEC =	32	
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a											
										Rounded LC50's		%
	MDL with $LTA_{a,c}$	0.575516543	TU_a	LC50 =	173.756951	%	Use NOAEC=100%			LC50 =	NA	%
	MDL with LTA_c	0.313024223	TU_a	LC50 =	319.464095	%	Use NOAEC=100%			LC50 =	NA	

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	77.7	1.286356		
Dilution series to use for limit			32	3.125
Dilution factor to recommend:	0.881697		0.5656854	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	88.2	1.13	56.6	1.77
	77.7	1.29	32.0	3.13
	68.5	1.46	18.1	5.52
	60.43	1.65	10.2	9.77
Extra dilutions if needed	53.28	1.88	5.8	17.26
	46.98	2.13	3.3	30.52

APPENDIX G
MIXING ZONE ANALYSIS

Mixing Zone Predictions for VA0001015 Outfall 003 Clinch River

Effluent Flow = 4.84 MGD
Stream 7Q10 = 29 MGD
Stream 30Q10 = 38 MGD
Stream 1Q10 = 25 MGD
Stream slope =.0001 ft/ft
Stream width = 70 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10
Depth = 2.8781 ft
Length = 1839.31 ft
Velocity = .26 ft/sec
Residence Time = .0819 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10
Depth = 3.3314 ft
Length = 1615.4 ft
Velocity = .2844 ft/sec
Residence Time = .0657 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 2.6628 ft
Length = 1969.92 ft
Velocity = .2478 ft/sec
Residence Time = 2.2081 hours

Recommendation:
A complete mix assumption is appropriate for this situation providing no more than **45.29%** of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1.0

Mixing Zone Predictions for VA0001015 Outfall 007 Clinch River

Effluent Flow = 0.31 MGD
Stream 7Q10 = 29 MGD
Stream 30Q10 = 38 MGD
Stream 1Q10 = 25 MGD
Stream slope =.0001 ft/ft
Stream width = 70 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10
Depth = 2.6335 ft
Length = 1989.19 ft
Velocity = .2461 ft/sec
Residence Time = .0935 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10
Depth = 3.1081 ft
Length = 1718.23 ft
Velocity = .2726 ft/sec
Residence Time = .073 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 2.4057 ft
Length = 2153.62 ft
Velocity = .2327 ft/sec
Residence Time = 2.5713 hours

Recommendation:
A complete mix assumption is appropriate for this situation providing no more than **38.89%** of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1.0

Mixing Zone Predictions for VA0001015 Outfall 008 Clinch River

Effluent Flow = 0.012 MGD
Stream 7Q10 = 29 MGD
Stream 30Q10 = 38 MGD
Stream 1Q10 = 25 MGD
Stream slope =.0001 ft/ft
Stream width = 70 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10
Depth = 2.6169 ft
Length = 2000.27 ft
Velocity = .2452 ft/sec
Residence Time = .0944 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10
Depth = 3.093 ft
Length = 1725.65 ft
Velocity = .2718 ft/sec
Residence Time = .0735 days

Recommendation:
A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 2.3882 ft
Length = 2167.52 ft
Velocity = .2316 ft/sec
Residence Time = 2.5997 hours

Recommendation:
A complete mix assumption is appropriate for this situation providing no more than **38.47%** of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1.0

APPENDIX H

MSTRANTI RESULTS

- **OUTFALL 003 (ADVANCED WASTEWATER TREATMENT PLANT)**
- **OUTFALL 003 DEWATERING OPERATION**
- **OUTFALL 007 (COAL PILE RUNOFF)**
- **OUTFALL 015 (ASH POND 2 TOE SEEPS)**

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: AEP Clinch River Plant Permit No.: VA0001015

Receiving Stream: Clinch River 003 - RMZ - Normal Operations Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	147	mg/L
90% Temperature (Annual) =	24.34	deg C
90% Temperature (Wet season) =	24.34	deg C
90% Maximum pH =	8.342	SU
10% Maximum pH =	8.042	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	N	
Trout Present Y/N? =	N	
Early Life Stages Present Y/N? =	Y	

Stream Flows

1Q10 (Annual) =	25	MGD
7Q10 (Annual) =	29	MGD
30Q10 (Annual) =	38	MGD
1Q10 (Wet season) =	43	MGD
30Q10 (Wet season)	97	MGD
30Q5 =	43	MGD
Harmonic Mean =	155	MGD

Mixing Information

Annual - 1Q10 Mix =	17.78	%
- 7Q10 Mix =	19.03	%
- 30Q10 Mix =	21.67	%
Wet Season - 1Q10 Mix =		%
30Q10 Mix =		%
30Q5 Mix =	23.04	%
Harmonic Mean Mix =	16.27	%

Effluent Information

Mean Hardness (as CaCO3) =	100	mg/L
90% Temp (Annual) =	14.1	deg C
90% Temp (Wet season) =	14.1	deg C
90% Maximum pH =	8.3	SU
10% Maximum pH =	7.4	SU
Discharge Flow =	4.84	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+01**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+01**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	5.8E+00	--	na	3.1E-03	--	--	--	--	--	--	--	--	**5.8E+00**	**--**	**na**	**3.1E-03**
Ammonia-N (mg/l) (Yearly)	0	4.54E+00	9.90E-01	na	--	8.71E+00	2.67E+00	na	--	--	--	--	--	--	--	--	--	**8.71E+00**	**2.67E+00**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	4.71E+00	1.52E+00	na	--	4.71E+00	1.52E+00	na	--	--	--	--	--	--	--	--	--	**4.71E+00**	**1.52E+00**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+05**
Antimony	0.5	--	--	na	6.4E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
Arsenic	0.58	3.4E+02	1.5E+02	na	--	6.5E+02	3.2E+02	na	--	--	--	--	--	--	--	--	--	**6.5E+02**	**3.2E+02**	**na**	**--**
Barium	50.14	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+03**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	1.2E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E-02**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	8.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.7E+03**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	5.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+03**
Cadmium	0.1	4.9E+00	1.4E+00	na	--	9.4E+00	2.8E+00	na	--	--	--	--	--	--	--	--	--	**9.4E+00**	**2.8E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	9.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.9E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.6E+00	9.2E-03	na	5.0E-02	--	--	--	--	--	--	--	--	**4.6E+00**	**9.2E-03**	**na**	**5.0E-02**
Chloride	13800	8.6E+05	2.3E+05	na	--	1.6E+06	4.8E+05	na	--	--	--	--	--	--	--	--	--	**1.6E+06**	**4.8E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	3.6E+01	2.4E+01	na	--	--	--	--	--	--	--	--	--	**3.6E+01**	**2.4E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	8.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	3.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.6E-01	8.8E-02	na	--	--	--	--	--	--	--	--	--	**1.6E-01**	**8.8E-02**	**na**	**--**
Chromium III	0	6.7E+02	8.9E+01	na	--	1.3E+03	1.9E+02	na	--	--	--	--	--	--	--	--	--	**1.3E+03**	**1.9E+02**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.1E+01	2.4E+01	na	--	--	--	--	--	--	--	--	--	**3.1E+01**	**2.4E+01**	**na**	**--**
Chromium, Total	2.86	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.1E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E-01**
Copper	0.9	1.95E+01	1.24E+01	na	--	3.7E+01	2.6E+01	na	--	--	--	--	--	--	--	--	--	**3.7E+01**	**2.6E+01**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.2E+01	1.1E+01	na	4.9E+04	--	--	--	--	--	--	--	--	**4.2E+01**	**1.1E+01**	**na**	**4.9E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	1.9E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E-02**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	1.4E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E-02**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.1E+00	2.1E-03	na	1.4E-02	--	--	--	--	--	--	--	--	**2.1E+00**	**2.1E-03**	**na**	**1.4E-02**
Demeton	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.1E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	3.3E-01	3.6E-01	na	--	--	--	--	--	--	--	--	--	**3.3E-01**	**3.6E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	1.7E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+00**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+03**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+03**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	3.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	8.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.8E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	9.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.3E+02**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.6E-01	1.2E-01	na	3.4E-03	--	--	--	--	--	--	--	--	**4.6E-01**	**1.2E-01**	**na**	**3.4E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	3.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.6E-07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	1.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.2E-01	na	2.7E+02	--	--	--	--	--	--	--	--	**4.2E-01**	**1.2E-01**	**na**	**2.7E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.2E-01	na	2.7E+02	--	--	--	--	--	--	--	--	**4.2E-01**	**1.2E-01**	**na**	**2.7E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.2E-01	1.2E-01	--	--	--	--	--	--	--	--	--	--	**4.2E-01**	**1.2E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.7E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.6E-01	7.7E-02	na	1.8E-01	--	--	--	--	--	--	--	--	**1.6E-01**	**7.7E-02**	**na**	**1.8E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	9.1E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.1E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	6.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.4E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	4.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	2.1E-02	na	--	--	--	--	--	--	--	--	--	**--**	**2.1E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	8.1E-03	na	4.9E-03	--	--	--	--	--	--	--	--	**1.0E+00**	**8.1E-03**	**na**	**4.9E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	8.1E-03	na	2.4E-03	--	--	--	--	--	--	--	--	**1.0E+00**	**8.1E-03**	**na**	**2.4E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-02**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.8E+00	--	na	1.1E+01	--	--	--	--	--	--	--	--	**1.8E+00**	**--**	**na**	**1.1E+01**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	3.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.3E+00	na	--	--	--	--	--	--	--	--	--	**--**	**4.3E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Iron	50	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	6.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0.1	1.5E+02	1.8E+01	na	--	3.0E+02	3.8E+01	na	--	--	--	--	--	--	--	--	--	**3.0E+02**	**3.8E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.1E-01**	**na**	**--**
Manganese	10.12	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0.0015	1.4E+00	7.7E-01	- -	- -	2.7E+00	1.6E+00	- -	- -	--	--	--	--	--	--	--	--	**2.7E+00**	**1.6E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	3.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	6.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**6.4E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	1.29	2.2E+02	2.4E+01	na	4.6E+03	4.1E+02	5.1E+01	na	1.4E+04	--	--	--	--	--	--	--	--	**4.1E+02**	**5.1E+01**	**na**	**1.4E+04**
Nitrate (as N)	650	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+02**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.4E+01	1.4E+01	na	--	--	--	--	--	--	--	--	--	**5.4E+01**	**1.4E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	1.2E-01	2.8E-02	na	--	--	--	--	--	--	--	--	--	**1.2E-01**	**2.8E-02**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	3.0E-02	na	4.0E-03	--	--	--	--	--	--	--	--	**--**	**3.0E-02**	**na**	**4.0E-03**
Pentachlorophenol [C]	0	1.6E+01	1.3E+01	na	3.0E+01	3.1E+01	2.7E+01	na	1.9E+02	--	--	--	--	--	--	--	--	**3.1E+01**	**2.7E+01**	**na**	**1.9E+02**
Phenol	0	--	--	na	8.6E+05	--	--	na	2.6E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0.63	2.0E+01	5.0E+00	na	4.2E+03	3.8E+01	1.0E+01	na	1.3E+04	--	--	--	--	--	--	--	--	**3.8E+01**	**1.0E+01**	**na**	**1.3E+04**
Silver	0.1	4.9E+00	--	na	--	9.3E+00	--	na	--	--	--	--	--	--	--	--	--	**9.3E+00**	**--**	**na**	**--**
Sulfate	17300	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	2.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+02**
Thallium	0.1	--	--	na	4.7E-01	--	--	na	1.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.4E+00	4.3E-04	na	1.7E-02	--	--	--	--	--	--	--	--	**1.4E+00**	**4.3E-04**	**na**	**1.7E-02**
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.8E-01	1.5E-01	na	--	--	--	--	--	--	--	--	--	**8.8E-01**	**1.5E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.9E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
Zinc	1.53	1.4E+02	1.4E+02	na	2.6E+04	2.7E+02	3.0E+02	na	7.9E+04	--	--	--	--	--	--	--	--	**2.7E+02**	**3.0E+02**	**na**	**7.9E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.9E+03
Arsenic	1.9E+02
Barium	na
Cadmium	1.7E+00
Chromium III	1.1E+02
Chromium VI	1.2E+01
Copper	1.5E+01
Iron	na
Lead	2.3E+01
Manganese	na
Mercury	9.9E-01
Nickel	3.1E+01
Selenium	6.0E+00
Silver	3.7E+00
Zinc	1.1E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: AEP Clinch River Plant Permit No.: VA0001015

Receiving Stream: Clinch River D003 - Dewatering Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	147	mg/L
90% Temperature (Annual) =	24.34	deg C
90% Temperature (Wet season) =	24.34	deg C
90% Maximum pH =	8.342	SU
10% Maximum pH =	8.042	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	N	
Trout Present Y/N? =	N	
Early Life Stages Present Y/N? =	Y	

Stream Flows

1Q10 (Annual) =	25	MGD
7Q10 (Annual) =	29	MGD
30Q10 (Annual) =	38	MGD
1Q10 (Wet season) =	43	MGD
30Q10 (Wet season)	97	MGD
30Q5 =	43	MGD
Harmonic Mean =	155	MGD

Mixing Information

Annual - 1Q10 Mix =	17.78	%
- 7Q10 Mix =	19.03	%
- 30Q10 Mix =	21.67	%
Wet Season - 1Q10 Mix =		%
30Q10 Mix =		%
30Q5 Mix =	23.04	%
Harmonic Mean Mix =	16.27	%

Effluent Information

Mean Hardness (as CaCO3) =	100	mg/L
90% Temp (Annual) =	14.1	deg C
90% Temp (Wet season) =	14.1	deg C
90% Maximum pH =	8.3	SU
10% Maximum pH =	7.4	SU
Discharge Flow =	4.84	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	3.0E+03	--	--	na	9.9E+01	--	--	na	9.8E+02	**--**	**--**	**na**	**9.8E+02**
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.8E+01	--	--	na	9.3E-01	--	--	na	9.2E+00	**--**	**--**	**na**	**9.2E+00**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	1.6E+01	--	--	na	2.5E-01	--	--	na	8.3E+00	**--**	**--**	**na**	**8.3E+00**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	5.8E+00	--	na	3.1E-03	7.5E-01	--	na	5.0E-05	4.6E+00	--	na	1.7E-03	**4.6E+00**	**--**	**na**	**1.7E-03**
Ammonia-N (mg/l) (Yearly)	0	4.54E+00	9.90E-01	na	--	8.71E+00	2.67E+00	na	--	1.10E+00	2.05E-01	na	--	6.79E+00	1.81E+00	na	--	**6.79E+00**	**1.81E+00**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	4.71E+00	1.52E+00	na	--	4.71E+00	1.52E+00	na	--	1.10E+00	1.95E-01	na	--	1.08E+01	4.11E+00	na	--	**4.71E+00**	**1.52E+00**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.2E+05	--	--	na	4.0E+03	--	--	na	4.0E+04	**--**	**--**	**na**	**4.0E+04**
Antimony	0.5	--	--	na	6.4E+02	--	--	na	1.9E+03	--	--	na	6.4E+01	--	--	na	6.3E+02	**--**	**--**	**na**	**6.3E+02**
Arsenic	0.58	3.4E+02	1.5E+02	na	--	6.5E+02	3.2E+02	na	--	8.5E+01	3.8E+01	na	--	5.2E+02	2.6E+02	na	--	**5.2E+02**	**2.6E+02**	**na**	**--**
Barium	50.14	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	3.2E+03	--	--	na	5.1E+01	--	--	na	1.7E+03	**--**	**--**	**na**	**1.7E+03**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	1.2E-02	--	--	na	2.0E-04	--	--	na	6.6E-03	**--**	**--**	**na**	**6.6E-03**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	3.3E+01	--	--	na	5.3E-01	--	--	na	1.8E+01	**--**	**--**	**na**	**1.8E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	2.0E+05	--	--	na	6.5E+03	--	--	na	6.4E+04	**--**	**--**	**na**	**6.4E+04**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	1.4E+02	--	--	na	2.2E+00	--	--	na	7.3E+01	**--**	**--**	**na**	**7.3E+01**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	8.7E+03	--	--	na	1.4E+02	--	--	na	4.6E+03	**--**	**--**	**na**	**4.6E+03**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	5.8E+03	--	--	na	1.9E+02	--	--	na	1.9E+03	**--**	**--**	**na**	**1.9E+03**
Cadmium	0.1	4.9E+00	1.4E+00	na	--	9.4E+00	2.8E+00	na	--	1.5E+00	4.4E-01	na	--	8.7E+00	2.5E+00	na	--	**8.7E+00**	**2.5E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	9.9E+01	--	--	na	1.6E+00	--	--	na	5.3E+01	**--**	**--**	**na**	**5.3E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.6E+00	9.2E-03	na	5.0E-02	6.0E-01	1.1E-03	na	8.1E-04	3.7E+00	7.5E-03	na	2.7E-02	**3.7E+00**	**7.5E-03**	**na**	**2.7E-02**
Chloride	13800	8.6E+05	2.3E+05	na	--	1.6E+06	4.8E+05	na	--	2.3E+05	6.8E+04	na	--	1.3E+06	3.9E+05	na	--	**1.3E+06**	**3.9E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	3.6E+01	2.4E+01	na	--	4.8E+00	2.8E+00	na	--	2.9E+01	1.9E+01	na	--	**2.9E+01**	**1.9E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.9E+03	--	--	na	1.6E+02	--	--	na	1.6E+03	**--**	**--**	**na**	**1.6E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane [C]	0	--	--	na	1.3E+02	--	--	na	8.1E+02	--	--	na	1.3E+01	--	--	na	4.3E+02	**--**	**--**	**na**	**4.3E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	3.4E+04	--	--	na	1.1E+03	--	--	na	1.1E+04	**--**	**--**	**na**	**1.1E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.9E+03	--	--	na	1.6E+02	--	--	na	1.6E+03	**--**	**--**	**na**	**1.6E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	4.6E+02	--	--	na	1.5E+01	--	--	na	1.5E+02	**--**	**--**	**na**	**1.5E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.6E-01	8.8E-02	na	--	2.1E-02	1.0E-02	na	--	1.3E-01	7.2E-02	na	--	**1.3E-01**	**7.2E-02**	**na**	**--**
Chromium III	0	6.7E+02	8.9E+01	na	--	1.3E+03	1.9E+02	na	--	1.9E+02	2.4E+01	na	--	1.2E+03	1.7E+02	na	--	**1.2E+03**	**1.7E+02**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.1E+01	2.4E+01	na	--	4.0E+00	2.8E+00	na	--	2.5E+01	1.9E+01	na	--	**2.5E+01**	**1.9E+01**	**na**	**--**
Chromium, Total	2.86	--	--	1.0E+02	--	--	--	na	--	--	--	1.3E+01	--	--	--	9.9E+01	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.1E-01	--	--	na	1.8E-03	--	--	na	5.9E-02	**--**	**--**	**na**	**5.9E-02**
Copper	0.9	1.95E+01	1.24E+01	na	--	3.7E+01	2.6E+01	na	--	5.55E+00	3.78E+00	na	--	3.0E+01	2.1E+01	na	--	**3.0E+01**	**2.1E+01**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.2E+01	1.1E+01	na	4.9E+04	5.5E+00	1.3E+00	na	1.6E+03	3.4E+01	9.1E+00	na	1.6E+04	**3.4E+01**	**9.1E+00**	**na**	**1.6E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	1.9E-02	--	--	na	3.1E-04	--	--	na	1.0E-02	**--**	**--**	**na**	**1.0E-02**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	1.4E-02	--	--	na	2.2E-04	--	--	na	7.3E-03	**--**	**--**	**na**	**7.3E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.1E+00	2.1E-03	na	1.4E-02	2.8E-01	2.5E-04	na	2.2E-04	1.7E+00	1.7E-03	na	7.3E-03	**1.7E+00**	**1.7E-03**	**na**	**7.3E-03**
Demeton	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	2.5E-02	na	--	--	1.7E-01	na	--	**--**	**1.7E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	3.3E-01	3.6E-01	na	--	4.3E-02	4.3E-02	na	--	2.6E-01	3.0E-01	na	--	**2.6E-01**	**3.0E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	4.0E+03	--	--	na	1.3E+02	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.9E+03	--	--	na	9.6E+01	--	--	na	9.5E+02	**--**	**--**	**na**	**9.5E+02**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	5.8E+02	--	--	na	1.9E+01	--	--	na	1.9E+02	**--**	**--**	**na**	**1.9E+02**
3,3-Dichlorobenzidine [C]	0	--	--	na	2.8E-01	--	--	na	1.7E+00	--	--	na	2.8E-02	--	--	na	9.2E-01	**--**	**--**	**na**	**9.2E-01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.1E+03	--	--	na	1.7E+01	--	--	na	5.6E+02	**--**	**--**	**na**	**5.6E+02**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	2.3E+03	--	--	na	3.7E+01	--	--	na	1.2E+03	**--**	**--**	**na**	**1.2E+03**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	2.2E+04	--	--	na	7.1E+02	--	--	na	7.0E+03	**--**	**--**	**na**	**7.0E+03**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	3.0E+04	--	--	na	1.0E+03	--	--	na	9.9E+03	**--**	**--**	**na**	**9.9E+03**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	8.8E+02	--	--	na	2.9E+01	--	--	na	2.9E+02	**--**	**--**	**na**	**2.9E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane [C]	0	--	--	na	1.5E+02	--	--	na	9.3E+02	--	--	na	1.5E+01	--	--	na	5.0E+02	**--**	**--**	**na**	**5.0E+02**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	1.3E+03	--	--	na	2.1E+01	--	--	na	6.9E+02	**--**	**--**	**na**	**6.9E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.6E-01	1.2E-01	na	3.4E-03	6.0E-02	1.4E-02	na	5.4E-05	3.7E-01	9.8E-02	na	1.8E-03	**3.7E-01**	**9.8E-02**	**na**	**1.8E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.3E+05	--	--	na	4.4E+03	--	--	na	4.3E+04	**--**	**--**	**na**	**4.3E+04**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.6E+03	--	--	na	8.5E+01	--	--	na	8.4E+02	**--**	**--**	**na**	**8.4E+02**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	3.4E+06	--	--	na	1.1E+05	--	--	na	1.1E+06	**--**	**--**	**na**	**1.1E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.4E+04	--	--	na	4.5E+02	--	--	na	4.4E+03	**--**	**--**	**na**	**4.4E+03**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.6E+04	--	--	na	5.3E+02	--	--	na	5.2E+03	**--**	**--**	**na**	**5.2E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	8.5E+02	--	--	na	2.8E+01	--	--	na	2.8E+02	**--**	**--**	**na**	**2.8E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	2.1E+02	--	--	na	3.4E+00	--	--	na	1.1E+02	**--**	**--**	**na**	**1.1E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.6E-07	--	--	na	5.1E-09	--	--	na	5.0E-08	**--**	**--**	**na**	**5.0E-08**
1,2-Diphenylhydrazine [C]	0	--	--	na	2.0E+00	--	--	na	1.2E+01	--	--	na	2.0E-01	--	--	na	6.6E+00	**--**	**--**	**na**	**6.6E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.2E-01	na	2.7E+02	5.5E-02	1.4E-02	na	8.9E+00	3.4E-01	9.8E-02	na	8.8E+01	**3.4E-01**	**9.8E-02**	**na**	**8.8E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E-01	1.2E-01	na	2.7E+02	5.5E-02	1.4E-02	na	8.9E+00	3.4E-01	9.8E-02	na	8.8E+01	**3.4E-01**	**9.8E-02**	**na**	**8.8E+01**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.2E-01	1.2E-01	--	--	5.5E-02	1.4E-02	--	--	3.4E-01	9.8E-02	--	--	**3.4E-01**	**9.8E-02**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.7E+02	--	--	na	8.9E+00	--	--	na	8.8E+01	**--**	**--**	**na**	**8.8E+01**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.6E-01	7.7E-02	na	1.8E-01	2.2E-02	9.0E-03	na	6.0E-03	1.3E-01	6.3E-02	na	5.9E-02	**1.3E-01**	**6.3E-02**	**na**	**5.9E-02**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	9.1E-01	--	--	na	3.0E-02	--	--	na	3.0E-01	**--**	**--**	**na**	**3.0E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	6.4E+03	--	--	na	2.1E+02	--	--	na	2.1E+03	**--**	**--**	**na**	**2.1E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	4.3E+02	--	--	na	1.4E+01	--	--	na	1.4E+02	**--**	**--**	**na**	**1.4E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.6E+04	--	--	na	5.3E+02	--	--	na	5.2E+03	**--**	**--**	**na**	**5.2E+03**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	2.1E-02	na	--	--	2.5E-03	na	--	--	1.7E-02	na	--	**--**	**1.7E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	8.1E-03	na	4.9E-03	1.3E-01	9.5E-04	na	7.9E-05	8.0E-01	6.6E-03	na	2.6E-03	**8.0E-01**	**6.6E-03**	**na**	**2.6E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	8.1E-03	na	2.4E-03	1.3E-01	9.5E-04	na	3.9E-05	8.0E-01	6.6E-03	na	1.3E-03	**8.0E-01**	**6.6E-03**	**na**	**1.3E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	1.8E-02	--	--	na	2.9E-04	--	--	na	9.6E-03	**--**	**--**	**na**	**9.6E-03**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.1E+03	--	--	na	1.8E+01	--	--	na	5.9E+02	**--**	**--**	**na**	**5.9E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	3.0E-01	--	--	na	4.9E-03	--	--	na	1.6E-01	**--**	**--**	**na**	**1.6E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.1E+00	--	--	na	1.7E-02	--	--	na	5.6E-01	**--**	**--**	**na**	**5.6E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.8E+00	--	na	1.1E+01	2.4E-01	--	na	1.8E-01	1.5E+00	--	na	5.9E+00	**1.5E+00**	**--**	**na**	**5.9E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	3.4E+03	--	--	na	1.1E+02	--	--	na	1.1E+03	**--**	**--**	**na**	**1.1E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	2.0E+02	--	--	na	3.3E+00	--	--	na	1.1E+02	**--**	**--**	**na**	**1.1E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.3E+00	na	--	--	5.0E-01	na	--	--	3.5E+00	na	--	**--**	**3.5E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.1E+00	--	--	na	1.8E-02	--	--	na	5.9E-01	**--**	**--**	**na**	**5.9E-01**
Iron	50	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	6.0E+04	--	--	na	9.6E+02	--	--	na	3.2E+04	**--**	**--**	**na**	**3.2E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	**--**	**0.0E+00**	**na**	**--**
Lead	0.1	1.5E+02	1.8E+01	na	--	3.0E+02	3.8E+01	na	--	4.5E+01	5.3E+00	na	--	2.8E+02	3.6E+01	na	--	**2.8E+02**	**3.6E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	2.1E-01	na	--	--	2.5E-02	na	--	--	1.7E-01	na	--	**--**	**1.7E-01**	**na**	**--**
Manganese	10.12	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Mercury	0.0015	1.4E+00	7.7E-01	- -	- -	2.7E+00	1.6E+00	- -	- -	3.5E-01	1.9E-01	- -	--	2.2E+00	1.3E+00	- -	--	**2.2E+00**	**1.3E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	4.6E+03	--	--	na	1.5E+02	--	--	na	1.5E+03	**--**	**--**	**na**	**1.5E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	3.7E+04	--	--	na	5.9E+02	--	--	na	1.9E+04	**--**	**--**	**na**	**1.9E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	6.4E-02	na	--	--	7.5E-03	na	--	--	5.2E-02	na	--	**--**	**5.2E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	**--**	**0.0E+00**	**na**	**--**
Nickel	1.29	2.2E+02	2.4E+01	na	4.6E+03	4.1E+02	5.1E+01	na	1.4E+04	6.1E+01	7.7E+00	na	4.6E+02	3.7E+02	4.6E+01	na	4.5E+03	**3.7E+02**	**4.6E+01**	**na**	**4.5E+03**
Nitrate (as N)	650	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	2.1E+03	--	--	na	6.9E+01	--	--	na	6.8E+02	**--**	**--**	**na**	**6.8E+02**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	1.9E+02	--	--	na	3.0E+00	--	--	na	9.9E+01	**--**	**--**	**na**	**9.9E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	3.7E+02	--	--	na	6.0E+00	--	--	na	2.0E+02	**--**	**--**	**na**	**2.0E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	3.2E+01	--	--	na	5.1E-01	--	--	na	1.7E+01	**--**	**--**	**na**	**1.7E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.4E+01	1.4E+01	na	--	7.0E+00	1.7E+00	--	--	4.3E+01	1.2E+01	--	--	**4.3E+01**	**1.2E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	1.2E-01	2.8E-02	na	--	1.6E-02	3.3E-03	na	--	1.0E-01	2.3E-02	na	--	**1.0E-01**	**2.3E-02**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	3.0E-02	na	4.0E-03	--	3.5E-03	na	6.4E-05	--	2.4E-02	na	2.1E-03	**--**	**2.4E-02**	**na**	**2.1E-03**
Pentachlorophenol [C]	0	1.6E+01	1.3E+01	na	3.0E+01	3.1E+01	2.7E+01	na	1.9E+02	5.1E+00	4.0E+00	na	3.0E+00	3.2E+01	2.8E+01	na	9.9E+01	**3.1E+01**	**2.7E+01**	**na**	**9.9E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	2.6E+06	--	--	na	8.6E+04	--	--	na	8.5E+05	**--**	**--**	**na**	**8.5E+05**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.2E+04	--	--	na	4.0E+02	--	--	na	4.0E+03	**--**	**--**	**na**	**4.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0.63	2.0E+01	5.0E+00	na	4.2E+03	3.8E+01	1.0E+01	na	1.3E+04	5.5E+00	1.7E+00	na	4.2E+02	3.0E+01	8.3E+00	na	4.2E+03	**3.0E+01**	**8.3E+00**	**na**	**4.2E+03**
Silver	0.1	4.9E+00	--	na	--	9.3E+00	--	na	--	1.6E+00	--	na	--	9.4E+00	--	na	--	**9.3E+00**	**--**	**na**	**--**
Sulfate	17300	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	2.5E+02	--	--	na	4.0E+00	--	--	na	1.3E+02	**--**	**--**	**na**	**1.3E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	2.0E+02	--	--	na	3.3E+00	--	--	na	1.1E+02	**--**	**--**	**na**	**1.1E+02**
Thallium	0.1	--	--	na	4.7E-01	--	--	na	1.2E+00	--	--	na	1.4E-01	--	--	na	4.7E-01	**--**	**--**	**na**	**4.7E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.8E+04	--	--	na	6.0E+02	--	--	na	5.9E+03	**--**	**--**	**na**	**5.9E+03**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.4E+00	4.3E-04	na	1.7E-02	1.8E-01	5.0E-05	na	2.8E-04	1.1E+00	3.5E-04	na	9.2E-03	**1.1E+00**	**3.5E-04**	**na**	**9.2E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.8E-01	1.5E-01	na	--	1.2E-01	1.8E-02	na	--	7.1E-01	1.3E-01	na	--	**7.1E-01**	**1.3E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	2.1E+02	--	--	na	7.0E+00	--	--	na	6.9E+01	**--**	**--**	**na**	**6.9E+01**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	9.9E+02	--	--	na	1.6E+01	--	--	na	5.3E+02	**--**	**--**	**na**	**5.3E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	1.9E+03	--	--	na	3.0E+01	--	--	na	9.9E+02	**--**	**--**	**na**	**9.9E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	1.5E+02	--	--	na	2.4E+00	--	--	na	7.9E+01	**--**	**--**	**na**	**7.9E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	1.5E+02	--	--	na	2.4E+00	--	--	na	7.9E+01	**--**	**--**	**na**	**7.9E+01**
Zinc	1.53	1.4E+02	1.4E+02	na	2.6E+04	2.7E+02	3.0E+02	na	7.9E+04	4.0E+01	4.0E+01	na	2.6E+03	2.4E+02	2.7E+02	na	2.6E+04	**2.4E+02**	**2.7E+02**	**na**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.3E+02
Arsenic	1.6E+02
Barium	na
Cadmium	1.5E+00
Chromium III	1.0E+02
Chromium VI	9.9E+00
Copper	1.2E+01
Iron	na
Lead	2.2E+01
Manganese	na
Mercury	8.1E-01
Nickel	2.8E+01
Selenium	5.0E+00
Silver	3.7E+00
Zinc	9.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: AEP Clinch River Plant Permit No.: VA0001015

Receiving Stream: Clinch River Outfall 007 Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	147	mg/L
90% Temperature (Annual) =	24.34	deg C
90% Temperature (Wet season) =	24.34	deg C
90% Maximum pH =	8.342	SU
10% Maximum pH =	8.042	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	N	
Trout Present Y/N? =	N	
Early Life Stages Present Y/N? =	Y	

Stream Flows

1Q10 (Annual) =	25	MGD
7Q10 (Annual) =	29	MGD
30Q10 (Annual) =	38	MGD
1Q10 (Wet season) =	43	MGD
30Q10 (Wet season)	97	MGD
30Q5 =	43	MGD
Harmonic Mean =	155	MGD

Mixing Information

Annual - 1Q10 Mix =	38.89	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
30Q10 Mix =	100	%
30Q5 Mix =	100	%
Harmonic Mean Mix =	100	%

Effluent Information

Mean Hardness (as CaCO3) =	100	mg/L
90% Temp (Annual) =	15.1	deg C
90% Temp (Wet season) =	15.1	deg C
90% Maximum pH =	8.4	SU
10% Maximum pH =	7.4	SU
Discharge Flow =	1.2	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	3.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+04**
Acrolein	0	--	--	na	9.3E+00	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+02**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+02**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	2.7E+01	--	na	6.5E-02	--	--	--	--	--	--	--	--	**2.7E+01**	**--**	**na**	**6.5E-02**
Ammonia-N (mg/l) (Yearly)	0	4.29E+00	7.66E-01	na	--	3.91E+01	2.50E+01	na	--	--	--	--	--	--	--	--	--	**3.91E+01**	**2.50E+01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	4.33E+00	7.59E-01	na	--	1.60E+02	6.21E+01	na	--	--	--	--	--	--	--	--	--	**1.60E+02**	**6.21E+01**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+06**
Antimony	0.5	--	--	na	6.4E+02	--	--	na	2.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+04**
Arsenic	0.58	3.4E+02	1.5E+02	na	--	3.1E+03	3.8E+03	na	--	--	--	--	--	--	--	--	--	**3.1E+03**	**3.8E+03**	**na**	**--**
Barium	50.14	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	6.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+04**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	2.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E-01**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	6.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.9E+02**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	2.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+06**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+03**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+05**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.0E+04**
Cadmium	0.1	5.8E+00	1.5E+00	na	--	5.2E+01	3.6E+01	na	--	--	--	--	--	--	--	--	--	**5.2E+01**	**3.6E+01**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+03**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.2E+01	1.1E-01	na	1.1E+00	--	--	--	--	--	--	--	--	**2.2E+01**	**1.1E-01**	**na**	**1.1E+00**
Chloride	13800	8.6E+05	2.3E+05	na	--	7.7E+06	5.5E+06	na	--	--	--	--	--	--	--	--	--	**7.7E+06**	**5.5E+06**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.7E+02	2.8E+02	na	--	--	--	--	--	--	--	--	--	**1.7E+02**	**2.8E+02**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	5.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+04**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane [C]	0	--	--	na	1.3E+02	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+04**
Chloroform	0	--	--	na	1.1E+04	--	--	na	4.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.1E+05**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	5.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+04**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	5.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.5E+03**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	7.6E-01	1.0E+00	na	--	--	--	--	--	--	--	--	--	**7.6E-01**	**1.0E+00**	**na**	**--**
Chromium III	0	7.6E+02	1.0E+02	na	--	6.9E+03	2.5E+03	na	--	--	--	--	--	--	--	--	--	**6.9E+03**	**2.5E+03**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.5E+02	2.8E+02	na	--	--	--	--	--	--	--	--	--	**1.5E+02**	**2.8E+02**	**na**	**--**
Chromium, Total	2.86	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	2.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+00**
Copper	0.9	1.95E+01	1.24E+01	na	--	1.7E+02	2.9E+02	na	--	--	--	--	--	--	--	--	--	**1.7E+02**	**2.9E+02**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.0E+02	1.3E+02	na	5.9E+05	--	--	--	--	--	--	--	--	**2.0E+02**	**1.3E+02**	**na**	**5.9E+05**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	4.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E-01**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	2.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E-01**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.0E+01	2.5E-02	na	2.9E-01	--	--	--	--	--	--	--	--	**1.0E+01**	**2.5E-02**	**na**	**2.9E-01**
Demeton	0	--	1.0E-01	na	--	--	2.5E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.5E+00**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.5E+00	4.3E+00	na	--	--	--	--	--	--	--	--	--	**1.5E+00**	**4.3E+00**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	4.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+04**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	3.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.5E+04**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	7.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.0E+03**
3,3-Dichlorobenzidine [C]	0	--	--	na	2.8E-01	--	--	na	3.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	4.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+04**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	2.6E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+05**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	3.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+05**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane [C]	0	--	--	na	1.5E+02	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+04**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.7E+04**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.2E+00	1.4E+00	na	7.0E-02	--	--	--	--	--	--	--	--	**2.2E+00**	**1.4E+00**	**na**	**7.0E-02**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.6E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+06**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+04**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	4.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.1E+07**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+05**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+05**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+04**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	4.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E+03**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.9E-06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E-06**
1,2-Diphenylhydrazine [C]	0	--	--	na	2.0E+00	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+02**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.0E+00	1.4E+00	na	3.3E+03	--	--	--	--	--	--	--	--	**2.0E+00**	**1.4E+00**	**na**	**3.3E+03**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.0E+00	1.4E+00	na	3.3E+03	--	--	--	--	--	--	--	--	**2.0E+00**	**1.4E+00**	**na**	**3.3E+03**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.0E+00	1.4E+00	--	--	--	--	--	--	--	--	--	--	**2.0E+00**	**1.4E+00**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+03**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	7.8E-01	9.1E-01	na	2.2E+00	--	--	--	--	--	--	--	--	**7.8E-01**	**9.1E-01**	**na**	**2.2E+00**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	7.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E+04**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E+03**
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+05**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	2.5E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.5E-01**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	4.7E+00	9.6E-02	na	1.0E-01	--	--	--	--	--	--	--	--	**4.7E+00**	**9.6E-02**	**na**	**1.0E-01**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	4.7E+00	9.6E-02	na	5.1E-02	--	--	--	--	--	--	--	--	**4.7E+00**	**9.6E-02**	**na**	**5.1E-02**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.8E-01**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+04**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	6.4E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.4E+00**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	8.6E+00	--	na	2.3E+02	--	--	--	--	--	--	--	--	**8.6E+00**	**--**	**na**	**2.3E+02**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	4.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.1E+04**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+03**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	5.0E+01	na	--	--	--	--	--	--	--	--	--	**--**	**5.0E+01**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+01**
Iron	50	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	1.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+06**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0.1	1.9E+02	2.2E+01	na	--	1.7E+03	5.4E+02	na	--	--	--	--	--	--	--	--	--	**1.7E+03**	**5.4E+02**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	2.5E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.5E+00**	**na**	**--**
Manganese	10.12	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0.0015	1.4E+00	7.7E-01	- -	- -	1.3E+01	1.9E+01	- -	- -	--	--	--	--	--	--	--	--	**1.3E+01**	**1.9E+01**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	5.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.5E+04**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	7.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E+05**
Methoxychlor	0	--	3.0E-02	na	--	--	7.6E-01	na	--	--	--	--	--	--	--	--	--	**--**	**7.6E-01**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	1.29	2.5E+02	2.8E+01	na	4.6E+03	2.2E+03	6.7E+02	na	1.7E+05	--	--	--	--	--	--	--	--	**2.2E+03**	**6.7E+02**	**na**	**1.7E+05**
Nitrate (as N)	650	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+04**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	3.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+03**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	7.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.8E+03**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	6.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+02**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.5E+02	1.7E+02	na	--	--	--	--	--	--	--	--	--	**2.5E+02**	**1.7E+02**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	5.9E-01	3.3E-01	na	--	--	--	--	--	--	--	--	--	**5.9E-01**	**3.3E-01**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	3.5E-01	na	8.3E-02	--	--	--	--	--	--	--	--	**--**	**3.5E-01**	**na**	**8.3E-02**
Pentachlorophenol [C]	0	2.2E+01	1.8E+01	na	3.0E+01	2.0E+02	4.5E+02	na	3.9E+03	--	--	--	--	--	--	--	--	**2.0E+02**	**4.5E+02**	**na**	**3.9E+03**
Phenol	0	--	--	na	8.6E+05	--	--	na	3.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+07**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+05**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0.63	2.0E+01	5.0E+00	na	4.2E+03	1.8E+02	1.1E+02	na	1.5E+05	--	--	--	--	--	--	--	--	**1.8E+02**	**1.1E+02**	**na**	**1.5E+05**
Silver	0.1	6.3E+00	--	na	--	5.6E+01	--	na	--	--	--	--	--	--	--	--	--	**5.6E+01**	**--**	**na**	**--**
Sulfate	17300	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E+03**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+03**
Thallium	0.1	--	--	na	4.7E-01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+01**
Toluene	0	--	--	na	6.0E+03	--	--	na	2.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	6.6E+00	5.0E-03	na	3.6E-01	--	--	--	--	--	--	--	--	**6.6E+00**	**5.0E-03**	**na**	**3.6E-01**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.2E+00	1.8E+00	na	--	--	--	--	--	--	--	--	--	**4.2E+00**	**1.8E+00**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+03**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+04**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+04**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+03**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+03**
Zinc	1.53	1.6E+02	1.6E+02	na	2.6E+04	1.4E+03	4.0E+03	na	9.6E+05	--	--	--	--	--	--	--	--	**1.4E+03**	**4.0E+03**	**na**	**9.6E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.4E+04
Arsenic	1.2E+03
Barium	na
Cadmium	2.1E+01
Chromium III	1.5E+03
Chromium VI	5.8E+01
Copper	6.8E+01
Iron	na
Lead	3.3E+02
Manganese	na
Mercury	5.1E+00
Nickel	4.0E+02
Selenium	6.6E+01
Silver	2.3E+01
Zinc	5.7E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: AEP Clinch River Plant Permit No.: VA0001015

Receiving Stream: Dumps Creek Outfall 015 Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	138	mg/L
90% Temperature (Annual) =	21.546	deg C
90% Temperature (Wet season) =	21.546	deg C
90% Maximum pH =	8.45	SU
10% Maximum pH =	7.881	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	1.84	MGD
7Q10 (Annual) =	2.11	MGD
30Q10 (Annual) =	2.53	MGD
1Q10 (Wet season) =	2.84	MGD
30Q10 (Wet season)	5.89	MGD
30Q5 =	2.89	MGD
Harmonic Mean =	9.05	MGD

Mixing Information

Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information

Mean Hardness (as CaCO3) =	100	mg/L
90% Temp (Annual) =	15.3	deg C
90% Temp (Wet season) =	15.3	deg C
90% Maximum pH =	11.89	SU
10% Maximum pH =	11.12	SU
Discharge Flow =	0.025	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+05**
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+03**
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	9.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.1E+02**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	2.2E+02	--	na	1.8E-01	--	--	--	--	--	--	--	--	**2.2E+02**	**--**	**na**	**1.8E-01**
Ammonia-N (mg/l) (Yearly)	0	3.49E+00	7.51E-01	na	--	2.60E+02	7.68E+01	na	--	--	--	--	--	--	--	--	--	**2.60E+02**	**7.68E+01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	3.50E+00	7.53E-01	na	--	4.01E+02	1.78E+02	na	--	--	--	--	--	--	--	--	--	**4.01E+02**	**1.78E+02**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E+06**
Antimony	0.16	--	--	na	6.4E+02	--	--	na	7.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.5E+04**
Arsenic	0.82	3.4E+02	1.5E+02	na	--	2.5E+04	1.3E+04	na	--	--	--	--	--	--	--	--	--	**2.5E+04**	**1.3E+04**	**na**	**--**
Barium	94.8	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+05**
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	7.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.3E-01**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	7.6E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.6E+06**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+03**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	5.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+05**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	2.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+05**
Cadmium	0.05	5.6E+00	1.5E+00	na	--	4.2E+02	1.2E+02	na	--	--	--	--	--	--	--	--	--	**4.2E+02**	**1.2E+02**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	5.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+03**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	1.8E+02	3.7E-01	na	2.9E+00	--	--	--	--	--	--	--	--	**1.8E+02**	**3.7E-01**	**na**	**2.9E+00**
Chloride	15.7	8.6E+05	2.3E+05	na	--	6.4E+07	2.0E+07	na	--	--	--	--	--	--	--	--	--	**6.4E+07**	**2.0E+07**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.4E+03	9.4E+02	na	--	--	--	--	--	--	--	--	--	**1.4E+03**	**9.4E+02**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+05**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane [C]	0	--	--	na	1.3E+02	--	--	na	4.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E+04**
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+06**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+05**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+04**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	6.2E+00	3.5E+00	na	--	--	--	--	--	--	--	--	--	**6.2E+00**	**3.5E+00**	**na**	**--**
Chromium III	0	7.4E+02	9.6E+01	na	--	5.5E+04	8.2E+03	na	--	--	--	--	--	--	--	--	--	**5.5E+04**	**8.2E+03**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.2E+03	9.4E+02	na	--	--	--	--	--	--	--	--	--	**1.2E+03**	**9.4E+02**	**na**	**--**
Chromium, Total	0.2	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	6.5E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+00**
Copper	0.92	1.8E+01	1.2E+01	na	--	1.3E+03	9.3E+02	na	--	--	--	--	--	--	--	--	--	**1.3E+03**	**9.3E+02**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.6E+03	4.4E+02	na	1.9E+06	--	--	--	--	--	--	--	--	**1.6E+03**	**4.4E+02**	**na**	**1.9E+06**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	8.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E-01**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	8.2E+01	8.5E-02	na	8.0E-01	--	--	--	--	--	--	--	--	**8.2E+01**	**8.5E-02**	**na**	**8.0E-01**
Demeton	0	--	1.0E-01	na	--	--	8.5E+00	na	--	--	--	--	--	--	--	--	--	**--**	**8.5E+00**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.3E+01	1.5E+01	na	--	--	--	--	--	--	--	--	--	**1.3E+01**	**1.5E+01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+05**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+05**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
3,3-Dichlorobenzidine [C]	0	--	--	na	2.8E-01	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+02**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	6.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+04**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	8.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.3E+05**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+06**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	3.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+04**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane [C]	0	--	--	na	1.5E+02	--	--	na	5.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.4E+04**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	7.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.6E+04**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	1.8E+01	4.8E+00	na	2.0E-01	--	--	--	--	--	--	--	--	**1.8E+01**	**4.8E+00**	**na**	**2.0E-01**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	5.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+06**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	9.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.9E+04**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.3E+08	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+08**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	5.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.2E+05**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	6.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+05**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	3.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+04**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.9E-06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E-06**
1,2-Diphenylhydrazine [C]	0	--	--	na	2.0E+00	--	--	na	7.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.3E+02**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.6E+01	4.8E+00	na	1.0E+04	--	--	--	--	--	--	--	--	**1.6E+01**	**4.8E+00**	**na**	**1.0E+04**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.6E+01	4.8E+00	na	1.0E+04	--	--	--	--	--	--	--	--	**1.6E+01**	**4.8E+00**	**na**	**1.0E+04**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.6E+01	4.8E+00	--	--	--	--	--	--	--	--	--	--	**1.6E+01**	**4.8E+00**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+04**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	6.4E+00	3.1E+00	na	7.0E+00	--	--	--	--	--	--	--	--	**6.4E+00**	**3.1E+00**	**na**	**7.0E+00**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.5E+01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.4E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+05**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+04**
Fluorene	0	--	--	na	5.3E+03	--	--	na	6.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+05**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	8.5E-01	na	--	--	--	--	--	--	--	--	--	**--**	**8.5E-01**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	3.9E+01	3.2E-01	na	2.9E-01	--	--	--	--	--	--	--	--	**3.9E+01**	**3.2E-01**	**na**	**2.9E-01**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	3.9E+01	3.2E-01	na	1.4E-01	--	--	--	--	--	--	--	--	**3.9E+01**	**3.2E-01**	**na**	**1.4E-01**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+00**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+04**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	6.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	7.1E+01	--	na	6.5E+02	--	--	--	--	--	--	--	--	**7.1E+01**	**--**	**na**	**6.5E+02**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.7E+02	na	--	--	--	--	--	--	--	--	--	**--**	**1.7E+02**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	3.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.5E+06**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0.367	1.8E+02	2.0E+01	na	--	1.3E+04	1.7E+03	na	--	--	--	--	--	--	--	--	--	**1.3E+04**	**1.7E+03**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	8.5E+00	na	--	--	--	--	--	--	--	--	--	**--**	**8.5E+00**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.0E+02	6.6E+01	- -	- -	--	--	--	--	--	--	--	--	**1.0E+02**	**6.6E+01**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+05**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	2.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+06**
Methoxychlor	0	--	3.0E-02	na	--	--	2.6E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.6E+00**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	0	2.4E+02	2.7E+01	na	4.6E+03	1.8E+04	2.3E+03	na	5.4E+05	--	--	--	--	--	--	--	--	**1.8E+04**	**2.3E+03**	**na**	**5.4E+05**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+04**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.1E+03	5.6E+02	na	--	--	--	--	--	--	--	--	--	**2.1E+03**	**5.6E+02**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	4.8E+00	1.1E+00	na	--	--	--	--	--	--	--	--	--	**4.8E+00**	**1.1E+00**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	1.2E+00	na	2.3E-01	--	--	--	--	--	--	--	--	**--**	**1.2E+00**	**na**	**2.3E-01**
Pentachlorophenol [C]	0	2.1E+01	1.6E+01	na	3.0E+01	1.6E+03	1.4E+03	na	1.1E+04	--	--	--	--	--	--	--	--	**1.6E+03**	**1.4E+03**	**na**	**1.1E+04**
Phenol	0	--	--	na	8.6E+05	--	--	na	1.0E+08	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+08**
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E+05**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0.5	2.0E+01	5.0E+00	na	4.2E+03	1.5E+03	3.8E+02	na	4.9E+05	--	--	--	--	--	--	--	--	**1.5E+03**	**3.8E+02**	**na**	**4.9E+05**
Silver	0	6.0E+00	--	na	--	4.5E+02	--	na	--	--	--	--	--	--	--	--	--	**4.5E+02**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Thallium	0.05	--	--	na	4.7E-01	--	--	na	4.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E+01**
Toluene	0	--	--	na	6.0E+03	--	--	na	7.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.0E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	5.4E+01	1.7E-02	na	1.0E+00	--	--	--	--	--	--	--	--	**5.4E+01**	**1.7E-02**	**na**	**1.0E+00**
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.4E+01	6.1E+00	na	--	--	--	--	--	--	--	--	--	**3.4E+01**	**6.1E+00**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	8.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.2E+03**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	5.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+04**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+05**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	8.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.7E+03**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	8.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.7E+03**
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	1.1E+04	1.3E+04	na	3.0E+06	--	--	--	--	--	--	--	--	**1.1E+04**	**1.3E+04**	**na**	**3.0E+06**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and
   Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	7.5E+04
Arsenic	7.6E+03
Barium	na
Cadmium	7.2E+01
Chromium III	4.9E+03
Chromium VI	4.8E+02
Copper	5.1E+02
Iron	na
Lead	1.0E+03
Manganese	na
Mercury	3.9E+01
Nickel	1.4E+03
Selenium	2.3E+02
Silver	1.8E+02
Zinc	4.6E+03

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Municipal Minor Fact Sheet Addendum

The following information summarizes the basis for the permit limitations and special conditions for the discharge from the sewage treatment plant permitted as Outfall 008 that discharges to the Clinch River. The sewage treatment works receives the sanitary wastewater from the Clinch River Plant including a small amount of flow from the plant laboratory. The plant is an extended aeration type activated sludge unit with a design capacity of 12,000 gallons per day. The sewage treatment plant consists of a 6,100 gallon aerated surge tank, a 3,100 gallon sludge holding tank, a 12,000 gallon aeration chamber, a 5,200 gallon clarifier, a 300 gallon dosing tank, a tertiary treatment unit, an ultraviolet disinfection unit and a post aeration unit. The SIC code is 4952.

1. Effluent Screening & Limitation Development:

- *Bacterial Standards*:
  On January 15, 2003, new bacteria standards in 9VAC25-260-170.A became effective, as did the revised disinfection policy of 9VAC25-260-170.B. These standards replaced the existing fecal coliform standard and disinfection policy of 9VAC25-160-170. In short, E.coli criteria replaced the existing fecal coliform criteria. The current bacteria standards in 9VAC25-260-170.A are as follows:

  For freshwater, E.coli bacteria per 100 ml of water shall not exceed the following for any single month:

Parameter	Geometric Mean
E.coli (N/100 ml)	126

  The Water Quality Standards (9VAC25-260-170) requires that a geometric mean be calculated using all data collected during any calendar month with a *minimum of four weekly* samples.

  In a previous permit, the permittee was required to demonstrate that the facility could meet the new E. coli limitations. The facility successfully conducted the E.coli/fecal coliform study during July through September 2005 and final limits for E.coli became effective on January 1, 2006. There have been no violations of the E.coli limit during the current permit term.

- *BOD_5 and Dissolved Oxygen Limits:*
  Secondary Limits for BOD_5 [30 *mg/l monthly average, 45 mg/l weekly average*] were established in the original VPDES permit. Based *on Best Professional Judgment/Best Engineering Judgment*, the secondary limits for BOD_5 will remain in effect for this permit. This decision is based on a very high dilution ratio of the receiving stream and the discharge (2,417:1) at 7Q10 drought flow conditions. Using the same rational a dissolved oxygen minimum concentration is not necessary to prevent degradation in the receiving stream.

- *Ammonia Nitrogen:*
  Effective on August 27, 2003 the State Water Control Board adopted new criteria for ammonia nitrogen (9VAC25-260-155). An acute ammonia nitrogen standard is now calculated without consideration of the stream temperature. The acute criteria are more restrictive if the trout species are present (*only Class V or VI waters*). A chronic ammonia nitrogen standard is now calculated by considering whether or not the early life stage of fish are present or absent and the pH and temperature of the stream. Based on the evaluation of the dry season conditions (June-November) the results indicate that *No Permit Limit is necessary* for ammonia nitrogen.

The following stream parameter values are being used for the calculations. The dry season is June-November.

Acute: Dry Season pH S.U. = 8.342

Dry Season Temperature (C^o) = 24

The ammonia nitrogen water quality criteria are:

Acute: $AStd_{dry}$ = 4.35 mg/l

Chronic: $CStd_{dry}$ = 0.755 mg/l (Early Life Stage Present)

MIXING ANALYSIS:

DEQ's mixing zone analysis version 2.1.0 indicates that **38.47% of the 1Q10 values and 100% of the 30Q10 values** are appropriate to use for this discharge. (*See Appendix G of the Fact Sheet for additional details*)

ANTIDEGREDATION:

The application for reissuance proposes no new or increased discharges of pollutants from outfall 008. This permit action will maintain the existing water quality and support the existing uses of the stream and complies with the antidegredation policy established by 9VA25-260-30. (*See Item No. 14 of the Fact Sheet for additional details*)

The following drought flows apply:

Q_{s-1} = 1Q10 Flow 9.62 (MGD)
Q_{s-30} = 30Q10 Flow 38 (MGD)

BACKGROUND AMMONIA CONCENTRATION FROM OUTFALL 003 AND CLINCH RIVER:

Acute Ammonia Nitrogen Background Concentration

Outfall 003 - 90th percentile ammonia nitrogen November, 2011 through October 2015 = 3.24 mg/l
Clinch River ammonia concentration upstream of outfall 003 = 0 mg/l

$C_r = (Q_{S-1})\ (\ C_s) + (Q_d)\ (C_d)/Q_r$

$C_r = (9.62)\ (0) + (4.84)\ (3.24)/14.5$

C_r = 1.08 mg/l Acute background concentration

Where:

Q_{s-1} = 1Q10 Flow (9.62 MGD)
Q_r = 1Q10 Flow + Outfall 003 Flow (14.5 MGD)
Q_d = Outfall 003 Discharge Flow (4.84 MGD)
C_s = Clinch River Background (0 mg/l)
C_d = Outfall 003 Ammonia Concentration (3.24 mg/l)
C_r = Concentration of Ammonia

Chronic Ammonia Nitrogen Background Concentration

Outfall 003 - 90th percentile ammonia nitrogen November, 2011 through October 2015 = 3.24 mg/l
Clinch River ammonia concentration prior to outfall 003 = 0 mg/l

$C_r = (Q_{S-30})\ (C_s) + (Q_d)\ (C_d)/Q_r$

$C_r = (38)\ (0) + (4.84)\ (3.24)/42.84$

C_r = 0.37 mg/l Chronic background concentration

Where:
Q_{s-30} = 30Q10 Flow (38 MGD)
Q_r = 30Q10 Flow + Outfall 003 Flow (42.84 MGD)
Q_d = Outfall 003 Discharge Flow (4.84 MGD)
C_s = Clinch River Background (0 mg/l)
C_d = Outfall 003 Ammonia Concentration (3.24 mg/l)
C_r = Concentration of Ammonia

WASTELOAD ALLOCATIONS:

The antidegredation wasteload allocations (WLAs) are calculated using the mass balance equation below, using a design flow of 0.012 MGD.

Acute:

$\text{Dry WLA}_{acute} = [AStd_{dry}\ (f)(Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3\text{-N background})]/Q_e$

$\text{Dry WLA}_{acute} = [4.35(.25)(9.62 + 0.012) - (.25)(9.62)(1.08)]/0.012$

Dry WLA_{acute} = 656 mg/l

Chronic:

$\text{Dry WLA}_{chronic} = [CStd_{dry}\ (f)(Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3\text{-N background})]/Q_e$

$\text{Dry WLA}_{chronic} = [0.755(.25)\ (38 + 0.012) - (.25)(38)(0.37)]/0.012$

$\text{Dry WLA}_{chronic}$ = 305 mg/l

Where:
$AStd_{dry}$ = Acute Ammonia Standard
Q_{s-1} = 1Q10 Flow
$CStd_{dry}$ = Chronic Ammonia Standard
Q_{s-30} = 30Q10 Flow
Q_e = Discharge Flow from 008
f = Fraction of Stream Flow for Antidegredation

PERMIT LIMITS:

Based on the large wasteload allocations for ammonia nitrogen, No Permit Limit Is Required.

- *Sewage Sludge:*
The contents of the sludge holding tank and other compartments of the sewage treatment works will be pumped as needed, typically less than once per year, by Blevins Septic Tank Service (VDH Permit Number 197-04), and transported in a truck-mounted watertight tank to the Town of St. Paul Wastewater Treatment Plant (VPDES Permit No. VA0026221). Additional treatment and/or stabilization of the sludge will be provided prior to final disposal. Special conditions regarding changes in sludge management practices are listed below under Special Conditions pertinent to Outfall 008. Chemical monitoring of the sludge is not required.

2. Reduced Monitoring:

EPA published "Interim Guidance For Performance-Based Reduction of NPDES Permit Frequencies" (EPA 833-B-96-001) in April 1996. Based on the sampling and testing required by the existing VPDES permit and the continued exemplary operation of the treatment works the facility qualifies for reduced monitoring. Data reported on the Discharge Monitoring Reports during the current permit term indicates full compliance with the permit limitations. These data and the reduced monitoring frequencies are summarized below.

Parameter	5 Year Average	Maximum	Range	**Performance to Limit Ratio Percentage**	*Reduced Frequency*
BOD_5	5.4 mg/l	16 mg/l	NA	**18%**	*1/3 Months*
TSS	6.9 mg/l	21 mg/l	NA	**23%**	*1/3 Months*
pH	NA	NA	6.1-8.4 S.U.	**NA**	*1/ Week*

The monitoring frequencies were arrived at by calculating average of the respective monitoring data and dividing it by the permit limit to determine the ratio of actual performance to the permit limit. A reduction in monitoring for E.Coli is not being considered because adequate disinfection is essential to ensure protection of aquatic life and human health. The monitoring frequency for pH is being reduced since no treatment is used to achieve the permit limit.

Provisions are contained in the permit to reinstate more stringent monitoring frequencies if the facility permitted herein is issued a Notice of Violation for any of the parameters listed below, then the following effluent monitoring frequencies shall become effective upon written notice from DEQ and remain in effect until permit expiration.

Parameter	*Monitoring Frequency*
BOD_5	*1/Month*
TSS	*1/Month*
pH	*1/Day*

3. Basis for Effluent Limitations:

PARAMETER	(**a**) BASIS FOR LIMITS	DISCHARGE LIMITS(**b**) Outfall 008				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MIN	MAX	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	1/Day	(**c**) Estimate
pH (S.U.)	3	NA	NA	6.0	9.0	1/Week	Grab
BOD_5	2,5	30 mg/l 1.4 kg/d	45 mg/l 2.0 kg/d	NA	NA	1/3 Months	Grab
Total Suspended Solids	1	30 mg/l 1.4 kg/d	45 mg/l 2.0 kg/d	NA	NA	1/3 Months	Grab
E.coli	3	126 N/100 ml Geometric Mean	NA	NA	NA	1/Week	Grab

a. 1. Federal Effluent guidelines
2. Best Engineering Judgment:
3. Water Quality standard
4. Other (e.g. wasteload allocation model)
5. Best Professional Judgment

b. Express limits in units of concentration (mg/l) and/or mass (kg/d).

c. Estimated average daily flowrate shall be based on the most accurate method or device available such as: weir, potable water meter, pump rates, etc.

3. Changes to the permit limits for Outfall 008:

- Limitations and Monitoring Requirements: The frequency of monitoring for BOD_5 and TSS has been reduced from 1/Month to 1/3 Months. The frequency of monitoring for pH has been reduced from 1/Day to 1/Week. 0

- Compliance Reporting: The quantification level (QL) for BOD_5 has been changed from 5.0 mg/l to 2 mg/l in accordance with current recommendations from the Office of VPDES Permits and Standard Methods 22st edition.

- The language and rationale for all special conditions (95% Flow, Indirect Dischargers, O & M Manual, Reliability Classification, Sludge Reopener, Sludge Use and Disposal, Closure Plan ,CTC/CTO and Effluent Monitoring Frequencies) were updated in accordance with the guidance provided in the 2014 Permit Manual that was updated on March 27, 2014.

- Special Conditions pertinent to Outfall 008 and rationale:

  1. Treatment Plant Flows - 95% Capacity Reopener:
     Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits.

  2. Indirect Dischargers:
     Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

  3. O&M Manual Requirement:
     Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190 E.

  4. Reliability Class:
     Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790 for all municipal facilities.

  5. Sludge Reopener:
     Rationale: Required by VPDES Permit Regulation, 9VAC25-31-220 C for all permits issued to treatment works treating domestic sewage.

  6. Sludge Use and Disposal:
     Rationale: VPDES Permit Regulation, 9VAC25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

  7. Treatment Works Closure Plan:
     Rationale: This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purpose of the State Water Control Law.

8. CTC, CTO Requirement:
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790.

9. Condition that the permit shall be terminated when public sewerage service is made available:
Rationale: DEQ strategy to minimize individual discharges and promote regionalization of wastewater treatment. The permit shall be terminated when public sewerage service is made available.

10. Effluent Monitoring Frequencies:
Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limits for which reduced frequencies were granted. If permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.

11. Section 303(d) List (TMDL) Reopener:
***Rationale*:** Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

12. Part II, Conditions Applicable to All Permits:
Rationale: VPDES Permit Regulation, 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

APPENDIX J

§316(B) CORRESPONDENCE

- **USFWS COMMENT LETTER – JULY 16, 2015**
- **AEP TECHNICAL RESPONSE TO USFWS COMMENT – AUGUST 27, 2015**
- **AEP RESPONSE LETTER – DECEMBER 4, 2015**
- **EPA MEMORANDUM – DECEMBER 11, 2014**
- **EPA COMMENTS – APRIL 28, 2016**
- **USFWS COMMENT LETTER – MAY 19, 2016**
- **AEP COMMENT LETTER – MAY 19, 2016**

Appendix J.1

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

July 16, 2015

Mr. Mark Trent
Virginia Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Re: Appalachian Power Company Clinch River Plant (VPDES VA0001015) 316(b) coordination, Russell County, VA, Project # 2015-I-2237

Dear Mr. Trent:

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided by the Virginia Department of Environmental Quality (VDEQ) on May 22, 2015 regarding the referenced project. The Appalachian Power Company (APCO) submitted documentation in support of its assertion that the cooling water intake structure (CWIS) at its Clinch River Plant is currently in compliance with Section 316(b) of the Clean Water Act and therefore no additional measures to reduce impingement mortality and entrainment (IM&E) of aquatic organisms are required. The following comments are provided under provisions of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Federally listed species that may be impacted by the CWIS

A number of federally listed fish and mussel species are known to occur in the Clinch River near this facility and could potentially be impacted by the intake of cooling water. These include the federally listed endangered Cumberlandian combshell (*Epioblasma brevidens*), oyster mussel (*Epioblasma capsaeformis*), snuffbox (*Epioblasma triquetra*), shiny pigtoe (*Fusconaia cor*), fine-rayed pigtoe (*Fusconaia cuneolus*), cracking pearlymussel (*Hemistena lata*), birdwing pearlymussel (*Lemiox rimosus*), sheepnose mussel (*Plethobasus cyphyus*), slabside pearlymussel (*Pleuronaia dolabelloides*), fluted kidneyshell (*Ptychobranchus subtentum*), rough rabbitsfoot (*Quadrula cylindrica strigillata*), Cumberland monkeyface (*Quadrula intermedia*), purple bean (*Villosa perpurpurea*), and Cumberland bean (*Villosa trabalis*) and the federally listed threatened yellowfin madtom (*Noturus flavipinnis*). Additionally, the stretch of the Clinch River in which the CWIS is located is designated critical habitat for the Cumberlandian combshell, oyster

mussel, slabside pearlymussel, fluted kidneyshell, rough rabbitsfoot, and purple bean. The permittee's intake of cooling water could potentially modify critical habitat for any of these species.

The yellowfin madtom is likely to occur in the vicinity of the intake and is susceptible to IM&E during all life stages. Freshwater mussels are at risk during their parasitic larval stage when they are attached to host fish. When their host fish are killed as a result of being impinged or entrained, attached larval mussels are also killed. Fish have been collected and identified from the vicinity of the Clinch River Plant since 1982; these data are provided in the Clean Water Act § 316(b) Compliance Submittal Requirements report (316[b] Report) that was included with APCO's Virginia Pollutant Discharge Elimination System (VPDES) permit renewal application. A number of the species collected are known to serve as hosts for the federally listed mussels known to occur in the area. Therefore, any IM&E of host fish species may adversely affect federally listed mussels. IM&E of host fish also represents an adverse modification to designated critical habitat since the presence of abundant host fish is considered a primary constituent element for the critical habitat of the Cumberlandian combshell, oyster mussel, rough rabbitsfoot, and purple bean (69 FR 53147) and the slabside pearlymussel and fluted kidneyshell (78 FR 59562- 59563).

Summary of the 316(b) rule

In 2014, the U.S. Environmental Protection Agency issued a rule under Section 316(b) of the Clean Water Act that pertains to existing power generating, manufacturing, and industrial facilities that withdraw more than two million gallons of water per day from waters of the United States and use at least 25 percent of that withdrawal for cooling purposes (76 FR 22173). Facilities that meet these criteria, including the APCO Clinch River Plant, are required under the rule to employ the best technology available to minimize IM&E of aquatic organisms at CWISs. Facilities must meet at least one of the following compliance alternatives for minimizing impingement mortality:

1) The utilization of a closed-cycle recirculating system.
2) A design through-screen velocity of 0.5 feet per second (fps) or lower.
3) An actual through-screen design velocity of 0.5 fps or lower as demonstrated by daily monitoring.
4) The utilization of an existing offshore velocity cap.
5) The utilization of modified traveling screens.
6) The operation of a system of technologies, management practices, and operational measures that represents the best technology available to minimize impingement.
7) Achieving a 12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality.

Existing facilities must also meet best technology available standards for entrainment; these are established by VDEQ on a site-specific basis.

In Virginia, the 316(b) rule is implemented through the VDEQ administration of VPDES permits. The Service is provided 60 days to comment on any materials that pertain to compliance

with the 316(b) rule. All comments received by VDEQ are considered in the preparation of a draft VPDES permit.

APCO's chosen method of compliance with the 316(b) rules

According to the 316(b) Report, APCO believes the Clinch River Plant is currently in compliance with the 316(b) rule because the facility utilizes a closed-cycle recirculating system (Compliance Alternative 1). APCO estimates that this system reduces flow, and therefore entrainment of aquatic organisms, by at least 97% compared to once-through cooling. The 316(b) Report also notes that the facility's design through-screen velocity is estimated to be 0.52 fps at its highest (when the water level is low) and 0.15 fps at normal pool elevation. This is close to meeting Compliance Alternative 2.

The Service's recommendations

Based on the information provided about the CWIS of the Clinch River Plant, the Service believes there is potential for the existing intake to impinge and entrain federally listed fish and larval mussels, resulting in injury or death of individuals, and we believe that this would result in unauthorized incidental take of federally listed species in addition to adverse modification of critical habitat.

Even though the Clinch River Plant's intake meets one compliance alternative and it can be argued that it meets a second, the Service believes that additional measures are necessary to ensure protection of federally listed species. The Environmental Protection Agency has verified that pursuant to §125.94(c)(11), the Service may recommend additional species protection measures if federally listed species are subject to IM&E even if one or more of the compliance alternatives has been satisfied (Service and NMFS 2014). For federally listed species, all unauthorized incidental take is prohibited by the ESA. With regards to the species listed above and associated critical habitat, the Service is concerned about the mesh size of the intake screen, the through-screen velocity, and the lack of a specified plan to monitor impingement and entrainment.

The Service does not believe the 3/8-inch (9.5 millimeters) mesh openings of the Clinch River Plant's CWIS screen are small enough to protect federally listed species from becoming entrained. In addition, the Service believes that a through-screen velocity of 0.5 fps is not protective of federally listed species (Service and NMFS 2014). Gowan et al. (1999) developed Virginia-specific guidance for ensuring that water withdrawals are protective of all fish, including federally listed species of fish and host fish of federally listed mussels. To ensure protection from entrainment, a 1.0 millimeter mesh size for intake screens is recommended. To ensure that all species are protected from impingement, it is recommended that the actual through-screen velocity not exceed 0.25 fps.

The Service also recommends monitoring of impingement and entrainment to ensure that federally listed species and associated critical habitat are being adequately protected. The 316(b) Report concluded that the vast majority of fish species that occur near the facility are unlikely to be impinged or entrained. However, we are not aware of any monitoring to support this

assumption or plans to conduct monitoring in the future. Gowan et al. (1999) believe that monitoring is essential because even the best designed CWIS can cause unexpected impacts to aquatic organisms and may require additional protective measures. We recommend that VDEQ and APCO work with the Service to develop a plan to monitor impingement and entrainment.

If the CWIS is modified as described above and monitoring results confirm no impingement or entrainment of federally listed species or host fish of federally listed mussels, then the Service believes that the Clinch River Plant's withdrawal of cooling water is not likely to adversely affect listed species or modify critical habitat. Further consultation pursuant to Section 7 of the ESA will not be necessary. If the above project modifications are not adopted as recommended, further consultation with the Service will be necessary pursuant to 50 CFR 402.13 and 402.14. We request that you notify the Service as to whether the recommended modifications and monitoring will be implemented.

If you have any questions, please contact Brett Hillman of this office at (804) 824-2420 or via email at brett_hillman@fws.gov.

Sincerely,

Cindy Schulz
For Field Supervisor
Virginia Ecological Services

cc: NOAA, Philadelphia, PA (Attn: Simeon Hahn)
SVFO, Abingdon, VA (Attn: Roberta Hylton)
VDCR, Richmond, VA (Attn: Rene Hypes)
VDGIF, Forest, VA (Attn: Brian Watson)
VDGIF, Richmond, VA (Attn: Ernie Aschenbach)
VDGIF, Richmond, VA (Attn: Amy Ewing)

Literature Cited

Gowan, C., G. Garman, and W. Shuart. 1999. Design criteria for fish screens in Virginia: recommendations based on a review of the literature. Report prepared for the Virginia Department of Game and Inland Fisheries, Richmond, Virginia.

United States Fish and Wildlife Service and National Marine Fisheries Service (Service and NMFS). 2014. Endangered Species Act Section 7 Consultation Programmatic Biological Opinion on the U.S. Environmental Protection Agency's issuance and implementation of the final regulations Section 316(b) of the Clean Water Act. <http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Final-316b-Biological-Opinion-and-Appendices-May-19-2014.pdf>.

Appendix J.2

Technical Response to USFWS Comments of July 16, 2015
Clinch River Plant 316(b)
Appalachian Power Company, August 27, 2015

U. S. Fish and Wildlife Service (USFWS) provided comments to the Virginia Department of Environmental Quality (VDEQ) on the February 27, 2015, submittal by Appalachian Power Company dba American Electric Power (APCo) addressing Clean Water Act Section 316(b) compliance by APCo's Clinch River Plant, located at Carbo, Virginia. In their comments, USFWS raised concerns regarding potential impingement and entrainment impacts of the plant's cooling water intake on several federally listed species that occur in the plant vicinity, including the yellowfin madtom and several species of freshwater mussels. APCo recently submitted a revised 316(b) document (dated July 20, 2015) for the plant that includes additional analysis of potential impingement and entrainment effects on these endangered species. APCo believes this information demonstrates that Clinch River Plant's cooling water intake is unlikely to affect federally listed species in the vicinity. To address the USFWS concerns and recommendations, this information has been summarized below.

1. To ensure protection of the yellowfin madtom and listed larval mussels from entrainment, USFWS recommends that the 3/8-inch mesh intake screens be replaced with 1.0-mm mesh.

   RESPONSE: Entrainment largely affects pelagic eggs and other early life stages of fish that have limited to no swimming capabilities and are passively transported by water currents. Consequently, the life stages of the species of concern for the Clinch River Plant would be the early life stages.

   The yellowfin madtom builds nests to spawn, typically in gravel or bedrock crevices, and guards the nest during early development. This type of spawning behavior results in very little probability that early life stages would be entrained, and larvae of madtom species are typically not observed in entrainment samples.

   Freshwater mussel species would not be expected to be entrained as juveniles or adults, or as glochidia attached to a juvenile or adult fish host. There is a chance that unattached glochidia could appear in an entrainment sample; however, such unattached glochidia would likely be moribund given the encystment strategies employed by these species, and the short 24-48 hr survival expectancy of glochidia once they are released from the parent mussel.

   The USFWS recommendation to replace the 3/8-in screen with 1-mm screen to prevent entrainment would have no benefit to mussel glochidia, even if they were viable. Glochidia typically range in size from 50 µm to 450 µm, which would pass through either size mesh.

2. To ensure protection of the yellowfin madtom and listed larval mussels from impingement, USFWS recommends that the actual through-screen intake velocity not exceed 0.25 fps.

RESPONSE: Impingement largely affects pelagic species such as gizzard shad, rather than benthic species or riffle-dwelling species.

The yellowfin madtom is typically found in gravel cover and bedrock crevices, and is unlikely to be found in the vicinity of the Clinch River Plant intake, which is located in the midsection of a long pool. This species has not been collected in repeated sampling in the plant vicinity.

Freshwater mussel species would not be expected to be impinged as juveniles or adults. For glochidia, common host species are various species of darters and sunfish. Known information on fish hosts, and their likelihood of impingement is provided in Table 4-8 of APCo's 316(b) submittal. This assessment concluded that none of the host fish species were likely to be impinged by the Clinch River Plant intake. Of particular significance is the area of influence of the intake, which was estimated at just over two feet out from the face of the screens, which means that flows in the intake vicinity are essentially indistinguishable from typical ambient flow conditions, such that swimming fish would have no difficulty avoiding the intake screens.

The USFWS recommendation that the through-screen intake velocity not exceed 0.25 fps is already being met at normal river pool. Even under more extreme low river level conditions, when the velocity is calculated to reach 0.5 fps, the area of influence of the intake is so small that there would be negligible benefit to impingement protection afforded by further reductions in intake flows. Further, the 1999 Virginia fish screen report cited by USFWS in support of its recommendation relied predominately on salmonids and other species not found in the Clinch River to derive the 0.25 fps recommendation. The test species in the cited report were mostly small larvae with limited swimming ability, which are not representative of the adult fish hosts that USFWS wishes to protect. These adult species can easily avoid the 0.25-0.5 fps intake velocity at Clinch River Plant.

In fact, the most relevant recommendation in the 1999 report pertinent for Clinch River Plant is that sweeping velocity (parallel and adjacent to the intake screens) should exceed approach velocity (perpendicular through-screen velocity), such that fish will be carried past the intake. Due to the negligible area of influence of the plant intake, combined with the typical river current traveling parallel to the intake, such is the case at this facility.

Finally, USFWS does not appear to take into account how intake velocity would actually be reduced. Conceptually, to go from 0.5 fps to 0.25 fps would require a doubling of the intake screened area to be able to provide the same total supply of water. (This would be further compounded if the mesh size was reduced from 3/8" (9.5mm) to 1 mm openings.) The recommendation is deficient in accounting for the cost and prospective impacts associated with an intake structure that is several times larger than the current system, which as stated here is already suitably protective.

3. USFWS recommends monitoring of impingement and entrainment to ensure that federally listed species and associated critical habitat are adequately protected.

   RESPONSE: USEPA in its 2014 316(b) rule did not require impingement sampling for facilities such as Clinch River Plant that already meet one of the specified compliance alternatives. In addition, entrainment sampling was not specified for facilities withdrawing less than 125 mgd, based on EPA's desire to focus on major withdrawals, rather than those facilities such as Clinch River Plant that already have substantially lower withdrawals through the use of closed-cycle cooling technology or other means. It is also not necessary to collect and verify the presence of every entrained species as long as there is sufficient information to support the entrainment evaluation. Such is the case for Clinch River Plant, based on the above assessment showing little likelihood of impingement or entrainment of federally listed species. Based on this assessment, there is no justification for the expense of collecting monitoring data.

Appendix J.3

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

December 4, 2015

Mr. Mark Trent
Virginia Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Re: Appalachian Power Company, Clinch River Plant
Russell County, VA
VPDES VA0001015
316(b) coordination

Dear Mr. Trent:

Appalachian Power Company (APCO) appreciates the coordination that you and the Virginia Department of Environmental Quality (VDEQ) have provided to facilitate discussion of the issues raised in the letter received from the U.S. Fish and Wildlife Service (USFWS), dated July 16, 2015, regarding the 316(b) determination of Best Technology Available (BTA) for the cooling water intake at APCO's Clinch River Plant. APCO also appreciates the time and resources dedicated to the meeting with USFWS and VDEQ personnel at the plant on October 21, 2015. We have several concerns about the recommendations made by the USFWS, and appreciate the opportunity to submit additional information to you surrounding these issues. We believe the recommendations do not meet the standards set forth in 40 CFR §125.94(g), and go beyond the limited "reasonable and prudent measures" described in the final rule.

Description of the Role of the Services

The U.S. Environmental Protection Agency (EPA) completed consultation with USFWS and other agencies prior to issuance of the final 316(b) rule for existing facilities. The Services concluded that EPA's action adopting these standards was not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of critical habitat. However, EPA agreed to include new procedures for coordination between state permitting authorities and USFWS in 40 CFR §125.94(g), that provide a mechanism through which USFWS and other agencies can identify and recommend additional control measures, and associated monitoring and reporting requirements, if those measures are "designed to minimize incidental take, reduce or remove more than minor detrimental effects to Federally-listed species and designated critical habitat, or avoid jeopardizing Federally-listed species or destroying or adversely modifying designated critical habitat."

This process is not a formal consultation under Section 7 of the Endangered Species Act, since neither state permitting authorities nor private parties are subject to the consultation requirement. However, even in a

formal consultation, or in the context of issuing an incidental take authorization, the governing regulations describe the role of the wildlife agencies as one of recommending "reasonable and prudent measures" that minimize the impact of any incidental take. Such measures cannot "alter the basic design, location, equipment, scope, duration and timing of the action, and may involve only minor changes." 50 CFR §402.14(i)(2). This same description of the scope of the recommendations expected to be made by USFWS in the permitting process at the state level is incorporated in the preamble to the 316(b) regulations. 79 Fed. Reg. 48,382 (August 15, 2014).

The state permitting authority must consider the recommendations of USFWS, as well as other comments received during the permit development process, and need only include those recommendations if deemed appropriate by the state permit authority based on full consideration of all available data and information. 40 CFR §125.94(g). If EPA determines, taking into account all available information, that issuance of the permit is likely to jeopardize the continued existence of a federally-listed species, or result in the destruction of adverse modification of designated critical habitat, EPA can use its authority to object to a state-issued permit, or assume permit-issuing authority. 79 Fed. Reg. at 48,382.

The Clinch River Application and USFWS Recommendations

The two operating units at the Clinch River Plant were initially constructed in 1958 and have served as baseload electric generating facilities throughout their service lives. Originally constructed as coal-fired generating units, they are currently out of service while the work necessary to convert the units to natural gas firing is completed. When they return to service next year, they will be solely fueled by natural gas. A third unit operated until May of 2015, and has now been permanently retired.

The original design of the plant included a closed-cycle cooling water system with five cooling towers. The original towers were recently replaced during the period from 1999-2001. One cooling tower that served the retired Unit 3 is now retired. The towers are supplied by an intake system with two traveling screens using 3/8" mesh screens, and have an actual intake velocity of 0.5 feet per second (fps) or less with two units in operation. The intake is located in a long pool, and is oriented perpendicular to the flow of the river. Operation of only the two converted units (in contrast to the historic operation of three units) will allow the plant to increase the cycles of concentration within the system from two to five, which results in a 98.1% reduction in water withdrawals compared to a once-through cooling water system. The current configuration and proposed operation of the converted units satisfies the requirements of both 40 CFR §125.94(c)(1) and (2) to minimize impingement mortality.

USFWS Impingement Recommendation

The USFWS has recommended that to assure that all federally listed species are protected from impingement, actual through-screen velocities should be reduced to 0.25 fps. As noted in the application and in the letter from USFWS, through-screen velocity at Clinch River at normal pool elevation is about 0.15 fps. Low pool elevations typically occur in September, when ambient temperatures are moderate and demand for electricity is low. Peak generating season is usually in July, when nearer normal pool elevations are present.

In addition, the species of concern identified in the application, which has not been disputed by the USFWS, includes several species of mussels and only one fish species, the yellowfin madtom. The location and orientation of the intake, the habitat preferred by larval mussels and their juvenile and adult hosts, and the low

intake velocity and limited area of influence of the intake make it unlikely that such species will even be in the area of the intake. Further, the technical report relied upon by USFWS to support this recommendation relied predominantly on salmonid species, which are not found in the Clinch River. Although the yellowfin madtom may be present in the area of the intake, it, too, is unlikely to be impinged due to the low intake velocity and limited area of influence. Adult species can easily avoid the low intake velocity and limited area of influence of the intake at Clinch River Plant.

Nor has USFWS recommended a particular measure that could be used at Clinch River to further reduce the intake velocity without altering the basic design, location, and equipment of the process. 79 Fed. Reg. 48,382. Reducing the velocity by one-half, as recommended, would require essentially doubling the size of the intake, with all of the associated disturbances and environmental impacts that would accompany such a project.

The USFWS claims that without site-specific monitoring data, it cannot be assured that a listed species would not be impinged, and that any potential for impingement of a listed species is sufficient to trigger a determination that the intake structure will jeopardize a federally-listed species or destroy or adversely modify designated critical habitat. This amounts to little more than a tautological statement, with no explanation why a single instance of take would cause such substantial impacts at the species or habitat levels that jeopardy or adverse modification would occur. Furthermore, the burden is not on the applicant to prove that impingement would *never* occur. APCO has provided sufficient evidence to substantiate a finding that impingement of listed species is not likely to occur, and that no additional impingement measures are necessary.

USFWS Recommendation for Entrainment

The USFWS has also recommended that the mesh size of the screens on the Clinch River intake should be reduced from the current 3/8-inch size to 1 millimeter, in order to protect early life stages of the listed fish and freshwater mussels from entrainment. As noted in the application, the preferred habitat that most of the species of concern in the Clinch River populate is located within the riffles and shoreline of the river, far away from the Long pool where the intake structure is located. These areas are also those that are preferred for spawning and early life stage development, and, in addition to the low intake velocity and small area of influence, significantly reduce the potential for entrainment. As noted in the technical response, yellowfin madtom builds nests to spawn and guards the nest during early development, primarily in gravel or rock crevices. Madtom species are rarely found in entrainment samples. Glochidia of freshwater mussels attach themselves to juvenile and adult host fish, which likewise are unlikely to be entrained. Detached glochidia are likely already moribund, given the short survival period once released by the parent.

In addition, USFWS presents no analysis of how the costs or adverse impacts associated with this recommendation could be considered "reasonable and prudent" or are measures that do not "alter the basic design, location, scope, duration, or timing" and involve only "minor changes." 79 Fed. Reg. 48,382. Reducing the screen mesh to the recommended size will not prevent entrainment of mussel glochidia or most fish larval stages, which would pass through even a 1 millimeter screen. And the reduction in screen size requires greater screen surface area to provide the same amount of water to the plant. Similar to the recommendation on intake velocity, such a recommendation alters the basic design, location and equipment of the intake, and goes far beyond the reasonable and prudent measures contemplated by the EPA's regulations. APCO has provided sufficient evidence

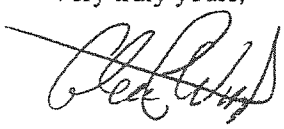
to substantiate a finding that entrainment of listed species is not likely to occur, and that no additional measures are necessary.

Monitoring and Reporting

The 316(b) regulations require the state permitting agency to include additional monitoring and reporting related to federally listed species only if additional measures to prevent impingement or entrainment are included in the permit. 40 CFR §125.96(g). Additional monitoring of listed species could result in a "take" that might not otherwise occur, because of the fragility of many such species. In addition, monitoring for listed species is not likely to yield significant catch because of the rarity of these species. Thus, where there is not a well-defined need for additional monitoring, it should not be required.

Based on all of the foregoing, APCO respectfully recommends that VDEQ confirm that the intake at the Clinch River Plant is equipped with the best technology available, and that neither additional measures nor additional monitoring or reporting are required. If you have any questions concerning this submission, our technical response, or the information included in the application, please contact John Van Hassel of my staff at (614) 716-1249 or email John at jhvanhassel@aep.com.

Very truly yours,



Alan R. Wood, P.E.
Director, Water and Ecological Resource Services
American Electric Power

Appendix J.4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

DEC 1 1 2014

MEMORANDUM

SUBJECT: Clean Water Act Section 316(b) Regulations for Cooling Water Intake Structures at Existing Facilities: NPDES Permitting Process When Federally-Listed Threatened and Endangered Species and/or Designated Critical Habitat Are or May be Present

FROM: Deborah G. Nagle, Director
Water Permits Division

Robert K. Wood, Director
Engineering and Analysis Division

TO: Water Division Directors, Regions I – X

This memorandum addresses implementation of the U.S. Environmental Protection Agency's (EPA) recently promulgated regulation for cooling water intake structures. It is a summary of the rule and the coordination processes in it and is intended to be an aid to the Regions and State National Pollutant Discharge Elimination System (NPDES) Directors. It is not intended to add any new requirements, procedures or interpretations beyond the rule and preamble and documents cited therein. **We respectfully request that you share this memorandum with the State NPDES Directors in your Region.**

The EPA promulgated a Clean Water Act (CWA) section 316(b) regulation on August 15, 2014, that establishes standards for cooling water intake structures. 79 Fed. Reg. 48300-439 (Aug. 15, 2014). The regulation establishes best technology available standards to reduce impingement and entrainment of aquatic organisms at existing power generation and manufacturing facilities and it became effective on October 14, 2014.

The 316(b) rule includes a number of provisions specifically designed to ensure that the rule as it is implemented is not likely to jeopardize the continued existence of federally-listed species or result in the destruction or adverse modification of designated critical habitat pursuant to the Endangered Species Act of 1973, as amended (ESA). The NPDES permit process to establish 316(b) controls for cooling water intake structures (CWIS) under this rule provides a framework for addressing and minimizing adverse environmental impacts that may include adverse effects to threatened and endangered species and designated critical habitat. The rule also establishes requirements that build on existing CWA requirements to coordinate with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (collectively, the Services) prior to issuing these NPDES permits. The rule provides facilities, State NPDES Directors (Directors) and the Services the opportunity in the permitting process to identify

potential impacts that CWISs may have on threatened and endangered species and designated critical habitat and to identify control measures, and associated monitoring and reporting requirements, that may be included in NPDES permits in light of the presence of listed species and designated critical habitat.

The EPA consulted on the 316(b) rule with the Services under the provisions of section 7 of the ESA that require Federal agencies to insure that any agency action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The EPA completed consultation with the Services, and on May 19, 2014, received a joint Biological Opinion[1] that concluded the 316(b) rule is not likely to jeopardize the continued existence of ESA-listed species or result in the destruction or adverse modification of designated critical habitat. The Biological Opinion includes an incidental take statement[2] that exempts EPA from the take prohibitions in section 9 of the ESA and regulations issued pursuant to section 4(d) of the ESA, and eight terms and conditions the EPA must meet in order to be afforded this take exemption.

The fourth term and condition of the Biological Opinion specifies that the EPA will provide State Directors an instructional memorandum describing the technical assistance process between the Directors and the Services described in the rule and preamble. Under the term and condition, the memorandum must also explain how Directors are to interpret the various aspects of the rule, consistent with the April 8, 2014, correspondence from the EPA (attached as Appendix A to the Biological Opinion). In accordance with this term and condition, we are providing you with this instructional memorandum and as noted above, respectfully request that you share it with the State Directors in your Region.

This memorandum addresses how to implement the rule where a State is the permitting authority.[3] For State-issued permits the rule provides the Services two opportunities to participate in the permitting process, first by reviewing and commenting on the permit application, and later by reviewing and commenting on the draft permit. Under these provisions, the Services have the opportunity to recommend that the Director require site-specific and species-specific control measures and monitoring and reporting requirements, including measures to minimize incidental take, reduce or remove more than minor detrimental effects on listed species and designated critical habitat, and avoid jeopardizing federally-listed species and destroying or adversely modifying designated critical habitat.

In addition, Attachment A of this memorandum describes the responsibilities of facilities in implementing the regulation when threatened and endangered species listed under the ESA and/or their designated critical habitat are or may be present. Note that nothing in the rule changes the existing, independent ESA obligations of a facility subject to this rule. Particularly, compliance with the 316(b) rule does not provide an exemption from the prohibitions on "take" of listed species contained in section 9 of the ESA

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[1] Endangered Species Act Section 7 Consultation Programmatic Biological Opinion on the U.S. Environmental Protection Agency's Issuance and Implementation of the Final Regulations Section 316(b) of the Clean Water Act. http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Final-316b-Biological-Opinion-and-Appendices-May-19-2014.pdf

[2] ESA Section 9 prohibits the "take" of endangered species of fish and wildlife. "Take" is defined in ESA Section 3(19) to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Incidental take statements exempt action agencies from the take prohibition if they comply with the reasonable and prudent measures and the implementing terms and conditions of incidental take statements.

[3] EPA issuance of an NPDES permit is a Federal action. Thus, for EPA-issued NPDES permits with 316(b) provisions for existing facilities, as is the case with EPA-issued NDPES permits generally, the EPA must consult with the Services in appropriate circumstances consistent with section 7 of the ESA.

and regulations issued pursuant to section 4(d) of the ESA. Section 11 of the ESA provides for civil and criminal penalties for violating these prohibitions and also provides for citizen lawsuits.

Finally, in Attachment B of this memorandum, the EPA describes its longstanding commitment to oversee the operation of state NPDES programs to ensure protection of listed species and designated critical habitat through existing regulatory processes.

What is the timing of the submission of information required in permit applications under the 316(b) rule?

The requirements in this rule will be implemented in NPDES permits as the permits are issued. The EPA realizes that, in some cases, a facility may already have been in the middle of a permit proceeding at the time of promulgation of this rule. In other cases, the Director may have, prior to promulgation of the new rule, already obtained much of the same information from the facility required by the new rule. In addition, there may be circumstances, in the case of the renewal of already issued permits with 316(b) conditions, where existing information may be adequate for determining whether or not to modify existing 316(b) permit conditions. Therefore, the rule includes several provisions that provide flexibility for the Director in determining what specific permit application requirements apply to such applicants. How the rule treats permit application requirements in several different circumstances is described below.

If the Director began a permit proceeding prior to October 14, 2014, the Director may issue a permit based on the information supplied by the applicant so long as the permit is issued prior to July 14, 2018.[4] See 40 C.F.R. 125.95(a)(2) and 125.98(g). However, the Director has the discretion to require additional information from the applicant where necessary for determining appropriate permit conditions, including additional information on threatened and endangered species and designated critical habitat that may be affected by the cooling water intake structures. See 40 C.F.R 122.21(r).

In the case of any permit expiring prior to July 14, 2018, under 40 C.F.R. 125.95(a)(2), a facility may request that the Director establish an alternate schedule for submission of some of the permit application information required by 40 C.F.R. 122.21(r), based on a showing by the owner or operator of the facility that it could not develop the information for which such an alternate schedule is requested by the time required for submission of the permit renewal application. If the Director subsequently chooses to allow a delay for the submittal of any of the information required under 40 C.F.R. 122.21(r), the Director should establish a schedule requiring submission of the required information as soon as practicable.

In the case of any permit expiring on or after July 14, 2018, under 40 C.F.R. 125.95 the facility must submit a permit application that includes all the information required in 40 C.F.R. 122.21(r) with its next NPDES permit renewal application.

Where a facility's permit application was submitted on or after October 14, 2014 and the facility submitted the 122.21(r) permit application studies, the Director may approve an applicant's request to reduce information required for subsequent permit applications, if conditions at the facility and in the waterbody remain substantially unchanged since the previous application. However, if conditions at the

[4] As described in the preamble to the 316(b) rule, the EPA has determined that for many facilities, it may take as long as 39 months to plan, collect, and compile the data and studies required to be submitted with the permit application. The rule therefore specifies that July 14, 2018 (39 months after the rule's effective date) reflects the date after which all permit application requirements must be submitted as specified at 40 C.F.R. 125.95.

facility or in the waterbody have in fact changed substantially since the previous permit application, the Director will need to review and revise the data collection expectation where necessary. The presence of any designated critical habitat, or threatened and endangered species, designated or listed after issuance of the current permit (whose range of habitat or designated critical habit includes waters in the vicinity of CWIS), constitutes potential for a substantial change that must be addressed by the owner/operator in subsequent permit application, unless the facility received from the Services an exemption pursuant to 16 U.S.C. 1536(o) or a permit pursuant to 16 U.S.C. 1539(a), or the Services have informed the owner/operator there is no reasonable expectation of take. See 40 C.F.R. 125.95(c), 79 Fed. Reg. 48358 (Aug. 15, 2014).

What are the responsibilities of the Director regarding listed species and designated critical habitat?

The rule requires the Director to take certain actions relevant to threatened and endangered species and designated critical habitat during the development of NPDES permits with 316(b) requirements.[5] These actions, listed below, will assist the Director in developing the record necessary to support the inclusion of any protective measures and requirements for listed species and designated critical habitat in the permit:

I. The Director Must Transmit the Permit Application to the Services. Pursuant to 40 C.F.R. 125.98(h), upon receipt of an NPDES permit application for an existing facility subject to the rule, the Director must forward a copy of the permit application to the appropriate Field Office of the U.S. Fish and Wildlife Service and/or Regional Office of the National Marine Fisheries Service for a 60-day review.

As noted earlier, in the case of permit proceedings begun prior to the effective date of today's rule, the Director may require additional information from the applicant pursuant to 40 C.F.R. 122.21(r). Upon receipt of such additional permit application information requested under 40 C.F.R. 122.21(r), the Director must forward a copy of that information to the Services. In the case of any permit expiring prior to July 14, 2018, the Director can choose to allow a delay for the submittal of any of the information requirements of 40 C.F.R. 122.21(r), but should require submittal as soon as practicable. Upon receipt of the additional delayed information under 40 C.F.R. 122.21(r), the Director must forward a copy of that information to the Services.

The EPA expects that the Services will respond within 60 days of receipt of the complete application and provide to the Director:

A. Any corrections to the list of federally-listed threatened and endangered species and critical habitat included in the permit application,

B. Any measures the Services recommend for inclusion in the permit (including monitoring and reporting requirements) for the protection of federally-listed species and designated critical habitat, including measures that would minimize any incidental take of listed species, and/or

[5] The ESA provisions of the rule extend to all federally-listed endangered and threatened species (not just fish and shellfish) and the Director may require additional control measures, monitoring requirements, and reporting requirements to protect federally-listed endangered and threatened species and designated critical habitat. See 40 C.F.R. 125.94(g); 125.98(b)(2).

avoid likely jeopardy to a listed species or destruction or adverse modification of critical habitat, and/or

C. Notification that the Service(s) have no corrections to the list of species and critical habitat and/or that the Service(s) do not recommend any control measures.

See 79 Fed. Reg. 48381 (Aug. 15, 2014).

II. The Director's Processing of the Permit Application and Development of a Draft Permit

The Services' 60-day review period of the application under the new rule is not expected to constrain the Director's ability to process the applicant's permit application in a timely manner.

A. The Director, however, may not propose or publish the draft permit until the 60-day review period has ended, unless the Director has received the Services' response prior to that time. This is a modification to the usual NPDES permit development process.

B. The Services may make recommendations to the Director after as well as during the 60-day period for the Services' review of the permit application.

C. In developing the draft as well as the final permit, the Director should be guided by the following:

The rule generally applies to impingement and entrainment of fish and shellfish. However, as explained in the preamble, the ESA provisions of the rule extend to all federally-listed threatened and endangered species. The Director's authority to establish additional measures to protect listed species and designated critical habitat from direct and indirect effects broadly encompasses all taxa of federally-listed species and all critical habitat and is not limited to fish and shellfish.

In situations where a Director determines, pursuant to 40 C.F.R. 125.94(c)(11), that a facility's rate of impingement is so low as to not warrant additional impingement controls, the Services may still consider the detrimental effects of the facility's operation to be more than minor if federally-listed threatened and endangered species are subject to impingement (including entrapment) and recommend additional impingement controls.

When a Director, pursuant to 40 C.F.R. 125.92(s), approves of fish being returned to water sources other than the original source water, the Director is to take into account any recommendations from the Services with respect to endangered or threatened species.

D. Permits subject to the rule must include a permit condition stating "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).

For additional information, see 79 Fed. Reg. 48381-2, 48371-72 (Aug. 15, 2014) and the Services Biological Opinion.

III. The Director's Development of the Draft Permit Fact Sheet

As part of the administrative record for the draft permit, under existing NPDES regulations, the Director must develop a fact sheet that includes certain standard information. 40 C.F.R. 124.8. In addition, 40 C.F.R. 125.98(f)(1-(2) of the new rule requires the Director to include in the fact sheet an explanation of the proposed entrainment determination, including why the Director has rejected any entrainment control technologies or measures that perform better than the selected technologies or measures.

A. The explanation must reflect consideration of all reasonable attempts to mitigate any adverse impacts of otherwise available better performing entrainment technologies. 40 C.F.R. 125.98(f)(1).

B. The rule lists factors that must or may be considered in making the determination, such as the numbers and types of organisms entrained, including the numbers of federally-listed species and designated critical habitat to the lowest taxonomic classification possible. 40 C.F.R. 125.98(f)(2-3).

C. Importantly, the weight given to each factor is within the Director's discretion based upon the circumstances of the facility. 40 C.F.R. 125.98(f)(2).

IV. The Director's Development of a Public Notice of Draft Permit and Request for Comment

Under the existing regulations, the Director must provide public notice and an opportunity for public comment on draft NPDES permits, including notice to Federal and State agencies with jurisdiction over fish, shellfish and wildlife resources. 40 C.F.R. 124.10. The new 316(b) rule at 40 C.F.R 125.98(h) makes these requirements more explicit with respect to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, by requiring that the Director provide to the appropriate Service office a copy of the fact sheet, the permit application, and the draft permit. This review is in addition to the 60 days for the Services to review each complete permit application described above.

Pursuant to 40 C.F.R. 125.98(h), the Director must also provide the Services notice of specific CWIS requirements at 40 C.F.R. 124.10(d)(1)(ix), including requirements applicable to CWISs under CWA section 316(b)), and any specific information the Director has about federally-listed species and critical habitat that are or may be present in the action area[6], including any proposed control measures and monitoring and reporting requirements for such species and habitat.

V. The Director's Issuance of the Final Permit

As with all NPDES permits, the Director must consider comments received during the public comment period on the draft permit, make any appropriate changes, and issue the final permit.

The rule does not compel the Director to include the Services' suggested control measures in the permit; the Director has the discretion to consider the Services' suggestions and include them if the Director deems appropriate based on full consideration of the available data and information.[7] See 40 C.F.R. 125.94(g). However, (as discussed in Attachment B) under the 2001 Memorandum of Agreement signed

[6] "Action area" is described further in Attachment A.

[7] Information provided by the Services to the Director should be included in the administrative record for the permit.

by both the Services and the EPA (66 Fed. Reg. 11202, Feb. 22, 2001), the EPA and the Services have agreed to follow certain coordination procedures with regard to EPA review of State or Tribal permits, including when contacted by the Services, to coordinate with the Services and State or Tribe during the permit process, in order to ensure that the permits comply with all applicable CWA requirements.

Where the Director requires additional measures to protect federally-listed species or designated critical habitat pursuant to the new rule, the Director shall require monitoring and reporting associated with those measures. See 40 C.F.R. 125.95(g), 125.96(g), 125.97(g).

VI. The Director Must Report Certain Information to the EPA During Permit Term

The rule requires that Directors submit certain information annually to the EPA with respect to any take of listed species that is reported to the Director.

Pursuant to 40 C.F.R. 125.98(k), the Director must submit at least annually to the appropriate EPA Regional Office, facilities' annual reports submitted pursuant to 40 C.F.R. 125.97(g), for compilation and transmittal to the Services.

Term and condition #2 of the Services' Biological Opinion (described in more detail below), specifies that EPA will provide to the Services an annual report summarizing any monitoring reports submitted by facilities to state Directors, including data on impacts to ESA-listed species or critical habitat; a table that identifies all ESA-listed species taken by CWIS along with the total number of organisms taken (deaths and injuries) per year at each facility as reported to the EPA by the state Director pursuant to 125.98(k); and the compiled raw data when the State provides such data to the EPA. The EPA will also seek to provide additional raw data from the Director's summarized reports if requested to do so.

Additional Information

The EPA has posted a web page to support 316(b) NPDES permitting for existing facilities titled "Section 316(b) Implementation Guide for Existing Facilities."[8] The web page, designed to help walk Directors and facilities through the 316(b) permitting process, will be updated with new 316(b) permitting assistance materials as they become available.

Please contact Marcus Zobrist at 202-564-8311 (or zobrist.marcus@epa.gov) or Julie Hewitt at 202-566-1031 (or hewitt.julie@epa.gov) should you have any additional questions concerning this memorandum.

[8] See http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/implement.cfm

Attachment A

What are the permit application responsibilities of the owner or operator of an existing facility?

Permit application materials are due to the Director 180 days prior to the expiration date of the existing permit under existing regulations. 40 C.F.R. 122.21(d)(2). Pursuant to existing regulations at 40 C.F.R. 122.22(d) and reiterated in the new regulation at 40 C.F.R. 125.95(g), the owner or operator must certify their application is true, accurate and complete, making its certification in the form provided at 40 C.F.R. 122.22(d) of the NPDES permitting regulations. These 180-day and certification requirements are generally applicable under existing regulations for all facilities required to obtain an NPDES permit and are not unique to facilities subject to the new 316(b) rule.

The contents of the permit application for 316(b) facilities under the new rule will apprise the Director of the presence and extent of threatened and endangered species and designated critical habitat in the vicinity of a facility's intake. Several studies, as noted below, are required to be submitted as part of the facility's permit application under the new 316(b) rule. Although not all of these studies specifically address federally-listed species and designated critical habitat, they serve to characterize important aspects of the aquatic environment and operation of the CWIS. In addition, the new rule establishes new permit application requirements, also described below, that specifically address threatened and endangered species and designated critical habitat.

I. All Existing Facilities Subject to the New Rule Must Submit the Following Information with Their Permit Application.

A. All information received as a result of any communication with the Services (40 C.F.R. 122.21(r)(1)(ii)(H)).

B. All identified federally-listed species and designated critical habitat that are or may be present in the action area. (40 C.F.R. 125.95(f))[1]. As explained in the preamble, the action area can generally be considered the area in the vicinity of the cooling water intake structure. 79 Fed. Reg. 48381 (Aug. 15, 2014). Please note that under the Services' Biological Opinion the term "action area" means "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action," as defined under the ESA's implementing regulations at See 50 C.F.R. 402.02. Therefore, it is important for Directors to note that in individual permit coordinations, the Services may consider all areas to be affected directly or indirectly by the cooling water intake structure and not merely the immediate area involved in the permit action when recommending measures to include in the permit, even though the coordination on the state permit is not a consultation under Section 7 of the ESA. We recommend that applicants engage with the Services when developing species and habitat lists to avoid any misunderstandings.

All identification must be based on readily available information at the time of the permit application. 40 C.F.R. 125.95(f); 79 Fed. Reg. 48381 (Aug. 15, 2014). Readily available information is not limited to information that is in the facility's possession and includes information that is publicly available. A facility, however, is not required to create new information (e.g., new studies or surveys) in order to identify federally-listed threatened and

[1] For information about identifying federally-listed species and designated critical habitat please use the following websites: http://ecos.fws.gov/ecos/home.action; http://www.nmfs.noaa.gov/pr/species/esa/

endangered species and/or designated critical habitat. If a permit applicant has received information from the Services, that information would be considered readily available.

C. Source water baseline biological characterization study (40 C.F.R. 122.21(r)(4)). The source water baseline biological characterization study must identify all species and life stages in the vicinity of the CWIS, including biological and life history information that will help characterize the vulnerability of biota to being impinged or entrained.[2]

D. Cooling water system data (40 C.F.R. 122.21(r)(5)). Cooling water system data include a narrative description of the CWIS operation, the proportion of the design intake flow that is used in the cooling water system and the proportion of the source waterbody withdrawn on a monthly basis. The cooling water system data also include a description of existing impingement and entrainment technologies or operational measures and a summary of their performance, including reductions in impingement mortality and entrainment.

E. The facility's chosen impingement compliance method(s) (40 C.F.R. 122.21(r)(6)). Under 40 C.F.R. 125.94(c), facilities have to comply with one of seven options for minimizing impingement. Additional studies also may be required depending on compliance method selected, such as the Impingement Technology Performance Optimization Study (40 C.F.R. 122.21(r)(6)(i) and (ii)).[3]

F. Any previously conducted studies or studies obtained from other facilities addressing technology efficacy, through-plant entrainment survival, and other entrainment studies (40 C.F.R. 122.21(r)(7)).

G. A description of the operational status of each generating, production, or process unit that uses cooling water (40 C.F.R. 122.21(r)(8)). This includes (for power production or steam generation) descriptions of individual unit operating status, descriptions of current and future production schedules, and descriptions of plans or schedules for any new units planned within the next 5 years, and the Nuclear Regulatory Commission relicensing status of each unit at nuclear facilities.

H. Source water physical data, and cooling water intake structure data (40 C.F.R. 122.21(r)(2)-(3)). This information is the same as that required of new facilities in the Phase I rule (and were also included in the suspended Phase II rule). The source water physical data is focused on the waterbody potentially affected by the data, while the intake structure data is focused on the design of the intake structure and how cooling water is used at the facility. For more detail, see the preamble at p. 48363.

II. Existing Facilities Withdrawing More Than 125 Million Gallons per Day (MGD) Actual Intake Flow Must Submit Certain Additional Information in Their Permit Application.

A. An Entrainment Characterization Study that includes a minimum of two years of entrainment monitoring (40 C.F.R. 122.21(r)(9)). This study should contain identification and documentation of all life stages of fish and shellfish in the vicinity of the CWIS and susceptible to entrainment,

[2] See 316(b) rule preamble, section VIII.C.3. "What Information Will I Be Required to Submit to the Director When I Apply for My NPDES Permit?" for a discussion of the information that must be included in the Source Water Baseline Biological Characterization Study.

[3] http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/implement.cfm.

including any listed species with a habitat range encompassing waters in the vicinity of the CWIS. The study must include a characterization of all life stages of fish, shellfish, and any species protected under Federal, State law, including a description of their abundance and their temporal and spatial characteristics in the vicinity of the CWIS, based on sufficient data to characterize annual, seasonal, and diel variations in entrainment, including but not limited to variations related to climate and weather differences, spawning, feeding, and water column migration. We recommend that applicants engage with the Services when developing this characterization. The facility must provide documentation of the current entrainment of all life stages of fish, shellfish, and any species protected under Federal or State law.

B. A benefits valuation study (40 C.F.R. 122.21(r)(11)) that evaluates the benefits of the candidate entrainment reduction technologies and operational measures. Each category of benefits must be described narratively, and when possible, benefits should be quantified in physical or biological units and monetized using appropriate economic valuation methods.

C. A comprehensive technical feasibility and cost evaluation study (40 C.F.R. 122.21(r)(10)), and a non-water quality and other environmental impacts study (40 C.F.R. 122.21(r)(12)). These two studies constitute the compliance and social cost analysis. The (r)(10) study must include a description of all technologies and operational measures under consideration, and cover the private and social costs of compliance. The (r)(12) study includes information on other effects, including such effects as energy consumption, air pollutant emissions, noise, safety, and grid reliability. For more detail, see Preamble at p. 48367-8.

D. Facilities must also obtain external peer review of the studies called for in 40 C.F.R. 122.21(r)(10) - (12)) per 40 C.F.R. 122.21(r)(13). The peer reviewers must have appropriate qualifications to review the studies. The Director may require disapproval of reviewers or require additional peer reviewers, and the applicant must provide an explanation for any significant reviewer comments not accepted.

Attachment B

The EPA's Commitment to the 2001 MOA with the Services

In addition to the permit requirements summarized above, as part of the EPA's action to promulgate the new 316(b) rule, the EPA reaffirmed in the preamble to the 316(b) rule the EPA's commitment to ensure coordination of the EPA's and Services' programs to protect federally-listed species and designated critical habitat and to follow the procedures in the 2001 MOA, signed by both the Services and the EPA (66 Fed. Reg. 11202, Feb. 22, 2001). The objective of the MOA is to enhance coordination among the agencies and to assist them in fulfilling their respective responsibilities under the CWA and ESA. The MOA reflects, in part, the EPA's longstanding commitment to overseeing the operation of state NPDES programs to ensure protection of federally-listed species and designated critical habitat thorough existing regulatory processes.

The MOA committed the EPA to a number of specific actions that are protective of federally-listed species and designated critical habitat. Under the MOA, the EPA committed, when contacted by the Services, to coordinate with the Services and the State/Tribe during the permit development process, in order to ensure that permits will comply with all applicable CWA requirements. One way in which coordination between the EPA and the Services is facilitated is through the exchange of information about permits. The MOA facilitates such information exchange, as do the EPA's NPDES permit regulations that require the Director to provide public notice and a comment period for draft permits and to notify listed persons including the Services. In addition, the EPA's commitment to coordinate effectively with the Services includes following the procedures in section IX.A.6 and 7 of the MOA. The MOA describes a process whereby if a NPDES permit has minor detrimental effects on federally-listed species or designated critical habitat, the Services will work with the State or Tribe to reduce those detrimental effects. If the permit has more than minor detrimental effects, the Services will work with the State or Tribe and if unable to address the detrimental effects in the permit, the EPA would work with the State or Tribe to remove or reduce the detrimental effects of the permit. This step may include the EPA objecting to the state permit, where consistent with the EPA's CWA authority.

As stated in the preamble and consistent with the MOA, where the EPA finds (taking into account all available information and giving, as appropriate, substantial weight to the views of the Services) that a permit is likely to jeopardize the continued existence of any federally-listed species or result in the destruction or adverse modification of designated critical habitat, the EPA will use the full extent of its CWA authority to object to the permit. The grounds for the EPA's exercise of discretionary authority to object to a draft permit are described in the NPDES regulations at 40 C.F.R. 123.44. If the EPA objects to a permit, the EPA will follow the permit objection procedures outlined in 40 C.F.R. 123.44 and coordinate with the Services in seeking to have the State or Tribe revise its permit. A State or Tribe may not issue a permit over an outstanding EPA objection. If the EPA assumes permit issuing authority for an NPDES permit, the EPA will consult with the Service(s) prior to issuance of the permit (as a Federal action) as appropriate under section 7 of the ESA.

For more details about the MOA and EPA oversight of state-issued NPDES permits to protect threatened and endangered species, see VIII.K.4 of the rule preamble.

Appendix J.5

Nishida, David (DEQ)

From: Smith, Mark <Smith.Mark@epa.gov>
Sent: Thursday, April 28, 2016 9:04 AM
To: Daub, Elleanore (DEQ); Nishida, David (DEQ)
Cc: Trulear, Brian
Subject: FW: VA0001015 AEP - Clinch River Plant - Major Industrial Facility / TMDL Review Requested (4/28/16)

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Elleanore and David. We received the draft permit for the AEP Clinch River Plant (VA0001015) on 4/1/ 2016. EPA has exercised its discretion to perform a limited review of the state submitted draft permit for adherence to TMDL and 316(b) requirements. As a result of that limited review we wish to comment on the 316(b) implementation requirements. The United States Fish and Wildlife Service (FWS) has submitted recommendations concerning the 316(b) implementation for adherence to the Endangered Species Act (ESA). EPA supports the recommendation to perform biologic monitoring prior to the final 316(b) best technology available determination. EPA, VADEQ, and FWS have meet to review FWS service recommendations. EPA requests that the FWS develop and submit a study plan describing the design intent of the ESA study, level of effort , and duration of the requested biologic monitoring. Thanks

---

From: Nishida, David (DEQ) [mailto:David.Nishida@deq.virginia.gov]
Sent: Friday, April 01, 2016 11:06 AM
To: Smith, Mark <Smith.Mark@epa.gov>
Subject: VA0001015 AEP - Clinch River Plant - Major Industrial Facility / TMDL Review Requested

http://www.deq.virginia.gov/fileshare/wps/PERMIT/SWRO/VPDES/VA0001015/

Mark,

Please use the URL above to review the VPDES Fact Sheet, Draft Permit and Application Items for the AEP – Clinch River Plant. This facility is a Major Industrial Facility that discharges to the Clinch River and Dumps Creek (TMDL). The public notice for this draft permit begins April 1, 2016 and ends May 19, 2016. A public hearing will be held on May 4, 2016 at 7pm at the Russell County Conference Center. DEQ will also maintain permit related documents on the DEQ public website at the following link:

http://www.deq.virginia.gov/Programs/Water/PermittingCompliance/VPDESPermitActions.aspx
Please feel free to contact me with any questions you may have.

Thank you,
David

David Nishida
VWPP / VPDES Programs
VA Department of Environmental Quality
Southwest Regional Office

355-A Deadmore Street
Abingdon, VA 24210
(276) 676 - 4864
david.nishida@deq.virginia.gov

Appendix J.6

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

May 19, 2016

Mr. David Nishida
Virginia Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Re: Appalachian Power Company Clinch River Plant, Russell County, VA, VPDES Permit Renewal (VA0001015)

Dear Mr. Nishida:

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided by the Virginia Department of Environmental Quality (VDEQ) regarding the Virginia Pollutant Discharge Elimination System (VPDES) permit renewal for the Appalachian Power Company (APCO) Clinch River Plant. The draft VPDES permit includes effluent limitations and monitoring requirements for the advanced wastewater treatment plant (AWWTP) during normal operation and coal ash pond dewatering (Outfalls 003/003A and D003, respectively), the on-site sewage treatment plant (Outfall 008), the settling pond for coal pile runoff (Outfall 007), the collective groundwater discharges from the now capped Ash Pond 2 (Outfall 015), and several stormwater discharges. In addition, the permit contains requirements for the cooling water intake structure (CWIS) for compliance with Section 316(b) of the Clean Water Act to minimize impingement mortality and entrainment (IM&E) of aquatic organisms. The following comments are provided under provisions of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Federally listed species and designated critical habitat

Federally listed species known to occur in the Clinch River near the APCO facility that may be affected by its operation include: the federally listed threatened yellowfin madtom (*Noturus flavipinnis*) and the federally listed endangered Cumberlandian combshell (*Epioblasma brevidens*), oyster mussel (*Epioblasma capsaeformis*), snuffbox (*Epioblasma triquetra*), shiny pigtoe (*Fusconaia cor*), fine-rayed pigtoe (*Fusconaia cuneolus*), cracking pearlymussel (*Hemistena lata*), birdwing pearlymussel (*Lemiox rimosus*), sheepnose mussel (*Plethobasus*

cyphyus), slabside pearlymussel (*Pleuronaia dolabelloides*), fluted kidneyshell (*Ptychobranchus subtentum*), rough rabbitsfoot (*Quadrula cylindrica strigillata*), Cumberland monkeyface (*Quadrula intermedia*), purple bean (*Villosa perpurpurea*), and Cumberland bean (*Villosa trabalis*). In the reach of the Clinch River where the facility is located, critical habitat has been designated for the Cumberlandian combshell, oyster mussel, slabside pearlymussel, fluted kidneyshell, rough rabbitsfoot, and purple bean and may be affected by facility operation.

Concerns regarding effluent during dewatering (D003) and normal operation (003/003A)

Contaminants of concern in the effluent that may affect listed species and their designated critical habitat are ammonia, copper (Cu), and selenium (Se). Freshwater mussels are sensitive to ammonia and Cu (March et al. 2007, U.S. Environmental Protection Agency [EPA] 2013) and exposure to high levels may be lethal. Selenium may result in larval deformities in yellowfin madtom or mussel host fishes (Janz et al. 2010).

The measured daily maximum concentrations of these contaminants in effluent from the AWWTP (Table in Appendix A of the Fact Sheet; Evaluation of Effluent) appear to approach or exceed proposed limits for D003 prior to the introduction of water from the dewatering process. Thus, the ability of the AWWTP to effectively remove these contaminants under a potentially increased load is questionable. To evaluate effects to listed species and their designated critical habitat, the following are needed: more stringent reporting of analytical data, more frequent and robust whole effluent toxicity (WET) testing, incorporation of Dumps Creek Se loadings into effluent limit calculations, and substitution of zero values below the quantitation limit (<QL). These items are detailed below.

More stringent reporting of analytical data – During the dewatering process (Outfall D003), report analytical results to VDEQ within 48 hours of collection so VDEQ can verify compliance and track any changes in effluent quality with progression of the dewatering process. During dewatering, increase the reporting frequency of total suspended solids, total iron, aluminum, barium, beryllium, boron, cobalt, molybdenum, and vanadium concentrations to 3/week. Although there are no enforceable limits for the majority of these elements, if the effluent fails a WET test, concentrations of all potentially toxic elements should be evaluated so that the treatment process can be refined, if necessary.

During normal operations (Outfall 003), the reporting of ammonia concentrations appears too infrequent given the measured concentrations which approach or exceed permit limits. Ammonia monitoring is required 1/month, which precludes calculation of a monthly average. Increase monitoring frequency of ammonia to 1/week.

More frequent and robust WET testing – A WET testing interval of 1/month appears too infrequent for the dewatering operation, given that the permittee states that dewatering will only occur for 24 working days. Conduct WET testing 1/week during the first 2 weeks of the dewatering operation. Notify the Service as soon as practicable if adverse effects to test organisms are observed. If no adverse effects are observed to test organisms and the chemistry of the effluent remains consistent, reduce the frequency of WET testing to 1 time every 2 weeks for the duration of the dewatering process. This would result in 3 WET tests during the first month

and 2 WET tests during the second month. The rationale for the increased frequency of WET testing frequency is based on the chronic *Ceriodaphnia dubia* no-observed effect concentration (NOEC) in 2014 of 2.0 Toxicity Units (50%) without the additional load of ash pond dewatering. If the enforceable Toxicity Unit chronic (TUc) value is 3.12 (31%) during dewatering and the ability of the AWWTP to treat the additional contaminant load in dewatering water is unknown, more frequent WET testing, particularly at the initiation of dewatering, is necessary.

Clarification/correction of the chronic effluent limit for dewatering of Ash Pond 1A/1B listed on page 15 of the Fact Sheet (paragraph 7) is needed. In this paragraph, the specified chronic effluent limit is an NOEC of 10.00 TUc (10%). However, in Table 6 of Appendix F, a TUc of 3.12 (31%) was generated by the WETLImit10 program. A TUc of 3.12 is also mentioned in the text of Appendix F and listed on page 20 of the draft permit Section I.

Include a juvenile (<3 months old) freshwater mussel (preferably *Villosa iris*, but species selection may depend on hatchery availability) in WET testing during dewatering, given the sensitivity of freshwater mussels to ammonia and Cu. This would allow further assessment of the potential toxicity of the effluent to listed species in this reach of the Clinch River.

Incorporation of Dumps Creek Se loadings into effluent limit calculations – Sampling conducted by the permittee in Dumps Creek upstream and downstream of Ash Pond 2 indicates that Dumps Creek is contributing Se to the Clinch River (maximum observed concentration 2.4 micrograms/ Liter (µg/L) Se in Dumps Creek; <0.5 µg/L in the Clinch River 3.7 miles upstream of the plant/confluence with Dumps Creek). The primary contribution of Se to Dumps Creek is likely from Ash Pond 2, as there is an average Se concentration of 150 µg/L in the groundwater and an increase in instream Se concentration below Ash Pond 2. Dumps Creek contributes approximately 10% of flow to the Clinch River in the vicinity of the AWWTP discharge and the Dumps Creek contribution of Se should be included in the background concentration used to calculate Waste Load Allocation acute (WLa) and Waste Load Allocation chronic (WLc) values for determining effluent limitations during both dewatering and normal operation of the AWWTP.

Substitution of zero for values below quantitation limits – During dewatering, the required QL values for many contaminants are slightly above the permitted monthly averages. Substitution of 0 for <QL values could artificially reduce monthly average concentrations. Substitute ½ QL for <QL values to effectively evaluate whether levels of contaminants in effluents are of concern to listed species and/or critical habitat.

General concerns related to effluent discharges and wastewater treatment

Calculation of ammonia limits for the on-site sewage treatment plant (Outfall 008) – Clarify whether the loading from the AWWTP (Outfall 003) was included in the calculations of WLa and WLc for Outfall 008 and the determination of 'no limit required.' If not, include the loading from Outfall 003 as it occurs upstream of Outfall 008 and appears to be significant, given the results submitted in Appendix A of the Fact Sheet.

QL for mercury (Hg) – The QL for Hg is equal to the monthly average (1.0 µg/L). A lower QL for Hg should be required, otherwise, samples could be above chronic water quality protection criteria (0.77 µg/L), but would not have to reported. A QL of 0.2 µg/L should be achievable using EPA Method 1631E or another sufficiently sensitive EPA-approved method.

Sludge disposal – There is no detailed sludge management plan for the dewatering operation (Outfall D003). Disposal of the sludge from the filter press at a municipal landfill prior to closure of Ash Pond 1A/1B is specified on page 6 of the Fact Sheet. This sludge will likely have a high trace element load, and disposal at a municipal landfill may not be appropriate. Clarify the sludge management plan during the dewatering operation and during post-dewatering operation of the AWWTP to ensure that potential disposals sites could not impact federally listed aquatic species or their designated critical habitat. Designate disposal in an industrial landfill designed for contaminated waste unless the permittee can demonstrate that precipitants are not contaminated with trace elements.

Notify the Service as to whether our recommendations for permit reissuance will be implemented. If these recommendations are implemented, effects to listed species and critical habitat can be evaluated by the Service to determine whether further ESA coordination is required. If any of these recommendations are not implemented, VDEQ should contact the Service to determine how to proceed with permit reissuance to be in compliance with the ESA.

Operation of the CWIS and compliance with the 316(b) rule

The yellowfin madtom is likely to occur in the vicinity of the intake and is susceptible to IM&E during all life stages. Freshwater mussels are at risk during their parasitic larval stage when they are attached to host fish. When host fish are killed as a result of being impinged or entrained, attached larval mussels are also killed. Fish species collected from the Clinch River (per APCO's VPDES permit renewal application) serve as hosts for federally listed mussels occurring in the area. Many of the smaller host fishes have a body width <10 millimeters and are therefore susceptible to IM&E. Any IM&E of host fishes is likely to adversely affect federally listed mussels. IM&E of host fishes is also likely to adversely affect designated critical habitat since the presence of abundant host fishes is considered a physical and biological features essential to the conservation of a species for the Cumberlandian combshell, oyster mussel, rough rabbitsfoot, and purple bean (69 FR 53136-53180) and the slabside pearlymussel and fluted kidneyshell (78 FR 59555-59620).

The Service provided recommendations to reduce IM&E of host fish species at the Clinch River Plant in a letter to VDEQ dated July 16, 2015. These recommendations included reduction of the mesh size of the CWIS intake screen, reduction of the velocity across the intake screen, and monitoring of IM&E. As detailed on page 20 of the Fact Sheet, APCO responded to the Service's concerns indicating that reductions in through screen velocity and screen mesh size would require significant changes to the design of the intake structure. The determination by VDEQ is that APCO has complied with interim 316(b) best technology available (BTA) through use of a closed cycle cooling system. However, VDEQ included a monitoring requirement as a special condition in the permit (Part I.E) to ensure continued compliance with the 316(b) rule. As stated in the permit, VDEQ will require the permittee to prepare an annual report including a

"compilation of any federally-listed threatened or endangered species found to have been impinged or entrained during the reporting year, including the total number and type of organisms (listed by taxa), and life stage cycle (egg, larva, juvenile, adult) impacted by injury or death." As stated on page 28 of the Fact Sheet, a specific monitoring protocol is not required by VDEQ.

Given that adverse effects to listed mussels and their designated critical habitat are likely to occur via IM&E of host fish species, the Service recommends that the CWIS 316(b) monitoring by APCO include an Impingement Mortality and Entrainment Characterization Study whose purpose is to provide information to support the development of baseline for evaluating IM&E and to characterize current IM&E. The study should include the following in sufficient detail to support establishment of baseline conditions:

a. Taxonomic identification of all life stages of fishes and mussels and any species protected under Federal or State law (including threatened or endangered species) that are in the vicinity of the water intake structure(s) and are susceptible to impingement and entrainment, including a description of their abundance and temporal and spatial characteristics in the vicinity of the water intake structure(s). These may include historical data that are representative of the current operation of the facility and of biological conditions at the site; and

b. Documentation of the current IM&E of all life stages of fishes, mussels, and any species protected under Federal or State Law (including threatened or endangered species) and an estimate of IM&E to be used as the calculation baseline. Impingement mortality and entrainment samples to support the calculations required must be collected during periods of representative operational flows for the water intake structure and the flows associated with the samples must be documented. Recommended sampling for impingement mortality is one 24-hour sampling event 1/week (on same day of each week) for 1 year and for entrainment 1/week for 1 year.

If the results from the Impingement Mortality and Entrainment Characterization Study indicate that federally listed species and/or designated critical habitat (i.e., fish hosts) are being effected by the project, additional consultation with the Service will be necessary. The Service will work with the applicant, VDEQ, and EPA to develop additional site-specific and species-specific measures to avoid and minimize effects to federally listed species and designated critical habitat.

If you have any questions, please contact Susan Lingenfelser of this office at (804) 824-2415 or via email at susan_lingenfelser@fws.gov.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: EPA, Philadelphia, PA (Attn: Mark Smith)
SVFO, Abingdon, VA (Attn: Roberta Hylton)
VDCR, Richmond, VA (Attn: Rene Hypes)
VDGIF, Forest, VA (Attn: Brian Watson)
VDGIF, Richmond, VA (Attn: Ernie Aschenbach)
VDGIF, Richmond, VA (Attn: Amy Ewing)

Literature Cited

Gowan, C., G. Garman, and W. Shuart. 1999. Design criteria for fish screens in Virginia: recommendations based on a review of the literature. Report prepared for the Virginia Department of Game and Inland Fisheries, Richmond, VA.

Janz, D., D. DeForest, M. Brooks, P. Chapman, G. Gilron, D. Hoff, W. Hopkins, D. McIntyre, C. Mebane, V. Palace, J. Skorupa, M. Wayland. 2010. Selenium toxicity to aquatic organisms. In Chapman P., W. Adams, M. Brooks, C. Delos, S. Luoma, W. Maher, H. Ohlendorf, T. Presser, and D. Shaw, eds, Ecological Assessment of Selenium in the Aquatic Environment SETAC, Pensacola, FL, USA. pp 141–232.

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U.S. Environmental Protection Agency. 2013. Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater 2013. Office of Water. EPA 822-R-13-001.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 2014. Endangered Species Act Section 7 Consultation Programmatic Biological Opinion on the U.S. Environmental Protection Agency's issuance and implementation of the final regulations Section 316(b) of the Clean Water Act. <http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Final-316b-Biological-Opinion-and-Appendices-May-19-2014.pdf>.

Appendix J.7

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

May 19, 2016

Mr. David Nishida
Virginia Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210

Re: Appalachian Power Company - Clinch River Plant
Proposed Reissuance of VPDES Permit VA0001015
Draft Permit Comments

Mr. Nishida,

On behalf of Appalachian Power Company (APCo), American Electric Power Service Corporation (both jointly referred to as the Company) submits the following comments on the referenced draft permit for Clinch River Plant. The Company appreciates the opportunity to provide comments to the Virginia Department of Environmental Quality (VDEQ) regarding this reissuance.

Part I.A.2, Outfall D003

The Company requests that the sample type for chloride and hardness be changed from 24-hour composite to 4-hour composite to align with the remaining 3/week parameters.

The Company also requests that the effluent limitations and monitoring requirements for outfall D003 be stated to apply "during any week in which stormwater that has come into contact with coal ash in Pond 1A/1B has been pumped from Pond 1A/1B below elevation 1554.0'," which corresponds to the pool level that is maintained by the current gravity-flow discharge system.

Part I.B.18, Pond 1A/1B Notification

The Company is required to notify VDEQ a minimum of 72 hours prior to the planned commencement of enhanced dewatering of Pond 1, and a second time 24 hours after initiating the discharge. The Company requests clarification that these notifications are only required once each at the beginning of the overall draining operation, with the understanding that draining is planned to be an intermittent process and will start/stop on multiple occasions.

Part I.B.19

The Company believes that 'Attachment A,' indicating the additional sampling requirements at outfall 003, was unintentionally omitted from the draft permit package.

Part I.B.20, Cease Pond 1A/1B Dewatering Requirements for Outfall D003

Part I.B.20 states that "the permittee shall immediately cease the pumping of water from the reclaim pond to the advanced wastewater treatment plant upon receipt of results in exceedance of permit limitations…" The Company believes this condition should rather state that "…the permittee shall immediately cease the pumping of water from Pond 1A/1B to the reclaim pond upon receipt of results in exceedance of permit limitations." This would be consistent with the condition noted in Part I.A.2 stating that "The permittee shall immediately cease the dewatering operation upon notification of an exceedance of an established effluent limit and/or WET limit at outfall D003." Other influent flows to the reclaim pond are unrelated to the pond dewatering operation, including dike seepage and landfill leachate. These are part of the current permit and must be forwarded from the reclaim pond to the AWWTP on an as-needed basis to prevent the reclaim pond from discharging via outfall 001.

Part I.E. Cooling Water Intake Structure Requirements

On October 14, 2014, EPA finalized new requirements for cooling water intake structures at existing facilities. 40 CFR Part 125, Subpart J. These requirements include descriptions of various alternatives that can be used to satisfy the obligation to minimize impingement and entrainment of aquatic species, including installation of closed cycle cooling water intake systems. The Clinch River Plant currently utilizes closed cycle cooling technology. It is supplied by an intake structure that is equipped with two conventional traveling screens near the shore of the Clinch River. Since the retirement of Clinch River Unit 3 and the conversion of Clinch River Units 1 and 2 to natural gas firing, one of the five mechanical draft cooling towers has been retired, and current operations require only one of the three pumps, each rated at 6,500 gpm, to be in service to provide make-up water for the plant. Maximum intake through this arrangement is limited to 9.36 MGD. The cooling towers operate on two to five cycles of concentration, reducing the flow of water into the intake by 97 % compared to a once-through cooling water system.

EPA's final regulations provided multiple options for implementing the new standards at facilities whose NPDES permits expire before July 14, 2018. As noted in the Fact Sheet issued with the draft permit, the Company submitted the required information under 40 CFR § 122.21(r) with its renewal application for this permit. DEQ has determined that the facility meets one of the alternatives specified to minimize impingement and entrainment – a closed cycle cooling system – and has required that the facility continue utilization of the current closed cycle cooling system through the term of the renewal permit. This determination is supported by the information provided by the Company, and is consistent with the final 316(b) rules. DEQ notes that the U.S. Fish and Wildlife Service (the Service) submitted comments recommending certain changes to the current intake structure, but has determined that such measures are not justified under the applicable ESA regulations, which limit the measures recommended by the Service to those "reasonable and prudent measures" that do not "alter the basic design, location, scope, duration or timing" of the technology-based standard. 50 CFR §402.14(i)(2).

Part I.E.1, Interim §316(b) Best Technology Available (BTA)

DEQ has labeled its determination an "interim BTA" determination because DEQ has not yet adopted the final 316(b) rules into its administrative regulations. See generally, 9VAC 25-31-165(C) (requiring existing facilities to comply with case-by-case requirements based on best professional judgment). To assist DEQ in making a final determination in the next renewal permit, and to provide assurance of the proper operation of the existing system, DEQ has added other special conditions. The Company appreciates the opportunity to comment on these conditions, and offers the following additional suggestions to streamline and tailor these requirements to the existing system at Clinch River Plant.

Part I.E.2, Impingement and Entrainment Control Technology Preventative Maintenance

Condition E.2 would require the Company to develop and implement a specific schedule and procedures for preventive maintenance of impingement and entrainment control technology, and maintain records of their implementation. No similar condition appears in the final rules adopted by EPA, and such a requirement is unnecessary and duplicative of the inspections and related recordkeeping required by condition E.4. The Company currently maintains an O&M manual for its sewage treatment plant, where there is a need for active ongoing maintenance of those systems. In contrast, the cooling water intake is connected to the recirculating cooling water system, operates only in conjunction with the closed cycle cooling system, and cannot operate without engaging the traveling screens that provide the necessary impingement/entrainment protection. That is, as a fully integrated system, water withdrawals cannot occur if the I&E measures are "off-line" because they are static design specifications rather than operational controls. The Company respectfully submits that Condition E.2 should be removed from the final permit.

Part I.E.3, Alternate Schedule for Submittal of 40 CFR §122.21(r) Information

Condition E.3 establishes an alternate schedule for submittal of the information outlined in 40 CFR§122.21(r), and requires this information to be submitted no later than 270 days prior to the expiration date of the renewal permit. The Company notes that DEQ has determined that all of the information necessary for review of the current closed cycle cooling system was submitted during this permit cycle. Fact Sheet, p.19. The federal rules require resubmittal and/or updating of this information 180 days prior to the expiration date of the renewal permit. 40 CFR §§122.21(d)(2) and 125.95(a)(1). Existing facilities like the Clinch River Plant are not required to perform site-specific studies, but can rely on relevant published information obtained from studies undertaken by others. EPA streamlined the monitoring requirements for facilities that adopt one or more of the technology options outlined in the final rule, focusing on monitoring to assure that the chosen technology is properly operating and being regularly maintained. Recognizing the potential detrimental effects of attempting to conduct regular biological monitoring on aquatic communities, EPA estimated in its cost-benefit analysis that 99 percent or more of facilities would choose compliance options for which no ongoing monitoring was required. 79 Fed. Reg. 48360 (Aug. 15, 2014). Expediting the time for submittal of information otherwise required as part of the renewal application imposes an additional burden on the facility, and may not allow the facility to include the most recent information that would be helpful to DEQ. Accordingly, the Company respectfully requests that this condition be changed to conform to the final rule, and require this submission no later than 180 days prior to the expiration of the renewal permit. If DEQ retains the requirement to submit this information separate from the complete renewal application, the Company requests that this condition indicate that the early submission may be supplemented with additional information, if available, as part of the renewal application and that any completeness review of the application in total would be based on information ultimately submitted by the deadline of 180 days prior to expiration.

Part I.E.4, Visual or Remote Inspections

Condition E.4 establishes the criteria and schedule for conducting visual or remote inspections of a cooling water intake structure that are generally consistent with the requirements in 40 CFR §125.96(e). The Company appreciates the additional detail provided on inspection documentation, but notes that estimated actual water withdrawal volumes for this facility are based on the operating time for the pump and the pump's rated capacity, and seeks confirmation that such records satisfy item (c) in this condition, and the requirements in 40 CFR §125.94(c)(1) for daily measurements of actual intake flows. Facilities with closed cycle cooling systems also can satisfy the monitoring requirements by recording cycles of concentration, and the Company asks that this option be added to this condition as an alternative to satisfy these requirements. The Company also notes that no means of measuring head losses across the intake screens is currently in place, and item (d) therefore could be deleted from this condition.

Part I.E.6 and 7, Measures to Protect Federally-listed Threatened or Endangered (T&E) Species, Designated Critical Habitat, and Fragile Species or Shellfish

Conditions E.6 and E.7 could be improved to more clearly describe their interrelationship with the other terms and conditions included in the permit. The Company suggests that Conditions E.6 and E.7 be combined and revised to read as follows: "The permittee shall operate and inspect each cooling water intake system in accordance with the terms and conditions of this permit, which are designed to minimize incidental take and reduce or remove more than minor detrimental effects to Federally-listed threatened, endangered, or fragile species and designated critical habitat, including prey base. Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act."

The continued operation of the closed cycle cooling system, by reducing water withdrawal volumes by 97% compared to a once-through cooling system, recording of actual flows or cycles of concentration, and the regular weekly inspection and prompt repair of the intake screens will all contribute to sustained operations that will allow threatened, endangered, and fragile species and their habitat to continue the recovery documented in the information submitted as part of the Company's renewal permit application. The second paragraph of Condition E.6 in the draft permit is not based on any requirements in the final rule, and EPA expressly determined that for most facilities no ongoing monitoring would be required for impingement or entrainment. As noted above, EPA streamlined the monitoring requirements for facilities that adopt one or more of the technology options outlined in the final rule, focusing on monitoring to assure that the chosen technology is properly operating and being regularly maintained. Recognizing the potential detrimental effects of attempting to conduct regular biological monitoring on aquatic communities, EPA estimated in its cost-benefit analysis that 99 percent or more of facilities would choose compliance options for which no ongoing monitoring was required. 79 Fed. Reg. 48360 (Aug. 15, 2014). Included in that estimate were facilities like the Clinch River Plant that were already equipped with closed cycle cooling systems. EPA expressly indicated that such facilities were not expected to be required to install such technology if they were already equipped with those systems. Id.

Although the Virginia Department of Conservation and Recreation has recommended including specific sampling requirements on a more frequent basis than annually in the final permit (see Memorandum from Roberta Rhur, DCR to David Nishida, DEQ, dated May 17, 2016), those recommendations are not supported by any analysis of the relative costs and benefits associated with such sampling. The proposed condition does not specifically require any sampling or biological monitoring, and 40 CFR §125.97(g) allows the permitting authority to impose additional monitoring requirements related to federally-listed species, but only if additional measures are specified in the permit to address specific concerns related to threatened or endangered species. Here no such conditions

have been included, and additional monitoring is not necessary. Accordingly, DEQ has no obligations under 40 CFR §125.98(k) to transmit that information annually to EPA. Moreover, given the location of the intake, the lack of proximity of any species of concern to the intake during particularly vulnerable periods in their life cycle, and the negative effects that would be associated with sampling to assess the status of threatened or endangered species, the requirement for periodic assessments should be removed from the final permit. As noted in the DCR memorandum, the Clinch River - Little River Stream Conservation Unit is located more than two miles downstream from the intake for the Clinch River Plant, so there have been no documented occurrences of endangered or threatened species within the area of influence of the intake. Any sampling effort would likely have more negative impacts on the local aquatic communities, including any listed species, without providing any valuable additional information.

Part I.B.11 and Fact Sheet Item 11, Discharge Description - Outfall 005

Outfall 005 is listed as a potential discharge location in Part I.B.11. Historically it served as the emergency overflow discharge point for Sump 004. In 2015, the Company installed a buried natural gas distribution line on Plant property to provide fuel to the converted generating units. The discharge pipe between Sump 004 and outfall 005 was encountered during the installation and was cut and sealed. Sump 004 can no longer overflow to outfall 005, effectively eliminating outfall 005 permanently. The Company requests that references to outfall 005 throughout the permit and Fact Sheet be removed.

Fact sheet Item 9, Facility/Treatment Description

This section states that a groundwater well provides potable water to the facility. This is likely carryover from a dated permit fact sheet and is no longer accurate. All plant process waters come from the surface water intake, and a municipal connection provides potable water.

Fact Sheet Item 24, Effluent Limitations - Outfall 015

In the approved Ash Pond 2 Closure Plan (Revised May 2012), the Company and VDEQ agreed to quarterly monitoring for a suite of parameters at outfall 015, upstream within Dumps Creek, and downstream within Dumps Creek to serve as a surrogate for groundwater monitoring wells. The closure plan stated that the data would be summarized and submitted for evaluation with the next VPDES permit renewal application. The March 2015 renewal application contained this summary.

Fact Sheet Item 24 discusses the evaluation of the data and VDEQ's determination that outfall 015 does not warrant additional effluent limitations based on applicable water quality standards. The Company agrees with this determination and requests clarification that the quarterly sampling described in the referenced closure plan may be discontinued corresponding with the proposed permit reissuance.

Fact Sheet Item 27, DEQ Proposed Modifications

Fact Sheet Item 27(B) describes the addition of the dewatering tier of effluent limits but states that they apply until the conclusion of pond closure activities. That terminology could be open to multiple interpretations, so the

Company requests that the language be changed to be consisted with Part I.A.2. Also, throughout Item 27, the Company believes Part I.A.2 is mistakenly referred to as Part I.A.3.

Comments on Letter from The Nature Conservancy

The Company obtained a copy of the comment letter submitted to VDEQ by The Nature Conservancy (TNC) on May 18, 2016, and has had a limited opportunity to review the information contained in that letter. While the Company reserves its right to supplement these comments after a complete review, we offer the following preliminary responses to the comments submitted by TNC.

With respect to TNC's suggested changes to the draft permit that are applicable both to the ash pond dewatering phase and normal plant operations following the conversion to natural gas firing, TNC says its suggestions are intended to "establish a VPDES permit with the most stringent effluent limits possible." However, the intent of Congress expressed in the statutes enacting the Clean Water Act permitting program and authorizing state programs to issue such permits is to allow discharges that comply with the applicable technological and water quality based permit limits that are developed by the permitting authority in accordance with the requirements of the Act. 33 U.S.C. § 1342. The suggestions made by TNC would go beyond those requirements on a site-specific basis that is not contemplated in the CWA, and could only be implemented following state-wide rulemaking processes. Accordingly, the Company respectfully requests that VDEQ reject the changes suggested by TNC as not supported by current laws and regulations.

As TNC notes, the ongoing operations at the Clinch River Plant will have greatly reduced impacts on surface waters due to the cessation of coal firing and the reduced water usage at the plant. However, TNC suggests that DEQ's own guidance regarding mixing zones would indicate some alternative approach must be taken due to the presence of protected species in proximity to the plant. We believe that VDEQ is aware of and has properly accounted for the potential for such species in the vicinity, and has properly followed their own guidance in calculating appropriate effluent limits in this situation. Further, the majority of the effluent limitations established on a case-by-case basis in the Clinch River draft permit are water-quality based effluent limitations, based on state-specific or EPA recommended water quality criteria. These criteria are based on an examination of the impacts of concentrations of specific chemical pollutants on fish, shellfish and other wildlife. As noted in TNC's letter, "specific toxicological relationships and pollutant concentration thresholds have not been established for all contaminants" and were such scientific information available, it should be presented and reviewed as part of the triennial water quality standards review process. It is not appropriate to require VDEQ to re-examine individual water quality criteria in the context of an individual NPDES permit, particularly where, as TNC itself admits, the available scientific data suggest that populations of mussel species in the Clinch River below the plant discharge are already increasing (Ahlstedt et al. (2008)). VDEQ has developed discharge limitations consistent with the requirements of 9 VAC 25-31-220 and its guidance, and those limitations assure that there is no reasonable possibility of causing an exceedance of the water quality standards in the Clinch River below the discharge.

TNC has also suggested that monitoring and analysis of discharged pollutant concentrations in coal ash water be conducted on an even more expedited timeline than that proposed in the draft permit, namely test reporting would be shortened from 4 days to 48 hours. The monitored parameters would be present at extremely low levels that would not be a concern for short-term, acute toxicity, such that 4-day reporting will be sufficient to protect against meaningful exposures to instream organisms. In addition, 48-hour reporting would be extremely challenging given that it would require immediate transportation of samples by either plant personnel or overnight courier, followed by same-day sample preparation and analysis, with reporting within a matter of hours. Finally, there is little

justification for attempting this feat given the absence of a short-term toxicity concern, and we question whether a 48-hour timeframe would allow the certified lab to perform all required QA/QC procedures associated with the samples.

TNC also recommends including conditions requiring whole effluent toxicity (WET) testing with native mussel species. These requirements are not necessary given the reductions in water usage, reduced pollutant loadings, and demonstrated recovery occurring in the Clinch River. WET testing is notoriously difficult to perform in a replicable fashion, and the facility should not be burdened with locating laboratories qualified to perform this testing on unique species, using procedures that have not been approved by EPA as standard reference methods for monitoring under the NPDES/VPDES program. Further, comparisons of toxicity to mussels for a number of metals and other parameters to results using the standard *C. dubia* test have demonstrated that *C. dubia* is typically protective of tested mussel species.

The Company respectfully requests that VDEQ not make the specific changes included in TNC's recommendations. If further discussions of any of these recommendations would be useful, the Company respectfully requests an opportunity to meet with VDEQ and discuss any such changes prior to the finalization of the Clinch River permit.

Thank you for your consideration of these comments. The Company appreciates the effort on the part of VDEQ to conduct this reissuance process in a timely manner. If you wish to discuss any of the comments further, please contact Lindsey Forhan of my staff at 614-716-2275 or lgforhan@aep.com at any time.

Sincerely,

Alan R. Wood, P.E.
Director, Water & Ecological Resource Services
American Electric Power Service Corporation

cc: Mark Trent, VDEQ
R. L. Chafin / L. W. Hartsock / K. M. Gilmer – Clinch River Plant
L. G. Forhan - AEPSC