MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Modification of Virginia Pollutant Discharge Elimination System (VPDES) Permit VA0087033

TO: Dominion Energy – Gordonsville Power Station 2022 Modification File

FROM: Susan Mackert

DATE: November 24, 2021

UPDATED: January 11, 2022

On August 11, 2021, The Department of Environmental Quality – Northern Regional Office (DEQ) received a permit modification request from Dominion Energy Services, Inc. (Dominion) for the Dominion Energy – Gordonsville Power Station (Station) located in Louisa County. The modification was requested by the permittee to incorporate the results of a Zinc Compliance Plan Chemical Translator Study and Water Effects Ratio (WER) Study which was completed in 2020. This memorandum summarizes the changes to the permit effective August 1, 2019, and serves as the modification to the original Fact Sheet (Attachment 1).

The following discussions are numbered as they appear in the original Fact Sheet. The information contained in this memorandum replaces or expands upon the information in the original Fact Sheet.

Section 12.c – Receiving Stream Water Quality and Water Quality Standards - Receiving Stream Water Quality Criteria

Metals Criteria

The Water Quality Criteria for some metals are dependent on the receiving stream's total hardness, as well as the total hardness of the final effluent (expressed as mg/L calcium carbonate). In 2010, the facility completed a streamlined WER and chemical translator/hardness study for copper. Ambient data was collected from the South Anna River upstream of the Station at the point where the quarry access bridge crosses the South Anna River. Based on these studies, the average hardness of the receiving stream was determined to be 64 mg/L. This value was carried forward and used during the development of the Station's current permit. As such, staff believes it is also appropriate to use this value for the current modification. In addition to the effluent hardness data collected during the zinc chemical translator study and WER, Dominion also monitors for hardness as a requirement of the current permit. Using all available data, the average hardness of the effluent was determined to be 43 mg/L. The hardness dependent metals criteria shown in Attachment 2 are based on the above values.

Section 14.a and Attachment 6 – Effluent Screening, Wasteload Allocation, and Effluent Limit Development – Effluent Limitations Toxic Pollutants, Outfall 001 – Metals

During the 2019 reissuance, it was determined that a zinc limit of 54 µg/L was necessary. Semi-annual monitoring and a three year schedule of compliance were included in the 2019 permit reissuance. The zinc limit is to become effective on August 1, 2022. In response, Dominion opted to pursue a Water Effects Ratio (WER) study for zinc as provided for in the Virginia Water Quality Standards at 9VAC25-260-140 and a chemical translator study.

Water Effects Ratio

The Dominion study followed EPA guidance for a Streamlined Water Effect Ratio Procedure for the Discharges of Copper (EPA 822-R-01-05) as well as pertinent guidance in the Interim Guidance on Determination of Use of Water Effect Ratios for Metals (EPA 823-B-94-001). While the guidance procedures specifically address copper WERs performed in freshwater, the procedures may be applied to other metals (zinc) following EPA's guidelines for a streamlined copper WER study under suitable conditions. DEQ approved Dominion's study plans on August 21, 2020.

The final Streamlined WER Report was submitted to DEQ on December 21, 2020. Water Quality Standards staff reviewed the WER study and approved the use of a dissolved zinc WER of 1.185 to adjust the zinc criteria (Attachment 3).

Per 9VAC25-260-140F, the formulas for the freshwater acute and chronic criteria (µg/L) for zinc utilize a default WER value of 1.0 unless shown otherwise.

Acute Criteria

$$WER \times [e^{\{0.9422[\ln(hardness)]-1.700\}}] \times (CF_a)$$

Where $CF_a = 0.96$

Chronic Criteria

$$WER \times [e^{\{0.8545[\ln(hardness)]-1.702\}}] \times (CF_c)$$

Where $CF_c = 0.96$

A Wasteload Allocation analysis was conducted using the average receiving stream hardness of 64 mg/L, an average effluent hardness of 43 mg/L, and a dissolved zinc WER value of 1.185 (Attachment 2). The following acute and chronic zinc Waste Load Allocations (WLAs) were calculated.

Acute WLA	Chronic WLA
67.92 µg/L	68.48 µg/L

Chemical Translator

In 1993, EPA recommended that dissolved metal concentrations be used for the application of metals aquatic life criteria and that State water quality standards be based on dissolved metals. However, permit limits for metals shall be expressed as total recoverable. An additional calculation (translator) is applied to the Waste Load Allocation (WLA) to produce a permit limit expressed as total recoverable.

The final chemical translator report was submitted to DEQ on December 21, 2020. Water Quality Standards staff reviewed the WER study and approved the use of a translator of 0.5997 (Attachment 3).

Per EPA guidance The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA 823-B-96-007), the translator is applied by dividing a dissolved WLA by the translator to produce a total recoverable limit.

Using the approved translator value of 0.5997, the final acute and chronic criteria were derived.

Acute Criteria			Chronic Criteria		
$\frac{67.92\ \mu g/L}{0.5997}$	=	113 µg/L	$\frac{68.48\ \mu g/L}{0.5997}$	=	114 µg/L

Using the above criteria and all available zinc monitoring data (including that data used to determine the existing zinc limit), a zinc limit is no longer warranted (Attachment 4).

Section 14.a and Attachment 6 – Effluent Screening, Wasteload Allocation, and Effluent Limit Development:

Effluent Limitations and Monitoring Requirements: Outfall 001 (Retention Basin)

Average Flow: 0.08 MGD
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR MONITORING	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/M	Estimate
pH[(a)]	2,3a	NA	NA	6.0 S.U.	9.0 S.U.	1/M	Grab
Dissolved Oxygen (D.O.)	1,2	NA	NA	5.0 mg/L	NA	1/M	Grab
Total Residual Chlorine (TRC) (after dechlorination)	1,2	NA	0.016 mg/L	NA	NA	1/M	Grab
Temperature (May – October)	1,2	NA	32°C	NA	NA	1/M	IS
Total Suspended Solids (TSS)	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Total Petroleum Hydrocarbons (TPH)[(b)]	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Copper, Dissolved[(c)]	1,2	NA	NL (µg/L)	NA	NA	1/6M	Grab
Zinc, Dissolved[(c)]	1,2	NA	NL (µg/L)	NA	NA	1/6M	Grab
Hardness, Total (as $CaCO_3$)[(c)]	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Acute Toxicity – *C. dubia* ($_{NOAEC}$)	1	NA	NA	NA	NL (%)	1/YR	Grab
Acute Toxicity – *P. promelas* ($_{NOAEC}$)	1	NA	NA	NA	NL (%)	1/YR	Grab

1. Professional Judgement
2. Water Quality Standards
3. Federal Effluent Requirements
   - 40 CFR 423.15(a)(1)

NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
IS = Immersion stabilization.

1/M = Once every month.
1/6M = Once every six months.
1/YR = Once every year.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

1/6M = The semi-annual monitoring periods shall be January 1 – June 30 and July 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (July 10 and January 10, respectively).

1/YR = The annual monitoring period shall be January 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (January 10).

Federal Effluent Requirements:

a. 40 CFR 423.15(a)(1) – NSPS the pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0.

Total Petroleum Hydrocarbons Requirements:

b. Total Petroleum Hydrocarbons (TPH) is the sum of individual gasoline range organics and diesel range organics or TPH-GRO and TPH-DRO to be measured by EPA SW 846 Method 8015 for gasoline and diesel range organics, or by EPA SW 846 Methods 8260 Extended and 8270 Extended.

Total Hardness and Metals Requirements:

c. Samples for total hardness and metals shall be collected concurrently.

17b. Other Permit Requirements – Schedule of Compliance

A three year schedule of compliance was established in the current permit to allow the permittee time to achieve compliance with new permit limit established for Total Recoverable Zinc. Because this item has been addressed, language pertaining to the compliance schedule has been removed from the permit.

19. Changes to Permit from the Previously Issued Permit

a) Special Conditions

- Schedule of Compliance requirements previously found within Part 1.C. of the permit have been removed with this modification as the language is no longer necessary.
- The Water Effects Ratio Confirmation Testing special condition has been removed with this modification as the requirement has been completed and the language is no longer necessary.

b) Monitoring and Effluent Limitations

- Based on the Water Effects Ratio (WER) and chemical translator studies a total recoverable zinc limit at Outfall 001 is no longer warranted. As such, monitoring and reporting for total recoverable zinc, and the associated limit of 54 µg/L, have been removed from the permit.

c) Other:

- Part 1.A.1 (Footnote 7) has been updated to remove language referring to the three year schedule of compliance and the cessation of dissolved zinc monitoring upon the effective date of the total recoverable zinc limit as the limit is no longer warranted.
- Part I.A.1 (Footnote 8) has been removed as a total recoverable zinc limit at Outfall 001 is no longer warranted.
- Part I.A.1 (Footnote 9) has been removed as the compliance schedule has been completed and a total recoverable zinc limit at Outfall 001 is no longer warranted.
- Part I.A.1 (Footnote 10) has been renumbered as Footnote 8.
- Part I.D (Whole Effluent Toxicity Program Requirements) is now Part I.C due to the removal of the schedule of compliance requirements.
- Part I.E (Other Requirements and Special Conditions) is now Part I.D due to the removal of the schedule of compliance requirements.
- Part II.I (Reports of Noncompliance) has been updated to reflect a new link for online reporting.

21. Public Notice Information:

First Public Notice Date: February 17, 2022 Second Public Notice Date: February 24, 2022

Public Notice Information is required by 9VAC25-31-280 B. In accordance with Chapter 552 of the 2018 Acts of Assembly, the VPDES permit regulation 9VAC25-31-290 has been revised to allow, if the permittee so elects, an abbreviated public notice procedure for industrial minors in which an abbreviated notice is published in the newspaper with a link to the full notice on the department's website. With this reissuance, the permittee elected to use the abbreviated procedure. As such, staff elected to use the abbreviated procedure. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (571) 866-6514, susan.mackert@deq.virginia.gov. See Attachment 5 and Attachment 6 for copies of the abbreviated and full public notice documents, respectively.

22. Additional Comments:

Staff Comments:

The draft permit modification package was provided to EPA for review on January 13, 2022. EPA performed a limited review based on the use of the WER and chemical translator. EPA provided the following response to DEQ on February 2, 2022: "EPA notes that to be consistent with EPA's *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* (EPA-823-B-94-001), additional toxicity tests should have been conducted when determining a zinc WER for an industrial discharge. However, that guidance also indicates that WERs larger than 5 should be investigated. As the WER resulting from this study is 1.185 EPA will not require any further investigation, but please be aware of these requirements for future WERs".

Public Comments:

No public comments were received.

Fact Sheet Attachments – Table of Contents

Dominion – Gordonsville Power Station
VA0087033

2022 Modification

Modification Memo –

Attachment 1

This document gives pertinent information concerning the reissuance of the Virginia Pollutant Discharge Elimination System (VPDES) Permit listed below. This permit is being processed as a Minor, Industrial permit. The discharge results from the operation of an existing natural gas and oil fired combined cycle power station. This permit action consists of updating the proposed effluent limits to reflect the current Virginia Water Quality Standards (effective June 5, 2017) and updating permit language as appropriate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260-00 et seq.

1.	Facility Name and Mailing Address:	Dominion – Gordonsville Power Station 5000 Dominion Boulevard Glen Allen, VA 23060	SIC Code : NAICS Code:	4911 - Electric Services 221112 – Fossil Fuel Electric Power Generation
	Facility Location:	819 Hill Road Gordonsville, VA 22942	County:	Louisa
	Facility Contact Name:	Mr. Jason Williams	Telephone Number:	(804) 273-2646
	Facility E-mail Address:	Jason.E.Williams@dominionenergy.com		
2.	Permit No.:	VA0087033	Expiration Date of previous permit:	March 19, 2018
	Other VPDES Permits associated with this facility:		None	
	Other Permits associated with this facility:		Air Registration Number 40808 (Title V) Hazardous Waste – VA0000125211 VWP – 91-1631	
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Virginia Power and Electric Company		
	Owner Contact/Title:	Mr. Jason Williams / Director – Environmental	Telephone Number:	(804) 273-2646
	Owner E-mail Address:	Jason.E.Williams@dominionenergy.com		
4.	Application Complete Date:	August 22, 2017		
	Permit Drafted By:	Susan Mackert	Date Drafted:	April 13, 2018
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	April 24, 2018
	Draft Permit Revised By:	Susan Mackert	Date Drafted:	May 3, 2018
	Draft Permit Revised By:	Susan Mackert	Date Drafted:	August 10, 2018
	WPM Review By:	Bryant Thomas	Date Reviewed:	August 22, 2018
	Public Comment Period :	Start Date: June 14, 2019	End Date:	July 15, 2019

5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination*

Receiving Stream Name :	South Anna River	Stream Code:	8-SAR
Drainage Area at Outfall:	6.1 square miles	River Mile:	100.31
Stream Basin:	York	Subbasin:	None
Section:	3	Stream Class:	III
Special Standards:	None	Waterbody ID:	VAN-F01R / YO01
7Q10 Low Flow:	0.035 MGD	7Q10 High Flow:	0.591 MGD
1Q10 Low Flow:	0.028 MGD	1Q10 High Flow:	0.452 MGD
30Q10 Low Flow:	0.085 MGD	30Q10 High Flow:	0.853 MGD
Harmonic Mean Flow:	0.639 MGD	30Q5 Flow:	0.149 MGD

Receiving Waters Information (Continued):

*Using GIS, DEQ staff has determined the drainage area to be 5.1 square miles which is reflected within the planning statement (see Attachment 7). During the previous reissuance of the permit, Dominion determined the drainage area to be 6.1 square miles. DEQ staff has compared the flow frequency determinations for both the 5.1 and 6.1 square mile drainage areas and finds no significant difference. It is staff's professional judgement that a drainage area of 6.1 square miles be used as it provides consistency with the previous permit and subsequent Water Effects Ratio and chemical translator study.

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

X	State Water Control Law	**X**	EPA Guidelines*
X	Clean Water Act	**X**	Water Quality Standards
X	VPDES Permit Regulation		Other
X	EPA National Pollutant Discharge Elimination System (NPDES) Regulation		

*40 CFR Part 423 – Steam Electric Power Generating

7. Permit Characterization:

X	Private	**X**	Effluent Limited		Possible Interstate Effect
	Federal	**X**	Water Quality Limited	**X**	Compliance Schedule Required
	State	**X**	Whole Effluent Toxicity Program Required		Interim Limits in Permit
	WTP		Pretreatment Program Required		Interim Limits in Other Document
	TMDL	**X**	e-DMR Participant		

8. Industrial Process Description:

The Dominion – Gordonsville Power Station is an existing natural gas and oil fired combined cycle power station. The facility utilizes two combined cycle combustion turbines (Units 1 and 2) generating a combined 218 MW total gross. The primary source of water for Station operations is provided by the Town of Gordonsville. An intake, located on a quarry adjacent to the Station, is utilized for both firefighting reserve water and process water for use in creating demineralized water for the station steam system. See Section 16 of the Fact Sheet for additional information on the intake.

TABLE 1 – Generation Units

Generating Unit	Fuel Source	MW Generation
Unit 1	Natural Gas	109 MW
Unit 2	Natural Gas	109 MW

See Attachment 2 for the NPDES Permit Rating Worksheet.

See Attachment 3 for a facility schematic/diagram.

TABLE 2 – Industrial Process Wastewater Outfall Description				
Outfall Number	**Discharge Sources**	**Treatment**	**Average Flow**	**Latitude and Longitude[1]**
001	Retention Basin*	Mixing, Acid Injection, Sedimentation, Dechlorination, Neutralization, Algae and Hardness Control	0.08 MGD	38° 07′ 24″ N 78° 12′ 9″ W
	*Sources include Internal Outfall 101, Internal Outfall 103, Internal Outfall 104, and plant perimeter water drains.			
101 (Internal)	Boiler Blowdown*	None	0.03 MGD	38° 07′ 26″ N 78° 12′ 9″ W
	*Sources include Units 1 and 2 boiler blowdown tanks, steam sample cabinet, boiler feed pump vents and drains, various drains, and demineralized water.			
103 (Internal)	Unit 1 Oil-Water Separator*	Flotation, Sedimentation, Chlorination	0.003 MGD	38° 07′ 30″ N 78° 12′ 10″ W
	*Sources include Unit 1 wastewater sump, diesel fuel containment, fuel unloading area runoff, steam turbine oily water drains, combustion turbine oily water drains, silica analyzer drains, water injection skid, vacuum pump seals, boiler feed pumps, false start drains, diesel fire pump seal leakage and drains, and demineralized water.			
104 (Internal)	Unit 2 Oil-Water Separator*	Flotation, Sedimentation, Chlorination	0.001 MGD	38° 07′ 27″ N 78° 12′ 09″ W
	*Sources include Unit 2 wastewater sump, steam turbine oily water drains, combustion turbine oily water drains, water injection skid, vacuum pump seals, boiler feed pumps, false start drains, and instrument air receiver blow down.			

See Attachment 4 for (Gordonsville, DEQ #172B) topographic map.

9. Discharges in HUC Waterbody YO01:

TABLE 3 DISCHARGES WITHIN HUC WATERBODY YO01		
Individual VPDES Discharge Permits		
Permit No.	Facility Name	Receiving Stream(s)
VA0021105	Gordonsville Sewage Treatment Plant	South Anna River, UT *
VA0076678	Shenandoah Crossing Sewage Treatment Plant	Lickinghole Creek
VA0091332	Old Dominion Electric Cooperative – Louisa Generation	Happy Creek, UT
Non-Contact Cooling Water General Permits		
Permit No.	Facility Name	Receiving Stream
VAG250135	Klockner Pentaplast of America	South Anna River, UT
Domestic Sewage General Permits		
Permit No.	Facility Name	Receiving Stream
VAG406049	Neighborhood Properties Limited Liability Company	South Anna River, UT
VAG406073	Elizabeth Watson Residence	South Anna River
VAG406455	Green Springs Estates Limited Liability Company	South Anna River, UT
VAG406484	Heather and Carol Haney Residence	Bowles Creek, UT
VAG406571	Adam Gholson Residence	South Anna River, UT

TABLE 3 (Continued) DISCHARGES WITHIN HUC WATERBODY YO01		
Non-Metallic Mineral Mining General Permits		
Permit No.	Facility Name	Receiving Stream
VAG840026	Virginia Vermiculite Limited	South Anna River; South Anna River, UT
Stormwater Industrial General Permits		
Permit No.	Facility Name	Receiving Stream
VAR050848	Klockner Pentaplast of America	South Anna River, UT

*UT – Unnamed Tributary

10. Material Storage:

Material storage information was provided as a component of the reissuance package. See Attachment 5 for a bulk chemical list and storage locations.

11. Site Inspection:

A site visit was conducted by Susan Mackert and Ann Zimmerman on September 20, 2017, in support of the permit reissuance. Information gathered during the site visit is included within the outfall discussion found in Attachment 6.

12. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

This facility discharges to South Anna River. DEQ ambient monitoring station 8-SAR101.03 is located at Route 231, approximately 0.72 miles upstream from Outfall 001. The following is the water quality summary for this segment of South Anna River, as taken from the 2016 Integrated Report:

Class III, Section 3.

DEQ monitoring stations located in this segment of South Anna River:

- Ambient monitoring station 8-SAR101.03, at Route 231

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for the South Anna River watershed has been completed and approved. The aquatic life and wildlife uses are considered fully supporting. An observed effect for the aquatic life use is noted based on total phosphorus samples collected from 2000 to 2004. While nutrients are not assessed as there are no nutrient standards for free-flowing streams, the observed effect was noted in the 2006 Integrated Report because seven of 22 samples (31.8%) exceeded the total phosphorus screening value (0.20 mg/L) that was in place at the time. The observed effect for total phosphorus has remained in place. There is also an observed effect for the aquatic life use noted based on benthic macroinvertebrate bioassessments. The fish consumption use was not assessed.

b. 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)

TABLE 4
Impairment and TMDL Information – Receiving Stream Segment
(VA 2016 Integrated Report)

Waterbody Name	Impaired Use	Cause	Year First Listed as Impaired	TMDL Completed	WLA*	Basis for WLA
South Anna River	Recreation	*E. coli*	2002	Pamunkey River Basin Bacteria 08/02/2006 Modified 04/27/2015	None (not expected to discharge pollutant)	---

TABLE 5
Impairment and TMDL Information – Downstream*
(VA 2016 Integrated Report)

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
South Anna River	Aquatic Life Use	Benthic Macroinvertebrates	1.5 miles	No	---	---	---

*It is staff's expectation the downstream impairment will be delisted in the 2018 IR based on more recent biological monitoring data.

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2014 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment. EPA issued the Bay TMDL on December 29, 2010. It was based, in part, on the Watershed Implementation Plans developed by the Bay watershed states and the District of Columbia.

The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries that are on the impaired waters list. As with all TMDLs, a maximum aggregate watershed pollutant loading necessary to achieve the Chesapeake Bay's water quality standards has been identified. This aggregate watershed loading is divided among the Bay states and their major tributary basins, as well as by major source categories [wastewater, urban storm water, onsite/septic agriculture, air deposition]. It is staff's professional judgement that the industrial discharge from the facility would not be considered a significant point source of nutrients. As such, monitoring requirements for nutrients were not implemented for this facility.

The full planning statement is found in Attachment 7.

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, the South Anna River, is located within Section 3 of the York River Basin, and classified as a Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0 - 9.0 standard units (S.U.).

Attachment 8 details other water quality criteria applicable to the receiving stream.

Ammonia, as N:
The fresh water, aquatic life Water Quality Criteria for ammonia are dependent on the instream and/or effluent temperature and pH. The 90th percentile temperature and pH values are used because they best represent the critical design conditions of the receiving stream. The facility completed a streamlined Water Effects Ratio (WER) and chemical translator/hardness study in 2010. Ambient data was collected from the South Anna River upstream of the Station at the point where the quarry access bridge crosses the South Anna River. It is staff's professional judgement that the ambient data collected in support of these studies be utilized with this reissuance.

When instream temperature and pH data are available for use, staff must also use effluent pH and temperature data to establish the ammonia water quality standard to account for mixing in receiving waters. As such, staff has reviewed pH and temperature data from Discharge Monitoring Report (DMR) form submissions from the current permit cycle (2013 – 2017) and determined the 90% pH value to be 7.8 S.U., the 10% pH value to be 6.4 S.U., and the 90% temperature value to be 30ºC.

The values shown below in Table 6 were used to derive the criteria in Attachment 8.

TABLE 6 – 90th Percentile Derivations			
WER / Chemical Translator		Effluent	
pH	6.8 S.U.	pH	7.8 S.U.
Temperature	26ºC	Temperature	30ºC

Ammonia, as N, is not a parameter of concern due to the fact the discharge is industrial in nature. As such, there is no reasonable potential to exceed the ammonia criteria. It is staff's professional judgment that ammonia limits need not be developed for this discharge.

Metals Criteria:
The Water Quality Criteria for some metals are dependent on the receiving stream and/or effluent hardness (expressed as mg/L calcium carbonate). As discussed above, it is staff's professional judgement that available ambient data collected in support of the WER and chemical translator/hardness studies be utilized with this reissuance. Based on these studies, the average hardness of the receiving stream was determined to be 64 mg/L. Staff has reviewed hardness data from Discharge Monitoring Report (DMR) form submissions from the current permit cycle (2013 – 2017) and determined the average hardness of the effluent to be 40 mg/L. The hardness-dependent metals criteria in Attachment 8 are based on these values.

Copper Criteria – Water Effects Ratio and Chemical Translator Studies:
During the 2008 reissuance, it was determined that a copper limit was necessary. A schedule of compliance was included in the 2008 permit reissuance, with the copper limit becoming effective on January 20, 2011. In response, Dominion opted to pursue a Water Effects Ratio (WER) streamlined study for copper as provided for in the Virginia Water Quality Standards at 9VAC25-260-140. Dominion also chose to conduct a chemical translator and characterization of in-stream hardness study.

1. Water Effects Ratio
   The study followed EPA guidance for a Streamlined Water Effect Ratio Procedure for the Discharges of Copper (EPA 822-R-01-05). The Final Streamlined WER Report was submitted to DEQ on May 14, 2010. DEQ staff reviewed the WER study and approved the use of a dissolved copper WER of 2.593 to adjust the copper criteria. The WER study was submitted to the EPA for their review on October 28, 2010. In correspondence dated January 5, 2011, EPA had no comments on the WER study.

   The water quality criteria for copper are established in Virginia's Water Quality Standards Regulations, Section 9VAC25-260-140, and are presented below.

Acute Criteria

$$WER \times [e^{\{0.9422[\ln(hardness)]-1.700\}}] \times (CF_a)$$
Where $CF_a = 0.96$

Chronic Criteria

$$WER \times [e^{\{0.8545[\ln(hardness)]-1.702\}}] \times (CF_c)$$
Where $CF_c = 0.96$

Pursuant to 9VAC25-260-140F, the formulas for the freshwater acute and chronic criteria (µg/L) for copper utilize a default WER value of 1.0 unless shown otherwise. The copper WER is derived for the specific receiving stream and discharge. It establishes a unique WER for the receiving stream which is used to establish an instream concentration for the specific metal that will protect designated uses. Final approval and application of the WER is established through VPDES permitting actions.

The derivation of the applicable water quality criteria as well as a wasteload allocation analysis was conducted using the average receiving stream hardness of 64 mg/L and an average effluent hardness of 40 mg/L. The water quality criteria were first computed incorporating the established copper WER into the formula's presented above. Subsequently, the applicable Waste Load Allocations were established. See Attachment 8 for additional details and information.

WER Adjusted Acute Criteria	WER Adjusted Chronic Criterion
15 µg/L	11 µg/L

The facility shall be required to perform confirmation testing related to the original WER study during the upcoming permit term (See Section 18.h). The original WER Study Review is found as Attachment 9.

2. Chemical Translator

In 1993, EPA recommended that dissolved metal concentrations be used for the application of metals aquatic life criteria and that State water quality standards be based on dissolved metals. However, permit limits for metals are expressed as total recoverable. An additional calculation (translator) is applied to the Waste Load Allocation (WLA) to produce a permit limit expressed as total recoverable.

The Derivation of a Chemical Translator and Characterization of In-stream Hardness Report was submitted to DEQ on May 14, 2010. DEQ staff reviewed the translator study and approved the use of a translator of 0.4052 on September 7, 2010.

Pursuant to EPA guidance, The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA 823-B-96-007), the translator is applied by dividing a dissolved WLA by the translator to produce a total recoverable limit.

Using the approved translator value of 0.4052, the final acute and chronic criteria for the Dominion – Gordonsville Power Station were derived.

Acute Criteria			Chronic Criteria		
$\frac{15\ \mu g/L}{0.4052}$	=	37 µg/L	$\frac{\mu g/L}{0.4052}$	=	27DooD µg/L

The above criteria are applied with this reissuance for copper only. The facility shall be required to perform confirmation testing related to the original chemical translator study during the upcoming permit term (See Section 18.h). The original Chemical Translator Study Review is found as Attachment 10.

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, the South Anna River, is located within Section 3 of the York River Basin. This section has not been designated with any special standards.

13. Antidegradation (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 receiving stream has been classified as Tier 1 based on a downstream biological impairment. Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

14. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a. Effluent Screening:
See Attachment 6 for discussion and rationale.

b. Mixing Zones and Wasteload Allocations (WLAs):

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- f = Decimal fraction of critical flow from mixing evaluation
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

At times the stream is comprised entirely of effluent. It is staff's professional judgement that the instream waste concentration is 100% during critical stream flows, and that the water quality of the stream will mirror the quality of the effluent. As such, staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. Attachment 8 details the WLA derivations.

c. Effluent Limitations and Monitoring

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits. See Attachment 6 for further discussion.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from Publicly Owned Treatment Works (POTW) and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

d. Federal Effluent Guidelines:

40 CFR Part 423 establishes Federal Effluent Limitation Guidelines for the Steam Electric Power Generating Point Source Category. Effluent guidelines are technology-based regulations that have been developed by the Environmental Protection Agency (EPA) for a specific category of discharger. These regulations are based on the performance of control and treatment technologies. The effluent limitations for this category of discharger, Steam Electric Power Generating Point Source, have been established using Best Available Technology (BAT), Best Practicable Control Technology (BPT), and New Source Performance Standards (NSPS) guidelines for this type of industry. See Attachment 6 for the applicability of these guidelines on an outfall-by-outfall basis.

e. Effluent Limitations and Monitoring Summary:

A summary of all limitations and monitoring is provided in Attachment 6 on an outfall-by-outfall basis.

Limit derivations are found within Attachment 11.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

15. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

16. 316(b):

Background

While the primary source of water for Station operations is obtained from the Town of Gordonsville, the Station does maintain an intake located on a quarry adjacent to the Station and the South Anna River. When water is not available from the Town of Gordonsville, water from the quarry is utilized for cooling purposes.

The Gordonsville quarry is considered to be "waters of the United States" and the Dominion-Gordonsville intake in the quarry is classified as a cooling water intake structure subject to the requirements of Clean Water Act §316(b). 40CFR §125.92(f) defines cooling water intake structures to mean the "…total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States." Virginia DEQ currently operates under the federal 2015 Clean Water Rule which defines "waters of the United States" to include waters adjacent, bordering, contiguous, or neighboring other waters of the United States. In turn, "neighboring" is defined under 40CFR §122.2 of the 2015 Clean Water Rule, as all waters located within 100 feet of the ordinary high water mark of other waters of the United States. The entire water is "neighboring" if any portion is located within 100 feet of the ordinary high water mark. A review by DEQ indicates the Gordonsville quarry is within 100-feet of the ordinary high water mark of the South Anna River. Cooling water withdrawals from the intake are thereby subject to the 316(b) rule.

Section 316(b) of the Clean Water Act requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. The primary adverse environmental impacts typically associated with cooling water intake structures evaluated by EPA are the entrainment of fish eggs, larvae, and other small forms of aquatic life through the cooling system and the impingement of fish and other larger forms of aquatic life on the intake screens. The United States Environmental Protection Agency (EPA) promulgated regulations in 2001, 2003, 2006, and 2014 to implement requirements of §316(b) in three phases. Final EPA regulations for existing facilities were published in the Federal Register on August 15, 2014. The Existing Facility Rule became effective October 14, 2014.

In accordance with the final rule, the Station is subject to permit conditions implementing §316(b) on a case-by-case basis using best professional judgement under 40 CFR Part 125.90(b) based on the following:

- The Station maintains a VPDES permit as a point source discharger;
- The Station was constructed prior to January 18, 2002;
- The cooling water intake structure is used to withdraw surface waters for cooling purposes; but
- The Station does not meet the design intake flow requirement of greater than 2 MGD; and
- The actual intake flow of the Station uses less than twenty-five percent of its withdrawn water exclusively for cooling purposes.

Source Waterbody and Water Withdrawal Information

As previously noted, the primary source of water for Station operations is provided by the Town of Gordonsville (who, in turn, purchases its water from the Rapidan Service Authority). This arrangement is fully executed within a water service agreement, originally signed in January 1993 for a 30-year term, between the Town of Gordonsville and Dominion (a copy of the water service agreement is found within the application package). As amended in August 1993, the water service agreement provides delivery of up to 6,000,000 gallons of water per month to the Dominion facility. The water provided by the Town is used by the facility for both domestic potable and industrial process water purposes.

Dominion is also authorized to withdraw water from an intake located on a quarry adjacent and southwest from the Station. The quarry forms a lacustrine aquatic environment within the York River Basin Hydrologic Unit Code 02080106. The watershed drainage area upstream of the quarry is approximately 6 square miles in size. The South Anna River meanders immediately adjacent around the quarry to the north and east. The South Anna River provides indirect hydrologic connectivity to the quarry. Other nearby features include a bordering railroad line that runs from the southwest to northeast of the quarry. The quarry has a water surface area of approximately 23 acres. It is irregularly shaped with a width of about 1335-feet (406 meters) and length of 1235-feet (376 meters). No information was readily available to determine the intake's area of influence within the quarry waterbody.

The water withdrawal from the quarry is authorized under a Virginia Water Protection (VWP) Permit (91-1631) which was originally issued in July 1992 commensurate with construction of the power station. The original VWP permit issuance included a special condition limiting use of the quarry water to emergency use only. In June 1994, at the request of the permittee, VWP Permit 91-1631 was modified to allow use of the quarry water under normal circumstances. The modified permit included maximum annual, monthly, and daily volume limitations on water withdrawals from the quarry. The maximum withdrawal caps were tiered to address three different scenarios involving water supplied from the Town of Gordonsville, along with two seasonal periods. The three scenarios addressed: 1) a total shut down of water supplied to the Station by the Town of Gordonsville; b) if the water supplied from the Town is reduced to 60,000 gallons per day for emergency conservation reasons; and 3) if there are no conservation reductions in supply or shutdowns imposed by the Town. The modified VWP permit also established lower allowable water withdrawal thresholds during each March 1 through October 31 seasonal period. The seasonal restriction periods presumably coincide with periods of low expected quarry recharge and South Anna River instream flows.

Due to the indirect hydraulic connectivity between the quarry and the South Anna River, the 1994 VWP Fact Sheet estimated the facility's withdrawals to account for a maximum 15% of the flow of the South Anna River at this location. The VWP Fact Sheet projected the impacted area would be limited to a section of the South Anna River alongside the quarry, approximately 950 feet long, until South Anna River flows would be augmented by effluent discharges from the Rapidan Service Authority, Gordonsville Sewage Treatment Plant (VA0021105).

VWP Permit 91-1631 was subsequently reissued February 25, 2008. The current permit expires February 24, 2023. The reissued VWP permit carried-forward the water withdrawal volume and seasonal restrictions established in the 1994 permit modification. The current VWP Permit also carried-forward requirements for the annual submittal to DEQ of reports documenting the volume of actual annual, monthly ,and daily water withdrawal volumes from the quarry.

Reported withdrawals for the 2012-2016 period document quarry withdrawals having occurred most months, typically for a single day (reported daily withdrawals = reported monthly total), with peak water usage generally occurring during the Summer to late Fall months:

Year	Annual Total Quarry Withdrawal (Gallons)	Peak Month (& Peak Volume, in gallons) Quarry Withdrawal	Peak Daily Quarry Withdrawal (Gallons)
2009	13,044	September (2,905)	2,905
2010	5,557	December (1,339)	968
2011	11,717	July (2,741)	2,741
2012	32,796	July (9,359)	9,359
2013	20,693	June (3,252)	3,252
2014	21,469	May (3,035)	3,035
2015	22,587	August (3,803)	3,803
2016	20,788	November (5,087)	5,087

While the VWP Permit limits maximum annual water withdrawals from the quarry to no more than 13.32 million gallons (MG), there have been only two reported periods where actual annual withdrawals from the quarry have exceeded 1 MG. In 2002, due to drought-induced critical low flow conditions, there was a total shutdown of water provided by the Town to the facility. This resulted in the need to withdraw 1,565,224 gallons of water from the quarry in 2002, with a peak daily reported withdrawal of 163,477 gallons (8/25/2002). A water line replacement in 2007 also resulted in a total shutdown of water from the Town of Gordonsville to the Station. This shutdown caused Dominion to utilize water from the quarry for Station operations, including cooling purposes.

Cooling Water Intake Structure Information

The intake structure is located at approximate latitude of 38º 07' 23"N and longitude of -078º 12' 13"W. The intake consists of six-inch stainless steel piping supported by piers and extending horizontally from the shoreline approximately 19-feet into the quarry, where the intake pipe makes a vertical 90-degree bend to become submerged into the quarry waters. The invert of the intake pipe is at elevation 426.60 feet, with a normal water surface elevation of the quarry at 433.62 feet. The intake opening is covered with an 18-inch x 18-inch x 18-inch fixed screen comprised of 0.5" x 0.5" inch size mesh openings. The intake structure does not currently include a traveling screen or fish-friendly fish return system.

The withdrawn water is pumped to a pump house prior to conveyance to a filter house. The pumped distance from the quarry is approximately 200 feet. Information regarding the number, features (e.g. whether the pumps are variable speed, etc.), or limitations of the intake pumps was not readily available at the time of permit drafting. However, Dominion has indicated the design flow capacity of the pump(s) is approximately 382 gallons per minute (0.55 MGD). The calculated flow through design screen velocity is 0.12 feet per second (fps). Design plans of the facility's intake structure, and flow through velocity calculations are provided in Attachment 12.

Source Water Biological Characterization

A list of species known or likely to occur within a 3-mile radius of the Gordonsville Quarry intake structure was identified in Dominion's 2007 application for renewal of its VWP permit (Appendix A), and is provided in Attachment 13. The following information was not readily available to DEQ staff for these analyses at the time of drafting this permit reissuance:

- The relative abundance, for all life stages, of species within the quarry;
- Primary periods of reproduction, larval recruitment, and peak abundance of relevant species; or
- Data of seasonal and daily activities of biological organisms within the quarry;

According to email correspondence dated January 24, 2018, the USFWS confirmed there are no federally-listed threatened or endangered species or designated critical habitat under consideration for listing located in the quarry. As part of the 2008 VWP Permit #01-1631 process, the Virginia Department of Conservation & Recreation indicated they did not anticipate water withdrawals at the site would have adverse impact on natural heritage resources or documented state-listed plants or insects.

Cooling Water System Discussion

The Station serves as a peaking plant[1] as it is generally operational only when there is a high demand for electricity. As a peaking plant, the Station may operate numerous hours per day or it may operate only a few hours per year depending on demand and the electrical grid.

Water withdrawn from the quarry is ultimately stored in a raw water tank located on-site. The stored water in the raw water tank is used for both firefighting reserve water and process water for use in creating demineralized water for the Station steam system. The raw water tank is a 300,000 gallon tank; 204,000 gallons are reserve for firefighting. Both the Town of Gordonsville water supply and the quarry can fill this tank. On a monthly basis water from the quarry is used to perform monthly reliability tests to ensure the system will remain operational when needed and, since 2007, to redistribute media in the resin treatment bed. That is, water withdrawn from the quarry since 2007 has not been used for cooling purposes. Instead, under normal conditions, water delivered from the Town of Gordonsville is used for cooling purposes.

The Station has two combustion turbines and two steam turbines that utilize closed loop glycol systems. Each of the combustion and steam turbines has its own closed loop system. Of specific relevance is the additional use of air-cooled heat exchangers and air-cooled condensers.

- Air-Cooled Heat Exchangers:
  Air-cooled heat exchangers do not directly require water. Supplemental information provided by Dominion indicates some water may be sprayed on the fins of the air-cooled heat exchangers to provide additional thermal cooling. The sprayed water on the fins of the heat exchangers is considered to meet the 40CFR §125.92(e) definition of "cooling water" because its primary use is to absorb heat from the industrial process.

- Air-Cooled Condensers:
  Air-cooled condensers condense steam from the exhaust of the steam turbines without additional water consumption. Steam that passes through the inside of the air-cooled condenser radiator fins is condensed to water (condensate) which is then returned to the steam cycle system. Supplemental information provided by Dominion indicates some water may be sprayed on the outside of the fins to improve condensing action through evaporation of the water that is sprayed on the fins. The sprayed water on the fins of the condensers is also considered to meet the 40CFR §125.92(e) definition of "cooling water" because its primary use is to absorb heat from the industrial process.

[1]Per Dominion, the Station is a cycling plant (peak), but does not meet the air definition of a peaking plant because of the number of operating hours.

According to data of cooling water use over the 2012-2016 time period, the proportion of the facility's total annual water demand that was supplied by the quarry was less than one percent (<1%). As mentioned previously, according to Dominion, none of the quarry water has been used for cooling purposes since 2007. The proportion of the total non-quarry water (i.e. supplied by the Town of Gordonsville) that was used for cooling purposes during the same 2012-2016 time period ranged from 1.57% to 12.43%. See Attachment 12 for Dominion's supporting calculations.

According to Dominion's 2007 VWP Permit renewal application, maximum consumptive water loss from the cooling system is estimated at 224 gallons permit minute (0.351 MGD), assuming water injection at full load on both turbines during cold weather with units at 17 pounds/second on fuel oil.

To DEQ staff's knowledge, the facility does not use gray water or reuse process waters for cooling purposes, and does not use water in the manufacturing process either before or after it is used for cooling.

A description of the Station's cooling system may be found within the reissuance file.

Previously Conducted Studies
Information of previous conducted studies, or studies obtained from other comparable facilities, addressing technology efficacy, through-facility entrainment survival, and other entrainment studies was not readily available to DEQ staff at the time of permit drafting.

Operational Status
The following information was not readily available to DEQ staff for these analyses at the time of permit drafting:

- The age of each power production unit;
- The capacity utilization rate for the previous five (5) years, including any extended or unusual outages that significantly affected current data for flow, impingement, entrainment, or other factors;
- Major upgrades completed within the past 15 years, including but not limited to boiler replacement, condenser replacement, turbine replacement, or changes to fuel type; or
- Any plans or schedules for decommissioning units or adding new units within the next five (5) years.

Best Professional Judgement Discussion

As noted above, the cooling water intake structure is subject to permit conditions implementing §316(b) on a case-by-case basis using best professional judgement (BPJ). In establishing case-by-case BPJ permit conditions, federal regulations at 40 CFR §125.3(d) require that certain factors must be considered. These factors include: (1) the total costs of applying a given technology relative to its impact reduction benefits, (2) the age of the equipment and facilities, (3) the process employed, (4) engineering evaluations of alternative types of control techniques, (5) changes to the industrial process, and (6) non-water quality environmental impacts.

The above factors are discussed in more detail below with respect to their applicability towards a final Best Technology Available (BTA) determination for the Station. In reviewing the above factors, DEQ used its discretion in how to consider them in making its decision. Additionally, staff also took in to consideration the fact that information concerning adverse environmental impacts (i.e., impingement and entrainment (I&E) mortality) that have occurred at the Station due to the operation of the intake structure was not readily available at the time of permit drafting. It should be noted the BTA analysis for this permit is not a determination of the BTA for any other facility.

1. *The total costs of applying a given technology relative to its impact reduction benefits.*
   Data relating to total costs and impact reduction benefits of technologies pertinent to this facility and site were not readily available at the time of permit drafting. Absent of specific data, it is generally assumed by DEQ staff that the capital infrastructure costs of applying new impingement and entrainment minimization technologies at this facility would proportionally exceed the costs of continuing current design and operational measures, along with associated routine operation and maintenance (O&M) protocols, without material incremental gain in impact reduction benefits.

2. *The age of the equipment and facilities.*
   The Gordonsville Power Station began generating electricity in 1994. Staff believes it would be neither reasonable nor necessary to install new equipment of the same type, as doing so would not be expected to achieve a lower level of I&E mortality performance. Therefore, at this time, the permittee is not required to make enhancements to the intake structure to further minimize I&E mortality.

3. The process employed.
Staff believes that the current process employed has reduced and minimized adverse environmental impacts to the extent believed practicable for this facility. The consideration of other processes and/or alternatives will not provide an enhanced benefit when compared to the history of no adverse impacts. Therefore, at this time, a change in process is not warranted to further minimize I&E mortality.

4. Engineering evaluations of alternative types of control techniques.
Staff believes adverse environmental impacts have already been minimized based on the following control techniques:

- Utilization of the intake on the quarry in accordance with volume limits and seasonal restrictions on the withdrawal established within the Virginia Water Protection Permit (91-1631). DEQ staff anticipates the current Virginia Water Protection Permit, and its associated water withdrawal conditions, to remain in effect for the duration of this VPDES permit term. Staff believes that continued compliance with the Virginia Water Protection Permit is a component of the BTA to minimize I&E mortality.

- The design intake velocity of less than 0.25 fps meets the federal threshold of what is believed to be protective of impingement, but also meets Virginia specific criteria for ensuring water withdrawals are adequately protective of all species subject to impingement, including federally listed threatened and endangered species. The Virginia specific criteria, which is recognized by the federal fishery services for ensuring water withdrawals are protective, resulted from a 1999 study (*Gowan et al.*) prepared for the Virginia Department of Game and Inland Fisheries (DGIF). Also, while not subject to the national BTA standard for impingement mortality at §125.94(c), it should be noted that the design intake velocity of less than 0.25 fps would be considered a pre-approved technology to meet impingement mortality standards with no further demonstration needed. Staff believes the design intake velocity of less than 0.25 fps is a component of the BTA to minimize impingement.

- <u>Closed-Cycle Cooling</u>
  The primary source of water for Station operations is obtained from the Town of Gordonsville. Given there is no historical evidence of adverse environmental impact; there are no federally listed species, designated critical habitat, or species under consideration for listing within the quarry; and the intake meets impingement mortality standards through its design intake through-screen velocity, it is staff's position that it would not be reasonable to convert the current closed-cycle cooling system from using glycol to using water. As such, closed-cycle cooling is not considered warranted to reduce impingement or entrainment mortality further compared to current facility operations at this time.

- <u>Fine Mesh Screens</u>
  Fine mesh screens are defined as those with a mesh size of two millimeters or smaller. Fine mesh screens are generally used to exclude egg, larval, and juvenile life stages of fish from entering the industrial cooling system. Decreasing the size of the open area in the screen mesh typically decreases entrainment. As noted by EPA in the preamble to the final 2014 Existing Facility Rule, mesh sizes greater than two millimeters generally do not prevent the egg life stage of aquatic species from passing through the screen. However, converting coarse mesh screens to fine mesh screens will correspondingly reduce water withdrawal flows, since the additional wire in the fine mesh screens takes up more of the cross sectional flow area, compared to course mesh screens. A lower cross-sectional flow area, in turn, will result in increased through-screen intake velocities.

  Preliminary results from recent studies of fine mesh screens suggest that lower approach and through-screen intake velocities may have a greater influence on reducing fish mortality by facilitating aquatic species avoidance of the intake. EPA data shows that intake velocities of 0.5 fps protected 96% of tested fish; substantially slower intake velocities (such as 0.12 fps) would offer an even greater level of protection. As such, staff does not believe requiring the installation of fine mesh screens to be necessary given the intake already achieves a design intake velocity of less than of 0.25 fps. As such, fine mesh screens are not considered warranted at this time.

- <u>Water Reuse or Use of other Raw Water Sources of Cooling Water</u>
  A limited number of industrial facilities and publicly owned wastewater treatment plants are located within proximity to the Station that could be evaluated for potential reuse. However, the discharge from these facilities is not of such quality that it could be reused for cooling water purposes without further treatment being installed at the Station. Additionally, there could be a competing interest for reuse water from those same limited facilities in the form of another power generation facility subject to the requirements of §316(b).

As previously noted, the primary source of water for Station operations is obtained from the Town of Gordonsville. Staff believes obtaining the primary source water from the Town of Gordonsville is a component of the BTA and evaluating options for other raw water sources is unnecessary to reduce entrainment mortality further.

In addition to the alternative technologies identified in 40CFR §122.21(r)(10)(i), the Preamble to the 2014 Existing Facility Rule included notable discussions of "modified traveling screens" as a significant technology for minimizing impingement mortality. Staff analysis of this additional alternative technology is as follows:

- Modified Traveling Screens
  The 2014 Existing Facility Rule identified several alternative technology options that could achieve the impingement standard of mortality (including latent mortality) for all life stages of fish and shellfish being no more than 24 percent, calculated over a 12-month period. Of these, EPA concluded, "modified traveling screens" to be BTA for minimizing impingement mortality. Modified traveling screens include modified Ristoph screens with a fish handling and return system, dual flow screens with smooth mesh, and rotary screens with fish returns such as vacuum pumps. However, the Rule and its Preamble also identified at least four (4) other technologies that reduce impingement mortality to levels comparable to, or better than, modified traveling screens: 1) closed-cycle recirculating systems; 2) design intake velocities < 0.5 fps; 2) actual intake velocities < 0.5 fps; and 4) offshore velocity caps. While Dominion does not currently have a modified traveling screen installed at Gordonsville, it does operate its cooling water intake structure with design intake velocities substantially less than 0.5 fps. As such, staff finds the facility's maximum calculated design through-screen intake velocity of 0.12 fps to be sufficiently adequate in addressing BTA for minimizing impingement mortality, in lieu of modified traveling screens, for this case at this time.

5. *Changes to the industrial process.*
Staff does not believe changes to the industrial process are warranted. Adverse environmental impacts have already been minimized through the implementation of volume limits and seasonal restrictions on the withdrawal from the quarry. Additionally, the intake meets impingement mortality standards through its design intake through-screen velocity. Given there is no known evidence of historical adverse environmental impact, it would not be reasonable to convert the current closed-cycle cooling system from using glycol to using water as no added benefit would be expected to achieve a lower level of I&E mortality performance. Therefore, the permittee is not required to make changes or enhancements to its industrial process to minimize I&E further at this time.

6. *Non-water quality environmental impacts (including energy requirements).*
While not subject to the requirements of 40 CFR §122.21 (r)(10)-(12), staff may use these sections of the final rule as a guide in making a BPJ determination. With respect to the technologies currently in place, staff considered the non-water quality impacts found within 40 CFR §122.21(r)(12) and used discretion to narrow the scope of review to the following:

- Estimates of Changes to Energy Consumption
  Of the alternative technologies considered above, each would be expected to result in greater energy consumption needs compared to currently installed technologies and operational measures at the facility. The conversion from a glycol-based to water-based closed-cycle recirculating cooling system would increase the amount of process water needed and associated construction and pumping needs. Conversion to use of reclaimed water would also require energy for construction and additional pumping and/or treatment needs. Installation of a modified traveling screen would require energy to operate and maintain the screen system.

- Estimates of Air Pollutant Emissions (Human Health and Environmental Impacts)
  Louisa County is not currently listed by EPA as an Air Quality NAAQS Non-Attainment Area in Virginia. Of the alternative technologies considered above, the conversion to the use of reclaimed water, or installation of fine mesh screens or a modified traveling screen system would not be expected to have appreciable impacts on local air pollution emissions compared to currently installed technologies and operational measures at the facility. Conversion from a glycol-based to water-based closed-cycle recirculating cooling system would, however, be expected to result in increased air pollutant emissions, particularly if cooling towers were to be utilized.

- Estimates of Changes in Noise
  Of the alternative technologies considered above, each would be expected to have temporary increases in noise associated with installation construction. Once constructed, fine mesh screens would be expected to have no impact on local noise levels. Conversion to use of reclaimed water would be accompanied by minor change in satellite and/or local noise levels associated with reclaimed water pumping and treatment needs. Installation of

a modified traveling screen would also be expected to result in minor changes in local noise levels associated with its operation. Compared to currently installed technologies and operational measures, the conversion from a glycol-based to water-based closed-cycle recirculating cooling system, with the associated increased source water pumping needs, would result in an increase in noise levels. Local noise levels would be particularly impacted if mechanical draft cooling towers were to be utilized.

Discussion of BTA Determination

Staff has evaluated all information that was readily available at the time of permit drafting to determine any improvements that might be warranted to minimize adverse environmental impacts further due to the location, design, construction and capacity of a cooling water intake structure located in the quarry at the Station. The BTA for minimizing entrainment mortality was considered first, followed by an independent evaluation of BTA for minimizing impingement mortality. The entrainment and impingement BTA findings were then compared to derive an overall final BTA determination for the facility. The following reflects a BTA determination established on a case-by-case, BPJ basis.

Entrainment BTA
Of the BPJ factors considered in accordance with federal regulations at 40 CFR §125.3(d), DEQ staff gave great weight to current processes employed at the facility. DEQ believes minimization of adverse entrainment effects at this site can be achieved through limiting the amount of water needed for cooling purposes, and reducing and/or limiting the volumes and seasonal periods of water withdrawn through the cooling water intake structure. Doing so will reduce the number of aquatic organisms pulled into the cooling water system, particularly during periods of aquatic species reproduction, larval recruitment, and peak abundance.

DEQ staff thus finds Entrainment BTA at the Dominion-Gordonsville Station to consist of:

- The continuation of a water service agreement with the Town of Gordonsville to provide the primary source of water for Station operations, including for cooling purposes;
- Continued use of an air-cooled glycol-based closed cycle cooling system, including the use of air cooled heat exchangers and air cooled condensers;
- Limiting maximum annual, monthly and daily water withdrawal limitations, consistent with the requirements of VWP Permit #91-1631; and
- Implementing seasonal water withdrawal reductions from the quarry, consistent with the requirements of VWP Permit #91-1631.

Impingement BTA
Of the BPJ factors considered in accordance with federal regulations at 40 CFR §125.3(d), DEQ staff gave great weight to current processes employed at the facility. DEQ believes minimization of adverse impingement effects at this site can be achieved by limiting intake through-screen velocities to facilitate motile organisms avoiding or being able to escape the hydraulic water withdrawal forces created at the cooling water intake structure.

DEQ thus finds Impingement BTA at the Dominion-Gordonsville Station to consist of:

- Operating a cooling water intake structure with maximum design through-screen velocities of no greater than 0.12 ft./sec; and

Overall BTA Determination

With this reissuance, staff is making a final 316(b) determination for the Station on a case-by-case BPJ basis. Staff has reviewed location, design and construction, and capacity factors of the intake structure. Available information concerning potential adverse environmental impacts was not readily available at the time of permit drafting. The lack of historical adverse environmental impact information serves as a default presumption for this permit cycle that cooling water withdrawals at the Station, and the technologies currently installed there, are minimizing adverse environmental impacts. Based on the above considerations, staff believes no additional controls or requirements are needed beyond the current design and operational measures undertaken at the facility. DEQ staff has determined that the following measures represent BTA:

- The continuation of a water service agreement with the Town of Gordonsville to provide the primary source of water for Station operations, including for cooling purposes;

- Continued compliance with Virginia Water Protection Permit 91-0163, which imposes volume limits and seasonal restrictions on the withdrawal from the quarry;

- Operation of a cooling water intake structure with maximum design through-screen velocities of 0.25 fps, or less;

- The continued use of closed-cycle glycol-based cooling system, including air-cooled heat exchangers and air-cooled condensers.

Since the overall BTA determination reflects current installed technologies and operational measures, and are also addressed by conditions of a VWP permit that is expected to remain in effect for the term of this reissued VPDES permit, DEQ staff believes the need for overlapping and duplicative requirements in the VPDES permit are unnecessary. However, if conditions associated with any of the overall BTA elements subsequently change, this permit may be re-opened and modified, or alternatively revoked and reissued, to re-evaluate this §316(b) BTA finding.

17. Other Permit Requirements:

a. Part I.B of the permit contains quantification levels and compliance reporting instructions.
9VAC25-31-190.L.4.c requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

b. Part I.C of the permit details the requirements for a Schedule of Compliance for Total Recoverable Zinc.
The VPDES Permit Regulation, 9VAC25-31-250 allows use of Compliance Schedules to allow facilities sufficient time for upgrades to meet newly established effluent limits. The permit contains newly established limits for zinc.

Since the facility is now required to meet these limits a schedule of compliance is required to provide the permittee time to evaluate and determine if these limits can be met and if an upgrade to this facility is needed to meet these new limits. The permittee shall achieve compliance with the final limits specified in Part I.A. of the VPDES permit in accordance with the following four year schedule as contained in Part I.C. of the permit:

Action	Time Frame
1. Submit a plan to achieve compliance with final zinc limits.	A plan shall be submitted 180 days from the effective date of the permit (due February 1, 2020).
2. Prepare a report biannually of progress on attainment of final zinc limits.	By July 10, 2020, January 10, 2021, July 10, 2021, January 10, 2022, and July 10, 2022.
3. Achieve compliance with final zinc limits.	Within 60 days of the completion of compliance plan activities and implementation of the corrective measure(s) but no later than three (3) years from the effective date of the permit (due August 1, 2022).

c. Part I.D of the permit details the requirements for a Whole Effluent Toxicity Program.
Whole Effluent Toxicity (WET) refers to the aggregate toxic effect to aquatic organisms from all pollutants present within a facility's wastewater effluent. This program is one approach to comply with the Clean Water Act's prohibition of the discharge of toxic pollutants in toxic amounts. WET testing allows for the measurement of the wastewater's potential effects on specific test organism's ability to survive, grow and reproduce.

The VPDES Permit Regulation at 9VAC25-31-220.D.1.a-d requires limitations in permits to provide for and ensure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Limitations must control all pollutants or pollutant parameters which the Board determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any Virginia water quality standard, including narrative criteria. The determination whether a discharge causes or contributes to an instream excursion above a narrative or numeric criteria shall utilize procedures which account for existing controls on sources of pollution, variability of the pollutant, species sensitivity and dilution of the effluent in the receiving stream. If it is determined that a reasonable potential exists to cause or contribute to an instream excursion of narrative criterion of the water quality standard, the permit must contain effluent limits for whole effluent toxicity. However, limits may not be necessary when it is demonstrated that chemical-specific limits are sufficient to attain and maintain applicable numeric and narrative water quality standards.

A WET Program is imposed for industrial facilities based on the facility's Standard Industrial Classification (SIC) code, instream waste concentration (IWC) and/or those required by the Board based on effluent variability, compliance history, existing treatment processes and/or the receiving stream characteristics. Based on the facility's SIC code and the IWC at the critical 1Q10 stream flow, monitoring for toxicity is warranted to ensure aquatic life use protection. Since the facility does not discharge on a continual basis, it is staff's professional judgement that acute toxicity testing is appropriate.

As referenced above, reasonable potential determinations must take into account the variability of the pollutant or pollutant parameter in the effluent, sensitivity of the species to toxicity testing and, as appropriate, the dilution of the effluent in the receiving stream. This warrants a sampling regime that rotates throughout a given calendar year; a quarterly schedule in order to obtain seasonal perspectives that encompass that potential variableness listed prior. This methodology coincides with the VPDES Permit Regulation requirements that facilities submit representative data that reflects the seasonal variation in the discharge with each permit application (9VAC25-31-100.K.4.g.). Therefore, it is staff's professional judgement that a WET testing protocol be proposed with this permit action that requires a rotating, quarterly testing regime for each annual monitoring requirement. The schedule as set forth within Part I.C of the permit will ensure that the discharge is monitored for whole effluent toxicity and demonstrates seasonal variations.

See Attachment 14 for a summary of the past test results. Attachment 15 documents the calculated compliance endpoints that will be carried forward with this reissuance.

d. Permit Section Part II. Required by VPDES Regulation 9VAC25-31-190, Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

18. Other Special Conditions:

a. O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Permit Regulation, 9VAC25-31-190.E and 40 CFR 122.41(e). The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

b. Notification Levels. Required by VPDES Permit Regulation 9VAC-31-200A for all manufacturing, commercial, mining, and silvacultural discharges. The permittee shall notify the Department as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following notification levels:
   (a) One hundred micrograms per liter;
   (b) Two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter for antimony;
   (c) Five times the maximum concentration value reported for that pollutant in the permit application; or
   (d) The level established by the Board.

2. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following notification levels:
   (a) Five hundred micrograms per liter;
   (b) One milligram per liter for antimony;
   (c) Ten times the maximum concentration value reported for that pollutant in the permit application; or
   (d) The level established by the Board.

c. Materials Handling/Storage. 9VAC25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorize the Board to regulate the discharge of industrial waste or other waste.

d. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should data collected and submitted for Attachment A of the permit, indicate the need for limits to ensure protection of water quality criteria, the permit may be modified or alternately revoked and reissued to impose such water quality-based limitations.

e. Water Quality Criteria Monitoring. State Water Control Law §62.1-44.21 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 criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

e. No Discharge of Detergents, Surfactants, or Solvents to the Oil/Water Separators. This special condition is necessary to ensure that the oil/water separators' performance is not impacted by compounds designed to emulsify oil. Detergents, surfactants, and some other solvents will prohibit oil recovery by physical means.

f. Polychlorinated Biphenyl. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. Compliance with this requirement shall be determined using EPA Method 608 (as referenced in 40 CFR Part 136).

g. Prohibition of Chemical Additives. Chemical additives may not be used in non-contact cooling water without prior notification to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). The chemical additives may be toxic and/or otherwise violate the receiving stream water quality standards. Upon notification, the Regional Office can determine if this activity will warrant a modification to the permit.

h. Water Effects Ratio Study Confirmation Testing. This special condition requires that the permittee perform the necessary testing to demonstrate that the results of the Water Effects Ratio (WER) submitted in the report dated May 14, 2010, and incorporated into the VPDES permit with the 2011 modification and 2013 reissuance are still appropriate indicators of impact of the discharge from the facility on the receiving stream.

EPA's Water Quality Standards Handbook, Second Edition, Appendix L, *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals*, states that "Even if no changes are known to have occurred, WERs should be reevaluated periodically. (The National Toxics Rule recommends that "NPDES permits include periodic determinations of WERs in the monitoring requirements.)"

State Water Control Law §62.1-44.21 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.

This special condition also allows the permittee the option of conducting a Biotic Ligand Model (BLM) study in lieu of the approved WER. The study shall be conducted as noted in 9VAC25-260-140-G of the Water Quality Standards. The results of the BLM shall be used in lieu of the approved WER in establishing copper effluent limitations.

i. TMDL Reopener. This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

j. 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.

k. Thermal Mixing Zone Study.
The permittee shall conduct a site specific thermal mixing zone study for the receiving waters to determine if the discharge causes an increase in temperature of the receiving stream of more than 3°C above the natural water temperature and/or causes the temperature of the receiving stream to change more than 2° per hour. Results of the mixing zone study shall be submitted with the application for reissuance at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Board.

19. Changes to the Permit from the Previously Issued Permit:

a. Special Conditions:

- A Water Effects Ratio Study Confirmation Testing special condition has been added to the permit with this reissuance.
- The Federal Endangered Species Act Compliance special condition has been added to the permit with this reissuance.
- A Thermal Mixing Zone special condition has been added to the permit with this reissuance.

b. Monitoring and Effluent Limitations:

- A zinc limit of 54 µg/L has been established for Outfall 001.
- A three year schedule of compliance has been established for Outfall 001 based on the new zinc limit.
- A condition has been added that metals and hardness sampling be conducted concurrently.
- TSS monitoring was added to Outfall 001.

20. Variances/Alternate Limits or Conditions: None

21. Public Notice Information:

First Public Notice Date: June 13, 2019 Second Public Notice Date: June 20, 2019

Public Notice Information is required by 9VAC25-31-280 B. In accordance with Chapter 552 of the 2018 Acts of Assembly, the VPDES permit regulation 9VAC25-31-290 has been revised to allow, if the permittee so elects, an abbreviated public notice procedure for industrial minors in which an abbreviated notice is published in the newspaper with a link to the full notice on the department's website. With this reissuance, the permittee elected to use the abbreviated procedure. As such, staff elected to use the abbreviated procedure. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3853, susan.mackert@deq.virginia.gov. See Attachment 16 and Attachment 17 for copies of the abbreviated and full public notice documents, respectively.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, 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. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

22. Additional Comments:

Previous Board Action(s): None

Staff Comments:

1. Staff voluntarily submitted a copy of the permit application on December 7, 2017, to the appropriate field office of the U.S. Fish and Wildlife Service (USFWS) and regional office of the National Marine Fisheries Service (NMFS) for a 60 day review period. By doing this voluntarily, application review was consistent with that of facilities required to submit applications in accordance with §125.98(h).

   By email correspondence dated January 24, 2018, the USFWS indicated that since the facility only withdraws cooling water from the quarry on an intermittent basis, and there are no federally listed species or species under consideration for listing located in the quarry the agency had no additional comments with respect to 316(b) coordination related to the application indicating no further controls are necessary. No comments were received from NMFS during the 60 day review period.

2. Copies of the public notice and proposed draft permit and fact sheet were voluntarily transmitted to the appropriate field office of the U.S. Fish and Wildlife Service (USFWS) and regional office of the National Marine Fisheries Service (NMFS) for review on June 4, 2019. No comments were received.

3. On March 2, 2017, EPA withdrew its waiver of permit review for the NPDES minor industrial categories in 40 CFR Part 122 Appendix A that was originally allowed by the 1975 Memorandum of Understanding Regarding Permit and Enforcement Programs between the State Water Control Board and the Regional Administrator, Region III Environmental Protection Agency (MOU). Per the amended MOU, EPA was provided access to this permit and had no comments.

Public Comment: No public comments were received.

Fact Sheet Attachments – Table of Contents

Dominion – Gordonsville Power Station
VA0087033

2019 Reissuance

Attachment 1

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Flow Frequency Determination
Dominion – Gordonsville Power Station (VA0087033)

TO: File

FROM: Susan Mackert

DATE: October 31, 2012

COPIES:

The Dominion – Gordonsville Power Station discharges to the South Anna River near Gordonsville, Virginia. Stream flow frequencies are required at this site for use in developing effluent limitations for the VPDES permit. This memo supersedes the October 30, 1996, and December 4, 2007 flow frequency determination memos concerning the subject VPDES permit.

Based on discussions with Dominion during the previous reissuance in 2008, they believed the watershed of the South Anna River upstream of Outfall 001 to be approximately 6.1 square miles rather than the 5.0 square miles as presented in the original flow frequency determination from 1996. The 6.1 square miles was based on calculations and observations of the USGS topographic map for the area.

With the 2013 reissuance, DEQ staff utilized GIS and determined the drainage area to be 5.1 square miles. This drainage area is reflected within the planning statement (see Attachment 7). DEQ staff has compared the flow frequency determinations for both the 5.1 and 6.1 square mile drainage areas and finds no significant difference. It is staff's best professional judgement that a drainage area of 6.1 square miles be used as it provides consistency with the previous permit and subsequent Water Effects Ratio and chemical translator study.

Contrary Creek near Mineral, VA (#01670300):

Drainage Area = 5.1 square miles

1Q10	=	0.023 MGD	High Flow 1Q10	=	0.381 MGD
7Q10	=	0.029 MGD	High Flow 7Q10	=	0.494 MGD
30Q5	=	0.124 MGD	High Flow 30Q10	=	0.710 MGD
30Q10	=	0.071 MGD	Harmonic Mean	=	0.536 MGD

Drainage Area = 6.1 square miles

1Q10	=	0.028 MGD	High Flow 1Q10	=	0.452 MGD
7Q10	=	0.035 MGD	High Flow 7Q10	=	0.591 MGD
30Q5	=	0.149 MGD	High Flow 30Q10	=	0.853 MGD
30Q10	=	0.085 MGD	Harmonic Mean	=	0.639 MGD

The high flow months are November through April.

Attachment 2

NPDES PERMIT RATING WORK SHEET

[X] Regular Addition
[ ] Discretionary Addition
[ ] Score change, but no status Change
[ ] Deletion

VPDES NO. : VA0087033

Facility Name: Dominion – Gordonsville Power Station
City / County: Gordonsville / Louisa County
Receiving Water: South Anna River
Waterbody ID: VAN-F01R / YO01

Is this facility a steam electric power plant (sic =4911) with one or more of the following characteristics?

1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power Plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rater

[ ] Yes; score is 600 (stop here) [X] NO; (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

[ ] YES; score is 700 (stop here)
[X] NO; (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary Sic Code: 4911 Other Sic Codes: _____ _____ _____

Industrial Subcategory Code: 000 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams	0	0	[ ] 3.	3	15	[ ] 7.	7	35
[ ] 1.	1	5	[ ] 4.	4	20	[ ] 8.	8	40
[ ] 2.	2	10	[ ] 5.	5	25	[ ] 9.	9	45
			[X] 6.	6	30	[ ] 10.	10	50

Code Number Checked: 6

Total Points Factor 1: 30

FACTOR 2: Flow/Stream Flow Volume (Complete either Section A or Section B; check only one)

Section A – Wastewater Flow Only considered

Wastewater Type (see Instructions)			Code	Points
Type I:	Flow < 5 MGD	[ ]	11	0
	Flow 5 to 10 MGD	[ ]	12	10
	Flow > 10 to 50 MGD	[ ]	13	20
	Flow > 50 MGD	[ ]	14	30
Type II:	Flow < 1 MGD	[ ]	21	10
	Flow 1 to 5 MGD	[ ]	22	20
	Flow > 5 to 10 MGD	[ ]	23	30
	Flow > 10 MGD	[ ]	24	50
Type III:	Flow < 1 MGD	[ ]	31	0
	Flow 1 to 5 MGD	[ ]	32	10
	Flow > 5 to 10 MGD	[ ]	33	20
	Flow > 10 MGD	[ ]	34	30

Section B – Wastewater and Stream Flow Considered

Wastewater Type (see Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	[ ]	41	0
	10 % to < 50 %	[ ]	42	10
	> 50%	[ ]	43	20
Type II:	< 10 %	[ ]	51	0
	10 % to < 50 %	[ ]	52	20
	> 50 %	[X]	53	30

Code Checked from Section A or B: 53

Total Points Factor 2: 30

NPDES PERMIT RATING WORK SHEET

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutants: (check one) [ ] BOD [ ] COD [X] Other: Dissolved Oxygen

Permit Limits: (check one)

		Code	Points
[X]	< 100 lbs/day	1	0
[ ]	100 to 1000 lbs/day	2	5
[ ]	> 1000 to 3000 lbs/day	3	15
[ ]	> 3000 lbs/day	4	20

Code Number Checked: 1

Points Scored: 0

B. Total Suspended Solids (TSS)

Permit Limits: (check one)

		Code	Points
[X]	< 100 lbs/day	1	0
[ ]	100 to 1000 lbs/day	2	5
[ ]	> 1000 to 5000 lbs/day	3	15
[ ]	> 5000 lbs/day	4	20

Code Number Checked: 1

Points Scored: 0

C. Nitrogen Pollutants: (check one) [ ] Ammonia [ ] Other: _____

Permit Limits: (check one)

	Nitrogen Equivalent	Code	Points
[ ]	< 300 lbs/day	1	0
[ ]	300 to 1000 lbs/day	2	5
[ ]	> 1000 to 3000 lbs/day	3	15
[ ]	> 3000 lbs/day	4	20

Code Number Checked: NA

Points Scored: 0

Total Points Factor 3: 0

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this include any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above reference supply.

[X] YES; (If yes, check toxicity potential number below)

[ ] NO; (If no, go to Factor 5)

Determine the *Human Health* potential from Appendix A. Use the same SIC doe and subcategory reference as in Factor 1. (Be sure to use the *Human Health* toxicity group column – check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams	0	0	[ ] 3.	3	0	[ ] 7.	7	15
[ ] 1.	1	0	[ ] 4.	4	0	[ ] 8.	8	20
[ ] 2.	2	0	[ ] 5.	5	5	[ ] 9.	9	25
			[X] 6.	6	10	[ ] 10.	10	30

Code Number Checked: 6

Total Points Factor 4: 10

NPDES PERMIT RATING WORK SHEET

FACTOR 5: Water Quality Factors

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-base federal effluent guidelines, or technology-base state effluent guidelines), or has a wasteload allocation been to the discharge

		Code	Points
[ ]	YES	1	10
[X]	NO	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
[X]	YES	1	0
[ ]	NO	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
[ ]	YES	1	10
[X]	NO	2	0

Code Number Checked: A 2 B 1 C 2

Points Factor 5: A 0 + B 0 + C 0 = **0**

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from factor 2) 53

Check appropriate facility HPRI code (from PCS):

	HPRI#	Code	HPRI Score
[ ]	1	1	20
[ ]	2	2	0
[ ]	3	3	30
[X]	4	4	0
[ ]	5	5	20

Enter the multiplication factor that corresponds to the flow code: _____

Flow Code	Multiplication Factor
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

HPRI code checked : 4

Base Score (HPRI Score): 0 X (Multiplication Factor) 0.60 = 0

B. Additional Points – NEP Program

For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
[ ]	1	10
[ ]	2	0

C. Additional Points – Great Lakes Area of Concern

For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 area's of concern (see instructions)?

	Code	Points
[ ]	1	10
[ ]	2	0

Code Number Checked: A 4 B NA C NA

Points Factor 6: A 0 + B NA + C NA = **0**

NPDES PERMIT RATING WORK SHEET

SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	30
2	Flows / Streamflow Volume	30
3	Conventional Pollutants	0
4	Public Health Impacts	10
5	Water Quality Factors	0
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	**70**

S1. Is the total score equal to or grater than 80 ☐ YES; (Facility is a Major) ☒ NO

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

☒ NO

☐ YES; (Add 500 points to the above score and provide reason below:

Reason: _____

NEW SCORE : 70

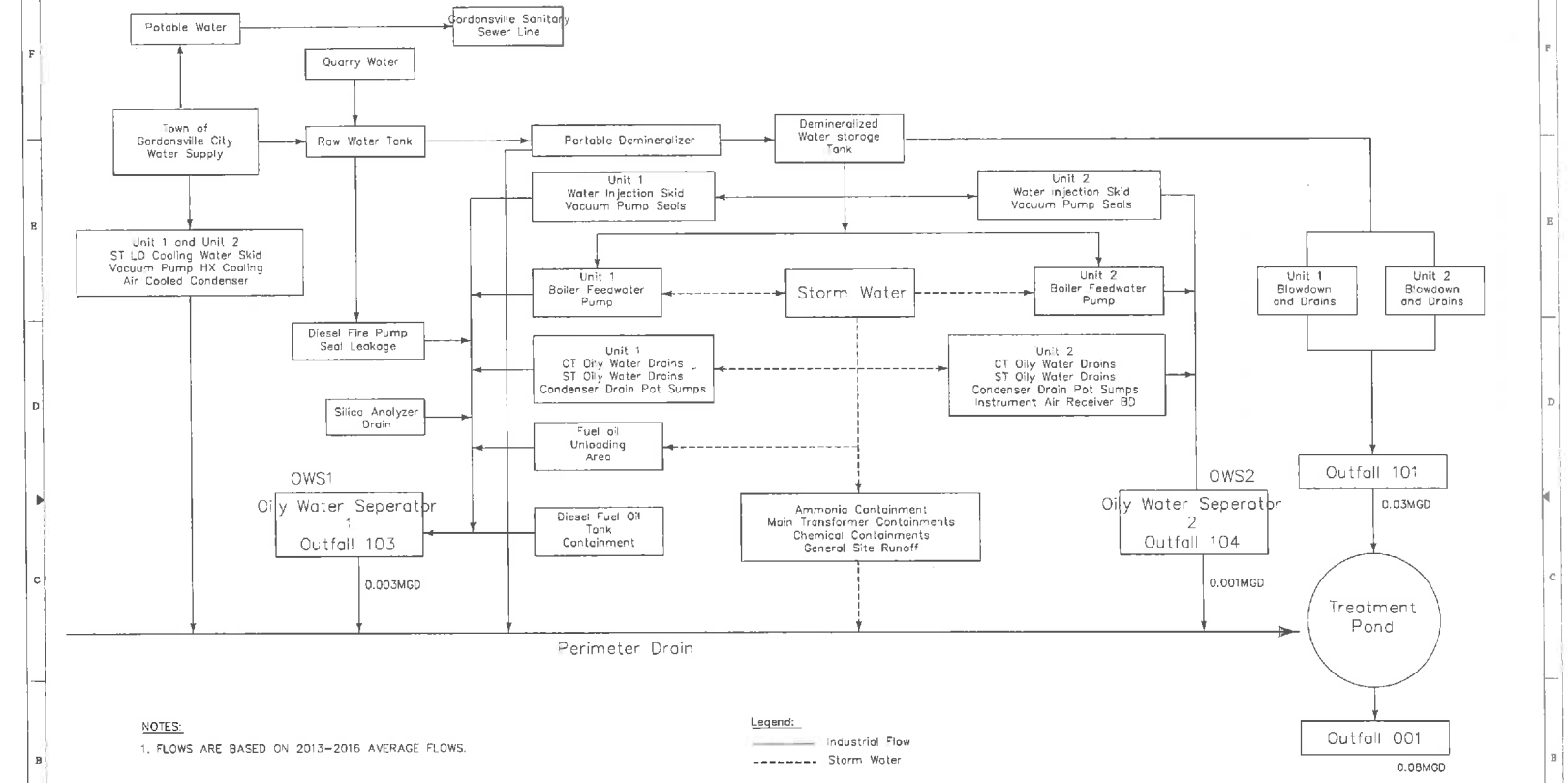
OLD SCORE : 70

Permit Reviewer's Name : Susan Mackert

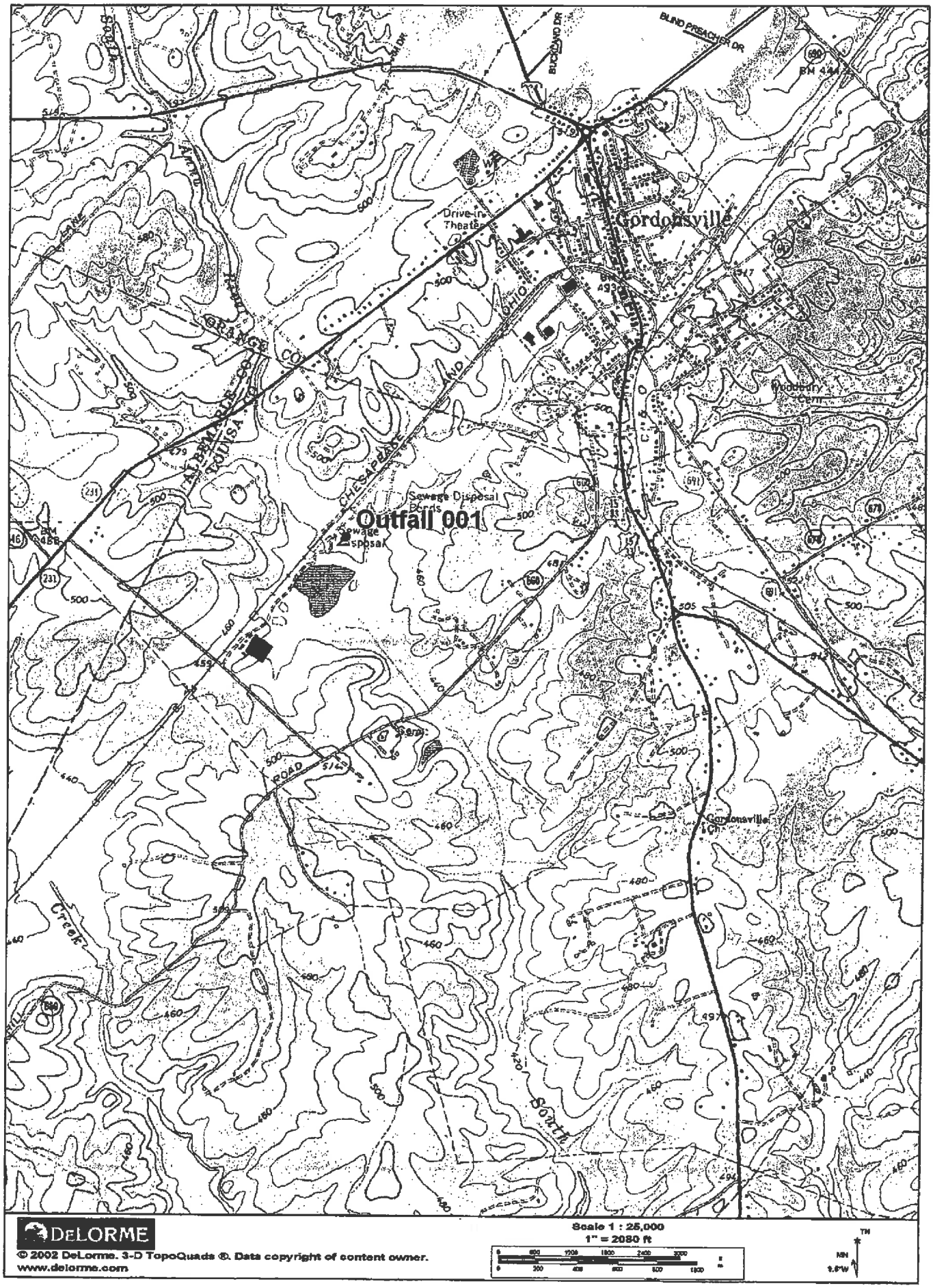
Phone Number: (703) 583-3853

Date: March 22, 2018

Attachment 3


Potable Water
Gordonsville Sanitary Sewer Line
Quarry Water
Town of Gordonsville City Water Supply
Raw Water Tank
Portable Demineralizer
Demineralized Water storage Tank
Unit 1 Water Injection Skid Vacuum Pump Seals
Unit 2 Water Injection Skid Vacuum Pump Seals
Unit 1 and Unit 2 ST LO Cooling Water Skid Vacuum Pump HX Cooling Air Cooled Condenser
Unit 1 Boiler Feedwater Pump
Storm Water
Unit 2 Boiler Feedwater Pump
Unit 1 Blowdown and Drains
Unit 2 Blowdown and Drains
Diesel Fire Pump Seal Leakage
Unit 1 CT Oily Water Drains ST Oily Water Drains Condenser Drain Pot Sumps
Unit 2 CT Oily Water Drains ST Oily Water Drains Condenser Drain Pot Sumps Instrument Air Receiver BD
Silica Analyzer Drain
Fuel oil Unloading Area
OWS1
Oily Water Seperator 1
Outfall 103
0.003MGD
Diesel Fuel Oil Tank Containment
Ammonia Containment Main Transformer Containments Chemical Containments General Site Runoff
OWS2
Oily Water Seperator 2
Outfall 104
0.001MGD
Outfall 101
0.03MGD
Treatment Pond
Outfall 001
0.08MGD
Perimeter Drain
NOTES:
1. FLOWS ARE BASED ON 2013-2016 AVERAGE FLOWS.
Legend:
Industrial Flow
Storm Water
DOMINION ENERGY
FOSSIL & HYDRO TECHNICAL SERVICES
RICHMOND, VIRGINIA
ONE LINE DIAGRAM
WATER FLOW DIAGRAM
GORDONSVILLE POWER STATION
THIS DWG. VOIDS & SUPERSEDES GV-VPDES-VA0087033-001
REVISED PER ENVIRONMENTAL REDLINE.
REDRAWN PER ENVIRONMENTAL REDLINE.
STATUS PER ENVIRONMENTAL REDLINE. CONVERTED TO AUTOCAD.
DRAWN —
DESIGN SUPV —
DRWN SWC
ENGR SUPV —
CHKD RAW
PROJ MGR —
PCOL ENGR. —
SCALE 1" = 40'
UNLESS OTHERWISE NOTED
DRAWING NUMBER GV-0-SP-STA-600
REV. 2
SH. 1 OF 1

Attachment 4


Outfall 001
Gordonsville
Drive-In Theater
Sewage Disposal Ponds
Sewage Disposal
Gordonsville Ch
Cemetery
BLIND PREACHER DR
BUCKLAND DR
OHIO
CHESAPEAKE
ALBEMARLE-LOUISA CO
ROAD
Creek
South
BM 448
BM 444
Scale 1 : 25,000
1" = 2080 ft
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com
DeLORME

Attachment 5

Site Bulk Chemicals/Materials

Chemical / Material Storage / Accessories		
Material	**Storage Capacity (Gallons)**	**Secondary Containment (Gallons)**
SULFURIC ACID STORAGE BUILDING: - Sulfuric Acid (Map Key #S1)	110 Gal.	Concrete Curbing : ≥ 120 gallons
AQUEOUS AMMONIA TANK: - Aqueous Ammonia (Map Key #S2)	25,000 Gal.	Concrete Curbing: ≥ 27,500 gallons
NEUTRALIZING AMINE STORAGE TOTE: - Neutralizing Amine (Map Key #S3)	1 - 390 Gal.	Concrete Curbing: ≥ 440 gallons
OXYGEN SCAVENGER STORAGE TOTES: - Oxygen Scavenger (Map Key #S4)	2 - 400 Gal.	Concrete Curbing: ≥ 440 gallons
PHOSPHATE CONTROL STORAGE TOTES: - Phosphate Control (Map Key #S5)	2 - 400 Gal.	Concrete Curbing: ≥ 440 gallons
LAYDOWN AREA: (Map Key #S6)	Various	Materials are placed inside the Facility's perimeter drainage ditch system that directs flows to the WWTB.
GENERAL REFUSE DUMPSTER AREA: (Map Key #S7)	Various Dumpsters	All containers are placed inside the Facility's perimeter drainage ditch system that directs flows to the WWTB.
STEAM TURBINES: - Lube Oil (Map Key #S8)	3 -10 Gal.	The lube oil skid is equipped with concrete secondary containment and located inside the Facility's perimeter drainage ditch system that directs flows to the WWTB.
CT Generator Vapor Extractor Used Oil Unit 1 bucket Unit 2 drum (Map Key #S11)	5 gallons 45 gallons	Located so any spills would be contained by the perimeter drainage ditch and WWTB.

Attachment 6

Outfall 001

Outfall Drainage Area/Sources:
Internal Outfall 101, Internal Outfall 103, Internal Outfall 104, Plant Perimeter Drains

Representative Outfalls:
None

Discharge Location:
South Anna River

Outfall Discussion:
Outfall 001 and the associated drainage areas were observed by staff during a site visit conducted on September 20, 2017. Under normal operations, flow from the above sources is directed to a retention pond located adjacent to the plant where it comingles with stormwater within the pond. Water from the retention pond is then discharged through Outfall 001. Flow from the outfall is then directed through a dechlorination tablet feeder prior to reaching the South Anna River.

Data Screening:
Monitoring data obtained from Discharge Monitoring Report forms (DMRs) from this permit cycle has been reviewed and determined to be suitable for evaluation. The following pollutants require a wasteload allocation analysis: Total Residual Chlorine and Zinc.

Monitoring Discussion and Requirements:

pH:
Limitations for pH were previously established at this outfall. Because the retention pond is utilized for pH adjustment related to the requirements of the Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category, pH limits shall remain in place at Outfall 001 and pH limits will not be applied at the respective internal outfalls (see additional discussion for each internal outfall this attachment).

In accordance with 40 CFR 423.15(a)(1) – NSPS, the pH of all discharges except once through cooling water shall be within the range of 6.0 – 9.0 S.U. Both water quality based limits and Federal Effluent Guideline requirements were compared. It is staff's professional judgement that the minimum limit of 6.0 S. U. and the maximum limit of 9.0 S. U. be carried forward with this reissuance. Given the limitations are equally as stringent, both are used as the basis for the final limit. The established monitoring frequency of once per month (1/M) shall be carried forward with this reissuance.

Temperature (May – October):
A limitation for temperature was previously established and was set at the water quality criteria. Given the thermal component of the discharge, it is staff's professional judgement that the previously established maximum temperature limit of 32ºC be maintained with this reissuance.

The monitoring frequency of once per month (1/M) during the months of May – October shall also be carried forward. This specific six month monitoring period is warranted as natural river temperatures are high and demand for electricity is greater and subsequently, days of operation at the facility increase. To ensure that the effluent does not cause an increase in temperature of the receiving stream of more than 3º C above the natural water temperature and/or does not cause the temperature in the receiving stream to change more than 2º per hour a site specific thermal mixing zone study is being required with this reissuance. Natural temperature is defined as that temperature of a body of water (measured as the arithmetic average over one hour) due solely to natural conditions without the influence of any point-source discharge. See Section 18.k of the Fact Sheet for ad

Dissolved Oxygen (DO):
The previously established minimum limit of 5.0 mg/L shall be carried forward with this reissuance. The DO limitation is based on staff's professional judgement and the WQS. The monitoring frequency of once per month (1/M) shall also be carried forward.

Total Residual Chlorine (TRC)*:*
Potable water from the local municipality is utilized for station operations. Because potable water contains measurable amounts of chlorine (1.0 – 3.0 mg/L), TRC limitations are established to prevent impacts (acute and chronic) to aquatic organisms.

In accordance with current DEQ guidance (Memo 00-2011), staff used a default data point of 0.2 mg/L to derive the water quality based limitations. The resulting derivation indicated a daily maximum limit of 0.016 mg/L and a monthly average limit of 0.016 mg/L are needed (Attachment 11). These limits are consistent with those established during the previous reissuance and as such, the previously derived daily maximum TRC limit of 0.016 mg/L and monthly average TRC limit of 0.016 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month (1/M) shall also be carried forward.

Total Petroleum Hydrocarbons (TPH):
Based on the use of #2 fuel oil, the diesel fuel containment area, fuel unloading area, and diesel fire pump seal leakage and drain at the Gordonsville Power Station, it is staff's professional judgement that monitoring for TPH continue with this reissuance. Limitations are not proposed. The monitoring frequency of once every six months (1/6M) shall also be carried forward.

Total Suspended Solids (TSS):
In order to determine stormwater contributions related to TSS being discharged directly to State waters, it is staff's professional judgement that TSS monitoring be implemented at Outfall 001 with this reissuance. A monitoring frequency of once every six months (1/6M) be implemented.

Copper:
Staff reviewed copper data from Discharge Monitoring Report (DMR) form submissions from the current permit cycle (2013 – 2017). All reported data is below both the acute and chronic values derived from the WER and Chemical Translator studies discussed in Section 12.c.1 and Section 12.c.2 of the Fact Sheet. As such, limitations are not warranted (Attachment 11).

It is staff's professional judgement that dissolved copper monitoring be continued with this reissuance. The monitoring frequency of once every six months (1/6M) shall also be carried forward.

Zinc:
During the 2013 permit reissuance, an analysis of available data indicated the need for a zinc limitation. The limit was derived based on one datum point and as such, it was staff's professional judgement that monitoring be implemented at that time in lieu of a limitation. The additional data collected was to assist in a later determination of whether a zinc limit is warranted.

Staff reviewed zinc data from Discharge Monitoring Report (DMR) form submissions from the current permit cycle (2013 – 2017). An analysis of the data provided with this reissuance indicates the need for a monthly average and daily maximum zinc limitation of 54 µg/L (Attachment 11). Given this is a new permit limit, the facility shall be given a three year compliance schedule to meet the new effluent limitation. During the schedule of compliance, the facility shall monitor without limitation for dissolved zinc on a semi-annual (1/6M) basis. Once the limit is effective, the facility shall monitor total recoverable zinc on a semi-annual (1/6M) basis. See Section 17.c of the Fact Sheet for additional discussion on the proposed compliance schedule.

Total Hardness:
The Water Quality Criteria for some metals are dependent on the hardness of the discharge (expressed as mg/L calcium carbonate). Because staff has proposed monitoring for the metals noted above, it is staff's professional judgement that hardness monitoring be carried forward with this reissuance. The established monitoring frequency of once every six months (1/6M) shall also be carried forward with this reissuance. Samples for metals and hardness shall be collected concurrently.

Effluent Limitations and Monitoring Requirements: Outfall 001 (Retention Basin)

Average Flow: 0.08 MGD
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR MONITORING	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/M	Estimate
pH[(a)]	2,3a	NA	NA	6.0 S.U.	9.0 S.U.	1/M	Grab
Dissolved Oxygen (D.O.)	1,2	NA	NA	5.0 mg/L	NA	1/M	Grab
Total Residual Chlorine (TRC) (after dechlorination)	1,2	NA	0.016 mg/L	NA	NA	1/M	Grab
Temperature (May – October)	1,2	NA	32ºC	NA	NA	1/M	IS
Total Suspended Solids (TSS)	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Total Petroleum Hydrocarbons (TPH)[(b)]	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Copper, Dissolved[(c)]	1,2	NA	NL (µg/L)	NA	NA	1/6M	Grab
Zinc, Dissolved[(c)]	1,2	NA	NL (µg/L)	NA	NA	1/6M	Grab
Zinc, Total Recoverable[(c)]	1,2	NA	54 µg/L	NA	NA	1/6M	Grab
Hardness, Total (as $CaCO_3$)[(c)]	1	NA	NL (mg/L)	NA	NA	1/6M	Grab
Acute Toxicity – *C. dubia* ($_{NOAEC}$)	1	NA	NA	NA	NL (%)	1/YR	Grab
Acute Toxicity – *P. promelas* ($_{NOAEC}$)	1	NA	NA	NA	NL (%)	1/YR	Grab

1. Professional Judgement
2. Water Quality Standards
3. Federal Effluent Requirements
   a) 40 CFR 423.15(a)(1)

NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

1/M = Once every month.
1/6M = Once every six months.
1/YR = Once every year.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

1/6M = The semi-annual monitoring periods shall be January 1 – June 30 and July 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (July 10 and January 10, respectively).

1/YR = The annual monitoring period shall be January 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (January 10).

Federal Effluent Requirements:

a. 40 CFR 423.15(a)(1) – NSPS the pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0.

Total Petroleum Hydrocarbons Requirements:

b. Total Petroleum Hydrocarbons (TPH) is the sum of individual gasoline range organics and diesel range organics or TPH-GRO and TPH-DRO to be measured by EPA SW 846 Method 8015 for gasoline and diesel range organics, or by EPA SW 846 Methods 8260 Extended and 8270 Extended.

Total Hardness and Metals Requirements:

c. Samples for total hardness and metals shall be collected concurrently.

Photo 1. When combined with photo two shows the retention basin associated with Outfall 001.

Photo 2. When combined with photo one shows the retention basin associated with Outfall 001.

Photo 3. Outfall 001.

Photo 4. Dechlorination tablet feeder.

Photo 5. Upstream of Outfall 001.

Photo 6. Downstream of Outfall 001.

Internal Outfall 101

Outfall Drainage Area/Sources:
Units 1 and 2 boiler blowdown tanks, steam sample cabinet, boiler feed pump vents and drains, various drains, and demineralized water.

Representative Outfalls:
None

Discharge Location:
Retention Basin

Outfall Discussion:
Internal Outfall 101 and the associated drainage areas were observed by staff during a site visit conducted on September 20, 2017. Under normal operations, flow from the above sources is directed via Internal Outfall 101 to the retention pond located adjacent to the plant where it comingles with stormwater within the pond. Water from the retention pond is then discharged through Outfall 001 to the South Anna River.

Data Screening:
Monitoring data obtained from Discharge Monitoring Report forms (DMRs) from this permit cycle has been reviewed and determined to be suitable for evaluation.

The discharge from Internal Outfall 101 is subject to Federal Effluent Guidelines established in 40 CFR Part 423 for the Steam Electric Power Generating Point Source Category. Effluent Limitation Guidelines are technology-based regulations that have been developed by the U.S. Environmental Protection Agency (EPA) for a specific category of discharger and are based on the performance of control and treatment technologies. By definition, the discharge from Internal Outfall 101 is considered a low volume waste source under the New Source Performance Standards (NSPS) found within §423.15.

Low Volume Waste
Effective November 3, 2015, EPA adopted a final rule updating the Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category. The updated rule broke Section 423.15 New Source Performance Standards (NSPS) in to two subparts, "a" and "b", with subpart "a" pertaining to new sources as of November 19, 1982, and subpart "b" pertaining to new sources as of November 17, 2015. Pursuant to 40 CFR Part 122.2, new source is defined as "any building, structure, facility of installation from which there is or may be a "discharge of pollutants" the construction of which commenced after promulgation of standards of performance under Section 306 of the Clean Water Act which are applicable to such source". A review of DEQ files indicates construction and operation of the Station began in the early to mid-1990s. As such, it is staff's professional judgement that subpart "a" of the updated rule is applicable given the Gordonsville Power Station commenced construction and became operational after promulgation of revised standards of performance in 1982.

The updated 2015 rule also established that compliance with new Best Available Technology (BAT) standards for flue gas desulfurization (FGD) wastewaters, fly ash transport waters, flue gas mercury control wastewaters, gasification wastewaters, and bottom ash transport waters [40 CFR §§423.13(g), (h), (i), (j) and (k)] be met as soon as possible beginning November 1, 2018, but no later than December 31, 2023. In a subsequent final rule published on September 18, 2017, EPA postponed the earliest compliance date for steam electric facilities to meet BAT specifically for discharges of bottom ash transport water and flue gas desulfurization wastewater until November 1, 2020 to facilitate a new federal rulemaking process to potentially revise the BAT standards. Given the Gordonsville Power Station utilizes natural gas and oil and does not have discharges of bottom ash transport water nor flue gas desulfurization wastewater, compliance dates for BAT are not applicable.

Monitoring Discussion and Requirements:

pH:
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13– BAT. Requirements for pH are only found within 40 CFR 423.15(a)(1) – NSPS. This section states that the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.

Because the retention pond is utilized for pH adjustment, it is staff's professional judgement that pH limitations required under the revised rule remain in place at Outfall 001 and that pH limitations not be implemented at Internal Outfall 101.

Oil and Grease (O&G):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 20 mg/L maximum for any one day and a 15 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 20 mg/L and a monthly average concentration of 15 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Suspended Solids (TSS):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 100 mg/L maximum for any one day and a 30 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 100 mg/L and a monthly average concentration of 30 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Effluent Limitations and Monitoring Requirements: Internal Outfall 101 (Boiler Blowdown)

Average Flow: 0.03 MGD
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NA	1/M	Estimate
Total Suspended Solids (TSS)	1a, 1b, 2	30 mg/L	100 mg/L	NA	NA	1/M	Grab
Oil and Grease (O&G)	1a, 1b, 2	15 mg/L	20 mg/L	NA	NA	1/M	Grab

1. Federal Effluent Requirements
   a) 40 CFR 423.15(a)(3)
   b) 40 CFR 423.15(a)(13)
2. Professional Judgement

NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
1/M = Once every month.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Federal Effluent Requirements:

a. 40 CFR 423.15(a)(3) – NSPS low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
b. 40 CFR 423.15(a)(13) – NSPS quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of a mass based limitation.

Photo 1. Internal Outfall 101.

Photo 2. The arrow points to the general location where Internal Outfall 101 enters the retention pond.

Photo 3. Unit 1. Boiler blowdown from this unit discharges to Internal Outfall 101.

Photo 4. Unit 2. Boiler blowdown from this unit discharges to Internal Outfall 101.

Internal Outfall 103

Outfall Drainage Area
Unit 1 Oil – Water Separator

Sources:
Unit 1 wastewater sump, diesel fuel containment, fuel unloading area runoff, steam turbine oily water drains, combustion turbine oily water drains, silica analyzer drains, water injection skid, vacuum pump seals, boiler feed pumps, false start drains, diesel fire pump seal leakage and drains, and demineralized water.

Representative Outfalls:
None

Discharge Location:
Retention Basin

Outfall Discussion:
Internal Outfall 103 and the associated drainage areas were observed by staff during a site visit conducted on September 20, 2017. Under normal operations, flow from the above sources is directed via Internal Outfall 103 to the retention pond located adjacent to the plant where it comingles with stormwater within the pond. Water from the retention pond is then discharged through Outfall 001 to the South Anna River.

Data Screening:
Monitoring data obtained from Discharge Monitoring Report forms (DMRs) from this permit cycle has been reviewed and determined to be suitable for evaluation.

Components of the discharge from Internal Outfall 103 are subject to Federal Effluent Guidelines established in 40 CFR Part 423 for the Steam Electric Power Generating Point Source Category. Effluent Limitation Guidelines are technology-based regulations that have been developed by the U.S. Environmental Protection Agency (EPA) for a specific category of discharger and are based on the performance of control and treatment technologies. By definition, the discharge from Internal Outfall 103 is considered a low volume waste source under the New Source Performance Standards (NSPS) found within §423.15. Those components of the discharge that are not subject to Federal Effluent Guidelines established in 40 CFR Part 423 for the Steam Electric Power Generating Point Source Category, are discussed in more detail later within the monitoring discussion and requirements section for Internal Outfall 103.

Low Volume Waste:
Effective November 3, 2015, EPA adopted a final rule updating the Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category. The updated rule broke Section 423.15 New Source Performance Standards (NSPS) in to two subparts, "a" and "b", with subpart "a" pertaining to new sources as of November 19, 1982, and subpart "b" pertaining to new sources as of November 17, 2015. Pursuant to 40 CFR Part 122.2, new source is defined as "any building, structure, facility of installation from which there is or may be a "discharge of pollutants" the construction of which commenced after promulgation of standards of performance under Section 306 of the Clean Water Act which are applicable to such source". A review of DEQ files indicates construction and operation of the Station began in the early to mid-1990s. As such, it is staff's professional judgement that subpart "a" of the updated rule is applicable given the Gordonsville Power Station commenced construction and became operational after promulgation of revised standards of performance in 1982.

The updated 2015 rule also established that compliance with new Best Available Technology (BAT) standards for flue gas desulfurization (FGD) wastewaters, fly ash transport waters, flue gas mercury control wastewaters, gasification wastewaters, and bottom ash transport waters [40 CFR §§423.13(g), (h), (i), (j) and (k)] be met as soon as possible beginning November 1, 2018, but no later than December 31, 2023. In a subsequent final rule published on September 18, 2017, EPA postponed the earliest compliance date for steam electric facilities to meet BAT specifically for discharges of bottom ash transport water and flue gas desulfurization wastewater until November 1, 2020 to facilitate a new federal rulemaking process to potentially revise the BAT standards. Given the Gordonsville Power Station utilizes natural gas and oil and does not have discharges of bottom ash transport water nor flue gas desulfurization wastewater, compliance dates for BAT are not applicable.

Monitoring Discussion and Requirements:

pH:
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13– BAT. Requirements for pH are only found within 40 CFR 423.15(a)(1) – NSPS. This section states that the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.

Because the retention pond is utilized for pH adjustment, it is staff's professional judgement that pH limitations required under the revised rule remain in place at Outfall 001 and that pH limitations not be implemented at Internal Outfall 103.

Oil and Grease (O&G):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 20 mg/L maximum for any one day and a 15 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 20 mg/L and a monthly average concentration of 15 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Suspended Solids (TSS):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 20 mg/L maximum for any one day and a 15 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 20 mg/L and a monthly average concentration of 15 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Petroleum Hydrocarbons (TPH):
Discharges associated with the diesel fuel containment area, fuel unloading area, and diesel fire pump seal leakage and drain are not subject to the requirements of the ELG discussed earlier within this section. However, discharges such as these do have the reasonable potential to impact water quality. As such, it is staff's professional judgement that monitoring for TPH be implemented with this reissuance. It is noted that the Gordonsville Power Station is already required to monitor for O&G at this internal outfall. However, DEQ has determined that the oil and grease analytical method is better suited for detection of animal and vegetable fats rather than petroleum. Therefore, monitoring for TPH is more appropriate.

As previously noted flow from Internal Outfall 103 is directed to the retention pond located adjacent to the plant where it comingles with stormwater within the pond and discharges from Outfall 001. Given this parameter is already being monitoring at Outfall 001, it is staff's professional judgement that additional monitoring at Internal Outfall 103 is not necessary.

Effluent Limitations and Monitoring Requirements: Internal Outfall 103 (Unit 1 Oil – Water Separator)

Average Flow: 0.003 MGD
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NA	1/M	Estimate
Total Suspended Solids (TSS)	1a, 1b, 2	30 mg/L	100 mg/L	NA	NA	1/M	Grab
Oil and Grease (O&G)	1a, 1b, 2	15 mg/L	20 mg/L	NA	NA	1/M	Grab

1. Federal Effluent Requirements
   a) 40 CFR 423.15(a)(3)
   b) 40 CFR 423.15(a)(13)
2. Professional Judgement

NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
1/M = Once every month.

1/6M = The semi-annual monitoring period shall be January 1 – June 30 and July 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (July 10 and January 10, respectively).
Grab = An individual sample collected over a period of time not to exceed 15-minutes.
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Federal Effluent Requirements:

a. 40 CFR 423.15(a)(3) – NSPS low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
b. 40 CFR 423.15(a)(13) – NSPS quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of a mass based limitation.

Photo 1. Internal Outfall 103.

Photo 2. Trench drain from Internal Outfall 103 to retention pond. Flow is in the direction of the arrow.

Photo 3. The arrow points to the location where Internal Outfall 103 enters the retention pond.

Internal Outfall 104

Outfall Drainage Area
Unit 2 Oil – Water Separator

Sources:
Unit 2 wastewater sump, steam turbine oily water drains, combustion turbine oily water drains, water injection skid, vacuum pump seals, boiler feed pumps, false start drains, and instrument air receiver blow down.

Representative Outfalls:
None

Discharge Location:
Retention Basin

Outfall Discussion:
Internal Outfall 104 and the associated drainage areas were observed by staff during a site visit conducted on September 20, 2017. Under normal operations, flow from the above sources is directed via Internal Outfall 103 to the retention pond located adjacent to the plant where it comingles with stormwater within the pond. Water from the retention pond is then discharged through Outfall 001 to the South Anna River.

Data Screening:
Monitoring data obtained from Discharge Monitoring Report forms (DMRs) from this permit cycle has been reviewed and determined to be suitable for evaluation.

The discharge from Internal Outfall 104 is subject to Federal Effluent Guidelines established in 40 CFR Part 423 for the Steam Electric Power Generating Point Source Category. Effluent Limitation Guidelines are technology-based regulations that have been developed by the U.S. Environmental Protection Agency (EPA) for a specific category of discharger and are based on the performance of control and treatment technologies. By definition, the discharge from Internal Outfall 104 is considered a low volume waste source under the New Source Performance Standards (NSPS) found within §423.15.

Low Volume Waste:
Effective November 3, 2015, EPA adopted a final rule updating the Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category. The updated rule broke Section 423.15 New Source Performance Standards (NSPS) in to two subparts, "a" and "b", with subpart "a" pertaining to new sources as of November 19, 1982, and subpart "b" pertaining to new sources as of November 17, 2015. Pursuant to 40 CFR Part 122.2, new source is defined as "any building, structure, facility of installation from which there is or may be a "discharge of pollutants" the construction of which commenced after promulgation of standards of performance under Section 306 of the Clean Water Act which are applicable to such source". A review of DEQ files indicates construction and operation of the Station began in the early to mid-1990s. As such, it is staff's professional judgement that subpart "a" of the updated rule is applicable given the Gordonsville Power Station commenced construction and became operational after promulgation of revised standards of performance in 1982.

The updated 2015 rule also established that compliance with new Best Available Technology (BAT) standards for flue gas desulfurization (FGD) wastewaters, fly ash transport waters, flue gas mercury control wastewaters, gasification wastewaters, and bottom ash transport waters [40 CFR §§423.13(g), (h), (i), (j) and (k)] be met as soon as possible beginning November 1, 2018, but no later than December 31, 2023. In a subsequent final rule published on September 18, 2017, EPA postponed the earliest compliance date for steam electric facilities to meet BAT specifically for discharges of bottom ash transport water and flue gas desulfurization wastewater until November 1, 2020 to facilitate a new federal rulemaking process to potentially revise the BAT standards. Given the Gordonsville Power Station utilizes natural gas and oil and does not have discharges of bottom ash transport water nor flue gas desulfurization wastewater, compliance dates for BAT are not applicable.

Monitoring Discussion and Requirements:

pH:
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13– BAT. Requirements for pH are only found within 40 CFR 423.15(a)(1) – NSPS. This section states that the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.

Because the retention pond is utilized for pH adjustment, it is staff's professional judgement that pH limitations required under the revised rule remain in place at Outfall 001 and that pH limitations not be implemented at Internal Outfall 104.

Oil and Grease (O&G):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 20 mg/L maximum for any one day and a 15 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 20 mg/L and a monthly average concentration of 15 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Suspended Solids (TSS):
In accordance with the revised rule, staff compared the requirements found within 40 CFR 423.15 – NSPS and 40 CFR 423.13 – BAT. Low volume waste requirements are only addressed within 40 CFR 423.15(a)(3). As such, the basis for the limitation would be based on the NSPS. 40 CFR 423.15(a)(3) states that the quantity of pollutants discharged in low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times a 20 mg/L maximum for any one day and a 15 mg/L average of daily values for thirty consecutive days.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(a)(13)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of any mass based limitation specified in paragraph 423.15(a)(3). It is staff's professional judgement that converting the maximum for any one day to a daily maximum and the average of daily values for thirty consecutive days to a monthly average is the most conservative approach. As such, a daily maximum concentration of 20 mg/L and a monthly average concentration of 15 mg/L shall be applied to the discharge. These limitations are consistent with those established in previous reissuances. The monitoring frequency of once per month (1/M) shall be carried forward.

Effluent Limitations and Monitoring Requirements: Internal Outfall 104 (Unit 2 Oil – Water Separator)

Average Flow: 0.001 MGD
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NA	1/M	Estimate
Total Suspended Solids (TSS)	1a, 1b, 2	30 mg/L	100 mg/L	NA	NA	1/M	Grab
Oil and Grease (O&G)	1a, 1b, 2	15 mg/L	20 mg/L	NA	NA	1/M	Grab

1. Federal Effluent Requirements
   a) 40 CFR 423.15(a)(3)
   b) 40 CFR 423.15(a)(13)
2. Professional Judgement

NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
1/M = Once every month.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Federal Effluent Requirements:

a. 40 CFR 423.15(a)(3) – NSPS low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
b. 40 CFR 423.15(a)(13) – NSPS quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of a mass based limitation.

Photo 1. Internal Outfall 104.

Photo 2. Trench drain from Internal Outfall 104 to retention pond. Flow is in the direction of the arrow.

Photo 3. The arrow points to the location where Internal Outfall 104 enters the retention pond.

Quarry

Discussion:
The Station receives the majority of its intake water from the Town of Gordonsville for use in plant processes including cooling towers to condense steam used to produce electricity. Should water not be available from the Town of Gordonsville, the Station maintains an intake on a quarry located adjacent to the South Anna River. The quarry is approximately 100 feet deep and is spring fed. The intake is regulated by a Virginia Water Protection (VWP) permit, 91-1631. The quarry was observed by staff during a site visit conducted on September 20, 2017.

Photo 1. Quarry.

Photo 2. Intake from quarry.

Photo 3. Town of Gordonsville water connection.

Attachment 7

To:	Susan Mackert
From:	Rebecca Shoemaker
Date:	April 19, 2018
Subject:	Planning Statement for Dominion – Gordonsville Power Station
Permit Number:	VA0087033

Information for Outfall 001:

Discharge Type: Industrial Wastewater and Industrial Stormwater
Discharge Flow: 0.08 MGD
Receiving Stream: South Anna River
Latitude / Longitude: 38° 07′ 24″ / 78° 12′ 9″
Rivermile: 100.31
Streamcode: 8-SAR
Waterbody: VAN-F01R
6th Order HUC: YO01
Stream Class/Stream Section/Special Standards: Class III, Section 3, no special standards
Drainage Area: 5.1 mi^2

1. Please provide water quality monitoring information for the receiving stream segment. If there is not monitoring information for the receiving stream segment, please provide information on the nearest downstream monitoring station, including how far downstream the monitoring station is from the outfall.

This facility discharges to South Anna River. DEQ ambient monitoring station 8-SAR101.03 is located at Route 231, approximately 0.72 miles upstream from Outfall 001. The following is the water quality summary for this segment of South Anna River, as taken from the 2016 Integrated Report:

Class III, Section 3.

DEQ monitoring stations located in this segment of South Anna River:

- *ambient monitoring station 8-SAR101.03, at Route 231*

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for the South Anna River watershed has been completed and approved. The aquatic life and wildlife uses are considered fully supporting. An observed effect for the aquatic life use is noted based on total phosphorus samples collected from 2000 to 2004. While nutrients are not assessed as there are no nutrient standards for free-flowing streams, the observed effect was noted in the 2006 Integrated Report because seven of 22 samples (31.8%) exceeded the total phosphorus screening value (0.20 mg/L) that was in place at the time. The observed effect for total phosphorus has remained in place. There is also an observed effect for the aquatic life use noted based on benthic macroinvertebrate bioassessments. The fish consumption use was not assessed.

2. Does this facility discharge to a stream segment on the 303(d) list? If yes, please fill out Table A.

Yes.

Table A. 303(d) Impairment and TMDL information for the receiving stream segment

Waterbody Name	Impaired Use	Cause	Year First Listed as Impaired	TMDL Completed	WLA	Basis for WLA
Impairment Information in the 2016 Integrated Report						
South Anna River	Recreation	*E. coli*	2002	Pamunkey River Basin Bacteria 08/02/2006 Modified 04/27/2015	None (not expected to discharge pollutant)	---

3. Are there any downstream 303(d) listed impairments that are relevant to this discharge? If yes, please fill out Table B.

Yes.

Table B. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the 2016 Integrated Report							
South Anna River	Aquatic Life Use	Benthic Macroinvertebrates	1.5 miles	No	---	---	---

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

This facility is a candidate for additional monitoring based on the downstream benthic macroinvertebrate impairment for the South Anna River. However, the benthic macroinvertebrate impairment in the 2016 Integrated Report was based on biological monitoring performed in 2007 and 2008. Biological monitoring performed at this location in 2015 and 2016 (after the completion of the 2016IR assessment period) indicated a healthy aquatic community and support of the aquatic life use. Therefore, no additional monitoring is requested.

There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

5. Fact Sheet Requirements – Please provide information regarding any drinking water intakes located within a 5 mile radius of the discharge point.

There are no public water supply intakes located within five miles of this discharge.

Attachment 8

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Dominion - Gordonsville Power Station Permit No.: VA0087033

Receiving Stream: South Anna River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	64	mg/L
90% Temperature (Annual) =	26	deg C
90% Temperature (Wet season) =		deg C
90% Maximum pH =	6.8	SU
10% Maximum pH =		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) =	0.028	MGD
7Q10 (Annual) =	0.035	MGD
30Q10 (Annual) =	0.085	MGD
1Q10 (Wet season) =	0.452	MGD
30Q10 (Wet season)	0.853	MGD
30Q5 =	0.149	MGD
Harmonic Mean =	0.639	MGD

Mixing Information

Annual - 1Q10 Mix =	0	%
- 7Q10 Mix =	0	%
- 30Q10 Mix =	0	%
Wet Season - 1Q10 Mix =	0	%
- 30Q10 Mix =	0	%

Effluent Information

Mean Hardness (as CaCO3) =	40	mg/L
90% Temp (Annual) =	30	deg C
90% Temp (Wet season) =		deg C
90% Maximum pH =	7.8	SU
10% Maximum pH =	6.4	SU
Discharge Flow =	0.08	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				Method
(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	Target Value
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03	2.8E+03
Acrolein	0	3.0E+00	3.0E+00	na	9.3E+00	3.0E+00	3.0E+00	na	8.4E+01	--	--	--	--	--	--	--	--	3.0E+00	3.0E+00	na	8.4E+01	1.2E+00
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01	2.2E+01
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	4.5E-03	--	--	--	--	--	--	--	--	3.0E+00	--	na	4.5E-03	4.5E-03
Ammonia-N (mg/l) (Yearly)	0	1.21E+01	1.17E+00	na	--	1.21E+01	1.17E+00	na	--	--	--	--	--	--	--	--	--	1.21E+01	1.17E+00	na	--	7.0E-01
Ammonia-N (mg/l) (High Flow)	0	1.21E+01	3.18E+00	na	--	1.21E+01	3.18E+00	na	--	--	--	--	--	--	--	--	--	1.21E+01	3.18E+00	na	--	1.9E+00
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05	1.1E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03	1.8E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--	9.0E+01
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	--	--	na	4.6E+03	4.6E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-02	1.8E-02
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01	4.8E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	--	--	na	1.9E+05	1.9E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	--	--	na	2.0E+02	2.0E+02
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04	1.3E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03	5.4E+03
Cadmium	0	1.4E+00	5.5E-01	na	--	1.4E+00	5.5E-01	na	--	--	--	--	--	--	--	--	--	1.4E+00	5.5E-01	na	--	3.3E-01
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02	1.4E+02
Carbaryl		2.1E+00	2.1E+00	na	--	2.1E+00	2.1E+00	na	--	--	--	--	--	--	--	--	--	2.1E+00	2.1E+00	na	--	8.4E-01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	7.3E-02	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	7.3E-02	2.6E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--	1.4E+05
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--	6.6E+00
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	--	--	na	4.6E+03	4.6E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				Method
(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	Target Value
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	--	--	na	1.2E+03	1.2E+03
Chloroform	0	--	--	na	1.1E+04	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	--	--	na	3.1E+04	3.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	--	--	na	4.6E+03	4.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	4.3E+02	--	--	--	--	--	--	--	--	--	--	na	4.3E+02	4.3E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--	2.5E-02
Chromium III	0	2.7E+02	3.5E+01	na	--	2.7E+02	3.5E+01	na	--	--	--	--	--	--	--	--	--	2.7E+02	3.5E+01	na	--	2.1E+01
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--	6.4E+00
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Chrysene[C]	0	--	--	3.8E-02	1.8E-02	--	--	na	1.6E-01	--	--	--	--	--	--	--	--	--	--	na	1.6E-01	1.6E-01
Copper	0	5.7E+00	4.1E+00	na	--	5.7E+00	4.1E+00	na	--	--	--	--	--	--	--	--	--	5.7E+00	4.1E+00	na	--	2.3E+00
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	4.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	4.6E+04	3.1E+00
DDD[C]	0	--	--	na	3.1E-03	--	--	na	2.8E-02	--	--	--	--	--	--	--	--	--	--	na	2.8E-02	2.8E-02
DDE[C]	0	--	--	na	2.2E-03	--	--	na	2.0E-02	--	--	--	--	--	--	--	--	--	--	na	2.0E-02	2.0E-02
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.0E-02	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.0E-02	6.0E-04
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--	1.0E-01
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--	6.8E-02
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	3.7E+03	--	--	--	--	--	--	--	--	--	--	na	3.7E+03	3.7E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03	2.7E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	na	5.4E+02	5.4E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00	2.5E+00
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03	1.5E+03
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03	3.3E+03
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04	2.0E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04	2.9E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	8.3E+02	--	--	--	--	--	--	--	--	--	--	na	8.3E+02	8.3E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03	1.3E+03
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03	1.9E+03
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	4.9E-03	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	4.9E-03	4.9E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05	1.3E+05
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.4E+03	--	--	--	--	--	--	--	--	--	--	na	2.4E+03	2.4E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	3.1E+06	--	--	--	--	--	--	--	--	--	--	na	3.1E+06	3.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04	1.3E+04
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04	1.5E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	8.0E+02	--	--	--	--	--	--	--	--	--	--	na	8.0E+02	8.0E+02
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02	3.1E+02
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.5E-07	--	--	--	--	--	--	--	--	--	--	na	1.5E-07	1.5E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01	1.8E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.5E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.5E+02	3.4E-02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	2.5E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.5E+02	3.4E-02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--	3.4E-02
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.5E+02	--	--	--	--	--	--	--	--	--	--	na	2.5E+02	2.5E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	1.7E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	1.7E-01	2.2E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	8.6E-01	--	--	--	--	--	--	--	--	--	--	na	8.6E-01	8.6E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				Method
(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	Target Value
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	6.0E+03	--	--	--	--	--	--	--	--	--	--	na	6.0E+03	6.0E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02	4.0E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04	1.5E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--	1.0E-02
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	7.1E-03	2.3E-03
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.5E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	3.5E-03	2.3E-03
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	2.6E-02	--	--	--	--	--	--	--	--	--	--	na	2.6E-02	2.6E-02
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03	1.6E+03
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	4.4E-01	--	--	--	--	--	--	--	--	--	--	na	4.4E-01	4.4E-01
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.5E+00	--	--	--	--	--	--	--	--	--	--	na	1.5E+00	1.5E+00
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.6E+01	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.6E+01	3.8E-01
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03	3.1E+03
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02	3.0E+02
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--	2.0E+00
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.6E+00	--	--	--	--	--	--	--	--	--	--	na	1.6E+00	1.6E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	8.6E+04	--	--	--	--	--	--	--	--	--	--	na	8.6E+04	8.6E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--	0.0E+00
Lead	0	3.4E+01	3.9E+00	na	--	3.4E+01	3.9E+00	na	--	--	--	--	--	--	--	--	--	3.4E+01	3.9E+00	na	--	2.3E+00
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--	1.0E-01
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--	4.6E-01
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03	4.3E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	5.3E+04	--	--	--	--	--	--	--	--	--	--	na	5.3E+04	5.3E+04
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--	1.8E-02
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--	0.0E+00
Nickel	0	8.4E+01	9.3E+00	na	4.6E+03	8.4E+01	9.3E+00	na	1.3E+04	--	--	--	--	--	--	--	--	8.4E+01	9.3E+00	na	1.3E+04	5.6E+00
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03	2.0E+03
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02	2.7E+02
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	na	5.4E+02	5.4E+02
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	4.6E+01	--	--	--	--	--	--	--	--	--	--	na	4.6E+01	4.6E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--	4.0E+00
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--	7.8E-03
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	5.8E-03	--	--	--	--	--	--	--	--	--	1.4E-02	na	5.8E-03	5.8E-03
Pentachlorophenol [C]	0	4.8E+00	3.7E+00	na	3.0E+01	4.8E+00	3.7E+00	na	2.7E+02	--	--	--	--	--	--	--	--	4.8E+00	3.7E+00	na	2.7E+02	1.9E+00
Phenol	0	--	--	na	8.6E+05	--	--	na	2.5E+06	--	--	--	--	--	--	--	--	--	--	na	2.5E+06	2.5E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04	1.1E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				Method
(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	Target Value
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	1.2E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	1.2E+04	3.0E+00
Silver	0	7.1E-01	--	na	--	7.1E-01	--	na	--	--	--	--	--	--	--	--	--	7.1E-01	--	na	--	2.9E-01
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02	3.6E+02
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02	3.0E+02
Thallium	0	--	--	na	4.7E-01	--	--	na	1.3E+00	--	--	--	--	--	--	--	--	--	--	na	1.3E+00	1.3E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04	1.7E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.5E-02	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.5E-02	1.2E-04
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--	4.3E-02
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	2.0E+02	--	--	--	--	--	--	--	--	--	--	na	2.0E+02	2.0E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03	1.4E+03
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03	2.7E+03
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.2E+02	--	--	--	--	--	--	--	--	--	--	na	2.2E+02	2.2E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--	0.0E+00
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.2E+02	--	--	--	--	--	--	--	--	--	--	na	2.2E+02	2.2E+02
Zinc	0	5.4E+01	5.4E+01	na	2.6E+04	5.4E+01	5.4E+01	na	7.4E+04	--	--	--	--	--	--	--	--	5.4E+01	5.4E+01	na	7.4E+04	2.2E+01

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.

VA0087033 - Gordonsville Power Station (pH Data)

Due	Outfall	Concentration Max/Min	Due	Outfall	Concentration Max/Min	Units
4/10/13	001	6.2	1/10/16	001	7.8	S.U.
5/10/13	001	7.4	2/10/16	001	6.3	S.U.
6/10/13	001	6.0	3/10/16	001	6.9	S.U.
7/10/13	001	8.2	4/10/16	001	6.3	S.U.
8/10/13	001	6.7	5/10/16	001	6.6	S.U.
9/10/13	001	6.1	6/10/16	001	7.3	S.U.
10/10/13	001	8.7	7/10/16	001	7.4	S.U.
11/10/13	001	7.1	8/10/16	001	7.5	S.U.
12/10/13	001	6.6	9/10/16	001	7.4	S.U.
1/10/14	001	8.0	10/10/16	001	7.8	S.U.
2/10/14	001	7.6	11/10/16	001	7.2	S.U.
3/10/14	001	7.5	12/10/16	001	7.5	S.U.
4/10/14	001	7.0	1/10/17	001	7.5	S.U.
5/10/14	001	7.1	2/10/17	001	9.0	S.U.
6/10/14	001	7.0	3/10/17	001	8.6	S.U.
7/10/14	001	7.0	4/10/17	001	8.0	S.U.
8/10/14	001	6.6	5/10/17	001	7.3	S.U.
9/10/14	001	6.7	6/10/17	001	7.0	S.U.
10/10/14	001	7.7	7/10/17	001	7.9	S.U.
11/10/14	001	7.4	8/10/17	001	8.1	S.U.
12/10/14	001	7.0	9/10/17	001	7.4	S.U.
1/10/15	001	7.5	10/10/17	001	7.4	S.U.
2/10/15	001	7.0	11/10/17	001	7.4	S.U.
3/10/15	001	7.1				
4/10/15	001	7.3				
5/10/15	001	7.0				
6/10/15	001	6.5				
7/10/15	001	7.8				
8/10/15	001	6.8				
9/10/15	001	8.4				
10/10/15	001	6.4				
11/10/15	001	6.9				
12/10/15	001	7.1				

90% pH = 7.8 S.U.

10% pH = 6.4 S.U.

VA0087033 - Gordonsville Power Station (Hardness Data)

Due	Outfall	Concentration Max/Avg	Units
7/10/13	001	49.8	mg/L
1/10/14	001	40.0	mg/L
7/10/14	001	22.0	mg/L
1/10/15	001	51.4	mg/L
7/10/15	001	30.6	mg/L
1/10/16	001	29.7	mg/L
7/10/16	001	18.95	mg/L
1/10/17	001	37.3	mg/L
7/10/17	001	79.1	mg/L

Average = 40 mg/L

VA0087033 - Gordonsville Power Station (Temperature Data)

Due	Outfall	Concentration Maximum	Units
4/10/13	001	2.9	°C
6/10/13	001	13.6	°C
7/10/13	001	21.0	°C
8/10/13	001	30.8	°C
9/10/13	001	25.2	°C
10/10/13	001	28.9	°C
11/10/13	001	24.9	°C
6/10/14	001	17.6	°C
7/10/14	001	22.4	°C
8/10/14	001	23.5	°C
9/10/14	001	21.7	°C
10/10/14	001	20.9	°C
11/10/14	001	18.3	°C
6/10/15	001	26.9	°C
7/10/15	001	27.1	°C
8/10/15	001	29.8	°C
9/10/15	001	30.7	°C
10/10/15	001	24.9	°C
11/10/15	001	29.4	°C
6/10/16	001	17.7	°C
7/10/16	001	23.2	°C
8/10/16	001	28.7	°C
9/10/16	001	29.7	°C
10/10/16	001	28.1	°C
11/10/16	001	26.2	°C
6/10/16	001	14.4	°C
7/10/16	001	20.1	°C
8/10/16	001	24.3	°C
9/10/16	001	22.3	°C
10/10/16	001	20.5	°C
11/10/16	001	17.6	°C

90% Temperature = 30 °C

Attachment 9

DEPARTMENT OF ENVIRONMENTAL QUALITY

SUBJECT: Review of Gordonsville Power Station Water Effect Ratio Study

By: Alex M. Barron

Date: January 5, 2011
(Modified from September 9, 2010 memo to reflect EPA's review)

Summary Finding:
Dominion, Electric Environmental Services conducted a streamlined copper water effect ratio (WER) study for the Gordonsville Power Station, in Gordonsville, Virginia. The study followed EPA's guidelines for a streamlined copper WER study under suitable conditions and resulted in establishing a WER of 2.593 to be applied to dissolved copper concentrations. The WER will be used to adjust the copper criteria for copper and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the Gordonsville Power Station.

Description of study and review:
The Gordonsville Power Station, in Louisa County Virginia conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to their permitted discharge, consisting of boiler blowdown water and stormwater.

Virginia's water quality criteria for copper in freshwater consists of formulas to adjust the acute or chronic criteria for hardness using formulas developed and recommended by the U.S. Environmental Protection Agency (EPA). The Virginia criteria formulas include a water effect ratio (WER) which is set at a default value of 1.0 unless a WER study is performed for a specific receiving stream and discharge to establish a WER for that receiving stream. The Gordonsville Power Station conducted the WER study in order to establish a WER applicable to their receiving stream and to their discharge permit.

The Virginia freshwater criteria formulas for copper are shown below.

Freshwater acute criterion (µg /l)

WER x $[_e\{0.9422[\ln(\text{hardness})]-1.700\}]$ x (CFa)

Freshwater chronic criterion (µg/l)

WER x $[_e\{0.8545[\ln(\text{hardness})]-1.702\}]$ x (CFc)

WER = Water Effect Ratio =1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310.

e = natural antilogarithm
ln=natural logarithm
CFa = 0.960
CFc = 0.960

WER Study:
The Gordonsville Power Station conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to the receiving stream and to their discharge permit. This study followed the EPA guidance for a Streamlined Water-Effect Ratio Procedure for Discharges of Copper EPA-822-R-01-05 (hereafter referred to as the streamlined WER guidance). This guidance document is available at: http://epa.gov/waterscience/criteria/copper/2003/index.htm.

This streamlined WER guidance requires two sets of side-by side WER toxicity tests, conducted at different times at least a month apart and using a representative sample of the effluent and stream water mix at permit conditions. Each WER test consists of two side-by side toxicity tests using added copper to establish the LC_{50} value for copper. One of the tests is conducted in clean laboratory water and another text is conducted in simulated stream water consisting of receiving stream water and effluent mixed at the conditions of the permit. The two LC_{50} values for these two toxicity tests are used to calculate a water effect ratio by dividing the LC_{50} value from the test with the simulated stream-water by the LC_{50} value from the lab-water test.

A review of the streamlined water effect ratio (WER) study for the Gordonsville Power Station indicates that the set of toxicity tests conducted in August 2009 and September were conducted under acceptable conditions and are suitable for establishing a WER for this permitted facility. In all tests, the testing laboratory measured the concentrations of copper in the toxicity tests and calculated LC_{50} values based on both dissolved and total copper measurements. This allowed for the calculation of both dissolved and total copper WERs. Although this report provides data for both dissolved and total recoverable copper concentrations; the primary focus of this WER report is the dissolved copper in order to develop a dissolved WER that can be used to adjust the Virginia criteria, which is expressed as dissolved copper. Additional, permit specific issues are being investigated with separate studies conducted to investigate a chemical translator applicable to this discharge, as well as studies on stream flow and hardness for the receiving stream.

In both sets of tests the LC_{50} values for the lab-water tests were lower than the species mean acute value (SMAV) from other LC_{50} values reported in the literature for the test species *Ceriodaphnia dubia* as reported by EPA in the Streamlined Water-Effect Ratio Procedure for Discharges of Copper. This is not unusual in current toxicity tests with this species because the typical reference laboratory waters used in labs currently are often much "cleaner" (resulting in lower EC50 values) than the reference lab waters used in many of the original tests that form the basis for the criteria. To account for this and

appropriately develop a WER that applies to the original criteria, EPA's streamlined WER guidance requires (on page 13 and Appendix B page 17) that the SMAV reported in the EPA streamlined WER guidance be used to establish the WER for this discharge and receiving stream. Before calculating the WERs, all LC_{50} values from the toxicity tests and SMAVs from the EPA streamlined WER guidance (Appendix B page 17) were normalized to the same hardness level of 40 mg/L as CaCO3 (the hardness that is used for this stream in the permit). The hardness normalization was done using the following formula as described in EPA's streamlined WER guidance (page 13);

LC_{50} at standard hardness =

$LC_{50\ \text{at sample hardness}} \times (\text{standard hardness} / \text{sample hardness})^{0.9422}$

The consultant's report presented the findings by normalizing the original LC50 values to a reference hardness of 40 (representative to the hardness in the various toxicity tests and close to what will be the basis for the permit calculations); however the resulting WERs are the same regardless of the hardness used, as long as all values are normalized to the same hardness level. The original LC_{50} values from the two acceptable tests from August and September 2009, as well as these LC_{50} values after being normalized to the reference hardness of 40 and the resulting WERs are shown in Table 1 attached below. ..

Final WER
The final WER to be used with this permit is the geometric mean of the two dissolved copper WERs established in the study.

The final dissolved copper WER demonstrated by this study is 2.593.

At a hardness of 40 the acute criterion is 5.7 µg/L x (WER) 2.593 = 14.7
This would be rounded to15 µg/L.

DEQ Review and Approval of WER by DEQ:
The Virginia Department of Environmental Quality's Water Quality Standards Unit has reviewed this study and approves the use of a dissolved copper WER of 2.593 to adjust the copper criteria as it applies to the Gordonsville Power Station's permit and receiving stream, the South Anna River. This dissolved copper WER of 2.593 will be used to adjust the copper criteria and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the Gordonsville Power Station.

WER review by EPA and application in permits procedure:

DEQ submitted the results of the WER study to the U.S. Environmental Protection Agency (EPA) for their review. EPA concluded that they believe that the WER study demonstrating a WER of 2.593 applied to dissolved copper measurements could provide a sound scientific rational to support the copper site-specific WER as applied to the

Gordonsville Power station NPDES permit. EPA's review of the WER study is subject to any new information that may arise through the public notice process.

The Virginia water Quality Standards (WQS) allow for a permittee to demonstrate that a WER is appropriate for their discharge and receiving stream. The WQS states that the WER shall be described in the public notice of the permit proceedings. DEQ action to approve or disapprove a WER applicable to a permittee is a case decision rather than an amendment to the WQS. Decisions regarding WERs are subject to the public participation requirements of the Permit Regulation.

The WER-modified copper criteria can be subjected to public participations via a permit related comment period, either via a permit re-issuance or permit modification.

Table 1;
Summary of all LC_{50} values from the Gordonsville Power Station WER studies; showing original values normalized to a standard hardness of 40 (i.e. at permit condition hardness)

Test Description	**LC_{50} (dissolved)**	**LC50 (total recoverable)**	**LC50 (dissolved) (Normalized to hardness 40 mg/L)**	**LC50 (total) (Normalized to 40 hardness mg/L)**
August 19-21, 2009; Lab water (hardness 42 mg/L)	2.574 µg/L	3.773 µg/L	2.458 µg/L	3.603µg/L
August 19-21, 2009; (hardness 42 mg/L) **simulated stream water**	38.18 µg/L	75.17µg/L	**36.46 µg/L**	**71.79 µg/L**
September 23-25, 2009; Lab water (hardness = 42)	1.897 µg/L	2.477 µg/L	1.812 µg/L	2.366 µg/L
September 23-25, 2009; (hardness =38) **simulated stream water**	15.28 µg/L	28.43 µg/L	**16.04 µg/L**	**29.84 µg/L**
Species Mean Acute Value (SMAV) (see EPA Cu-WER Guidance, page 17)	**Dissolved Cu SMAV @ 100 hardness**	**Total Cu SMAV @ 100 hardness**	**Dissolved Cu SMAV (Normalized to hardness of 40 mg/L)**	**Total Cu SMAV @ (Normalized to hardness of 40 mg/L)**
***Ceriodaphnia. dubia* SMAV at hardness = 100: (see EPA Cu-WER Guidance, page 17)**	22.11 µg/L	24.00 µg/L	**9.325 µg/L**	**10.12 µg/L**
WERs:	**Dissolved Cu WER**	**Total Cu WER**		
August 2009 WER (using SMAV normalized to hardness @ 40 mg/L)	36.46 / 9.325 = **3.910**	71.79 / 10.12 = 7.094		
September 2009 WER (using SMAV normalized to hardness @ 40 mg/L)	16.04 / 9.325 = **1.720**	29.84 / 10.12 = 2.949		
	Final WER (dissolved)	**Final WER (total)**		
Final WER (geometric mean of August and September WERs)	**2.593 (dissolved copper)**	**4.574 (total copper)**		

Attachment 10

MEMORANDUM

Virginia Department of Environmental Quality
Office Water Quality Monitoring and Assessment

629 East Main Street
Post Office Box 10009
Richmond, Virginia 23240-0009
11th Floor
804 698 4449
804 698 4116 fax

SUBJECT: Dominion Power Gordonsville Power Station Chemical Translator Project

TO: Susan Mackert

FROM: R.E. Stewart RESTEWART

DATE: Monday, November 29, 2010

COPIES: Darryl Glover, Alex Barron, Bryant Thomas

The Gordonsville Power Station Chemical Translator Project as submitted to the Department is a study conducted by Dominion Power and subcontractors to determine the ratio of instream dissolved Copper to total recoverable Copper. Copper in the dissolved form is considered bioavailable to aquatic organisms and its concentration is limited by the Department's Water Quality Standards, 9 VAC 25-260 - Virginia Water Quality Standards. Total Copper (total recoverable) may contain species of Copper that are not dissolved and therefore considered not bioavailable. By determining the ratio of dissolved to total Copper effluent permit limits may be adjusted to account for only the dissolved fraction of Copper entering the receiving stream.

The Project as presented to the Department on 14 May 2010 is well prepared and thorough and if implemented as described will produce data that are acceptable to the Department. The study results and conclusions for the derivation of a chemical translator value for Copper are well prepared and indicate high quality data. The final chemical translator, f_D, value of 0.4052 is acceptable for the application of adjusting a final effluent permit limit for Copper.

The chemical translator Project was reviewed and deemed acceptable on 7 September 2010.

Attachment 11

5/2/2018 2:41:02 PM

Facility = Dominion - Gordonsville
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.019 mg/l
WLAc = 0.011 mg/l
Q.L. = 0.1 mg/l
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly limit = 1.60883226245855E-02
Average Monthly LImit = 1.60883226245855E-02

The data are:

0.2 mg/l

7/24/2007 1:41:33 PM

Facility = Dominion - Gordonsville
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 19
WLAc = 11
Q.L. = 100
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 200
Variance = 14400
C.V. = 0.6
97th percentile daily values = 486.683
97th percentile 4 day average = 332.758
97th percentile 30 day average= 241.210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 16.0883226245855
Average Weekly limit = 16.0883226245856
Average Monthly Limit = 16.0883226245856 } ug/l

The data are:

200

8/22/2018 2:38:10 PM

Facility = Dominion Gordonsville
Chemical = Copper
Chronic averaging period = 4
WLAa = 37 ug/l
WLAc = 27 ug/l
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 9
Expected Value = 4.26444
Variance = 6.54677
C.V. = 0.6
97th percentile daily values = 10.3771
97th percentile 4 day average = 7.09514
97th percentile 30 day average= 5.14314
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.6
2.5
2.6
3.14
3.64
4.4
3.5
12.5
3.5

5/2/2018 2:42:12 PM

Facility = Dominion - Gordonsville
Chemical = Zinc
Chronic averaging period = 4
WLAa = 54 ug/l
WLAc = 54 ug/l
Q.L. = 26 ug/l
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 9
Expected Value = 28.2794
Variance = 287.902
C.V. = 0.6
97th percentile daily values = 68.8157
97th percentile 4 day average = 47.0511
97th percentile 30 day average= 34.1065
< Q.L. = 5
Model used = BPJ Assumptions, Type 1 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 54
Average Weekly limit = 54
Average Monthly LImit = 54

The data are: ug/l

7.9
13.5
44.1
24.2
102
24.6
83
22
113

VA0087033 - Gordonsville Power Station (Zinc Data)

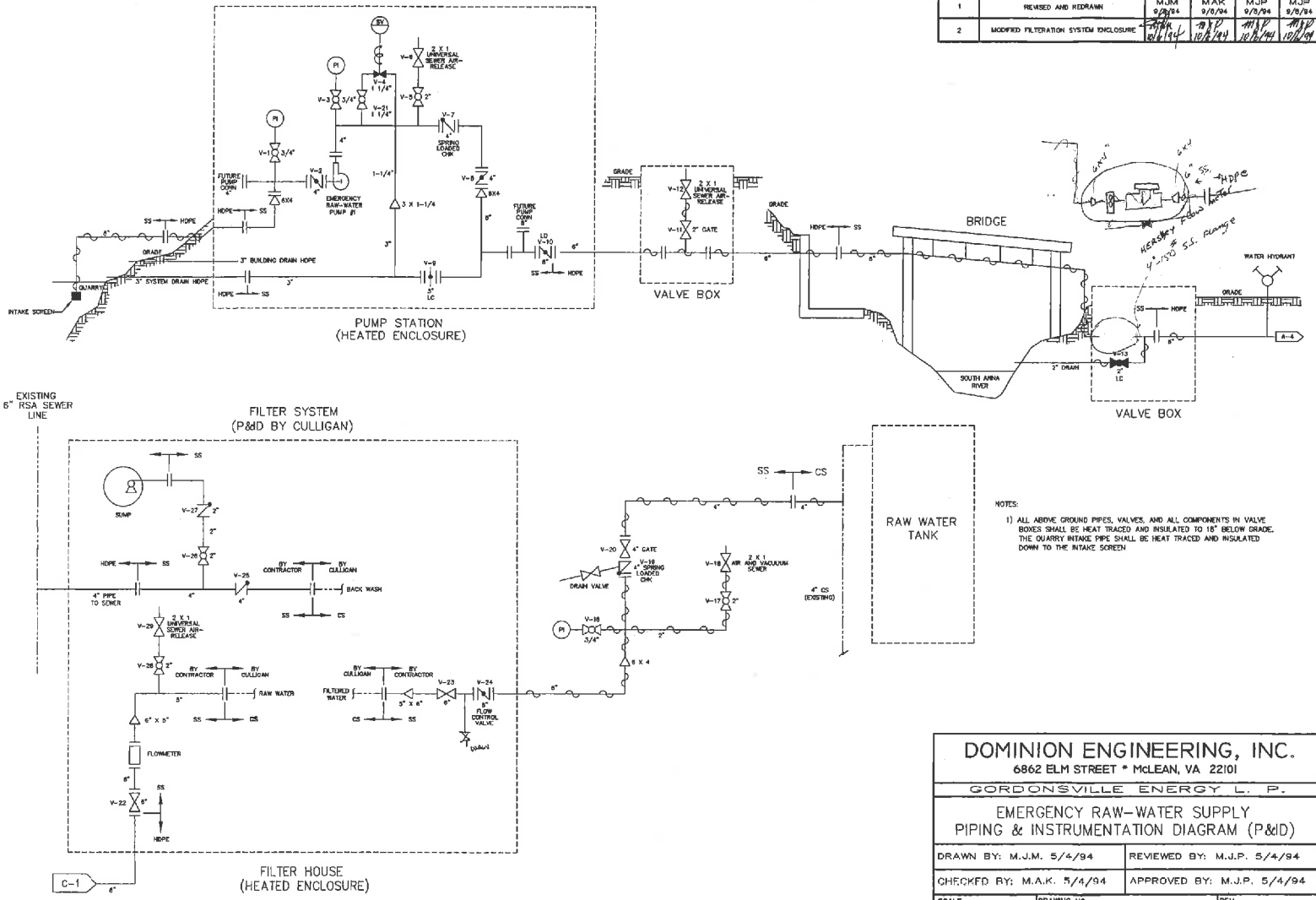
Due	Outfall	Concentration Max/Avg	Units
7/10/13	001	7.9	µg/L
1/10/14	001	13.5	µg/L
7/10/14	001	44.1	µg/L
1/10/15	001	24.2	µg/L
7/10/15	001	102	µg/L
1/10/16	001	24.6	µg/L
7/10/16	001	83	µg/L
1/10/17	001	22	µg/L
7/10/17	001	113	µg/L

VA0087033 - Gordonsville Power Station (Copper Data)

Due	Outfall	Concentration Max/Avg	Units
7/10/13	001	2.6	µg/L
1/10/14	001	2.5	µg/L
7/10/14	001	2.6	µg/L
1/10/15	001	3.14	µg/L
7/10/15	001	3.64	µg/L
1/10/16	001	4.4	µg/L
7/10/16	001	3.5	µg/L
1/10/17	001	12.5	µg/L
7/10/17	001	3.5	µg/L

Attachment 12

REV	DESCRIPTION	DRAWN	CHKD	REVD	APPD
1	REVISED AND REDRAWN	MJM 9/29/94	MAK 9/8/94	MJP 9/8/94	MJP 9/8/94
2	MODIFIED FILTERATION SYSTEM ENCLOSURE	MJM 10/6/94	MAK 10/8/94	MJP 10/8/94	MJP 10/10/94



NOTES:

1) ALL ABOVE GROUND PIPES, VALVES, AND ALL COMPONENTS IN VALVE BOXES SHALL BE HEAT TRACED AND INSULATED TO 18" BELOW GRADE. THE QUARRY INTAKE PIPE SHALL BE HEAT TRACED AND INSULATED DOWN TO THE INTAKE SCREEN

DOMINION ENGINEERING, INC.
6862 ELM STREET * McLEAN, VA 22101

GORDONSVILLE ENERGY L. P.

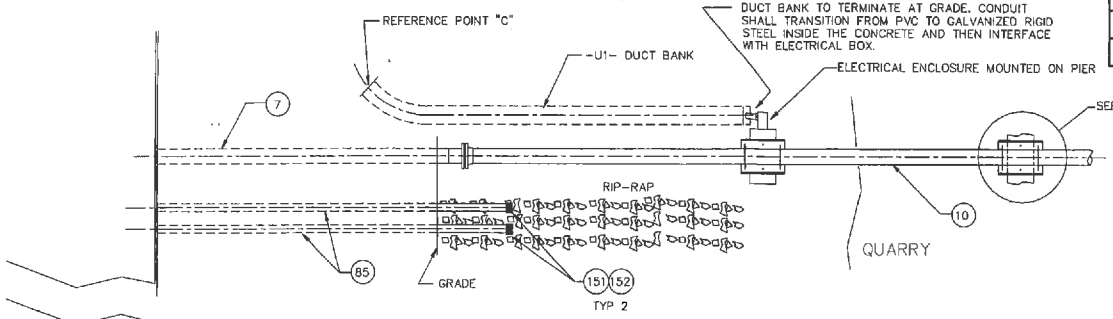
EMERGENCY RAW-WATER SUPPLY
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

DRAWN BY: M.J.M. 5/4/94	REVIEWED BY: M.J.P. 5/4/94
CHECKED BY: M.A.K. 5/4/94	APPROVED BY: M.J.P. 5/4/94

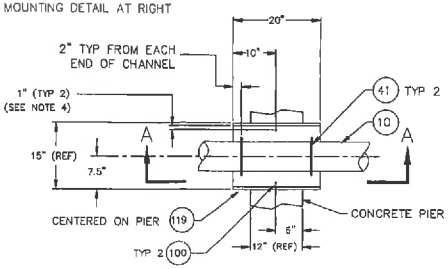
SCALE:	DRAWING NO.:	REV:
NONE	83-06-003 Sh 1/1	2

Fri Oct 7 02:24:25 1994

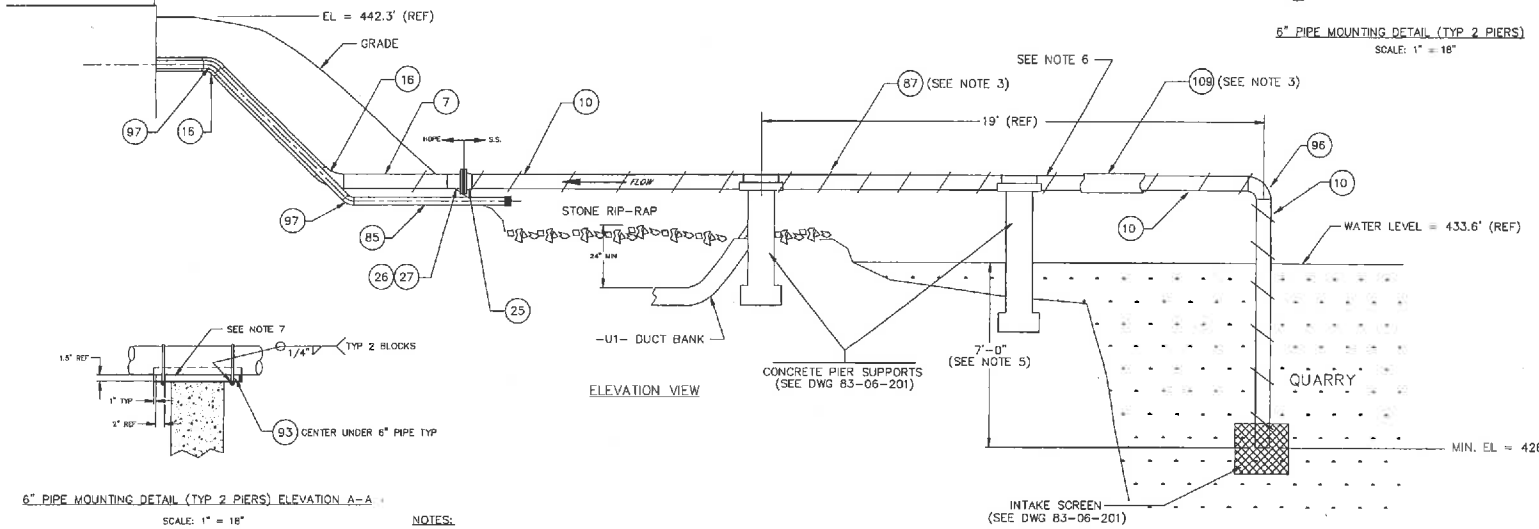
REV	DESCRIPTION	DRAWN	CHKD	REVD	APPD
1	CHG 6" PIPE TO 8", ADD DRAIN, ADD CROSS SECTION OF PIPE MOUNT	M.J.M. 9/8/94	M.A.K. 9/8/94	M.J.P. 9/8/94	M.J.P. 9/8/94
2	ADDED MESH WITH PIPE CLAMP.	BDC 10/8/94	MAK 10/8/94	MJP 10/8/94	MJP 10/8/94



PLAN VIEW



6" PIPE MOUNTING DETAIL (TYP 2 PIERS)
SCALE: 1" = 18"



ELEVATION VIEW

6" PIPE MOUNTING DETAIL (TYP 2 PIERS) ELEVATION A-A
SCALE: 1" = 18"

NOTES:

1) TOP OF 6" PIPE TO REMAIN 18" BELOW GRADE ALONG SLOPE PER DWG 83-06-004.
2) NOTE REMOVED
3) HEAT TRACE AND INSULATE ALL EXPOSED PIPING TO 18" BELOW GRADE AND ALL UNDERWATER PIPE. INCLUDE 2 SEPARATE HEAT-TRACING WRAPS TO BE POWERED BY INDEPENDENT CIRCUITS. THE HEAT TRACING SHEATH, HEAT TRACING CONNECTING JOINTS, AND THE INSULATION SHALL BE WATER PROOF (i.e., CAN BE CONTINUOUSLY IMMERSED IN WATER WITHOUT DAMAGE).
4) ANCHOR BOLTS (ITEMS 100) TO BE MOUNTED AS CLOSE TO THE CHANNEL FLANGES AS POSSIBLE.
5) THIS DIMENSION IS BASED ON A WATER ELEVATION OF 433.6'. IN NO CASE SHALL THE PIPE EXTEND BELOW AN ELEVATION OF 426.6' USING THE GELP SITE ELEVATION REFERENCE.
6) INTAKE PIPE TO SLOPE UP TOWARD PUMP HOUSE A MINIMUM OF 1/4" EVERY 10 FEET (NOT SHOWN).
7) CUTOUTS IN THE INSULATION TO CLEAR STANDOFF BLOCKS ARE PERMITTED. HEAT TRACING IS NOT TO BE PLACED BETWEEN THE PIPE AND CHANNELS. IT SHALL BE PLACED ON TOP OR ON THE SIDES OF THE PIPE.

DOMINION ENGINEERING, INC.
6862 ELM STREET * McLEAN, VA 22101

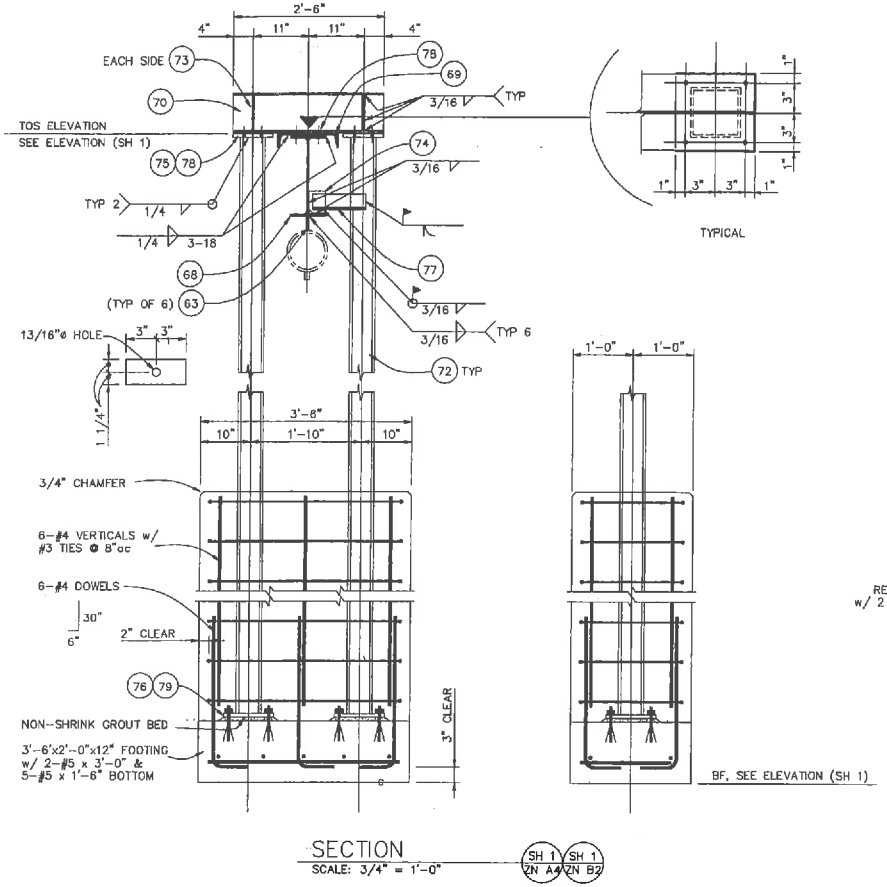
GORDONSVILLE ENERGY L. P.

EMERGENCY RAW-WATER SUPPLY
PUMP PLATFORM, HOUSING & ARRANGEMENT

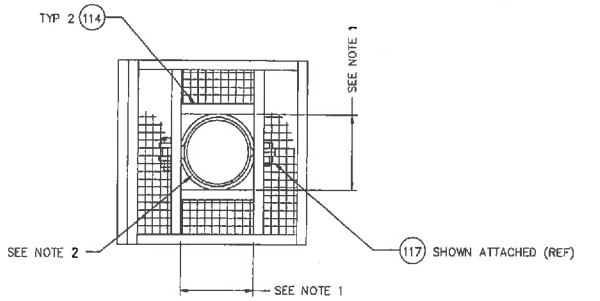
DRAWN BY: H.M. 5/4/94	REVIEWED BY: M.J.P. 5/4/94
CHECKED BY: M.A.K. 5/4/94	APPROVED BY: M.J.P. 5/4/94

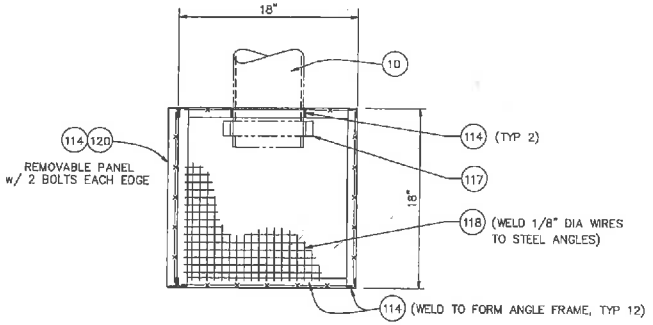
SCALE:	DRAWING NO.:	REV:
1"=36"	83-06-006 Sh 3/3	2

REV	DESCRIPTION	DRAWN	CHKD	REVD	APPD
1	ADD NOTE 1, AND PLAN VIEW OF SCREEN ASSY	MJM 5/5/94	MAK 5/5/94	MJP 5/5/94	MJP 5/5/94
2	REVISED TO SQUARE TUBING.	[illegible] 10/5/94	MJP 10/5/94	MJP 10/5/94	MJP 10/5/94



SECTION
SCALE: 3/4" = 1'-0"
SH 1 ZN A4 SH 1 ZN B2





SCREEN ASSEMBLY
SCALE: 1 1/2" = 1'-0"
SH 4 ZN C2

NOTES:

1) THIS DIMENSION TO BE DETERMINED IN THE FIELD TO ALLOW CLEARANCE OF 6" SS PIPE. THE GAPS BETWEEN ANGLES AND PIPE AT CLOSEST APPROACH SHALL BE LESS THAN 1/4".
2) VERIFY THAT THE SCREEN ASSEMBLY CANNOT SLIP OFF THE PIPE.

DOMINION ENGINEERING, INC.
6862 ELM STREET * MCLEAN, VA 22101

GORDONSVILLE ENERGY L. P.

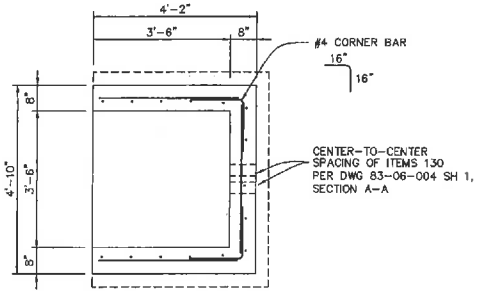
EMEREGENCY RAW-WATER SUPPLY

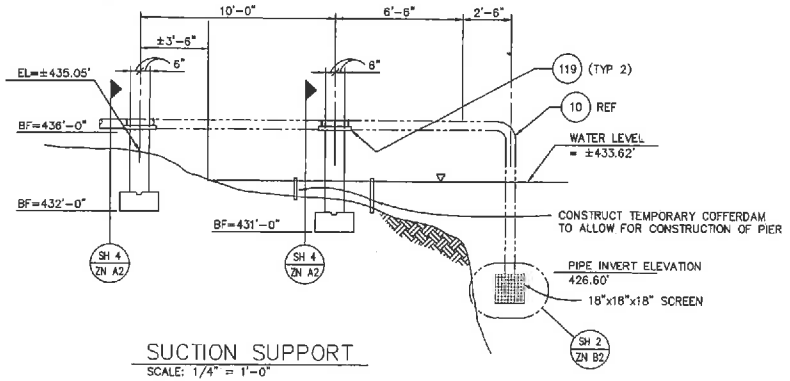
SOUTH ANNA RIVER BRIDGE & QUARRY INTAKE STRUCTURE SUPPORT

DRAWN BY: K.A.V. 5/4/94	REVIEWED BY: W.C.B. 5/4/94
CHECKED BY: W.C.B. 5/4/94	APPROVED BY: W.C.B. 5/4/94

SCALE:	DRAWING NO.:	REV:
AS NOTED	83-06-201 Sh 2/4	2

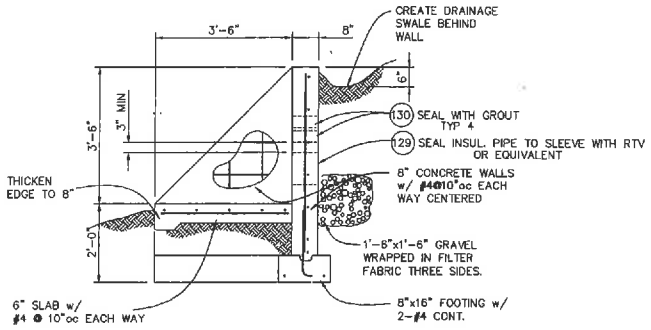
REV	DESCRIPTION	DRAWN	CHKD	REVD	APPD



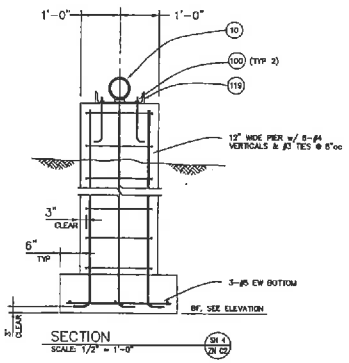


SUCTION SUPPORT
SCALE: 1/4" = 1'-0"

LEGEND
BF - BOTTOM OF FOOTING
TOS - TOP OF STEEL
EL - ELEVATION
O.C. - ON CENTER



SECTION
SCALE: 1/2" = 1'-0"
SH 1 ZN B1



NOTES:

1) THE PIPE AND CONDUITS SHALL BE INSTALLED THROUGH THE PIPE SLEEVES SHOWN AFTER CONSTRUCTION OF THE CONCRETE REINFORCEMENT. PIPE SHOULD HAVE HEAT TRACING AND INSULATION INSTALLED PRIOR TO SLEEVING. CARE SHALL BE TAKEN NOT TO PINCH HEAT TRACING BENEATH THE WATER PIPE.

DOMINION ENGINEERING, INC. 6862 ELM STREET * McLEAN, VA 22101		
GORDONSVILLE ENERGY L. P.		
EMERGENCY RAW-WATER SUPPLY SOUTH ANNA RIVER BRIDGE AND QUARRY INTAKE STRUCTURE SUPPORT		
DRAWN BY: MKP 9-8-94	REVIEWED BY: MKP 9/8/94	
CHECKED BY: MKP 9/8/94	APPROVED BY: MKP 9/8/94	
SCALE: AS NOTED	DRAWING NO.: 83-06-201 Sh 4/4	REV: 0

Thu Sep 8 11:52:12 1994

Gordonsville Quarry Intake Screen Velocity Calculations

Data:

Screen faces – 6, 18 in. x 18 in.
Pipe - 6 in. inner diameter, 6.625 in. outer diameter (schedule 40)
Screen mesh - ½ in. x ½ in.
Wire size – 1/8 in.
Design pump flow – 382 gpm

Calculations:

Screen area (nominal screen area minus area of intake pipe)

$$\frac{6 \times (18\text{ in})^2 - (6.625\text{ in})^2 \times \pi}{144\text{ in}^2/\text{ft.}} = 12.5\text{ ft}^2$$

Percent open area

$$A = (O/(O + D))^2 \times 100$$

Where O= opening size = wire spacing (1/2 in) – wire size (1/8 in = D)

$$A = (0.375\text{ in} / 0.5\text{ in})^2 = 56\ \%$$

Flow

$$\frac{382\text{ gal}}{\text{min}} \times \frac{1\text{ ft}^3}{7.48\text{ gal.}} \quad \frac{\text{min.}}{60\text{ sec.}} = 0.851\text{ ft}^3/\text{sec}$$

Approach velocity

$$\frac{0.851\text{ ft}^3/\text{sec}}{12.5\text{ ft}^2} = 0.069\text{ ft/sec}$$

Through screen velocity

$$0.069\text{ ft/sec} / 0.56 = 0.12\text{ ft/sec}$$

Attachment 13

Species List Report

List of species known or likely to occur within a **3 mile radius of (at 38,07,27 78,12,13)** in **003 Albemarle, 109 Louisa, 137 Orange, VA.**

1-494 Species Records

Bova Code	Status*	Common Name	Scientific Name
060017	FESE	Spinymussel, James (= Virginia)	Pleurobema (= Fusconaia = Elliptio = Canthyra) collina
040093	FTST	Eagle, bald	Haliaeetus leucocephalus
060121	FC	Kidneyshell, fluted	Ptychobranchus subtentum
060029	FSSS	Lance, yellow	Elliptio lanceolata
060081	FSST	Floater, green	Lasmigona subviridis
050081	FS	Woodrat, Allegheny	Neotoma magister
100248	FS	Fritillary, regal	Speyeria idalia idalia
060173	FSST	Pigtoe, Atlantic	Fusconaia masoni
040292	FSST	Shrike, migrant loggerhead	Lanius ludovicianus migrans
040320	FS	Warbler, cerulean	Dendroica cerulea
010363	FS	Darter, Appalachia	Percina gymnocephala
040293	ST	Shrike, loggerhead	Lanius ludovicianus
040096	ST	Falcon, peregrine	Falco peregrinus
040129	ST	Sandpiper, upland	Bartramia longicauda
040204	SS	Owl, barn	Tyto alba pratincola
040112	SS	Moorhen, common	Gallinula chloropus cachinnans
040094	SS	Harrier, northern	Circus cyaneus
040262	SS	Nuthatch, red-breasted	Sitta canadensis
040264	SS	Creeper, brown	Certhia americana
040189	SS	Tern, Caspian	Sterna caspia
040270	SS	Wren, sedge	Cistothorus platensis
040278	SS	Thrush, hermit	Catharus guttatus
010077	SS	Shiner, bridle	Notropis bifrenatus
040032	SS	Egret, great	Ardea alba egretta
040366	SS	Finch, purple	Carpodacus purpureus
040266	SS	Wren, winter	Troglodytes troglodytes
040285	SS	Kinglet, golden-crowned	Regulus satrapa
040306	SS	Warbler, golden-winged	Vermivora chrysoptera
040314	SS	Warbler, magnolia	Dendroica magnolia
040304	SS	Warbler, Swainson?s	Limnothlypis swainsonii

040364	SS	Dickcissel	Spiza americana
050045	SS	Otter, northern river	Lontra canadensis lataxina
050046		Skunk, eastern spotted	Spilogale putorius putorius
050047		Skunk, striped	Mephitis mephitis nigra
050048		Skunk, striped	Mephitis mephitis mephitis
050049		Fox, red	Vulpes vulpes fulva
050050		Fox, common gray	Urocyon cinereoargenteus cinereoargenteus
050051		Bobcat	Lynx rufus rufus
050054		Woodchuck	Marmota monax monax
050055		Chipmunk, Fisher?s eastern	Tamias striatus fisheri
050058		Squirrel, northern gray	Sciurus carolinensis pennsylvanicus
050059		Squirrel, talkative red	Tamiasciurus hudsonicus loquax
050063		Squirrel, eastern fox	Sciurus niger vulpinus
050065		Squirrel, southern flying	Glaucomys volans volans
050069		Beaver, American	Castor canadensis
050071		Mouse, eastern harvest	Reithrodontomys humulis virginianus
050073		Mouse, northern white-footed	Peromyscus leucopus noveboracensis
050076		Mouse, Lewis? golden	Ochrotomys nuttalli nuttalli
050078		Rat, marsh rice	Oryzomys palustris palustris
040365		Grosbeak, evening	Coccothraustes vespertinus
040305		Warbler, worm-eating	Helmitheros vermivorus
040315		Warbler, Cape May	Dendroica tigrina
040316		Warbler, black-throated blue	Dendroica caerulescens
040317		Warbler, yellow-rumped	Dendroica coronata cornata
040319		Warbler, black-throated green	Dendroica virens
040307		Warbler, blue-winged	Vermivora pinus
040311		Warbler, Nashville	Vermivora ruficapilla
040312		Parula, northern	Parula americana
040313		Warbler, yellow	Dendroica petechia
040286		Kinglet, ruby-crowned	Regulus calendula
040290		Waxwing, cedar	Bombycilla cedrorum
040268		Wren, Carolina	Thryothorus ludovicianus
040269		Wren, marsh	Cistothorus palustris
040367		Finch, house	Carpodacus mexicanus
040368		Grosbeak, pine	Pinicola enucleator
040369		Redpoll, common	Carduelis flammea
040370		Siskin, pine	Carduelis pinus
040371		Goldfinch, American	Carduelis tristis
040373		Crossbill, white-winged	Loxia leucoptera
040375		Towhee, eastern	Pipilo erythrophthalmus

040377		Sparrow, savannah	Passerculus sandwichensis
040378		Sparrow, grasshopper	Ammodramus savannarum pratensis
040383		Sparrow, vesper	Pooecetes gramineus
040387		Junco, dark-eyed	Junco hyemalis
040388		Sparrow, American tree	Spizella arborea
040389		Sparrow, chipping	Spizella passerina
040391		Sparrow, field	Spizella pusilla
040393		Sparrow, white-crowned	Zonotrichia leucophrys
040394		Sparrow, white-throated	Zonotrichia albicollis
040395		Sparrow, fox	Passerella iliaca
040397		Sparrow, swamp	Melospiza georgiana
040398		Sparrow, song	Melospiza melodia
040401		Bunting, snow	Plectrophenax nivalis nivalis
040408		Gull, ivory	Pagophila eburnea
050001		Opossum, Virginia	Didelphis virginiana virginiana
050002		Shrew, ashen masked	Sorex cinereus cinereus
050007		Shrew, southeastern	Sorex longirostris longirostris
050010		Shrew, pygmy	Sorex hoyi winnemana
050013		Shrew, Kirtland?s short-tailed	Blarina brevicauda kirtlandi
050015		Shrew, least	Cryptotis parva parva
050016		Mole, hairy-tailed	Parascalops breweri
050017		Mole, eastern	Scalopus aquaticus aquaticus
050020		Bat, little brown	Myotis lucifugus lucifugus
050022		Myotis, northern	Myotis septentrionalis septentrionalis
050025		Bat, silver-haired	Lasionycteris noctivagans
050027		Pipistrelle, eastern	Pipistrellus subflavus subflavus
050028		Bat, big brown	Eptesicus fuscus fuscus
050029		Bat, eastern red	Lasiurus borealis borealis
050030		Bat, hoary	Lasiurus cinereus cinereus
050037		Bear, black	Ursus americanus americanus
050038		Raccoon	Procyon lotor lotor
050040		Weasel, least	Mustela nivalis allegheniensis
050041		Weasel, long-tailed	Mustela frenata noveboracensis
050042		Mink, common	Mustela vison mink
070093		Crayfish, no common name	Cambarus longulus
070094		Crayfish, no common name	Cambarus acuminatus
070095		Crayfish, devil	Cambarus diogenes diogenes
070098		Crayfish, spiny cheek	Orconectes limosus
070102		Crayfish, Appalachian brook	Cambarus bartonii bartonii
070104		Crayfish	Orconectes obscurus

070119		CRAYFISH, VIRILE	ORCONECTES VIRILIS
070120		CRAYFISH, WHITE RIVER	Procambarus acutus
070130		CRAYFISH	Orconectes c. f. spinosus
100016		Gnat	Culicoides stellifer
100040		Moth, codling	Cydia pomonella
100041		Borer, European corn	Ostrinia nubilatis
100042		Earworm, corn	Heliathis zea
100043		Armyworm	Pseudaletia unipuncta
100047		Moth, gypsy	Lymantria dispar
100079		Butterfly, monarch	Danaus plexippus
100082		Butterfly, silver-spotted skipper	Epargyreus clarus
100090		Butterfly, mourning cloak	Nymphalis antiopa
100092		Butterfly, black swallowtail	Papilio polyxenes asterius
100093		Butterfly, eastern tiger swallowtail	Papilio glaucus
100094		Butterfly, clouded sulphur	Colias philodice
100137		Butterfly, brown elfin	Callophrys augustinus
100141		Butterfly, hoary edge	Achalarus lyciades
100142		Butterfly, southern cloudywing	Thorybes bathyllus
100143		Butterfly, northern cloudywing	Thorybes pylades
100146		Butterfly, sleepy duskywing	Erynnis brizo
100147		Butterfly, dreamy duskywing	Erynnis icelus
100148		Butterfly, Juvenal?s duskywing	Erynnis juvenalis
100149		Butterfly, Horace?s duskywing	Erynnis horatius
100158		Butterfly, swarthy skipper	Nastra lherminier
100160		Butterfly, least skipper	Ancyloxypha numitor
100161		Butterfly, European skipper	Thymelicus lineola
100162		Butterfly, fiery skipper	Hylephila phyleus
100165		Butterfly, cobweb skipper	Hesperia metea
100167		Butterfly, carus skipper	Polites carus
100168		Butterfly, crossline skipper	Polites origenes
100173		Butterfly, northern broken dash	Wallengrenia egeremet
100174		Butterfly, sachem	Atalopedes campestris
100175		Butterfly, little glassywing	Pompeius verna
100178		Butterfly, Hobomok skipper	Poanes hobomok
100180		Butterfly, Zabulon skipper	Poanes zabulon
100200		Butterfly, pipevine	Battus philenor

		swallowtail	
100202		Butterfly, spicebush swallowtail	Papilio troilus
100204		Butterfly, zebra swallowtail	Eurytides marcellus
100205		Butterfly, cabbage white	Pieris rapae
100206		Butterfly, checkered white	Pontia protodice
100209		Butterfly, falcate orangetip	Anthocharis midea
100211		Butterfly, orange sulphur	Colias eurytheme
100219		Butterfly, harvester	Feniseca tarquinius
100220		Butterfly, American copper	Lycaena phlaeas
100224		Butterfly, Henry?s elfin	Callophrys henrici
100225		Butterfly, eastern pine elfin	Callophrys niphon
100227		Butterfly, white M hairstreak	Parrhasius m-album
100232		Butterfly, banded hairstreak	Satyrium calanus
100234		Butterfly, striped hairstreak	Satyrium liparops
100235		Butterfly, red-banded hairstreak	Calycopis cecrops
100236		Butterfly, olive juniper hairstreak	Callophrys gryneus gryneus
100238		Butterfly, eastern tailed-blue	Everes comyntas
100239		Butterfly, spring azure	Celastrina ladon
100245		Butterfly, American snout	Libytheana carinenta
100247		Butterfly, variegated fritillary	Euptoieta claudia
100249		Butterfly, great spangled fritillary	Speyeria cybele
100250		Butterfly, Aprhodite fritillary	Speyeria aphrodite
100255		Butterfly, silvery checkerspot	Chlosyne nycteis
100258		Butterfly, eastern comma	Polygonia comma
100259		Butterfly, question mark	Polygonia interrogationis
100260		Butterfly, gray comma	Polygonia progne
100262		Butterfly, American lady	Vanessa virginiensis
100264		Butterfly, red admiral	Vanessa atalanta
100265		Butterfly, common buckeye	Junonia coenia
100266		Butterfly, viceroy	Limenitis archippus
100268		Butterfly, red-spotted purple	Limenitis arthemis astyanax
100269		Butterfly, tawny emperor	Asterocampa clyton
100270		Butterfly, hackberry emperor	Asterocampa celtis
100277		Butterfly, common wood-nymph	Cercyonis pegala
100279		Butterfly, little wood-satyr	Megisto cymela
100290		Moth, buck	Hemileuca maia
100359		Butterfly, Peck?s skipper	Polites peckius

110228		Tick, lone star	Amblyomma americanum
110229		Tick, winter	Dermacentor albipictus
110230		Tick, American dog	Dermacentor variabilis
110231		Tick, rabbit	Haemaphysalis leporispalustris
110232		Tick, brown dog	Rhipicephalus sanguineus
050082		Vole, meadow	Microtus pennsylvanicus pennsylvanicus
050085		Lemming, Stone?s southern bog	Synaptomys cooperi stonei
050087		vole, common Gapper?s red-backed	Clethrionomys gapperi gapperi
050091		Vole, pine	Microtus pinetorum scalopsoides
050093		Muskrat, large-toothed	Ondatra zibethicus macrodon
050095		Rat, Norway	Rattus norvegicus norvegicus
050098		Mouse, house	Mus musculus musculus
050099		Mouse, meadow jumping	Zapus hudsonius americanus
050103		Cottontail, eastern	Sylvilagus floridanus mallurus
050108		Deer, white-tailed	Odocoileus virginianus
050125		Coyote	Canis latrans
060025		Mussel, eastern elliptio	Elliptio complanata
060137		Mussel, creeper	Strophitus undulatus
060145		Mussel, notched rainbow	Villosa constricta
040038		Bittern, American	Botaurus lentiginosus
040041		Ibis, white	Eudocimus albus
040045		Goose, Canada	Branta canadensis
040048		Goose, greater white-fronted	Anser albifrons flavirostris
040051		Mallard	Anas platyrhynchos
040052		Duck, American black	Anas rubripes
040053		Gadwall	Anas strepera
040056		Teal, green-winged	Anas crecca carolinensis
040057		Teal, blue-winged	Anas discors orphna
040058		Wigeon, Eurasian	Anas penelope
040059		Wigeon, American	Anas americana
040061		Duck, wood	Aix sponsa
040062		Redhead	Aythya americana
040064		Canvasback	Aythya valisineria
040065		Scaup, greater	Aythya marila
040066		Scaup, lesser	Aythya affinis
040067		Goldeneye, common	Bucephala clangula americana
040068		Bufflehead	Bucephala albeola
040069		Duck, long-tailed	Clangula hyemalis
040073		Scoter, white-winged	Melanitta fusca deglandi
040076		Duck, ruddy	Oxyura jamaicensis

040077		Merganser, hooded	Lophodytes cucullatus
040079		Merganser, red-breasted	Mergus serrator serrator
040080		Vulture, turkey	Cathartes aura
040081		Vulture, black	Coragyps atratus
040083		Kite, Mississippi	Ictinia mississippiensis
040085		Hawk, sharp-shinned	Accipiter striatus velox
040086		Hawk, Cooper?s	Accipiter cooperii
040087		Hawk, red-tailed	Buteo jamaicensis
040088		Hawk, red-shouldered	Buteo lineatus lineatus
040089		Hawk, broad-winged	Buteo platypterus
040090		Hawk, rough-legged	Buteo lagopus johannis
040092		Eagle, golden	Aquila chrysaetos
010080		Shiner, common	Luxilus cornutus
010082		Shiner, spottail	Notropis hudsonius
010086		Shiner, swallowtail	Notropis procne
010087		Shiner, rosyface	Notropis rubellus
010099		Minnow, bluntnose	Pimephales notatus
010101		Dace, blacknose	Rhinichthys atratulus
010102		Dace, longnose	Rhinichthys cataractae
010103		Chub, creek	Semotilus atromaculatus
010104		Fallfish	Semotilus corporalis
010105		Sucker, white	Catostomus commersoni
010106		Chubsucker, creek	Erimyzon oblongus
010108		Sucker, northern hog	Hypentelium nigricans
010116		Redhorse, shorthead	Moxostoma macrolepidotum
010118		Sucker, torrent	Moxostoma rhothoecum
010122		Bullhead, yellow	Ameiurus natalis
010123		Bullhead, brown	Ameiurus nebulosus
010125		Catfish, channel	Ictalurus punctatus
010128		Madtom, tadpole	Noturus gyrinus
010129		Madtom, margined	Noturus insignis
010131		Eel, American	Anguilla rostrata
010143		Killifish, banded	Fundulus diaphanus
010163		Perch, pirate	Aphredoderus sayanus sayanus
010166		Perch, white	Morone americana
010168		Bass, striped	Morone saxatilis
010173		Sunfish, mud	Acantharchus pomotis
010175		Bass, rock	Ambloplites rupestris
010177		Warmouth	Lepomis gulosus
010178		Sunfish, bluespotted	Enneacanthus gloriosus
010180		Sunfish, redbreast	Lepomis auritus

010182		Pumpkinseed	Lepomis gibbosus
010183		Bluegill	Lepomis macrochirus
010185		Sunfish, redear	Lepomis microlophus
010186		Bass, smallmouth	Micropterus dolomieu
010188		Bass, largemouth	Micropterus salmoides
010189		Crappie, white	Pomoxis annularis
010190		Crappie, black	Pomoxis nigromaculatus
010193		Darter, fantail	Etheostoma flabellare
010196		Darter, longfin	Etheostoma longimanum
010198		Darter, johnny	Etheostoma nigrum
010204		Darter, glassy	Etheostoma vitreum
010206		Perch, yellow	Perca flavescens
010211		Darter, stripeback	Percina notogramma
010213		Darter, shield	Percina peltata
010216		Walleye	Stizostedion vitreum vitreum
010283		Sculpin, mottled	Cottus bairdi
010364		Pike, northern	Esox lucius
010373		Chub, bull	Nocomis raneyi
010397		Darter, tessellated	Etheostoma olmstedi
010408		Minnow, eastern silvery	Hybognathus regius
020004		Bullfrog, American	Rana catesbeiana
020006		Treefrog, Cope?s gray	Hyla chrysoscelis
020007		Treefrog, gray	Hyla versicolor
020008		Frog, northern green	Rana clamitans melanota
020012		Frog, eastern cricket	Acris crepitans crepitans
020013		Frog, pickerel	Rana palustris
020016		Frog, southern leopard	Rana sphenocephala
020018		Frog, upland chorus	Pseudacris feriarum feriarum
020019		Frog, wood	Rana sylvatica
020029		Salamander, four-toed	Hemidactylium scutatum
020035		Salamander, marbled	Ambystoma opacum
020038		Salamander, northern dusky	Desmognathus fuscus
020043		Salamander, eastern red-backed	Plethodon cinereus
020049		Salamander, spotted	Ambystoma maculatum
020050		Salamander, southern two-lined	Eurycea cirrigera
020051		Salamander, three-lined	Eurycea guttolineata
020059		Toad, American	Bufo americanus
020060		Toad, eastern narrow-mouthed	Gastrophryne carolinensis
020062		Toad, Fowler?s	Bufo fowleri

020065		Newt, red-spotted	Notophthalmus viridescens viridescens
020069		Salamander, eastern mud	Pseudotriton montanus montanus
020070		Salamander, northern red	Pseudotriton ruber ruber
020071		Peeper, northern spring	Pseudacris crucifer crucifer
020075		Salamander, seal	Desmognathus monticola
020077		Salamander, northern spring	Gyrinophilus porphyriticus porphyriticus
020080		Salamander, white-spotted slimy	Plethodon cylindraceus
030002		Lizard, eastern fence	Sceloporus undulatus
030003		Skink, northern coal	Eumeces anthracinus anthracinus
030004		Skink, common five-lined	Eumeces fasciatus
030005		Skink, southeastern five-lined	Eumeces inexpectatus
030006		Skink, broad-headed	Eumeces laticeps
030007		Skink, little brown	Scincella lateralis
030008		Racerunner, eastern six-lined	Aspidoscelis sexlineata sexlineata
030009		Lizard, eastern slender glass	Ophisaurus attenuatus longicaudus
030012		Rattlesnake, timber	Crotalus horridus
030016		Copperhead, northern	Agkistrodon contortrix mokasen
030018		Racer, northern black	Coluber constrictor constrictor
030019		Wormsnake, eastern	Carphophis amoenus amoenus
030020		Snake, northern ring-necked	Diadophis punctatus edwardsii
030022		Cornsnake, red	Elaphe guttata
030023		Ratsnake, black	Elaphe obsoleta obsoleta
030024		Snake, eastern hog-nosed	Heterodon platirhinos
030026		Kingsnake, eastern	Lampropeltis getula getula
030027		Kingsnake, mole	Lampropeltis calligaster rhombomaculata
030029		Milksnake, eastern	Lampropeltis triangulum triangulum
030033		Snake, queen	Regina septemvittata
030034		Watersnake, northern	Nerodia sipedon sipedon
030038		Greensnake, northern rough	Opheodrys aestivus aestivus
030039		Greensnake, smooth	Opheodrys vernalis
030041		Brownsnake, northern	Storeria dekayi dekayi
030042		Snake, northern red-bellied	Storeria occipitomaculata occipitomaculata
030044		Gartersnake, eastern	Thamnophis sirtalis sirtalis
030045		Ribbonsnake, common	Thamnophis sauritus sauritus
030049		Earthsnake, eastern smooth	Virginia valeriae valeriae
030050		Turtle, eastern snapping	Chelydra serpentina serpentina
030051		Turtle, eastern mud	Kinosternon subrubrum subrubrum
030052		Stinkpot	Sternotherus odoratus
030057		Cooter, northern red-bellied	Pseudemys rubriventris

030059		Cooter, eastern river	Pseudemys concinna concinna
030060		Turtle, eastern painted	Chrysemys picta picta
030063		Turtle, spotted	Clemmys guttata
030068		Turtle, eastern box	Terrapene carolina carolina
040001		Loon, common	Gavia immer
040008		Grebe, pied-billed	Podilymbus podiceps
040024		Cormorant, double-crested	Phalacrocorax auritus
040027		Heron, great blue	Ardea herodias herodias
040028		Heron, green	Butorides virescens
040280		Thrush, gray-cheeked	Catharus minimus
040281		Veery	Catharus fuscescens
040282		Bluebird, eastern	Sialia sialis
040283		Wheatear, northern	Oenanthe oenanthe
040284		Gnatcatcher, blue-gray	Polioptila caerulea
040271		Mockingbird, northern	Mimus polyglottos
040272		Catbird, gray	Dumetella carolinensis
040273		Thrasher, brown	Toxostoma rufum
040275		Robin, American	Turdus migratorius
040276		Thrush, varied	Ixoreus naevius
040277		Thrush, wood	Hylocichla mustelina
040294		Starling, European	Sturnus vulgaris
040295		Vireo, white-eyed	Vireo griseus
040297		Vireo, yellow-throated	Vireo flavifrons
040298		Vireo, blue-headed	Vireo solitarius
040299		Vireo, red-eyed	Vireo olivaceus
040301		Vireo, warbling	Vireo gilvus gilvus
040302		Warbler, black-and-white	Mniotilta varia
040303		Warbler, prothonotary	Protonotaria citrea
040197		Pigeon, rock	Columba livia
040198		Dove, mourning	Zenaida macroura carolinensis
040202		Cuckoo, yellow-billed	Coccyzus americanus
040203		Cuckoo, black-billed	Coccyzus erythropthalmus
040265		Wren, house	Troglodytes aedon
040095		Osprey	Pandion haliaetus carolinensis
040113		Coot, American	Fulica americana
040116		Avocet, American	Recurvirostra americana
040119		Killdeer	Charadrius vociferus
040098		Kestrel, American	Falco sparverius sparverius
040099		Grouse, ruffed	Bonasa umbellus
040100		Bobwhite, northern	Colinus virginianus
040101		Pheasant, ring-necked	Phasianus colchicus

040102		Turkey, wild	Meleagris gallopavo silvestris
040105		Rail, king	Rallus elegans
040321		Warbler, blackburnian	Dendroica fusca
040322		Warbler, yellow-throated	Dendroica dominica
040323		Warbler, chestnut-sided	Dendroica pensylvanica
040324		Warbler, bay-breasted	Dendroica castanea
040325		Warbler, blackpoll	Dendroica striata
040326		Warbler, pine	Dendroica pinus
040328		Warbler, prairie	Dendroica discolor
040329		Warbler, palm	Dendroica palmarum
040330		Ovenbird	Seiurus aurocapilla
040331		Waterthrush, northern	Seiurus noveboracensis
040332		Waterthrush, Louisiana	Seiurus motacilla
040333		Warbler, Kentucky	Oporornis formosus
040336		Yellowthroat, common	Geothlypis trichas
040337		Chat, yellow-breasted	Icteria virens virens
040338		Warbler, hooded	Wilsonia citrina
040340		Warbler, Canada	Wilsonia canadensis
040341		Redstart, American	Setophaga ruticilla
040342		Sparrow, house	Passer domesticus
040344		Meadowlark, eastern	Sturnella magna
040346		Blackbird, red-winged	Agelaius phoeniceus
040347		Oriole, orchard	Icterus spurius
040348		Oriole, Baltimore	Icterus galbula
040349		Blackbird, rusty	Euphagus carolinus
040350		Blackbird, Brewer?s	Euphagus cyanocephalus
040352		Grackle, common	Quiscalus quiscula
040353		Cowbird, brown-headed	Molothrus ater
040355		Tanager, scarlet	Piranga olivacea
040356		Tanager, summer	Piranga rubra
040357		Cardinal, northern	Cardinalis cardinalis
040358		Grosbeak, rose-breasted	Pheucticus ludovicianus
040359		Grosbeak, black-headed	Pheucticus melanocephalus
040360		Grosbeak, blue	Guiraca caerulea caerulea
040361		Bunting, indigo	Passerina cyanea
040205		Screech-owl, eastern	Megascops asio
040206		Owl, great horned	Bubo virginianus
040209		Owl, barred	Strix varia
040211		Owl, short-eared	Asio flammeus
040214		Chuck-will?s-widow	Caprimulgus carolinensis
040215		Whip-poor-will	Caprimulgus vociferus

040216		Nighthawk, common	Chordeiles minor
040217		Swift, chimney	Chaetura pelagica
040218		Hummingbird, ruby-throated	Archilochus colubris
040220		Kingfisher, belted	Ceryle alcyon
040221		Flicker, northern	Colaptes auratus
040222		Woodpecker, pileated	Dryocopus pileatus
040223		Woodpecker, red-bellied	Melanerpes carolinus
040224		Woodpecker, red-headed	Melanerpes erythrocephalus
040225		Sapsucker, yellow-bellied	Sphyrapicus varius
040226		Woodpecker, hairy	Picoides villosus
040227		Woodpecker, downy	Picoides pubescens medianus
040229		Kingbird, eastern	Tyrannus tyrannus
040233		Flycatcher, scissor-tailed	Tyrannus forficatus
040234		Flycatcher, great crested	Myiarchus crinitus
040236		Phoebe, eastern	Sayornis phoebe
040239		Flycatcher, Acadian	Empidonax virescens
040240		Flycatcher, willow	Empidonax traillii
040242		Flycatcher, least	Empidonax minimus
040243		Pewee, eastern wood	Contopus virens
040245		Lark, horned	Eremophila alpestris
040246		Swallow, tree	Tachycineta bicolor
040247		Swallow, bank	Riparia riparia
040248		Swallow, northern rough-winged	Stelgidopteryx serripennis
040249		Swallow, barn	Hirundo rustica
040250		Swallow, cliff	Petrochelidon pyrrhonota pyrrhonota
040251		Martin, purple	Progne subis
040252		Jay, blue	Cyanocitta cristata
040254		Raven, common	Corvus corax
040255		Crow, American	Corvus brachyrhynchos
040256		Crow, fish	Corvus ossifragus
040258		Chickadee, Carolina	Poecile carolinensis
040260		Titmouse, tufted	Baeolophus bicolor
040261		Nuthatch, white-breasted	Sitta carolinensis
040131		Yellowlegs, lesser	Tringa flavipes
040132		Sandpiper, solitary	Tringa solitaria
040134		Sandpiper, spotted	Actitis macularia
040136		Phalarope, Wilson?s	Phalaropus tricolor
040137		Phalarope, red-necked	Phalaropus lobatus
040138		Phalarope, red	Phalaropus fulicarius
040140		Woodcock, American	Scolopax minor

040141		Snipe, common	Gallinago gallinago
040142		Dowitcher, short-billed	Limnodromus griseus
040146		Sandpiper, semipalmated	Calidris pusilla
040150		Sandpiper, white-rumped	Calidris fuscicollis
040151		Sandpiper, Baird?s	Calidris bairdii
040152		Sandpiper, pectoral	Calidris melanotos
040154		Dunlin	Calidris alpina hudsonia
040164		Gull, Iceland	Larus glaucoides
040167		Gull, herring	Larus argentatus
040181		Tern, common	Sterna hirundo
010040		Shad, American	Alosa sapidissima
010041		Shad, gizzard	Dorosoma cepedianum
010042		Shad, threadfin	Dorosoma petenense
010045		Herring, blueback	Alosa aestivalis
010050		Trout, rainbow	Oncorhynchus mykiss
010051		Trout, brown	Salmo trutta
010052		Trout, brook	Salvelinus fontinalis
010054		Mudminnow, eastern	Umbra pygmaea
010055		Pickerel, redfin	Esox americanus americanus
010056		Pickerel, chain	Esox niger
010058		Stoneroller, central	Campostoma anomalum
010060		Dace, mountain redbelly	Phoxinus oreas
010061		Darter, Roanoke	Percina roanoka
010062		Carp, common	Cyprinus carpio
010063		Minnow, cutlips	Exoglossum maxillingua
010066		Chub, bluehead	Nocomis leptocephalus
010067		Chub, river	Nocomis micropogon
010068		Shiner, golden	Notemigonus crysoleucas
010072		Shiner, comely	Notropis amoenus
010073		Shiner, satinfin	Cyprinella analostana
010074		Shiner, rosefin	Lythrurus ardens

*FE=Federal Endangered; FT=Federal Threatened; FC=Federal Candidate; FS=Federal Species of Concern (not a legal status; list maintained by USFWS Virginia Field Office); SE=State Endangered; ST=State Threatened; SS=State Special Concern (not a legal status).

USGS Hydrological Unit(s): Mid Atlantic Region: Mattaponi River
Mid Atlantic Region: Middle James-Buffalo River
Mid Atlantic Region: Middle James-Willis River
Mid Atlantic Region: Pamunkey River
Mid Atlantic Region: Rapidan-Upper Rappahannock River
Mid Atlantic Region: Rivanna River
Mid Atlantic Region: South Fork Shenandoah River

USGS 7.5' Quadrangles: Keswick
Barboursville
Boswells Tavern
Gordonsville

Attachment 14

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Northern Regional Office
13901 Crown Court **Woodbridge, VA 22193** **(703) 583-3800**

SUBJECT: TOXICS MANAGEMENT PROGRAM (TMP) DATA REVIEW
Virginia Power - Gordonsville Energy (VA0087033)
REVIEWER: Douglas Frasier
DATE: 24 May 2017

PREVIOUS REVIEW: 5 August 2016

DATA REVIEWED:

This review covers the fourth (4^{th}) annual acute toxicity tests conducted in March 2017 at Outfall 001.

DISCUSSION:

The results of these acute toxicity tests along with the results of previous toxicity tests conducted on samples of effluent collected from Outfall 001 are summarized in Table 1.

The acute toxicity of the effluent samples was determined with a 48-hour static acute toxicity test using *C. dubia* and *P. promelas* as the test species.

CONCLUSION:

The acute toxicity tests are valid and the results acceptable. The toxicity tests results indicate that the effluent sample exhibit no acute toxicity to the test organisms.

BIOMONITORING RESULTS

Dominion Power Gordonsville Energy (VA0087033)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ ORGANISM	48-hr LC_{50} (%)	IC_{25} (%)	NOEC/ NOAEC (%)	% SURV	TU_a TU_c	LAB	REMARKS
1997	Acute *P. promelas*	>100					CVL	Wet
1997	Acute *P. promelas*	**66**					CVL	Wet
1997	Acute *P. promelas*	>100					CVL	Wet
1998	Acute *P. promelas*	>100					CVL	Dry
01/15/99	Acute *P. promelas*	>100			100		CVL	Wet
05/05/99	Acute *P. promelas*	>100			80		CVL	Dry
02/15/00	Acute *P. promelas*	>100			100		CVL	Wet
05/11/00	Acute *P. promelas*	>100			100		CVL	Dry
01/20/01	Acute *P. promelas*	>100			100		CVL	Wet
05/11/01	Acute *P. promelas*	>100			100		CVL	Dry
04/10/02	Acute *P. promelas*	>100			100		CBI	Wet
05/15/02	Acute *P. promelas*	>100			100		CBI	Dry
Permit reissued 5 September 2002								
10/09/02	Acute *P. promelas*	>100		100	100	1	CBI	1st annual dry
12/12/02	Acute *P. promelas*	>100		100	100	1	CBI	1st annual wet
12/11/03	Acute *P. promelas*	>100		100	100	1	CBI	2nd annual wet
01/16/04	Acute *P. promelas*	>100		100	100	1	CBI	2nd annual dry
03/09/05	Acute *P. promelas*	>100		100	95	1	CBI	3rd annual wet
03/09/05	Acute *P. promelas*	>100		100	100	1	CBI	Rejected: grab sample used
08/23/06	Acute *P. promelas*	>100		100	100	1	CBI	3rd annual dry
07/13/07	Acute *P. promelas*	>100		100	100	1	CBI	4th annual dry
07/17/07	Acute *P. promelas*	>100		100	100	1	CBI	4th annual wet
Permit reissued 31 January 2008								
09/12/08	Acute *C. dubia*	62.5		50	0	2	CBI	1st annual
09/12/08	Acute *P. promelas*	>100		100	100	1		
09/18/08	Acute *C. dubia*				100		CBI	Retest w/EDTA – sample too old
10/02/08	Acute *C. dubia*	>100			100	1	CBI	Retest – no treatment
10/02/08	Acute *C. dubia*	>100			100	1		Retest – EDTA
10/02/08	Acute *C. dubia*	>100			100	1	CBI	Retest – UV
06/11/09	Acute *C. dubia*	>100		100	100	1	CBI	2nd annual
06/11/09	Acute *P. promelas*	>100		100	90	1		
09/02/10	Acute *C. dubia*	>100		100	100	1	CBI	3rd annual
09/02/10	Acute *P. promelas*	>100		100	90	1		
06/09/11	Acute *C. dubia*	>100		100	80	1	CBI	4th annual
06/09/11	Acute *P. promelas*	>100		100	100	1		
10/05/12	Acute *C. dubia*	78.1		50	25	2	CBI	Extra test
10/05/12	Acute *P. promelas*	72.0		50	5	2		
11/02/12	Acute *C. dubia*	70.7		50	10	2	CBI	Extra test
11/02/12	Acute *P. promelas*	66.2		50	0	2		
12/07/12	Acute *C. dubia*	>100		100	100	1	CBI	Retest
12/07/12	Acute *P. promelas*	>100		100	100	1		

TEST DATE	TEST TYPE/ ORGANISM	48-hr LC_{50} (%)	IC_{25} (%)	NOEC/ NOAEC (%)	% SURV	TU_a TU_c	LAB	REMARKS
Permit Reissued 20 March 2013								
03/06/14	Acute *C. dubia*	>100		100	100	1	CBI	1st Annual
03/06/14	Acute *P. promelas*	>100		100	100	1		
02/04/15	Acute *C. dubia*	>100		100	100	1	CBI	2nd Annual
02/04/15	Acute *P. promelas*	>100		100	95	1		
04/09/16	Acute *C. dubia*	>100		100	100	1	CBI	3rd Annual
04/09/16	Acute *P. promelas*	>100		100	100	1		
03/08/17	Acute *C. dubia*	>100		100	100	1	CBI	4th Annual
03/08/17	Acute *P. promelas*	>100		100	100	1		

FOOTNOTES:

A **bold** faced LC_{50} or NOEC value indicates that the test failed the criteria.

ABBREVIATIONS:

S - Survival; R - Reproduction; G - Growth
% SURV - Percent survival in 100% effluent
CBI - Coastal Bioanalysts, Inc

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/13/13
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	12/21/17	
Facility Name:	Dominion - Gordonsville	
VPDES Number:	VA0087033	
Outfall Number:	1	
Plant Flow:	0.049	MGD
Acute 1Q10:	0.028	MGD
Chronic 7Q10:	0.035	MGD

Acute Endpoint/Permit Limit

ACUTE 100% = NOAEC LC50 = NA % Use as NA TUa

ACUTE WLAa 0.47142857

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

CHRONIC	2.50727089	TU_c	NOEC =	40 % Use as	2.50 TU_c
BOTH*	4.71428583	TU_c	NOEC =	22 % Use as	4.54 TU_c
AML	2.50727089	TU_c	NOEC =	40 % Use as	2.50 TU_c

ACUTE WLAa,c 4.71428571
CHRONIC WLAc 1.71428571
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.03034961 a limit may result using STATS.EXE

Use as LC_{50} in Special Condition, as TUa on DMR

Use as NOEC in Special Condition, as TUc on DMR

% Flow to be used from MIX.EXE

Acute	100	%
Chronic	100	%

Diffuser /modeling study?

Enter Y/N: n

Acute	1	:1
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	63.63636364	%	Plant flow/plant flow + 1Q10
IWC_c	58.33333333	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	1.571428571	100/IWCa
Dilution, chronic	1.714285714	100/IWCc

WLA_a	0.471428571	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.714285714	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	4.71428571	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 sample 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.**

$LTA_{a,c}$	1.937310729	WLAa,c X's eA				
LTA_c	1.030349657	WLAc X's eB				
MDL** with $LTA_{a,c}$	4.71428583	TU_c	NOEC =	21.212121	(Protects from acute/chronic toxicity)	
MDL** with LTA_c	2.507270887	TU_c	NOEC =	39.884003	(Protects from chronic toxicity)	
AML with lowest LTA	2.507270887	TU_c	NOEC =	39.884003	Lowest LTA X's eD	

Rounded NOEC's

NOEC =	22	%		
NOEC =	40	%		
NOEC =	40			

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

Rounded LC50's

MDL with $LTA_{a,c}$	0.471428583	TU_a	LC50 =	212.121207	%	Use NOAEC=100%	LC50 =	NA	%
MDL with LTA_c	0.250727089	TU_a	LC50 =	398.840032	%	Use NOAEC=100%	LC50 =	NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data		Invertebrate IC_{25} Data	
	or		or	
	LC_{50} Data	LN of data	LC_{50} Data	LN of data
	**********		**********	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA NEED DATA
Mean	0	0	Mean	0 0
Variance	0	0.000000	Variance	0 0.000000
CV	0		CV	0

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	97.1	1.03035		
Dilution series to use for limit			40	2.5
Dilution factor to recommend:	0.9851621		0.6324555	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	98.5	1.02	63.2	1.58
	97.1	1.03	40.0	2.50
	95.6	1.05	25.3	3.95
	94.20	1.06	16.0	6.25
Extra dilutions if needed	92.80	1.08	10.1	9.88
	91.42	1.09	6.4	15.63

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA %LC_{50} NO DATA TUa

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 16

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft Virginia Pollutant Discharge Elimination System permit from the Department of Environmental Quality that will allow the release of treated industrial wastewater and stormwater into a waterbody in Louisa County, Virginia.
PERMIT NO.: VA0087033
NAME AND ADDRESS OF FACILITY: Dominion – Gordonsville Power Station, 819 Hill Road, Gordonsville, VA 22942
DEQ CONTACT: Susan Mackert, (703) 583-3853, susan.mackert@deq.virginia.gov, 13901 Crown Court, Woodbridge, VA 22193
The full public notice is available at:
www.deq.virginia.gov/Programs/Water/PermittingCompliance/PollutionDischargeElimination/PublicNotices.aspx

Attachment 17

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated industrial wastewater and stormwater into a water body in Louisa County, Virginia.

PUBLIC COMMENT PERIOD: June 14, 2019 through July 15, 2019

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Industrial Wastewater and Stormwater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Virginia Electric and Power Company d/b/a Dominion Energy Virginia, 5000 Dominion Boulevard, Glen Allen, VA 23060, VA0087033

NAME AND ADDRESS OF FACILITY: Gordonsville Power Station, 819 Hill Road, Gordonsville, VA 22942

PROJECT DESCRIPTION: Dominion Energy has applied for a reissuance of a permit for the private Gordonsville Power Station. The applicant proposes to release treated industrial wastewater and stormwater at a rate of 0.08 million gallons per day into a water body. The facility proposes to release the treated industrial wastewater and stormwater in the South Anna River in Louisa County in the York River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, Dissolved Oxygen, Total Residual Chlorine, Temperature, Total Recoverable Zinc, Total Suspended Solids, and Oil and Grease. The permit establishes monitoring for the following pollutants: Flow, Dissolved Copper, Dissolved Zinc, Total Hardness, Total Suspended Solids, Total Petroleum Hydrocarbons, and Acute Toxicity. The permit also includes requirements for cooling water intake structures.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Susan Mackert
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3853 E-mail: susan.mackert@deq.virginia.gov

Modification Memo –

Attachment 2

Dominion - Gordonsville Power Station: VA0087033
Water Quality Criteria/Wasteload Allocation

24 November, 2021

Input Parameters:

Facility Information

Facility Name: Dominion - Gordonsville Power Station
Permit Number: VA0087033
Receiving Stream: South Anna River
Analysis Type: Freshwater

Stream Information

Mean Hardness (as $CaCO_3$):	64 mg/L
90% Temperature (Annual):	25 °C
90% Temperature (Wet Season):	15 °C
90% Maximum pH:	6.8 SU
10% Maximum pH:	6 SU
Tier Designation (1 or 2):	1
Public Water Supply (PWS)?	No
Trout Present?	No
Mussels Present?	No
Early Life Stages Present?	Yes
New Ammonia Criteria?	No

Stream Flows

1Q10 (Annual):	0.028 MGD (0% Used)
7Q10 (Annual):	0.035 MGD (0% Used)
30Q10 (Annual):	0.085 MGD (0% Used)
30Q5:	0.149 MGD
Harmonic Mean:	0.639 MGD
1Q10 (Wet Season):	0.452 MGD (0% Used)
30Q10 (Wet Season):	0.853 MGD (0% Used)

Effluent Information

Mean Hardness (as $CaCO_3$):	43 mg/L
90% Temperature (Annual):	26.9 °C
90% Temperature (Wet Season):	15 °C
90% Maximum pH:	8.6 SU
10% Maximum pH:	7 SU
Discharge Flow:	0.08 MGD

Parameter	Units	Background Concentration	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				Method Target Value
			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	
Zinc	ug/l	0	67.92	68.48		2.600e+4	67.92	68.48		7.443e+4									67.92	68.48		7.443e+4	27.17

Notes:

1. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals.
2. Metals measured as Dissolved, unless specified otherwise.
3. Regular WLA are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
4. Antidegradation Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic.
   Antidegradation Baseline = (0.10(WQC - background conc.) + background conc.) for human health.
5. 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 equal to 1 and 100% mix.
6. The following water effect ratios (WERs) were applied to metal water quality criteria computations: Cd = 1 , Cr = 1 , Cu = 1 , Pb = 1 , Ni = 1 , Ag = 1 , Zn = 1.19

VA0087033 - Gordonsville Power Station (Hardness Data)

Due / Sample Date	Outfall	Concentration Max	Units	Source
7/10/20	001	49.3	mg/L	DMR
7/14/20	001	60	mg/L	Internal Sample
8/7/20	001	40.6	mg/L	Translator Study
8/10/20	001	83.9	mg/L	WER / Translator Study
8/14/20	001	30.9	mg/L	Translator Study
8/17/20	001	17.5	mg/L	Translator Study
8/20/20	001	30.4	mg/L	Translator Study
8/24/20	001	64.7	mg/L	Translator Study
8/27/20	001	45	mg/L	Translator Study
8/31/20	001	22.5	mg/L	Translator Study
9/3/20	001	11.4	mg/L	Translator Study
9/7/20	001	46.0	mg/L	Translator Study
9/9/20	001	37.2	mg/L	WER / Translator Study
1/10/21	001	84	mg/L	DMR
7/10/21	001	19	mg/L	DMR

Average = 43 mg/L

VA0087033 - Gordonsville Power Station (pH Data)

Due / Sample Date	Outfall	Concentration Min/Max	Units	Source
9/10/19	001	6.7	S.U.	DMR
10/10/19	001	7.4	S.U.	DMR
11/10/19	001	7.0	S.U.	DMR
12/10/19	001	6.7	S.U.	DMR
1/10/20	001	7.0	S.U.	DMR
2/10/20	001	8.1	S.U.	DMR
3/10/20	001	7.1	S.U.	DMR
4/10/20	001	8.9	S.U.	DMR
5/10/20	001	7.1	S.U.	DMR
6/10/20	001	8.6	S.U.	DMR
7/10/20	001	7.3	S.U.	DMR
8/7/20	001	7.44	S.U.	Translator Study
8/10/20	001	7.5	S.U.	DMR
8/10/20	001	7.9	S.U.	DMR
8/10/20	001	7.44	S.U.	WER / Translator Study
8/14/20	001	7.22	S.U.	Translator Study
8/17/20	001	7.39	S.U.	Translator Study
8/20/20	001	8.61	S.U.	Translator Study
8/24/20	001	8.11	S.U.	Translator Study
8/27/20	001	7.78	S.U.	Translator Study
8/31/20	001	7.73	S.U.	Translator Study
9/3/20	001	8.41	S.U.	Translator Study
9/7/20	001	7.85	S.U.	Translator Study
9/9/20	001	7.74	S.U.	WER / Translator Study
9/10/20	001	7.2	S.U.	DMR
9/10/20	001	8.6	S.U.	DMR
10/10/20	001	7.7	S.U.	DMR
10/10/20	001	8.4	S.U.	DMR
11/10/20	001	7.8	S.U.	DMR
12/10/20	001	7.4	S.U.	DMR
1/10/21	001	7.8	S.U.	DMR
2/10/21	001	7.4	S.U.	DMR
3/10/21	001	7.8	S.U.	DMR
4/10/21	001	7.3	S.U.	DMR
5/10/21	001	7.7	S.U.	DMR
6/10/21	001	7.2	S.U.	DMR
7/10/21	001	7.3	S.U.	DMR
8/10/21	001	8.9	S.U.	DMR
9/10/21	001	7.7	S.U.	DMR
10/10/21	001	7.4	S.U.	DMR
11/10/21	001	6.6	S.U.	DMR

90% pH = 8.6 S.U.

10% pH = 7.0 S.U.

VA0087033 - Gordonsville Power Station (Temperature Data)

Due / Sample Date	Outfall	Concentration Max	Units	Source
9/10/19	001	24.2	°C	DMR
10/10/19	001	19.3	°C	DMR
11/10/19	001	22.2	°C	DMR
6/10/20	001	15.4	°C	DMR
7/10/20	001	21.9	°C	DMR
8/7/20	001	25.0	°C	Translator Study
8/10/20	001	28.7	°C	DMR
8/10/20	001	26.6	°C	WER / Translator Study
8/14/20	001	25.9	°C	Translator Study
8/17/20	001	21.7	°C	Translator Study
8/20/20	001	22.9	°C	Translator Study
8/24/20	001	27.3	°C	Translator Study
8/27/20	001	27.0	°C	Translator Study
8/31/20	001	24.6	°C	Translator Study
9/3/20	001	26.2	°C	Translator Study
9/7/20	001	23.1	°C	Translator Study
9/9/20	001	25.2	°C	WER / Translator Study
9/10/20	001	26.8	°C	DMR
10/10/20	001	26.7	°C	DMR
11/10/20	001	14.9	°C	DMR
6/10/21	001	21.8	°C	DMR
7/10/21	001	26.3	°C	DMR
8/10/21	001	24.9	°C	DMR
9/10/21	001	23.4	°C	DMR
10/10/21	001	25	°C	DMR
11/10/21	001	19.8	°C	DMR

90% Temperature = 26.9 oC

Modification Memo –

Attachment 3

Commonwealth of Virginia

Mackert, Susan <susan.mackert@deq.virginia.gov>

Dominion Gordonsville power station Zinc translator & WER study review

1 message

Whitehurst, David <david.whitehurst@deq.virginia.gov> Mon, Feb 1, 2021 at 11:37 AM
To: "Mackert, Susan" <susan.mackert@deq.virginia.gov>, Bryant Thomas <bryant.thomas@deq.virginia.gov>
Cc: Kennedy John ika95442 <john.kennedy@deq.virginia.gov>, Robertson Tish msf11012 <tish.robertson@deq.virginia.gov>

Attached is the WQS review of the zinc translator & WER study for the Gordonsville power station discharge. Based on the information provided, a total to dissolved translator for zinc acute criteria of **0.5997** is deemed appropriate as is a water effects ratio of **1.185** . Working on a review of the copper translator/WER study for the same facility and hope to get it to you this week.

--
David C. Whitehurst, Water Quality Standards Coordinator
Dept. Environmental Quality
1111 East Main Street, Suite 1400
PO Box 1105
Richmond, VA 23218
Phone - 804-698-4121
Fax - 804-698-4178 (fax must name intended recipient)
email - David.Whitehurst@deq.virginia.gov

Gordonsville WER&translator study report review_FINAL_1FEB2021.docx
693K

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

SUBJECT: Review of the GORDONSVILLE POWER STATION Zinc Limit Compliance Strategy: Derivation of a Site-specific Zinc Standard and Chemical Translator - VPDES Permit Number VA0087033.

TO: Susan Mackert (NRO), Bryant Thomas (NRO), John Kennedy (CO), Tish Robertson (CO)

FROM: David Whitehurst (CO)

DATE: February 1, 2021

Background

The Gordonsville Power Station is located in Louisa County near Gordonsville, Virginia, and began commercial operation on June 1, 1994. At that time, the station was owned by Gordonsville Energy Limited Partnership (GELP) and was operated by Edison Mission O&M. Dominion purchased the Gordonsville Power Station in November 2003. The plant is currently operated by Dominion's contractor NAES. The facility site is bounded by the Rapidan Service Authority to the east, the CSX railroad to the north, the South Anna River and a water-filled quarry site to the west, and undeveloped land toward the south.

The facility's current VPDES discharge permit imposes a total recoverable zinc limit of 54 ug/L, effective within 60 days of completion of the compliance plan and associated corrective measures, but no later than August 1, 2022. An average hardness of 40 mg/l for the effluent was used to derive the limit based on the hardness-dependent Virginia water quality standard for Zinc, which uses a default dissolved-to-total translator ("conversion") value of 0.978 and water effects ratio (WER; see section II) of 1.0 (9VAC25-260-140 B). Dominion is working to identify and implement a site-specific regulatory alternative for adjustment of the zinc water quality criterion and/or permit limit.

To that end, Dominion has submitted the document: "*Gordonsville Power Station Zinc Limit Compliance Strategy: Derivation of a Site-specific Zinc Standard and Chemical Translator, December 15, 2020*". The study was conducted on behalf of Dominion Power by Coastal Bioanalysts, Inc. and subcontractors to determine the ratio of instream dissolved zinc to total recoverable zinc. Zinc in the dissolved form is considered bioavailable to aquatic organisms and its concentration is limited by the Virginia Water Quality Standards (WQS) Regulation (9 VAC 25-260). Total zinc (total recoverable) may contain species of zinc that are not dissolved and therefore considered not bioavailable. By determining the ratio of dissolved to total zinc, effluent permit limits may be adjusted to account for only the dissolved fraction of zinc entering the receiving stream. The Virginia water quality criteria for zinc uses a default dissolved-to-total translator ("conversion") value of 0.978 and water effects ratio (9VAC25-260-140.F) of 1.0 (9VAC25-260-140.B). The chemical translator study followed the protocol stipulated in EPA's *The Metals*

Translator: Guidance for Calculating a Total Recoverable Permit Limit for a Dissolved Criterion (EPA 823-B-96-007).

A Water Effects Ratio (WER) study was also done concurrently with the chemical translator study. A WER is a criteria adjustment factor accounting for the effect of site-specific water characteristics on metal bioavailability and toxicity to aquatic life. This is the ratio of toxicity of the specific metal measured in side-by-side tests conducted in the site water and a standard laboratory water comparable to that used in the studies cited in the EPA water quality criteria document.

The Virginia water quality criteria for zinc (9VAC 25-260-140.B) includes a WER as part of the criteria equations, and is set at a default of 1.0 unless a study is performed to establish a different value. The WQS Regulation, in section 9VAC 25-260-140.F, allow a permittee to demonstrate that a WER is appropriate for their receiving waters. The WQS Regulation states that the WER shall be described in the public notice associated with the permit proceeding, and applies only to the applicant or permittee in that proceeding. The Department of Environmental Quality (DEQ) action to approve or disapprove a WER is a case decision, not an amendment to the present regulation. The decision to approve or disapprove a WER shall be subject to the public participation requirements of the Permit Regulation, 9 VAC 25-31-260 et seq.

Studies were performed during the generally low-flow period of August-September 2020 to characterize the effects of effluent quality from Outfall 001 on WER and translator values during the critical low-flow period upon which permit parameters are based. The basis for all translator and WER measurements and calculations is the 1Q10 critical flow rate of 0.0 mgd for the South Anna River, i.e. 100% effluent from Outfall 001 which discharges to the South Anna River.

Following is the DEQ-Water Quality Standards Program staff review of the subject Coastal Bioanalysts' Study Report.

Chemical Translator Study Review (Zinc)

A total of 11 translator measurements were conducted; WER testing samples were collected with the 8/10/20 and 9/9/20 translator samples. Measurements of stream flow, effluent flow and rainfall were collected concurrent with collection of all translator samples. Effluent limits for the facility are based on critical flows. In this case the stream (South Anna River) was judged to be 100% effluent during critical low-flow periods. Thus, characterization of speciation in effluent undiluted with receiving stream water is appropriate for derivation of a translator value. Samples were collected and analyzed in accordance with acceptable EPA guidance protocols. Chain-of-custody documentation, QA/QC and data validation, as well as original laboratory data reports and analytical methodology were provided and all are acceptable. A summary table of sample collection dates and related water chemistry data is below.

Study Date	Diss. Zn (ug/l)	Total Zn (ug/l)	fD	TSS (mg/l)	pH (S.U.)	Hardness (mg/l)	ln(fD)
8/7/2020	20.2	32.0	0.6313	11	7.44	40.6	-0.4601
8/10/2020*	15.5	21.9	0.7078	5.7	7.44	83.9	-0.3456
8/14/2020	22.0	36.1	0.6094	12	7.22	30.9	-0.4953
8/17/2020	16.4	25.2	0.6508	6.9	7.39	17.5	-0.4296
8/20/2020	8.72	22.5	0.3876	48	8.61	30.4	-0.9479
8/24/2020	15.2	20.2	0.7525	4.4	8.11	64.7	-0.2844

8/27/2020	7.52	14.1	0.5333	11	7.78	45.0	-0.6286
8/31/2020	6.02	10.3	0.5845	9.6	7.73	22.5	-0.5371
9/3/2020	13.7	25.3	0.5415	9.1	8.41	11.4	-0.6134
9/7/2020	13.1	17.5	0.7486	6.8	7.85	46.0	-0.2896
9/9/2020*	5.83	10.3	0.5660	6	7.74	37.2	-0.5691
Arithmetic mean:			**0.6103**	**12**	**7.79**	**39.1**	-0.5091
Geometric Mean fD:							**0.6010**
* Zn WER study sample also collected on these dates							

According to EPA guidance (EPA 823-B-96-007) a chemical translator may take the form of a simple ratio of dissolved to total recoverable metal (f_D) or may be functionally related through use of a regression equation to relevant water quality parameters. EPA guidance recommends monitoring total suspended solids (TSS), pH, and hardness in conjunction with measurements of f_D so that it can be determined whether a simple ratio will suffice or if f_D needs to account for variability in a water quality parameter such as TSS. If f_D is normally distributed, and found to be independent of TSS, hardness and pH, then the translator is calculated as the geometric mean of the measured f_D values.

The natural log-transformed data for f_D were tested for normality using the Anderson-Darling test statistic and found to be normally distributed. The magnitude of the transformed f_D did not vary as a function of effluent pH or hardness but was significantly related (p=0.001) to TSS. Based on a TSS value of 12 mg/l (average for this study), the resulting f_D calculated using the derived regression equation is **0.5997.** This result is very similar to the geometric mean of 0.6010. Given the data provided, a site specific translator of **0.5997** is deemed appropriate.

Water Effects Ratio Study Review (Zinc)

Coastal Bioanalysts, Inc. conducted a water effect ratio (WER) study for zinc on behalf of Dominion Power for the Gordonsville Power Station. The protocols for development of a copper WER as presented in EPA's guidance document *Streamlined Water-Effect Ratio Procedure for Discharges of Copper* (EPA-822-R-01-005 March 2001) were used as well as pertinent guidance in the *Interim Guidance on Determination of Use of Water –Effect Ratios for Metals* (EPA 823-B-94-001). While the guidance procedures specifically address copper WERs performed in freshwater, the procedures may be applied to other metals (zinc) following EPA's guidelines for a streamlined copper WER study under suitable conditions.

Side-by-side, laboratory-water and site water toxicity tests are run to obtain the 48- hour acute EC_{50} with either *Ceriodaphnia dubia* or *Daphnia magna*. The test organism used to develop the WER for the Gordonsville Power Plant study was *Ceriodaphnia dubia* and the toxicity tests followed methods for *C. dubia* as described in *Methods for Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition, (EPA 821-R-02-012). The result may be expressed as either dissolved or total recoverable metal. After adjusting for any hardness differences, the WER for the sample is the lesser of (a) the site-water EC_{50} divided by the laboratory-water EC_{50}, or (b) the site-water EC_{50} divided by the documented Species Mean Acute Value (SMAV; the mean EC_{50} from a large number of published toxicity tests with laboratory water). The geometric mean of the two (or more) sampling event WERs is the site WER.

A review of the streamlined water effect ratio (WER) study for the Gordonsville Power Station indicates that the set of toxicity tests conducted on August 12-14, 2020 and September 11-13, 2020 were done

under acceptable conditions and are suitable for establishing a WER for this permitted facility. In all tests, the testing laboratory measured the concentrations of zinc in the toxicity tests and calculated EC_{50} values based on both dissolved and total Zinc measurements. This allowed for the calculation of both dissolved and total zinc WERs. The below tables summarize toxicity test results for total and dissolved zinc and the values used for calculation of a final WER value for dissolved zinc.

WER EC50 values (Total Zn)

Study	Test Matrix	48-h EC50 (□g/l)	95% C.L.	Test Hardness (mg/l CaCO3)	Normalized 48-h EC50 (ug/l)
WER 1	Lab Water:	274.0	243.9-306.5	82	149.1
	Effluent:	412.9	379.6-453.6	82	224.7
WER 2	Lab Water:	445.5	401.0-494.6	40	445.5
	Effluent:	481.5	432.7-534.7	39	491.9

WER EC50 values (Mean Dissolved Zn)

Study	Test Matrix	48-h EC50 (□g/l)	95% C.L.	Test Hardness (mg/l CaCO3)	Normalized 48-h EC50 (ug/l)
WER 1	Lab Water:	281.7	250.2-315.8	82	153.3
	Effluent:	422.3	382.3-464.9	82	229.9
WER 2	Lab Water:	469.0	426.5-518.3	40	469.0
	Effluent:	429.4	383.2-485.7	39	438.7

Final WER Values

All values as dissolved Zinc and normalized to 40 mg/l hardness. SMAV from EPA 820-B-96-001 (1996).

Study	Site Water LC50	Lab Water LC50	SMAV	WER	ln(WER)
WER 1	229.9	153.3	140.9	1.5000	0.4055
WER 2	438.7	469.0	140.9	0.9354	-0.0668
MEAN:	334.3	311.2	140.9	1.218	0.1693
				FINAL WER:	**1.185**

The study conducted by Coastal Bioanalysts resulted in establishing a WER of **1.185** to be applied to dissolved zinc concentrations. The WER may be used to adjust the criteria for zinc and calculate the resulting waste load allocations (WLA) for this permit and may be used to make permit decisions regarding the need for zinc discharge limits for the Gordonsville Power Station.

Modification Memo –

Attachment 4

Dominion - Gordonsville Power Station

24 November, 2021

Input Parameters:

Parameter Analyzed:	Zinc
Chronic Averaging Period:	4 day
WLA_a:	113 ug/L
WLA_c:	114 ug/L
Q.L.:	10 ug/L
# Samples/Mo.:	1
# Samples/Wk.:	1

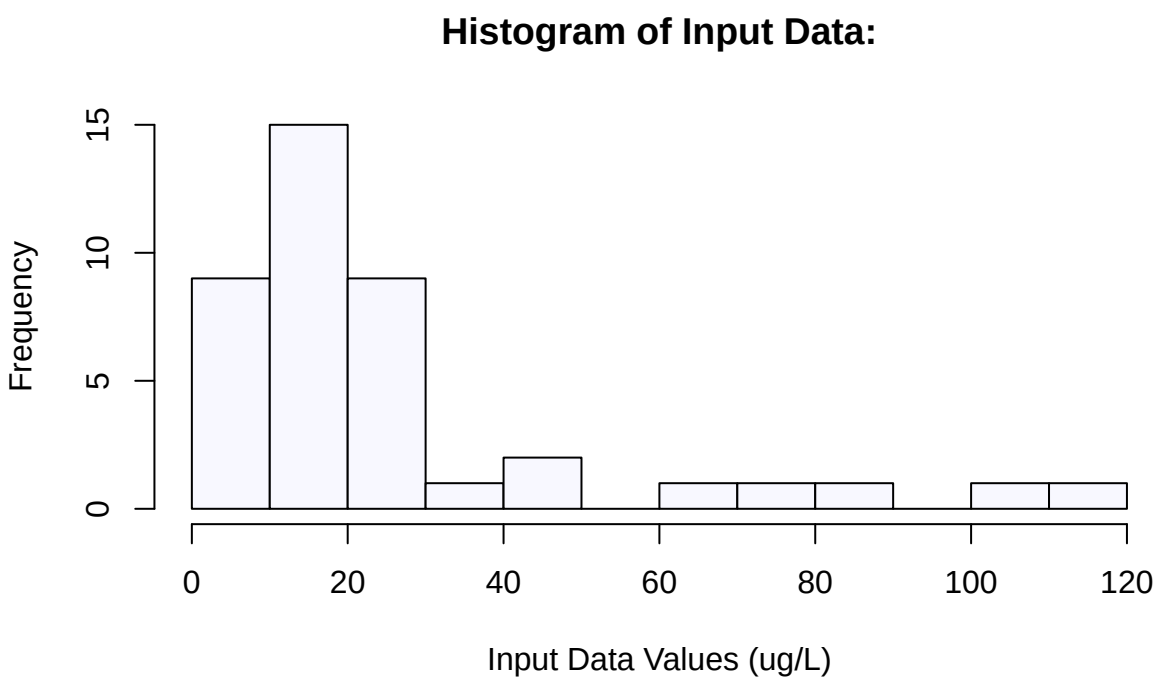
Statistical Results

# Observations:	41
Expected Value:	25.6778 ug/L
Variance:	435.2050 ug^2/L^2
C.V.:	0.8124
97^{th} percentile daily values:	76.5666 ug/L
97^{th} percentile 4 day average:	47.4872 ug/L
97^{th} percentile 30 day average:	32.8414 ug/L
# Observations < Q.L.:	9

Limit Results

Model Used:	Delta lognormal
Limit Needed?:	NO
Basis for Limit?:	NA
Maximum Daily Limit:	NA
Weekly Average Limit:	NA
Monthly Average Limit:	NA

Input Data 7.9, 13.5, 44.1, 24.2, 102, 24.6, 83, 22, 113, 63.7, 29.8, 20.7, 48.1, 18.8, 37.5, 13.8, 20.2, 21.4, 15.5, 13.4, 22, 18.6, 16.4, 15.6, 8.72, 8.62, 15.2, 15.1, 7.52, 7.28, 6.02, 6.61, 13.7, 12.1, 13.1, 14.3, 5.83, 6.75, 22, 72.2, 17.5 ug/L


Histogram of Input Data:
Frequency
0
5
10
15
0
20
40
60
80
100
120
Input Data Values (ug/L)

VA0087033 - Gordonsville Power Station (Dissolved Zinc Data)

Due / Sample Date	Outfall	Concentration Max	Units	Source
7/10/13	001	7.9	µg/L	DMR
1/10/14	001	13.5	µg/L	DMR
7/10/14	001	44.1	µg/L	DMR
1/10/15	001	24.2	µg/L	DMR
7/10/15	001	102	µg/L	DMR
1/10/16	001	24.6	µg/L	DMR
7/10/16	001	83	µg/L	DMR
1/10/17	001	22	µg/L	DMR
7/10/17	001	113	µg/L	DMR
1/10/18	001	63.7	µg/L	DMR
7/10/18	001	29.8	µg/L	DMR
1/10/19	001	20.7	µg/L	DMR
7/10/19	001	48.1	µg/L	DMR
1/10/20	001	18.8	µg/L	DMR
7/10/20	001	37.5	µg/L	DMR
7/14/20	001	13.8	µg/L	Internal Sample
8/7/20	001	20.2	µg/L	Translator Study
8/7/20	001	21.4	µg/L	Translator Study
8/10/20	001	15.5	µg/L	WER / Translator Study
8/10/20	001	13.4	µg/L	WER / Translator Study
8/14/20	001	22.0	µg/L	Translator Study
8/14/20	001	18.6	µg/L	Translator Study
8/17/20	001	16.4	µg/L	Translator Study
8/17/20	001	15.6	µg/L	Translator Study
8/20/20	001	8.72	µg/L	Translator Study
8/20/20	001	8.62	µg/L	Translator Study
8/24/20	001	15.2	µg/L	Translator Study
8/24/21	001	15.1	µg/L	Translator Study
8/27/20	001	7.52	µg/L	Translator Study
8/27/20	001	7.28	µg/L	Translator Study
8/31/20	001	6.02	µg/L	Translator Study
8/31/20	001	6.61	µg/L	Translator Study
9/3/20	001	13.7	µg/L	Translator Study
9/3/20	001	12.1	µg/L	Translator Study
9/7/20	001	13.1	µg/L	Translator Study
9/7/20	001	14.3	µg/L	Translator Study
9/9/20	001	5.83	µg/L	WER / Translator Study
9/9/20	001	6.75	µg/L	WER / Translator Study
1/10/21	001	22.0	µg/L	DMR
7/10/21	001	72.2	µg/L	DMR
1/10/22	001	17.5	µg/L	DMR

Data Used in Drafting of Permit

Albion Laboratory Results

AWS Laboratory Results

Modification Memo –

Attachment 5

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft Virginia Pollutant Discharge Elimination System permit from the Department of Environmental Quality that will allow the release of treated industrial wastewater and stormwater into a waterbody in Louisa County, Virginia, and to seek comment on a proposed Water Effects Ratio (WER) study and Chemical Translator Study for that same water body.
PERMIT NO.: VA0087033
NAME AND ADDRESS OF FACILITY: Dominion – Gordonsville Power Station, 819 Hill Road, Gordonsville, VA 22942
DEQ CONTACT: Susan Mackert, (571) 866-6514, susan.mackert@deq.virginia.gov, 13901 Crown Court, Woodbridge, VA 22193
The full public notice is available at: https://www.deq.virginia.gov/permits-regulations/public-notices/water/virginia-pollution-discharge-elimination-system-vpdes

Modification Memo –

Attachment 6

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated industrial wastewater and stormwater into a water body in Louisa County, Virginia, and to seek comment on a proposed Water Effects Ratio (WER) study and Chemical Translator Study for that same water body.

PUBLIC COMMENT PERIOD: February 18, 2022 through March 21, 2022

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Industrial Wastewater and Stormwater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Virginia Electric and Power Company d/b/a Dominion Energy Virginia, 120 Tredegar Street, Richmond, VA 23219, VA0087033

NAME AND ADDRESS OF FACILITY: Gordonsville Power Station, 819 Hill Road, Gordonsville, VA 22942

PROJECT DESCRIPTION: Dominion Energy Virginia has applied for a modification of a permit for the private Gordonsville Power Station. The applicant proposes to release treated industrial wastewater and stormwater at a rate of 0.08 million gallons per day into a water body. The facility proposes to release the treated industrial wastewater and stormwater in the South Anna River in Louisa County in the York River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: physical and chemical properties, inorganics, solids, and thermal. The permit also includes requirements for cooling water intake structures.

WATER EFFECTS RATIO STUDY AND CHEMICAL TRANSLATOR STUDY: Dominion Energy Virginia conducted a study to develop a site-specific WER and chemical translator for the purpose of applying the zinc water quality criteria, as defined in 9VAC25-260-140(B). The study concluded that the final WER for zinc at the specified location is 1.185 and the final chemical translator at the specified location is 0.5997 for the Gordonsville Power Station VPDES permit.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.
Name: Susan Mackert
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (571) 866-6514 E-mail: susan.mackert@deq.virginia.gov