This document gives pertinent information concerning the modification of the Virginia Pollutant Discharge Elimination System (VPDES) Permit listed below. This permitting action is being processed as a modification to a Major, Industrial permit. The discharges result from the operation of an existing 1845 Mega Watt (MW) natural gas and oil fired steam electric generating station. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260 et seq.

On June 30, 2014, The Department of Environmental Quality – Northern Regional Office (DEQ-NRO) received a permit modification request from Dominion Resources Services for the Possum Point Power Station. On December 24, 2014, DEQ-NRO received an addendum to the June 2014 modification request. On August 20, 2015, an additional modification request was received to address closure of the ash ponds at the Possum Point Power Station pursuant to a 2015 U.S. Environmental Protection Agency (EPA) final Rule that regulates the disposal of coal combustion residuals (CCR); hereafter referred to as final coal combustion residuals rule. A final modification request was received on October 21, 2015, to address stormwater outfalls associated with ash handling areas. This permit action addresses the industrial wastewater and stormwater discharges associated with the closure of the facility's ash ponds and those items not related to ash pond closure noted in Section 31 of the Fact Sheet. All other aspects of the Fact Sheet and final permit issued April 3, 2013 remained unchanged.

1.	Facility Name and Mailing Address:	Dominion – Possum Point Power Station 5000 Dominion Boulevard Glen Allen, VA 23060	SIC Code :	4911 - Electric Services
	Facility Location:	19000 Possum Point Road Dumfries, VA 22026	County:	Prince William
	Facility Contact Name:	Mr. Jeff Marcell	Telephone Number:	(703) 441-3813
2.	Permit No.:	VA0002071	Expiration Date of previous permit:	October 23, 2012
	Other VPDES Permits associated with this facility:		None	
	Other Permits associated with this facility:		Air – Registration Number 70225 (Title V) Hazardous Waste – VAD000620476	
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Virginia Electric and Power Company d/b/a Dominion Virginia Power		
	Owner Contact/Title:	Ms. Oula Shehab-Dandan / Environmental Consultant	Telephone Number:	(804) 273-2697
4.	Reissuance Application Complete Date:	April 12, 2012		
	Permit Modified By:	Susan Mackert	Date Drafted:	October 20, 2015
	Draft Modification Reviewed By:	Alison Thompson	Date Reviewed:	October 20, 2015
	WPM Review By:	Bryant Thomas	Date Reviewed:	October 20, 2015
	Modified Permit Updated By:	Susan Mackert	Date Updated:	October 21, 2015
	Central Office Review By:	Allan Brockenbrough, Curt Linderman, Justin Williams	Date Reviewed:	October 22, 2015
	Modified Permit Updated By:	Susan Mackert	Date Updated:	October 23, 2015
	Modified Permit Updated By:	Susan Mackert	Date Updated:	October 27, 2015
	Public Comment Period* :	Start Date: October 30, 2015	End Date:	December 14, 2015

*The public comment period totals 45 days; establishing a period for providing written comment before the public hearing that exceeds the minimum requirements and a shortened period for providing written comment after the public hearing.

5. Receiving Waters Information: Outfall 001/002 (Waterbody ID: VAN-A26E)

Receiving Stream Name :	Quantico Creek	Rivermile:	0.83
Stream Code:	1aQUA	Subbasin:	Lower Potomac
Stream Basin:	Potomac	Stream Class:	II
Section:	6	Special Standards:	b

Receiving Waters Information: Outfall 003 (Waterbody ID: VAN-A26E)

Receiving Stream Name :	Quantico Creek	Rivermile:	0.97
Stream Code:	1aQUA	Subbasin:	Lower Potomac
Stream Basin:	Potomac	Stream Class:	II
Section:	6	Special Standards:	b

Receiving Waters Information: Outfall 004 (Waterbody ID: VAN-A26E)

Receiving Stream Name :	Quantico Creek	Rivermile:	0.13
Stream Code:	1aQUA	Subbasin:	Lower Potomac
Stream Basin:	Potomac	Stream Class:	II
Section:	6	Special Standards:	b

Receiving Waters Information: Outfall 005 (Waterbody ID: VAN-A26E)

Receiving Stream Name :	UT, Quantico Creek*	Rivermile:	0.14
Stream Code:	1aXGR	Subbasin:	Lower Potomac
Stream Basin:	Potomac	Stream Class:	II
Section:	6	Special Standards:	b

*UT – Unnamed Tributary

Receiving Waters Information: Outfall 007 (Maryland Waters)

Receiving Stream Name :	Potomac River	Rivermile:	81.96
Section:	Maryland 02140102	Subbasin:	Lower Potomac
Stream Class:	Maryland Designated II	Special Standards:	Maryland Designated Use II

Receiving Waters Information: Outfall 008 (Maryland Waters)

Receiving Stream Name :	Potomac River	Rivermile:	81.99
Section:	Maryland 02140102	Subbasin:	Lower Potomac
Stream Class:	Maryland Designated II	Special Standards:	Maryland Designated Use II

Receiving Waters Information: Outfall 009 (Maryland Waters)

Receiving Stream Name :	Potomac River	Rivermile:	82.02
Section:	Maryland 02140102	Subbasin:	Lower Potomac
Stream Class:	Maryland Designated II	Special Standards:	Maryland Designated Use II

Receiving Waters Information: Outfall 010 (VAN-A26E)

Receiving Stream Name :	Quantico Creek	Rivermile:	1.24
Stream Code:	1aQUA	Subbasin:	Lower Potomac
Stream Basin:	Potomac	Stream Class:	II

Receiving Waters Information: All Virginia Outfalls

7Q10 Low Flow:	Tidal	7Q10 High Flow:	Tidal
1Q10 Low Flow:	Tidal	1Q10 High Flow:	Tidal
30Q10 Low Flow:	Tidal	30Q10 High Flow:	Tidal
Harmonic Mean Flow:	Tidal	30Q5 Flow:	Tidal

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

✓ State Water Control Law	✓ EPA Guidelines (40 CFR Part 423)
✓ Clean Water Act	✓ Water Quality Standards (VA and MD)
✓ VPDES Permit Regulation	___ Other
✓ EPA NPDES Regulation	

7. Licensed Operator Requirements: Not Applicable (Industrial Discharge)

8. Reliability Class: Not Applicable (Industrial Discharge)

9. Permit Characterization:

✓ Private	✓ Effluent Limited	✓ Possible Interstate Effect
___ Federal	✓ Water Quality Limited	___ Compliance Schedule Required
___ State	✓ Whole Effluent Toxicity Program Required	___ Interim Limits in Permit
___ POTW	___ Pretreatment Program Required	___ Interim Limits in Other Document
___ TMDL		

10. Wastewater Sources and Treatment Description:

The Dominion – Possum Point Power Station is an existing natural gas and oil fired steam electric generating station. The facility ceased the use of coal in March 2003, but five ash ponds (A, B, C, D, and E) remain on site. Please see Sections 11, 21.c and 22.k of the Fact Sheet for additional discussion on the ash ponds. All coal piles have subsequently been removed.

The facility utilizes three boiler units (Units 3, 4, and 5), one combined cycle combustion turbine (Unit 6), and six simple cycle combustion turbines generating a combined 1845 MW total gross. Water needed for unit operations is withdrawn from the Potomac River utilizing intake structures located on the Virginia shore. The intake structure formerly associated with Units 1 and 2, which were retired in June 2003, is currently used for Units 5 and 6. A second intake structure is dedicated to Units 3 and 4. An oil loading dock is also located on the Potomac River north of the two intake structures.

TABLE 1 – Generation Units		
Generating Unit	**Fuel Source**	**MW Generation**
Unit 3	Natural Gas	110 MW
Unit 4	Natural Gas	220 MW
Unit 5	#6 Low Sulfur Fuel Oil / #2 Low Sulfur Fuel Oil	850 MW
Unit 6	Natural Gas / #2 Low Sulfur Fuel Oil	575 MW
Combustion Turbines 1 - 6	#2 Low Sulfur Fuel Oil	15 MW each

Pursuant to the final coal combustion residuals rule promulgated on April 17, 2015, Dominion is closing the ash ponds at the Possum Point Power Station. To date, pre-closure activities have included the movement of ash from Ash Ponds A, B, C, and E to Ash Pond D as authorized under Part I.F.11 of the facility's existing permit, as well as the pumping of comingled decant water, dewatering water and stormwater from Ash Ponds A, B, C, and E to Ash Pond D. There has not been a discharge of the comingled water; all water is currently stored in Ash Pond D. In order to close the existing ash ponds, all water that is currently stored in Ash Pond D must be discharged. As such, the primary focus of this permit modification is to address the discharge of the comingled decant water, dewatering water, and stormwater from Ash Pond D. The discharge from Ash Pond D will be managed through the use of an treatment system designed to address the monitoring and effluent limitations established within this permit. See Section 18 of the Fact Sheet for additional discussion on the treatment system.

See Attachment 1 for the National Pollutant Discharge Elimination System (NPDES) Permit Rating Worksheet.

See Attachment 2 for a facility schematic/diagram.

TABLE 2 – Industrial Process Wastewater Outfall Description				
Outfall Number	**Discharge Sources**	**Treatment**	**Average Flow**	**Latitude and Longitude[1]**
001/002**	Unit 3, Unit 5 and Unit 6, Stormwater*	Mixing	86.38 MGD	38° 32′ 12″ N 77° 17′ 00″ W
	*Sources include Unit 3 condenser cooling water, Unit 5 cooling tower blowdown (Internal Outfall 201), Unit 6 cooling tower blowdown (Internal Outfall 202), Internal Outfall 503 (interim, based on operational needs) and stormwater. **Because the discharge from Outfall 001 and Outfall 002 originates from a common Seal Basin, the discharge is considered to be identical. As such, the discharge location is designated as Outfall 001/002 and reported on a Discharge Monitoring Report form as Outfall 001.			
003	Unit 4 Condenser Cooling Water	None	82.55 MGD	38° 32′ 17″ N 77° 16′ 58″ W

TABLE 2 – Industrial Process Wastewater Outfall Description (Continued)				
Outfall Number	**Discharge Sources**	**Treatment**	**Average Flow**	**Latitude and Longitude[1]**
004	Low Volume Waste Settling Pond*	Sedimentation, Flocculation, Skimming, Neutralization, Chemical Precipitation, Mixing	2.02 MGD	38° 31′ 55″ N 77° 17′ 04″ W
	*Sources include Internal Outfall 503 (interim, based on operational needs), Outfall 502 discharge, Unit 5 cooling tower drift, yard drains, floor drains, Unit 5 circulating water, Units 1-4 sand filter backwash, filter purge, Unit 6 wash water, Unit 6 Reverse Osmosis (RO) trailer discharge, electrodialysis reversal (EDR) backwash, neutralization sump, and stormwater.			
005	Ash Pond E*	Sedimentation, Mixing, Skimming	0.98 MGD	38° 33′ 6.89″ N 77° 17′ 36.8″ W
	* Interim sources include: Ash Pond D comingled process water discharge (Internal Outfall 503). * Final sources include: Internal Outfall 503 and Outfall 501.			
007	Intake Screen Backwash Water*	Mixing	0.19 MGD	38° 32′ 9.8″ N 77° 16′ 45.8″ W
	*Sources include Units 3, 4, 5 and 6 cooling water intake structures.			
008	Intake Screenwell Freeze Protection Water*	Mixing	0.00 MGD	38° 32′ 10″ N 77° 16′ 46″ W
	*Sources include non-contact cooling water.			
009	Intake Screen Backwash Water *	Mixing	0.19 MGD	38° 32′ 11.5″ N 77° 16′ 45.6″ W
	* Sources include Units 3 – 4 cooling water intake structures.			
010	Ash Pond D Toe Drain*	None	Variable	38° 32′ 43.8″ N 77° 16′ 37″ W
	*Sources include stormwater and groundwater infiltration from Ash Pond D.			
201 (Internal)	Unit 5 Cooling Tower Blowdown	Dechlorination, Sedimentation, Mixing	1.48 MGD	38° 32′ 11″ N 77° 16′ 57″ W
202 (Internal)	Unit 6 Cooling Tower Blowdown	Dechlorination, Sedimentation, Mixing	0.91 MGD	38° 32′ 11″ N 77° 16′ 57″ W
501 (Internal)	Metals Cleaning Waste Treatment Basin*	Mixing, Neutralization, Chemical Precipitation, Sedimentation	1.04 MGD	38° 32′ 58″ N 77° 17′ 20″ W
	*Sources include boiler wash water, air preheater rinse, precipitator rinse, stormwater.			
502 (Internal)	Oily Waste Treatment Basin*	Mixing, Sedimentation, Skimming	0.57 MGD	38° 32′ 42″ N 77° 16′ 40″ W
	*Sources include Unit 5 wastewater from various operations, oil unloading and handling system wastewater, tank bottoms, auxiliary boiler blowdown, Unit 6 cooling tower drift, false start drains, stormwater.			

TABLE 2 – Industrial Process Wastewater Outfall Description (Continued)				
Outfall Number	**Discharge Sources**	**Treatment**	**Average Flow**	**Latitude and Longitude[1]**
503 (Internal)	Comingled Process Water (Interim) / Ash Pond D Underdrain (Final)*	Technology to be Determined	2.53 MGD	NA
	*Sources include comingled decant water, dewatering water and stormwater from Ash Pond D, Ash Pond E and/or Ash Pond A, B, C complex and/or the subsurface dewatering system (underdrains).			

1. A component of the last reissuance process involved a review of outfall locations by DEQ planning staff. Based on this review, Dominion was asked to confirm the outfall coordinates which were provided within the application package. The latitude and longitude in Table 2 above have been updated to reflect Dominion's field verified coordinates which may differ from those found within the permit application. The updated coordinates are also found in Attachment 7.

See Attachment 3 for industrial process wastewater outfall locations.

TABLE 3 – Stormwater Outfall Description		
Outfall Number	**Drainage Area**	**Latitude and Longitude[1]**
S5**	Approximately 3.9 acres between the Unit 5 cooling towers.	38° 32′ 0.2″ N 77° 16′ 52.7″ W
S31	Approximately 0.15 acres from two drop inlets located at the north end of the Unit 5 Cooling Tower B. *Cooling tower mist is an allowable non-stormwater discharge pursuant to 9VAC25-151-50	38° 32′ 9.2″ N 77° 16′ 47.2″ W
S35**	Approximately 0.15 acres from the north end of Unit 5 Cooling Tower B.	38° 32′ 10″ N 77° 16′ 46″ W
S36	Approximately 0.11 acres located around the Unit 1 and 2 stacks and the road under the Unit 3 and 4 precipitators.	38° 32′ 11.2″ N 77° 16′ 46″ W
S37	Approximately 2.0 acres from the area around the Administration Building (primarily vehicle parking and roof drainage) and the eastern one half of the maintenance shop.	38° 32′ 09″ N 77° 16′ 46″ W
S42**	Approximately 6.6 acres from multiple drop inlets located around the perimeter of the Unit 5 boiler and dust collector.	38° 32′ 14″ N 77° 16′ 43.1″ W
S49	Approximately 0.15 acres from a drop inlet located in the drainage area east of the Unit 5 boiler and north of the oil dock foam house.	38° 32′ 17″ N 77° 16′ 40.6″ W

TABLE 3 – Stormwater Outfall Description (Continued)		
Outfall Number	**Drainage Area**	**Latitude and Longitude**[1]
S61**	Approximately 2.8 acres from the main entrance way to the plant, the gravel area west of the old combustion turbine buildings, a portion of the roadway leading from the old combustion turbines to the northwest end of the 115 kV switchyard, grassy area and railway located west of the 115 kV switchyard, and the west end of the maintenance shop.	38° 32′ 13.5″ N 77° 17′ 00″ W
S77	Approximately 0.14 acres from the area surrounding the eastern edge of the No. 6 fuel oil pipe bench leading north to the Unit 5 transfer pump house.	38° 32′ 20.7″ N 77° 16′ 37.3″ W
S78	Approximately 0.61 acres that drains the exterior berm of the heavy oil tanks containment via a concrete flume.	38° 32′ 25″ N 77° 16′ 36.1″ W
S79	Approximately 0.56 acres that drains the exterior berm of the heavy oil tanks containment via a concrete flume.	38° 32′ 27.5″ N 77° 16′ 35.5″ W
S80	Approximately 0.36 acres that drains the exterior berm of the heavy oil tanks containment via a concrete flume.	38° 32′ 31.6″ N 77° 16′ 35.1″ W
S86	Approximately 34.6 acres from drainage ditches on both sides of the railroad and sheet flow from the west side of the 230 kV switchyard, all of the Measurement and Regulator (M&R) station, west of the light oil containment tanks, parking lot near old combustion turbines, and the main entrance.	38° 31′ 53.5″ N 77° 17′ 5.5″ W
S94	Approximately 0.23 acres that drains the exterior berm of the heavy oil tanks containment via a concrete flume.	38° 32′ 35″ N 77° 16′ 34.7″ W
S95	Approximately 2.6 acres consisting of multiple ditches and graded surfaces at the north end of the Station.	38° 32′ 35″ N 77° 16′ 34.7″ W
S108	Approximately 0.76 acres from the area south of Ash Pond E located near the construction entrance at the point of convergence for runoff from a Virginia Department of Transportation (VDOT) culvert and the culverts containing the station's former ash sluice lines.	38° 32′ 52″ N 77° 17′ 21″ W

TABLE 3 – Stormwater Outfall Description (Continued)
1. A component of the reissuance process involved a review of outfall locations by DEQ planning staff. Based on this review, Dominion was asked to confirm the outfall coordinates which were provided within the application package. The latitude and longitude in Table 3 above have been updated to reflect Dominion's field verified coordinates which may differ from those found within the permit application. The updated coordinates are also found in Attachment 7.
The following industrially influenced stormwater outfalls have been deemed representative:
** Outfall S5 is deemed representative of Outfall S31 and S35
** Outfall S42 is deemed representative of Outfalls S49 and S77
** Outfall S61 is deemed representative of Outfalls S36 and S37

11. Solids Generation and Management:

The Dominion – Possum Point Power Station is an existing natural gas and oil fired steam electric generating station that does not treat domestic sewage and does not produce sewage sludge.

The facility has a permanent repository, Ash Pond D, for dredge spoil material and residuals related to the operation and maintenance of the Possum Point Power Station. Additionally, Ash Pond D may be used as a repository for dredge spoil material that is not related to operations at the Station provided the material originated from the Potomac River, Quantico Creek or public water bodies in the Quantico Creek watershed meeting the definition of State waters in Virginia.

Ash Pond D is a lined structure that was placed into service in 1989. The pond has a surface area of seventy-two acres, a maximum depth of 120 feet, and a design capacity of over one billion gallons. Please see Section 24.k of the Fact Sheet for further discussion pertaining to solids management.

Table 4 below provides a detailed description of dredge spoil material and residuals disposal in Ash Pond D.

TABLE 4 – Dredge Spoil Material and Residuals Disposal[1]		
Description	**Estimated Volume (yd^3)**	**Frequency**
Filter Cake – from water treatment unit for Unit 6	50	Weekly[2]
Dredge spoils and soils from the Possum Point site	50	Twice a year
Dredge spoils from the Quantico Creek watershed	50	Once a year
Solids from treatment ponds and stormwater management facilities	100	Once a year
Cooling tower basin sludge	200	Once a year
Solids from station floor drains, lift stations, and sumps	100	Once a year

1. Estimated volumes do not include potential special projects such as coal combustion byproducts in former ash ponds A, B, and C and spoils from Potomac River channel dredging.
2. Weekly when Unit 6 is operating; expected annual volume is approximately 850 cubic yards.

12. Other Discharges and Monitoring Stations in Vicinity of Possum Point Discharge Locations - Virginia Waters: 001/002, 003, 004, 005, 010, S5, S61, and S86

The facilities and monitoring stations listed below either discharge to or are located within the waterbody VAN-A26E.

TABLE 5	
1aQUA000.43	DEQ special study monitoring station located in the tidal portion of Quantico Creek approximately 1.7 miles downstream of Outfall 005 and 100 yards upstream of the railroad bridge
1aQUA001.00	DEQ fish tissue monitoring station located approximately 0.7 miles upstream of the railroad bridge
1aQUA001.09	DEQ special study monitoring station located approximately 0.75 rivermiles upstream of the railroad bridge
1aQUA001.81	DEQ special study monitoring station located downstream for the unnamed tributary to Quantico Creek into which Outfall 005 (Ash Pond E) discharges.
1aQUA002.38	DEQ special study monitoring station located in the upper Quantico Creek embayment.
1aQUA004.20	DEQ special study monitoring station located in the free-flowing portion of Quantico Creek near Route 1.
1aQUA004.88	DEQ special study monitoring station located in the free-flowing portion of Quantico Creek near Van Buren Road.
VA0002151	U.S. Marine Corps Base Quantico – NREAB Industrial (Chopawamsic Creek)
VA0002151	U.S. Marine Corps Base Quantico – NREAB Industrial (Potomac River)
VA0002151	U.S. Marine Corps Base Quantico – NREAB Industrial (Potomac River, UT)
VAR051039	NuStar Terminals (Potomac River)
VAR051065	Whitehurst Transport, Incorporated (Quantico Creek)
There are no public water supply intakes within a five mile radius of any of the outfalls listed in Table 2 and Table 3.	

13. Material Storage:

Material storage information was provided as a component of the reissuance package.

See Attachment 4 for a bulk chemical list.

See Attachment 5 for bulk chemical storage locations.

14. Site Inspection:

Performed by Susan Mackert and Bryant Thomas on February 17, 2012. The site visit confirms that the information provided in the facility's permit reapplication package dated April 5, 2012, and received April 10, 2012, is accurate and representative of actual site conditions. The site visit memo can be found as Attachment 6.

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

1) Outfalls 001/002, 003, S61 and S107 discharge into a portion of tidal Quantico Creek. The following is the water quality summary for this portion of Quantico Creek, as taken from the Draft 2012 Integrated Assessment*:

DEQ fish tissue monitoring station 1aQUA001.00 located approximately 0.7 miles upstream of the railroad bridge.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, Polychlorinated Biphenyl (PCB) fish consumption advisory and fish tissue monitoring. A PCB Total Maximum Daily Load (TMDL) for the tidal Potomac River watershed has been completed and approved.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The recreation and wildlife uses were not assessed.

Coastal 2000 weight of evidence analysis, utilizing bulk chemical data, toxicity test data, and an evaluation of benthic community conditions, resulted in an impaired determination for the aquatic life use. Results from the estuarine bioassessment, sediment chemistry analysis (elevated nickel levels), and sediment bioassay for estuarine waters were all factors for this determination. Station 1aQUA001.09, approximately 0.75 rivermiles above the railroad bridge, was sampled in 2001 for the Coastal 2000 program (part of the estuarine probabilistic monitoring program).

2) Outfalls 004, S5 and S86 discharge into the downstream most segment of tidal Quantico Creek. The following is the water quality summary for this portion of Quantico Creek, as taken from the Draft 2012 Integrated Assessment*:

DEQ ambient monitoring station 1aQUA000.43 located in the tidal portion of Quantico Creek, approximately 1.7 miles downstream of the outfall and located 100 yards upstream of the railroad bridge.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

The aquatic life use is fully supporting. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The recreation and wildlife uses are fully supporting.

3) Outfall 005 discharges to an unnamed tributary to Quantico Creek that has not been monitored. The nearest downstream DEQ ambient monitoring station is 1aQUA000.43, which is located in the tidal portion of Quantico Creek, approximately 1.7 miles downstream of the outfall and located 100 yards upstream of the railroad bridge. Discharge from Outfall 005 flows downstream into the tidal segment of Quantico Creek described above in Section 15.a.1of the Fact Sheet, then into the tidal segment described above in Section 15.a.2 of the Fact Sheet.

4) Outfalls 007, 008, 009, S31, S36, S37, S42, S49, S77, S78, S79, S80, S94 and S95 discharge into the tidal freshwater Potomac River. DEQ does not conduct ambient monitoring on the Potomac River, as this portion of the river falls under the jurisdiction of the state of Maryland. The following information is found in Maryland's Draft Water Quality Assessment 2012 Integrated Report:

The Upper Potomac River Tidal Fresh is listed as impaired for the open-water fish and shellfish subcategory, and for the seasonal migratory fish spawning and nursery subcategory of the aquatic life use due to total nitrogen and total phosphorus. A TMDL has been completed for the Chesapeake Bay watershed.

*Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently being finalized and prepared for release.

The full planning statement is found as Attachment 7.

b) <u>303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)</u>

TABLE 6

Impairment Information in VA Draft 2012 Integrated Report*

Waterbody Name	Impaired Use	Cause	TMDL Completed	WLA	Basis for WLA	TMDL Schedule
Quantico Creek	Aquatic Life	Estuarine Bioassessments	No	N/A	N/A	2018
		Sediment Bioassays for Estuarine and Marine Waters	No	N/A	N/A	2018
	Fish Consumption	PCBs	Tidal Potomac PCB TMDL 10/31/2007	None	---	N/A

Impairment Information in MD Draft 2012 Integrated Report

Waterbody Name	Impaired Use	Cause	TMDL Completed	WLA	Basis for WLA	TMDL Schedule
Potomac River	Open-Water Fish and Shellfish	Total Nitrogen and Total Phosphorus	There is a completed TMDL for the aquatic life use impairment for the Chesapeake Bay.			
	Seasonal Migratory Fish Spawning and Nursery					

*Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently being finalized and prepared for release.

c) <u>Receiving Stream Water Quality Criteria</u>

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections.

Quantico Creek and UT to Quantico Creek

Quantico Creek and the unnamed tributary to Quantico Creek are located within Section 6 of the Potomac River Basin, and are classified as Class II waters. Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0-9.0 standard units (S.U.) as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented in Attachment 8.

Potomac River
The mainstem of the Potomac River is considered Maryland waters. The receiving stream, per the Maryland Water Quality Criteria, has been designated as Use II water. The use goals include the support of estuarine and marine aquatic life and shellfish harvesting. The dissolved oxygen (D.O.) may not be less than 5.0 mg/L at any time and a pH of 6.5 – 8.5 standard units (S.U.) must be maintained.

d) Virginia Water Quality Standards

1) Existing Permit

Ammonia:

The freshwater, aquatic life Water Quality Criteria for Ammonia are dependent on the instream and/or effluent temperature and pH. Agency guidance uses the 90th percentile temperature and pH values because they best represent the critical design conditions of the receiving stream.

With the last reissuance, pH and temperature data from the tidal portion of Neabsco Creek (1ANEA000.57) were used as Neabsco Creek has similar characteristics to the tidal portion of Quantico Creek. It was staff's opinion that the data contained a sampling bias since most ambient samples were collected between 10 a.m. and 2 p.m. This time period is the period of highest photosynthetic activity in a shallow, open embayment such as the mouth of Neabsco Creek. During peak photosynthetic activity, the pH rises as carbon dioxide is taken up by the green autotrophic organisms, i.e. algae, present in the embayment (*Textbook of Limnology*, 3rd edition, G. Cole). Because of this sampling bias, staff used the 50th percentile pH and temperature values rather than the recommended 90th percentile temperature and pH values for the calculation of the ammonia as nitrogen Water Quality Criteria. These values are shown below in Table 7.

TABLE 7 – Instream 50th Percentile Derivations (2007)	
50th percentile pH	50th percentile temperature
8.2 S.U.	18°C

A new ambient monitoring station (1aQUA000.43) was installed in the tidal portion of Quantico Creek in March 2007. The use of data from this monitoring station is more appropriate given Outfall 004 and Outfall 005, for which ammonia criteria are being developed, discharge to Quantico Creek and an unnamed tributary to Quantico Creek, respectively. As such, staff has reviewed pH and temperature data from this monitoring station for the time period of March 2007 – July 2012 (Attachment 9b). Because ample data exists for the receiving stream it is staff's best professional judgement that the 90th percentile temperature and pH values be used as they best represent the critical design conditions of the receiving stream. The values are shown below in Table 8 were used to derive the criteria in Attachment 9a.

TABLE 8 – Instream 90th Percentile Derivations (2012)	
90th percentile pH	90th percentile temperature
8.1 S.U.	28°C

When instream temperature and pH data are available for use, staff also utilizes effluent pH and temperature data to establish the ammonia water quality standard to account for mixing in receiving waters. Of the four outfalls with discharges to Virginia state waters, Outfall 005 was selected for use as representative of all outfalls with regard to water quality criteria derivation. Outfall 005 was selected because metals criteria need to be evaluated for this discharge. The 90th percentile pH was derived from Outfall 005 DMR submissions dated April 2009 to May 2012 and was determined to be 8.6 S.U (Attachment 9b). Because the facility is not required to monitor temperature at this outfall, a default value of 25°C was used. The ammonia water quality standards calculations are shown in Attachment 9a.

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). The average hardness of the receiving stream, Quantico Creek, is 46 mg/L.

When instream hardness data is available for use, staff also utilizes effluent hardness data to establish the hardness-dependent metals criteria. Again, Outfall 005 was selected for use as metals criteria need to be evaluated for only this outfall. Because there is no Total Hardness effluent data for Outfall 005, staff guidance suggests using a default hardness value of 50 mg/L $CaCO_3$ for streams east of the Blue Ridge.

The hardness-dependent metals criteria shown in Attachment 9a are based on the two values above.

2) Interim and Final Configuration (Internal Outfall 503) – Modified Permit

Ammonia:

As noted above, during the reissuance of the existing permit staff utilized pH and temperature data from ambient monitoring station 1aQUA000.43 located in the tidal portion of Quantico Creek. It is staff's best professional judgement that the 90th percentile temperature and pH values determined during the 2013 reissuance be carried forward to determine the water quality criteria for Internal Outfall 503 as they best represent the critical design conditions of the receiving stream. As such, the 90th percentile pH of 8.1 S.U. and a 90th percentile temperature value of 28°C shall be used.

When instream temperature and pH data are available for use, staff also utilizes effluent pH and temperature data to establish the ammonia water quality standard to account for mixing in receiving waters. Staff utilized data from the modification application for blended ash dewatering and contact waters collected in May 2015. The 90th percentile pH was determined to be 7.9 S.U (Attachment 10b). Because the data collected in May does not reflect seasonality, it is staff's best professional judgement that the 90th percentile temperature for the effluent be set equal to that of the instream 90th percentile temperature. As such, a value of 28°C was used. The ammonia water quality standards calculations are shown in Attachment 10a.

Metals:

As noted above, during the reissuance of the permit staff utilized the average hardness, 46 mg/L, of the receiving stream, Quantico Creek. It is staff's best professional judgement that the average hardness used during the 2013 reissuance is representative and will be carried forward to determine the water quality criteria for Internal Outfall 503. As such, the average hardness of 46 mg/L shall be used.

The mean hardness value of 100 mg/L was established based on best professional judgment and is considered to be a conservative characterization of the process wastewater generated during dewatering activities.

The hardness-dependent metals criteria shown in Attachment 10a are based on the two values above.

Additionally, the background concentrations shown in Table 9 below were utilized to derive the criteria shown in Attachment 10a. Three ambient water quality stations, IAQUA000.43, IAQUA001.28, and IAQUA002.38, were sampled by DEQ on June 25, 2015. All samples were collected from a low slack tide. For purposes of background calculations, the sample collected near the mouth of Quantico Creek was not considered as this is downstream from the expected discharge location and more likely influenced by the Potomac River. While not utilized in the reissuance of the permit in 2013, background concentrations were included with this modification. The use of background concentrations is appropriate with this modification as the samples collected on June 25, 2015, were not influenced by the discharge from Outfall 005 which had not discharged since May 9, 2015.

TABLE 9 – Background Values Determined from June 2015 Metals Sampling	
Parameter Name (Reporting Units)	Background Value[1]
Arsenic, Dissolved (µg/L as As)	1.61
Cadmium, Dissolved (µg/L as Cd)	0
Chromium, Dissolved (µg/L as Cr)	0.36
Copper, Dissolved (µg/L as Cu)	1.98
Lead, Dissolved (µg/L as Pb)	0.24
Mercury-TL, Unfiltered Water (ng/L)[2]	1.00
Nickel, Dissolved (µg/L as Ni)	1.14
Selenium, Dissolved (µg/L as Se)[3]	0.49
Silver, Dissolved (µg/L as Ag)	0
Zinc, Dissolved (µg/L as Zn)	0.85

[1]Background values were determined for the two samples collected using the following guidelines:
- If both reported values were quantifiable, then the arithmetic average was determined.
- If both reported values were less than detection, the background is considered zero.
- If one of the reported values was quantifiable and one was non-detect or above detection but below quantification, either the detection limit or the quantification limit was used in computing the arithmetic average.

[2]Data for mercury, while in the total recoverable form, was utilized due to its availability and as a conservative measure.

[3]Data for selenium, while in the dissolved form, was utilized due to its availability with the ratio of total recoverable to dissolved assumed to be 1:1.

e) 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.

1) *Quantico Creek and UT to Quantico Creek*
Quantico Creek and the unnamed tributary to Quantico Creek are located within Section 6 of the Potomac River Basin. This section has been designated with a special standard of "b".

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 bridge in King George County. The Potomac Embayment Standards are not applied to the facility's discharges since the discharges do not contain the pollutants of concern in appreciable amounts.

2) *Potomac River*
The mainstem of the Potomac River is considered Maryland waters. The receiving stream, per the Maryland Water Quality Criteria, has been designated as Use II water. The use goals include the support of estuarine and marine aquatic life and shellfish harvesting.

f) Threatened or Endangered Species

The Virginia Department of Game and Inland Fisheries (DGIF) Fish and Wildlife Information System Database was searched on June 5, 2012, for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a 2 mile radius of the discharge: Atlantic Sturgeon, Brook Floater, Peregrine Falcon, Upland Sandpiper, Loggerhead Shrike, Henslow's Sparrow, Bald Eagle, and Migrant Loggerhead Shrike. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge.

The receiving streams are within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

g) Maryland Water Quality Standards

The mainstem of the Potomac River is considered Maryland waters. Outfalls 007, 008, and 009 discharge to the Potomac River, thus having the potential to impact Maryland waters. Staff has reviewed Title 26, Subtitle 08 of the Code of Maryland Regulations (Maryland Water Quality Standards) and believes that the effluent limitations established in this permit will comply with Maryland's water quality standards at the discharge points to the Potomac River.

16. 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.

All receiving streams have been classified as Tier 1as effluent limits were established to meet the Water Quality Standards (WQS), because of the highly developed receiving stream watersheds in Prince William County (Quantico Creek) and the District of Columbia metropolitan area (Potomac River), and the water quality impairment listed for the tidal fresh water Potomac River. The 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 streams, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. 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 is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards (WQS) 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. Pursuant to DEQ Guidance Memo 00-2011, there are two recommended approaches for calculating wasteload allocations and addressing antidegredation for discharges in tidal waters. One approach is to utilize fresh water flow frequencies and the other is to utilize tidal dilution factors. For purposes of this reissuance, the WLA were calculated using the tidal dilution factor method.

a) Effluent Screening:

The discharges from Outfalls 004, 005, 201, 202, 501, and 502, are covered by Federal Effluent Guidelines established in 40 CFR – Part 423. When applicable, both the water quality based limits and Federal Effluent Guideline requirements were compared for these outfalls. The most stringent limitation was used as the basis for the final limit. See Section 17.e of the Fact Sheet for additional discussion on the applicable Federal Effluent Guidelines.

Effluent data obtained from the permit application and Discharge Monitoring Report (DMR) forms from April 2009 through March 2012 has been reviewed and determined to be suitable for evaluation. The following pollutants require a wasteload allocation analysis: Total Residual Chlorine and Dissolved Nickel.

b) Tidal Water Quality Wasteload Allocations (Tidal WQWLAs):

The receiving streams, Quantico Creek, UT to Quantico Creek, and the Potomac River are tidally influenced. The acute wasteload allocations are established by multiplying the acute water quality criteria by a factor of 2 unless there is site specific dilution data available. The two times factor is derived from acute criteria being defined as one half of the final acute value (FAV) for a specific toxic pollutant. The FAV is determined from exposure of the specific toxicant to a variety of aquatic species, and is based on the level of a chemical or mixture of chemicals that does not allow the mortality, or other specified response, of aquatic organisms. These criteria represent maximum pollutant concentration values, which when exceeded, would cause acute effects on aquatic life in a short time period. For chronic wasteload allocations a dilution of 50 is used unless there is site specific dilution data available. The above Tidal WQWLA determinations are consistent with the instructions found within DEQ Guidance Memo 00-2011.

With the last permit reissuance, the facility was required to conduct a new mixing zone study. It was staff's best professional judgement that due to the retirement of Units 1 and 2 and the addition of Unit 6, operational changes at the Station warranted re-evaluation of the existing mixing zone boundaries from those approved in the mid-1980s study. In response to the permit requirement, the permittee conducted a detailed analysis of the mixing zone conditions and re-evaluated the accuracy of the mixing zone dimensions that were previously developed. The re-evaluation study plan was submitted to DEQ in October 2008, with the final thermal mixing zone modeling report submitted in October 2011. Statistical analysis of the positions of the thermal plume during extreme summer and winter simulations indicates that ninety-nine (99) percent of the time the plume would remain within about 657 and 507 acres, respectively, in Quantico Creek and a part of the Potomac River. The results of the re-evaluation do not differ significantly from those established in the mid-1980s study. Additionally, based upon temperature data collected, there have been no exceedances of the 3°C delta standard in Quantico Creek or the state water quality standard for temperature. Correspondence dated July 9, 2012, from the Virginia Department of Game and Inland Fisheries (DGIF) indicates that fish from Quantico Creek are all within expected ranges and are comparable to those from neighboring creeks. DGIF also indicates that there is no reason to believe there is any impairment to fishery resources in Quantico Creek as a result of the discharge from the Possum Point Power Station. The final thermal mixing zone modeling report is maintained within the Northern Regional Office's files and is found as Attachment 10. The correspondence from DGIF is found as Attachment 11.

Because site specific dilution data were not determined as part of the thermal mixing zone study, a default acute dilution factor of 2:1 and a default chronic dilution factor of 50:1 shall be used (based on DEQ Guidance Memo 00-2011). Please refer to the outfall discussions below for the applicability of dilution factors on an outfall-by-outfall basis. Attachment 9a summarizes the wasteload allocation determinations.

1) Outfalls 001/002, 003, 005, and 503*

Acute Wasteload Allocation (WLA_A)
Both Outfalls 001/002 and 003 discharge to Quantico Creek and Outfall 005 discharges to an unnamed tributary of Quantico Creek. Because site specific dilution data were not determined, it is staff's best professional judgement that as recommended in agency guidance a dilution factor of 2:1 is appropriate.

Chronic Wasteload Allocation (WLA_C)
Due to the shallow depth and confined morphometry of the Quantico Creek embayment and the volume of water being discharged by the Dominion – Possum Point Power Station, it is staff's best professional judgement that a dilution factor of 2:1 is more appropriate than the 50:1 dilution factor recommend in agency guidance. The factor of two has been used on similar embayments and has been demonstrated to be a reasonable estimate. As such, the chronic wasteload allocation (WLA_C) shall be determined by multiplying the chronic water quality criteria by two.

*Because the final configuration for Internal Outfall 503 involves discharge through Outfall 005, staff applied the above dilution factors to determine the wasteload allocations and limitations for Internal Outfall 503 during the interim operational period shown in Section 21.n of the Fact Sheet. These assumptions will maintain and protect the Water Quality Standards of the receiving stream regardless of outfall location.

2) Outfalls 004, 007, 008 and 009

Acute Wasteload Allocation (WLA_A)
Due to the fact Outfall 004 discharges into tidal estuary waters in close proximity to the main stem of the Potomac River, and Outfalls 007, 008, and 009 discharge directly to the main stem of the Potomac River, the dilution factor of 2:1 recommended in agency guidance shall be used to calculate the acute wasteload allocation (WLA_A) for these outfalls. The acute waste load allocation shall be determined by multiplying the acute water quality criteria by two.

Chronic Wasteload Allocation (WLA_C)
The dilution factor of 50:1 recommended in agency guidance shall be used for the determining the chronic wasteload allocation (WLA_C) for these outfalls. The WLA_C shall be determined by multiplying the chronic water quality criteria by fifty.

c) Effluent Limitations and Monitoring

The following Federal Effluent Guideline abbreviations are used within the discussions in Section 17.c and Sections 21.a through 21.n of the Fact Sheet:

Best Available Technology – BAT
Best Practicable Technology – BPT
New Source Performance Standards – NSPS

1) Outfall 001/002

Heat Rejection:
Heat Rejection is defined as the rate of heat transfer from a unit's condenser to its circulating water system. It is calculated directly by conservation of mass and energy either across the circulating water system (condenser tube side) or from the turbine exhaust to the hotwell (condenser shell side). Heat Rejection is measured in BTU/Hour.

Because there have been no operational changes at the Possum Point Power Station which could impact the thermal component of the discharge from this outfall, no change to the heat rejection limit is proposed with this reissuance. As such, the previously established heat rejection limit of 5.58×10^8 BTU/hr shall be carried forward with this reissuance. The continuous monitoring frequency shall be carried forward.

Intake Temperature:
A Schedule of Compliance was included with the previous reissuance to implement temperature monitoring at the intake structure. The Schedule of Compliance was completed on October 23, 2008, and as such will be removed with this reissuance.

It is staff's best professional judgement that intake temperature monitoring continue with this reissuance. The monitoring frequency of once per day (1/D) shall be carried forward.

Discharge Temperature:
A Schedule of Compliance was included with the previous reissuance to implement temperature monitoring of the effluent. The Schedule of Compliance was completed on October 23, 2008, and as such will be removed with this reissuance.

It is staff's best professional judgement that effluent temperature monitoring should continue with this reissuance. The monitoring frequency of once per day (1/D) shall be carried forward.

pH:

pH limitations are set at the water quality criteria. As such, the previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Residual Chlorine (TRC):
Federal Effluent Guidelines (40 CFR 423.13(b)(1) – Best Available Technology) state that for any plant with a total rated electric generating capacity of 25 or more megawatts, the quantity of pollutants discharged in once through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of once through cooling water times the maximum concentration of 0.2 mg/L. At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.13(b)(1). It is staff's best professional judgement that applying the maximum concentration of 0.2 mg/L to the discharge is appropriate and will allow comparison to the Virginia WQS for TRC which are established in concentration units.

In accordance with current DEQ guidance (Memo 00-2011), staff used a default data point of 0.2 mg/L and the most limiting allocations to derive the water quality based limits which were compared against the Federal Effluent Guidelines. The resulting water quality based derivation indicated a water quality based daily maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L is needed (Attachment 13a). The water quality based limits are more stringent than the Federal Effluent Guidelines and as such, the water quality based limits shall be applied. These limits are consistent with the previous reissuance which also included a water quality based daily maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L. The daily maximum TRC limit of 0.032 mg/L and monthly average TRC limit of 0.022 mg/L shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall also be carried forward. Monitoring is only required when the facility is chlorinating.

Free Available Chlorine:
In accordance with the Federal Effluent Guidelines found in 40 CFR 423.12(b)(6) and 40 CFR 423.12(b)(7) – Best Practicable Technology and 40 CFR 423.13(d)(1) – Best Available Technology, free available chlorine limitations are applicable to discharges that contain once through cooling water and cooling tower blowdown. The discharge from Outfall 001/002 contains both once through cooling water and cooling tower blowdown flow. Because free available chlorine limits are applied at internal Outfalls 201 and 202 for the cooling tower blowdown, limits only need to be considered for the once through cooling water component of the discharge.

The sum of free available chlorine and combined available chlorine form total residual chlorine. If established total residual chlorine limits are met, it is assumed free available chlorine will be equivalent to or less than the total residual chlorine. As discussed above, total residual chlorine limitations (daily maximum of 0.032 mg/L and monthly average of 0.022 mg/L) were developed based on the once through cooling water component of the discharge from Outfall 001/002. Free available chlorine associated with the once through cooling water component would be expected to be equivalent to or less than the established total residual chlorine limitations and therefore, comply with the Federal Effluent Guideline (40 CFR 423.12(b)(6)) limitations (daily maximum of 0.5 mg/L and a monthly average of 0.2 mg/L). Therefore, it is staff's best professional judgement that free available chlorine limitations are not warranted given the total residual chlorine limitation is more stringent.

2) Outfall 003

Heat Rejection:
Because there have been no operational changes at the Possum Point Power Station which could impact the thermal component of the discharge from this outfall, no change to the heat rejection limit is proposed with this reissuance. As such, the previously established heat rejection limit of 1.14×10^9 BTU/hr shall be carried forward with this reissuance. The continuous monitoring frequency shall be carried forward.

Discharge Temperature:
A Schedule of Compliance was included with the previous reissuance to implement temperature monitoring of the effluent. The Schedule of Compliance was completed on October 23, 2008, and as such will be removed with this reissuance.

It is staff's best professional judgement that effluent temperature monitoring continue with this reissuance. The monitoring frequency of once per day (1/W) shall be carried forward.

pH:
pH limitations are set at the water quality criteria. As such, the previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of once per month (1/M) shall be carried forward.

Total Residual Chlorine (TRC):
Federal Effluent Guidelines (40 CFR 423.13(b)(1)) state that the quantity of pollutants discharged in once through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of once through cooling water times the maximum concentration of 0.2 mg/L. At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.13(b)(1). It is staff's best professional judgement that applying the maximum concentration of 0.2 mg/L to the discharge is appropriate and will allow comparison to the Virginia WQS for TRC which are established in concentration units.

In accordance with current DEQ guidance (Memo 00-2011), staff used a default data point of 0.2 mg/L and the most limiting allocations to derive the water quality based limits which were compared against the Federal Effluent Guidelines. The resulting water quality based derivation indicated a water quality based daily maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L is needed (Attachment 13a). The water quality based limits are more stringent than the Federal Effluent Guidelines and as such, the water quality based limits shall be applied. These limits are consistent with the previous reissuance which also included a water quality based daily maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L. As such, the daily maximum TRC limit of 0.032 mg/L and monthly average TRC limit of 0.022 mg/L shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall also be carried forward. Monitoring is only required when the facility is chlorinating.

Free Available Chlorine:
The previous reissuance of this permit did not included free available chlorine limitations. In accordance with the Federal Effluent Guidelines found in 40 CFR 423.12(b)(6) – Best Practicable Technology, free available chlorine limitations are applicable to discharges that contain once through cooling water. The discharge from Outfall 003 contains once through cooling water.

The sum of free available chlorine and combined available chlorine form total residual chlorine. If established total residual chlorine limits are met, it is assumed free available chlorine will be equivalent to or less than the total residual chlorine. As discussed above, total residual chlorine limitations (daily maximum of 0.032 mg/L and monthly average of 0.022 mg/L) were developed based on the once through cooling water component of the discharge from Outfall 003. Free available chlorine associated with the once through cooling water component would be expected to be equivalent to or less than the established total residual chlorine limitations and therefore, comply with the Federal Effluent Guideline (40 CFR 423.12(b)(6)) limitations (daily maximum of 0.5 mg/L and a monthly average of 0.2 mg/L). As such, it is staff's best professional judgement that free available chlorine limitations are not warranted given the total residual chlorine limitation is more stringent.

Dissolved Copper:
During the previous reissuance of the permit, data analysis indicated the need for a copper limit of 16 μg/L. This limit was derived based on one datum point and it was staff's best professional judgement to implement a copper monitoring program in lieu of a limit. The monitoring program was instituted to compile additional data to assist in a later determination of whether a copper limit was warranted.

A review of copper effluent data from April 2009 – June 2012 (Attachment 13b) and data submitted with the permit application indicates all data were below the QL and as such no effluent limitation is warranted. It is staff's best professional judgement that copper monitoring at Outfall 003 is no longer necessary and the requirement for monitoring shall be removed with this reissuance.

3) Outfall 004

Heat Rejection:
Because there have been no operational changes at the Possum Point Power Station which could impact the thermal component of the discharge from this outfall, no change to the heat rejection limit is proposed with this reissuance. As such, the previously established heat rejection limit of 1.9×10^8 BTU/hr shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall be carried forward.

Discharge Temperature:
A Schedule of Compliance was included with the previous reissuance to implement temperature monitoring of the effluent. The Schedule of Compliance was completed on October 23, 2008, and as such will be removed with this reissuance.

It is staff's best professional judgement that effluent temperature monitoring continue with this reissuance. The monitoring frequency of once per day (1/W) shall be carried forward.

pH:
Federal Effluent Guidelines (40 CFR Part 40 CFR 423.12(b)(1) – Best Practicable Technology) state that all discharges, except once through cooling water shall be within a range of 6.0 S.U. – 9.0 S.U. and water quality criteria states that pH shall be a minimum value of 6.0 S.U. and a maximum value of 9.0 S.U. Because the pH range is the same for both the Federal Effluent Guidelines and the water quality criteria, the previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall be carried forward.

Total Residual Chlorine (TRC):
The Federal Effluent Guidelines for TRC found in 40 CFR 423.13(b)(1) are only applicable to the quantity of pollutants discharged in once through cooling water from each discharge point. The effluent from Outfall 004 does not have a once through cooling water component. As such, the reference to the Federal Effluent Guidelines in the previous permit as a basis for TRC limits for Outfall 004 is not included with this reissuance.

It is staff's best professional judgement that there is reasonable potential for TRC to be present in the discharge from Outfall 004 and that both daily maximum and monthly average TRC limits be continued with this reissuance. In accordance with current DEQ guidance (Memo 00-2011), staff used a default data point of 0.2 mg/L and the most limiting allocations to derive the water quality based limit. The resulting water quality based derivation indicated a daily maximum limit of 0.038 mg/L and a monthly average limit of 0.026 mg/L is needed (Attachment 13a).

During the drafting of this permit it was discovered that the TRC limits derived for the 2007 reissuance, while technically correct, were incorrectly transferred from the Fact Sheet to the permit. The permit lists a daily maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L rather than the daily maximum limit of 0.038 mg/L and the monthly average limit of 0.026 mg/L as derived (Attachment 13a). This reissuance corrects the typographical error associated with the TRC limits at Outfall 004, and as such a daily maximum TRC limit of 0.038 mg/L and a monthly average TRC limit of 0.026 mg/L shall be included with this reissuance. These limitations are also consistent with those derived for the 2012 reissuance of the permit. It is staff's best professional judgement that this revised limit will not create any instream excursion of any applicable State narrative or numerical Water Quality Standard. See Section 18 of the Fact Sheet for further discussion on backsliding.

The monitoring frequency of once per week (1/W) shall be carried forward. Monitoring is only required when the facility is chlorinating.

Oil and Grease (O&G):
Federal Effluent Guidelines (40 CFR 423.12(b)(3) - Best Practicable Technology) state that that the quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the maximum concentration of 20 mg/L and the average concentration of 15 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(3). It is staff's best professional judgement that applying the maximum concentration of 20 mg/L and the average concentration of 15 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum O&G limit of 20 mg/L and the monthly average O&G limit of 15 mg/L shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall also be carried forward.

Total Suspended Solids (TSS):
Federal Effluent Guidelines (40 CFR 423.12(b)(3) - Best Practicable Technology) state that that the quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the maximum concentration of 100 mg/L and the average concentration of 30 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(3). It is staff's best professional judgement that applying the maximum concentration of 100 mg/L and the average concentration of 30 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum TSS limit of 100 mg/L and the monthly average TSS limit of 30 mg/L shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall also be carried forward.

Nutrients (Total Nitrogen, Total Kjeldahl Nitrogen, Nitrate+Nitrite, Ammonia as N, Total Phosphorus):
Due to the use of chemicals containing both ammonia and phosphorus and continued initiatives to reduce nutrients to the Chesapeake Bay, it is staff's best professional judgement that nutrient monitoring at Outfall 004 continue with this reissuance. Given the discharge is industrial in nature and data thus far demonstrates the discharge is not causing instream issues, the monitoring frequency shall be reduced from quarterly to semi-annually (1/6M).

Attachment A:
It is staff's opinion that there is reasonable potential for toxic pollutants to be discharged from Outfall 004. As such, Attachment A monitoring shall be carried forward with this reissuance. Given the compliance history of the facility, the monitoring frequency shall be reduced from an annual basis (1/YR) to once every five years (1/5YR). Monitoring shall be initiated after the start of the third year from the permit's effective date. Using Attachment A as the reporting form, the data shall be submitted with the next application for reissuance, which is due at least 180 days prior to the expiration date of this permit.

4) Outfall 005 (Current Configuration)

pH:
Federal Effluent Guidelines (40 CFR Part 40 CFR 423.12(b)(1) – Best Practicable Technology) state that all discharges, except once through cooling water shall be within a range of 6.0 S.U. – 9.0 S.U. and water quality criteria states that pH shall be a minimum value of 6.0 S.U. and a maximum value of 9.0 S.U. Because the pH range is the same for both the Federal Effluent Guidelines and the water quality criteria, the previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall be carried forward.

Oil and Grease (O&G):
Federal Effluent Guidelines 40 CFR 423.13(b)(4) - Best Practicable Technology state that that the quantity of pollutants discharged in fly ash and bottom ash transport water shall not exceed the quantity determined by multiplying the flow of low volume waste sources and the flow of fly ash and bottom ash transport water times the maximum concentration of 20 mg/L and the average concentration of 15 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(4). It is staff's best professional judgement that applying the maximum concentration of 20 mg/L and the average concentration of 15 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum O&G limit of 20 mg/L and the monthly average O&G limit of 15 mg/L shall be carried forward with this reissuance. The monitoring frequency of twice per month (2/M) shall also be carried forward.

Total Suspended Solids (TSS):
The previous reissuance of this permit included a maximum TSS limit of 50 mg/L referencing Federal Effluent Guidelines 40 CFR 423.12(b)(3) and 40 CFR 423.13(b)(4) as the basis for the limit. Staff has reviewed 40 CFR 423 and determined that based on the limit established in the permit the more appropriate citation should have been 40 CFR 423.12(b)(9). This performance standard, rather than those cited, establishes the 50 mg/L maximum TSS limit as found within the existing permit. However, this limit is only applicable to the point source discharge of pollutants in coal pile runoff which is defined as the rainfall runoff from or through any coal storage pile (40 CFR 423.11(m)).

With this reissuance staff proposes a change to the daily maximum TSS limit from 50 mg/L to100 mg/L to be consistent with the Federal Effluent Guidelines in 40 CFR 423.13(b)(4) – Best Practicable Technology for the discharge of fly ash and bottom ash transport water. While staff believes the permittee can continue to meet a daily maximum TSS limit of 50 mg/L, the following are taken in to consideration:

- The facility ceased the use of coal in March 2003 and all coal piles were subsequently removed. As such, the limit based on coal pile runoff is no longer applicable.

- Federal Effluent Guidelines in 40 CFR 423.12(b)(11) - Best Practicable Technology state "in the event waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant property controlled in paragraphs (b)(1) through (11) of this section attributable to each controlled waste source shall not exceed the specified limitations for that waste source".

  Internal Outfall 501 and Internal Outfall 502, which are described in further detail in Section 17.d.3 and Section 17.d.4 of the Fact Sheet, respectively, discharge to Ash Pond E which is the discharge source for Outfall 005. These internal outfalls are themselves governed by Federal Effluent Guidelines establishing a 100 mg/L daily maximum TSS limit. Waste streams from various sources, which have specified limitations of 100 mg/L daily maximum TSS, are combined. In accordance with 40 CFR 423.12(b)(11) and absent coal pile runoff, it is staff's opinion that a daily maximum TSS limit of 100 mg/L is applicable.

- A review of TSS effluent data from April 2009 – June 2012 (Attachment 13b) and data submitted with the permit application indicates there is no reasonable potential for this revised limit to create any instream excursion of any applicable State narrative or numerical Water Quality Standard. Staff believes this data supports the proposed backsliding. See Section 18 of the Fact Sheet for further discussion on backsliding.

Federal Effluent Guidelines 40 CFR 423.13(b)(4) - Best Practicable Technology state that that the quantity of pollutants discharged from low volume waste sources and fly ash and bottom ash transport water shall not exceed the quantity determined by multiplying the flow of low volume waste sources and the flow of fly ash and bottom ash transport water times the maximum concentration of 100 mg/L and the average concentration of 30 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(4). It is staff's best professional judgement that applying the maximum concentration of 100 mg/L and the average concentration of 30 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. A daily maximum TSS limit of 100 mg/L shall be implemented with this reissuance and the monthly average TSS limit of 30 mg/L shall be carried forward. The monitoring frequency of twice per month (2/M) shall also be carried forward for both the daily maximum and monthly average limits.

Dissolved Nickel:
Due to the elevated nickel levels in sediment noted in Quantico Creek during the Coastal 2000 weight of evidence analysis, and the resulting impaired determination for the aquatic life use, it is staff's best professional judgement that the discharge from Outfall 005 be evaluated for a possible nickel effluent limitation.

A review of nickel effluent data from annual Attachment A sampling (2008 – 2011) and data submitted with the permit application, found as Attachment 13c, indicates no effluent limitation is warranted (Attachment 13c). However, given the elevated nickel levels in sediment it is staff's best professional judgement that nickel monitoring be implemented at Outfall 005 on a semi-annual (1/6M) basis. This sampling is in addition to that required as a component of Attachment A sampling which is discussed in further detail below. Staff will reevaluate the data with the next permit reissuance to determine if a nickel effluent limitation is necessary.

Polychlorinated Biphenyl Compounds (PCBs):
The tidal portion of Quantico Creek is listed with a PCB impairment. Due to this impairment, the Possum Point Power Station is a candidate for low-level PCB monitoring. This is based upon its designation as an industrial facility providing electrical, gas and/or sanitary services. It is staff's best professional judgement that the Possum Point Power Station conduct low-level PCB monitoring at Outfall 005 with this permit reissuance. Because of the trace analytical QLs, this sampling is not intended to evaluate compliance with the Federal Effluent Guideline prohibition on the discharge of PCBs. Rather, it is intended to better understand and characterize potential PCB discharges from this outfall.

The facility shall collect two samples within the first three (3) years after the permit reissuance date of January 7, 2013. Monitoring and analysis shall be conducted in accordance with the most current version of EPA Method 1668, or other equivalent methods capable of providing low-detection level, congener specific results (all 209 PCB congeners). Any equivalent method shall be submitted to DEQ-NRO for review and approval prior to sampling and analysis. The sampling protocol shall be submitted to DEQ-NRO for review and approval prior to the first sample collection. It is the responsibility of the permittee to ensure that proper QA/QC protocols are followed during the sample gathering and analytical procedures.

Each effluent sample shall consist of a minimum 2 liter volume. The sample type, either a grab or automated composite, shall be at the discretion of the permittee.

The data shall be submitted to DEQ-NRO by the 10th day of the month following receipt of the results. The permittee shall submit the results electronically. The submittal shall include the unadjusted and appropriately qualified individual PCB congener analytical results. Additionally, laboratory and field QA/QC documentation and results shall be reported. Total PCBs are to be computed as the summation of the reported, quantified congeners.

Nutrients (Total Nitrogen, Total Kjeldahl Nitrogen, Nitrate+Nitrite, Ammonia as N, Total Phosphorus):
Due to the use of chemicals containing both ammonia and phosphorus and continued initiatives to reduce nutrients to the Chesapeake Bay, it is staff's best professional judgement that nutrient monitoring at Outfall 005 continue with this reissuance. Given the discharge is industrial in nature and data thus far demonstrates the discharge is not causing instream issues, the monitoring frequency shall be reduced from quarterly to semi-annually (1/6M).

Attachment A:
It is staff's opinion that there is reasonable potential for toxic pollutants to be discharged from Outfall 501, Outfall 502, and Ash Pond D into Ash Pond E (Outfall 005). As such, Attachment A monitoring shall be carried forward with this reissuance. Given the compliance history of the facility, the monitoring frequency shall be reduced from an annual basis (1/YR) to once every five years (1/5YR). Monitoring shall be initiated after the start of the third year from the permit's effective date. Using Attachment A as the reporting form, the data shall be submitted with the next application for reissuance, which is due at least 180 days prior to the expiration date of this permit.

5) Outfall 005 (Interim Configuration)

As noted in Section 18 of the Fact Sheet, in order to begin closure of the existing ash ponds, all comingled process water that has been pumped to Ash Pond D, as well as stormwater, must be removed. The discharge from Ash Pond D is to be managed through the use of a treatment system designed to address the monitoring and effluent limitations described in this Fact Sheet. Staff's rationale in applying these effluent limitations is that they be applied to the discharge from the treatment system after any and all storage of the comingled process water to protect and maintain the water quality of the receiving waters. This allows the permittee flexibility to possibly route the discharge through different outfalls while ensuring protection of the receiving waters. See Section 17.d.5 of this fact sheet for additional details.

It is recognized that during the interim configuration there may be an operational need to store the treated water within a newly constructed unlined holding basin located within the footprint of former Ash Pond E. This holding basin would then discharge via existing Outfall 005. Because this holding basin will not be lined, it is staff's best professional judgement that the discharge limits established for Internal Outfall 503 (Section 21.n) also be applied to the discharge from Outfall 005 during the interim dewatering period. The establishment of effluent limits at Outfall 005 during the interim period will ensure water quality standards are maintained and protected whether the discharge is directly from Internal Outfall 503 or from the holding pond to be constructed in the footprint of Ash Pond E.

6) Outfall 007

Historically, this outfall was permitted under a NPDES permit issued by the State of Maryland (MD0066427). With the 2007 reissuance, the outfall was incorporated in the facility's VPDES permit carrying forward Maryland's permit requirement for flow monitoring on a quarterly basis. Monitoring for flow shall be carried forward with this reissuance. The quarterly monitoring frequency (1/3M) shall also be carried forward.

7) Outfall 008

Historically, this outfall was permitted under a NPDES permit issued by the State of Maryland (MD0066427). With the 2007 reissuance, the outfall was incorporated in the facility's VPDES permit carrying forward Maryland's permit requirement for flow monitoring on a quarterly basis. Monitoring for flow shall be carried forward with this reissuance. The quarterly monitoring frequency (1/3M) shall also be carried forward.

8) Outfall 009

This outfall has been added with this reissuance. The discharge from this outfall is identical to that of Outfall 007. As such, it's staff's best professional judgement that monitoring for flow on a quarterly basis (1/3M) be implemented with this reissuance. Please see Section 26 of the Fact Sheet for discussion on this new outfall.

9) Outfall 010 (Dominion S107)

Outfall S107 is currently addressed in the facility's permit as a stormwater outfall not associated with industrial activity. In the December 24, 2014, and October 21, 2015, addendums to the modification request, Dominion has requested to change the permit language associated with stormwater Outfall S107 from a stormwater outfall not associated with industrial activity to a stormwater outfall associated with industrial activity.

The applications submitted with the addendums also state that this outfall is designed to collect groundwater infiltration from Ash Pond D's berm for stabilization. Staff has reviewed groundwater monitoring data from Ash Pond D and believes there is reasonable potential for the discharge from S107 to be contaminated with metals typically associated with coal combustion residuals. Additionally, DEQ staff observed this outfall discharging in November 2014 absent a storm event. It is staff's best professional judgement that the discharge from this outfall also consists of non-stormwater contributions, possibly including drainage through the dam and groundwater, and should, therefore, be viewed as a non-stormwater outfall. For this reason Outfall S107 shall be referred to as Outfall 010.

Because the discharge from Outfall 010 is potentially influenced by groundwater infiltration from Ash Pond D, it is staff's best professional judgement that a component of monitoring at this outfall include those parameters being monitored in groundwater at Ash Pond D. See Section 21.i of the fact sheet for a list of the groundwater parameters to be monitored. Please note that flow will be required in lieu of static water level. Temperature monitoring will not be required. Additionally, because of this outfall's proximity to the ash handling area and the potential influence of that activity, it is staff's best professional judgement that monitoring for Total Solids, Dissolved Antimony and Dissolved Thallium also be included. Monitoring shall be conducted on a monthly basis (1/M).

d) <u>Effluent Limitations and Monitoring, Internal Outfalls 201, 202, 501, 502, and 503</u>

1) Internal Outfall 201

pH:
Federal Effluent Guidelines (40 CFR 423.12(b)(1) – Best Practicable Technology) state that all discharges, except once through cooling water shall be within a range of 6.0 S.U. – 9.0 S.U. The previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of once per week in which there is a discharge (1/D-W) shall also be carried forward.

Free Available Chlorine:
Federal Effluent Guidelines found in 40 CFR 423.12(b)(7) – Best Practicable Technology and 40 CFR 423.13(d)(1) – Best Available Technology, state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 0.5 mg/L and the average concentration of 0.2 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423 423.12(b)(11) and 40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified in paragraphs 423.12(b)(7) and 423.13(d)(1). It is staff's best professional judgement that applying the maximum concentration of 0.5 mg/L and the average concentration of 0.2 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum free chlorine limit of 0.5 mg/L and a monthly average free chlorine limit of 0.2 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per week in which there is a discharge (1/D-W) shall also be carried forward. Monitoring is only required when the facility is chlorinating.

Total Chromium:
Federal Effluent Guidelines (40 CFR 423.13(d)(1) – Best Available Technology) state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 0.2 mg/L and the average concentration of 0.2 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.13(d)(1). It is staff's best professional judgement that applying the maximum concentration of 0.2 mg/L and the average concentration of 0.2 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum total chromium limit of 0.2 mg/L and a monthly average total chromium limit of 0.2 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

Total Zinc:
Federal Effluent Guidelines (40 CFR 423.13(d)(1) – Best Available Technology) state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.13(d)(1). It is staff's best professional judgement that applying the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum total zinc limit of 1.0 mg/L and a monthly average total zinc limit of 1.0 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

126 Priority Pollutants:
Federal Effluent Guidelines (40 CFR 423.13(d)(1) – Best Available Technology) state that the quantity of pollutants in cooling tower blowdown discharges (Appendix A to Part 423) shall be in non-detectable amounts. As such, the daily maximum and monthly average non-detectable limits shall be carried forward. The monitoring frequency of once per year in which there is a discharge (1/D-Y) shall also be carried forward.

At the permitting authority's discretion (40 CFR 423.13(d)(3)), compliance with the limitations for the 126 priority pollutants may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

2) Internal Outfall 202
This outfall falls under the Federal Effluent Guidelines for New Source Performance Standards (40 CFR 423.15) which are applied below.

pH:
Federal Effluent Guidelines (40 CFR Part 40 CFR 423.15(a)) state that all discharges, except once through cooling water shall be within a range of 6.0 S.U. – 9.0 S.U. The previously established minimum limit of 6.0 S.U. and the maximum limit of 9.0 S.U. shall be carried forward with this reissuance. The monitoring frequency of once per week in which there is a discharge (1/D-W) shall also be carried forward.

Free Available Chlorine:
Federal Effluent Guidelines found in 40 CFR 423.15(j)(1) state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 0.5 mg/L and the average concentration of 0.2 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(m)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified in paragraph 423.15(j)(1). It is staff's best professional judgement that applying the maximum concentration of 0.5 mg/L and the average concentration of 0.2 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum free chlorine limit of 0.5 mg/L and a monthly average free chlorine limit of 0.2 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per week in which there is a discharge (1/D-W) shall also be carried forward. Monitoring is only required when the facility is chlorinating.

Total Chromium:
Federal Effluent Guidelines (40 CFR 423.15(j)(1)) state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 0.2 mg/L and the average concentration of 0.2 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(m)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.15(j)(1). It is staff's best professional judgement that applying the maximum concentration of 0.2 mg/L and the average concentration of 0.2 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum total chromium limit of 0.2 mg/L and a monthly average total chromium limit of 0.2 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

Total Zinc:
Federal Effluent Guidelines (40 CFR 423.15(j)(1)) state that the quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.15(m)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.15(j)(1). It is staff's best professional judgement that applying the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum total zinc limit of 1.0 mg/L and a monthly average total zinc limit of 1.0 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

126 Priority Pollutants:
Federal Effluent Guidelines (40 CFR 423.15(j)(1)) state that the quantity of pollutants in cooling tower blowdown discharges (Appendix A to Part 423) shall be in non-detectable amounts. As such, the daily maximum and monthly average non-detectable limits shall be carried forward. The monitoring frequency of once per year in which there is a discharge (1/D-Y) shall also be carried forward.

At the permitting authority's discretion (40 CFR 423.15(j)(3)), compliance with the limitations for the 126 priority pollutants may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

3) Internal Outfall 501

Oil and Grease (O&G):
Federal Effluent Guidelines (40 CFR 423.12(b)(5) - Best Practicable Technology) state that that the quantity of pollutants discharged from metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the maximum concentration of 20 mg/L and the monthly average concentration of 15 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(5). It is staff's best professional judgement that applying the maximum concentration of 20 mg/L and the average concentration of 15 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum O&G limit of 20 mg/L and the monthly average O&G limit of 15 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

Total Suspended Solids (TSS):
Federal Effluent Guidelines (40 CFR 423.12(b)(5) - Best Practicable Technology) state that that the quantity of pollutants discharged from metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the maximum concentration of 100 mg/L and the monthly average concentration of 30 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(5). It is staff's best professional judgement that applying the maximum concentration of 100 mg/L and the average concentration of 30 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum TSS limit of 100 mg/L and the monthly average TSS limit of 30 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

Total Iron:
Federal Effluent Guidelines (40 CFR 423.12(b)(5) – Best Practicable Technology and 40 CFR 423.13(e) – Best Available Technology) state that the quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.12(b)(11) and 40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified in paragraphs 423.12(b)(5) and 423.13(e). It is staff's best professional judgement that applying the maximum concentration of 1.0 mg/L and the average concentration of 1.0

mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum total iron limit of 1.0 mg/L and the monthly average total iron limit of 1.0 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

Total Copper:
Federal Effluent Guidelines (40 CFR 423.12(b)(5) – Best Practicable Technology and 40 CFR 423.13(e) – Best Available Technology) state that the quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L.

At the permitting authority's discretion (Federal Effluent Guidelines 40 CFR 423.12(b)(11) and 40 CFR 423.13(g)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitations specified in paragraphs 423.12(b)(5) and 423.13(e). It is staff's best professional judgement that applying the maximum concentration of 1.0 mg/L and the average concentration of 1.0 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. These limits are the same as those previous established and as such the daily maximum total copper limit of 1.0 mg/L and the monthly average total copper limit of 1.0 mg/L shall be carried forward with this reissuance. The monitoring frequency of once per month in which there is a discharge (1/D-M) shall also be carried forward.

4) Internal Outfall 502

Oil and Grease (O&G):
The previous reissuance of this permit included Total Petroleum Hydrocarbon (TPH) limitations based upon the assumption the Oily Waste Treatment Basin functions as an oil-water separator. The limits placed in the permit, a maximum of 60 mg/L and a monthly average of 30 mg/L, were consistent with those typically applied to oil-water separator discharges at the time of the 2007 reissuance. In accordance with the Federal Effluent Guidelines (40 CFR 423.12(b)(3) - Best Practicable Technology), Oil and Grease limitations are applicable to the quantity of pollutants discharged from low volume waste sources. Components of the discharge from Outfall 502 contain auxiliary boiler blowdown and drains, both of which are specifically included in the definition of low volume waste sources. Therefore, it is staff's best professional judgement that oil and grease limitations be implemented with this reissuance and the previously established TPH limitations be removed (see further discussion below in this section pertaining to TPH analysis).

Federal Effluent Guidelines (40 CFR 423.12(b)(3) - Best Practicable Technology) also state that that the quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the maximum concentration of 20 mg/L and the monthly average concentration of 15 mg/L. At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(3). It is staff's best professional judgement that applying the maximum concentration of 20 mg/L and the monthly average concentration of 15 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum O&G limit of 20 mg/L and a monthly average O&G limit of 15 mg/L shall be implemented with this reissuance. The monitoring frequency of twice per month (2/M) shall be carried forward.

Total Petroleum Hydrocarbons (TPH):
As discussed within Section 20 of the Fact Sheet, DEQ staff recommended the continued analysis of groundwater associated with the Oily Waste Treatment Basin for TPH. Given the constituent fraction of TPH groups, both Diesel Range Organics and, with this reissuance, Oil Range Organics are to be analyzed. As such, it is staff's best professional judgement that TPH monitoring of the surface water discharge associated with the Oily Waste Treatment Basin continue with this reissuance. A monitoring frequency of twice per month (2/M), without effluent limitation, is proposed for this reissuance.

To provide consistency with groundwater monitoring requirements, monitoring for TPH – Oil Range Organics is also proposed with this reissuance. A monitoring frequency of twice per month (2/M), without effluent limitation, shall be implemented with this reissuance. The permittee shall sample and submit TPH-ORO results at the frequency of twice per month for one year. If all reported results for TPH-ORO do not exceed the QL for TPH (0.50 mg/L), the permittee may submit a written request to DEQ-NRO for a reduction in sampling frequency to one per quarter (1/3M). Please see Section 19.k of the Fact Sheet for additional information.

Total Suspended Solids (TSS):
The previous reissuance of this permit did not include Total Suspended Solids limitations. In accordance with the Federal Effluent Guidelines found in 40 CFR 423.12(b)(3) - Best Practicable Technology, TSS limitations are applicable to the quantity of pollutants discharged from low volume waste sources. Components of the discharge from Outfall 502 contain auxiliary boiler blowdown and drains, both of which are specifically included in the definition of low volume waste sources. Therefore, it is staff's best professional judgement that TSS limitations be implemented with this reissuance.

Federal Effluent Guidelines (40 CFR 423.12(b)(3) - Best Practicable Technology) state that that the quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the maximum concentration of 100 mg/L and the monthly average concentration of 30 mg/L. At the permitting authority's discretion (Federal Effluent Guidelines (40 CFR 423.12(b)(11)), the quantity of pollutants allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraph 423.12(b)(3). It is staff's best professional judgement that applying the maximum concentration of 100 mg/L and the monthly average concentration of 30 mg/L to the discharge is the most conservative approach and will maintain and protect the water quality of the receiving stream. As such, a daily maximum TSS limit of 100 mg/L and a monthly average TSS limit of 30 mg/L shall be implemented with this reissuance. A monitoring frequency of twice per month (2/M) shall be implemented.

5) Internal Outfall 503 (Interim)

Discharges Associated With Coal Combustion Residual (CCR) Impoundment Closure: Effluent Screening and Limitation Development

Effective October 2015, the U.S. Environmental Protection Agency (EPA) adopted a final Rule that will regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act. Coal combustion residuals (otherwise known as coal ash) may include fly ash, bottom ash, boiler slag, and other low volume waste materials and are generated from burning coal for the purposes of generating electrical power. Disposal of the CCRs at this facility has historically been accomplished in impoundments located on site. These impoundments include surface waters originating from precipitation, storm water runoff into the impoundments, comingled process wastewaters, and waters used to hydraulically dredge ash from one pond to another. Interstitial, or pore, waters, also exist within the bottom residual mass of the impoundment. Due to its direct contact and exposure to the coal ash materials, the pollutant concentrations of the coal ash interstitial waters may pose a reasonable potential to exceed established water quality criteria. In response to EPA's 2015 CCR Rule, the owner plans to remove and discharge the accumulated waters to dry the ash and residuals that have settled to the bottom of the impoundment. This process is expected to involve the disturbance, movement, or re-suspension of the bottom residuals. Drying the ash and bottom residuals will facilitate their subsequent removal or construction of a closure cap of the impoundment system.

To identify and evaluate constituents of potential concern (COPC) associated with the removal of waters from the coal ash ponds, DEQ relied upon work previously performed by the EPA and documented in the following: 1) 40CFR Part 423 federal effluent limitation guidelines (ELGs) for the "Steam Electric Power Generating Point Source Category;" 2) a June 7, 2010 EPA memorandum titled, "National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residual (CCR) Impoundments at Steam Electric Power Plants;" and 3) a 2015 final Rule (commonly referred to as the "CCR Rule") that amended 40 CFR §§257.50 – 257.107, "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." In its June 2010 memo,[1] EPA identified 37 chemical parameters that had the potential to exist in relatively high concentrations in CCR effluent. Several years later, in the preamble to the 2015 CCR Rule, EPA identified 35 "Table 1"[2] chemical parameters that represented a hazard potential because they were characteristic of releases from coal combustion impoundments and may pose a toxicity risk potential. EPA performed further probabilistic analyses of the potential risks to human health and ecological receptors from the 35 Table 1 constituents and narrowed the list down to 23 "Table 2"[3] parameters (List of Chemical Constituents Retained for Probabilistic Analysis). These parameters include Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chloride, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Lithium, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium and Zinc.

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

- **Category 1 - Table 2 constituents for which water quality criteria have been adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** Water quality based effluent limitations were developed for these parameters regardless of whether or not the existing data for the facility demonstrated a reasonable potential to exceed the water quality criteria (Attachment 14). Effluent limitations were developed in this fashion for Antimony, Arsenic, Cadmium, Chloride, Chromium (III and VI), Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. There are no water quality criteria that are applicable to the aquatic life designation for Antimony or Thallium. For these parameters, the effluent limitation is equal to the most limiting allocation for human health.

- **Category 2 – Table 2 constituents for which water quality criteria have not be adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** A Whole Effluent Toxicity limitation was established in the absence of an applicable Virginia numeric water quality criterion. This approach is consistent with EPA's Technical Support Document for Water Quality-based Toxics Control and the June 7, 2010 EPA memorandum. Parameters included in this category include Aluminum, Barium, Beryllium, Boron, Cobalt, Iron, Molybdenum and Vanadium. Attachment 15 details the derivation of the calculated WET limitations that will be included with this permit action.

- **Category 3 – Constituents not listed in Table 2 for which water quality criteria have been adopted in the Virginia Water Quality Standards regulation (9VAC25-260):** A reasonable potential analysis was performed to determine the need for water-quality based effluent limitations on a case-by-case basis. The reasonable potential analysis included in Attachment 14 resulted in no additional effluent limitations.

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

Total Hardness:
The Water Quality Criteria for some metals are dependent on the effluent hardness (expressed as mg/L calcium carbonate). Because staff has proposed monitoring for metals it is staff's best professional judgement that hardness monitoring also be implemented with this modification.

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

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

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

e) Effluent Limitations, 004, 005, 201, 202, 501, and 502– Federal Effluent Guidelines.

The quantity of pollutants discharged from the outfalls listed above, are also limited by Federal Effluent Guidelines established in 40 CFR – Part 423. 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.

When applicable, both water quality based limits and Federal Effluent Guideline requirements were compared for these outfalls. The most stringent limitation was used as the basis for the final limit.

f) Limitations and Monitoring Summary – Effluent and Groundwater

Effluent limitations and monitoring requirements for the facility's outfalls are presented in Section 21a. – Section 20.o of the Fact Sheet. When applicable, both water quality based limits and Federal Effluent Guideline requirements were compared for these outfalls. The most stringent limitation was used as the basis for the final limit.

Groundwater monitoring requirements for the facility's observation wells are presented in Section 20.p – Section 20.r of the Fact Sheet. Any existing groundwater monitoring, corrective action and/or risk assessment plans currently in effect under the facility's permit shall remain in effect until such time as they are superseded by a solid waste permit in accordance with the Virginia Solid Waste Management Regulations (9VAC20-81-10 et. seq.) See Section 23 of the Fact Sheet for further discussion.

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

18. Internal Outfall 503:

Interim Configuration (Attachment 2):

In order to begin closure of the existing Ash Pond D, all comingled process water that has been pumped to Ash Pond D, as well as stormwater, must be removed. The modification application submitted by Dominion on August 20, 2015, noted that flexibility in the management of process water generated throughout the closure was necessary. As a result, the modification application provided a number of options for the handling and discharge of all comingled process water, as well as stormwater. Comingled process water includes ash dewatering water and stormwater in contact with ash, i.e., contact water, from the closure of Ash Ponds A, B, C, D, and E, as well as Internal Outfall 501 water and Internal Outfall 502 water.

During ash pond A, B, C, D, and E closure activities, discharge to Internal Outfall 503 (interim) may include comingled process water, ash dewatering water and/or contact water from these ponds with or without mixing of these sources. The discharge from Internal Outfall 503 is to be managed through the use of a treatment system designed to address the monitoring and effluent limitations described above in Section 17.d.5 of the Fact Sheet. A cleaned area of Pond E may be used to provide storage and treatment prior to discharge to Outfall 503 during the interim configuration. For permitting purposes, staff has designated this interim operational configuration as Internal Outfall 503 (interim). It is staff's best professional judgement that the effluent limitations be applied to the discharge from the interim system after any and all storage of the comingled process water, or its individual sources. When applied in this manner compliance monitoring accurately characterizes the final effluent from the treated comingled water. Meeting effluent limits at Internal Outfall 503 (interim) will protect and maintain water quality at any of the outfalls identified as discharge options, while providing Dominion with the flexibility needed to achieve closure by the required deadline. It is envisioned that all of the comingled process wastewater, or its individual sources, will be treated prior to discharge in order to meet effluent limits. However, treatment is not mandatory or required if the effluent limits can be met otherwise. Accordingly, during the interim period, Internal Outfall 503 (interim) is authorized to discharge from the following outfalls: Outfall 001/002, Outfall 004, and/or Outfall 005.

Final Configuration (Attachment 2):

During the closing and capping of Ash Pond D, a subsurface dewatering system (i.e., underdrains) will be installed to remove excess water below the impermeable liner of Ash Pond D. The underdrains will be managed through the use of a treatment system designed to address the monitoring and effluent limitations established above in Section 17.d.5 of the Fact Sheet. For permitting purposes, the Internal Outfall 503 (final) designation will be applied to this treatment system. The treatment system will discharge via existing Outfall 005 to an unnamed tributary to Quantico Creek. Meeting effluent limits at Internal Outfall 503 (final) will protect and maintain the water quality at Outfall 005. Because closure is not expected to be concluded prior to the reissuance of this permit in April 2018, final limits for Outfall 005 will be established at that time. Limits will be based on actual monitoring data and the reasonable potential analysis of the wastewater that will exist upon final configuration.

It should also be noted that an alternate final configuration for the Ash Pond D underdrain system is also being considered by Dominion. This alternate configuration includes pretreatment, where required, and discharge to the Prince William County Service Authority's (PWCSA) H.L. Mooney Advanced Water Reclamation Facility (VA0025101). This alternate final configuration would be addressed by the PWCSA through the pretreatment program associated with the H.L. Mooney Advanced Water Reclamation Facility.

19. Ash Pond A, B, C Complex:

On April 9, 2014, Dominion notified the Northern Regional Office of a discharge from an ash pond complex (Ash Ponds A, B, and C) located on a parcel of land between Possum Point Road and Quantico Creek. The Ash Pond A, B, and C complex was actively utilized from 1955 through the early 1960s. The drainage area containing the inactive ash pond complex had been accounted for within the facility's VPDES permit in the 1990s as a stormwater outfall not associated with industrial activity (S104). However, after 1999 the outfall was no longer included in Dominion's reapplication packages due to its designation of not being associated with industrial activity.

DEQ staff observed the Ash Pond A, B, C complex on April 11, 2014 (Attachment 16). At the time, a discharge weir and discharge pipe remained in place at Ash Pond C which had a direct discharge to Quantico Creek. The modification request received on June 30, 2014, requested coverage for the discharge from the aforementioned weir. However, since the submission of that modification request Dominion has decided to clean-close the Ash Pond A, B, C complex. As part of the closure process, the discharge weir was sealed. A discharge has not occurred from this structure since May 2015. This permitting action does not authorize discharge from this weir structure. This permit allows discharge of Ash Pond A, B, and C waters to Internal Outfall 503.

Any ambient monitoring and/or groundwater monitoring required as a condition of closure will be regulated under the Virginia Solid Waste Management Regulations (9VAC20-81-10 et. seq.) and a solid waste permit for closure and post-closure issued pursuant to those regulations.

20. Antibacksliding:

1) Outfall 004

The Total Residual Chlorine (TRC) limits derived for the 2007 reissuance, while technically correct, were incorrectly transferred from the Fact Sheet to the permit. The permit lists a maximum limit of 0.032 mg/L and a monthly average limit of 0.022 mg/L rather than the maximum limit of 0.038 mg/L and the monthly average limit of 0.026 mg/L as derived (Attachment 15a). This reissuance corrects the typographical error associated with the TRC limits at Outfall 004, and as such a daily maximum TRC limit of 0.038 mg/L and a monthly average TRC limit of 0.026 mg/L shall be included with this reissuance.

It is staff's opinion that this change is appropriate given the limits that were derived for this reissuance are consistent with those previously derived (2007), and that they are based on the Water Quality Standard for TRC. Staff believes there is no reasonable potential for this revised limit to create any instream excursion of any applicable State narrative or numerical Water Quality Standard.

2) Outfall 005

The maximum Total Suspended Solids (TSS) limit was revised from 50 mg/L to a daily maximum of 100 mg/L. The change was made to provide consistency with Federal Effluent Guidelines 40 CFR 423.12(b)(3) and 40 CFR 423.13(b)(4) which establish a maximum concentration of 100 mg/L for low volume waste sources and fly ash and bottom ash transport water. It is staff's opinion that this change is appropriate given the previous limit was based on 40 CFR 423.13(b)(9) which is only applicable to the discharge of pollutants in coal pile runoff. As of 2003, the Dominion – Possum Point Power Station ceased using coal and all coal piles were subsequently removed.

Based on a review of TSS effluent data from April 2009 – June 2012 (Attachment 15b) and data submitted with the permit application, staff believes the data supports the proposed backsliding and that there is no reasonable potential for this revised limit to create any instream excursion of any applicable State narrative or numerical Water Quality Standard.

3) Outfall 502

The Total Petroleum Hydrocarbon (TPH) limits placed in the previous permit, a maximum of 60 mg/L and a monthly average of 30 mg/L, were consistent with those typically applied to oil-water separator discharges at the time of the 2007 reissuance. Components of the discharge from Outfall 502 contain auxiliary boiler blowdown and drains, both of which are specifically included in the definition of low volume waste sources. It is staff's best professional judgement that with this reissuance the previously established TPH limitations be removed and oil and grease limitations be implemented to provide consistency with Federal Effluent Guidelines CFR 423.12(b)(3). A daily maximum of 20 mg/L and a monthly average of 15 mg/L are proposed. It is staff's opinion that this change is appropriate given there is no state Water Quality Standard for TPH and as such, the Federal Effluent Guideline is the most stringent limitation. Staff believes there is no reasonable potential for this revised limit to create any instream excursion of any applicable State narrative or numerical Water Quality Standard.

21a. Effluent Limitations/Monitoring Requirements: Outfall 001/002 (Unit 3 Condenser Cooling Water, Unit 5 Cooling Tower Blowdown, Unit 6 Cooling Tower Blowdown, Stormwater, and Internal Outfall 503 (Interim)

Average flow is 86.38 MGD

Effective Dates: During the period beginning with the permit's major modification 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	NL	1/M	Estimate
pH	1,2	NA	NA	6.0 S.U.	9.0 S.U.	1/M	Grab
Heat Rejection (Unit 3)	1,2	NA	NA	NA	5.58×10^8 BTU/hr	Continuous	Calculated
Total Residual Chlorine (TRC)*	1,2	0.022 mg/L	0.032 mg/L	NA	NA	2/M	Grab
Total Nitrogen, Intake*	1	NL (mg/L)	NA	NA	NA	1/3M	Calculated
Total Nitrogen*	1	NL (mg/L)	NA	NA	NA	1/3M	Calculated
Total Phosphorus, Intake*	1	NL (mg/L)	NA	NA	NA	1/3M	Grab
Total Phosphorus*	1	NL (mg/L)	NA	NA	NA	1/3M	Grab
Temperature, Intake	1,2	NL (°C)	NA	NA	NL (°C)	1/D	IS
Temperature	1,2	NL (°C)	NA	NA	NL (°C)	1/D	IS
Dissolved Copper, Intake*	1	NL (µg/L)	NA	NA	NA	1/6M	Grab
Dissolved Copper*	1	NL (µg/L)	NA	NA	NA	1/6M	Grab
Total Hardness, Intake (as $CaCO_3$)*	1	NL (mg/L)	NA	NA	NA	1/6M	Grab
Total Hardness (as $CaCO_3$)*	1	NL (mg/L)	NA	NA	NA	1/6M	Grab
Chronic Toxicity – *C. dubia* (TU_c)	1	NA	NA	NA	NL	1/YR	Grab
Chronic Toxicity – *P. promelas* (TU_c)	1	NA	NA	NA	NL	1/YR	Grab

The basis for the limitations codes are:
1. Best Professional Judgement
2. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
IS = Immersion stabilization.

1/D = Once every day.
1/M = Once every month.
2/M = Twice every month.
1/3M = Once every three months.
1/6M = Once every six months.
1/YR = Once every year.

Total Nitrogen = The sum of Total Kjeldahl Nitrogen and NO_2+NO_3 and shall be calculated from the results of those tests.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

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).

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).

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Chlorine Requirements:

* Monitoring for Total Residual Chlorine is only required when the facility is chlorinating.

Total Nitrogen and Total Phosphorus Requirements:

* Intake and discharge sampling for the parameter (Total Phosphorus or Total Nitrogen) shall be conducted on the same date. To the maximum extent practicable, discharge samples shall be collected in such a manner to account for pass through time of the system to allow for evaluation of nutrient additions from station operations.

Dissolved Copper and Total Hardness Requirements:

* Dissolved copper and hardness samples shall be collected concurrently. Intake and discharge samples collected to comply with Dissolved Copper and Hardness requirements shall be collected on the same date. To the maximum extent practicable, discharge samples shall be collected in such a manner to account for pass through time of the system to allow for evaluation of dissolved copper additions from station operations.

21b. Effluent Limitations/Monitoring Requirements: Outfall 003 (Unit 4 Condenser Cooling Water)

Average flow is 82.55 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	NL	1/M	Estimate
pH	2	NA	NA	6.0 S.U.	9.0 S.U.	1/M	Grab
Heat Rejection (Unit 4)	1,2	NA	NA	NA	1.14×10^9 BTU/hr	Continuous	Calculated
Total Residual Chlorine (TRC)*	1,2	0.022 mg/L	0.032 mg/L	NA	NA	2/M	Grab
Temperature	1,2	NL (°C)	NA	NA	NL (°C)	1/W	IS
Chronic Toxicity – *C. dubia* (TU_c)	1	NA	NA	NA	NL	1/YR	Grab
Chronic Toxicity – *P. promelas* (TU_c)	1	NA	NA	NA	NL	1/YR	Grab

The basis for the limitations codes are:
1. Best Professional Judgement
2. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
IS = Immersion stabilization.

1/W = Once every week.
1/M = Once every month.
2/M = Twice every month.
1/YR = Once every year.

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

Chlorine Requirements:
* Monitoring for Total Residual Chlorine is only required when the facility is chlorinating.

21c. Effluent Limitations/Monitoring Requirements: Outfall 004 (Low Volume Waste Settling Pond and Internal Outfall 503 (Interim)

Average flow is 2.02 MGD

Effective Dates: During the period beginning with the permit's major modification 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	NL	2/M	Estimate
pH	1a,3	NA	NA	6.0 S.U.	9.0 S.U.	2/M	Grab
Heat Rejection (Unit 6)	2,3	NA	NA	NA	1.9×10^8 BTU/hr	2/M	Calculated
Total Residual Chlorine (TRC)*	2,3	0.026 mg/L	0.038 mg/L	NA	NA	1/W	Grab
Temperature	2,3	NL (°C)	NA	NA	NL (°C)	1/W	IS
Oil & Grease (O&G)	1b,1c	15 mg/L	20 mg/L	NA	NA	2/M	Grab
Total Suspended Solids (TSS)	1b,1c	30 mg/L	100 mg/L	NA	NA	2/M	Grab
Total Nitrogen	2	NL (mg/L)	NA	NA	NA	1/6M	Calculated
Total Kjeldahl Nitrogen (TKN)	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Nitrate+Nitrite (NO_2+NO_3)	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Ammonia, as N	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Total Phosphorus	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Chronic Toxicity – *C. dubia* (TU_c)	2	NA	NA	NA	NL	1/YR	Grab
Chronic Toxicity – *P. promelas* (TU_c)	2	NA	NA	NA	NL	1/YR	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
   a) 40 CFR 423.12(b)(1)
   b) 40 CFR 423.12(b)(3)
   c) 40 CFR 423.12(b)(11)
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
IS = Immersion stabilization.

1/W = Once every week.
2/M = Twice every month.
1/6M = Once every six months.
1/YR = Once every year.

Total Nitrogen = The sum of Total Kjeldahl Nitrogen and NO_2+NO_3 and shall be calculated from the results of those tests.
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).
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).
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.
Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Federal Effluent Requirements:

a) 40 CFR 423.12(b)(1) – BPT the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.
b) 40 CFR 423.12(b)(3) – BPT low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
c) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

Chlorine Requirements:

* Monitoring for Total Residual Chlorine is only required when the facility is chlorinating.

21d. Effluent Limitations/Monitoring Requirements: Outfall 005 (Ash Pond E – Current Configuration)

Average flow is 0.98 MGD

Effective Dates: During the period beginning with the permit's major modification date and lasting until commencement of facility dewatering activities, the permittee is authorized to discharge from Outfall Number 005. Such discharges shall be limited and monitored by the permittee as specified below.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	2/M	Estimate
pH	1a,3	NA	NA	6.0 S.U.	9.0 S.U.	2/M	Grab
Oil & Grease (O&G)	1b,1c	15 mg/L	20 mg/L	NA	NA	2/M	Grab
Total Suspended Solids (TSS)	1b,1c	30 mg/L	100 mg/L	NA	NA	2/M	Grab
Nickel, Dissolved	2	NL (µg/L)	NA	NA	NL (µg/L)	1/6M	Grab
Total Nitrogen	2	NL (mg/L)	NA	NA	NA	1/6M	Calculated
Total Kjeldahl Nitrogen (TKN)	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Nitrate+Nitrite (NO_2+NO_3)	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Ammonia, as N	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Total Phosphorus	2	NL (mg/L)	NA	NA	NA	1/6M	Grab
Chronic Toxicity – *C. dubia* (TU_c)	2	NA	NA	NA	NL	1/YR	Grab
Chronic Toxicity – *P. promelas* (TU_c)	2	NA	NA	NA	NL	1/YR	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
   a) 40 CFR 423.12(b)(1)
   b) 40 CFR 423.12(b)(4)
   c) 40 CFR 423.12(b)(11)
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

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

Total Nitrogen = The sum of Total Kjeldahl Nitrogen and NO_2+NO_3 and shall be calculated from the results of those tests.
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).
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).
Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.
Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Federal Effluent Requirements:

a) 40 CFR 423.12(b)(1) – BPT the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.
b) 40 CFR 423.12(b)(4) – BPT fly ash and bottom ash transport water establishing daily maximum and monthly average limitations for O&G and TSS.
c) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

21e. Effluent Limitations/Monitoring Requirements: Outfall 005 (Interim Configuration Discharge from Holding Basin)

Average flow is 2.53 MGD
Effective Dates: During the period beginning with the commencement of facility dewatering activities 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	NL	1/W	Estimate
pH	1,3a	NA	NA	6.0 S.U.	9.0 S.U.	1/W	Grab
Total Suspended Solids (TSS)	1,3a,3b,3c	30 mg/L	100 mg/L	NA	NA	1/W	4H-C
Oil and Grease (O&G)	1,3a,3b,3c	15 mg/L	20 mg/L	NA	NA	1/W	4H-C
Antimony, Total Recoverable	1	1300 µg/L	1300 µg/L	NA	NA	1/W	4H-C
Arsenic, Total Recoverable	1,2	300 µg/L	440 µg/L	NA	NA	1/W	4H-C
Cadmium, Total Recoverable	1,2	1.8 µg/L	2.6 µg/L	NA	NA	1/W	4H-C
Chloride	1,2	460,000 µg/L	670,000 µg/L	NA	NA	1/W	4H-C
Chromium III, Total Recoverable	1,2	110 µg/L	160 µg/L	NA	NA	1/W	4H-C
Chromium VI, Total Recoverable	1,2	22 µg/L	32 µg/L	NA	NA	1/W	4H-C
Coper, Total Recoverable	1,2	12 µg/L	18 µg/L	NA	NA	1/W	4H-C
Lead, Total Recoverable	1,2	18 µg/L	26 µg/L	NA	NA	1/W	4H-C
Mercury, Total Recoverable	1,2	1.5 µg/L	2.2 µg/L	NA	NA	1/W	4H-C
Nickel, Total Recoverable	1,2	30 µg/L	44 µg/L	NA	NA	1/W	4H-C
Nickel, Dissolved	1	NL (µg/L)	NA	NA	NL (µg/L)	1/W	4H-C
Selenium, Total Recoverable	1,2	10 µg/L	15 µg/L	NA	NA	1/W	4H-C
Silver, Total Recoverable	1,2	2.7 µg/L	4.0 µg/L	NA	NA	1/W	4H-C
Thallium, Total Recoverable	1	0.94 µg/L	0.94 µg/L	NA	NA	1/W	4H-C
Zinc, Total Recoverable	1,2	120 µg/L	180 µg/L	NA	NA	1/W	4H-C
Hardness, Total (as $CaCO_3$)	1	NL (mg/L)	NL (mg/L)	NA	NA	1/W	Grab
Total Nitrogen	1	NL (mg/L)	NA	NA	NA	1/W	Calculated
Total Kjeldahl Nitrogen (TKN)	1	NL (mg/L)	NA	NA	NA	1/W	4H-C
Nitrate+Nitrite (NO_2+NO_3)	1	NL (mg/L)	NA	NA	NA	1/W	4H-C
Ammonia, as N	1	NL (mg/L)	NA	NA	NA	1/W	4H-C
Total Phosphorus	1	NL (mg/L)	NA	NA	NA	1/W	4H-C
Acute Toxicity – *C. dubia* $_{(NOAEC)}$	1	NA	NA	100%	NA	1/M	24H-C
Acute Toxicity – *P. promelas* $_{(NOAEC)}$	1	NA	NA	100%	NA	1/M	24H-C
Chronic Toxicity – *C. dubia* (TU_c)	1	NA	NA	NA	2.85 TU_c	1/M	24H-C
Chronic Toxicity – *P. promelas* (TU_c)	1	NA	NA	NA	2.85 TU_c	1/M	24H-C

The basis for the limitations codes are:

1. Best Professional Judgement
2. Water Quality Standards
3. Federal Effluent Requirements
   a) 40 CFR423.12(b)(1)
   b) 40 CFR 423.12(b)(3)
   c) 40 CFR 423.12(b)(11)

MGD = Million gallons per day.
NL = No limit; monitor and report.
NA = Not applicable.
S.U. = Standard units.

1/W = Once every week.
1/M = Once every month.

21f. Effluent Limitations/Monitoring Requirements: Outfall 007 (Intake Screen Backwash Water – Units 3, 4, 5 and 6)

Average flow is 0.19 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	NL	1/3M	Measured

The basis for the limitations codes are:
1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.

1/3M = Once every three months.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

Measured = In lieu of providing measured flow at Outfall 007, the permittee may estimate flow and submit the following information with the DMR:

1. A description of the methodology used to estimate flow (based on the technical evaluation of the sources contributing to the discharge) where flow measurement equipment is not present;
2. Documentation appropriate to the methodology utilized which provides information necessary to support the validity of the reported flow estimate. If actual measurements or observations are made, a description of typical sampling times, locations, and persons performing the measurements/observations shall also be provided; and
3. A description of the factors (e.g., batch discharges, intermittent operation, etc.) which cause flow at the outfall to fluctuate significantly from the estimate provided.

21g. Effluent Limitations/Monitoring Requirements: Outfall 008 (Intake Screenwell Freeze Protection Water)

Average flow is 0.00 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	NL	1/3M	Measured

The basis for the limitations codes are:
1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.

1/3M = Once every three months.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

Measured = In lieu of providing measured flow at Outfall 008, the permittee may estimate flow and submit the following information with the DMR:

1. A description of the methodology used to estimate flow (based on the technical evaluation of the sources contributing to the discharge) where flow measurement equipment is not present;
2. Documentation appropriate to the methodology utilized which provides information necessary to support the validity of the reported flow estimate. If actual measurements or observations are made, a description of typical sampling times, locations, and persons performing the measurements/observations shall also be provided; and
3. A description of the factors (e.g., batch discharges, intermittent operation, etc.) which cause flow at the outfall to fluctuate significantly from the estimate provided.

21h. Effluent Limitations/Monitoring Requirements: Outfall 009 (Intake Screen Backwash Water – Units 3 and 4)

Average flow is 0.19 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	NL	1/3M	Measured

The basis for the limitations codes are:
1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.

1/3M = Once every three months.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

Measured = In lieu of providing measured flow at Outfall 009, the permittee may estimate flow and submit the following information with the DMR:

1. A description of the methodology used to estimate flow (based on the technical evaluation of the sources contributing to the discharge) where flow measurement equipment is not present;
2. Documentation appropriate to the methodology utilized which provides information necessary to support the validity of the reported flow estimate. If actual measurements or observations are made, a description of typical sampling times, locations, and persons performing the measurements/observations shall also be provided; and
3. A description of the factors (e.g., batch discharges, intermittent operation, etc.) which cause flow at the outfall to fluctuate significantly from the estimate provided.

21i. Effluent Limitations/Monitoring Requirements: Outfall 010 (Ash Pond D Toe Drain)

Average flow is variable.

Effective Dates: During the period beginning with the permit's major modification 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	NL	1/M	Estimate
pH	1	NA	NA	NL (S.U.)	NL (S.U.)	1/M	Grab
Specific Conductivity	1	NA	NA	NA	NL (µhoms/cm)	1/M	Grab
Hardness, Total (as $CaCO_3$)	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Total Solids	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Chlorides	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Fluoride	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Sodium	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Potassium	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Sulfate	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Total Organic Carbon	1	NA	NA	NA	NL (mg/L)	1/M	Grab
Antimony, Dissolved	1	NA	NA	NA	NL (µg /L)	1/M	Grab
Arsenic, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Barium, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Cadmium, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Copper, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Iron, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Mercury, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Lead, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Nickel, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Manganese, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Selenium, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Silver, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Thallium, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Vanadium, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Zinc, Dissolved	1	NA	NA	NA	NL (µg/L)	1/M	Grab
Phenol	1	NA	NA	NA	NL (mg/L)	1/M	Grab

The basis for the limitations codes are:
1. Best Professional Judgement

MGD = Million gallons per day.
NL = No limit; monitor and report.
NA = Not applicable.
S.U. = Standard units.

1/M = Once every month.

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

Metals and Total Hardness Requirements:

The metals and total hardness samples shall be collected concurrently.

21j. Effluent Limitations/Monitoring Requirements: Outfall 201 (Unit 5 Cooling Tower Blowdown)

Average flow is 1.48 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	NL	1/D-M	Estimate
pH	1a	NA	NA	6.0 S.U.	9.0 S.U.	1/D-W	Grab
Free Available Chlorine*	1b,1c,1d,1f	0.2 mg/L	0.5 mg/L	NA	NA	1/D-W	Grab
Total Nitrogen*	1	NL (mg/L)	NA	NA	NA	1/3M	Calculated
Total Phosphorus*	1	NL (mg/L)	NA	NA	NA	1/3M	Grab
Total Chromium	1d,1f	0.2 mg/L	0.2 mg/L	NA	NA	1/D-M	Grab
Total Zinc	1d,1f	1.0 mg/L	1.0 mg/L	NA	NA	1/D-M	Grab
126 Priority Pollutants (Appendix A of 40 CFR 423)	1d,1e	Non-detectable	NA	NA	Non-detectable	1/D-Y	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
   a) 40 CFR 423.12(b)(1)
   b) 40 CFR 423.12(b)(7)
   c) 40 CFR 423.12(b)(11)
   d) 40 CFR 423.13(d)(1)
   e) 40 CFR 423.13(d)(3)
   f) 40 CFR 423.13(g)

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

1/D-W = Once per week in which there is a discharge.
1/D-M = Once per month in which there is a discharge.
1/3M = Once every three months.
1/D-Y = Once per year in which there is a discharge.

Total Nitrogen = The sum of Total Kjeldahl Nitrogen and NO_2+NO_3 and shall be calculated from the results of those tests.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

1/D-Y = 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).

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Federal Effluent Requirements:

a) 40 CFR 423.12(b)(1) – BPT the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.
b) 40 CFR 423.12(b)(7) – BPT cooling tower blowdown establishing daily maximum and monthly average limitations for Free Available Chlorine.
c) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.
d) 40 CFR 423.13(d)(1) – BAT cooling tower blowdown establishing daily maximum and monthly average limitations for Total Chromium, Total Zinc, and the 126 Priority Pollutants.
e) 40 CFR 423.13(d)(3) – BAT cooling tower blowdown establishing that compliance with limitations for the 126 Priority Pollutants may be determined by engineering calculations.
f) 40 CFR 423.13(g) – BAT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

Chlorine Requirements:

* Monitoring for Free Available Chlorine is only required when the facility is chlorinating.

Total Nitrogen and Total Phosphorus Requirements:

* Sampling of the parameter (either Total Nitrogen or Total Phosphorus) shall be conducted on the same date as sampling for the parameter at the intake and Outfall 001/002 locations.

21k. Effluent Limitations/Monitoring Requirements: Outfall 202 (Unit 6 Cooling Tower Blowdown)

Average flow is 0.91 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	NL	1/D-M	Estimate
pH	1a	NA	NA	6.0 S.U.	9.0 S.U.	1/D-W	Grab
Free Available Chlorine*	1b,1d	0.2 mg/L	0.5 mg/L	NA	NA	1/D-W	Grab
Total Nitrogen*	1	NL (mg/L)	NA	NA	NA	1/3M	Calculated
Total Phosphorus*	1	NL (mg/L)	NA	NA	NA	1/3M	Grab
Total Chromium	1b,1d	0.2 mg/L	0.2 mg/L	NA	NA	1/D-M	Grab
Total Zinc	1b,1d	1.0 mg/L	1.0 mg/L	NA	NA	1/D-M	Grab
126 Priority Pollutants (Appendix A of 40 CFR 423)	1b,1c	Non-detectable	NA	NA	Non-detectable	1/D-Y	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
   a) 40 CFR 423.15(a)
   b) 40 CFR 423.15(j)(1)
   c) 40 CFR 423.15 (j)(3)
   d) 40 CFR 423.15(m)

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

1/D-W = Once per week in which there is a discharge.
1/D-M = Once per month in which there is a discharge.
1/3M = Once every three months.
1/D-Y = Once per year in which there is a discharge.

Total Nitrogen = The sum of Total Kjeldahl Nitrogen and NO_2+NO_3 and shall be calculated from the results of those tests.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).

1/D-Y = 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).

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Federal Effluent Requirements:

a) 40 CFR 423.15(a) – NSPS the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.
b) 40 CFR 423.15(j)(1) – NSPS cooling tower blowdown establishing daily maximum and monthly average limitations for Free Available Chlorine, Total Chromium, Total Zinc, and the 126 Priority Pollutants.
c) 40 CFR 423.12(j)(3) – NSPS cooling tower blowdown establishing that compliance with limitations for the 126 Priority Pollutants may be determined by engineering calculations.
d) 40 CFR 423.15(m) – NSPS quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

Chlorine Requirements:

* Monitoring for Free Available Chlorine is only required when the facility is chlorinating.

Total Nitrogen and Total Phosphorus Requirements:

* Sampling of the parameter (either Total Nitrogen or Total Phosphorus) shall be conducted on the same date as sampling for the parameter at the intake and Outfall 001/002 locations.

21l. Effluent Limitations/Monitoring Requirements: Outfall 501 (Metals Cleaning Waste Treatment Basin)

Average flow is 82.55 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	NL	1/D-M	Estimate
Oil and Grease (O&G)	1a,1b	15 mg/L	20 mg/L	NA	NA	1/D-M	Grab
Total Suspended Solids (TSS)	1a.1b	30 mg/L	100 mg/L	NA	NA	1/D-M	Grab
Total Iron	1a,1b,1c,1d	1.0 mg/L	1.0 mg/L	NA	NA	1/D-M	Grab
Total Copper	1a,1b,1c,1d	1.0 mg/L	1.0 mg/L	NA	NA	1/D-M	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
   a) 40 CFR 423.12(b)(5)
   b) 40 CFR 423.12 (b)(11)
   c) 40 CFR 423.13(e)
   d) 40 CFR 423.13(g)

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

1/D-M = Once per month in which there is a discharge.

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Federal Effluent Requirements:

a) 40 CFR 423.12(b)(5) – BPT metal cleaning wastes establishing daily maximum and monthly average limitations for O&G, TSS, Total Iron and Total Copper.

b) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

c) 40 CFR 423.13(e) – BAT metal cleaning wastes establishing daily maximum and monthly average limitations for Total Iron and Total Copper.

d) 40 CFR 423.13(g) – BAT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

21m. Effluent Limitations/Monitoring Requirements: Outfall 502 (Oily Waste Treatment Basin)

Average flow is 0.57 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	NL	2/M	Estimate
Oil and Grease (O&G)	1a,1b	15 mg/L	20 mg/L	NA	NA	2/M	Grab
Total Suspended Solids (TSS)	1a,1b	30 mg/L	100 mg/L	NA	NA	2/M	Grab
Total Petroleum Hydrocarbons (TPH)*	2	NL (mg/L)	NL (mg/L)	NA	NA	2/M	Grab
Total Petroleum Hydrocarbons – Oil Range Organics (ORO)**	2	NL (mg/L)	NL (mg/L)	NA	NA	2/M	Grab

The basis for the limitations codes are:
1. Federal Effluent Requirements
   a) 40 CFR 423.12(b)(3)
   b) 40 CFR 423.12(b)(11)
2. Best Professional Judgement

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.

2/M = Twice every month.

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

Federal Effluent Requirements:

a) 40 CFR 423.12(b)(3) – BPT low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
b) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

Total Petroleum Hydrocarbon Requirements:

* 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 Petroleum Hydrocarbons – Oil Range Organics shall be measured by EPA SW 846 Method 8015B or any other Virginia Environmental Laboratory Accreditation Program (VELAP) approved method.

The permittee shall sample and submit TPH-ORO results at the frequency of twice per month for one year. If all reported results for TPH-ORO do not exceed the QL for TPH (0.50 mg/L), the permittee may submit a written request to DEQ-NRO for a reduction in the sampling frequency to once per quarter.

Upon approval, the permittee shall collect one (1) sample during one month within each quarterly monitoring period. The quarterly monitoring periods shall be January through March, April through June, July through September and October through December. The sample shall be analyzed for TPH-ORO and the results shall be submitted on the DMR no later than the 10th day of the month following the quarterly monitoring period.

Should any of the quarterly monitoring results for TPH-ORO exceed the QL for TPH (0.50 mg/L), the monitoring frequency shall revert to twice per month for the remainder of the permit term.

21n. Effluent Limitations/Monitoring Requirements: Internal Outfall 503 (Comingled Process Water, Ash Dewatering Water, Contact Water (Interim) / Ash Pond D Underdrain (Final))

Average flow is 2.53 MGD
Effective Dates: During the period beginning with the commencement of facility dewatering activities and lasting until the completion of dewatering and/or installation of the underdrain, or the expiration date, whichever occurs first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Daily Maximum	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/W	Estimate
pH	1,3a	NA	NA	6.0 S.U.	9.0 S.U.	1/W	Grab
Total Suspended Solids (TSS)	1,3a,3b,3c	30 mg/L	100 mg/L	NA	NA	1/W	4H-C
Oil and Grease (O&G)	1,3a,3b,3c	15 mg/L	20 mg/L	NA	NA	1/W	4H-C
Antimony, Total Recoverable	1	1300 µg/L	1300 µg/L	NA	NA	1/W	4H-C
Arsenic, Total Recoverable	1,2	300 µg/L	440 µg/L	NA	NA	1/W	4H-C
Cadmium, Total Recoverable	1,2	1.8 µg/L	2.6 µg/L	NA	NA	1/W	4H-C
Chloride	1,2	460,000 µg/L	670,000 µg/L	NA	NA	1/W	4H-C
Chromium III, Total Recoverable	1,2	110 µg/L	160 µg/L	NA	NA	1/W	4H-C
Chromium VI, Total Recoverable	1,2	22 µg/L	32 µg/L	NA	NA	1/W	4H-C
Coper, Total Recoverable	1,2	12 µg/L	18 µg/L	NA	NA	1/W	4H-C
Lead, Total Recoverable	1,2	18 µg/L	26 µg/L	NA	NA	1/W	4H-C
Mercury, Total Recoverable	1,2	1.5 µg/L	2.2 µg/L	NA	NA	1/W	4H-C
Nickel, Total Recoverable	1,2	30 µg/L	44 µg/L	NA	NA	1/W	4H-C
Selenium, Total Recoverable	1,2	10 µg/L	15 µg/L	NA	NA	1/W	4H-C
Silver, Total Recoverable	1,2	2.7 µg/L	4.0 µg/L	NA	NA	1/W	4H-C
Thallium, Total Recoverable	1	0.94 µg/L	0.94 µg/L	NA	NA	1/W	4H-C
Zinc, Total Recoverable	1,2	120 µg/L	180 µg/L	NA	NA	1/W	4H-C
Hardness, Total (as $CaCO_3$)	1	NL (mg/L)	NL (mg/L)	NA	NA	1/W	Grab
Acute Toxicity – *C. dubia* (NOAEC)	1	NA	NA	100%	NA	1/M	24H-C
Acute Toxicity – *P. promelas* (NOAEC)	1	NA	NA	100%	NA	1/M	24H-C
Chronic Toxicity – *C. dubia* (TU_c)	1	NA	NA	NA	2.85 TU_c	1/M	24H-C
Chronic Toxicity – *P. promelas* (TU_c)	1	NA	NA	NA	2.85 TU_c	1/M	24H-C

The basis for the limitations codes are:
1. Best Professional Judgement
2. Water Quality Standards
3. Federal Effluent Requirements
   c) 40 CFR423.12(b)(1)
   d) 40 CFR 423.12(b)(3)
   c) 40 CFR 423.12(b)(11)

MGD = Million gallons per day.
NL = No limit; monitor and report.
NA = Not applicable.
S.U. = Standard units.

1/W = Once every week.
1/M = Once every month.

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

Federal Effluent Requirements:
a) 40 CFR 423.12(b)(1) – BPT the pH of all discharges, except once through cooling water, shall be within the range of 6.0 S.U. – 9.0 S.U.
b) 40 CFR 423.12(b)(3) – BPT low volume waste sources establishing daily maximum and monthly average limitations for O&G and TSS.
c) 40 CFR 423.12(b)(11) – BPT quantity of pollutants discharged may be expressed as a concentration instead of a mass balance.

1/3M = The quarterly monitoring periods shall be January 1 – March 31, April 1 – June 30, July 1 – September 30, and October 1 – December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).
4H-C= A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 4 (four)-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of 4 (four) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum 4 (four) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

21n. Effluent Limitations/Monitoring Requirements: Internal Outfall 503 (Comingled Process Water, Ash Dewatering Water, Contact Water (Interim) / Ash Pond D Underdrain (Final))

24H-C= A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24 (twenty-four)-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of 24 (twenty-four) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum 24 (twenty-four) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

21o. Monitoring Requirements: Outfalls S5, S31, S35, S36, S37, S42, S49, S61, S77, S78, S79, S80, S86, S94, S95, and S108 (Stormwater)

Average flow is variable.

Effective Dates: During the period beginning with the permit's major modification date and lasting until the expiration date. Discharges shall be monitored and managed in accordance with Part 1.E of the permit.

There shall be no discharge of industrially influenced stormwater from these outfalls - S78, S79, S80, S86, and S94.

Industrially influenced stormwater may be discharged from these outfalls - S5, S31, S35, S36, S37, S42, S49, S61, S77, and S95.

The following industrially influenced stormwater outfalls have been deemed representative:

- Outfall S5 is deemed representative of Outfall S31 and S35.
- Outfall S42 is deemed representative of Outfalls S49 and S77.
- Outfall S61 is deemed representative of Outfalls S36 and S37.

In addition to the requirements established in Part I.E of the permit, Outfall S108 shall be monitored and managed in accordance with Part I.F.18 of the permit.

21p. Limitations and Monitoring Requirements: Groundwater Monitoring

Effective Dates: During the period beginning with the permit's major modification date, and lasting until the permit expiration date, the permittee is authorized to manage pollutants at Ash Pond D and Ash Pond E. The groundwater shall be monitored by the permittee as specified below except where groundwater monitoring is superseded pursuant to a solid waste permit issued in accordance with the Virginia Solid Waste Management Regulations (9VAC20-81-10 et. seq.)

Ash Pond D Observation Wells	Stratum D	ED-1, ED-3, ED-9R, ED-15, ED-24R, ED-32
Ash Pond E Observation Wells	Stratum E	ES-1, ES-3a, ES-4

PARAMETER	GROUNDWATER MONITORING		MONITORING REQUIREMENTS	
	Limitations	Units	Frequency	Sample Type
Static Water Level (mean sea level)	NL	Feet	Semi-Annual	Measurement
pH	NL	Standard Units	Semi-Annual	Grab
Specific Conductivity	NL	µmhos/cm	Semi-Annual	Grab
Hardness (as $CaCO_3$)	NL	mg/L	Semi-Annual	Grab
Chlorides	NL	mg/L	Semi-Annual	Grab
Fluoride	NL	mg/L	Semi-Annual	Grab
Sodium	NL	mg/L	Semi-Annual	Grab
Potassium	NL	mg/L	Semi-Annual	Grab
Sulfate	NL	mg/L	Semi-Annual	Grab
Total Organic Carbon	NL	mg/L	Semi-Annual	Grab
Temperature	NL	°C	Semi-Annual	Grab
Dissolved Arsenic	NL	µg/L	Semi-Annual	Grab
Dissolved Barium	NL	µg/L	Semi-Annual	Grab
Dissolved Cadmium	NL	µg/L	Semi-Annual	Grab
Dissolved Copper	NL	µg/L	Semi-Annual	Grab
Dissolved Iron	NL	µg/L	Semi-Annual	Grab
Dissolved Mercury	NL	µg/L	Semi-Annual	Grab
Dissolved Lead	NL	µg/L	Semi-Annual	Grab
Dissolved Nickel	NL	µg/L	Semi-Annual	Grab
Dissolved Manganese	NL	µg/L	Semi-Annual	Grab
Dissolved Selenium	NL	µg/L	Semi-Annual	Grab
Dissolved Silver	NL	µg/L	Semi-Annual	Grab
Dissolved Vanadium	NL	µg/L	Semi-Annual	Grab
Dissolved Zinc	NL	µg/L	Semi-Annual	Grab
Phenol	NL	mg/L	Semi-Annual	Grab

NL = No Limit; monitor and report

Grab = An individual sample collected over a period of time not to exceed 15-minutes or the time needed to collect the proper sample amount.

Semi-Annual = The semi-annual monitoring periods shall be defined as January 1 – June 30 and July 1 – December 31. The results shall be submitted annually as part of the Groundwater Annual Report as described in Section 21.C.1 of the Fact Sheet.

21q. Limitations and Monitoring Requirements: Groundwater Monitoring

Effective Dates: During the period beginning with the permit's major modification date, and lasting until the permit expiration date, the permittee is authorized to manage pollutants at Ash Pond D and Ash Pond E. The groundwater shall be monitored by the permittee as specified below except where groundwater monitoring is superseded pursuant to a solid waste permit issued in accordance with the Virginia Solid Waste Management Regulations (9VAC20-81-10 et. seq.)

Ash Pond D and E Observation Wells	Stratum D	ED-4, ED-5, ED-17
	Stratum E	ED-31
	Stratum F	ED-26, ED-33

PARAMETER	GROUNDWATER MONITORING		MONITORING REQUIREMENTS	
	Limitations	Units	Frequency	Sample Type
Static Water Level (mean sea level)	NL	Feet	Annual	Measurement
pH	NL	Standard Units	Annual	Grab
Specific Conductivity	NL	µmhos/cm	Annual	Grab
Hardness (as $CaCO_3$)	NL	mg/L	Annual	Grab
Chlorides	NL	mg/L	Annual	Grab
Fluoride	NL	mg/L	Annual	Grab
Sodium	NL	mg/L	Annual	Grab
Potassium	NL	mg/L	Annual	Grab
Sulfate	NL	mg/L	Annual	Grab
Total Organic Carbon	NL	mg/L	Annual	Grab
Temperature	NL	°C	Annual	Grab
Dissolved Arsenic	NL	µg/L	Annual	Grab
Dissolved Barium	NL	µg/L	Annual	Grab
Dissolved Cadmium	NL	µg/L	Annual	Grab
Dissolved Copper	NL	µg/L	Annual	Grab
Dissolved Iron	NL	µg/L	Annual	Grab
Dissolved Mercury	NL	µg/L	Annual	Grab
Dissolved Lead	NL	µg/L	Annual	Grab
Dissolved Nickel	NL	µg/L	Annual	Grab
Dissolved Manganese	NL	µg/L	Annual	Grab
Dissolved Selenium	NL	µg/L	Annual	Grab
Dissolved Silver	NL	µg/L	Annual	Grab
Dissolved Vanadium	NL	µg/L	Annual	Grab
Dissolved Zinc	NL	µg/L	Annual	Grab
Phenol	NL	mg/L	Annual	Grab

NL = No Limit; monitor and report

Grab = An individual sample collected over a period of time not to exceed 15-minutes or the time needed to collect the proper sample amount.

Annual = The annual monitoring period shall be defined as January 1 – December 31. The results shall be submitted annually as part of the Groundwater Annual Report as described in Section 21.C.1 of the Fact Sheet.

21r. Limitations and Monitoring Requirements: Groundwater Monitoring

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date, the permittee is authorized to manage pollutants at the Oily Waste Treatment Basin. The groundwater shall be limited and monitored at the observation wells by the permittee as specified below.

Observation Wells — Oily Waste Treatment Basin — OWB-1, OWB-2, OWB-3, OWB-4, OWB-5

PARAMETER	GROUNDWATER MONITORING		MONITORING REQUIREMENTS	
	Limitations	Units	Frequency	Sample Type
Static Water Level (mean sea level)	NL	Feet	Semi-Annual	Measurement
pH	NL	Standard Units	Semi-Annual	Grab
Specific Conductivity	NL	µmhos/cm	Semi-Annual	Grab
Hardness (as $CaCO_3$)	NL	mg/L	Semi-Annual	Grab
Chlorides	NL	mg/L	Semi-Annual	Grab
Fluoride	NL	mg/L	Semi-Annual	Grab
Sodium	NL	mg/L	Semi-Annual	Grab
Potassium	NL	mg/L	Semi-Annual	Grab
Sulfate	NL	mg/L	Semi-Annual	Grab
Total Organic Carbon	NL	mg/L	Semi-Annual	Grab
Temperature	NL	°C	Semi-Annual	Grab
Dissolved Arsenic	NL	µg/L	Semi-Annual	Grab
Dissolved Barium	NL	µg/L	Semi-Annual	Grab
Dissolved Cadmium	NL	µg/L	Semi-Annual	Grab
Dissolved Copper	NL	µg/L	Semi-Annual	Grab
Dissolved Iron	NL	µg/L	Semi-Annual	Grab
Dissolved Mercury	NL	µg/L	Semi-Annual	Grab
Dissolved Lead	NL	µg/L	Semi-Annual	Grab
Dissolved Nickel	NL	µg/L	Semi-Annual	Grab
Dissolved Manganese	NL	µg/L	Semi-Annual	Grab
Dissolved Selenium	NL	µg/L	Semi-Annual	Grab
Dissolved Silver	NL	µg/L	Semi-Annual	Grab
Dissolved Vanadium	NL	µg/L	Semi-Annual	Grab
Dissolved Zinc	NL	µg/L	Semi-Annual	Grab
Phenol	NL	mg/L	Semi-Annual	Grab
Total Petroleum Hydrocarbons – Diesel Range Organics*	NL	mg/L	Semi-Annual	Grab
Total Petroleum Hydrocarbons – Oil Range Organics**	NL	mg/L	Semi-Annual	Grab
Benzene	NL	mg/L	Semi-Annual	Grab
Ethylbenzene	NL	mg/L	Semi-Annual	Grab
Toluene	NL	mg/L	Semi-Annual	Grab
Total Xylenes	NL	mg/L	Semi-Annual	Grab

NL = No Limit; monitor and report

*TPH = 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.

**TPH = Total Petroleum Hydrocarbons – Oil Range Organics (ORO) shall be measured by EPA SW 846 Method 8015B or any other Virginia Environmental Laboratory Accreditation Program (VELAP) approved method.

Grab = An individual sample collected over a period of time not to exceed 15-minutes or the time needed to collect the proper sample amount.

Semi-Annual = The semi-annual monitoring periods shall be defined as January 1 – June 30 and July 1 – December 31. The results shall be submitted annually as part of the Groundwater Annual Report as described in Section 21.C.1 of the Fact Sheet.

22. Groundwater Monitoring – Existing Permit:

Background

9VAC25-280-10 et seq. became effective February 12, 2004. This regulation establishes statewide groundwater standards (9VAC25-280-40) as well as groundwater standards applicable by physiographic province (9VAC25-280-50) and groundwater criteria applicable by physiographic province (9VAC25-280-70).

Groundwater monitoring has been ongoing at the Dominion – Possum Point Power Station since 1985, focusing on potential impacts from the operation of Ash Pond D, Ash Pond E, and the Oily Waste Treatment Basin. The facility currently monitors fifteen wells associated with Ash Pond D and Ash Pond E, as well as five wells associated with the Oily Waste Treatment Basin. The parameters and monitoring frequencies are defined above in 21.p through 21.r of the Fact Sheet.

Both ash ponds received coal combustion by-products prior to the facility's two coal fire units being converted to natural gas. Ash Pond D was rehabilitated and reconstructed into a long-term ash repository pond that receives ash dredged from Ash Pond E, as well as dredge spoil material that is not related to operations at the Station provided the material originated from the Potomac River, Quantico Creek or public water bodies in the Quantico Creek watershed meeting the definition of State waters in Virginia. Ash Pond E receives discharges from Outfall 501, Outfall 502, decanted water from Ash Pond D, untreated Potomac River water, and stormwater. The Oily Waste Treatment Basin receives process water discharges from various plant operations and stormwater runoff. These contributions are detailed in Section 10, Tables 2 and 3 of the Fact Sheet.

In March 2012, the facility submitted an approval request for a revision to their Groundwater Monitoring Plan. The revision included the removal of a specified order of sample collection within Section 5.4 of the plan previously approved on February 25, 2008. Specifically, the removal of the wording that samples be collected from the background well first and then progressing from the wells with the lowest known constituent levels to highest known constituent levels. The request was reviewed by DEQ staff who determined that there were no adverse consequences of the facility's proposal. The revised Groundwater Monitoring Plan was approved by letter dated April 9, 2012.

Data Evaluation and Recommendations – Existing Permit

In support of the permit reissuance, DEQ staff reviewed the 2010 annual groundwater monitoring report with the following comments and recommendations provided:

1. Based upon the groundwater data submitted, the 2010 data indicates exceedances of the Virginia Groundwater Quality Standards for dissolved cadmium, dissolved zinc, phenol, and pH. However, significant changes in the groundwater quality beneath the Station do not appear to have occurred.

2. The 2010 report indicates that monitoring well ED-15 is damaged. Because this well is utilized to monitor background groundwater concentrations it was recommended that the damaged well be properly abandoned and replaced. Based on the 2011annual groundwater monitoring report, monitoring well ED-15 was repaired in July 2011 and no further action is warranted.

3. The 2010 report indicates that monitoring well ED-4 has not had sufficient water to be sampled the last two monitoring events. It is staff's recommendation that this well be reinstalled so that the groundwater in the vicinity of the well is properly monitored. A special condition has been added to the permit with this reissuance to evaluate Stratum B monitoring network and propose any necessary changes for characterization of Stratum B water quality and to make any well modifications, replacements or abandonments deemed necessary. See Section 25.m of the Fact Sheet for this requirement.

4. It is staff's recommendation that the analysis for TPH-Oil Range Organics (TPH-ORO) be added to the list of required analytes for the monitoring wells surrounding the Oily Waste Treatment Basin (OWB-1, OWB-2, OWB-3, OWB-4, and OWB-5). This recommendation is based on the fact that the analyses for TPH-Diesel Range Organics (DRO) and TPH-Gasoline Range Organics (GRO) do not provide results for the heavier carbon chain constituents found in oil compounds, which may potentially be leaching from the Oily Waste Treatment Basin. Given the facility's history of using heavy oils on site, the analysis of TPH-ORO is appropriate to capture the range of oils potentially present.

TABLE 9 – Constituent Fraction of TPH Groups*					
TPH - GRO		TPH-DRO		TPH-ORO	
Aliphatics	C6 >C6 – C8 >C8 – C-10	Aliphatics	>C10 – C12 >C12 – C16 >C16 – C35	Aliphatics	Not Applicable
Aromatics	>C7 – C8 >C8 – C10	Aromatics	>C10 – C12 >C12 – C16 >C16 – C21	Aromatics	>C21-C35
*As provided by the Missouri Department of Natural Resources					

Based on the above recommendation, monitoring for TPH-Oil Range Organics has been added to the permit with this reissuance. This analysis is only required for monitoring wells OWB-1, OWB-2, OWB-3, OWB-4, and OWB-5. See Section 21.r of the Fact Sheet for this requirement.

The DEQ staff memo is found as Attachment 17.

23. Groundwater Monitoring – Post Operational Life Requirements:

EPA published a Final Rule for the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities on April 17, 2015. The rule established technical requirements for CCR landfills and surface impoundments under Subtitle D of the Resource Conservation and Recovery Act RCRA. These regulations address the management and disposal of coal ash including stability, groundwater monitoring, and fugitive dust emissions. Adoption of the federal regulations into the Virginia Solid Waste Management Regulations is anticipated in late 2015.

CCR Surface Impoundments have been regulated under the VPDES program during their operational life. The Virginia Solid Waste Management Regulations (VSWMR) applies after their operational life and provides for closure requirements in 9 Virginia Administrative Code 20-81-370. Their long-term management which includes closure, post-closure, and groundwater monitoring will be addressed by the solid waste program in accordance with the VSWMR and requirements under the EPA rule as applicable. Existing groundwater monitoring, corrective action and/or risk assessment plans currently in effect under the VPDES permit will remain in effect until such time that they are superseded by a groundwater monitoring program pursuant to a solid waste permit for closure and/or post-closure in accordance with the Virginia Solid Waste Management Regulations (9VAC20-81-10 *et. seq.*).

24. Quantico Creek Special Study:

Coastal 2000 weight of evidence analysis, utilizing bulk chemical data, toxicity test data, and an evaluation of benthic community conditions, resulted in an impaired determination for the aquatic life use. Results from the estuarine bioassessment, sediment chemistry analysis (elevated nickel levels), and sediment bioassay for estuarine waters were all factors for this determination (see Attachment 18 for sediment chemistry results). Station 1aQUA001.09, approximately 0.75 rivermiles above the railroad bridge, was sampled in 2001 for the Coastal 2000 program (part of the estuarine probabilistic monitoring program).

On July 16, 2014, DEQ staff conducted sediment sampling at four DEQ monitoring stations located in Quantico Creek including Station 1aQUA001.09 noted above (Attachment 19). Selected sample locations had elevated metals concentrations with some values exceeding estuarine and/or freshwater screening values (Attachment 20). However, the data were variable and not sufficient to draw conclusions as to whether Ash Ponds A, B, C, D and/or E or operations in general at the Possum Point Power Station are impacting Quantico Creek. As the embayment is subject to tidal action, it is uncertain whether these higher concentrations are due to tidal fluctuations or whether there may be additional sources causing or contributing to the impairment.

DEQ has initiated a special study including sediment and water column sampling in both the tidal and free-flowing portions of Quantico Creek. This monitoring is proposed to further investigate the aquatic life use impairment identified for a potion of the tidal embayment and to better understand the potential sources of pollutants causing and/or contributing to the impairment. Quantico Creek is an approximate 39 square mile watershed. Historical activities in the watershed include pyrite mining in the Prince William Forest National Park located upstream in the free-flowing portion of the watershed. Additionally, the watershed has undergone significant development over the last 30 years as a suburb of the Washington D.C. metropolitan area.

25. Other Permit Requirements:

a) Part I.B. of the permit contains additional 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) Permit Section Part I.C., details the requirements for Whole Effluent Toxicity (WET) Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A WET program is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, instream waste concentration, and receiving stream characteristics.

The Dominion - Possum Point Power Station's instream waste concentration and the activity at this facility warrant monitoring under the WET program. The test protocol utilizes bioassay-testing methods in measuring the potential for the effluent to cause chronic toxicity to aquatic organism in the receiving stream. Table 10 below provides a detailed description of the facility's existing permit requirements for toxicity testing.

TABLE 10 – Existing Permit Requirements for Whole Effluent Toxicity			
Outfall	Acute	Chronic	Frequency
001/002	*C. dubia*	*P. promelas*	Annual
003	*C. dubia*	*P. promelas*	Annual
004	*C. dubia / P. promelas*	*C. dubia / P. promelas*	Annual
005	*C. dubia / P. promelas*	*C. dubia / P. promelas*	Annual

With this reissuance, WET language shall require the permittee to perform annual chronic testing using both *C. dubia* and *P. promelas* as the test species at Outfalls 001/002, 003, 004, and 005 for the duration of the permit (Attachment 15). Table 11 below provides a detailed description of the facility's proposed permit requirements for toxicity testing.

TABLE 11 – Proposed Permit Requirements for Whole Effluent Toxicity		
Outfall	Chronic	Frequency
001/002	*C. dubia / P. promelas*	Annual
003	*C. dubia / P. promelas*	Annual
004	*C. dubia / P. promelas*	Annual
005	*C. dubia / P. promelas*	Annual

c) Permit Section Part I.D. details the requirements of a Groundwater Monitoring Plan.

The permittee shall continue groundwater sampling and reporting in accordance with Part I.A. of the permit and the groundwater monitoring plan approved on April 9, 2012. The purpose of this plan is to determine if the integrity of Ash Pond D, Ash Pond E, and the Oily Waste Treatment Basin is being maintained and to indicate if activities at the site are resulting in violations of the Board's Ground Water Standards. The permittee shall review the existing Groundwater Monitoring Plan and notify the DEQ Northern Regional Office, in writing, whether it is still accurate and complete by July 3, 2013. If the Groundwater Monitoring Plan is no longer accurate and complete, a revised Groundwater Monitoring Plan shall be submitted for approval to the DEQ Northern Regional Office by July 3, 2013. The approved plan is an enforceable part of the permit. Any future changes to the plan must be submitted for approval to the DEQ Northern Regional Office within 90 days of the changes.

1) The permittee shall submit a Groundwater Annual Report to the DEQ Northern Regional Office by April 30th of each year. The Annual Report shall include the annual and semi-annual sampling results for that year. The Annual Report shall include a review of the groundwater quality on the basis of background quality, Water Quality Standards, and statistical deviation thereof, as applicable with the Anti-degradation Policy for Groundwater.

2) Should data warrant, DEQ may require a Site Characterization Report for the Oily Waste Treatment Basin. The report shall include, at a minimum, an assessment of the following: the spatial extent and severity of the contamination with concentration depicted by isoconcentration maps, the cause of the contamination, identification of both human health and environmental receptors, assessment of risk to each receptors, and an analysis of remediation alternatives. The permittee shall submit the Site Characterization Report no later than three years after being notified by the regional office.

3) Following review and approval of a Site Characterization Report, a Corrective Action Plan may be required by DEQ-NRO. The plan shall be due within 180 days of being notified by the regional office. The plan shall set forth the steps to be taken by the permittee to ensure that the contamination source is eliminated or that the contaminant plume is contained on the permittee's property. In addition, based on the extent of contamination, a risk analysis may be required. Once approved, this plan and/or analysis shall be incorporated into the permit

by reference and become an enforceable part of the permit. The permittee shall put into practice the corrective action plan within 180 days after it has been approved by the regional office.

d) Permit Section Part I.E. details the requirements of a Stormwater Management Plan.

Industrial stormwater discharges may contain pollutants in quantities that could adversely affect water quality. Stormwater discharges which are discharged through a conveyance or outfall are considered point sources and require coverage by a VPDES permit. The primary method to reduce or eliminate pollutants in stormwater discharges from an industrial facility is through the use of best management practices (BMPs). Stormwater Management Plan requirements are derived from the VPDES General Permit for Stormwater Discharges Associated with Industrial Activity, 9VAC25-151 et seq.

26. Other Special Conditions:

a) O&M Manual Requirement. The permittee shall maintain a current Operations and Maintenance (O&M) Manual for the facility that is in accordance with Virginia Pollutant Discharge Elimination System Regulations, 9VAC25-31. The O&M Manual and subsequent revisions shall include the manual effective date and meet Part II.K.2 and Part II.K.4 Signatory Requirements of the permit. 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. The permittee shall operate the facility in accordance with the O&M Manual and shall make the O&M manual available to Department personnel for review during facility inspections. Within 30 days of a request by DEQ, the current O&M Manual shall be submitted to the DEQ Northern Regional Office for review and approval.

b) Notification Levels. The permittee shall notify the Department as soon as they know or have reason to believe:

a. 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:

(1) One hundred micrograms per liter;

(2) 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;

(3) Five times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Board.

b. 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:

(1) Five hundred micrograms per liter;

(2) One milligram per liter for antimony;

(3) Ten times the maximum concentration value reported for that pollutant in the permit application; or

(4) 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) 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.

e) 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).

f) 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 effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

g) 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 at Outfall 004 and Outfall 005 once every five years for the substances noted in Attachment A of this VPDES permit.

h) 126 Priority Pollutants. Federal Effluent Guidelines (40 CFR 423.13(d)(1)) state that the quantity of pollutants in cooling tower blowdown discharges (Appendix A to Part 423) shall be in non-detectable amounts. Sampling for these pollutants (except total chromium and total zinc) at the discharge point for Outfalls 201 and 202 shall be conducted annually when there is a discharge. At the permitting authority's discretion (40 CFR 423.13(d)(3)), compliance with the limitations for the 126 Priority Pollutants may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

i) In-stream Monitoring. Monitoring of the thermal mixing zone shall take place twice per year. The monitoring results shall be presented as a temperature plot with 3-degree Celcius isotherms and shall be taken as near to full plant operating conditions as reasonably possible. Monitoring and reporting shall be conducted in accordance with the following schedule:

Permit Year	Monitoring Period	Report Submission Dates
First	February 2013	May 31, 2013
First	July 2013	October 31, 2013
Second	February 2014	May 31, 2014
Second	July 2014	October 31, 2014
Third	February 2015	May 31, 2015
Third	July 2015	October 31, 2015
Fourth	February 2016	May 31, 2016
Fourth	July 2016	October 31, 2016
Fifth	February 2017	May 31, 2017
Fifth	July 2017	October 31, 2017

j) Debris Collection. Wastes such as solids, sludges, or other pollutants removed from or resulting from treatment or control of wastewaters, or facility operations, including all debris collected on the intake trash racks, shall be disposed of in a manner to prevent any of the removed substances, or runoff from such substances, from entering waters of the State.

k) Solids in Ash Pond D.

a. Ash Pond D may be used as a repository for dredge spoil material and residuals removed from facilities, areas, and systems related to operation and maintenance of Possum Point Power Station. These materials and residuals include :

1) Solids from VPDES treatment ponds and stormwater management facilities;
2) Solids from old/closed VPDES treatment ponds (Ash Pond A, B and C);
3) Solids from station floor drains, lift stations, and sumps;
4) Water treatment plant filter cake and cooling tower basin sludge;
5) Soil and fines from station beautification and land restoration projects, including the coal pile area, deicing grit, abrasives, and inert cleanup debris such as surplus soil, rock, and gravel; and
6) Sand/silt/sediment in the Potomac River and Quantico Creek within and adjacent to cooling water intake structures, outfall structures, oil barge berths, shoreline revetments, boat ramp, transportation structures, and navigation-related channels and structures.

b. Ash Pond D may be used as a repository for dredge spoil material that is not related to operations at Possum Point Power Station provided the material originated from the Potomac River, Quantico Creek or public bodies of water in the Quantico Creek watershed meeting the definition of state waters in Virginia. The following guideline shall be followed:

1) Dominion shall provide written notice to the Department of Environmental Quality-Northern Regional Office (DEQ-NRO) at least 30 days prior to the placement of any dredge spoil material in Ash Pond D. This notice shall include as a minimum the following information:
   a) Sampling tests and laboratory results (See 3 below);
   b) Copies of all permits or regulatory authorizations required for the project;
   c) Project schedule dates;
   d) Method of placement;
   e) Original location of material;
   f) Type and volume of material; and
   g) Name, address, and telephone number of dredging contractor (for placement of dredge spoil material) or station contact (for placement of station residuals).

2) Specific approval by the DEQ-NRO is not required for a placement project but the DEQ-NRO shall have the right to request additional information or halt any noticed activity. If the placement project is not halted by the DEQ-NRO within 30 days of receipt of the above notice, the project is deemed authorized.

c. Sampling Requirements.
1) A "sample" is defined as a Core Dredge sample, which will be a composite of dredge material from the river, stream or lake bottom to the depth of the intended dredge.
2) Number of Samples taken
   a) >300,000 Cubic Yards of Material
      For every 100,000 cubic yards of material a representative sample shall be collected. These samples shall best represent the materials being placed in Ash Pond D from the dredge area.
   b) <300,000 Cubic Yards, but >50,000 Cubic Yards of Material
      There shall be three representative samples of dredge area. These samples shall best represent the materials being placed in Ash Pond D from the dredge area.
   c) <50,000 Cubic Yards, but >1,000 Cubic Yards of Material
      There shall be two representative samples of dredge area. These samples shall best represent the materials being placed in Ash Pond D from the dredge area.
   d) <1,000 Cubic Yards of Material
      No sampling requirement shall apply to projects involving the placement of material less than 1,000 cubic yards with approval from Dominion (Virginia Power).

3) All parameters limited in Attachment B shall be sampled. The permittee shall use Attachment B as a reporting form which will be submitted to DEQ-NRO at least 30 days prior to placement in Ash Pond D. If the measured constituents in the sample exceed any respective threshold levels listed in Attachment B, the material shall not be placed in Ash Pond D.

4) Materials and residuals related to routine station operations and dredge materials identified in Part I.F.11.a and Part I.F.11.b of the permit (Sections 22.k.a and 22.k.b of the Fact Sheet) shall be tested prior to initial placement under this protocol and if station processes have not materially changed, further testing is not required.

5) The above sampling requirements for any placement activity may be waived in the event of declared public emergency conditions or by consent of the DEQ-NRO.

d. The placement of any material in Ash Pond D shall not be incompatible with the Ash Pond D liner system or cause a violation of the VPDES permit requirements applicable to Outfall 005 at Ash Pond E.

e. Dominion shall retain records relating to the placement event for a minimum of three years and comply with the requirements of Part II.B.2 of the subject permit.

f. Dredging shall be performed in accordance with all Federal and Virginia laws and regulations.

l) 316(b) Special Condition. The facility includes a cooling water intake structure governed by §316(b) of the Clean Water Act which requires that the location, design, construction and capacity of the cooling water intake structures reflect the "best technology available for minimizing adverse environmental impact". The Possum Point – December, 1976 environmental report on impingement and entrainment studies conducted at the facility indicated minimal or no adverse environmental impact. The special condition requires continued compliance with §316(b) and submittal of new data that was recently collected in response to EPA's Phase II requirements. Collected data and any changes to the intake structures or conditions will be reevaluated at each reissuance to monitor continued compliance with the requirement. The condition also includes a reopener, should further 316(b) related conditions become necessary once the EPA Phase II rule is finalized or a new BPJ determination is required.

m) Re-Evaluation of Stratum B. Within 180 days of the permit reissuance (April 3, 2013), the permittee shall submit to the DEQ- Northern Regional Office for review and approval, a work plan to evaluate Stratum B monitoring network and propose any necessary changes for characterization of Stratum B water quality. Any well modifications, replacements or abandonments proposed in the approved plan must be completed within 180 days of the plan approval.

n) PCB Monitoring. The permittee shall conduct PCB monitoring using low-level PCB analysis to support the PCB TMDL for the fish consumption use impairment in the Tidal Potomac River.

o) 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.

p) Ash Pond Dewatering Special Condition. The permittee shall notify the DEQ Northern Regional Office upon commencing operations to draw down the water elevation in Ash Pond D in preparation of pond closure.

q) Ash Pond Closure Stormwater Management Special Condition. Best management practices (BMPs), structural and/or non-structural, shall be utilized by the permittee to minimize the impact of ash pond closure activities on stormwater quality. Ash pond closure activities may include, but are not limited to, the process of ash movement for off-site disposal, ash loading and unloading areas, any area(s) associated with the storage of ash prior to transport off-site, and vehicle tracking associated with the movement of ash.

The facility's Stormwater Pollution Prevention Plan (SWPPP) shall include a description of the BMPs being implemented and a regular schedule for preventive maintenance of all BMPs where appropriate. All structural BMPs identified in the SWPPP shall be maintained in effective operating condition and shall be inspected for structural integrity and operational efficiency once per week during ash pond closure activities. Results of the weekly inspections and actions needed and performed in response to the weekly inspections shall be documented per the SWPPP.

r) Ash Handling Area Outfall Inspections. Inspections of Outfall 010 and Stormwater Outfall S108 shall be conducted at a frequency of once every five business days and no later than forty-eight (48) hours following a measurable storm event. Corrective actions identified as a result of these inspections shall be implemented as soon as possible, but no later than seven (7) days after discovery. Results of these inspections and actions needed and performed in response to these inspections shall be documented per the SWPPP. Ash handling area outfall inspections shall be conducted as noted above until such time as the ash pond closure project is completed.

s) Weir Structure Discharge Prohibition. Discharge from the weir structure associated with the Ash Pond A, B, and C complex is not authorized by this permit.

Permit Section Part II. 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.

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

a) Special Conditions:

1. An Ash Pond Dewatering Special Condition was added to the permit to ensure the discharge does not cause or contribute to an excursion of an applicable water quality standard.
2. An Ash Pond Closure Stormwater Management Special Condition was added to the draft permit to ensure adequate stormwater management related to ash pond closure activities.
3. An Ash Handling Area Outfall Inspection Special Condition was added to the draft permit to ensure adequate stormwater management related to ash pond closure activities.
4. A Weir Structure Discharge Prohibition Special Condition was added to the draft permit as a discharge from the weir structure is not authorized.

b) Monitoring and Effluent Limitations:

1. Additional monitoring and limitations have been added to the draft permit for Outfall 005 (Interim Configuration) with this modification.
2. Monitoring has been added to the draft permit for Outfall 010 with this modification.
3. Monitoring and limitations have been added to the draft permit for Internal Outfall 503 with this modification.
4. The existing groundwater monitoring, corrective action and/or risk assessment plans currently in effect under the facility's permit shall remain in effect until such time as they are superseded by a solid waste permit in accordance with the Virginia Solid Waste Management Regulations (9VAC20-81-10 et. seq.) The construction drawings, specifications, and solid waste permitting application package for the Possum Point

Power Station will be submitted to DEQ under separate cover.

c) Other:
1. The discharge of Internal Outfall 503 (interim) is authorized through Outfall 001/002, Outfall 004, and/or Outfall 005.
2. Internal Outfall 503 (interim) has been identified as a source to Outfall 001/001, Outfall 004, and/or Outfall 005 based on operational needs.
3. Outfall S35 and S108 (stormwater) were added to the permit with this modification.
4. The discharge from the Unit 6 Reverse Osmosis (RO) trailers was added to Outfall 004 as a permanent source to the outfall.
5. Uncontaminated river water was added to the list of allowable non-stormwater discharges.
6. Outfall S107 was re-identified as Outfall 010.
7. As a result of closure activities, Internal Outfall 502 will be permanently re-routed to Outfall 004 rather than Ash Pond E.
8. As a result of closure activities, the subsurface dewatering system has been added as a discharge source to the final configuration of Outfall 005.

28. Changes to the Draft Permit from the Public Comment Period:

29. Variances/Alternate Limits or Conditions: None

30. Public Notice Information:

First Public Notice Date: October 29, 2015 Second Public Notice Date: November 5, 2015

Public Notice Information is required by 9VAC25-31-280 B. 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 22 for a copy of the public notice document.

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.

31. Modification Requests Not Related to Ash Pond Closure:

As a result of the August 20, 2015 modification request a number of items requested in the previous modification requests were no longer necessary (Attachment 23). The discussion below details those modifications that are still requested.

1. The permit modification request received on June 30, 2014, requested uncontaminated river water be added to the list of allowable non-stormwater discharges. Staff has no objection to this request. Uncontaminated river water shall be added to Part I.E.1.b.1 of the facility's VPDES permit.

2. The permit modification request received on June 30, 2014, requested approval for the use of water from the Seal Pit as a back-up raw water supply for Unit 6. Staff has no objection to this request.

3. The permit modification request received on June 30, 2014, requested that sources contributing to Outfall 007 be reworded. The language was revised to reflect the discharge of Intake Screen Backwash Water is from Units 3, 4, 5, and 6 and to remove the authorization to discharge Intake Screen Backwash Water from Units 3 and 4 through Outfall 007 until such time that Outfall 009 is operational recognizing that Outfall 007 and Outfall 009 are separate. This is reflected in Table 2 and Section 21.e of the fact sheet and Part I.A.5 of the facility's VPDES permit.

4. The permit modification request received on June 30, 2014, requested clarification that Outfall 009 is an intermittent discharge and would only be used if the bridge and trough connecting the intakes fails. This is reflected in Table 3 and Section 21.g of the fact sheet and Part I.A.7 of the facility's VPDES permit.

5. The permit addendum request received on December 24, 2014, requested the addition of stormwater Outfall S35. This is reflected in Table 3 and Section 21.l of the fact sheet and Part I.A.15 of the facility's VPDES permit.

6. The permit addendum request received on December 24, 2014, requested that permit language associated with stormwater Outfall S107 from a stormwater outfall not associated with industrial activity to a stormwater outfall associated with industrial activity. Please see Section 17.c.8 of the fact sheet for discussion.

32. Additional Comments:

Previous Board Action(s): None

Staff Comments:

1. Based on comments received from the public during the reissuance of the permit in 2013, the following changes were made to the draft permit after the close of the comment period:

   - Monitoring for Total Nitrogen and Total Phosphorus at both the intake and Outfall 001/002 was added to the draft permit.
   - Monitoring for Dissolved Copper at both the intake and Outfall 001/002 was added to the draft permit.
   - Monitoring for Total Hardness at both the intake and Outfall 001/002 was added to the draft permit.
   - Monitoring for Total Nitrogen and Total Phosphorus was added to Internal Outfall 201.
   - Monitoring for Total Nitrogen and Total Phosphorus was added to Internal Outfall 202.

Public Comment: TBD

Fact Sheet Attachments – Table of Contents

Dominion – Possum Point Power Station
VA0002071

2016 Modification

<u>Fact Sheet Attachments – Table of Contents (Continued)</u>

Dominion – Possum Point Power Station
VA0002071

2016 Modification

Attachment 1

NPDES PERMIT RATING WORK SHEET

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

VPDES NO. : VA0002071

Facility Name: Dominion – Possum Point Power Station
City / County: Dumfries / Prince William County

Receiving Water:	Potomac River	Quantico Creek	Quantico Creek, UT
Waterbody ID:	Maryland Waters	VAN-A26E	VAN-A26E

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

[X] Yes; score is 600 (stop here) [ ] 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
			[ ] 6.	6	30	[ ] 10.	10	50

Code Number Checked: NA
Total Points Factor 1: NA

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 %	[ ]	53	30

Code Checked from Section A or B: NA
Total Points Factor 2: NA

NPDES PERMIT RATING WORK SHEET

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutants: (check one) ☐ BOD ☐ COD ☐ Other: ______

Permit Limits: (check one)

	Limit	Code	Points
☐	< 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: NA

Points Scored: NA

B. Total Suspended Solids (TSS)

Permit Limits: (check one)

	Limit	Code	Points
☐	< 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: NA

Points Scored: NA

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: NA

Total Points Factor 3: NA

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.

☐ 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
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: NA

Total Points Factor 4: NA

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
☐	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
☐	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
☐	NO	2	0

Code Number Checked: A NA B NA C NA

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

FACTOR 6: Proximity to Near Coastal Waters

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

Check appropriate facility HPRI code (from PCS):

	HPRI#	Code	HPRI Score
☐	1	1	20
☐	2	2	0
☐	3	3	30
☐	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 : NA

Base Score (HPRI Score): NA X (Multiplication Factor) NA = NA

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 NA B NA C NA

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

NPDES PERMIT RATING WORK SHEET

SCORE SUMMARY

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

S1. Is the total score equal to or grater than 80 [X] 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

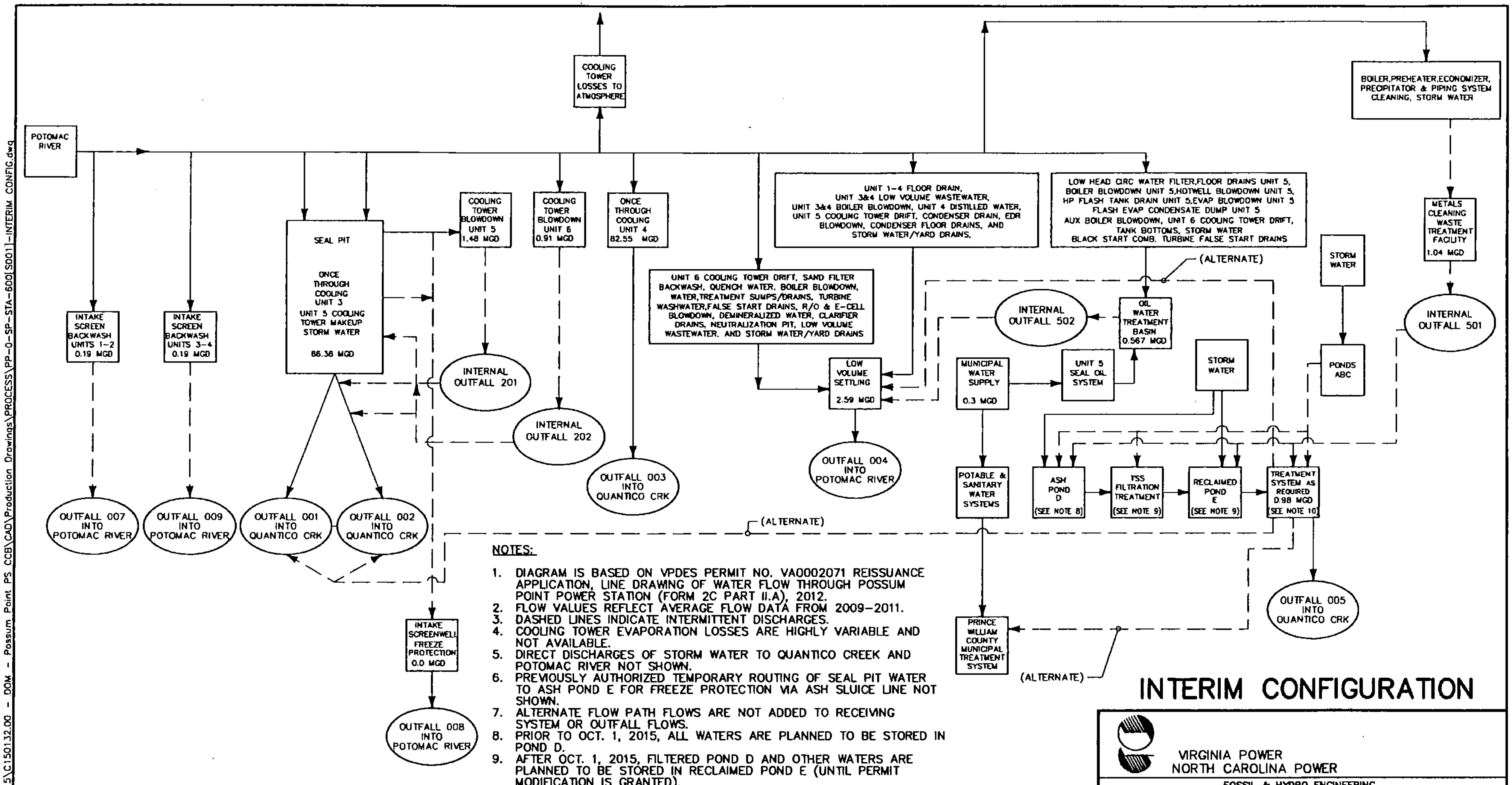
[ ] YES; (Add 500 points to the above score and provide reason below:

Reason: ____________

NEW SCORE : 600
OLD SCORE : 600

Permit Reviewer's Name : Susan Mackert
Phone Number: (703) 583-3853
Date: July 9, 2012

Attachment 2



NOTES:

1. DIAGRAM IS BASED ON VPDES PERMIT NO. VA0002071 REISSUANCE APPLICATION, LINE DRAWING OF WATER FLOW THROUGH POSSUM POINT POWER STATION (FORM 2C PART II.A), 2012.
2. FLOW VALUES REFLECT AVERAGE FLOW DATA FROM 2009-2011.
3. DASHED LINES INDICATE INTERMITTENT DISCHARGES.
4. COOLING TOWER EVAPORATION LOSSES ARE HIGHLY VARIABLE AND NOT AVAILABLE.
5. DIRECT DISCHARGES OF STORM WATER TO QUANTICO CREEK AND POTOMAC RIVER NOT SHOWN.
6. PREVIOUSLY AUTHORIZED TEMPORARY ROUTING OF SEAL PIT WATER TO ASH POND E FOR FREEZE PROTECTION VIA ASH SLUICE LINE NOT SHOWN.
7. ALTERNATE FLOW PATH FLOWS ARE NOT ADDED TO RECEIVING SYSTEM OR OUTFALL FLOWS.
8. PRIOR TO OCT. 1, 2015, ALL WATERS ARE PLANNED TO BE STORED IN POND D.
9. AFTER OCT. 1, 2015, FILTERED POND D AND OTHER WATERS ARE PLANNED TO BE STORED IN RECLAIMED POND E (UNTIL PERMIT MODIFICATION IS GRANTED).
10. AFTER PERMIT MODIFICATION IS GRANTED, WATERS MAY BE DIRECTLY TREATED, AS REQUIRED, AND DISCHARGED.

INTERIM CONFIGURATION

VIRGINIA POWER
NORTH CAROLINA POWER
FOSSIL & HYDRO ENGINEERING
RICHMOND, VIRGINIA

WATER FLOW BALANCE LINE DIAGRAM

POSSUM POINT POWER STATION

APPROVAL OF THE SUPT OF TECH SERVICES IS REQ'D PRIOR TO ISSUE OF THIS DWG

CAD FILE: DGNSPEC FOR FILE VERIFICATION DATE$$$$$$$$

DRAWING NO. PP-0-SP-STA-600 REV. 1

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD	ENGR
2	REVISED FOR VPDES INDUSTRIAL WW PERMIT MODIFICATION	8/17/15	LITZIJ	DEBARJD	QUINLSC	
1	REVISED PER ENVIRONMENTAL REDLINE TO INCORPORATE STATION REVIEW.	5/31/12	KTC	OD-D	RWM	
0	ORIG. ISSUE FOR 600 SERIES ACAD CONVERSION. REV PER ENVIRONMENTAL REDLINE.	3/6/12	KTC	OD-D	RWM	— —

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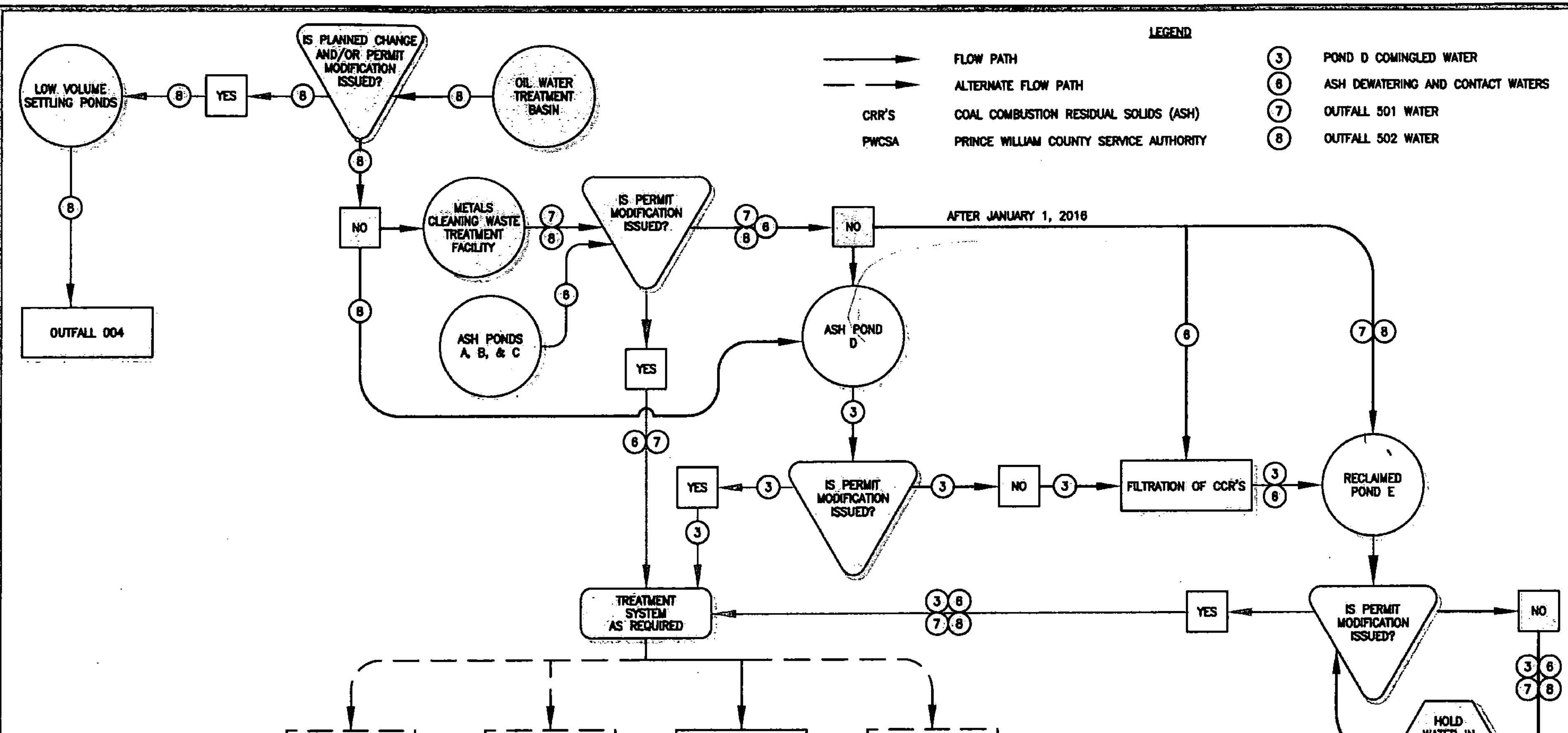

NOTES:
ALSO, REFER TO TABLE 1 FOR ACTIVITY/FLOW PATH NUMBER DESCRIPTIONS.

NO.:	DATE:	DWN:	CHK:	APV:	DESCRIPTION:

REVISION RECORD

DRAWING TITLE
INTERIM CONFIGURATION (DURING CONSTRUCTION)

PROJECT
POSSUM POINT POWER STATION
19000 POSSUM POINT ROAD
DUMFRIES, PRINCE WILLIAM COUNTY
VIRGINIA 22026

gai consultants

CLIENT
DOMINION RESOURCES SERVICE, INC.
5000 DOMINION BOULEVARD
GLEN ALLEN, VIRGINIA 23060

DRAWN BY:	CHECKED BY:	APPROVED BY:
LITZIJ	DEBARJD	QUINLSC
REVISION	SCALE:	ISSUE DATE:
A/0	AS SHOWN	08/14/2015
	SHEET NO.:	
	2 OF 3	

GAI FILE NUMBER:
C150132-00-047-00-P-B2-002
GAI DRAWING NUMBER:
C150132-00-047-00-P-B2-002

ISSUING OFFICE: Richmond | 4198 Cox Road, Suite 114, Glen Allen, VA 23060

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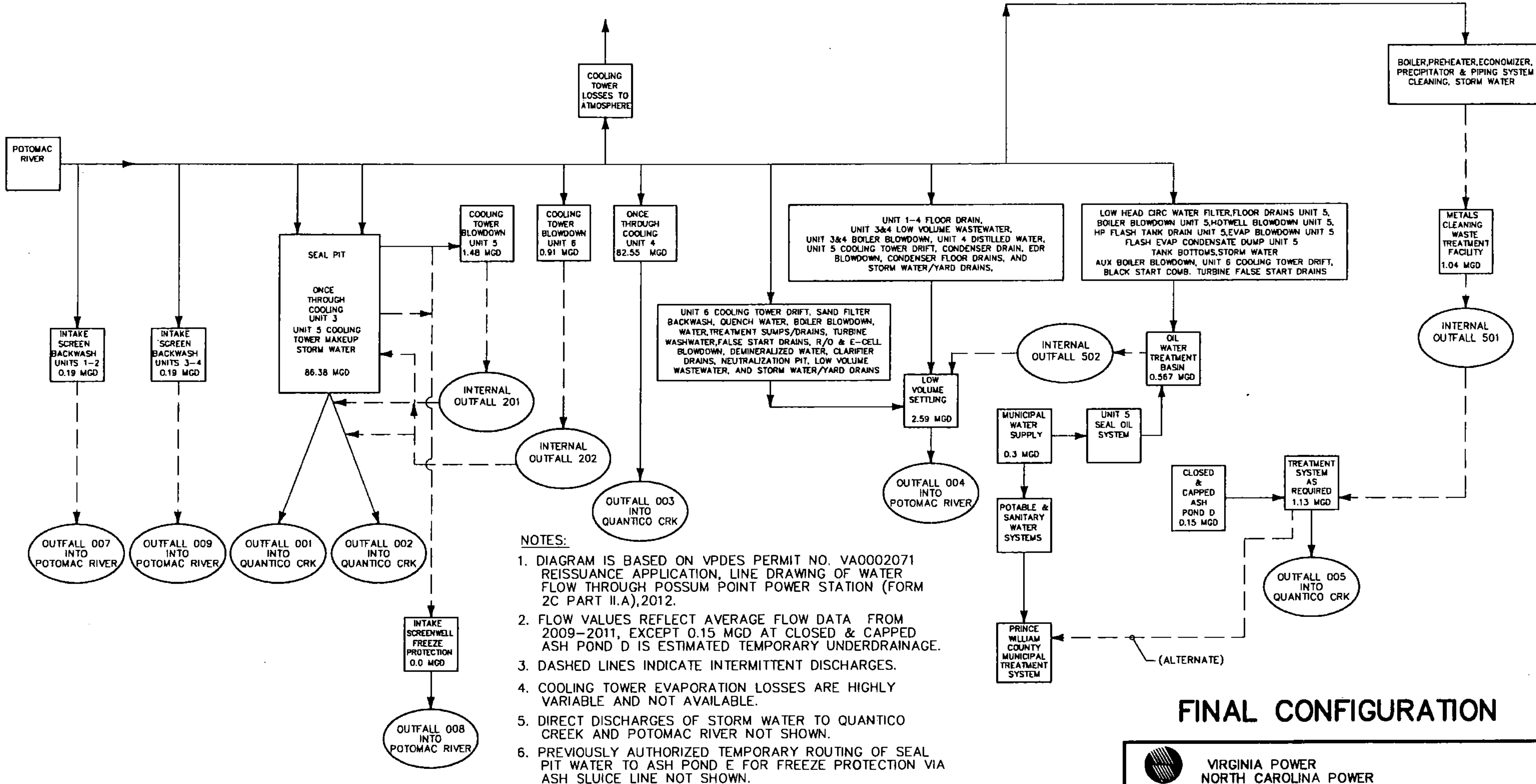
PLOTTED ON: 8/14/2015 9:19:37 PM PLOTTED BY: John DeBarbieri PLOT FILE: GAI.ctb



NOTES:

1. DIAGRAM IS BASED ON VPDES PERMIT NO. VA0002071 REISSUANCE APPLICATION, LINE DRAWING OF WATER FLOW THROUGH POSSUM POINT POWER STATION (FORM 2C PART II.A),2012.
2. FLOW VALUES REFLECT AVERAGE FLOW DATA FROM 2009-2011, EXCEPT 0.15 MGD AT CLOSED & CAPPED ASH POND D IS ESTIMATED TEMPORARY UNDERDRAINAGE.
3. DASHED LINES INDICATE INTERMITTENT DISCHARGES.
4. COOLING TOWER EVAPORATION LOSSES ARE HIGHLY VARIABLE AND NOT AVAILABLE.
5. DIRECT DISCHARGES OF STORM WATER TO QUANTICO CREEK AND POTOMAC RIVER NOT SHOWN.
6. PREVIOUSLY AUTHORIZED TEMPORARY ROUTING OF SEAL PIT WATER TO ASH POND E FOR FREEZE PROTECTION VIA ASH SLUICE LINE NOT SHOWN.

FINAL CONFIGURATION

VIRGINIA POWER
NORTH CAROLINA POWER
FOSSIL & HYDRO ENGINEERING
RICHMOND,VIRGINIA

WATER FLOW BALANCE LINE DIAGRAM

POSSUM POINT POWER STATION

CAD FILE: DGNSPEC FOR FILE VERIFICATION DATE$$$$$$$$

DRAWING NO. PP-0-SP-STA-600 REV. 1

APPROVAL OF THE SUPT OF TECH SERVICES IS REQ'D PRIOR TO ISSUE OF THIS DWG

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD	ENGR
2	REVISED FOR VPDES INDUSTRIAL WW PERMIT MODIFICATION	8/14/15	LITZIJ	DEBARJD	QUINLSC	
1	REVISED PER ENVIRONMENTAL REDLINE TO INCORPORATE STATION REVIEW.	5/31/12	KTC	OD-D	RWM	
0	ORIG. ISSUE FOR 600 SERIES ACAD CONVERSION. REV PER ENVIRONMENTAL REDLINE.	3/6/12	KTC	OD-D	RWM	— —

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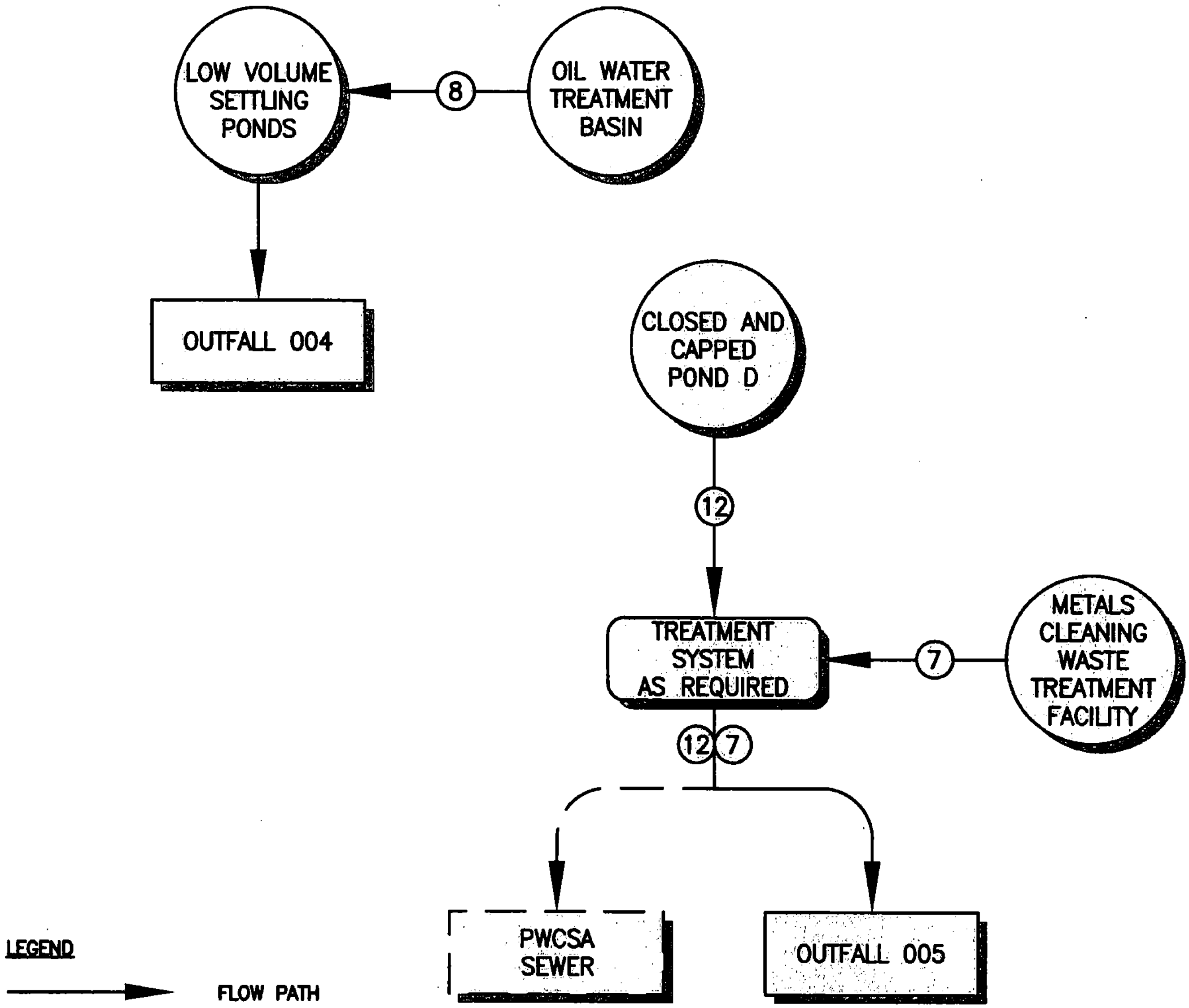


LEGEND

FLOW PATH

ALTERNATE FLOW PATH

PWCSA PRINCE WILLIAM COUNTY SERVICE AUTHORITY

(7) OUTFALL 501 WATER

(8) OUTFALL 502 WATER

(12) CLOSED ASH POND D PASSIVE UNDERDRAINAGE

NOTES:
ALSO, REFER TO TABLE 1 FOR ACTIVITY/FLOW PATH NUMBER DESCRIPTIONS.

DRAWING TITLE	GAI DRAWING NUMBER:		
FINAL CONFIGURATION (POST CONSTRUCTION)	**C150132-00-047-00-P-A2-003**		
PROJECT	GAI FILE NUMBER:		
POSSUM POINT POWER STATION **19000 POSSUM POINT ROAD** **DUMFRIES, PRINCE WILLIAM CO., VA 22026**	**C150132-00-047-00-P-A2-003**		
	DRAWN BY:	CHECKED BY:	APPROVED BY:
	HULTBGC	**DEBARJD**	**QUINLSC**
CLIENT	SHEET NO.:	SCALE:	ISSUE DATE:
DOMINION RESOURCES SERVICE, INC. **5000 DOMINION BOULEVARD** **GLEN ALLEN, VIRGINIA 23060**	**3 OF 3**	**AS SHOWN**	**07/06/2015**

gai consultants

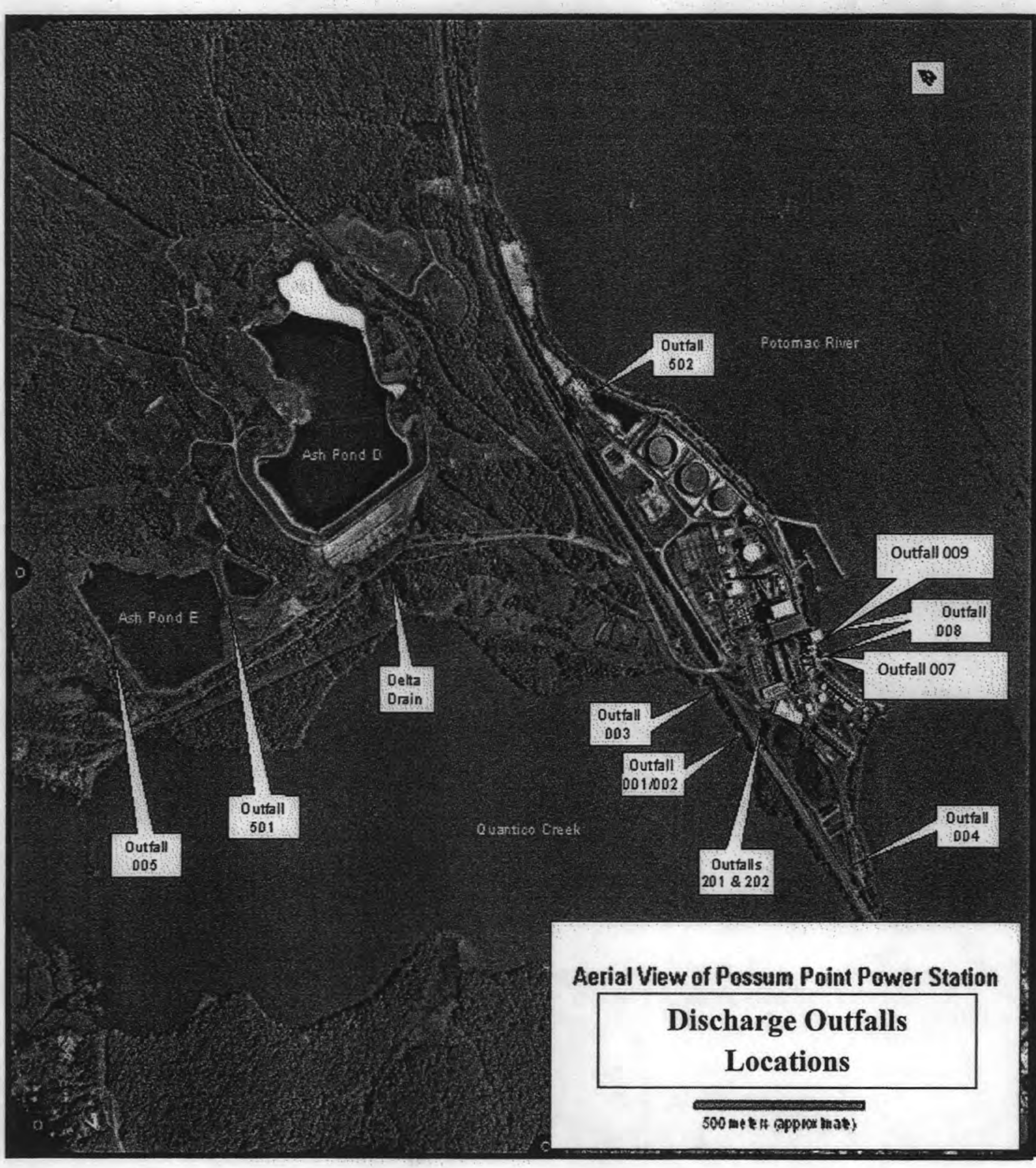
This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.

ISSUING OFFICE: Richmond | 4198 Cox Road, Suite 114, Glen Allen, VA 23060

PLOTTED ON: 8/14/2015 9:22:35 PM PLOTTED BY: John DeBarbieri PLOT FILE: GAI.stb

GAI CAD FILE PATH: Z:\Energy\2015\C150132.00 - DOM - Possum Point PS CCB\CAD\Production Drawings\PROCESS\C150132-00-047-00-P-A2-003.dwg

Attachment 3


Potomac River
Outfall 502
Ash Pond D
Ash Pond E
Outfall 009
Outfall 008
Outfall 007
Delta Drain
Outfall 003
Outfall 001/002
Outfall 501
Outfall 005
Quantico Creek
Outfall 004
Outfalls 201 & 202
Aerial View of Possum Point Power Station
Discharge Outfalls Locations
500 meters (approximate)

Attachment 4

BULK CHEMICAL LIST FOR 2012 POSSUM POINT VPDES PERMIT RENEWAL APPLICATION

Commercial or Generic Name of Chemical	Approx. Usage/Yr	Purpose and Treatment	Associated Outfall
Sulfuric acid	~ 150 tons	pH control in flash evaporator brine, cooling towers, demineralizer plant, and neutralization pit	001/002, 004, 005, 201, 202, 502
Betz KlarAid PC 1192	~ 19 tons	Coagulent	004, 501
Carbohydrazide, (Betz CorTrol OS 5607)	~ 27 tons	pH control, oxygen scavenger, metal passivator	004, 005, 502
Neutralizing amines compounds (ammonia hydroxide, cyclohexylamine, Morpholine soln.)	~ 15 tons	pH control in boiler feedwater cycle, HRSG	004, 005, 502
Soda ash	~ 5 tons	pH control - various station systems, acid neutralization	001/002, 004, 005, 201, 202, 502
Hydrated calcium lime	~ 63 tons	Acid neutralization in metals treatment pond & coal pile	004, 005, 501
Detergents/cleaning agents, phosphate free or citrus based.	~ 3 tons	General cleaning of various station equipment	all
Silicon emulsion, 10% dimethyl silicone, food grade	~ 1 ton	Antifoam agent for closed circulation cooling towers	001/002, 201, 202
Trisodium phosphate	~2 tons	Boiler pH control, water hardness reducer	004, 005, 502
Sodium hydroxide (caustic)	~ 5 tons	Boiler and neutralization pit pH control, RO cleaner	004, 005, 502
Tetrasodium EDTA	NA***	RO cleaning	004
Tetraammonium EDTA	~10-40 tons*	Boiler chemical cleaning*	501**
Sodium nitrite	~1-5 tons*	Boiler chemical cleaning*	501**
Cronox 240 Inhibitor	~200-500 lbs.*	Boiler chemical cleaning*	501**
Citric Acid	~10-40 tons*	Boiler chemical cleaning* RO Cleaning	004, 501**
Sodium hypochlorite	~360 tons	Water treatment, cooling tower antifoulant	004, 201, 202
Aluminum sulfate	~430 tons	Water treatment coagulant	004
Phosphates (di, tri, tripoly)	~2 tons	pH adjustment. water treatment	004, 005, 502
Sodium bisulfite	~57 tons	Dechlorination	001/002, 004, 201, 202
Ammonia hydroxide	~73 tons	NOX control in SCR system, water treatment/RO chem.	004, 005

Commercial or Generic Name of Chemical	Approx. Usage/Yr	Purpose and Treatment	Associated Outfall
Phosphonates and polyacrylate polymers	NA***	Scale inhibitor & dispersant in water treatment system	004
Sodium dodecylbenzene sulfonate	NA***	RO cleaning	004
Sodium hydrosulfite	NA***	RO cleaning	004
Sodium dodecylsulfate	~25 lbs	RO cleaning	004
Hydrochloric Acid	~1.5 tons	E Cell cleaning agent, EDR, RO cleaning agent	004
Salt/brine	~7 tons	E Cell/RO cleaning agent, EDR	004
Depositrol PY5201	N/A***	Cooling tower treatment	001/002, 202
Spectrus BD1500	N/A***	Cooling tower treatment	001/002, 202
Polyfloc AE1115	~24 tons	Water treatment flocculant	001/002, 004, 202
Polyfloc AE1128P	N/A***	Water treatment flocculant	001/002, 004, 202
Polyfloc AE1117	N/A***	Water treatment flocculant	001/002, 004, 202
Nalclear 7768	N/A***	Water treatment flocculant	004
Klaraid CDP1336, CDP1346	N/A***	Water treatment coagulant	001/002, 004, 202
Hypersperse MDC700	~1 ton	Water treatment/RO chem.	004
Conntect 6000	~0.6 ton	HRSG, turbine chemical	004
Propylene glycol	~2.5 tons	Freeze protection	004
Hydrogen peroxide	N/A***	Cleaning agent	001/002, 202
Kleen MCT411	~0.5 ton	RO Cleaning agent	004
Kleen MCT511	~0.5 ton	RO Cleaning agent	004
Kleen MCT103	~0.5 ton	RO Cleaning agent	004
Kleen MCT882	~0.5 ton	RO Cleaning agent	004
Biomate MBC2881	~1200 lbs	RO Cleaning agent	004
RoClean P303	~0.5 ton	RO Cleaning agent	004
RoClean P111	~0.5 ton	RO Cleaning agent	004
Spectrus OX103 (oxidizer)	~8 tons	Cooling tower circulating water treatment	201

* Boilers are cleaned approx. every 3-5 years. Therefore, for most years the usage/year is 0.

** EDTA boiler cleaning wastewater is sent off-site for treatment and disposal. Trace amounts may be present in discharge. Citric Acid boiler cleaning wash water (non-hazardous) may be sent to Metals Pond Treatment Facility (Outfall 501)

*** N/A = Not Available

Attachment 5

STORAGE LOCATIONS OF BULK CHEMICALS AT POSSUM POINT POWER STATION

Commercial or Generic Name of Chemical	Location(s)	Spill Containment at Location(s)
Sulfuric acid	Warehouse, Unit 6 Water Treatment Bldg, Unit 6 Cooling Tower Bldg, Unit 6 Neutralization Pit, Unit 5 Basement	Yes
Betz KlarAid PC 1192	Metals Treatment Pond Area, Unit 5 Sand Filter Bldg	Yes
Carbohydrazide, (Betz CorTrol OS 5607)	Units 4 and 5 Basements	Yes
Neutralizing amines compounds	Warehouse, Unit 6 Steam Turbine Bldg, Units 3-5 Basements	Yes
Soda ash	Warehouse, Unit 6 Steam Turbine Bldg, Units 3-5 Basements, Unit 6 Neutralization Pit	Yes
Hydrated calcium lime	Warehouse	Yes
Detergents/cleaning agents, phosphate free or citrus based.	Facility-Wide (inside buildings)	Yes
Silicon emulsion, 10% dimethyl silicone, food grade	Warehouse, Unit 5 Cooling Tower Bldg, Unit 6 Cooling Tower Bldg	Yes
Trisodium phosphate	Warehouse, Unit 5 Cooling Tower Bldg, Units 3-5 Basements, Auxiliary Boiler Area	Yes
Sodium hydroxide (caustic)	Warehouse, Unit 6 Steam Turbine Bldg, Units 3-5 Basements	Yes
Tetrasodium EDTA	Temporarily stored on-site only as needed	Yes
Tetraammonium EDTA	Temporarily stored on-site only as needed	Yes
Sodium nitrite	Temporarily stored on-site only as needed	Yes
Cronox 240 Inhibitor	Temporarily stored on-site only as needed	Yes
Citric Acid	Temporarily stored on-site only as needed	Yes
Sodium hypochlorite	Warehouse, All Unit 6 Bldgs	Yes
Aluminum sulfate	Warehouse, Unit 6 Pretreatment Bldg	Yes

Commercial or Generic Name of Chemical	Location(s)	Spill Containment at Location(s)
Phosphates (di, tri, tripoly)	Warehouse, Unit 5 Cooling Tower Bldg, Units 3-5 Basements, Auxiliary Boiler Area	Yes
Sodium sulfite or Sodium bisulfite	Warehouse, All Unit 6 Bldgs, Unit 5 Sand Filter Bldg	Yes
Ammonia hydroxide	Warehouse, Unit 6 Water Treatment Bldg, Unit 6 Steam Turbine Bldg, Unit 6-A HRSG	Yes
Phosphonates and polyacrylate polymers	Warehouse, Units 3-5 Basements	Yes
Sodium dodecylbenzene sulfonate	Warehouse, Unit 6 Water Treatment Bldg	Yes
Sodium hydrosulfite	Warehouse, Unit 6 Water Treatment Bldg	Yes
Sodium dodecylsulfate	Warehouse, Unit 6 Water Treatment Bldg	Yes
Hydrochloric Acid	Unit 6 Water Treatment Bldg, Units 3 and 4 Basements	Yes
Salt/brine	Warehouse, Unit 6 Water Treatment Bldg, Units 3-5 Basements	Yes
Depositrol PY5201	Warehouse, Units 5 and 6 Cooling Tower Bldgs	Yes
Spectrus BD1500	Warehouse, Units 5 and 6 Cooling Tower Bldgs	Yes
Polyfloc AE1115	Warehouse, All Unit 6 Bldgs	Yes
Polyfloc AE1128P	Warehouse, All Unit 6 Bldgs	Yes
Polyfloc AE1117	Warehouse, All Unit 6 Bldgs	Yes
Nalclear 7768	Warehouse, All Unit 6 Bldgs	Yes
Klaraid CDP1336, CDP1346	Warehouse, All Unit 6 Bldgs	Yes
Hypersperse MDC700	Warehouse, All Unit 6 Bldgs	Yes
Conntect 6000	Warehouse, Unit 6-A and Unit 6-B HRSGs	Yes
Propylene glycol	Warehouse, Unit 6 Steam Turbine Bldg, Unit 5 Basement	Yes
Hydrogen peroxide	Warehouse, Units 5 and 6 Cooling Tower Bldgs	Yes
Kleen MCT411	Warehouse, Unit 6 Water Treatment Bldg	Yes
Kleen MCT511	Warehouse, Unit 6 Water Treatment Bldg	Yes
Kleen MCT103	Warehouse, Unit 6 Water Treatment Bldg	Yes

Commercial or Generic Name of Chemical	Location(s)	Spill Containment at Location(s)
Kleen MCT882	Warehouse, Unit 6 Water Treatment Bldg	Yes
Biomate MBC2881	Warehouse, Unit 6 Water Treatment Bldg	Yes
RoClean P303	Warehouse, Unit 6 Water Treatment Bldg	Yes
RoClean P111	Warehouse, Unit 6 Water Treatment Bldg	Yes
Spectrus OX103	Unit 5 Cooling Tower Bldg (when used)	Yes

Attachment 6

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Pre-Application and Reissuance Site Visit
Dominion – Possum Point Power Station (VA0002071)

TO: Permit Reissuance File

FROM: Susan Mackert

DATE: May 14, 2012

A pre-application and reissuance site visit was performed on February 17, 2012. Information provided in the facility's permit reapplication package dated April 5, 2012, and received April 10, 2012, is representative of actual site conditions observed during the earlier site visit.

General Site Observations

The Dominion – Possum Point Power Station is an existing gas and oil fired steam electric generating station. The facility utilizes three boiler units (Units 3, 4, and 5), one combined cycle combustion turbine (Unit 6), and six simple cycle combustion turbines generating 1845 MW total gross. Water needed for unit operations is withdrawn from the Potomac River utilizing intake structures located on the Virginia shore. The intake structure formerly associated with Units 1 and 2 (photo 1), which were retired in June 2003, is currently used for Units 5 and 6. A second intake structure (photo 2) is dedicated to Units 3 and 4. An oil loading dock is also located on the Potomac River north of the two intake structures (photo 3).

Outfall 001/002

Outfall 001/002 is located on the west side of the facility. The discharge from this outfall is comprised of once through non-contact condenser cooling water from Unit 3 and intermittent cooling tower blowdown from Unit 5 and Unit 6.

Cooling water from Unit 3 is discharged to a structure referred to as the Seal Pit (photo 4). Unit 5 cooling tower blowdown discharges directly to the Seal Pit via internal Outfall 201. Unit 6 cooling tower blowdown, via internal Outfall 202, can discharge either directly to the Seal Pit or into the discharge line of the Seal Pit. Under normal operations, Outfall 202 discharges to the discharge line of the Seal Pit. During winter operations internal Outfall 202 may be mixed into the Seal Pit.

Outfall 003

Outfall 003 is located on the west side of the facility north of Outfall 001/002. The discharge from this outfall is comprised of once through non-contact condenser cooling water from Unit 4.

Outfall 004

Outfall 004 is located on the south end of the facility (photo 5). The discharge from this outfall consists of process water from various station operations which is classified as a low volume waste under Federal Effluent Guidelines, as well as storm water. Prior to discharge from Outfall 004, water enters a series of four ponds for treatment by settling. Water enters the first pond and then discharges to the second pond. The remaining ponds operate in series providing approximately twenty-four hours of retention time before discharge.

Outfall 005

Outfall 005 is located northwest of the physical footprint of the facility. The facility has two ash ponds, D and E, which contribute to the discharge from Outfall 005 as well as manual batch discharges from the metals cleaning waste treatment facilities (internal Outfall 501) and the oily waste pond (internal Outfall 502). The internal outfall waste streams are classified as chemical metal cleaning wastes and low volume wastes under Federal Effluent Guidelines.

Ash Pond D is located east of Ash Pond E (photo 6). Water levels in Ash Pond D are manually controlled via a decant tower to release water to Ash Pond E. Discharges from the metals cleaning waste treatment facilities (internal Outfall 501) and the oily waste pond (internal Outfall 502) are directly to Ash Pond E.

Outfall 007

Outfall 007 is located on the Potomac River just south of the intake structure for Units 5 and 6. The discharge is comprised of wash water from pump intake screens for Units 3, 4, 5, and 6. The wash water is routed though a trough, also known as the fish return line, which parallels the Virginia shoreline.

Outfall 008

Outfall 008 (photo 7) is a submerged discharge located on the Potomac River outside the eastern wall for each intake structure. The discharge is comprised of heated, non-contact cooling water from Unit 5 which is used to prevent the build-up of ice during the winter months.

Photo 1. Intake structure for Unit 5 and Unit 6.

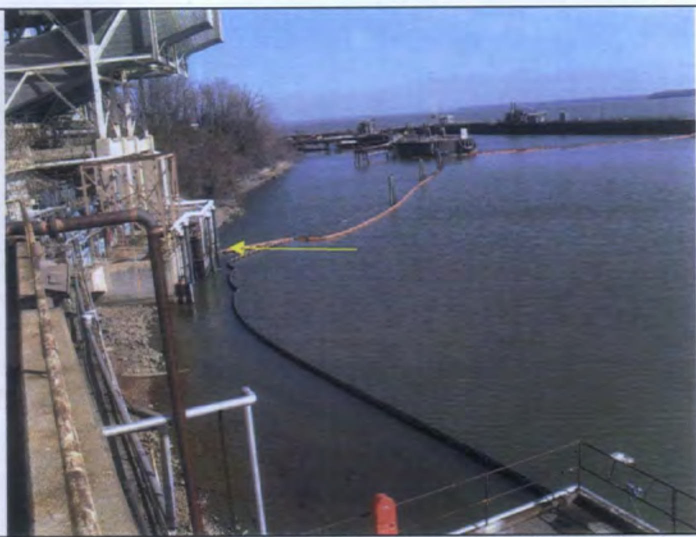


Photo 2. The arrow points to the intake structure for Unit 3 and Unit 4.

Photo 3. The arrow points to the oil loading dock.

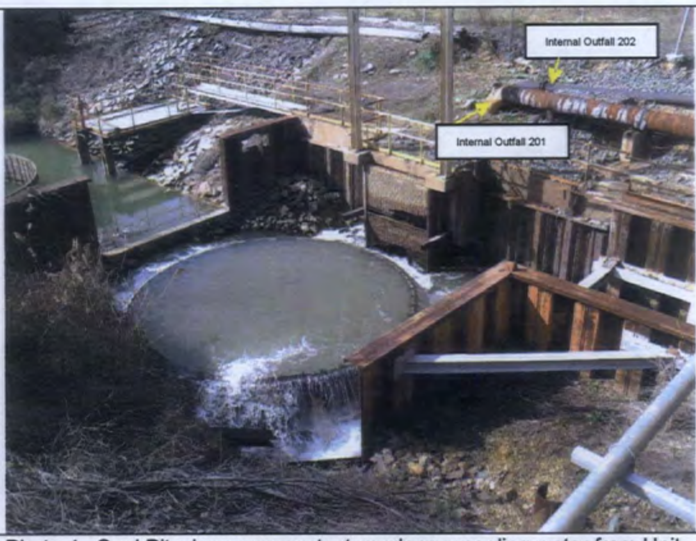


Photo 4. Seal Pit where non-contact condenser cooling water from Unit 3 is discharged. Internal Outfall 201 and 202 are shown combining with the Seal Pit discharge prior to eventual discharge via Outfall 001/002.

Photo 5. Outfall 004.

Photo 6. Ash Pond E.

	
Photo 7. Outfall 005.	Photo 8. The arrow points to the general location of Outfall 008.

Attachment 7

To:	Susan Mackert
From:	Jennifer Carlson
Date:	August 17, 2012
Subject:	Planning Statement for Dominion – Possum Point Power Station
Permit Number:	VA0002071

Information for Outfall 001: (See table of end of document)

- Discharge Type:
- Discharge Flow:
- Receiving Stream:
- Latitude / Longitude:
- Rivermile:
- Streamcode:
- Waterbody:
- Water Quality Standards:

1. Please provide water quality monitoring information for the receiving stream segments. 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.

   A. Outfalls 001/002, 003, S61 and S107 discharge into a portion of tidal Quantico Creek. The following is the water quality summary for this portion of Quantico Creek, as taken from the Draft 2012 Integrated Assessment*:

      Class II, Section 6, special stds. b.

      DEQ fish tissue monitoring station 1aQUA001.00, located approximately 0.7 miles upstream of the railroad bridge.

      The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and fish tissue monitoring. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

      The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. A TMDL has been completed for the Chesapeake Bay watershed.

      The recreation and wildlife uses were not assessed.

      Coastal 2000 weight of evidence analysis, utilizing bulk chemical data, toxicity test data, and an evaluation of benthic community conditions, resulted in an impaired determination for the aquatic life use. Results from the estuarine bioassessment, sediment chemistry analysis (elevated nickel levels), and sediment bioassay for estuarine waters were all factors for this determination. Station 1aQUA001.09, approximately 0.75 rivermile above the railroad bridge *was sampled in 2001 for the Coastal 2000 program (which is part of the estuarine probabilistic monitoring program).*

B. Outfalls 004, S5 and S86 discharge into the downstream most segment of tidal Quantico Creek. The following is the water quality summary for this portion of Quantico Creek, as taken from the Draft 2012 Integrated Assessment*:

Class II, Section 6, special stds. b.

DEQ ambient monitoring station 1aQUA000.43, located 100 yards upstream of the railroad bridge.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. A PCB TMDL for the tidal Potomac River watershed has been completed and approved.

The aquatic life use is fully supporting. A TMDL has been completed for the Chesapeake Bay watershed. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The recreation and wildlife uses are fully supporting.

C. Outfall 005 discharges to an unnamed tributary to Quantico Creek that has not been monitored. The nearest downstream DEQ ambient monitoring station is 1aQUA000.43, which is located in the tidal portion of Quantico Creek, approximately 1.7 miles downstream of the outfall. Discharge from Outfall 005 flows downstream into the tidal segment of Quantico Creek described in Part A, then into the tidal segment described in Part B.

D. Outfalls 007, 008, 009, S31, S36, S37, S42, S49, S77, S78, S79, S80, S94 and S95 discharge into the tidal freshwater Potomac. DEQ does not conduct ambient monitoring on the Potomac River, as this portion of the river falls under the jurisdiction of the state of Maryland. The following information is found in Maryland's Draft Water Quality Assessment 2012 Integrated Report:

The Upper Potomac River Tidal Fresh is listed for the open-water fish and shellfish subcategory, and for the seasonal migratory fish spawning and nursery subcategory of the aquatic life use due to total nitrogen and total phosphorus.

**Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently being finalized and prepared for release.*

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 segments

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in VA Draft 2012 Integrated Report*						
Quantico Creek	Aquatic Life	Estuarine Bioassessments (elevated nickel)	No	N/A	N/A	2018
		Sediment Bioassays for Estuarine and Marine Waters	No	N/A	N/A	2018
	Fish Consumption	PCBs	Tidal Potomac PCB TMDL 10/31/2007	None	---	N/A
Impairment Information in MD Draft 2012 Integrated Report						
Potomac River	Open-Water Fish and Shellfish	Total Nitrogen and Total Phosphorus	There is a completed 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.			
	Seasonal Migratory Fish Spawning and Nursery					

**Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently being finalized and prepared for release.*

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

   No.

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

   The tidal portion of Quantico Creek is listed with a PCB impairment. Due to this PCB impairment, this facility is a candidate for low-level PCB monitoring, based upon its designation as an industrial facility providing electrical, gas and/or sanitary services. Low-level PCB analysis uses EPA Method 1668, which is capable of detecting low-level concentrations for all 209 PCB congeners. The Assessment/TMDL Staff recommends that this facility perform low-level PCB monitoring at Outfall 005 during the upcoming permit cycle. It is recommended that this facility collect 2 samples within the first 3 years of the permit reissuance, using EPA Method 1668, which is capable of detecting low-level concentrations for all 209 PCB congeners. During the interim period while EPA is undergoing the rulemaking process to promulgate EPA Method 1668C within 40 CFR, rather than requiring the most recent version of 1668 be utilized, Method 1668 revisions A, B, C or other revisions issued by EPA prior to final promulgation are acceptable for use.

   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 points.

   There are no public water supply intakes within a 5 mile radius of any of the listed outfalls.

Dominion – Possum Point Outfall Descriptions						
Receiving Stream Name	**Streamcode and Waterbody**	**Water Quality Standards**	**Outfall Number**	**Latitude & Longitude**	**Discharge Flow (MGD)**	**Rivermile**
Quantico Creek	1aQUA — VAN-A26E	Class II Section 6 Special Stds. b	001/002*	38° 32' 12" -77° 17' 00"	86.38	0.83
			003	38° 32' 17" -77° 16' 58"	82.55	0.97
			004	38° 31' 55" -77° 17' 04"	2.02	0.13
			S5	38° 32' 0.2" -77° 16' 52.7"	Variable	0.05
			S61	38° 32' 13.5" -77° 17' 00"	Variable	0.84
			S86	38° 31' 53.5" -77° 17' 5.5"	Variable	0.18
			S107	38° 32' 46.1" -77° 17' 13.1"	Variable	1.24
UT to Quantico Creek	1aXGR — VAN-A26E	Class II Section 6 Special Stds. b	005	38° 33' 6.89" -77° 17' 36.8"	0.98	0.14
Potomac River	MD Waters	MD Waters	007	38° 32' 9.8" -77° 16' 45.8"	0.19	81.96
			008	38° 32' 10" -77° 16' 46"	0.00	81.99
			009	38° 32' 11.5" -77° 16' 45.6"	0.19	82.02
			S42	38° 32' 14" -77° 16' 43.1"	Variable	82.07
			S31	38° 32' 9.2" -77° 16' 47.2"	Variable	81.96
			S36	38° 32' 11.2" -77° 16' 46"	Variable	82.02
			S37	38° 32' 09" -77° 16' 46"	Variable	81.98
			S49	38° 32' 17" -77° 16' 40.6"	Variable	82.15
			S77	38° 32' 20.7" -77° 16' 37.3"	Variable	82.18
			S78	38° 32' 25 " -77° 16' 36.1"	Variable	82.31
			S79	38° 32' 27.5" -77° 16' 35.5"	Variable	82.37
			S80	38° 32' 31.6" -77° 16' 35.1"	Variable	82.43
			S94	38° 32' 35" -77° 16' 34.7"	Variable	82.51
			S95	38° 32' 43.8" -77° 16' 37"	Variable	82.67

Dominion – Possum Point Outfall Descriptions (Based on Dominion Field Review – GPS Unit Accurate to +/- 10 Feet)						
Receiving Stream Name	**Streamcode and Waterbody**	**Water Quality Standards**	**Outfall Number**	**Latitude & Longitude**	**Discharge Flow (MGD)**	**Rivermile**
Quantico Creek	1aQUA — VAN-A26E	Class II Section 6 Special Stds. b	001/002*	38° 32′ 13″ -77° 17′ 00″	86.38	0.83
			003	38° 32′ 17″ -77° 16′ 58″	82.55	0.97
			004	38° 31′ 55″ -77° 17′ 04″	2.02	0.13
			S5	38° 32′ 0.2″ -77° 16′ 52.7″	Variable	0.05
			S61	38° 32′ 13.5″ -77° 17′ 00″	Variable	0.84
			S86	38° 31′ 53.5″ -77° 17′ 5.5″	Variable	0.23
			S107	38° 32′ 46.1″ -77° 17′ 13.1″	Variable	1.24
UT to Quantico Creek	1aXGR — VAN-A26R	Class III Section 7 Special Stds. b	005	38° 33′ 6.89″ -77° 17′ 36.8″	0.98	0.14
Potomac River	MD Waters	MD Waters	007	38° 32′ 9.8″ -77° 16′ 45.8″	0.19	81.96
			008	38° 32′ 10″ -77° 16′ 46″	0.00	81.99
			009	38° 32′ 11.5″ -77° 16′ 45.6″	0.19	82.02
			S42	38° 32′ 14″ -77° 16′ 43.1″	Variable	82.07
			S31	38° 32′ 9.2″ -77° 16′ 47.2″	Variable	81.96
			S36	38° 32′ 11.2″ -77° 16′ 46″	Variable	82.02
			S37	38° 32′ 09″ -77° 16′ 46″	Variable	81.98
			S49	38° 32′ 17″ -77° 16′ 40.6″	Variable	82.15
			S77	38° 32′ 20.7″ -77° 16′ 37.3″	Variable	82.23
			S78	38° 32′ 25 ″ -77° 16′ 36.1″	Variable	82.31
			S79	38° 32′ 27.5″ -77° 16′ 35.5″	Variable	82.37
			S80	38° 32′ 31.6″ -77° 16′ 35.1″	Variable	82.43
			S94	38° 32′ 35″ -77° 16′ 34.7″	Variable	82.51
			S95	38° 32′ 43.8″ -77° 16′ 37″	Variable	82.67

Attachment 8

Dissolved Oxygen Criteria (9 VAC 25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1,2]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean >3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

[1]See subsection aa of 9 VAC 25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

[2]In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.

Attachment 9a

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Possum Point Power Station   Permit No.: VA0002071

Receiving Stream: Quantico Creek, UT to Quantico Creek - 2:1 Dilution   Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	46 mg/L
90% Temperature (Annual) =	28 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	8.1 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) =	1 MGD
7Q10 (Annual) =	1 MGD
30Q10 (Annual) =	1 MGD
1Q10 (Wet season) =	1 MGD
30Q10 (Wet season)	1 MGD
30Q5 =	1 MGD
Harmonic Mean =	1 MGD

Mixing Information

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

Effluent Information

Mean Hardness (as CaCO3) =	50 mg/L
90% Temp (Annual) =	25 deg C
90% Temp (Wet season) =	deg C
90% Maximum pH =	8.6 SU
10% Maximum pH =	SU
Discharge Flow =	1 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	4.89E+00	7.25E-01	na	--	9.77E+00	1.45E+00	na	--	--	--	--	--	--	--	--	--	9.77E+00	1.45E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	4.89E+00	1.57E+00	na	--	9.77E+00	3.14E+00	na	--	--	--	--	--	--	--	--	--	9.77E+00	3.14E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	o	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	1.7E+00	6.4E-01	na	--	3.4E+00	1.3E+00	na	--	--	--	--	--	--	--	--	--	3.4E+00	1.3E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane [C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	3.1E+02	4.1E+01	na	--	6.2E+02	8.1E+01	na	--	--	--	--	--	--	--	--	--	6.2E+02	8.1E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	6.7E+00	4.8E+00	na	--	1.3E+01	9.6E+00	na	--	--	--	--	--	--	--	--	--	1.3E+01	9.6E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine [C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	6.6E-01
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane [C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine [C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	**4.2E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	**2.8E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	**1.1E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	**2.0E-02**	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	na	**1.6E-03**
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	na	**7.8E-04**
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	**5.8E-03**
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	**3.6E+02**
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	**9.8E-02**
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	**3.4E-01**
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	**1.9E+00**	--	na	**3.6E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	**2.2E+03**
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	**6.6E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	**4.0E+00**	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	**3.6E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	**1.9E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	na	--
Lead	0	4.7E+01	5.3E+00	na	--	9.3E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**9.3E+01**	**1.1E+01**	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	**2.0E-01**	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	**2.8E+00**	**1.5E+00**	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	**3.0E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	**1.2E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	**6.0E-02**	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	na	--
Nickel	0	9.8E+01	1.1E+01	na	4.6E+03	2.0E+02	2.2E+01	na	9.2E+03	--	--	--	--	--	--	--	--	**2.0E+02**	**2.2E+01**	na	**9.2E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	**1.4E+03**
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	**6.0E+01**
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	**1.2E+02**
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	**1.0E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	**5.6E+01**	**1.3E+01**	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	**1.3E-01**	**2.6E-02**	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	**2.8E-02**	na	**1.3E-03**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	1.5E-02	1.2E-02	na	6.0E+01	--	--	--	--	--	--	--	--	**1.5E-02**	**1.2E-02**	na	**6.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	**1.7E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	**8.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	**4.0E+01**	**1.0E+01**	**na**	**8.4E+03**
Silver	0	9.8E-01	--	na	--	2.0E+00	--	na	--	--	--	--	--	--	--	--	--	**2.0E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane^{C}	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+01**
Tetrachloroethylene^{C}	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.4E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene ^{C}	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	**1.5E+00**	**4.0E-04**	**na**	**5.6E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	**9.2E-01**	**1.4E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
1,1,2-Trichloroethane^{C}	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+02**
Trichloroethylene ^{C}	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+02**
2,4,6-Trichlorophenol ^{C}	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride^{C}	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
Zinc	0	6.3E+01	6.3E+01	na	2.6E+04	1.3E+02	1.3E+02	na	5.2E+04	--	--	--	--	--	--	--	--	**1.3E+02**	**1.3E+02**	**na**	**5.2E+04**

Notes:

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

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	7.6E-01
Chromium III	4.9E+01
Chromium VI	1.3E+01
Copper	5.4E+00
Iron	na
Lead	6.4E+00
Manganese	na
Mercury	9.2E-01
Nickel	1.3E+01
Selenium	6.0E+00
Silver	7.8E-01
Zinc	5.0E+01

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

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Possum Point Power Station   Permit No.: VA0002071

Receiving Stream: Quantico Creek, UT to Quantico Creek - 50:1Dilution   Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	46 mg/L
90% Temperature (Annual) =	28 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	8.1 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) =	49 MGD
7Q10 (Annual) =	49 MGD
30Q10 (Annual) =	49 MGD
1Q10 (Wet season) =	49 MGD
30Q10 (Wet season)	49 MGD
30Q5 =	49 MGD
Harmonic Mean =	49 MGD

Mixing Information

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

Effluent Information

Mean Hardness (as CaCO3) =	50 mg/L
90% Temp (Annual) =	25 deg C
90% Temp (Wet season) =	deg C
90% Maximum pH =	8.6 SU
10% Maximum pH =	SU
Discharge Flow =	1 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	5.0E+04	--	--	--	--	--	--	--	--	--	--	na	5.0E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.7E+02	--	--	--	--	--	--	--	--	--	--	na	4.7E+02
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	1.5E+02	--	na	2.5E-02	--	--	--	--	--	--	--	--	1.5E+02	--	na	2.5E-02
Ammonia-N (mg/l) (Yearly)	0	6.87E+00	8.75E-01	na	--	3.43E+02	4.37E+01	na	--	--	--	--	--	--	--	--	--	3.43E+02	4.37E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	6.87E+00	2.08E+00	na	--	3.43E+02	1.04E+02	na	--	--	--	--	--	--	--	--	--	3.43E+02	1.04E+02	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.0E+06	--	--	--	--	--	--	--	--	--	--	na	2.0E+06
Antimony	0	--	--	na	6.4E+02	--	--	na	3.2E+04	--	--	--	--	--	--	--	--	--	--	na	3.2E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	1.7E+04	7.5E+03	na	--	--	--	--	--	--	--	--	--	1.7E+04	7.5E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	--	--	na	2.6E+04
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	1.0E-01	--	--	--	--	--	--	--	--	--	--	na	1.0E-01
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Bis2-Chloroethyl Ether[C]	0	--	--	na	5.3E+00	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.3E+06	--	--	--	--	--	--	--	--	--	--	na	3.3E+06
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	na	2.2E+01	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	7.0E+04	--	--	--	--	--	--	--	--	--	--	na	7.0E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	9.5E+04	--	--	--	--	--	--	--	--	--	--	na	9.5E+04
Cadmium	0	1.6E+00	6.2E-01	na	--	8.2E+01	3.1E+01	na	--	--	--	--	--	--	--	--	--	8.2E+01	3.1E+01	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	8.0E+02	--	--	--	--	--	--	--	--	--	--	na	8.0E+02
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	1.2E+02	2.2E-01	na	4.1E-01	--	--	--	--	--	--	--	--	1.2E+02	2.2E-01	na	4.1E-01
Chloride	0	8.6E+05	2.3E+05	na	--	4.3E+07	1.2E+07	na	--	--	--	--	--	--	--	--	--	4.3E+07	1.2E+07	na	--
TRC	0	1.9E+01	1.1E+01	na	--	9.5E+02	5.5E+02	na	--	--	--	--	--	--	--	--	--	9.5E+02	5.5E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	6.5E+03	--	--	--	--	--	--	--	--	--	--	na	6.5E+03
Chloroform	0	--	--	na	1.1E+04	--	--	na	5.5E+05	--	--	--	--	--	--	--	--	--	--	na	5.5E+05
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	4.2E+00	2.1E+00	na	--	--	--	--	--	--	--	--	--	4.2E+00	2.1E+00	na	--
Chromium III	0	3.0E+02	3.9E+01	na	--	1.5E+04	2.0E+03	na	--	--	--	--	--	--	--	--	--	1.5E+04	2.0E+03	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	8.0E+02	5.5E+02	na	--	--	--	--	--	--	--	--	--	8.0E+02	5.5E+02	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	9.0E-01	--	--	--	--	--	--	--	--	--	--	na	9.0E-01
Copper	0	6.5E+00	4.6E+00	na	--	3.2E+02	2.3E+02	na	--	--	--	--	--	--	--	--	--	3.2E+02	2.3E+02	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.1E+03	2.6E+02	na	8.0E+05	--	--	--	--	--	--	--	--	1.1E+03	2.6E+02	na	8.0E+05
DDD[C]	0	--	--	na	3.1E-03	--	--	na	1.6E-01	--	--	--	--	--	--	--	--	--	--	na	1.6E-01
DDE[C]	0	--	--	na	2.2E-03	--	--	na	1.1E-01	--	--	--	--	--	--	--	--	--	--	na	1.1E-01
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	5.5E+01	5.0E-02	na	1.1E-01	--	--	--	--	--	--	--	--	5.5E+01	5.0E-02	na	1.1E-01
Demeton	0	--	1.0E-01	na	--	--	5.0E+00	na	--	--	--	--	--	--	--	--	--	--	5.0E+00	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	8.5E+00	8.5E+00	na	--	--	--	--	--	--	--	--	--	8.5E+00	8.5E+00	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	--	--	na	6.5E+04
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.8E+04	--	--	--	--	--	--	--	--	--	--	na	4.8E+04
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	9.5E+03	--	--	--	--	--	--	--	--	--	--	na	9.5E+03
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	8.5E+03	--	--	--	--	--	--	--	--	--	--	na	8.5E+03
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.6E+05	--	--	--	--	--	--	--	--	--	--	na	3.6E+05
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	5.0E+05	--	--	--	--	--	--	--	--	--	--	na	5.0E+05
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	1.2E+01	2.8E+00	na	2.7E-02	--	--	--	--	--	--	--	--	1.2E+01	2.8E+00	na	2.7E-02
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	4.3E+04	--	--	--	--	--	--	--	--	--	--	na	4.3E+04
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.5E+07	--	--	--	--	--	--	--	--	--	--	na	5.5E+07
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.3E+05	--	--	--	--	--	--	--	--	--	--	na	2.3E+05
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	na	2.7E+05
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.6E-06	--	--	--	--	--	--	--	--	--	--	na	2.6E-06
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	--	--	na	1.0E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.1E+01	2.8E+00	na	4.5E+03	--	--	--	--	--	--	--	--	1.1E+01	2.8E+00	na	4.5E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.1E+01	2.8E+00	na	4.5E+03	--	--	--	--	--	--	--	--	1.1E+01	2.8E+00	na	4.5E+03
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.1E+01	2.8E+00	--	--	--	--	--	--	--	--	--	--	1.1E+01	2.8E+00	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	4.3E+00	1.8E+00	na	3.0E+00	--	--	--	--	--	--	--	--	4.3E+00	1.8E+00	na	3.0E+00
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	na	1.5E+01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	7.0E+03	--	--	--	--	--	--	--	--	--	--	na	7.0E+03
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	--	--	na	2.7E+05
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	5.0E-01	na	--	--	--	--	--	--	--	--	--	--	5.0E-01	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	2.6E+01	1.9E-01	na	4.0E-02	--	--	--	--	--	--	--	--	2.6E+01	1.9E-01	na	4.0E-02
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	2.6E+01	1.9E-01	na	2.0E-02	--	--	--	--	--	--	--	--	2.6E+01	1.9E-01	na	2.0E-02
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	1.5E-01	--	--	--	--	--	--	--	--	--	--	na	1.5E-01
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	8.5E+00	--	--	--	--	--	--	--	--	--	--	na	8.5E+00
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	4.8E+01	--	na	9.0E+01	--	--	--	--	--	--	--	--	4.8E+01	--	na	9.0E+01
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.5E+04	--	--	--	--	--	--	--	--	--	--	na	5.5E+04
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.0E+02	na	--	--	--	--	--	--	--	--	--	--	1.0E+02	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	9.0E+00	--	--	--	--	--	--	--	--	--	--	na	9.0E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	4.8E+05	--	--	--	--	--	--	--	--	--	--	na	4.8E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	4.4E+01	5.0E+00	na	--	2.2E+03	2.5E+02	na	--	--	--	--	--	--	--	--	--	2.2E+03	2.5E+02	na	--
Malathion	0	--	1.0E-01	na	--	--	5.0E+00	na	--	--	--	--	--	--	--	--	--	--	5.0E+00	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	7.0E+01	3.9E+01	--	--	--	--	--	--	--	--	--	--	7.0E+01	3.9E+01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	7.5E+04	--	--	--	--	--	--	--	--	--	--	na	7.5E+04
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	--	na	3.0E+05
Methoxychlor	0	--	3.0E-02	na	--	--	1.5E+00	na	--	--	--	--	--	--	--	--	--	--	1.5E+00	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	9.5E+01	1.1E+01	na	4.6E+03	4.7E+03	5.3E+02	na	2.3E+05	--	--	--	--	--	--	--	--	4.7E+03	5.3E+02	na	2.3E+05
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.5E+04	--	--	--	--	--	--	--	--	--	--	na	3.5E+04
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.4E+03	3.3E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	3.3E+02	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	3.3E+00	6.5E-01	na	--	--	--	--	--	--	--	--	--	3.3E+00	6.5E-01	na	--
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	7.0E-01	na	3.2E-02	--	--	--	--	--	--	--	--	--	7.0E-01	na	3.2E-02
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	3.8E-01	2.9E-01	na	1.5E+03	--	--	--	--	--	--	--	--	3.8E-01	2.9E-01	na	1.5E+03
Phenol	0	--	--	na	8.6E+05	--	--	na	4.3E+07	--	--	--	--	--	--	--	--	--	--	na	4.3E+07
Pyrene	0	--	--	na	4.0E+03	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	na	2.0E+05
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	1.0E+03	2.5E+02	na	2.1E+05	--	--	--	--	--	--	--	--	**1.0E+03**	**2.5E+02**	**na**	**2.1E+05**
Silver	0	9.1E-01	--	na	--	4.6E+01	--	na	--	--	--	--	--	--	--	--	--	**4.6E+01**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+03**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+03**
Thallium	0	--	--	na	4.7E-01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
Toluene	0	--	--	na	6.0E+03	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	3.7E+01	1.0E-02	na	1.4E-01	--	--	--	--	--	--	--	--	**3.7E+01**	**1.0E-02**	**na**	**1.4E-01**
Tributyltin	0	4.6E-01	7.2E-02	na	--	2.3E+01	3.6E+00	na	--	--	--	--	--	--	--	--	--	**2.3E+01**	**3.6E+00**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.5E+03**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+03**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+03**
Zinc	0	6.1E+01	6.1E+01	na	2.6E+04	3.0E+03	3.1E+03	na	1.3E+06	--	--	--	--	--	--	--	--	**3.0E+03**	**3.1E+03**	**na**	**1.3E+06**

Notes:

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

Metal	Target Value (SSTV)
Antimony	3.2E+04
Arsenic	4.5E+03
Barium	na
Cadmium	1.9E+01
Chromium III	1.2E+03
Chromium VI	3.2E+02
Copper	1.3E+02
Iron	na
Lead	1.5E+02
Manganese	na
Mercury	2.3E+01
Nickel	3.2E+02
Selenium	1.5E+02
Silver	1.8E+01
Zinc	1.2E+03

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

Attachment 9b

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC MIN	Lim Min	CONC MAX	Lim Max
10-May-09	005	pH (S.U.)	7.98	6.0	8.01	9.0
10-Jun-09	005	pH (S.U.)	7.40	6.0	7.73	9.0
10-Jul-09	005	pH (S.U.)	7.97	6.0	8.33	9.0
10-Aug-09	005	pH (S.U.)	8.28	6.0	8.39	9.0
10-Sep-09	005	pH (S.U.)	7.73	6.0	8.16	9.0
10-Oct-09	005	pH (S.U.)	7.67	6.0	8.04	9.0
10-Nov-09	005	pH (S.U.)	7.73	6.0	7.76	9.0
10-Dec-09	005	pH (S.U.)	7.78	6.0	7.93	9.0
10-Jan-10	005	pH (S.U.)	7.65	6.0	7.76	9.0
10-Feb-10	005	pH (S.U.)	7.77	6.0	7.87	9.0
10-Mar-10	005	pH (S.U.)	7.95	6.0	7.95	9.0
10-Apr-10	005	pH (S.U.)	7.75	6.0	8.17	9.0
10-May-10	005	pH (S.U.)	8.23	6.0	8.38	9.0
10-Jun-10	005	pH (S.U.)	8.01	6.0	8.26	9.0
10-Jul-10	005	pH (S.U.)	8.31	6.0	8.46	9.0
10-Aug-10	005	pH (S.U.)	7.98	6.0	8.04	9.0
10-Sep-10	005	pH (S.U.)	7.68	6.0	8.36	9.0
10-Oct-10	005	pH (S.U.)	8.17	6.0	8.57	9.0
10-Nov-10	005	pH (S.U.)	7.92	6.0	8.32	9.0
10-Dec-10	005	pH (S.U.)	7.62	6.0	7.77	9.0
10-Jan-11	005	pH (S.U.)	7.70	6.0	7.73	9.0
10-Feb-11	005	pH (S.U.)	7.80	6.0	7.97	9.0
10-Mar-11	005	pH (S.U.)	7.71	6.0	7.77	9.0
10-Apr-11	005	pH (S.U.)	7.96	6.0	7.98	9.0
10-May-11	005	pH (S.U.)	7.84	6.0	7.97	9.0
10-Jun-11	005	pH (S.U.)	8.52	6.0	8.83	9.0
10-Jul-11	005	pH (S.U.)	8.58	6.0	8.66	9.0
10-Aug-11	005	pH (S.U.)	8.70	6.0	8.72	9.0

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC MIN	Lim Min	CONC MAX	Lim Max
10-Sep-11	005	pH (S.U.)	8.79	6.0	8.79	9.0
10-Oct-11	005	pH (S.U.)	8.04	6.0	8.61	9.0
10-Nov-11	005	pH (S.U.)	7.73	6.0	7.81	9.0
10-Dec-11	005	pH (S.U.)	8.25	6.0	8.54	9.0
10-Jan-12	005	pH (S.U.)	7.53	6.0	7.57	9.0
10-Feb-12	005	pH (S.U.)	8.12	6.0	8.38	9.0
10-Mar-12	005	pH (S.U.)	7.84	6.0	8.29	9.0
10-Apr-12	005	pH (S.U.)	8.34	6.0	8.46	9.0
10-May-12	005	pH (S.U.)	8.38	6.0	8.51	9.0
10-Jun-12	005	pH (S.U.)	7.75	6.0	7.94	9.0

90% Percentile pH = 8.6 S.U.

Quantico Creek Field Parameters Collected At Station 1aQUA000.43

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
3/19/07 9:55	5.8	7.7
3/19/07 9:55	5.7	7.7
3/19/07 9:55	5.7	7.7
3/19/07 9:55	5.7	7.7
6/18/07 10:38	26.6	7.9
6/18/07 10:38	25.8	7.8
6/18/07 10:38	25.7	7.7
6/18/07 10:38	25.7	7.7
6/18/07 10:38	25.7	7.7
8/20/07 10:25	25.1	7.5
8/20/07 10:25	25.1	7.5
8/20/07 10:25	25.1	7.5
8/20/07 10:25	25.1	7.5
9/24/07 9:25	22.9	7.3
9/24/07 9:25	22.9	7.2
9/24/07 9:25	22.9	7.1
9/24/07 9:25	22.9	6.9
10/29/07 10:30	17	7.6
10/29/07 10:30	17	7.6
10/29/07 10:30	17	7.6
10/29/07 10:30	17	7.6
10/29/07 10:30	17.1	7.6
10/29/07 10:30	17	7.5
11/26/07 10:00	9.2	7.6
11/26/07 10:00	9.3	7.6
11/26/07 10:00	9.4	7.4

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
11/26/07 10:00	9.4	7.3
12/10/07 9:30	5.6	7.7
12/10/07 9:30	5.7	7.7
12/10/07 9:30	5.7	7.7
12/10/07 9:30	5.7	7.6
2/4/08 9:25	4.4	7.8
2/4/08 9:25	4.4	7.8
2/4/08 9:25	4.3	7.7
3/17/08 9:55	9.5	7.6
3/17/08 9:55	9.5	7.6
3/17/08 9:55	9.2	7.6
3/17/08 9:55	9.1	7.6
3/17/08 9:55	9.1	7.6
4/29/08 12:20	17.4	7.6
4/29/08 12:20	17.5	7.6
4/29/08 12:20	17.4	7.6
5/19/08 9:15	16	7.3
5/19/08 9:15	16	7.3
5/19/08 9:15	15.9	7.3
5/19/08 9:15	15.8	7.3
5/19/08 9:15	15.8	7.3
5/19/08 9:15	15.8	7.3
6/23/08 8:55	26.5	7.6
6/23/08 8:55	26.4	7.6
6/23/08 8:55	26.4	7.6
6/23/08 8:55	26.4	7.6
6/23/08 8:55	26.4	7.6

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
6/23/08 8:55	26.4	7.6
6/23/08 8:55	26.4	7.6
7/28/08 9:45	29.3	8.5
7/28/08 9:45	28.8	8.6
7/28/08 9:45	28.3	8.6
7/28/08 9:45	28.2	8.6
7/28/08 9:45	28.1	8.5
7/28/08 9:45	28.1	8.5
8/25/08 9:40	26.5	8.2
8/25/08 9:40	26.5	8.1
8/25/08 9:40	26.5	8
8/25/08 9:40	26.5	7.8
10/27/08 10:15	14.3	7.8
10/27/08 10:15	14.3	7.8
10/27/08 10:15	14.3	7.8
10/27/08 10:15	14.3	7.8
10/27/08 10:15	14.3	7.8
10/27/08 10:15	14.3	7.8
11/17/08 10:00	11.3	7.5
11/17/08 10:00	11.3	6.2
11/17/08 10:00	11.3	6.1
11/17/08 10:00	11.3	6.7
11/17/08 10:00	11.3	6.5
11/17/08 10:00	11.4	6.2
2/23/09 9:40	2.3	8
2/23/09 9:40	2.4	8
2/23/09 9:40	2.3	8

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
2/23/09 9:40	2.1	8
3/23/09 9:45	8.6	7.8
3/23/09 9:45	8.6	7.8
3/23/09 9:45	8.4	7.8
3/23/09 9:45	8.4	7.7
5/19/09 10:25	18.3	7.4
5/19/09 10:25	18.2	7.4
5/19/09 10:25	18.1	7.4
5/19/09 10:25	18	7.3
6/22/09 10:00	24.6	7.6
6/22/09 10:00	24.6	7.6
6/22/09 10:00	24.5	7.6
6/22/09 10:00	24.5	7.6
6/22/09 10:00	24.5	7.6
6/22/09 10:00	24.5	7.5
7/27/09 10:12	27.4	7.6
7/27/09 10:12	27.4	7.6
7/27/09 10:12	27.4	7.6
7/27/09 10:12	27.4	7.6
7/27/09 10:12	27.4	7.6
7/27/09 10:12	27.4	7.6
8/24/09 11:15	28.3	7.6
8/24/09 11:15	28.2	7.6
8/24/09 11:15	28.2	7.6
8/24/09 11:15	28.2	7.5
8/24/09 11:15	28.2	7.5
10/5/09 10:25	19.8	7.9

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
10/5/09 10:25	19.8	7.9
10/5/09 10:25	19.8	7.8
10/5/09 10:25	19.8	7.8
10/5/09 10:25	19.8	7.8
10/5/09 10:25	19.8	7.7
11/16/09 10:00	11.9	7.7
11/16/09 10:00	11.9	7.7
11/16/09 10:00	11.9	7.7
11/16/09 10:00	11.9	7.7
11/16/09 10:00	11.9	7.7
3/31/10 9:25	10.7	7.6
3/31/10 9:25	10.7	7.6
3/31/10 9:25	10.7	7.6
3/31/10 9:25	10.7	7.6
4/26/10 9:45	17.5	8.1
4/26/10 9:45	17.5	8.1
4/26/10 9:45	17.5	8.1
4/26/10 9:45	17.5	8.1
5/17/10 10:10	20.4	8.2
5/17/10 10:10	20.4	8.2
5/17/10 10:10	20.4	8.2
5/17/10 10:10	20.4	8.2
6/28/10 10:10	30	8.1
6/28/10 10:10	30	8.1
6/28/10 10:10	29.9	8.1
6/28/10 10:10	29.7	7.9
6/28/10 10:10	29.6	7.9

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
7/26/10 9:55	30.4	7.8
7/26/10 9:55	30.3	7.7
7/26/10 9:55	30.2	7.7
7/26/10 9:55	30.2	7.7
7/26/10 9:55	30.2	7.7
7/26/10 9:55	30.1	7.6
8/30/10 10:00	27.7	7.7
8/30/10 10:00	27.4	7.7
8/30/10 10:00	27.4	7.7
8/30/10 10:00	27.4	7.6
8/30/10 10:00	27.4	7.6
8/30/10 10:00	27.3	7.6
10/25/10 10:08	16.2	7.7
10/25/10 10:08	16.1	7.6
10/25/10 10:08	16	7.6
10/25/10 10:08	16	7.6
3/24/11 10:22	11.3	7.5
3/24/11 10:22	11.3	7.5
3/24/11 10:22	11.3	7.5
3/24/11 10:22	11.3	7.5
3/24/11 10:22	11.3	7.5
4/25/11 10:22	14.7	7.6
4/25/11 10:22	14.7	7.5
4/25/11 10:22	14.7	7.5
4/25/11 10:22	14.7	7.5
5/23/11 10:45	19.2	7.5
5/23/11 10:45	19	7.5

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
5/23/11 10:45	18.9	7.5
5/23/11 10:45	18.8	7.5
5/23/11 10:45	18.8	7.5
6/29/11 9:45	27.6	8.6
6/29/11 9:45	27.2	8.4
6/29/11 9:45	27.1	8.3
6/29/11 9:45	27	8.3
6/29/11 9:45	27	8.3
8/24/11 10:40	26.2	8.2
8/24/11 10:40	26.2	8.1
8/24/11 10:40	26.1	8.1
8/24/11 10:40	26.1	8.1
8/24/11 10:40	26.1	8.1
10/24/11 11:06	15.7	7.8
10/24/11 11:06	15.6	7.8
10/24/11 11:06	15.6	7.8
10/24/11 11:06	15.5	7.8
10/24/11 11:06	15.3	7.8
12/5/11 10:10	8	7.9
12/5/11 10:10	7.9	7.9
12/5/11 10:10	7.9	7.9
5/23/12 11:05	23.73	8.16
5/23/12 11:05	23.55	8.16
5/23/12 11:05	23.5	8.14
5/23/12 11:05	23.46	8.14
5/23/12 11:05	23.45	8.12
5/23/12 11:05	23.49	8.13

Quantico Creek Field Parameters Collected At Station 1aQUA000.43 (Continued)

Data From The Period 3-19-2007 to 7-10-2012

Collection Date & Time	Temperature (Celcius)	pH (S.U.)
7/10/12 11:14	30.38	7.95
7/10/12 11:14	30.33	7.91
7/10/12 11:14	30.25	7.87
7/10/12 11:14	30.19	7.82
7/10/12 11:14	30.22	7.84

90% Temperature = 28°C

90% pH = 8.1 S.U.

Attachment 10a

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Possum Point Power Station - Internal Outfall 503 Permit No.: VA0002071

Receiving Stream: Quantico Creek, UT - 2:1 Dilution Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	46 mg/L
90% Temperature (Annual) =	28 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	8.1 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) =	1 MGD
7Q10 (Annual) =	1 MGD
30Q10 (Annual) =	1 MGD
1Q10 (Wet season) =	1 MGD
30Q10 (Wet season)	1 MGD
30Q5 =	1 MGD
Harmonic Mean =	1 MGD

Mixing Information

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

Effluent Information

Mean Hardness (as CaCO3) =	100 mg/L
90% Temp (Annual) =	28 deg C
90% Temp (Wet season) =	deg C
90% Maximum pH =	7.9 SU
10% Maximum pH =	SU
Discharge Flow =	1 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	8.59E+00	1.04E+00	na	--	1.72E+01	2.07E+00	na	--	--	--	--	--	--	--	--	--	1.72E+01	2.07E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	8.59E+00	2.47E+00	na	--	1.72E+01	4.95E+00	na	--	--	--	--	--	--	--	--	--	1.72E+01	4.95E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	1.61	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	2.8E+00	8.9E-01	na	--	5.5E+00	1.8E+00	na	--	--	--	--	--	--	--	--	--	5.5E+00	1.8E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	**2.6E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	**2.2E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	**3.2E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	**3.0E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	**1.7E-01**	**8.2E-02**	na	--
Chromium III	0	4.4E+02	5.7E+01	na	--	8.8E+02	1.1E+02	na	--	--	--	--	--	--	--	--	--	**8.8E+02**	**1.1E+02**	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	**3.2E+01**	**2.2E+01**	na	--
Chromium, Total	0.36	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	**3.6E-02**
Copper	1.98	1.0E+01	6.8E+00	na	--	1.8E+01	1.2E+01	na	--	--	--	--	--	--	--	--	--	**1.8E+01**	**1.2E+01**	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	**4.4E+01**	**1.0E+01**	na	**3.2E+04**
DDD[C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	**6.2E-03**
DDE[C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	**4.4E-03**
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	**2.2E+00**	**2.0E-03**	na	**4.4E-03**
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	**2.0E-01**	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	**3.4E-01**	**3.4E-01**	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	**3.6E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	**2.6E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	**1.9E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	**3.8E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	**5.6E-01**
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	**3.4E+02**
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	**7.4E+02**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	**1.4E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	**2.0E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	**5.8E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	**3.0E+02**
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	**4.2E+02**
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	**4.8E-01**	**1.1E-01**	na	**1.1E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	**8.8E+04**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	**1.7E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	**2.2E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	**9.0E+03**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	**1.1E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	**5.6E+02**
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	**6.8E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	**1.0E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	**4.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	na	**1.8E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	na	**1.8E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	**1.8E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	**1.7E-01**	**7.2E-02**	na	**1.2E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	**6.0E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	**na**	**4.2E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	**na**	**2.8E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.1E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	**2.0E-02**	**na**	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**na**	**1.6E-03**
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**na**	**7.8E-04**
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	**na**	**5.8E-03**
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	**na**	**3.6E+02**
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	**na**	**9.8E-02**
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	**na**	**3.4E-01**
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	**1.9E+00**	--	**na**	**3.6E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	**na**	**2.2E+03**
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	**na**	**6.6E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	**4.0E+00**	**na**	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	**na**	**3.6E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.9E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	**na**	--
Lead	0.24	8.0E+01	9.0E+00	na	--	1.6E+02	1.8E+01	na	--	--	--	--	--	--	--	--	--	**1.6E+02**	**1.8E+01**	**na**	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	**2.0E-01**	**na**	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Mercury	0.001	1.4E+00	7.7E-01	- -	- -	2.8E+00	1.5E+00	- -	- -	--	--	--	--	--	--	--	--	**2.8E+00**	**1.5E+00**	- -	- -
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	**na**	**3.0E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.2E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	**6.0E-02**	**na**	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	**na**	--
Nickel	1.14	1.4E+02	1.6E+01	na	4.6E+03	2.8E+02	3.0E+01	na	9.2E+03	--	--	--	--	--	--	--	--	**2.8E+02**	**3.0E+01**	**na**	**9.2E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	**na**	**1.4E+03**
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	**na**	**6.0E+01**
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	**na**	**1.2E+02**
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	**na**	**1.0E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	**5.6E+01**	**1.3E+01**	**na**	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	**1.3E-01**	**2.6E-02**	**na**	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	**2.8E-02**	**na**	**1.3E-03**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	1.5E-02	1.2E-02	na	6.0E+01	--	--	--	--	--	--	--	--	**1.5E-02**	**1.2E-02**	**na**	**6.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	**na**	**1.7E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	**na**	**8.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0.49	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	**4.0E+01**	**1.0E+01**	**na**	**8.4E+03**
Silver	0	2.0E+00	--	na	--	4.0E+00	--	na	--	--	--	--	--	--	--	--	--	**4.0E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane^{C}	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+01**
Tetrachloroethylene^{C}	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.4E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene ^{C}	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.8E-03	--	--	--	--	--	--	--	--	**1.5E+00**	**4.0E-04**	**na**	**5.6E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	**9.2E-01**	**1.4E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
1,1,2-Trichloroethane^{C}	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+02**
Trichloroethylene ^{C}	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+02**
2,4,6-Trichlorophenol ^{C}	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride^{C}	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
Zinc	0.85	9.0E+01	9.0E+01	na	2.6E+04	1.8E+02	1.8E+02	na	5.2E+04	--	--	--	--	--	--	--	--	**1.8E+02**	**1.8E+02**	**na**	**5.2E+04**

Notes:

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

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.1E+00
Chromium III	6.9E+01
Chromium VI	1.3E+01
Copper	7.0E+00
Iron	na
Lead	1.1E+01
Manganese	na
Mercury	9.2E-01
Nickel	1.8E+01
Selenium	6.0E+00
Silver	1.6E+00
Zinc	7.1E+01

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

Attachment 10b

VA0002071 - Possum Point Power Station*

Date	Parameter Description	Data (S.U.)
5/5/15	pH	7.9
5/11/15	pH	7.77
5/12/15	pH	7.88
5/13/15	pH	7.76

90% pH = 7.9 S.U.

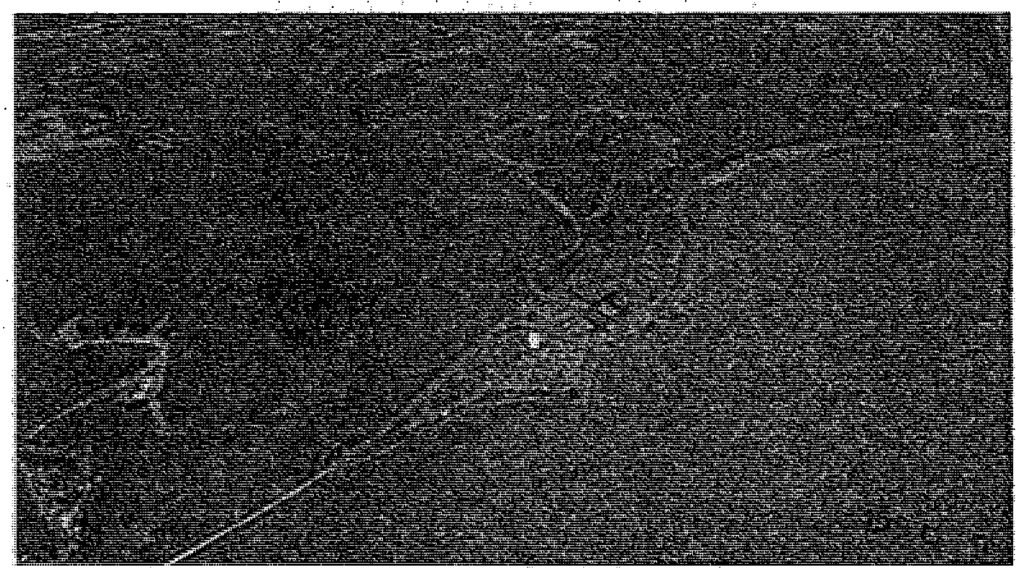
*Data taken from modification application for blended ash dewatering and contact waters.

Attachment 11

Dominion Resources

FINAL REPORT

THERMAL MODELING STUDIES FOR THE POSSUM POINT POWER STATION



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AUGUST 2011

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SECTION 1

INTRODUCTION

The Possum Point Power Station (the Station) is located in Dumfries, VA and is operated by Dominion Virginia Power (Dominion). The Station currently has an existing Virginia Pollution Discharge Elimination System (VPDES) Permit No. VA0002071 from the Virginia Department of Environmental Quality (DEQ) for the discharge of cooling water to Quantico Creek. The Station has developed and implemented a thermal monitoring and modeling study as required by Part I. Section E. #9 of the permit. The primary goal of the study is to evaluate the thermal mixing zone for the Station under present maximum power generation operating conditions and can be identified as:

1. To update information on thermal discharges from the Station;
2. To design field monitoring program to support thermal modeling; and
3. To perform a thermal mixing zone analysis.

To support the third goal, a thermal model was developed. The model fully addressed thermal contributions from Unit 3 through Unit 6 on temperatures in Quantico Creek.

1.1 STATION'S VIRGINIA POLLUTION DISCHARGE ELIMINATION SYSTEM PERMIT CONDITIONS

The currently permitted thermal mixing zone is defined as 'part of Quantico Creek from the established border between the Commonwealth of Virginia and the State of Maryland, to upstream'. This thermal mixing zone was established in early 1980's when the Station was operating with Units 1 through 5. In 2003, Units 1 and 2 were retired and a new Unit 6 began commercial operation. Units 1 through 4 employ once-through cooling system and Units 5 and 6 employ close-circuit cooling system (cooling towers).

When VDEQ reissued the discharge permit in 2007, thermal mixing zone monitoring and delineation requirements were included in Part I Section E #9. A summary of the requirements is as follows:

- Monitoring of thermal mixing zone during flood tide: twice a year (February and July);
- Report 3°C isotherms during full Station operating conditions;
- Within 1 year of permit reissuance, submit a proposal to study and redefine the thermal mixing zone; and

- Within 4 years of permit reissuance, submit results of thermal mixing zone analyses including all supporting documentations (due in October 24, 2011).

Dominion submitted a study plan to DEQ in October 2008, and DEQ subsequently approved the plan in February 2009. The study plan contains a methodology and rationale for the field monitoring program and thermal modeling in support of the Possum Point VPDES permit.

Commonwealth of Virginia Water Quality Standards applicable to the Possum Point Power Station are:

- The size of a thermal mixing zone shall be determined on a case-by-case basis (9 VAC 25-260-20 B.11);
- Thermal area is defined as "any rise above natural temperature (one-hour average temperature without point source influence) shall not exceed 3°C" (or 5.4°F) (9 VAC 25-260-60); and
- Maximum hourly temperature change shall not exceed 2°C above natural conditions beyond boundaries of mixing zones (9 VAC 25-260-70).

1.2 STATION OPERATING CONDITIONS

The Possum Point Power Station withdraws approximately 240 million gallons per day (MGD) of cooling water from the Potomac River on an annual average for Units 3, 4, 5, and 6. Cooling water is withdrawn through two shoreline intake structures on the Potomac River. The Station discharge outfalls are located near the mouth of Quantico Creek. Figure 1-1 shows the locations of the Station intake and outfalls. Currently, Units 3 and 4 use once-through cooling water system and Units 5 and 6 use closed-cycle cooling water system (cooling towers). After retiring Units 1 and 2 in 2003, the Station's cooling water discharge volume to Quantico Creek was reduced significantly (to about a half of the volume from Units 1 through 4). Since the Station became a peaking power generating station for the power grid in the region, the Station operates intermittently at full capacity. Table 1-1 summarizes the typical discharge flow rates of each outfall when each unit is operating at full capacity.

Table 1-1. Summary of the Possum Point Station Thermal Discharge Outfalls

Outfall	Units	Average Flow (MGD)
001/002	Unit 3 (once through cooling), Units 5 & 6 (cooling tower blowdown)	112.5
003	Unit 4 (once through cooling)	120.6
004	Low Volume Settling Ponds	1.3

1.3 DATA REQUIREMENTS/DATA GATHERING/DATA REVIEW

A series of data were gathered for the modeling study. The data and information concerning operations of the Station were utilized to help design the modeling strategy, i.e., the spatial extent of the modeling domain, the computational grid resolution, the selection of the modeling period, and the construction of model forcing inputs.

The following data were utilized in the study:

- Facility discharge design;
- Current Station intake, discharge flows and temperature data;
- Tidal water levels in the vicinity of the Station from NOAA gauges;
- Hourly meteorological data from nearby NOAA weather station;
- In-situ temperature monitoring data collected by Dominion in the summer of 2009; and
- Existing and historic thermal discharge and ambient water data, as available and if judged to be appropriate based on acceptable Quality Assurance measures.

1.4 FIELD MONITORING PROGRAM

Currently, there is a semi-annual field monitoring program for the Possum Point Station; one survey is conducted in the winter (usually in the month of February) and the other in the summer (usually in the month of July). This monitoring program has been in place for more than 30 years. Due to the intermittent nature of the Station's power generating conditions, the present monitoring program may not be capturing thermal impact areas during maximum power generating conditions. To support the thermal modeling study, an alternative field monitoring program was implemented. An array of *in situ* temperature monitoring stations was deployed at various locations within Quantico Creek and the Potomac River. The locations of the *in situ* monitoring stations were determined after review of preliminary modeling results. These *in situ* temperature monitoring stations were deployed from June 29 through October 14, 2009 with the sensors installed at about 1 m below surface. These temperature sensors detected any thermal signals originating from the Station when the Station was in operating conditions and recorded the ambient conditions during non-operating conditions. Changes in water temperature recorded by those *in situ* sensors, both in the magnitude of temperature increase and duration, provided valuable information for the thermal modeling.

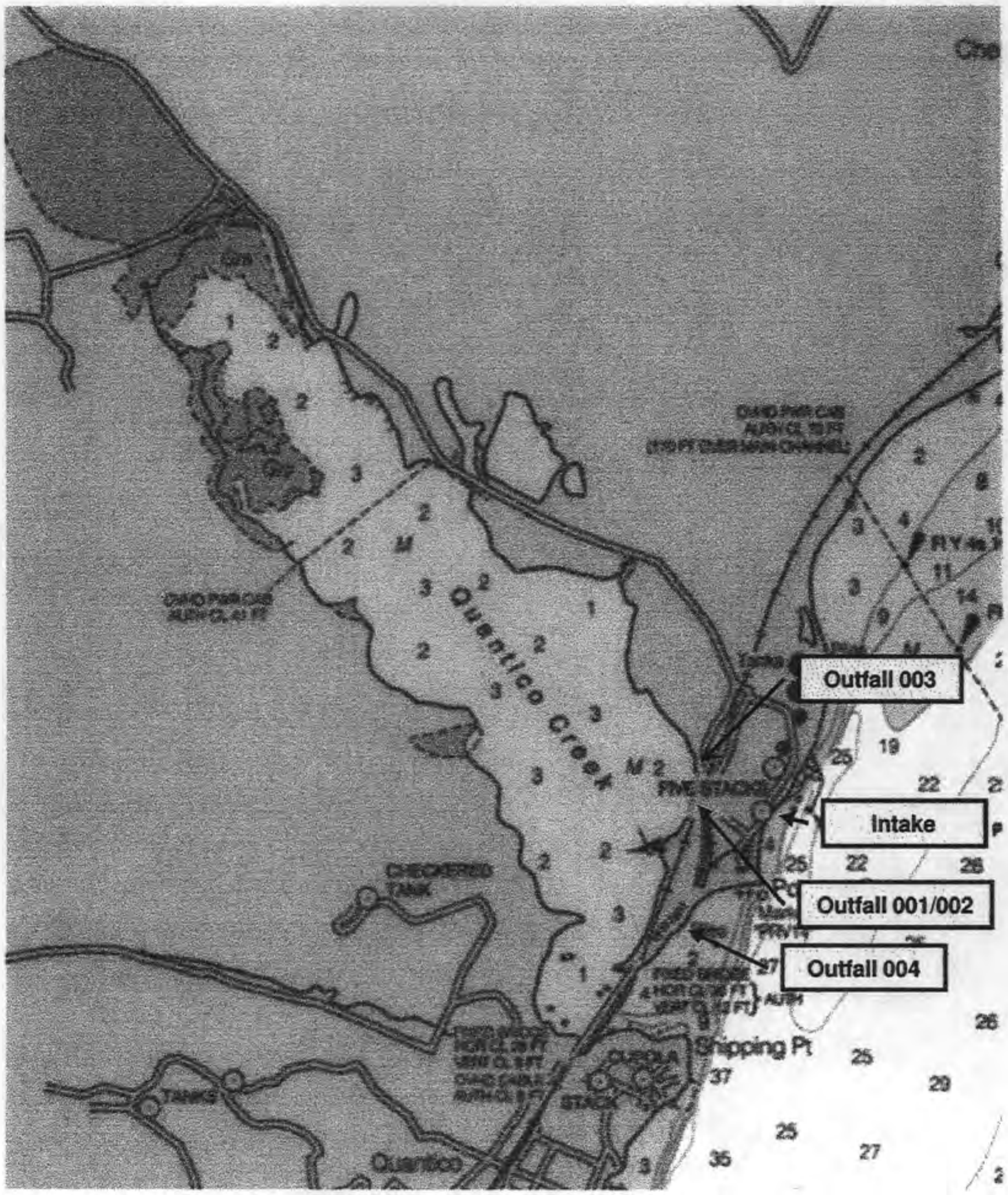


Figure 1-1. Study Area Showing Possum Point Power Station Intake and Discharge Locations

SECTION 2

BACKGROUND OF STUDY AREA

2.1 HYDRODYNAMICS OF THE POTOMAC RIVER

Possum Point Power Station is located in the tidal section of the Potomac River. The Station withdraws cooling water from the Potomac River and discharges through two outfalls into Quantico Creek. Figure 1-1 shows the locations of the Station intake and discharges. Quantico Creek is a rectangular shaped small tidal embayment on the western shore of the Potomac River and is about 2.4 miles long and about 0.5 miles wide. The surface area of Quantico Creek is about 700 acres. The mouth of Quantico Creek is located about 75 miles from the mouth of the Potomac River, which connects to the Chesapeake Bay, and about 25 miles downstream of Alexandria, VA. Tides in the Potomac River are predominantly semi-diurnal, which have two high and two low waters a day. Tidal range in the vicinity of Quantico Creek is about 1.8 feet during spring tides and the magnitudes of maximum tidal currents are about 1 ft/s. A NOAA chart (Chart No. 12288) indicates that most of Quantico Creek is less than 3 feet deep at mean low water.

2.2 HISTORICAL DATA ANALYSIS

Meteorological data measured at Quantico Marine Air Base, which is about 2.5 miles downstream of the Possum Point Station, were analyzed to assess long-term air temperature and wind patterns in the study area. Data from 1998 through 2009 were used for these analyses.

Using hourly data, average monthly and multi-year averaged and daily maximum air temperatures were tabulated in Tables 2-1 and 2-2 for the 1998-2009 time period, respectively. The seasonal temperature variation pattern can be seen clearly from the tabulated data. The lowest monthly air temperature of 37-39°F occurs in the December through February timeframe and the highest monthly air temperature of 77°F during July and August. Hourly wind data were also analyzed. Figures 2-1 and 2-2 show frequency distributions of wind roses for the entire time period and for twelve individual months, respectively. The direction of arrows indicates wind direction and the thickness of each bin indicates wind speed. Figure 2-1 indicates that winds blow from the northwest quadrant for more than half the time in the study area. The figure also suggests that relatively less winds blowing from the east throughout the years. Figure 2-2 shows monthly wind patterns. During the cold months of January, February, March, November and December, strong winds generally come from the west and north directions. Wind roses for April through September show that dominant wind directions are from the west-southwest and south. The figure also shows that winds blowing from northeast and southeast directions are relatively weak in the study area.

Table 2-1. Possum Point Power Station - Average Monthly Air Temperature (°F)

YEAR	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1998	41	42	46	57	67	72	77	77	74	59	48	43
1999	38	39	43	56	65	72	79	77	69	55	51	40
2000	34	40	50	55	67	74	74	75	68	59	45	32
2001	32	40	43	57	64	74	74	77	67	57	52	44
2002	39	43	47	59	65	75	79	78	71	58	46	36
2003	31	33	46	55	62	70	77	78	70	57	51	38
2004	31	36	47	56	70	72	76	74	69	57	49	38
2005	37	39	42	56	61	74	79	79	73	59	49	35
2006	41	38	47	58	63	72	79	79	66	55	48	42
2007	40	30	47	53	66	74	77	78	74	64	50	42
2008	41	39	48	57	63	75	77	75	70	56	52	43
2009	33	44	45	56	65	72	75	78	68	56	50	-
Ave Temp	37	39	46	56	65	73	77	77	70	58	49	39

Table 2-2. Possum Point Power Station - Maximum Daily Air Temperature (°F)

YEAR	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1998	63	63	88	81	91	94	97	92	95	83	73	80
1999	63	64	78	86	88	96	101	97	84	75	77	70
2000	70	66	84	81	88	91	91	93	88	84	66	57
2001	63	68	68	88	84	91	93	95	86	83	79	70
2002	75	77	80	88	90	92	98	95	91	88	68	64
2003	64	64	79	88	82	91	93	93	88	81	82	57
2004	70	61	77	86	90	91	91	88	84	79	73	66
2005	75	64	70	86	81	91	99	93	93	81	75	59
2006	66	70	82	82	91	90	93	97	90	81	73	73
2007	73	61	82	86	84	93	95	102	88	86	66	66
2008	72	73	77	79	90	93	93	91	90	77	66	70
2009	48	88	77	90	86	88	91	95	88	84	72	-
Max	75	88	88	90	91	96	101	102	95	88	82	80

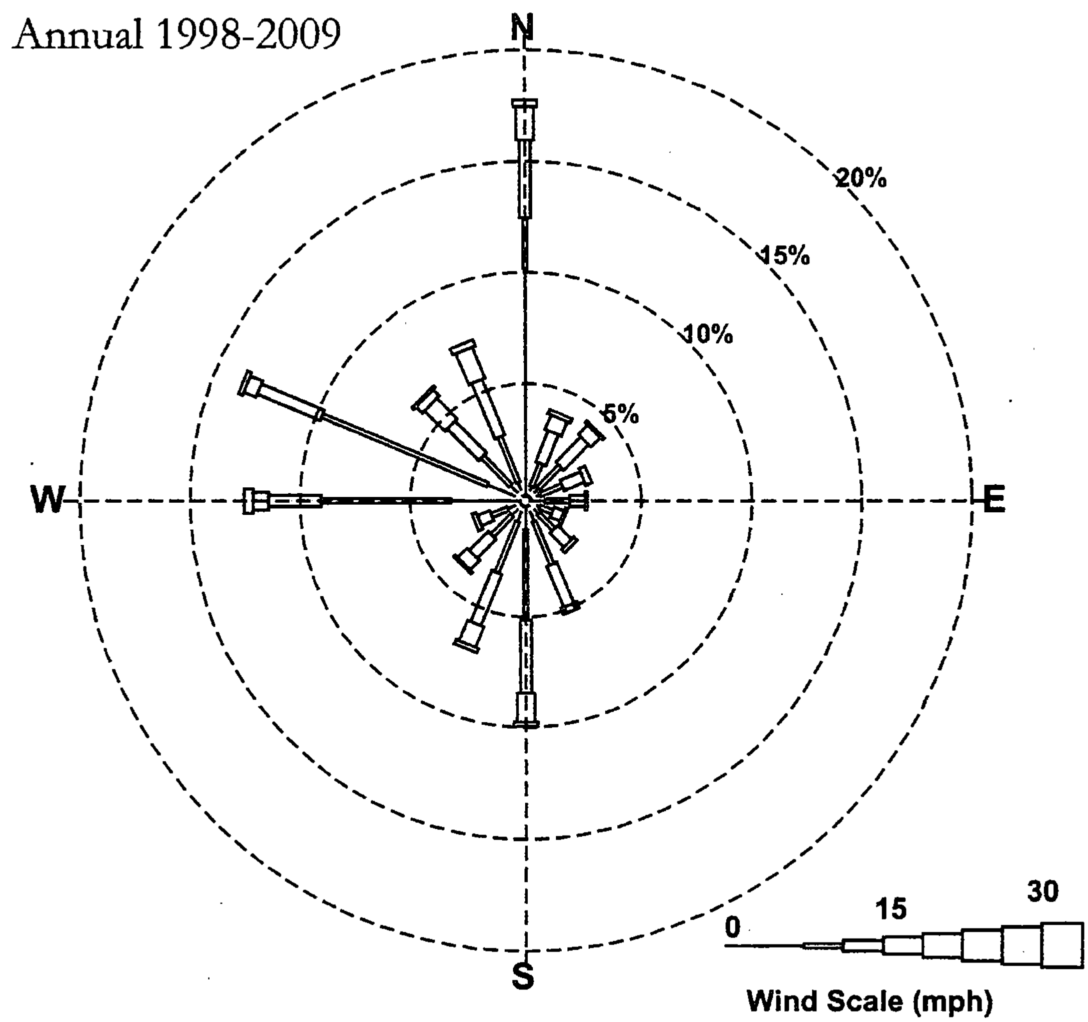
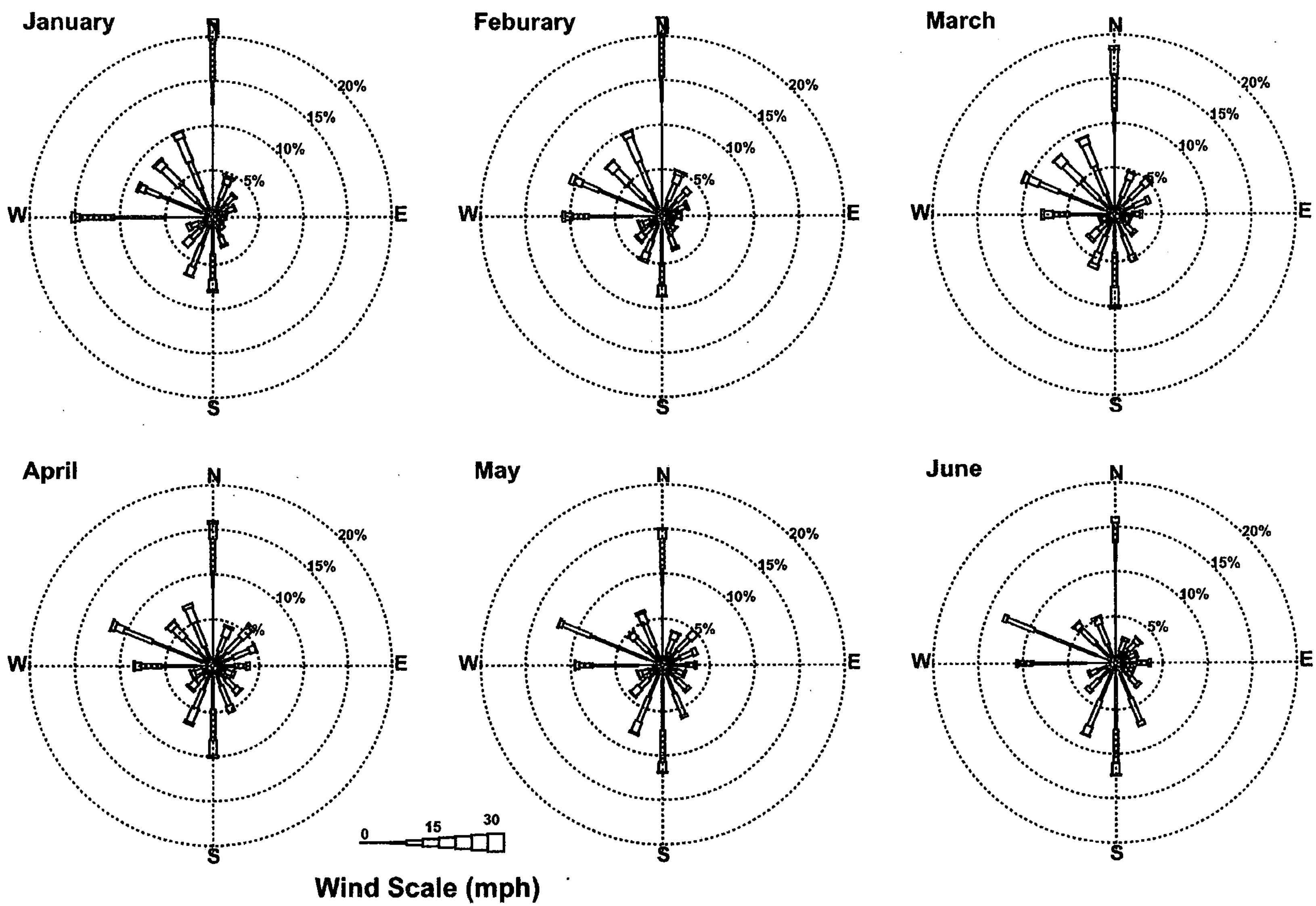


Figure 2-1. Frequency Analysis of Wind Data for Entire 1998-2009 Period.



Monthly 1998-2009

Figure 2-2. Frequency Analysis of Wind Data (1998-2009) for Months January – December

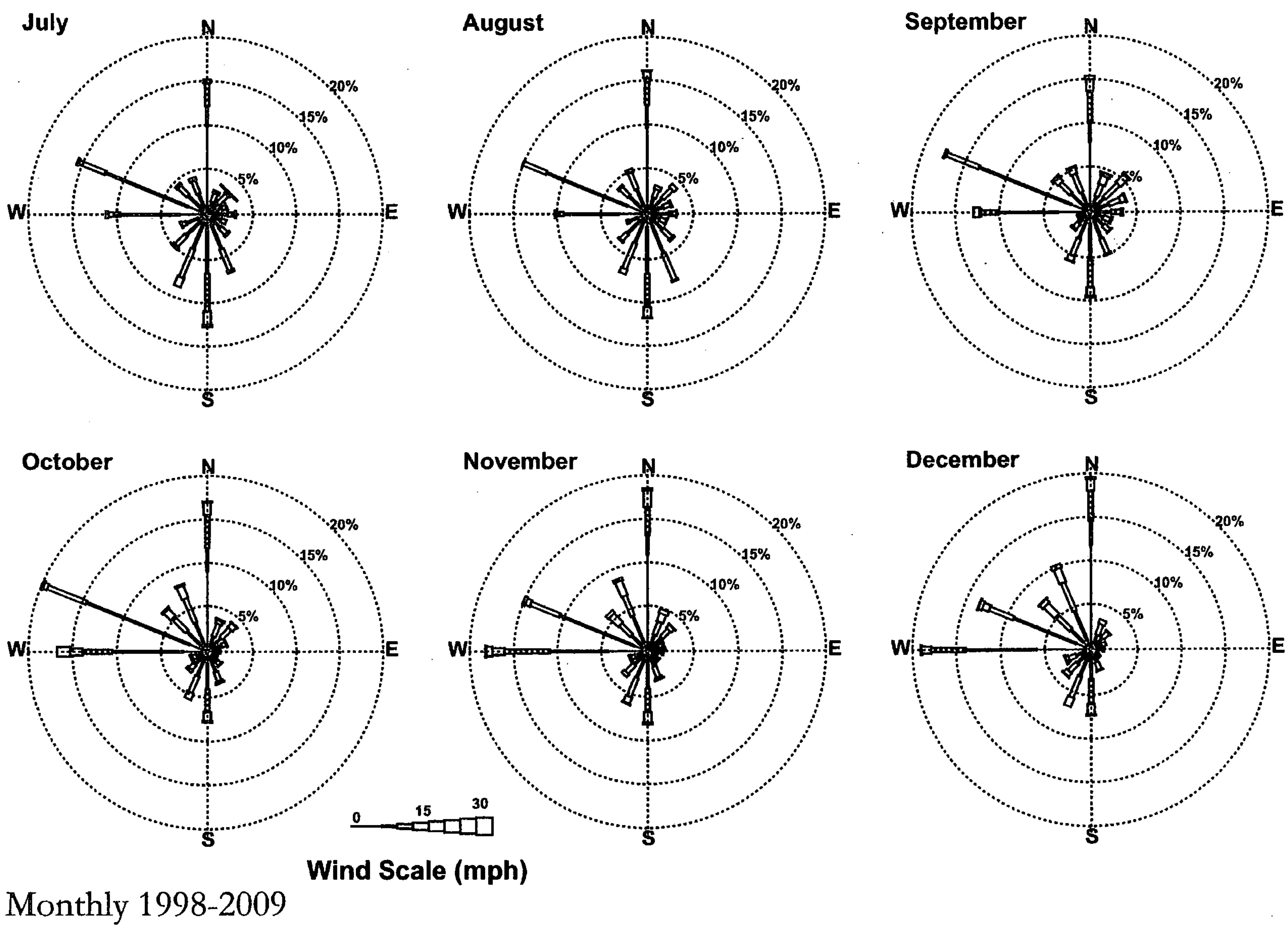


Figure 2-2. Frequency Analysis of Wind Data (1998-2009) for Months January – December (cont.)

SECTION 3

HYDROTHERMAL MODELING FRAMEWORK

The transport and mixing of thermal loads introduced to rivers, lakes, reservoirs and coastal environments are controlled by the circulation characteristics of the receiving water body. The fate of a thermal plume is strongly influenced by turbulent mixing created by the surface wind stress, coastal currents and tides (astronomical or meteorological). At the same time, turbulent mixing leads to horizontal dispersion in the longitudinal and lateral directions and to vertical dispersion throughout the water column. Coupled with turbulent mixing due to wind and currents are heat exchange processes between the water column and the atmosphere. All these mechanisms determine the spatial extent and size of the thermal plume. The processes that control the heat exchanges between the water and atmosphere are well documented (Ahsan and Blumberg, 1999; Cole and Buchak, 1995). Four major heat flux components are examined in the present study: short-wave solar radiation; long-wave atmospheric radiation; sensible (conduction), and latent (evaporation) heat exchange. These processes were modeled based on formulae reported in Ahsan and Blumberg (1999). Figure 3-1 shows the schematic diagram of these processes adopted in the present modeling framework. The complexity of physical processes governing evolution of an introduced constituent, such as heated water, suggests the use of sophisticated hydrodynamic models. For this study, HydroQual's far-field hydrodynamic model (ECOM) was applied to analyze Possum Point Power Station Units 3, 4, 5 and 6 discharges into Quantico Creek.

3.1 HYDRODYNAMIC MODEL

The hydrodynamic model is a three-dimensional, time-dependent, estuarine and coastal circulation model developed by Blumberg and Mellor (1987). The model incorporates the Mellor and Yamada (1982) level 2-½ turbulent closure scheme to provide a realistic parameterization of vertical mixing. A system of curvilinear coordinates is used in the horizontal direction which allows for a smooth and accurate representation of variable shoreline geometry. In the vertical scale, the model uses a transformed coordinate system known as the σ-coordinate transformation to allow for a better representation of bottom topography. Water surface elevation, water velocity in three dimensions, temperature and salinity, and water turbulence are predicted in response to weather conditions (winds and incident solar radiation), tributary inflows, tides, temperature and salinity at open boundaries connected to the coastal waters.

The model has gained wide acceptance within the modeling community and regulatory agencies as indicated by the number of applications to important water bodies around the world. Among these applications are: Delaware River, Delaware Bay, and adjacent continental shelf (Galperin and Mellor 1990a,b), the South Atlantic Bight (Blumberg and Mellor, 1983), the Hudson

Raritan estuary (Oey et al., 1985a,b), the Gulf of Mexico (Blumberg and Mellor, 1985), Chesapeake Bay (Blumberg and Goodrich 1990), Massachusetts Bay (Blumberg et al., 1993), St. Andrew Bay (Blumberg and Kim, 1998), New York Harbor and Bight (Blumberg et al, 1999) and Onondaga Lake (Ahsan and Blumberg 1999). The model has also been applied in several other lake environments such as Lake Michigan (Schwab et al., 1999), Lake Pontchartrain (Signell and List, 1997), Green Bay (HydroQual, 2001), and Lake Ontario (HydroQual, 2005 and 2008). In all these studies, model performance was assessed by means of extensive comparisons between model calculations and measurements. The predominant physics were realistically reproduced by the model for this wide range of applications.

The model solves a coupled system of differential, prognostic equations describing the conservation of mass, momentum, temperature, salinity, turbulence energy and turbulence macroscale. The governing equations for velocity $U_i = (u, v, w)$, temperature (T), salinity (S), and $x_i = (x,y,z)$ are as follows:

$$\frac{\partial U_i}{\partial x_i} = 0 \tag{3-1}$$

$$\frac{\partial}{\partial t}(U,V) + \frac{\partial}{\partial x_i}\left[U_i(u,v) + f(-v,u)\right]$$
$$= -\frac{1}{\rho_o}\left[\frac{\partial P}{\partial x},\frac{\partial P}{\partial y}\right] + \frac{\partial}{\partial z}\left[K_M\frac{\partial}{\partial z}(u,v)\right] + (F_U,F_V) \tag{3-2}$$

$$\frac{\partial T}{\partial t} + \frac{\partial}{\partial x_i}(U_i T) = \frac{\partial}{\partial z}\left[K_H\frac{\partial T}{\partial z}\right] + F_T \tag{3-3}$$

$$\frac{\partial S}{\partial t} + \frac{\partial}{\partial x_i}(U_i S) = \frac{\partial}{\partial z}\left[K_H\frac{\partial S}{\partial z}\right] + F_S \tag{3-4}$$

The horizontal diffusion terms, (F_U, F_V), F_T and F_S, in Equations (3-2) through (3-4) are calculated using a Smagorinsky (1963) horizontal diffusion formulation (Mellor and Blumberg, 1985). Under the shallow water assumption, the vertical momentum equation is reduced to a hydrostatic pressure equation. Vertical accelerations due to buoyancy effects and sudden variations in bottom topography are not taken into account. The hydrostatic approximation yields:

$$\frac{P}{\rho_o} = g(\eta - z) + \int_z^{\eta} g \frac{\rho' - \rho_o}{\rho_o} dz' \tag{3-5}$$

where P is pressure, z is water depth, $\eta(x,y,t)$ is the free surface elevation, ρo is a reference density, and $\rho = \rho(T,S)$ is the density. For this study salinity is considered zero.

The vertical mixing coefficients, K_M and K_H, in Equations (3-2) through (3-4) are obtained by applying the level 2 ½ turbulence closure scheme and are given by:

$$K_M = \hat{K}_M + \upsilon_M, K_H = \hat{K}_H + \upsilon_H \tag{3-6}$$

$$\hat{K}_M = q\ell S_M, \hat{K}_H = q\ell S_H \tag{3-7}$$

where $q^2/2$ is the turbulent kinetic energy, l is a turbulence length scale, S_M and S_H are stability functions defined by solutions to algebraic equations given by Mellor and Yamada (1982) as modified by Galperin et al. (1988), and υ_M and υ_H are constants. The variables q^2 and l are determined from the following equations:

$$\frac{\partial q^2}{\partial t} + \frac{\partial (uq^2)}{\partial x} + \frac{\partial (vq^2)}{\partial y} + \frac{\partial (wq^2)}{\partial z} = \frac{\partial}{\partial z}\left[K_q \frac{\partial q^2}{\partial z}\right] + 2K_M\left[\left(\frac{\partial u}{\partial z}\right)^2 + \left(\frac{\partial v}{\partial z}\right)^2\right] + \frac{2g}{\rho_o} K_H \frac{\partial \rho}{\partial z} - 2\frac{q^3}{B_1 \ell} + F_q \tag{3-8}$$

$$\frac{\partial (q^2\ell)}{\partial t} + \frac{\partial (uq^2\ell)}{\partial x} + \frac{\partial (vq^2\ell)}{\partial y} + \frac{\partial (wq^2\ell)}{\partial z} = \frac{\partial}{\partial z}\left[K_q \frac{\partial (q^2\ell)}{\partial z}\right] + E_1\ell\left\{K_M\left[\left(\frac{\partial u}{\partial z}\right)^2 + \left(\frac{\partial v}{\partial z}\right)^2\right] + \frac{g}{\rho_o} K_H \frac{\partial \rho}{\partial z}\right\} - \frac{q^3}{B_1 \tilde{\omega}} + F_\ell \tag{3-9}$$

where $K_q = 0.2q\ell$, the eddy diffusion coefficient for turbulent kinetic energy; F_q and F_ℓ represent horizontal diffusion of the turbulent kinetic energy and turbulence length scale and are parameterized in a manner analogous to either Equation (3-6) or (3-7); $\tilde{\omega}$ is a wall proximity function defined as $\tilde{\omega} = 1 + E_2 (\ell / \kappa L)^2$, $(L)^{-1} = (\eta - z)^{-1} + (H + z)^{-1}$, κ is the von Karman constant, H is the water depth, η is the free surface elevation, and E_1, E_2 and B_1 are empirical constants set in the closure model.

The basic Equations, (3-1) through (3-9), are transformed into a terrain-following σ-coordinate system in the vertical scale and an orthogonal curvilinear coordinate system in the horizontal scale. The resulting equations are vertically integrated to extract barotropic variables, and a mode splitting technique is introduced such that the fast-moving, external barotropic modes and relatively much-slower internal baroclinic modes are calculated by prognostic equations with different time steps. Detailed solution techniques are described in Blumberg and Mellor (1987).

3.2 ATMOSPHERIC HEAT EXCHANGE MODEL

The heat content in Quantico Creek and the Potomac River in the vicinity of the Possum Point Power Station is primarily governed by surface heat exchange between the atmosphere and water and thermal loads from the Station. Processes that control heat exchange between water and atmosphere are well documented (Ahsan and Blumberg, 1999; Cole and Buchak, 1995). All of these works relied mostly on the bulk formulae to evaluate the components of the heat budget. It is important to note here that most of the bulk formulae for calculations of radiative fluxes that are available in the open literature are based essentially on the same principles and agree generally with one another on patterns of temporal and spatial variations of fluxes. However, significant differences in their magnitudes may exist, depending on the time of year and latitude of the study area.

As stated earlier, four major heat flux components, shortwave solar radiation, longwave atmospheric radiation, sensible heat and latent heat, have been used in the present study. They are based on the formulae originally reported in Cole and Buchak (1995), as suggested by Edinger et al. (1974). Figure 3-1 shows the schematic diagram of these processes. Details of the formulation for these heat flux components are described below.

3.2.1 Atmospheric Radiation

Net atmospheric radiation at the surface is the result of two processes, downward radiation from the atmosphere and upward radiation emitted from the water surface. This longwave radiation ranges in wavelength between 4 and 120μm and has a peak intensity at about 10 μm. Atmospheric radiation depends primarily on air temperature, humidity and cloud cover. Atmospheric radiation constitutes the major component of heat exchange processes during night and cloudy conditions (Edinger et al., 1974). The physics of longwave radiation are based on black body radiation, in which the magnitude is directly proportional to the fourth-power of the absolute temperature. Computations for the downflux are more complicated as it includes effects of changes in atmospheric temperature, humidity, cloud, aerosol distribution, carbon dioxide, and other atmospheric constituents. Among several commonly referenced bulk formulae, Brunt (1932) suggested that the downflux depends on the square root of near-surface vapor pressure (e_a). In the present study the Swinbank (1963) formulation has been used, which suggests that e_a is strongly correlated with air temperature (T_a) and calculates the downflux as a function of T_a alone. The net atmospheric flux is given as

$$H_a = \varepsilon\sigma\left((9.37 \times 10^{-6} T_a^6)(1 + 0.17 C^2) - T_s^4\right) \tag{3-10}$$

Here H_a = net longwave atmospheric radiations (Watt/m^2)

ε = emissivity of the water body (0.97)

σ = Stefan-Boltzmann constant (5.67×10^{-8} Watt/m^2/K^4)

T_a = atmospheric temperature in °K

T_s = surface water temperature in °K

C = cloud fraction (0-1)

Swinbank's formulation is more attractive when surface humidity observations are not as readily available as air temperatures (Fung et al., 1984). It may also be attractive when a land-based meteorological station is too far from the water body and may not provide representative relative humidity data for the site. If field measurements of incoming shortwave radiations are not available, the model computes solar radiation based on formula suggested by Rosati and Miyakoda(1988). These fluxes are based chiefly on latitude, day of year (solar declination-angle of the sun) and cloud cover.

3.2.2 Sensible Heat Flux, H_c

Heat exchange can occur between the atmosphere and a water body through conduction. The direction of the heat flux may depend on the sense of the temperature difference between the air and the water. It has been shown (Edinger et al., 1974) that the daily rate of heat conduction is about an order of magnitude less than other dominant processes. The flux of heat conduction is commonly parameterized by a bulk transfer formula with dependencies on wind speed as suggested by Edinger et al.(1974).

$$H_c = C_c f(W)(T_s - T_a) \tag{3-11}$$

where H_c = Sensible (conduction) heat fluxes Watt/m^2

C_c = Bowen's coefficient (0.62 mb/K)

f(W) = wind speed function defined as $a_0 + a_1W + a_2W^2$ (Watt/m^2/mb)

T_s and T_a are surface water and air temperature, respectively, as defined earlier

The coefficients a_0, a_1 and a_2 are chosen based on Brady et al., (1969) as suggested by Edinger et al. (1974). Significant discrepancies in formulating the wind speed function have been reported in latter studies, suggesting a wide variety of opinions among researchers. Opinions differ over whether conduction processes will remain on a negligible molecular scale in the absence of wind or whether other small scale processes such as conduction currents due to density instabilities may dominate. The latter concept gained significant favor due to the fact that density instabilities exist during conduction and evaporation from a thermally loaded water surface or during the night when the air temperature may be less than the water temperature. Following Brady et al. (1969) and Edinger et al. (1974), a slightly conservative formulation has been adopted in this study:

$$f(W) = 6.9 + 0.345\ W^2\ (\text{Watt/m}^2/\text{mb}) \qquad (3\text{-}12)$$

where W is wind speed in m/s measured at 10 m above the water surface.

For both sensible and evaporative heat flux computations, the evaporative wind speed function f(W) is a somewhat uncertain parameter (Cole and Buchak, 1995). Various formulations of f(W) have been examined in Edinger et al.(1974). Cole and Buchak (1995) termed the wind speed in this function as "ventilation speed" rather than a vector velocity speed as used in the wind stress computations. This ventilation speed is somewhat lower than the actual wind speed measured in a land based meteorological station at some distance from the site, and accounts for sheltering and canopy effects by the surroundings of a water body. A wind shelter coefficient has been introduced by Cole and Buchak (1995) having a range of 0 to 1 depending on the shape and size of the water body. For this study, a shelter coefficient of 1.0 was found to be representative of the modeled scenario.

3.2.3 Evaporative Heat Flux, H_e

The evaporative heat flux is related to the conductive heat fluxes by the Bowen ratio and can be given as a function of wind speed and the difference between saturated water vapor pressure at the water surface temperature and the water vapor pressure in the overlying air (Edinger et al., 1974).

$$H_e = f(W)\,(e_s - e_a) \tag{3-13}$$

where H_e = evaporative heat flux (Watt/m^2),

e_s = saturated vapor pressure at temperature T_s (mb),

e_a = air-vapor pressure at temperature T_a (mb).

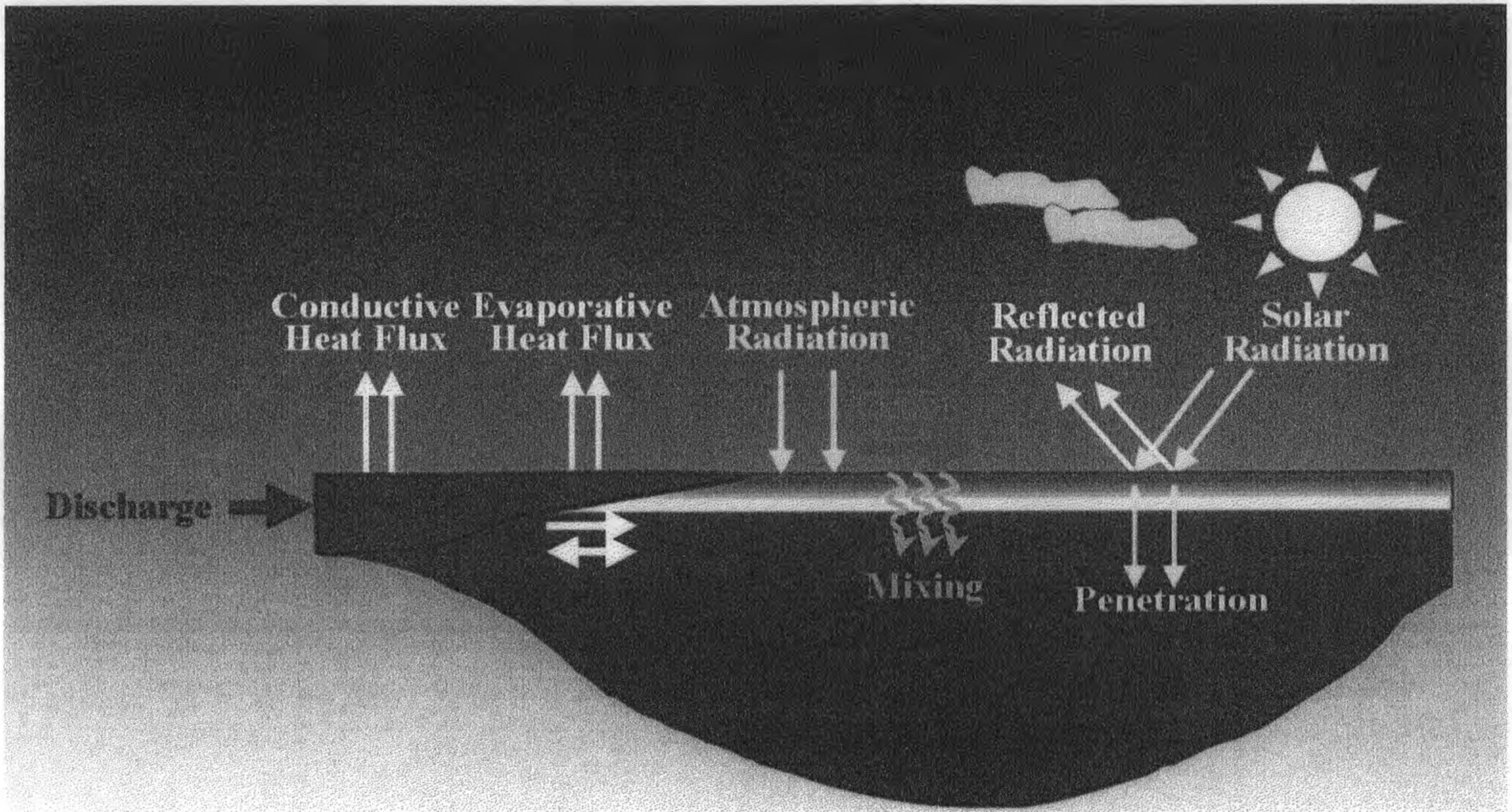


Figure 3-1. Schematic Diagram of Surface Heat Exchange Processes

SECTION 4

TEMPERATURE SURVEYS

A field survey program was performed by the Dominion field crew beginning June 29 through October 14, 2009 to gather temperature data in Quantico Creek and the Potomac River in the vicinity of the Possum Point Station. Concurrent data were available from eight *in situ* temperature monitoring stations, which measured continuous temperature near the Possum Point Power Station. Locations of the *in situ* monitoring stations are shown in Figure 4-1. HydroQual provided guidance and review of the sampling scheme to ensure that field data would support model development efforts. The field data were used to both calibrate and validate the far-field thermal model.

A total of eight *in situ* temperature monitoring stations (buoy-mounted sensors) were deployed to gather temperature data for the study (Stations QC3 through QC10). Five stations were placed within Quantico Creek: Stations QC 3 and QC4 were placed upstream of Outfalls 001/002 and 003. Stations QC-5 and QC-6 were placed close to Outfalls 001/002 and 003, with QC5 slightly upstream and QC6 downstream. Each of these stations had one sensor placed at one meter (~3ft) below surface due to the shallow water depth of the creek. No appreciable thermal stratification has been observed within the creek during past field surveys by Dominion biologists. Station QC7 was located on the south shore near the mouth of the creek by the railway bridge with two sensors. Station QC8, located at the confluence of Quantico Creek with the Potomac River, had two sensors. Station QC-9 and QC-10 were placed in the Potomac River to detect thermal signals (temperature differences) in the river at various tidal conditions. QC9, with two sensors, was placed downstream of the mouth of Quantico Creek. Finally, QC10, with one sensor, was placed upstream of the mouth of Quantico Creek. In addition to *in situ* monitoring stations, water temperature data measured at intake and discharge locations were also used for the study. Table 4-1 summarizes locations of the *in situ* temperature monitoring stations.

Time series of continuous temperature observations at these *in situ* monitoring stations are shown in Figure 4-2. Temperatures measured at each monitoring station are shown in the plot along with the air temperature observed at the Quantico Marine Air Base during the survey period. At stations QC-5 and QC-6, which are close to the outfalls, the measurements indicate several episodes of sudden temperature increases over a few days. These spikes of water temperature, as much as 10°C (or 18°F), are the results of operations of Units 3 and 4. The figure shows that the magnitudes of water temperature increase due to Units 3 and 4 operations diminish sharply as discharged water was transported away from the outfalls. However, as evident in Figure 4-2, limited temperature differences were detected at Station QC-3, which was located upstream in Quantico Creek or about 6,400 ft (1.2 miles) from the outfalls. At locations leading to the Potomac River (i.e.

QC-7 and QC-8), there are visible increases of temperatures as much as 5°C (or 9°F) during the operations of Units 3 and 4. However, the data suggest that these signals are only present at these locations during certain periods in the tidal cycle. The ebbing currents carry heated Quantico Creek water to the Potomac River, and during the reverse tidal cycle, Potomac River water is carried into Quantico Creek where it mixes with the heated water. Water temperatures measured at Stations QC-9 and QC-10, which are located downstream and upstream of the Potomac River, respectively, did not show any thermal signals originating from the Possum Point Power Station during the survey period.

Table 4-1. Summary of *In Situ* Temperature Monitoring Stations

Station	Distance from Outfalls 001/002 and 003 (ft)	Water Depth (ft)	Number of Sensors
QC-3	6,400	~5	1
QC-4	3,200	~5	1
QC-5	900	~5	1
QC-6	1,800	~6	1
QC-7	4,000	~10	2
QC-8	5,300	~20	2
QC-9	8,100	45	2
QC-10	8,000	40	1

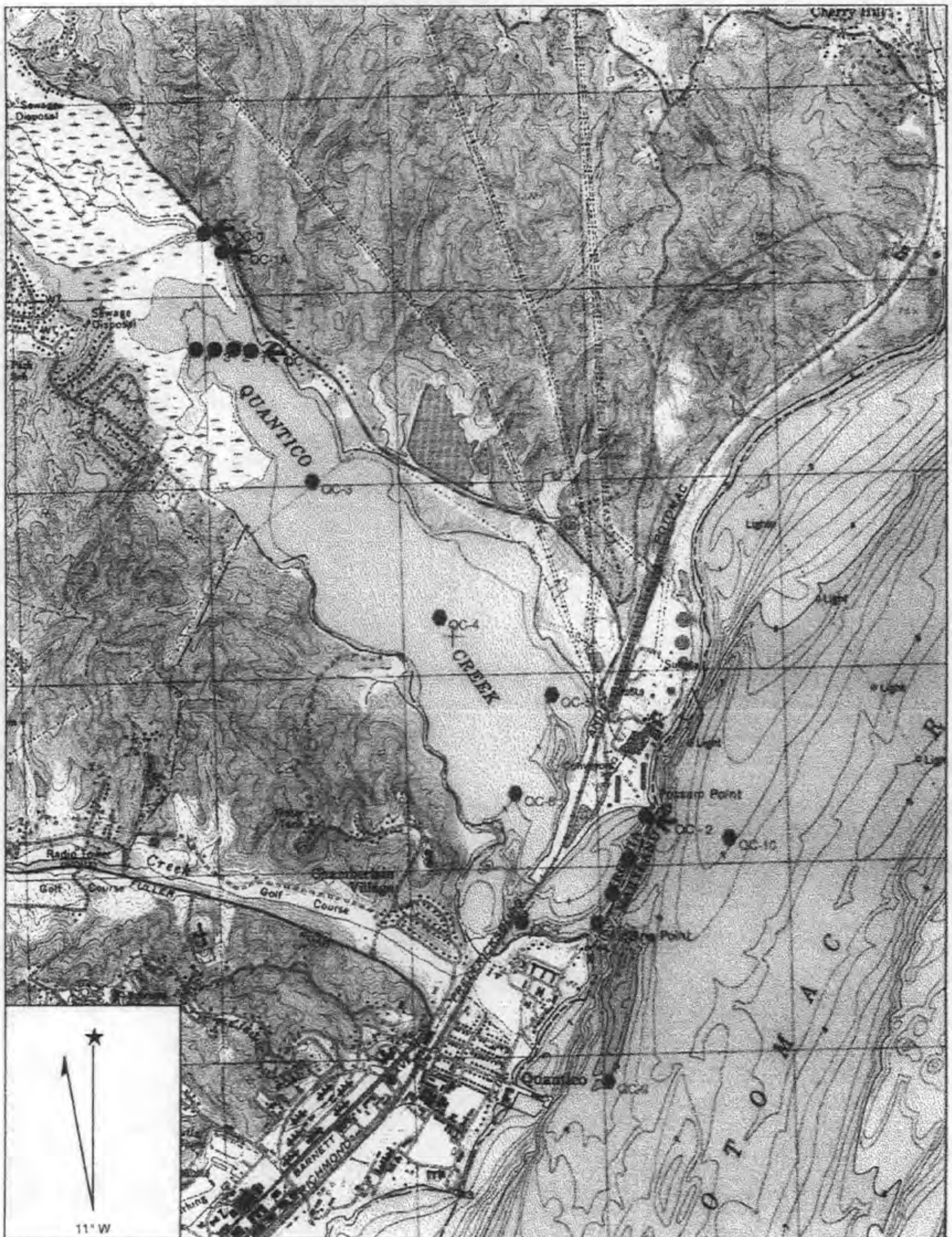


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Figure 4-1. *In situ* Monitoring Locations (June – October 2009)

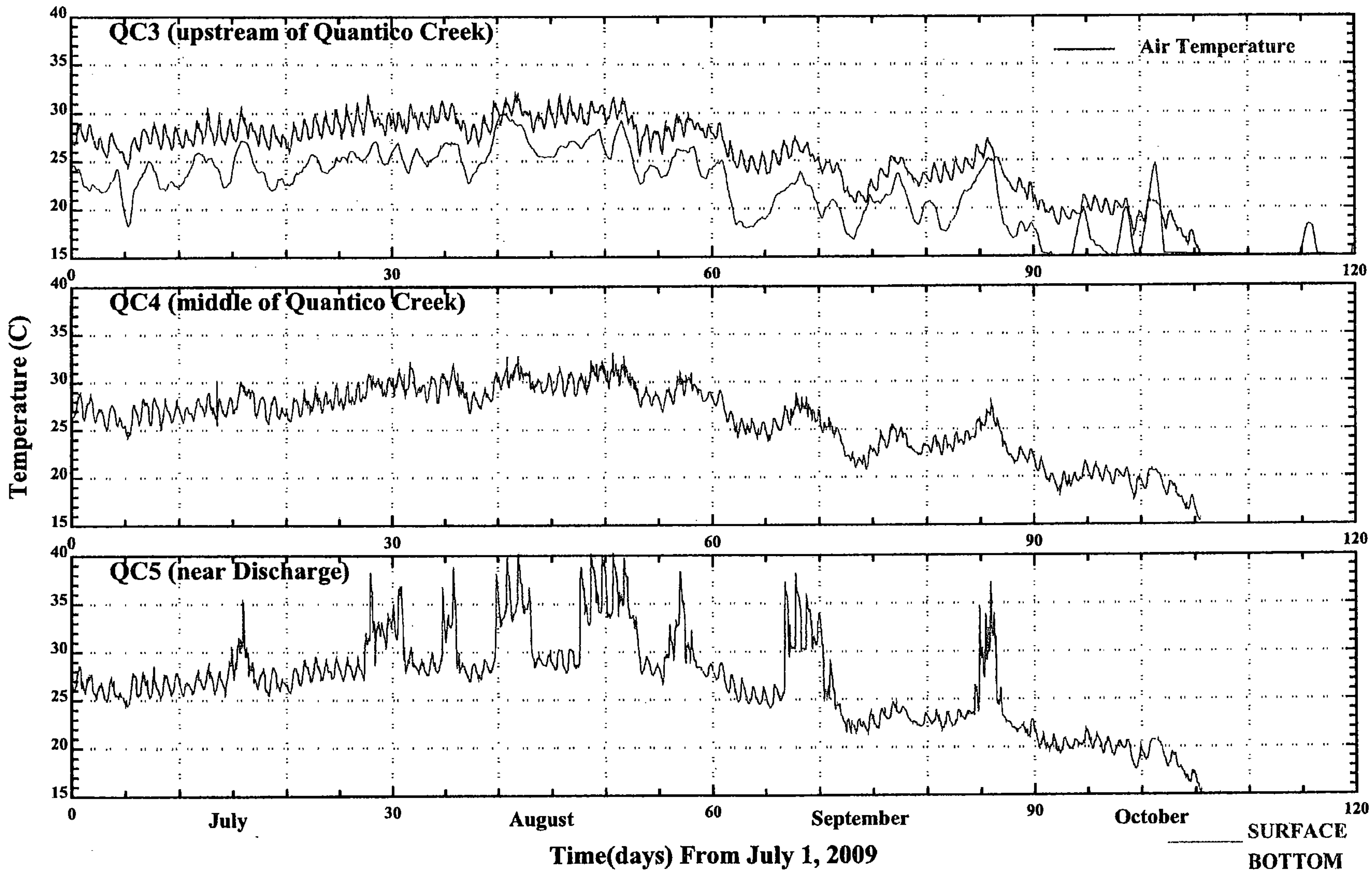

Figure 4-2. In situ Temperature Monitoring Data Collected During the Field Study

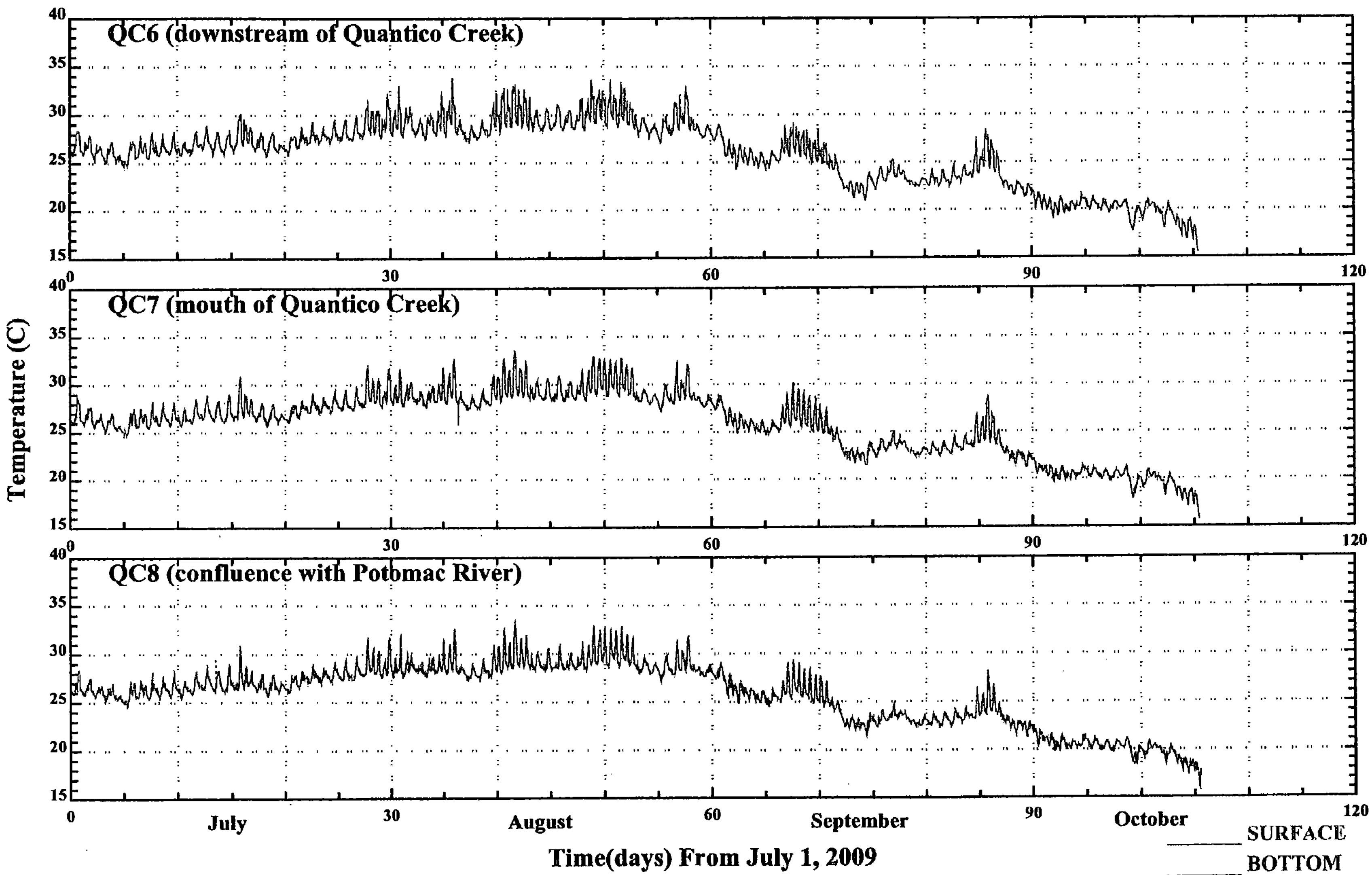

Figure 4-2. In situ Temperature Monitoring Data Collected During the Field Study (Cont.)

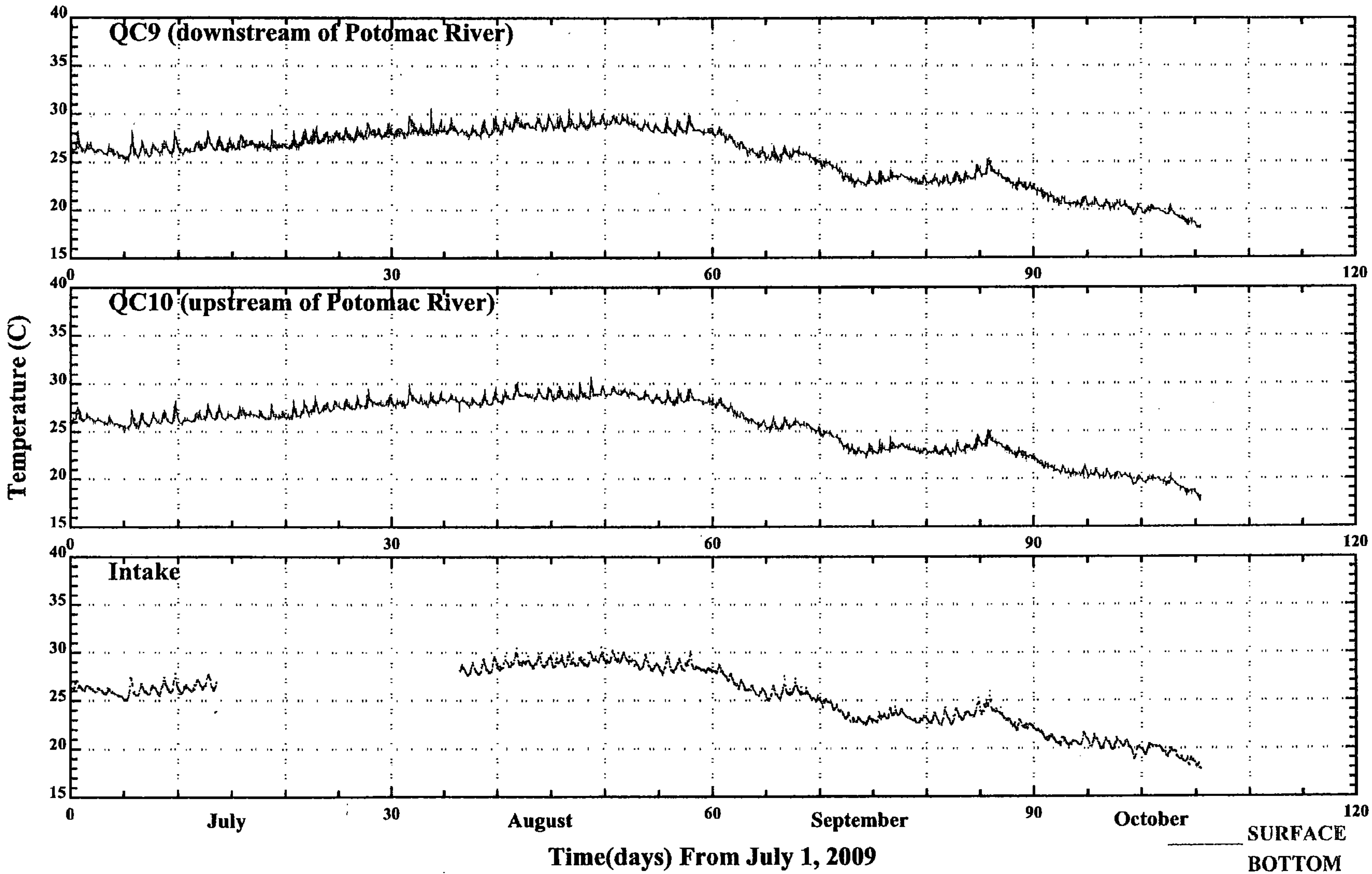

Figure 4-2. In situ Temperature Monitoring Data Collected During the Field Study (Cont.)

SECTION 5

HYDRODYNAMIC MODEL CONFIGURATION

A practical, numerically efficient and accurate approach has been taken to discretize Quantico Creek and the portion of the Potomac River in the vicinity of the Possum Point Power Station. The orthogonal, curvilinear grid system used in the present study is shown in Figure 5-1. The model domain encompasses the entirety of Quantico Creek and about 20 miles upstream and downstream of the Potomac River centered at Possum Point. The grid consists of 130x110 segments in the horizontal plane and 10 equally spaced σ-layers in the vertical plane. The transformed σ-coordinate system in the vertical plane allows the model to have an equal number of vertical segments in all of the computational grid cells. It should be noted that the curvilinear grid allows for finest grid resolution in the zone near the Possum Point Power Station discharges and coarser grid resolution at upstream and downstream locations in the Potomac River. This technique allows for an efficient and computationally time-effective modeling framework. The smallest grid size is about 30m (100 ft) in the vicinity of discharge locations and about 1000 m (3,300 ft) in the Potomac River. A zoomed-in view of the model grid near the Possum Point Power Station intake and discharge structures is shown in Figure 5-2.

Model parameters were set to reasonable values for the tidal system of the study area to produce results consistent with physical measurements. The minimum bottom friction coefficient, C_D, representing the characteristics of the river bottom was set to 0.025. The horizontal eddy diffusion coefficient based on the Smagorinsky (1963) formulation, C_S, was chosen equal to 0.01. A computational time step of 10 seconds produced stable and accurate model results for the entire simulation period.

5.1 MODEL VERIFICATION SIMULATION PERIOD

Data from thermal *in situ* temperature monitoring surveys conducted by Dominion from June through October, 2009 were used for model verification. The surveys were conducted to measure *in situ* water temperatures at eight stations in the model domain (Figure 4-1). The five month simulation period used to verify the model was selected as June through October, 2009 in order to encompass the survey period. Model performance was assessed against these field observations.

5.2 MODEL FORCING (BOUNDARY CONDITIONS)

A number of forcing functions were used to drive the model. These forcing functions include tidal water level variations at the model boundaries and concurrent temperature measured during *in situ* temperature monitoring surveys. Because no tide stations exist in the immediate vicinity of the upstream and downstream model boundaries, tidal harmonic constituents were obtained from NOAA. These harmonic constituents were then used to predict hourly tidal water levels at both boundaries. Tidal data obtained from the nearest NOAA stations in Washington D.C. (NOAA Station #8594900) and Lewisetta, VA (#8635750) were used to estimate sub-tidal water elevations caused by upstream river flows and meteorological conditions such as wind induced low-frequency water elevations. Boundary water elevations were then constructed by combining predicted tidal elevations and the low frequency water elevations. Figure 5-3shows the tidal water elevations and temperatures specified at the open boundaries.

Meteorological boundary conditions which determine atmospheric and solar heating and cooling such as wind speed and direction, air temperature, cloud cover, barometric pressure, and relative humidity were used as input to the model. These data were obtained from the Quantico Marine Corps Air Base, which is located about 2.5 miles downstream of the Possum Point Power Station. The weather station at Quantico Marine Air Base measured all components required for the computation of heat fluxes. Hourly meteorological data used for the model validation are shown in Figure 5-4.

Thermal loads from the Possum Point Power Station were estimated from Station operating data. Although the Station measured the continuous outfall temperatures during the survey period, discharge flow rates at Outfalls 001/002 and 003 were not monitored continuously during the field survey period. Due to the intermittent operation of the Possum Point Power Station, there are times of relatively rapid increase of discharge temperatures when Units 3 and 4 began power production. These units utilize once-through cooling system and their combined discharge volumes can reach about 220 MGD. Station operating data indicate that circulating pumps associated with Unit 3 (Outfall 001/002) were operating at a constant flow rate of 80 MGD during the summer of 2009 regardless of Station power output. Unit 4 circulating pumps were operating at 114 MGD during down times and increased up to 142 MGD when it began generating electricity. These data were used to configure the Station's intake and discharge flows and associated temperatures in the model input module. These Station intake and discharge volumes, as well as water temperature data during the field survey period, were specified for the model forcing. The Station operating data, including discharge flow and associated temperature when each unit is operating, are summarized in Table 5-1 and are shown in the lower two panels in Figure 5-3.

Table 5-1. Station Operation Conditions during the Model Verification Period

Outfall 001/002		Outfall 003	
Flow (MGD)	**ΔT (°C (°F))**	**Flow(MGD)**	**ΔT (°C(°F))**
80	10 (18)	114 - 142	10 (18)

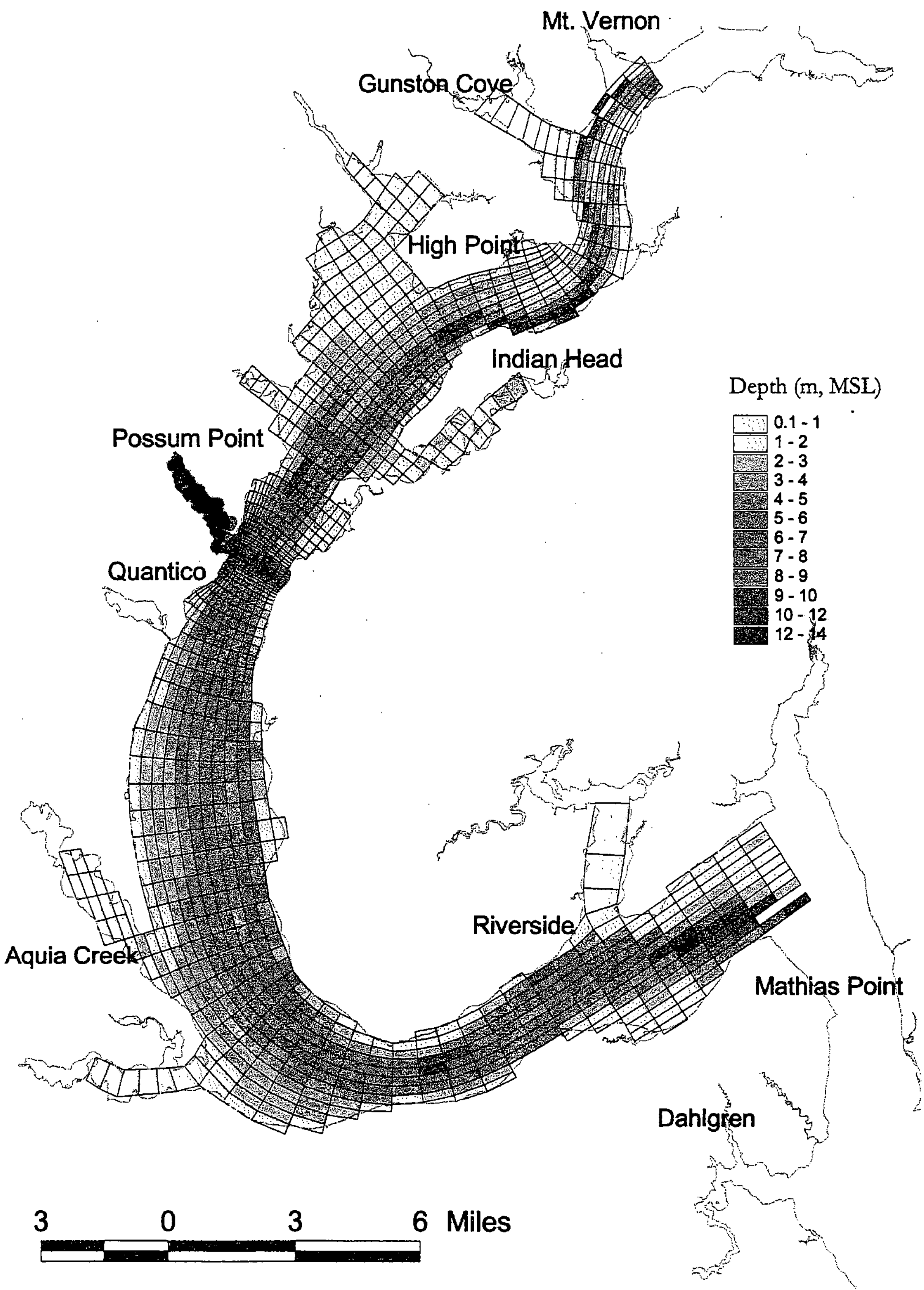

Figure 5-1. Orthogonal Curvilinear Grid of the Possum Point Power Station Thermal Discharge Study

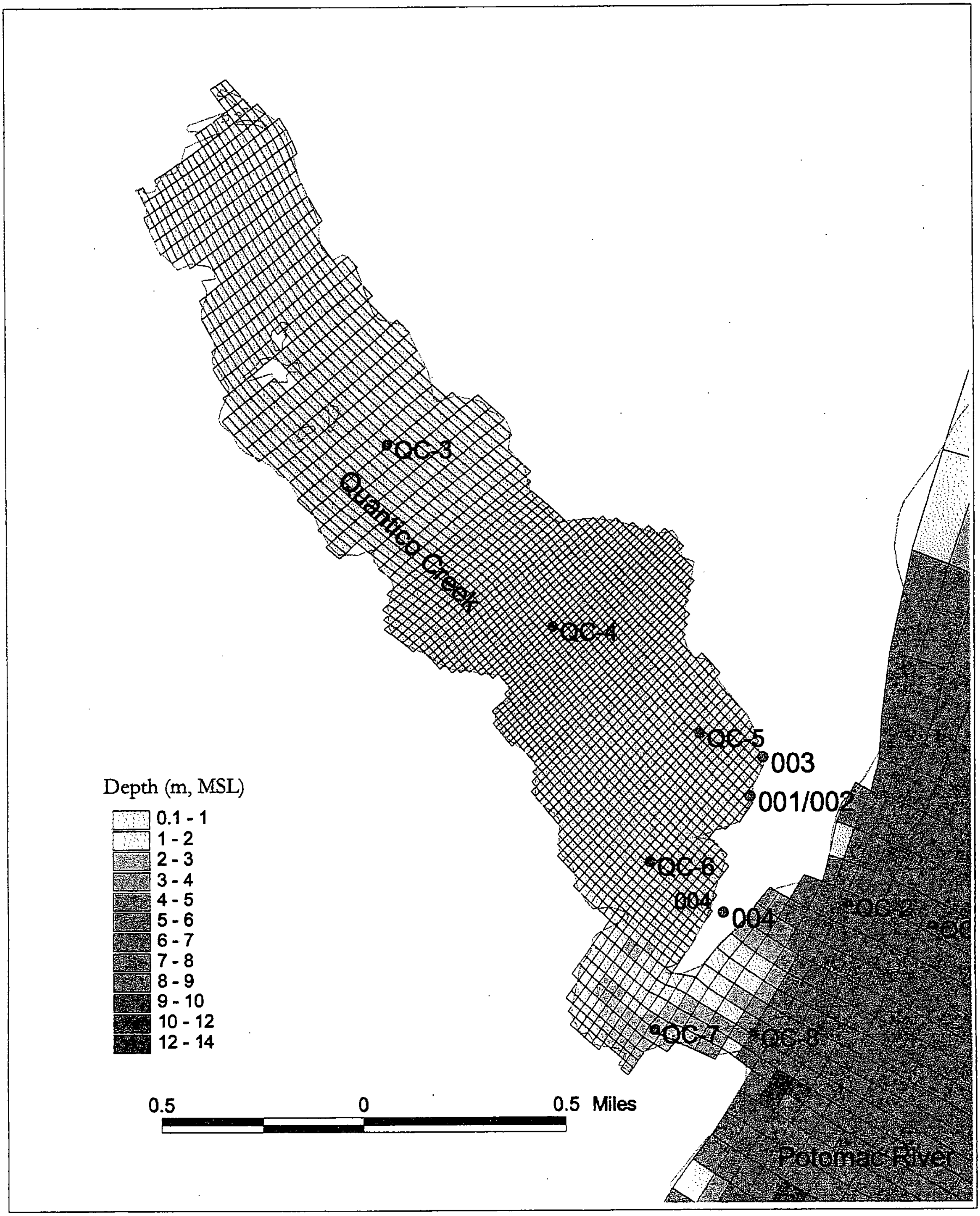

Figure 5-2. Zoomed-in View of Model Grid. Monitoring Locations Are Also Shown

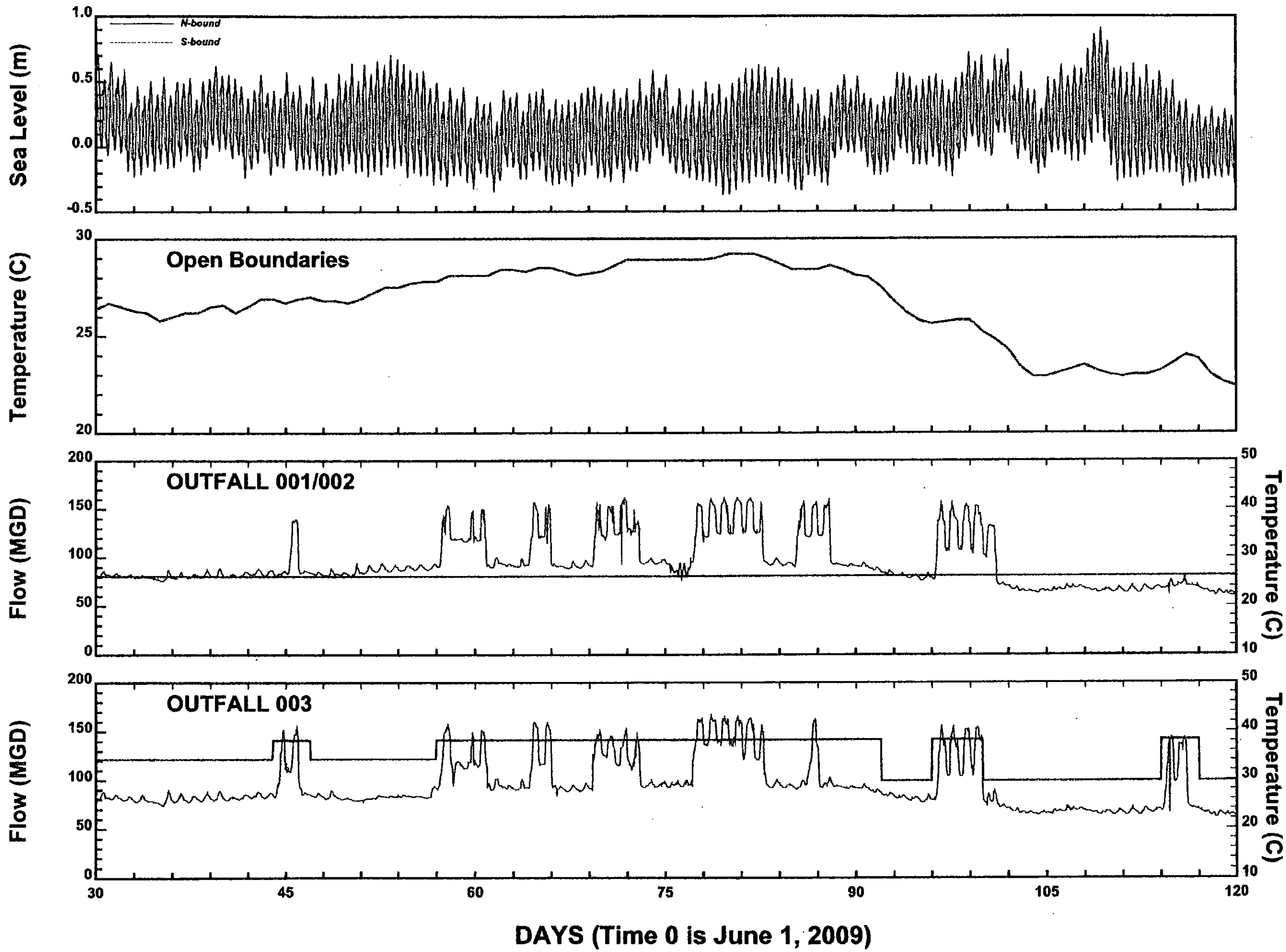

Figure 5-3. Open Boundary Forcing and Station Operating Conditions During the Model Validation Period

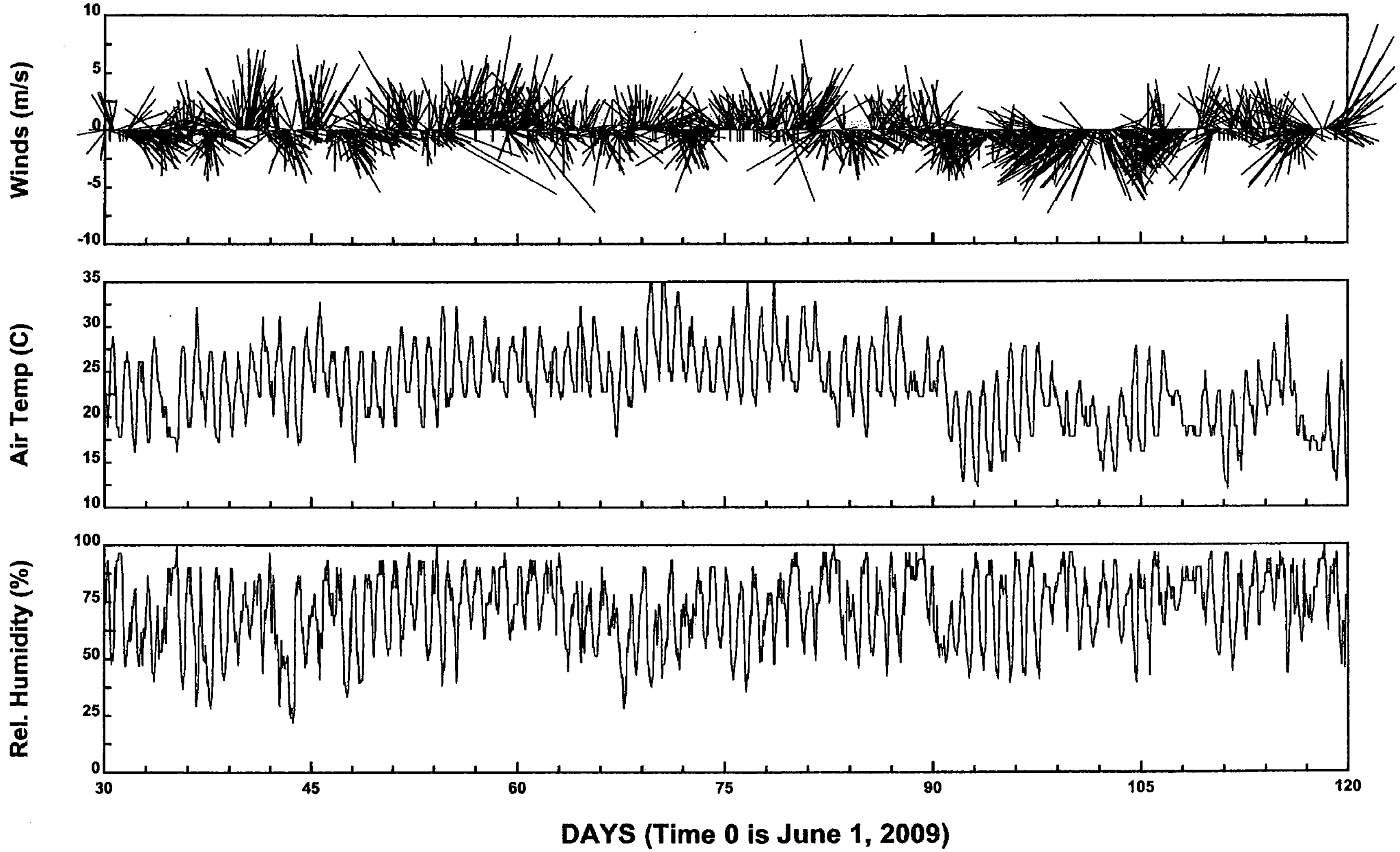

Figure 5-4. Meteorological Data Used During the Model Validation Period

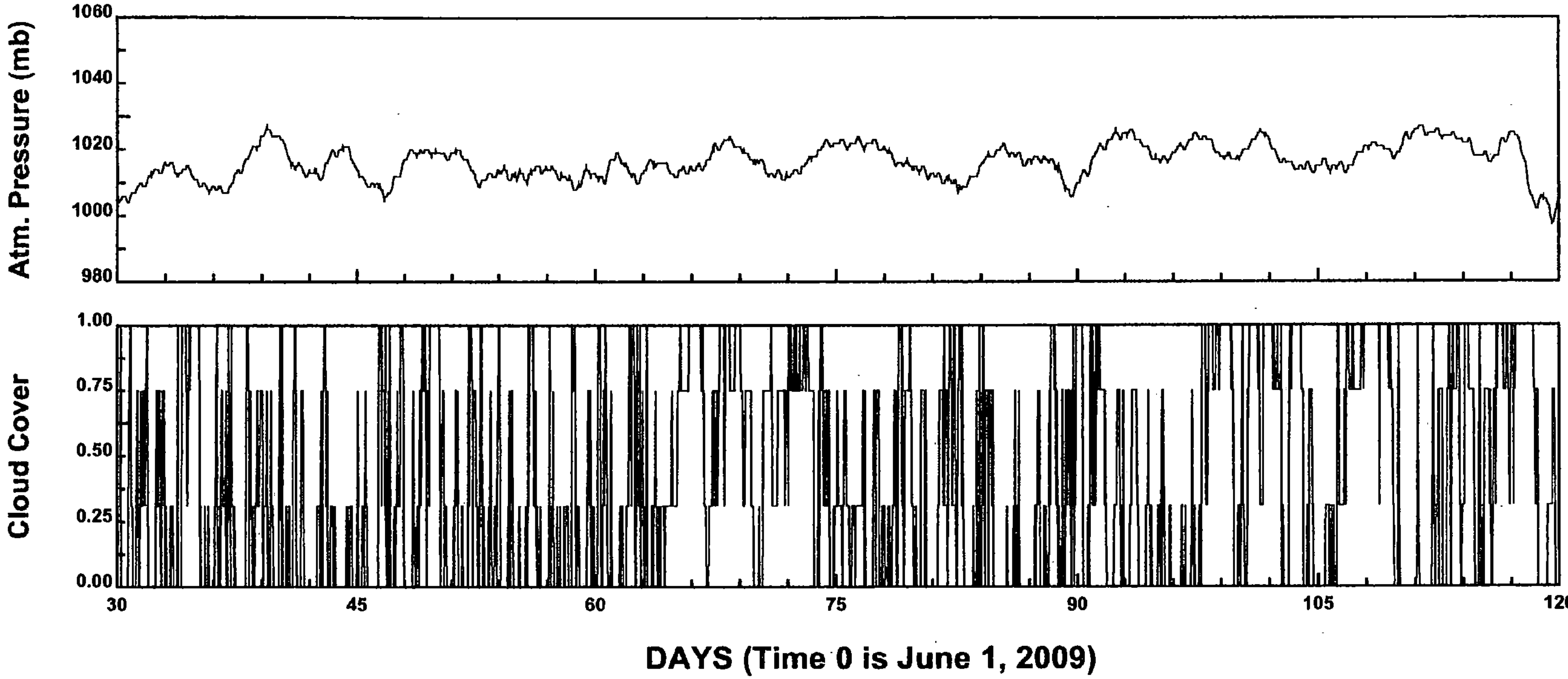

Figure 5-4. Meteorological Data Used During the Model Validation Period (Cont.)

SECTION 6

MODEL VERIFICATION

The goal of this study was to develop a reliable hydrodynamic model to reproduce temperature distributions in Quantico Creek and the Potomac River in the vicinity of the Possum Point Power Station. In order to establish the credibility and skill of the model, verification of the model was accomplished by comparing model results against field measurements. The calibrated model parameters did not change in time. Therefore, the degree of reliability and robustness of the model for reproducing receiving water temperature distributions in the vicinity of the Possum Point Power Station during the simulation period for a wide range of the Station's operating conditions, meteorological and hydrodynamic conditions in the study area can be most reliably assessed.

The model simulations were performed for the period June through October, 2009, a period that encompassed the field measurements conducted by the Dominion field crew. The simulation period provides a range of forcing mechanisms, especially for wind speed, wind direction, and seasonal changes of air temperatures.

Figure 6-1 shows the comparison of model-computed tidal water elevations with NOAA predicted water elevations at five locations within the model domain. The locations for these tidal water elevations are shown in Figure 5-1. Broken red lines indicate the data (measurements) and solid black lines indicate model-computed water elevations. The figure indicates that there are substantial variations in amplitude of tidal elevations from downstream end at Riverside to Gunston Cove near the upstream end of the model domain. At Riverside, tidal range is about 0.45m (~1.5 ft). As the tide travels upstream, its amplitude increases slowly, and by the time tides reach the upstream end of the model domain, the tidal range is about 0.65m (~2.1ft). A phase lag of about 2.5 hours exists between Riverside and Gunston Cove. The figure indicates that the model reproduces both the tidal amplitude and phases at all locations.

Figure 6-2 illustrates the comparison of model predicted surface water temperature against the observations at ten locations, including two additional locations (QC2 and Potomac 119,70) where *in situ* temperature monitoring stations were not placed. Locations of these stations are shown in Figure 4-1. Model-computed temperatures (blue lines) compare well with measurements (red lines) at all stations. Light gray lines in each frame indicate 24-hour moving average air temperature measured at Quantico Marine Air Base. At QC-5, which was placed near the Station's outfalls, measured and computed water temperatures increase by as much as 10°C (18°F) when Units 3 and 4 were operating. Within Quantico Creek, model-computed surface temperatures follow general patterns of the attenuation of temperature rise due to thermal loads from the Possum Point Power Station as discharge water moves away from the outfalls. For example, increased water temperatures due to thermal discharges observed at QC-5 and QC-6, which were located near the Station's outfalls, rapidly dissipate as discharged water moves toward the Potomac River. By the time the thermal plume reaches QC-9 and QC-10, which were located downstream and upstream of Quantico Creek in the Potomac River, there is no visible signs of thermal discharge.

It is interesting to note that, at around Days 95 and 105, there are substantial temperature decreases over a few days at the stations positioned within Quantico Creek. This relatively rapid cooling of water temperatures is not as apparent at locations in the Potomac River. It appears that the shallow waters of Quantico Creek respond to decreasing air temperatures (shown in gray lines) faster than deep waters in the Potomac River. At these times, there are about 4°C (7.2°F) differences between QC-3 and QC-9 or QC-10. The close examination of measured water temperatures within Quantico Creek and the main section of the Potomac River indicates that there is about a 1-3°C (1.8-5.4°F) difference on any given day regardless of Station discharges. The model performed very well to reproduce these temporal and spatial variations of water temperatures in the vicinity of the Possum Point Power Station during operation as well as during Station down times.

Plan views of hourly averaged surface temperature distributions at different times are shown in Figures 6-3 and 6-4. In each figure, measured temperatures at *in situ* monitoring are shown in colored circles along with their values (°C). Figure 6-3 shows surface temperatures in Quantico Creek and part of the Potomac River at Day 84.85 (August 24, 2009 20:00). The Possum Point Power Station was not operating on that day, and there was no visible temperature rise near the Station's outfalls. Figure 6-4 shows the surface temperature distribution on Day 79.10 (August 19, 2009 02:00) when the station was operating. There is clear indication of thermal plume near the outfalls (temperatures > 36°C (96.8°F)). Background temperature in the Potomac River is about 29°C (84.2°F) at this time. As discussed earlier, Figures 6-3 and 6-4 indicate that there are at least 1-2°C (1.8-3.6°F) temperature gradients between the deep waters in the Potomac River and the shallow parts of Quantico Creek.

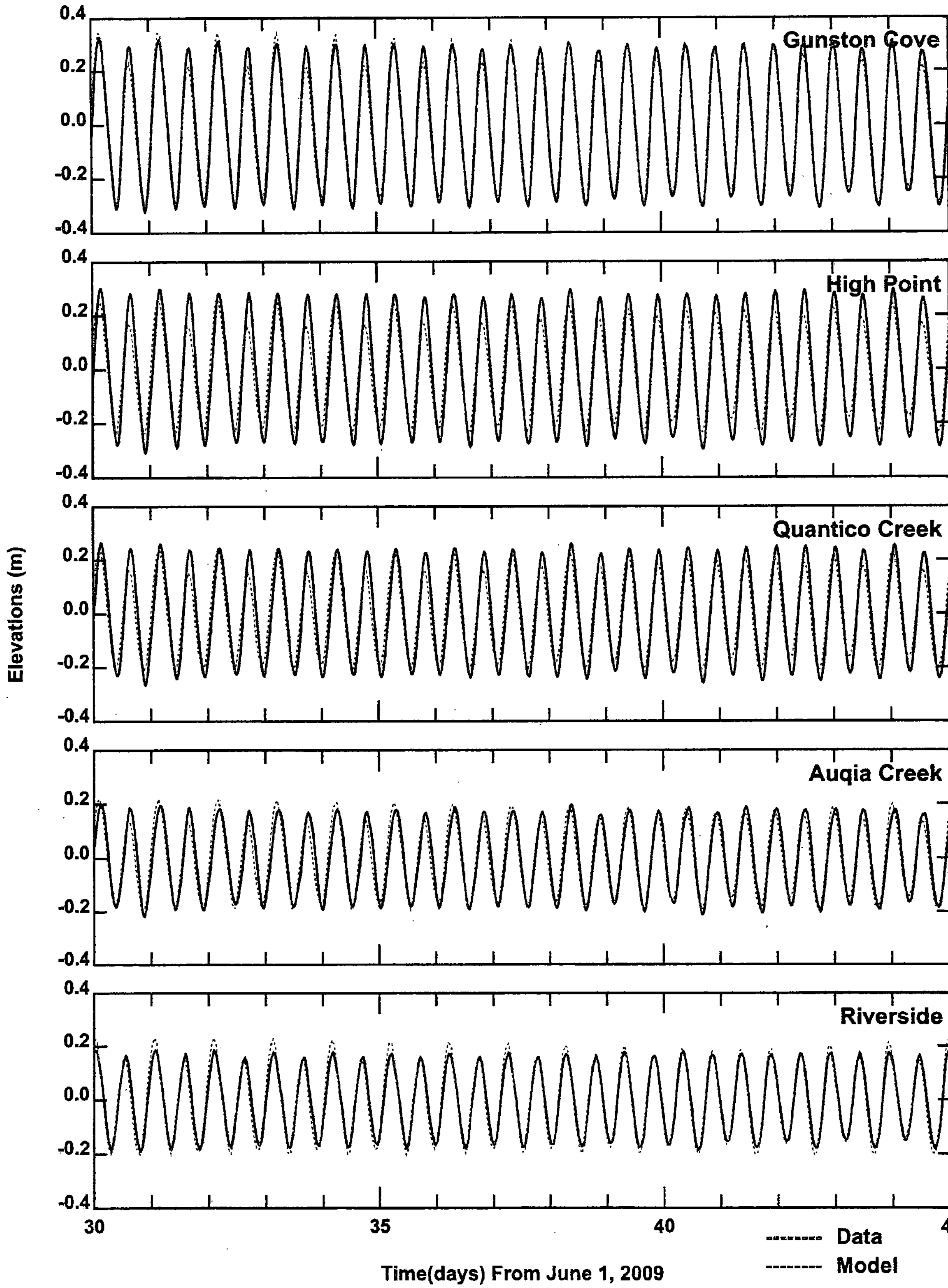

Figure 6-1. Comparison of Model Results with NOAA predicted Tidal Water Elevations

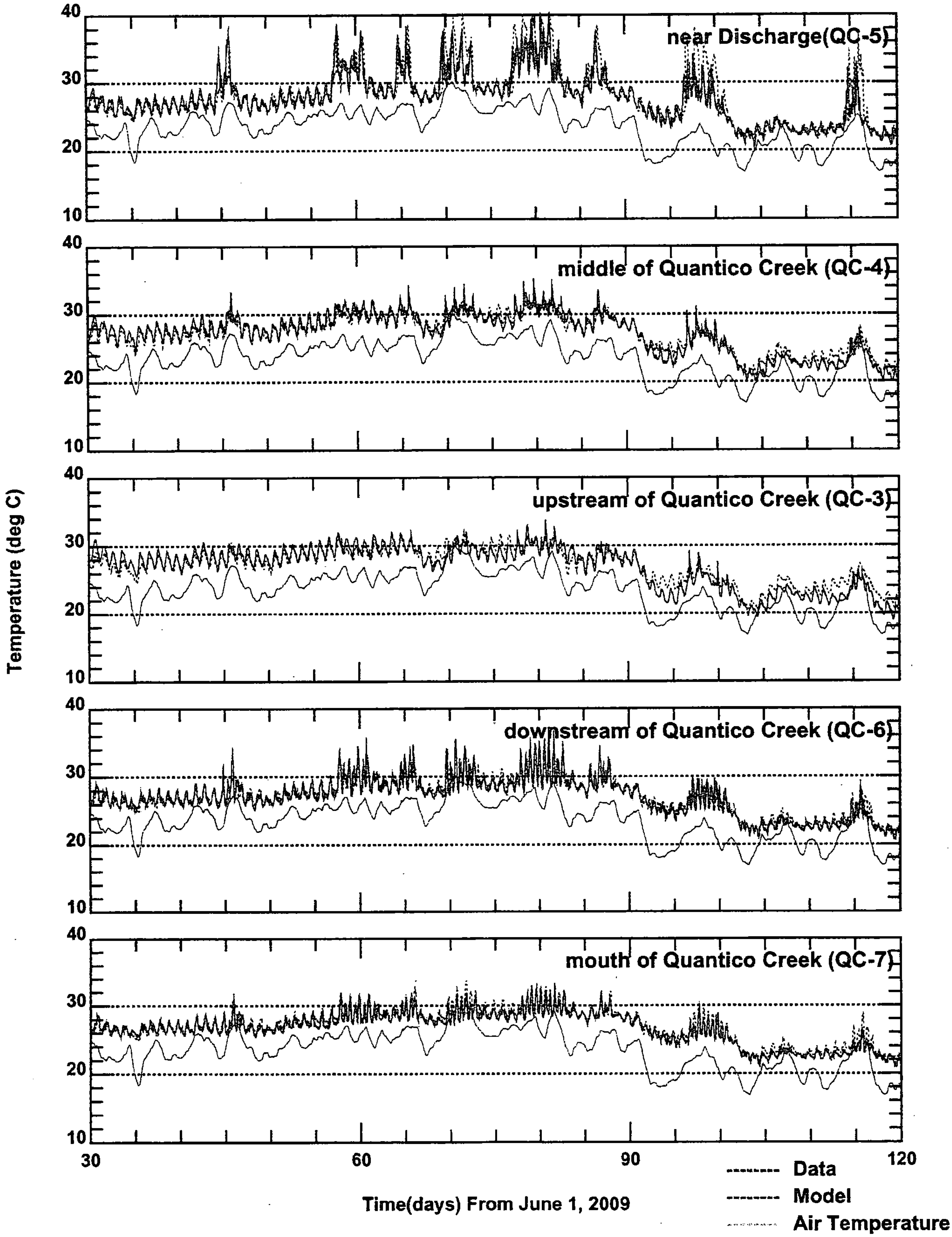

Figure 6-2. Comparison of Model Results with in situ Temperature Monitoring Data

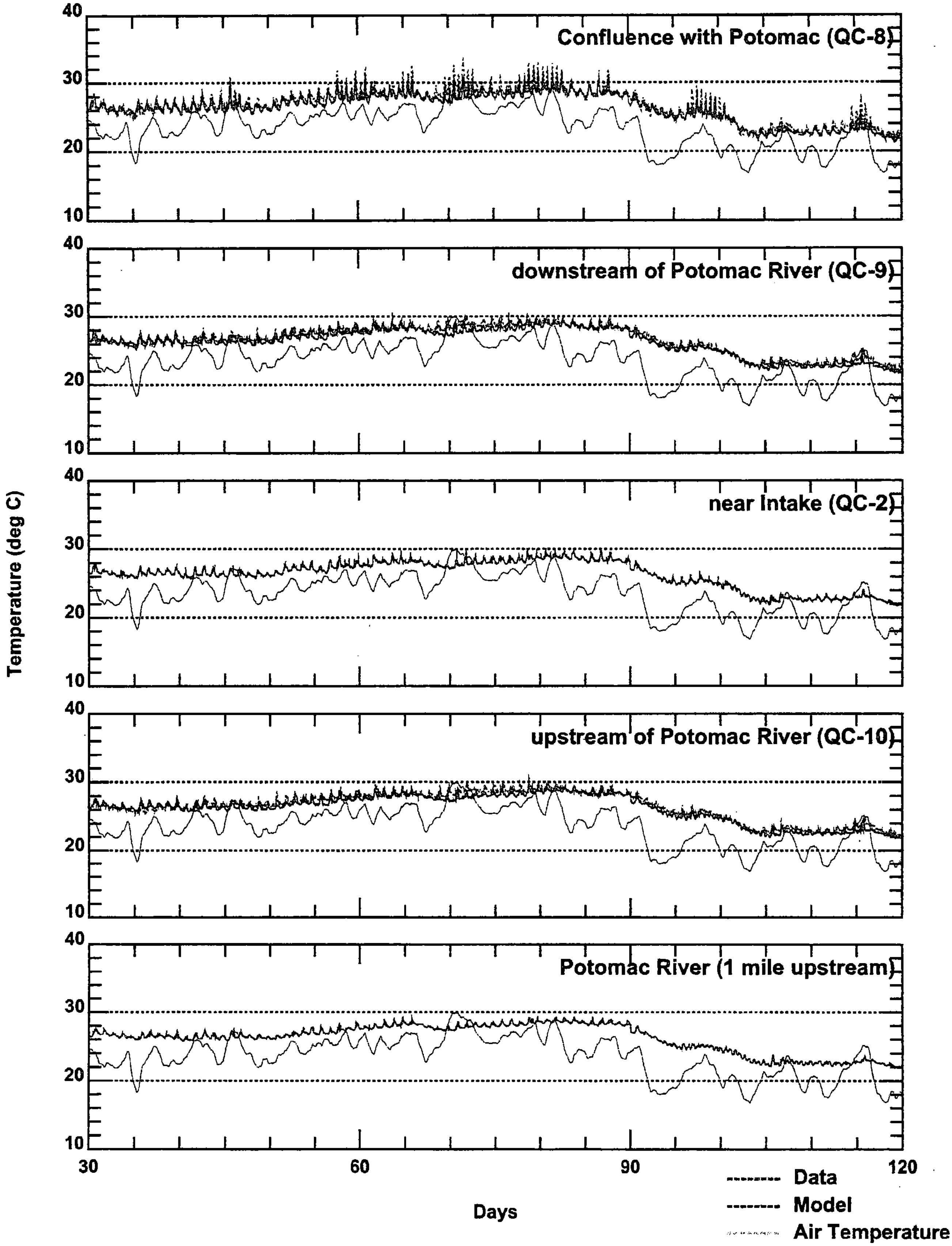

Figure 6-2. Comparison of Model Results with in situ Temperature Monitoring Data (Cont.)

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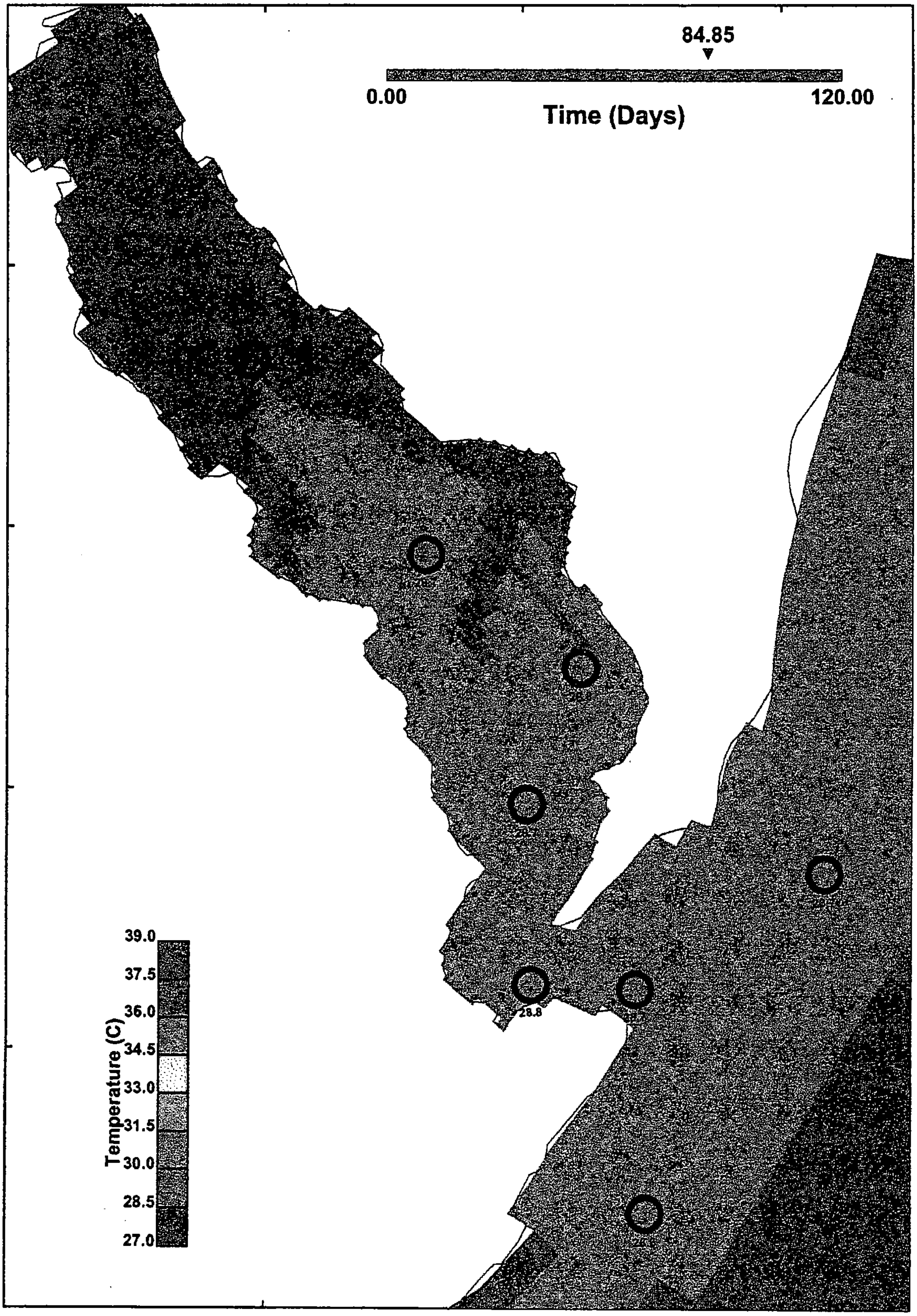

Figure 6-3. Surface Water Temperature Distribution when Possum Point Units 3 and 4 are not Operating

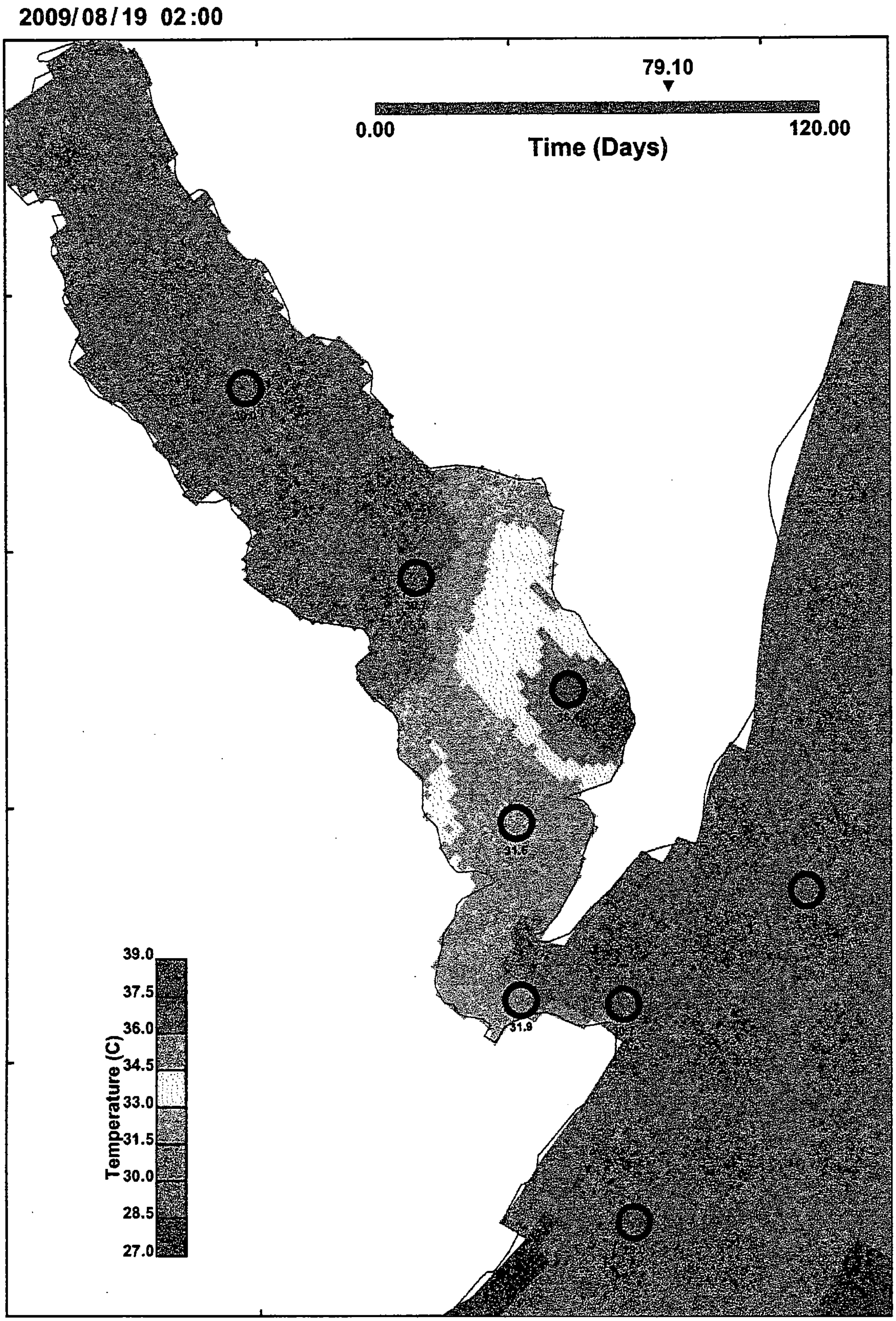

Figure 6-4. Surface Water Temperature Distribution when Possum Point Units 3 and 4 are Operating

SECTION 7

MODELING ANALYSIS FOR FULL OPERATING CONDITIONS

After the model was verified against field measured temperatures, modeling simulations were performed for extreme summer and winter months under maximum Station operating conditions. The Possum Point Power Station withdraws cooling water for its four units from the Potomac River and discharges it to Quantico Creek. Of these four units, two units are once-through cooling system (Units 3 and 4) and other two units (Units 5 and 6) utilize cooling tower system (closed-circuit). The maximum difference (ΔT) between the temperature of the cooling water discharged to the discharge outlet and water withdrawn from the Potomac River at the intake structure under current full power operation is approximately 10°C (18°F) for Unit 3 and 12.2°C (22°F) for Unit 4. Whereas the maximum temperature differences of the cooling water blow-downs for the Units 5 and 6 are approximately 6°C (10.8°F) and 11.1°C (20°F), respectively. However, these temperatures of blow-downs from Units 5 and 6 are from the cooling tower design specifications. Actual values monitored during the 2009 field survey period shows they were less than 3°C (5.2°F) for both units. Maximum discharge water temperature for the Low Volume Settling Basin (Outfall 4) was derived from a previous study for the outfall (Lung, 2004). For the modeling analysis of extreme summer and winter conditions, maximum cooling water flows and discharge temperatures were used based on peak operating conditions of the Possum Point Power Station. Table 7-1 lists the ΔT values and Station flows used in the analysis.

Table 7-1. Operational Scenarios Used in Modeling Analysis for Full Operating Conditions

Outfall	Unit	Maximum Discharge (MGD)	Maximum ΔT °C (°F)
001/002	3	81.4	10 (18)
001/002	5	5.8	6 (10.8)
001/002	6	2.0	11 (19.8)
003	4	142.5	12.2 (22)
004	Low Volume Settling Basin	3.5	20 (36)

7.1 SIMULATION OF EXTREME SUMMER CONDITIONS

7.1.1 Forcing Functions

As stated in Section 2, weak wind speeds and warm air temperatures impede dissipation of thermal discharges in the study area. Analyses of long-term meteorological data collected at Quantico Marine Air Base from 1998 through 2009 indicate that the annual wind pattern (Figure 2-1) is characterized by relatively strong and more frequent winds from the west and northwest. Although there is no distinct seasonal wind pattern in the area, wind speed is generally higher in winter months than in summer (see Section 2), leading to more rapid mixing and heat dissipation. Monthly-averaged air temperatures were obtained from this data set and are presented in Table 2-1. Inspection of these data revealed that August 2005 was the hottest month on average for the data period. Therefore, a model simulation for the August 2005 period was selected to represent a critical (minimum surface cooling) summer period. As in the case of the model verification period, a wide range of data were used to drive the model for the critical summer month conditions. Predicted water surface elevations were applied at the model open boundaries.

The hydrodynamic model was also driven by meteorological forcing functions including wind, air temperature, relative humidity atmospheric pressure, and cloud cover. Observed data at the Quantico Marine Air Base during August 2005 were used. Figure 7-1 illustrates the atmospheric boundary conditions used in the model. The Possum Point Power Station operational data were brought into the modeling framework by configuring the Station's intake and discharge temperatures. Discharge flow volumes for each unit were specified as constant during the summer month as listed in Table 7-1.

7.1.2 Model Simulations

After all the forcing functions described above were configured for the model, two model simulations for the period August 1 to 30, 2005 were performed. One simulation included all thermal loads from Units 3, 4, 5, and 6. An additional simulation was also performed without the Station's thermal loads to estimate receiving water conditions before the addition of heat (a Blank Run). As discussed in the previous section, field measurements indicate that there are about 1-3°C (1.8-5.4°F) spatial temperature differences between Quantico Creek and the main channel of the Potomac River.

Figure 7-2 shows the results of the model simulation for the extreme summer condition. The figure shows model forcing data (wind, air temperature, and tidal elevations) as well as thermal areas exceeding Δ3°C. The top panel is a stick diagram of the wind showing its direction to which wind blows and magnitude (black line) and speed (blue line). The right hand side of the y-axis in the top panel shows the magnitude of wind speed (m/s). The bottom panel shows hourly surface plume areas exceeding Δ3°C (or Δ5.4°F) before addition of Station heated effluents. The figure indicates that thermal areas (ΔT ≥ 3°C or 5.4°F) vary from 100 to 500 acres depending on tide and wind conditions. Model results indicate that wind speed is somewhat related with the size of thermal areas. For example, at Days 20, 23, 24, 26, and 27, when the size of the thermal areas exceeds 400 acres, wind speeds are less than 3 m/s (or ~7 mile per hour). These results show that air temperature does not have much effect on the size of thermal areas. The average size of the thermal area during the extreme summer month is 269 acres, which covers about 40% of the surface area of Quantico Creek.

Model results indicate that thermal areas are larger during floods (i.e. high tides) when the discharged thermal plume disperses to shallow areas in Quantico Creek because it has limited volume of water to mix and dissipate heat. On ebbing cycles of the tide, heated water leaves Quantico Creek and mixes with relatively deep Potomac River waters, further reducing the size of areas exceeding Δ3°C. Figures 7-3 and 7-4 show the elevated water temperatures due to the operation of Possum Point Power Station during high and low tides, respectively.

7.2 SIMULATION OF WINTER CONDITIONS

7.2.1 Forcing Functions

As indicated in Tables 2-1 and 2-2, January and February are typically the coldest months of the year in the region. After review of the measurements, a model simulation for the period of 30 days from January 26 to February 24, 2007 was selected to represent the extreme winter month. Average air temperature during this 30 day period was 29.2°F.

Model forcing data were compiled the same way as for the summer extreme month simulation (Section 7.1.1). Station physical conditions for the winter period (i.e. outflow rates, discharge temperatures, etc.) were the same as those used for the extreme summer simulation. Meteorological forcing data (wind, air temperature, relative humidity, atmospheric pressure, and cloud cover) for the extreme winter month simulation represent the conditions that occurred in January 26 through February 24, 2007. Figure 7-5 illustrates the atmospheric boundary conditions used in the model simulations for winter conditions.

7.2.2 Model Simulations

After input data for the 30 day extreme winter period were configured for the model, simulations were performed for the Station's maximum operating conditions (see Table 7-1). Figure 7-6 shows daily-averaged surface plume areas (ΔT ≥ 3°C) (bottom panel) and hourly meteorological forcing data and tidal water elevations for the extreme winter simulation period. The figure shows that model-predicted plume areas ($\Delta T \geq 3°C$) during the winter simulation period, were smaller compared to those of summer (see Figure 7-2). During the winter simulation period, the computed thermal areas are usually less than 300 acres except during days when air temperatures exceeded 5°C (41°F) and wind speeds were persistently lower than 3 m/s (~7 mph). The figure shows that during extreme months the thermal areas rarely exceeds 400 acres and monthly average of the thermal plume area during the winter simulation period is about 226 acres.

7.3 STATISTICAL ANALYSIS ON THE POSITION OF THERMAL PLUME

7.3.1 Summer Extreme Conditions

Frequency analysis of projected plume positions based on the August 2005 simulation period was performed. Hourly plume positions were mapped for the simulation period. Figure 7-7 depicts the contour map of the frequency of plume ($\Delta T \geq 3°C$) occurrence. The outermost contour line represents the occurrence of thermal plume 1 percent of the time (about 7 hours out of 720 hours, or 30 days) during the 30 day simulation. Given that these contour lines were estimated during the warmest month in 12 years between 1998 and 2009, the outermost contour line actually represents the occurrence of a thermal plume that would be expected to occur much less than 1 % of the time. The shape of the contours depicts the general shape of the Possum Point Power Station plume during the extreme summer period and maximum station operation. The results indicate that under the maximum Station operating conditions, the contour line indicating the frequency of 50 percent occurrence remains within about 5,000 feet of the Station. In other words, 50 percent of the time the thermal plume would remain within this area. Less frequently the plume may travel as much as 9,000 feet from the Station to the upstream of Quantico Creek and few thousand feet into the Potomac River.

Tabulation of the areas of these contour intervals is shown in Table 7-2, which describes the thermal impact in terms of the maximum surface area in which $\Delta T \geq 3°C$ and the frequency of occurrence. The table shows that the aerial extent of the model-predicted thermal plume ($\Delta T \geq 3°C$) that occurs with 99 percent frequency is limited to 657 acres. The results also show that while on average the thermal plume will remain within a few thousand feet of the power Station discharge within an area of 266 acres, at any instantaneous moment (about 1 percent of time), under extreme low wind or high air temperature conditions, the plume may be found within 657 acres.

Table 7-2. Area Coverage as a Function of Frequency of Thermal Plume Occurrences (ΔT ≥ 3°C) Under Maximum Station Operating Conditions during August 2005 Extreme Summer Simulation Period

Frequency (≥ %)	Hours of Occurrence[a]	Thermal Area (acres)
1	7	657
5	36	553
10	72	491
20	144	430
30	216	381
40	288	322
50	360	266
60	432	202
70	504	148
80	576	109
90	648	57

a. Values reflect total time (30 days or 720 hours) versus duration of a sustained plume

7.3.2 Winter Extreme Conditions

The same frequency analysis of plume positions was performed using the winter 2007 model simulation results. Hourly plume positions were mapped for the 30 day simulation period. Figure 7-8 depicts the contour map of the frequency of plume (ΔT ≥ 3°C) occurrence during the extreme winter simulation period. The outermost contour line represents the occurrence of thermal plume 1 percent of the time during each simulation. The shape of the contours for winter period shows a similar plume shape as those during the summer period. The 90 percentile or higher contour lines (shaded in dark reddish colors) are bigger than those during the summer period while the 1 percentile contour line occupies smaller area. It appears that strong and persistent northerly wind during the simulation period may have trapped the thermal plume near the discharge locations and pushed the plume toward shallow part of Quantico Creek for a prolonged period of time.

Tabulation of the area associated with these contour intervals is shown in Table 7-3, which describes the thermal impact in terms of areal extent in which ΔT ≥ 3°C and the frequency of occurrence. The table shows that the aerial extent of the 50 percent frequency of occurrence of the model predicted thermal plume (ΔT ≥ 3°C) is limited to 212 acres during the extreme winter month. The area with a 1 percent or higher frequency of occurrence in the extreme winter month is 507 acres which is about 23 percent smaller than for the extreme summer simulation period. The results indicate rapid cooling of the discharged thermal plumes during the winter month under relatively higher wind speed and low air temperature.

Table 7-3. Area Coverage as a Function of Frequency of Thermal Plume Occurrences ($\Delta T \geq 3°C$) Under Maximum Station Operating Conditions during January 26 – February 24, 2007 Extreme Winter Simulation Period

Frequency (≥ %)	Hours of Occurrence[a]	Thermal Area (acres)
1	7	507
5	36	457
10	72	410
20	144	337
30	216	287
40	288	247
50	360	212
60	432	181
70	504	140
80	576	102
90	648	75

a. Values reflect total time (30 days or 720 hours) versus duration of a sustained plume

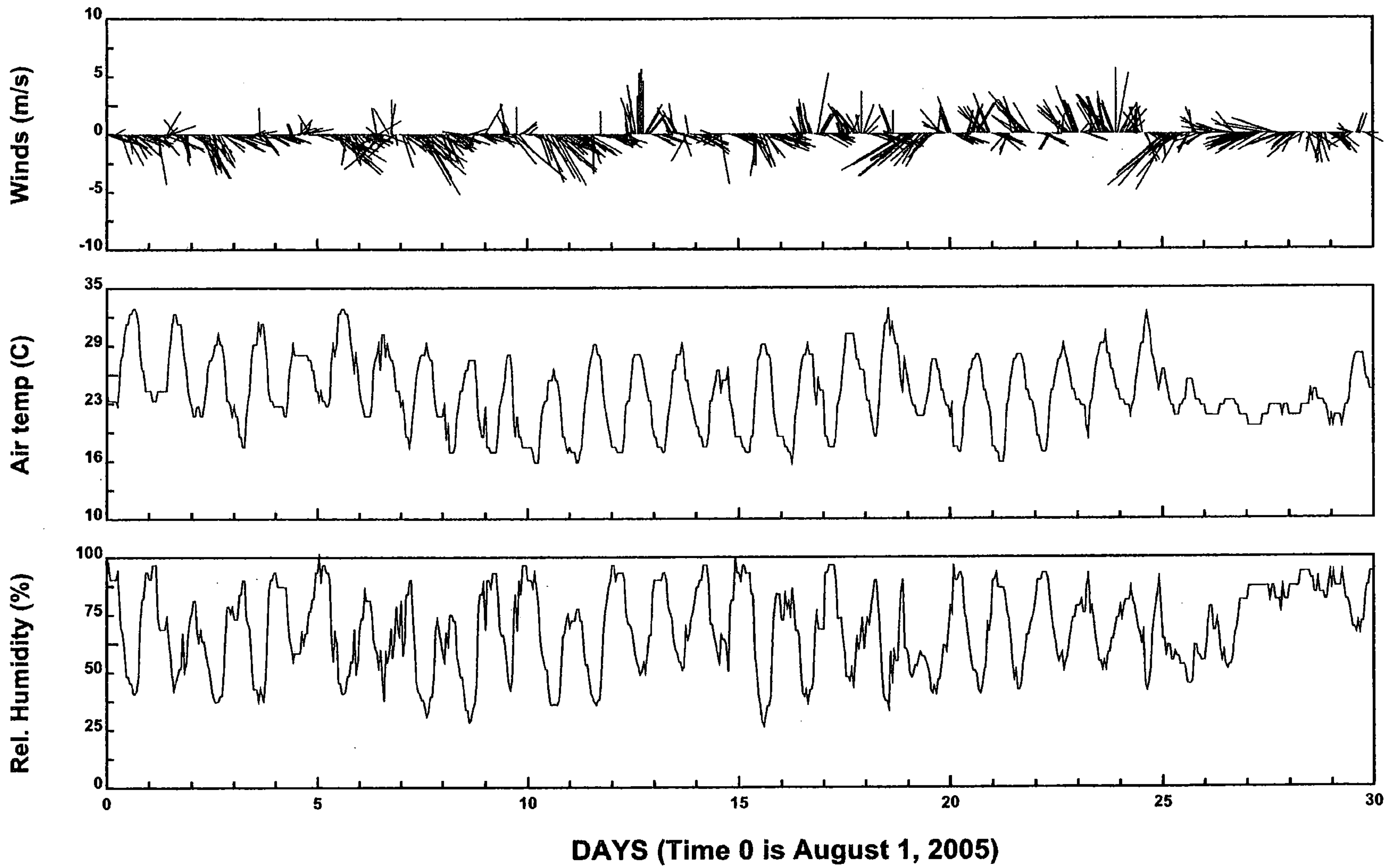

Figure 7-1. Meteorological Data Used in the Model for the Extreme Summer Condition (August 2005)

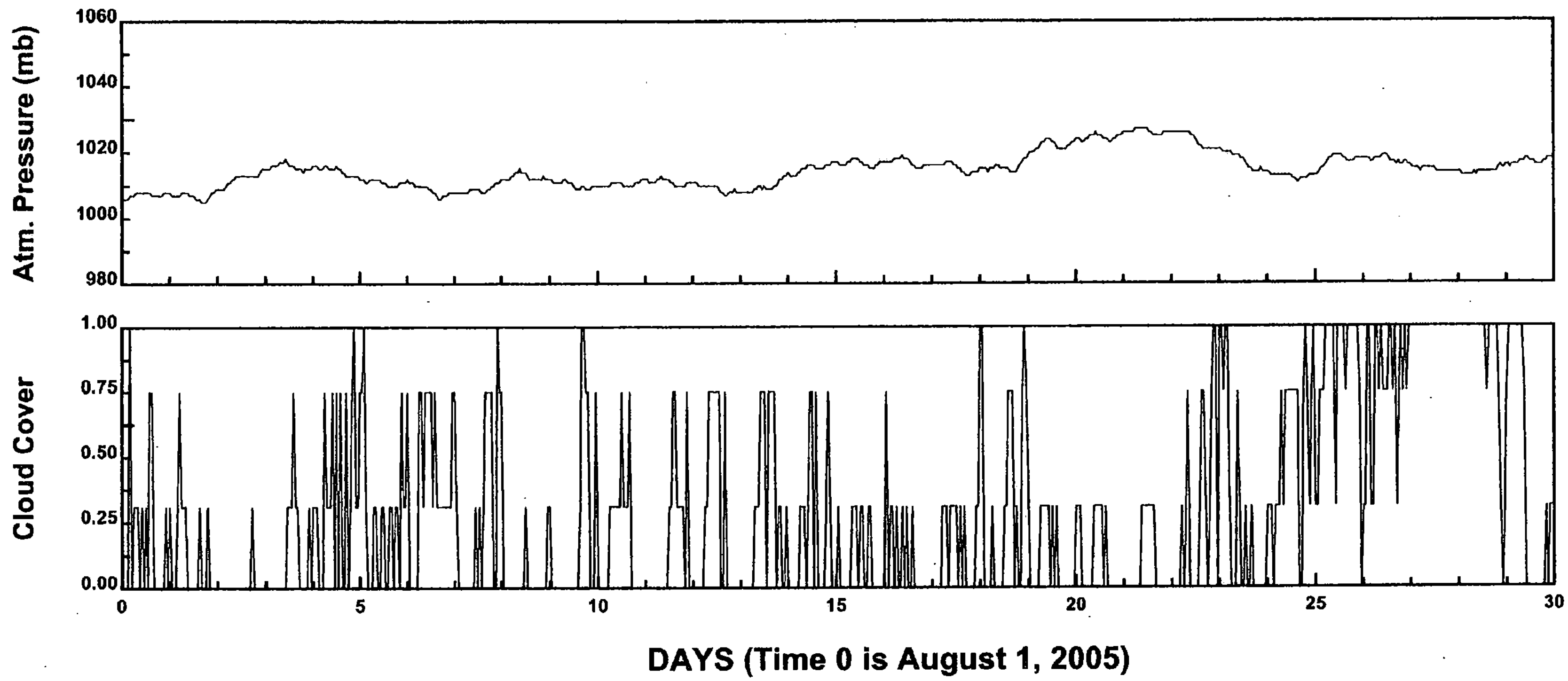

Figure 7-1. Meteorological Data Used in the Model for the Extreme Summer Condition (August 2005) (Cont.)

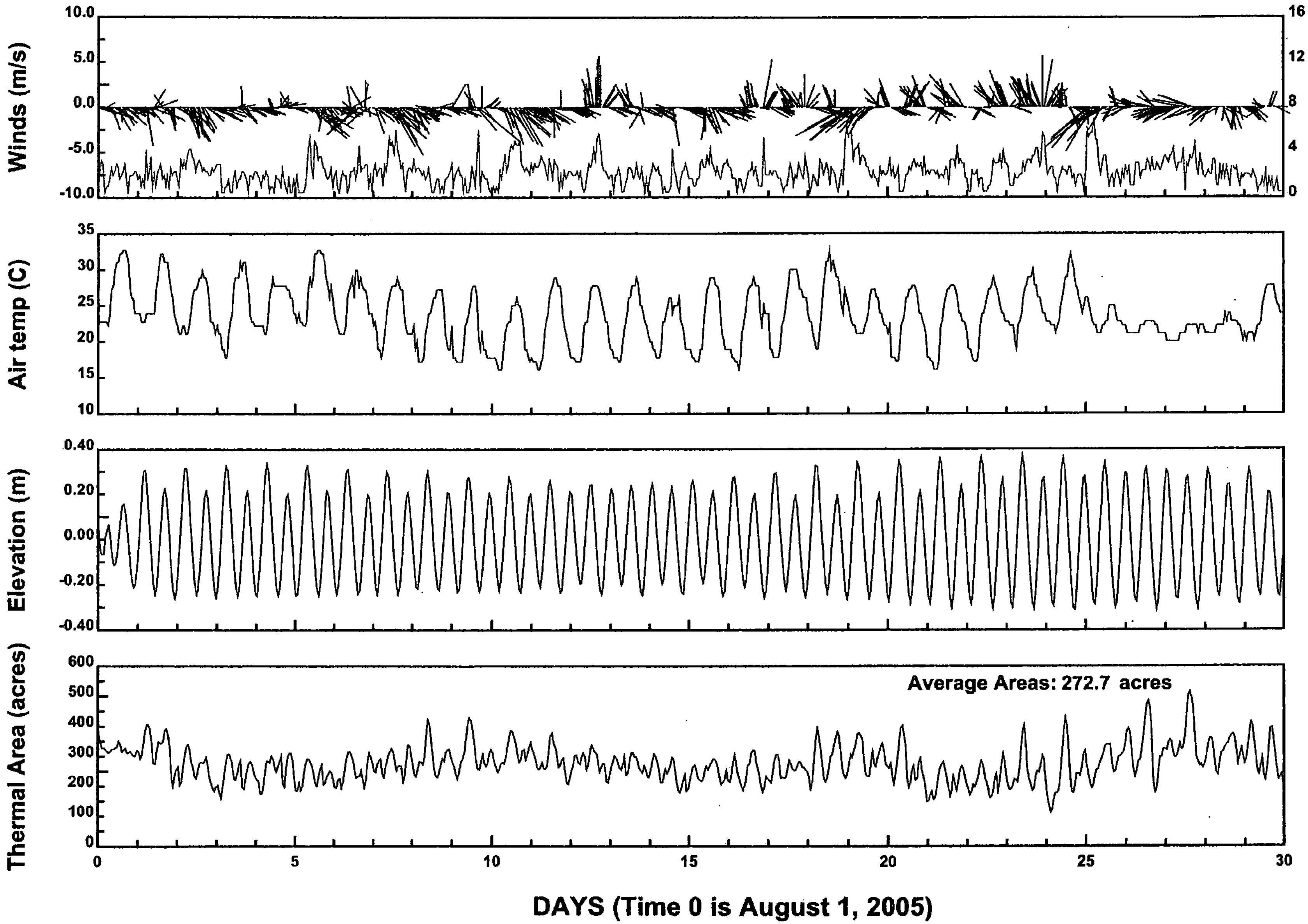

Figure 7-2. Hourly Thermal Areas for the Extreme Summer Condition (August 2005)

Summer Extreme: August 2005

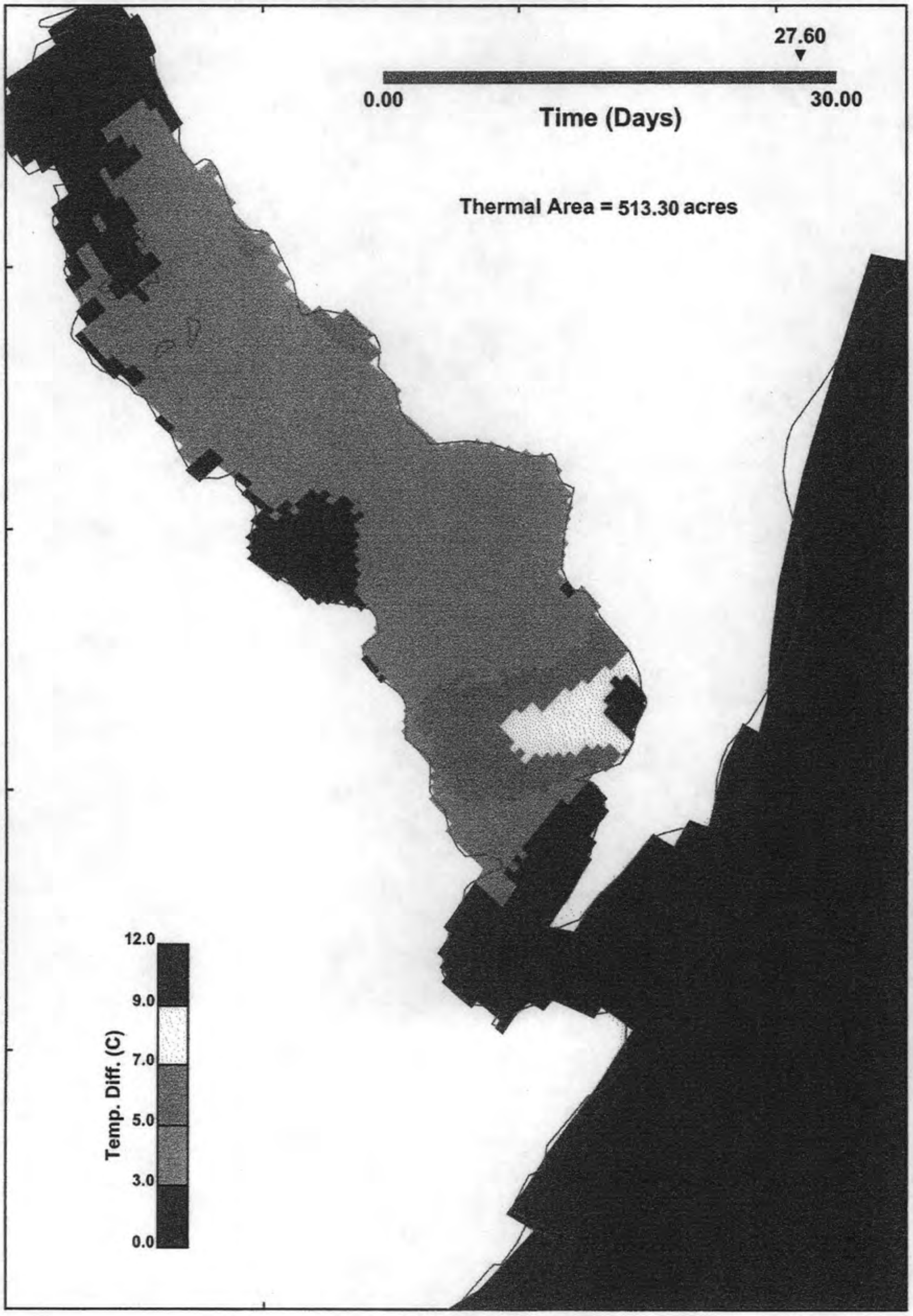

Figure 7-3. Possum Point Power Station Thermal Areas ($\Delta T \geq 3°C$) during High Tide

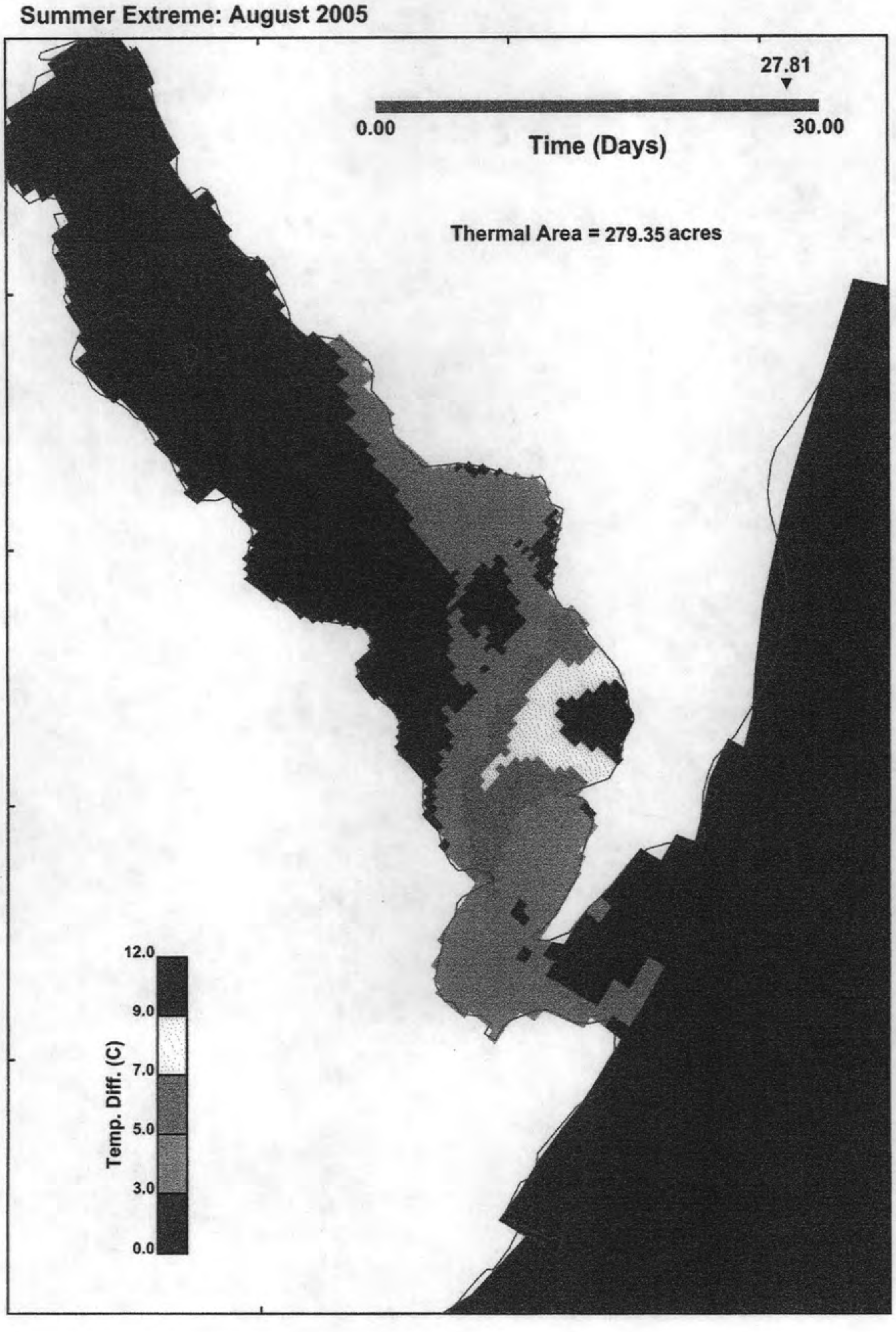

Figure 7-4. Possum Point Power Station Thermal Areas ($\Delta T \geq 3°C$) during Low Tide

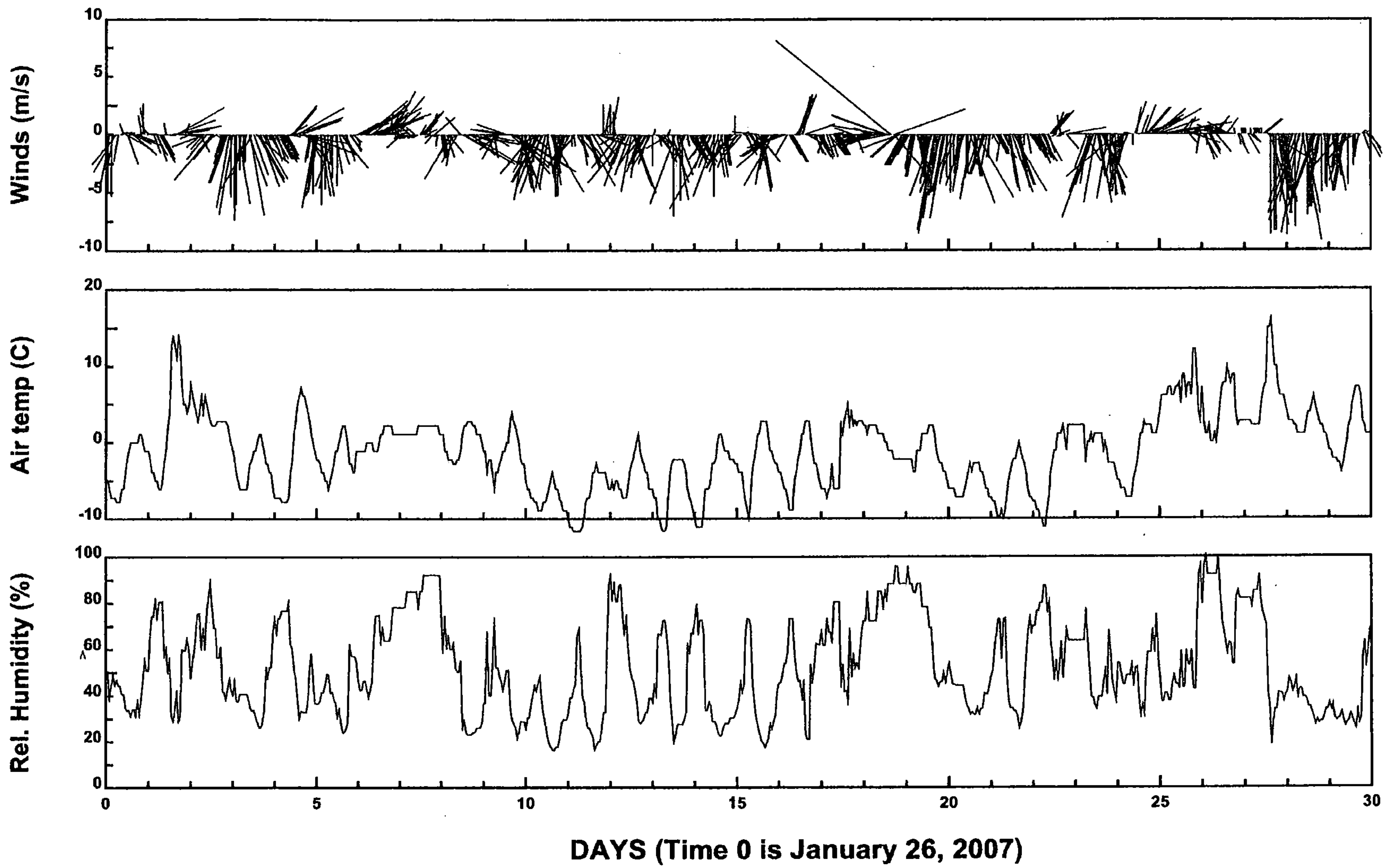

Figure 7-5. Meteorological Data Used in the Model for the Extreme Winter Condition (January 26 - February 24, 2007)

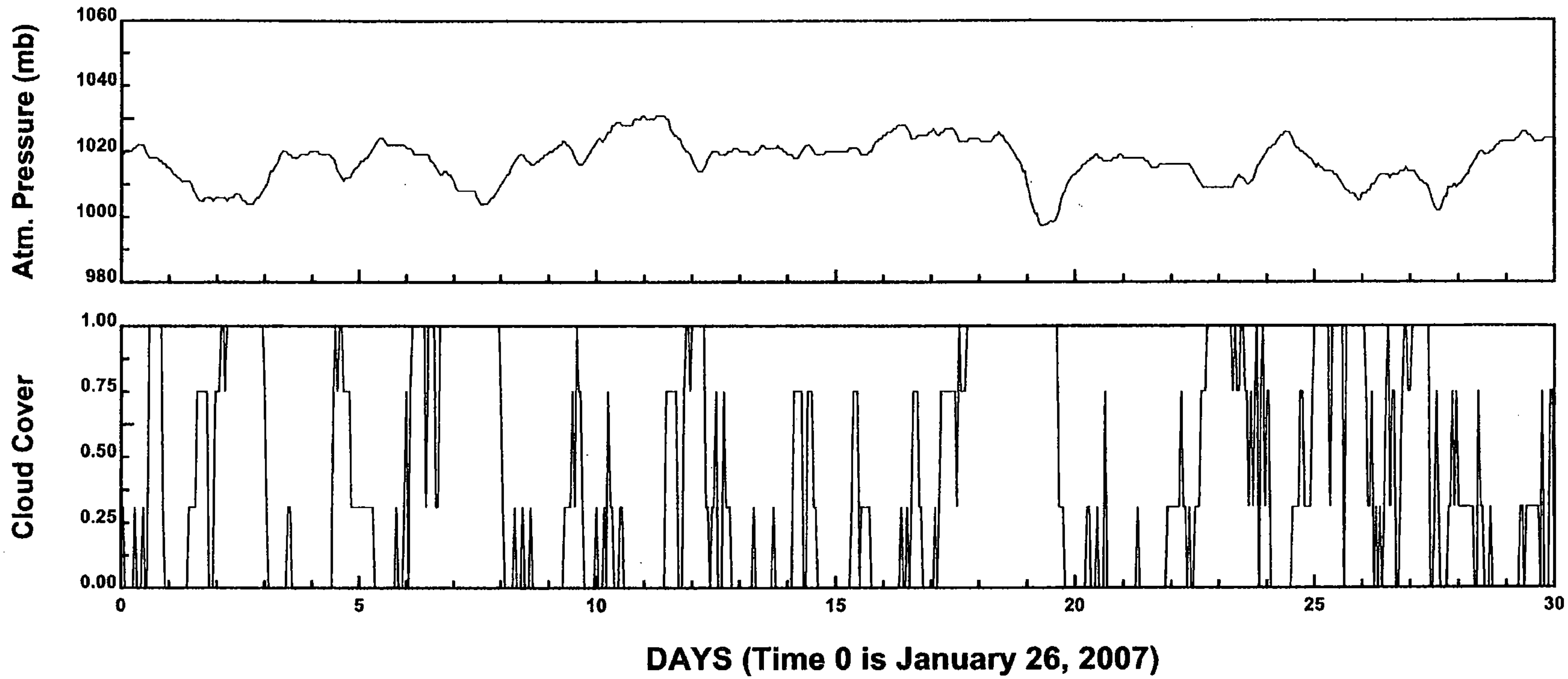

Figure 7-5. Meteorological Data Used in the Model for the Extreme Winter Condition (January 26 - February 24, 2007) (Cont.)

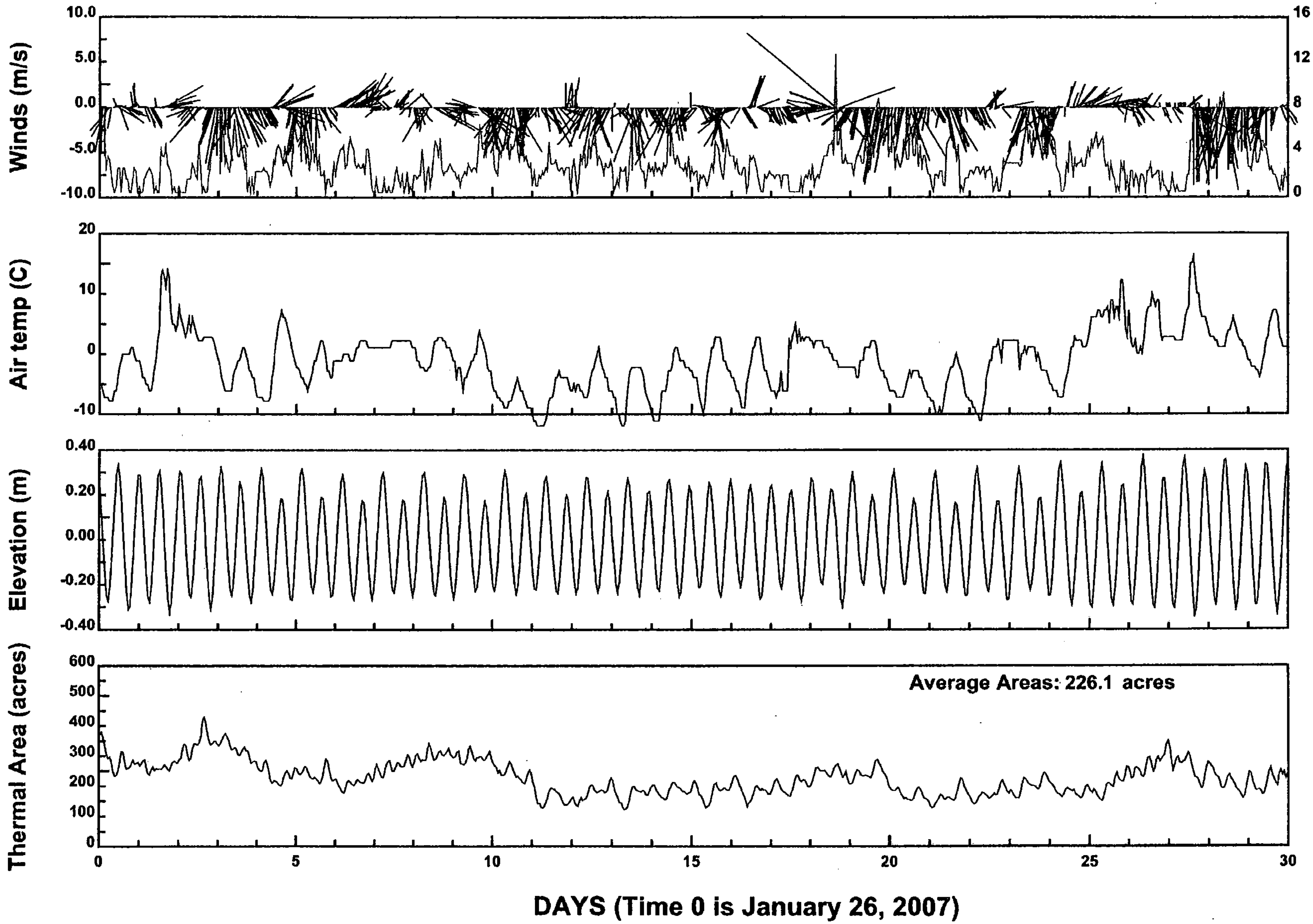

Figure 7-6. Hourly Thermal Areas for the Extreme Winter Condition (January 26 - February 24, 2007)

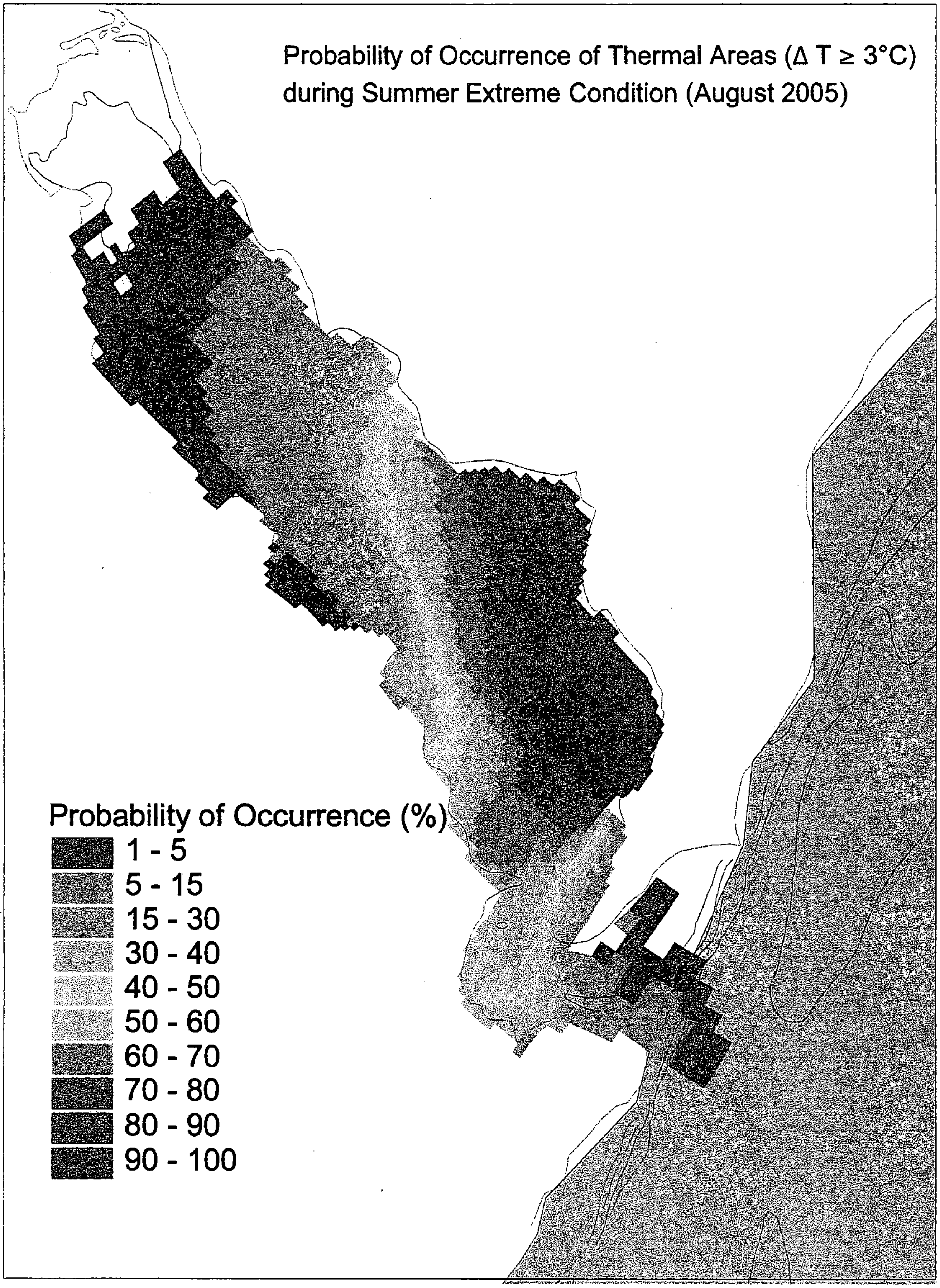

Figure 7-7. Contour Map of Frequency of Thermal Plume Occurrence during Extreme Summer Condition (August 2005)

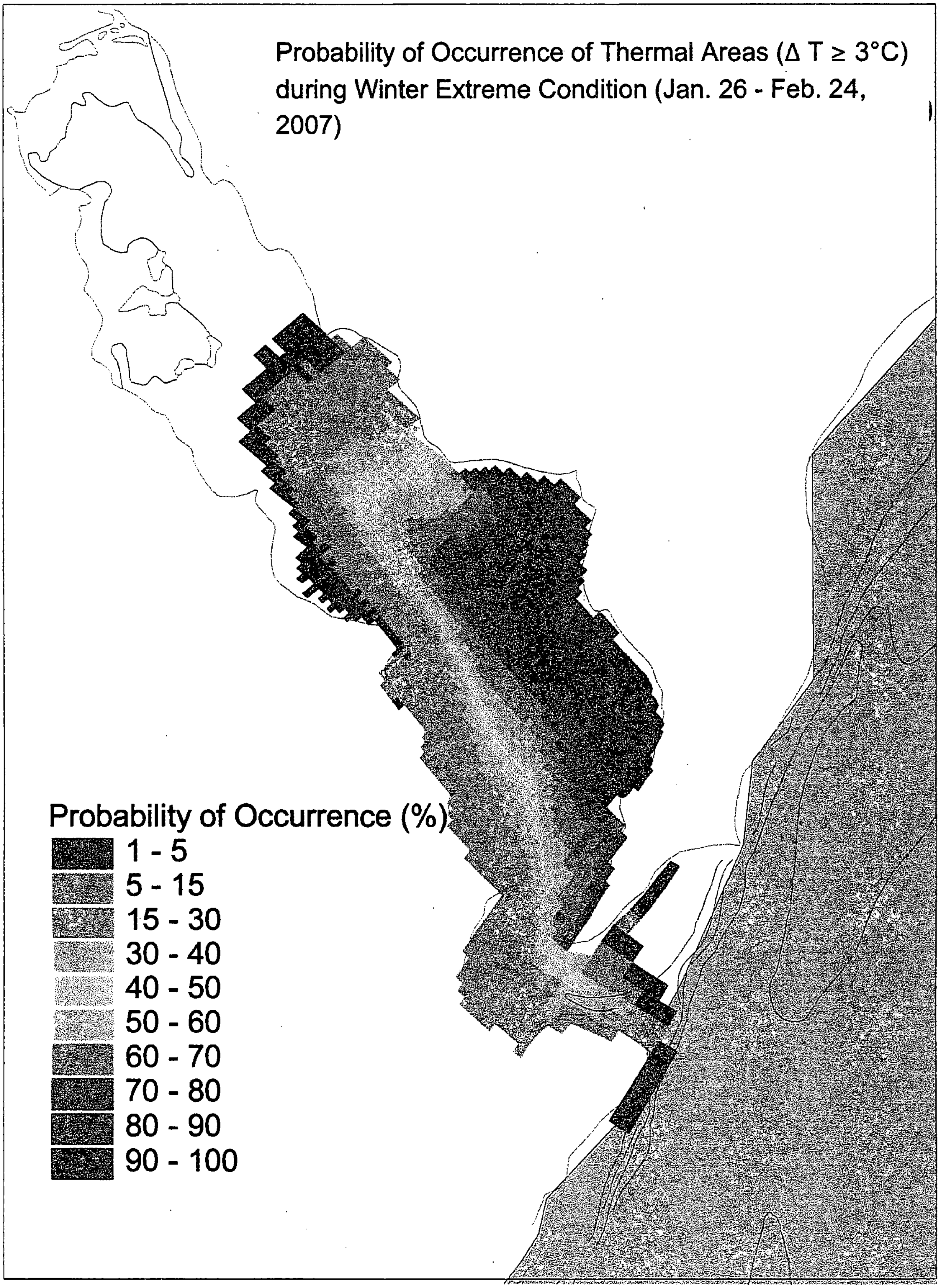

Figure 7-8. Contour Map of Frequency of Thermal Plume Occurrence during Extreme Winter Condition (January 26 - February 24, 2007)

SECTION 8

CONCLUSIONS

A three-dimensional far-field hydrodynamic and hydrothermal model (ECOM) of Quantico Creek and the Potomac River in the vicinity of the Possum Point Power Station was developed to study and redefine size of the Station's thermal mixing zone under the current operating conditions. An efficient and computationally time-effective orthogonal, curvilinear grid was designed to simulate tidal system physics and temperature distributions in the study area. Model verification was demonstrated by comparing the model predicted temperature against the observations at all stationary *in situ* temperature monitoring stations surveyed during June 29 through October 14, 2009.

The calibrated ECOM model reproduced the overall circulation and mixing characteristics of Quantico Creek and the Potomac River in the vicinity of the Station as demonstrated by reasonable agreement between measured and modeled tidal hydrodynamics and the temporal and spatial distributions of temperatures. Based on this performance, the ECOM model was judged to be an appropriate predictive tool for analyzing thermal discharges from the Possum Point Power Station.

After confidence in the model was established, model simulations were performed for extreme summer and winter conditions under maximum Station operating conditions (flow: 81.4 MGD, ΔT=18°F for Unit 3, flow: 142.5 MGD, ΔT=22°F for Unit 4, flow: 5.8 MGD, ΔT=10.8°F for Unit 5, flow: 2.0 MGD, ΔT=19.8°F for Unit 6, flow: 3.5 MGD, T=36°F for Low Volume Settling Ponds). Model simulations were performed under these conditions to assess surface plume sizes ($\Delta T \geq$ 3°C or 5.4°F). Analyses of model-computed thermal plume areas with excess temperatures of Δ3°C or higher indicates that plume size varied in time and was correlated with tide and wind conditions. Statistical analysis on the positions of thermal plume during extreme summer and winter simulations indicates that 99 percent of the time the plume would remain within about 657 and 507 acres, respectively, in Quantico Creek and a part of the Potomac River.

SECTION 9

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Attachment 12

Mackert, Susan (DEQ)

From: Odenkirk, John (DGIF)
Sent: Monday, July 09, 2012 2:13 PM
To: Mackert, Susan (DEQ)
Cc: Owens, Steve (DGIF); Bugas, Paul (DGIF)
Subject: Quantico creek fishery

Per recent telephone correspondence about the fishery at Quantico Creek and the vicinity of the Possum Point thermal discharge, I offer the following observations and comments:

We have conducted periodic sampling of this and other Virginia tidal Potomac River tributaries as part of our ongoing fisheries monitoring and northern snakehead evaluations over the past decade. (There have been no specific "studies" to compare the fish assemblages of these creeks per se).

Catch rates, size structures and species composition are similar for all creeks along the Stafford and Prince William County shorelines. Indices mentioned previously for fish from Quantico Creek are all within expected ranges and comparable to neighboring creeks.

The creek and thermal outflow are popular fishing spots (especially during winter).

Based on cursory information, there is no reason to believe there is any impairment to fishery resources in Quantico Creek as a result of thermal discharge from the power plant.

Please contact me if you need more information:

John Odenkirk, VDGIF 1320 Belman Road Fredericksburg VA 22401 540-899-4169 x117

Attachment 13a

8/17/2012 1:37:05 PM

Facility = Possum Point - Outfalls 001/002 and 003
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.038
WLAc = 0.022
Q.L. = 0.1
# samples/mo. = 4
# 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 = 3.21766452491711E-02
Average Weekly limit = 3.21766452491711E-02
Average Monthly LImit = 0.022

The data are:

0.2

8/17/2012 1:37:51 PM

Facility = Possum Point - Outfall 004
Chemical = Chlorine
Chronic averaging period = 30
WLAa = 0.038
WLAc = 0.55
Q.L. = 0.1
# samples/mo. = 4
# 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 Acute Toxicity
Maximum Daily Limit = 0.038
Average Weekly limit = 0.038
Average Monthly LImit = 2.59815774306533E-02

The data are:

0.2

Facility = Possum Point - Outfall 004 (2007 Reissuance)
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.038
WLAc = 0.55
Q.L. = 0.1
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 10
Variance = 36
C.V. = 0.6
97th percentile daily values = 24.3341
97th percentile 4 day average = 16.6379
97th percentile 30 day average= 12.0605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.038
Average Weekly limit = 0.038
Average Monthly LImit = 2.59815774306532E-02

The data are:

10

Attachment 13b

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC AVG	Lim Avg
10-May-09	004	AMMONIA, AS N (mg/L)	0.07	NL
10-Aug-09	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Nov-09	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Feb-10	004	AMMONIA, AS N (mg/L)	0.15	NL
10-May-10	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jul-10	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jan-11	004	AMMONIA, AS N (mg/L)	0.16	NL
10-Apr-11	004	AMMONIA, AS N (mg/L)	0.18	NL
10-Jul-11	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Oct-11	004	AMMONIA, AS N (mg/L)	0.06	NL
10-Jan-12	004	AMMONIA, AS N (mg/L)	<0.05	NL
10-Apr-12	004	AMMONIA, AS N (mg/L)	0.07	NL

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC AVG	Lim Avg
10-May-09	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Aug-09	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Nov-09	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Feb-10	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-May-10	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jul-10	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jan-11	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Apr-11	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jul-11	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Oct-11	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Jan-12	005	AMMONIA, AS N (mg/L)	<0.05	NL
10-Apr-12	005	AMMONIA, AS N (mg/L)	<0.05	NL

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC AVG	Lim Avg
10-May-09	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Nov-09	003	Copper, Dissolved (µg/L)	<0.05	NL
10-May-10	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Jul-10	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Jan-11	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Jul-11	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Jan-12	003	Copper, Dissolved (µg/L)	<0.05	NL
10-Jul-12	003	Copper, Dissolved (µg/L)	<0.05	NL

DMR QA/QC

Permit #:VA0002071 Facility:Dominion - Possum Point Power Station

Due Date	Outfall	Parameter Description	CONC AVG	Lim Avg	CONC MAX	Lim Max
10-May-09	005	TSS (mg/L)	5.8	30.	5.8	50.
10-Jun-09	005	TSS (mg/L)	4.4	30.	5.4	50.
10-Jul-09	005	TSS (mg/L)	4.2	30.	4.8	50.
10-Aug-09	005	TSS (mg/L)	4.2	30.	4.4	50.
10-Sep-09	005	TSS (mg/L)	4.4	30.	5.2	50.
10-Oct-09	005	TSS (mg/L)	7.2	30.	10.0	50.
10-Nov-09	005	TSS (mg/L)	5.8	30.	5.9	50.
10-Dec-09	005	TSS (mg/L)	3.6	30.	4.1	50.
10-Jan-10	005	TSS (mg/L)	4.6	30.	5.8	50.
10-Feb-10	005	TSS (mg/L)	12.0	30.	13.4	50.
10-Mar-10	005	TSS (mg/L)	8.2	30.	9.3	50.
10-Apr-10	005	TSS (mg/L)	6.4	30.	6.9	50.
10-May-10	005	TSS (mg/L)	5.0	30.	5.2	50.
10-Jun-10	005	TSS (mg/L)	4.5	30.	4.9	50.
10-Jul-10	005	TSS (mg/L)	3.3	30.	3.8	50.
10-Aug-10	005	TSS (mg/L)	4.2	30.	4.6	50.
10-Sep-10	005	TSS (mg/L)	6.0	30.	6.2	50.
10-Oct-10	005	TSS (mg/L)	9.6	30.	10.3	50.
10-Nov-10	005	TSS (mg/L)	8.0	30.	8.0	50.
10-Dec-10	005	TSS (mg/L)	10.5	30	12.9	50
10-Jan-11	005	TSS (mg/L)	5.8	30	6.9	50
10-Feb-11	005	TSS (mg/L)	4.2	30	4.2	50
10-Mar-11	005	TSS (mg/L)	3.2	30	3.8	50
10-Apr-11	005	TSS (mg/L)	6.2	30	7.7	50
10-May-11	005	TSS (mg/L)	4.6	30	4.8	50
10-Jun-11	005	TSS (mg/L)	8.0	30	10.3	50
10-Jul-11	005	TSS (mg/L)	5.6	30	6.5	50
10-Aug-11	005	TSS (mg/L)	6.0	30	6.5	50
10-Sep-11	005	TSS (mg/L)	8.6	30	8.9	50

DMR QA/QC

Permit #:VA0002071 **Facility:Dominion - Possum Point Power Station**

10-Oct-11	005	TSS (mg/L)	7.1	30	7.4	50
10-Nov-11	005	TSS (mg/L)	9.8	30	10.6	50
10-Dec-11	005	TSS (mg/L)	9.0	30	10.0	50
10-Jan-12	005	TSS (mg/L)	5.8	30	6.0	50
10-Feb-12	005	TSS (mg/L)	5.0	30	5.8	50
10-Mar-12	005	TSS (mg/L)	4.0	30	4.0	50
10-Apr-12	005	TSS (mg/L)	5.2	30	6.0	50
10-May-12	005	TSS (mg/L)	5.2	30	5.7	50
10-Jun-12	005	TSS (mg/L)	1.7	30	1.8	50

Attachment 13c

WATER QUALITY MONITORING - 2008
ATTACHMENT A, PAGE 1 of 6

Facility Name: Virginia Power - Possum Point Outfall 005

VPDES Permit: VA0002071
Outfall 005

CAS Number	Parameter	EPA Analysis No.	Quantification Level(1) (µg/L)	Reporting Result (1) (µg/L)	Sample Type(2)	Sample Frequency(3)
			DISSOLVED METALS			
7440-36-0	Antimony	(4)		< 1. ppb	G	1/YR
7440-38-2	Arsenic	(4)		7.0 ppb	G	1/YR
7440-43-9	Cadmium	(4)		< 0.3 ppb	G	1/YR
16065-83-1	Chromium III	(4)		< 10. ppb	G	1/YR
18540-29-9	Chromium VI	(4)		< 10.ppb	G	1/YR
7440-50-8	Copper	(4)		4.0 ppb	G	1/YR
7439-92-1	Lead	(4)		< 1.0 ppb	G	1/YR
7439-97-6	Mercury	(4)		< 0.2 ppb	G	1/YR
7440-02-0	Nickel	(4)		8.0 ppb	G	1/YR
7782-49-2	Selenium	(4)		< 3.0 ppb	G	1/YR
7440-22-4	Silver	(4)		< 0.1 ppb	G	1/YR
7440-28-0	Thallium	(4)		< 0.20 ppb	G	1/YR
7440-66-6	Zinc	(4)		< 0.010 PPM	G	1/YR
			PESTICIDES/PCBs			
309-00-2	Aldrin	608	0.05	< 0.050 ppb	G or C	1/YR
57-74-9	Chlordane	608	0.2	< 0.200 ppb	G or C	1/YR
2921-88-2	Chlorpyrifos (Dursban)	622	(6)	< 0.2 ppb	G or C	1/YR
72-54-8	DDD	608	0.1	< 0.100 ppb	G or C	1/YR
72-55-9	DDE	608	0.1	< 0.100 ppb	G or C	1/YR
50-29-3	DDT	608	0.1	< 0.100 ppb	G or C	1/YR
8065-48-3	Demeton	(5)	(6)	< 1.0 ppb	G or C	1/YR
60-57-1	Dieldrin	608	0.1	< 0.100 ppb	G or C	1/YR
959-98-8	Alpha-Endosulfan	608	0.1	< 0.10 ppb	G or C	1/YR
33213-65-9	Beta-Endosulfan	608	0.1	< 0.10 ppb	G or C	1/YR
1031-07-8	Endosulfan Sulfate	608	0.1	< 0.10 ppb	G or C	1/YR
72-20-8	Endrin	608	0.1	< 0.10 ppb	G or C	1/YR
7421-93-4	Endrin Aldehyde	608	0.1	< 0.10 ppb	G or C	1/YR
86-50-0	Guthion	622	(6)	< 1.0 ppb	G or C	1/YR
76-44-8	Heptachlor	608	0.05	< 0.05 ppb	G or C	1/YR
1024-57-3	Heptachlor Epoxide	608	0.05	< 0.05 ppb	G or C	1/YR
58-89-9	Hexachlorocyclohexane (Lindane)	608	0.05	< 0.05 ppb	G or C	1/YR

WATER QUALITY MONITORING - 2009
ATTACHMENT A, PAGE 1 of 6

Facility Name: Virginia Power - Possum Point Outfall 005

VPDES Permit: VA0002071
Outfall ~~00X~~ 005

CAS Number	Parameter	EPA Analysis No.	Quantification Level(1) (µg/L)	Reporting Result (1) (µg/L)	Sample Type(2)	Sample Frequency(3)
			DISSOLVED METALS			
7440-36-0	Antimony	(4)		2.0 ppb	G	1/YR
7440-38-2	Arsenic	(4)		7.0 ppb	G	1/YR
7440-43-9	Cadmium	(4)		< QL	G	1/YR
16065-83-1	Chromium III	(4)		< QL	G	1/YR
18540-29-9	Chromium VI	(4)		< QL	G	1/YR
7440-50-8	Copper	(4)		2.0 ppb	G	1/YR
7439-92-1	Lead	(4)		< QL	G	1/YR
7439-97-6	Mercury	(4)		< QL	G	1/YR
7440-02-0	Nickel	(4)		12.0 ppb	G	1/YR
7782-49-2	Selenium	(4)		< QL	G	1/YR
7440-22-4	Silver	(4)		< QL	G	1/YR
7440-28-0	Thallium	(4)		< QL	G	1/YR
7440-66-6	Zinc	(4)		< QL	G	1/YR
			PESTICIDES/PCBs			
309-00-2	Aldrin	608	0.05	< QL	G or C	1/YR
57-74-9	Chlordane	608	0.2	< QL	G or C	1/YR
2921-88-2	Chlorpyrifos (Dursban)	622	(6)	< QL	G or C	1/YR
72-54-8	DDD	608	0.1	< QL	G or C	1/YR
72-55-9	DDE	608	0.1	< QL	G or C	1/YR
50-29-3	DDT	608	0.1	< QL	G or C	1/YR
8065-48-3	Demeton	(5)	(6)	< QL	G or C	1/YR
60-57-1	Dieldrin	608	0.1	< QL	G or C	1/YR
959-98-8	Alpha-Endosulfan	608	0.1	< QL	G or C	1/YR
33213-65-9	Beta-Endosulfan	608	0.1	< QL	G or C	1/YR
1031-07-8	Endosulfan Sulfate	608	0.1	< QL	G or C	1/YR
72-20-8	Endrin	608	0.1	< QL	G or C	1/YR
7421-93-4	Endrin Aldehyde	608	0.1	< QL	G or C	1/YR
86-50-0	Guthion	622	(6)	< QL	G or C	1/YR
76-44-8	Heptachlor	608	0.05	< QL	G or C	1/YR
1024-57-3	Heptachlor Epoxide	608	0.05	< QL	G or C	1/YR
58-89-9	Hexachlorocyclohexane (Lindane)	608	0.05	< QL	G or C	1/YR

WATER QUALITY MONITORING - 2010
ATTACHMENT A, PAGE 1 of 6

Facility Name: Virginia Power - Possum Point Outfall 005 | VPDES Permit: VA0002071 | Outfall 005

CAS Number	Parameter	EPA Analysis No.	Quantification Level(1) (µg/L)	Reporting Result (1) (µg/L)	Sample Type(2)	Sample Frequency(3)
			DISSOLVED METALS			
7440-36-0	Antimony	(4)		< QL	G	1/YR
7440-38-2	Arsenic	(4)		7.0 ppb	G	1/YR
7440-43-9	Cadmium	(4)		< QL	G	1/YR
16065-83-1	Chromium III	(4)		< QL	G	1/YR
18540-29-9	Chromium VI	(4)		< QL	G	1/YR
7440-50-8	Copper	(4)		4.0 ppb	G	1/YR
7439-92-1	Lead	(4)		< QL	G	1/YR
7439-97-6	Mercury	(4)		< QL	G	1/YR
7440-02-0	Nickel	(4)		< QL	G	1/YR
7782-49-2	Selenium	(4)		< QL	G	1/YR
7440-22-4	Silver	(4)		< QL	G	1/YR
7440-28-0	Thallium	(4)		< QL	G	1/YR
7440-66-6	Zinc	(4)		< QL	G	1/YR
			PESTICIDES/PCBs			
309-00-2	Aldrin	608	0.05	< QL	G or C	1/YR
57-74-9	Chlordane	608	0.2	< QL	G or C	1/YR
2921-88-2	Chlorpyrifos (Dursban)	622	(6)	< QL	G or C	1/YR
72-54-8	DDD	608	0.1	< QL	G or C	1/YR
72-55-9	DDE	608	0.1	< QL	G or C	1/YR
50-29-3	DDT	608	0.1	< QL	G or C	1/YR
8065-48-3	Demeton	(5)	(6)	< QL	G or C	1/YR
60-57-1	Dieldrin	608	0.1	< QL	G or C	1/YR
959-98-8	Alpha-Endosulfan	608	0.1	< QL	G or C	1/YR
33213-65-9	Beta-Endosulfan	608	0.1	< QL	G or C	1/YR
1031-07-8	Endosulfan Sulfate	608	0.1	< QL	G or C	1/YR
72-20-8	Endrin	608	0.1	< QL	G or C	1/YR
7421-93-4	Endrin Aldehyde	608	0.1	< QL	G or C	1/YR
86-50-0	Guthion	622	(6)	< QL	G or C	1/YR
76-44-8	Heptachlor	608	0.05	< QL	G or C	1/YR
1024-57-3	Heptachlor Epoxide	608	0.05	< QL	G or C	1/YR
58-89-9	Hexachlorocyclohexane (Lindane)	608	0.05	< QL	G or C	1/YR

WATER QUALITY MONITORING - 2011
ATTACHMENT A, PAGE 1 of 6

Facility Name: Virginia Power - Possum Point Outfall 005

VPDES Permit: VA0002071
Outfall ~~XXX~~ 005

CAS Number	Parameter	EPA Analysis No.	Quantification Level(1) (µg/L)	Reporting Result (1) (µg/L)	Sample Type(2)	Sample Frequency(3)
			DISSOLVED METALS			
7440-36-0	Antimony	(4)		< QL	G	1/YR
7440-38-2	Arsenic	(4)		< QL	G	1/YR
7440-43-9	Cadmium	(4)		< QL	G	1/YR
16065-83-1	Chromium III	(4)		< QL	G	1/YR
18540-29-9	Chromium VI	(4)		< QL	G	1/YR
7440-50-8	Copper	(4)		4.0 ppb	G	1/YR
7439-92-1	Lead	(4)		< QL	G	1/YR
7439-97-6	Mercury	(4)		< QL	G	1/YR
7440-02-0	Nickel	(4)		< QL	G	1/YR
7782-49-2	Selenium	(4)		< QL	G	1/YR
7440-22-4	Silver	(4)		< QL	G	1/YR
7440-28-0	Thallium	(4)		< QL	G	1/YR
7440-66-6	Zinc	(4)		< QL	G	1/YR
			PESTICIDES/PCBs			
309-00-2	Aldrin	608	0.05	< QL	G or C	1/YR
57-74-9	Chlordane	608	0.2	< QL	G or C	1/YR
2921-88-2	Chlorpyrifos (Dursban)	622	(6)	< QL	G or C	1/YR
72-54-8	DDD	608	0.1	< QL	G or C	1/YR
72-55-9	DDE	608	0.1	< QL	G or C	1/YR
50-29-3	DDT	608	0.1	< QL	G or C	1/YR
8065-48-3	Demeton	(5)	(6)	< QL	G or C	1/YR
60-57-1	Dieldrin	608	0.1	< QL	G or C	1/YR
959-98-8	Alpha-Endosulfan	608	0.1	< QL	G or C	1/YR
33213-65-9	Beta-Endosulfan	608	0.1	< QL	G or C	1/YR
1031-07-8	Endosulfan Sulfate	608	0.1	< QL	G or C	1/YR
72-20-8	Endrin	608	0.1	< QL	G or C	1/YR
7421-93-4	Endrin Aldehyde	608	0.1	< QL	G or C	1/YR
86-50-0	Guthion	622	(6)	< QL	G or C	1/YR
76-44-8	Heptachlor	608	0.05	< QL	G or C	1/YR
1024-57-3	Heptachlor Epoxide	608	0.05	< QL	G or C	1/YR
58-89-9	Hexachlorocyclohexane (Lindane)	608	0.05	< QL	G or C	1/YR

CONTINUED FROM PAGE V-2

EPA I.D. NUMBER (copy from Item 1 of Form 1) 110000340774	OUTFALL NO. 005

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements

1. Pollutant and CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. Testing Required	b. Believed Present	c. Believed Absent	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVG. VALUE (1) CONCENTRATION	a. LONG TERM AVG. VALUE (2) MASS	b. NO. OF ANALYSES
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	x	x		0.001	0.03	--	--	--	--	1	PPM	LBS/DAY	--	--	--
2M. Arsenic, Total (7440-38-2	x	x		0.011	0.32	--	--	--	--	1	PPM	LBS/DAY	--	--	--
3M. Beryllium, Total (7440-41-7)	x	x		< 0.0002	< 0.01	--	--	--	--	1	PPM	LBS/DAY	--	--	--
4M. Cadmium, Total (7440-43-9)	x	x		< 0.0003	< 0.01	--	--	--	--	1	PPM	LBS/DAY	--	--	--
5M. Chromium, Total (7440-47-3)	x	x		< 0.02	< 0.59	--	--	--	--	1	PPM	LBS/DAY	--	--	--
6M. Copper, Total (7440-50-8)	x	x		0.001	0.03	--	--	--	--	1	PPM	LBS/DAY	--	--	--
7M. Lead, Total (7439-92-1)	x	x		< 0.001	< 0.03	--	--	--	--	1	PPM	LBS/DAY	--	--	--
8M. Mercury, Total (7439-97-6)	x	x		< 0.0002	< 0.01	--	--	--	--	1	PPM	LBS/DAY	--	--	--
9M. Nickel, Total (7440-02-0)	x	x		0.013	0.38	--	--	--	--	1	PPM	LBS/DAY	--	--	--
10M. Selenium, Total (7782-49-2)	x	x		< 0.003	< 0.09	--	--	--	--	1	PPM	LBS/DAY	--	--	--
11M. Silver, Total (7440-22-4	x	x		< 0.0001	< 0.00	--	--	--	--	1	PPM	LBS/DAY	--	--	--
12M. Thallium, Total (7440-28-0)	x	x		0.0005	0.01	--	--	--	--	1	PPM	LBS/DAY	--	--	--
13M. Zinc, Total (7440-66-6)	x	x		0.01	0.29	--	--	--	--	1	PPM	LBS/DAY	--	--	--
14M. Cyanide, Total (57-12-5)	x	x		< 0.01	< 0.29	--	--	--	--	1	PPM	LBS/DAY	--	--	--
15M. Phenols, Total	x	x		0.03	0.88	--	--	--	--	1	PPM	LBS/DAY	--	--	--
DIOXIN															
2,3,7,8-Tetrachlorodibenzo-P Dioxin (1764-01-6)			x	DESCRIBE RESULTS No Sample											

Additional Testing Results on 9/14/2011 sample

OUTFALL NO. 005

1. Pollutant and CAS NO. (if available)	2. MARK "X" a. Testing Required	b. Believed Present	c. Believed Absent	3. EFFLUENT a. MAXIMUM DAY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. No. OF ANALYSES	4. UNITS (specify if blank) a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVG. VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
Uranium		x		0.00051	0.0150	--	--	--	--	1	PPM	LBS/DAY	--	--	--
2,4-D		x		< 0.01	< 0.2936	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Tl (dissolved)		x		0.0004	0.0117	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Ti (dissolved)		x		< 0.002	< 0.0587	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Sn (dissolved)		x		< 0.005	< 0.1468	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Se (dissolved)		x		< 0.003	< 0.0881	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Sb (dissolved)		x		0.001	0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Pb (dissolved)		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Ni (dissolved)		x		0.01	0.2936	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Mo (dissolved)		x		0.006	0.1761	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Hg (dissolved)		x		< 0.0002	< 0.0059	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Cu (dissolved)		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Cr (dissolved)		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Co (dissolved)		x		< 0.0006	< 0.0176	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Cd (dissolved)		x		< 0.0003	< 0.0088	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Be (dissolved)		x		< 0.0002	< 0.0059	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Ba (dissolved)		x		0.19	5.58	--	--	--	--	1	PPM	LBS/DAY	--	--	--
As (dissolved)		x		0.01	0.29	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Ag (dissolved)		x		< 0.0001	< 0.0029	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Zn (dissolved)		x		< 0.01	< 0.29	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Mn (dissolved)		x		0.06	1.76	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Mg (dissolved)		x		15.38	451.51	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Fe (dissolved)		x		0.06	1.76	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Al (dissolved)		x		< 0.09	< 2.64	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Total Dissolved Solids		x		452	13269.27	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Total Hardness as CaCO3		x		129.96	3815.21	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Chlorides as Cl		x		153.19	4497.17	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Hydrogen Sulfide		x		< 0.05	< 1.47	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Chromium +6 as Cr6		x		< 0.005	< 0.15	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Kepone		x		< 0.0001	< 0.0029	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Methoxychlor		x		< 0.0001	< 0.0029	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Mirex		x		< 0.0001	< 0.0029	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Chlorpyrifos		x		< 0.0002	< 0.0059	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Demeton		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Diazinon		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Guthion		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Malathion		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Parathion		x		< 0.001	< 0.0294	--	--	--	--	1	PPM	LBS/DAY	--	--	--
Silvex		x		< 0.002	< 0.0587	--	--	--	--	1	PPM	LBS/DAY	--	--	--

8/17/2012 1:41:52 PM

Facility = Possum Point - Outfall 005
Chemical = Nickel
Chronic averaging period = 30
WLAa = 200
WLAc = 22
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 4
Expected Value = 10.75
Variance = 41.6025
C.V. = 0.6
97th percentile daily values = 26.1592
97th percentile 4 day average = 17.8857
97th percentile 30 day average= 12.9650
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8
12
13
10

Attachment 14

10/26/2015 7:55:21 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Ammonia
Chronic averaging period = 4
WLAa = 17.2
WLAc = 2.07
Q.L. = 0.2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 4
Expected Value = .339026
Variance = .041378
C.V. = 0.6
97th percentile daily values = .824993
97th percentile 4 day average = .564069
97th percentile 30 day average= .408884
< Q.L. = 1
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0
0.306
0.322
0.287

10/26/2015 7:56:24 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Arsenic
Chronic averaging period = 4
WLAa = 680
WLAc = 300
Q.L. = 180
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 300
Variance = 32400
C.V. = 0.6
97th percentile daily values = 730.025
97th percentile 4 day average = 499.137
97th percentile 30 day average= 361.815
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 438.772435215969
Average Weekly limit = 438.772435215969
Average Monthly LImit = 300

The data are:

300

10/26/2015 7:56:54 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Cadmium
Chronic averaging period = 4
WLAa = 5.5
WLAc = 1.8
Q.L. = 1.1
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 3.9
Variance = 5.4756
C.V. = 0.6
97th percentile daily values = 9.49032
97th percentile 4 day average = 6.48878
97th percentile 30 day average= 4.70360
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.63263461129582
Average Weekly limit = 2.63263461129582
Average Monthly LImit = 1.8

The data are:

3.9

10/26/2015 7:57:40 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Chloride
Chronic averaging period = 4
WLAa = 1700000
WLAc = 460000
Q.L. = 1.0
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 460000
Variance = 7617599
C.V. = 0.6
97th percentile daily values = 1119372
97th percentile 4 day average = 765343.
97th percentile 30 day average= 554784.
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 672784.400664486
Average Weekly limit = 672784.400664487
Average Monthly LImit = 460000

The data are:

460000

10/26/2015 7:58:16 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Chromium III
Chronic averaging period = 4
WLAa = 880
WLAc = 110
Q.L. = 69
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

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

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 160.883226245855
Average Weekly limit = 160.883226245855
Average Monthly LImit = 110

The data are:

260

10/26/2015 8:02:49 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Chromium VI
Chronic averaging period = 4
WLAa = 32
WLAc = 22
Q.L. = 13
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 22
Variance = 174.24
C.V. = 0.6
97th percentile daily values = 53.5351
97th percentile 4 day average = 36.6033
97th percentile 30 day average= 26.5331
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 32
Average Weekly limit = 32
Average Monthly LImit = 21.8792230994975

The data are:

22

10/26/2015 8:03:43 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Copper
Chronic averaging period = 4
WLAa = 18
WLAc = 12
Q.L. = 7.0
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

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

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 17.5508974086388
Average Weekly limit = 17.5508974086388
Average Monthly LImit = 12

The data are:

31

10/26/2015 8:04:18 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Lead
Chronic averaging period = 4
WLAa = 160
WLAc = 18
Q.L. = 11
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 65
Variance = 1521
C.V. = 0.6
97th percentile daily values = 158.172
97th percentile 4 day average = 108.146
97th percentile 30 day average= 78.3934
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 26.3263461129582
Average Weekly limit = 26.3263461129582
Average Monthly LImit = 18

The data are:

65

10/26/2015 8:04:57 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Mercury
Chronic averaging period = 4
WLAa = 2.8
WLAc = 1.5
Q.L. = 1.0
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1.5
Variance = .81
C.V. = 0.6
97th percentile daily values = 3.65012
97th percentile 4 day average = 2.49568
97th percentile 30 day average= 1.80907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.19386217607985
Average Weekly limit = 2.19386217607985
Average Monthly LImit = 1.5

The data are:

1.5

10/26/2015 8:05:30 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Nickel
Chronic averaging period = 4
WLAa = 280
WLAc = 30
Q.L. = 18
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 72
Variance = 1866.24
C.V. = 0.6
97th percentile daily values = 175.206
97th percentile 4 day average = 119.792
97th percentile 30 day average= 86.8358
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 43.8772435215969
Average Weekly limit = 43.8772435215969
Average Monthly LImit = 30

The data are:

72

10/26/2015 8:06:00 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Selenium
Chronic averaging period = 4
WLAa = 40
WLAc = 10
Q.L. = 6.0
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 10
Variance = 36
C.V. = 0.6
97th percentile daily values = 24.3341
97th percentile 4 day average = 16.6379
97th percentile 30 day average= 12.0605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.6257478405323
Average Weekly limit = 14.6257478405323
Average Monthly LImit = 10

The data are:

10

10/26/2015 8:08:57 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Silver
Chronic averaging period = 4
WLAa = 4
WLAc =
Q.L. = 1.6
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 23
Variance = 190.44
C.V. = 0.6
97th percentile daily values = 55.9686
97th percentile 4 day average = 38.2671
97th percentile 30 day average= 27.7392
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 4
Average Weekly limit = 4
Average Monthly LImit = 2.73490288743718

The data are:

23

10/26/2015 8:09:50 AM

Facility = Possum Point - Internal Outfall 503
Chemical = Zinc
Chronic averaging period = 4
WLAa = 180
WLAc = 180
Q.L. = 71
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 420
Variance = 63504
C.V. = 0.6
97th percentile daily values = 1022.03
97th percentile 4 day average = 698.791
97th percentile 30 day average= 506.542
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 180
Average Weekly limit = 180
Average Monthly LImit = 123.070629934673

The data are:

420

Attachment 15

Spreadsheet for determination of WET test endpoints or WET limits

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
4		**Excel 97**			**Acute Endpoint/Permit Limit**			**Use as LC_{50} in Special Condition, as TUa on DMR**							
5		**Revision Date: 12/13/13**													
6		**File: WETLIM10.xls**			ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa			
7		**(MIX.EXE required also)**													
8					ACUTE WLAa		0.6	Note: Inform the permittee that if the mean of the data exceeds							
9								this TUa:	1.0	a limit may result using STATS.EXE					
11					**Chronic Endpoint/Permit Limit**			**Use as NOEC in Special Condition, as TUc on DMR**							
13					CHRONIC	2.92514937	TU_c	NOEC =	35	% Use as	2.85	TU_c			
14					BOTH*	6.00000015	TU_c	NOEC =	17	% Use as	5.88	TU_c			
15	**Enter data in the cells with blue type:**				AML	2.92514937	TU_c	NOEC =	35	% Use as	2.85	TU_c			
17	Entry Date:		10/21/15		ACUTE WLAa,c		6		Note: Inform the permittee that if the mean						
18	Facility Name:		Possum Point		CHRONIC WLAc		2		of the data exceeds this TUc:			1.20207454			
19	VPDES Number:		VA0002071		* Both means acute expressed as chronic				a limit may result using STATS.EXE						
20	Outfall Number:		5												
21					**% Flow to be used from MIX.EXE**				**Diffuser /modeling study?**						
22	Plant Flow:		1	MGD					Enter Y/N	n					
23	Acute 1Q10:		1	MGD	100	%			Acute	1	:1				
24	Chronic 7Q10:		1	MGD	100	%			Chronic	1	:1				
26	Are data available to calculate CV? (Y/N)				N	(Minimum of 10 data points, same species, needed)					Go to Page 2				
27	Are data available to calculate ACR? (Y/N)				N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3				
30	IWC_a		50	%	Plant flow/plant flow + 1Q10		**NOTE: If the IWCa is >33%, specify the**								
31	IWC_c		50	%	Plant flow/plant flow + 7Q10		**NOAEC = 100% test/endpoint for use**								
33	Dilution, acute		2	100/IWCa											
34	Dilution, chronic		2	100/IWCc											
36	WLA_a		0.6	Instream criterion (0.3 TUa) X's Dilution, acute											
37	WLA_c		2	Instream criterion (1.0 TUc) X's Dilution, chronic											
38	$WLA_{a,c}$		6	ACR X's WLA_a - converts acute WLA to chronic units											
40	ACR -acute/chronic ratio		10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)											
41	CV-Coefficient of variatior		0.6	Default of 0.6 - if data are available, use tables Page 2)											
42	Constants	eA	0.4109447	Default = 0.41											
43		eB	0.6010373	Default = 0.60											
44		eC	2.4334175	Default = 2.43											
45		eD	2.4334175	Default = 2.43 (1 samp)		No. of sample	1	****The Maximum Daily Limit is calculated from the lowest**							
46								**LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**							
47	$LTA_{a,c}$		2.4656682	WLAa,c X's eA											
48	LTA_c		1.2020746	WLAc X's eB							Rounded NOEC's		%		
49	MDL** with $LTA_{a,c}$		6.000000147	TU_c	NOEC =	16.666666	(Protects from acute/chronic toxicity)				NOEC =	17	%		
50	MDL** with LTA_c		2.925149368	TU_c	NOEC =	34.186288	(Protects from chronic toxicity)				NOEC =	35	%		
51	AML with lowest LTA		2.925149368	TU_c	NOEC =	34.186288	Lowest LTA X's eD				NOEC =	35			
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a														
54											Rounded LC50's		%		
55	MDL with $LTA_{a,c}$		0.600000015	TU_a	LC50 =	166.666663	%	Use NOAEC=100%			LC50 =	NA	%		
56	MDL with LTA_c		0.292514937	TU_a	LC50 =	341.862884	%	Use NOAEC=100%			LC50 =	NA			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
59															
60		**Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)**													
61															
62		IF YOU HAVE AT LEAST 10 DATA POINTS THAT					Vertebrate			Invertebrate					
63		ARE QUANTIFIABLE (NOT "<" OR ">")					IC_{25} Data			IC_{25} Data					
64		FOR A SPECIES, ENTER THE DATA IN EITHER					or			or					
65		COLUMN "G" (VERTEBRATE) OR COLUMN					LC_{50} Data	LN of data		LC_{50} Data	LN of data				
66		"J" (INVERTEBRATE). THE 'CV' WILL BE					***********			************					
67		PICKED UP FOR THE CALCULATIONS				1			1						
68		BELOW. THE DEFAULT VALUES FOR eA,				2			2						
69		eB, AND eC WILL CHANGE IF THE 'CV' IS				3			3						
70		ANYTHING OTHER THAN 0.6.				4			4						
71						5			5						
72						6			6						
73						7			7						
74		Coefficient of Variation for effluent tests				8			8						
75						9			9						
76		CV =	0.6	(Default 0.6)		10			10						
77						11			11						
78		δ^2 =	0.3074847			12			12						
79		δ =	0.554513029			13			13						
80						14			14						
81		Using the log variance to develop eA				15			15						
82			(P. 100, step 2a of TSD)			16			16						
83		Z = 1.881 (97% probability stat from table				17			17						
84		A =	-0.88929666			18			18						
85		eA =	0.410944686			19			19						
86						20			20						
87		Using the log variance to develop eB													
88			(P. 100, step 2b of TSD)			St Dev	NEED DATA	NEED DATA	St Dev	NEED DAT/	NEED DATA				
89		δ_4^2 =	0.086177696			Mean	0	0	Mean	0	0				
90		δ_4 =	0.293560379			Variance	0	0.000000	Variance	0	0.000000				
91		B =	-0.50909823			CV	0		CV	0					
92		eB =	0.601037335												
93															
94		Using the log variance to develop eC													
95			(P. 100, step 4a of TSD)												
96															
97		δ^2 =	0.3074847												
98		δ =	0.554513029												
99		C =	0.889296658												
100		eC =	2.433417525												
101															
102		Using the log variance to develop eD													
103			(P. 100, step 4b of TSD)												
104		n =	1	This number will most likely stay as "1", for 1 sample/month.											
105		δ_n^2 =	0.3074847												
106		δ_n =	0.554513029												
107		D =	0.889296658												
108		eD =	2.433417525												
109															

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

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:

enter it here:	NO DATA	%LC_{50}
	NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	TUc	Limit % Effluent	TUc
Dilution series based on data mean	83.2	1.202075		
Dilution series to use for limit			35	2.8571429
Dilution factor to recommend:	0.9120829		0.591608	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	91.2	1.10	59.2	1.69
	83.2	1.20	35.0	2.86
	75.9	1.32	20.7	4.83
	69.20	1.44	12.3	8.16
Extra dilutions if needed	63.12	1.58	7.2	13.80
	57.57	1.74	4.3	23.32

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:
Pimepheles promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebretes 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

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Dominion – Possum Point Power Station VA0002071

TO: Tom Faha

FROM: Dan Demers and Susan Mackert

DATE: April 15, 2014

UPDATED: April 16, 2014

COPIES: Trisha Beasley, Rich Doucette, Bryant Thomas

BACKGROUND

Staff received a call from Dominion on Wednesday, April 9, 2014, concerning the presence of three previously unaccounted for ash ponds (A, B, and C) located at the Possum Point Power Station. The ash pond complex is located on a parcel of land between Possum Point Road and Quantico Creek (Attachment 1). The ash pond complex was constructed in approximately 1955 and was last used in 1972. Ash was deposited in all three ponds starting with "A", moving to "B", and then to "C" as the ponds filled.

Dominion noted that a discharge structure and discharge pipe remain in place at Ash Pond C which has a direct discharge to Quantico Creek. A sample was collected from the discharge. According to Dominion, sample results indicate the presence of some trace metals typically associated with ash pond operations.

Dominion also noted a breach of the berm associated with Ash Pond A. Dominion believes storm water has collected along the berm causing the storm water to overtop the berm. An area approximately five feet wide by six feet deep has been eroded. It is Dominion's belief that this has been occurring for some time.

After speaking with Dominion, staff briefed Northern Regional Office (NRO) management on April 9, 2014. NRO staff was directed to conduct a site visit to the Possum Point Power Station by week's end.

SUMMARY OF FIELD OBSERVATIONS

April 11, 2014

On April 11, 2014, Dan Demers and Susan Mackert conducted a site visit to observe the ash pond complex and gather additional information from Dominion. Dominion staff present included Ken Roller and Jeff Marcell. Photographs taken during this site visit are provided in Attachment 2. The following are noted:

- The facility ceased the use of coal in March 2003.
- The quantity of ash deposited in to the ash pond complex is unknown. Staff requested that, if the information is available, Dominion review the amount of coal burned during the usage period of the ash ponds to determine an estimate of ash quantity.
- The acreage of each ash pond is unknown. An aerial survey was conducted within the last two weeks and Dominion anticipates acreage information will be available soon. Additionally, the survey will be used to determine the extent of the complex so that a proposed channel can be constructed to redirect all surface water flow to Ash Pond C; thereby stopping the apparent over topping of the berm and subsequent erosion at the area of the breach.

- Dam safety staff from the Department of Conservation and Recreation (DCR) has been contacted. Dominion is awaiting guidance from DCR staff concerning core sampling. As of the date of the site visit, a schedule for core sampling was not in place.
- Staff from the U.S. Army Corps of Engineers has been contacted concerning a wetlands determination.
- Ash Ponds A, B, and C are overgrown with vegetation (photos 1 – 9). There is no evidence that the ash ponds are lined (synthetic or natural) or capped.
- A discharge weir structure does remain in place at Ash Pond C (photos 10 – 11). The structure at Ash Pond C is draining and/or seeping through a gap in the wall at approximately thirty-five inches below the top as measured by Dominion staff. Flow is estimated at approximately two gallons per minute (photo 12). The discharge is directly to Quantico Creek (photos 13 – 14) and is tidally influenced.
- Two groundwater monitoring wells are located just off the access road in to the ash pond complex in closest proximity to Ash Pond C (photo 15).
- The berm wall for Ash Ponds A, B, and C is one continuous wall (photo 16). There is a downward slope towards Quantico Creek (photo 17). The toe of the path that serves as the berm appears to have seepage along all three ash ponds.
- There is an intermittent overflow point from Ash Pond B (photos 18 – 19). Heavy rains cause this area to overtop the berm wall and drain down the berm slope towards Quantico Creek (photo 20). Standing water in this area appeared dark in color.
- The breach area identified at Ash Pond A (photo 21) appeared to have some vegetation and did not appear to be new. Staff estimates this area to be possibly six to nine months old. Dominion noted a constant flow since the breach was first discovered in March 2014. The flow appeared to be a combination of surface drainage (photos 22 - 24) and seepage through the berm. There did not appear to be erosion at the low flow observed. However, during rain events it does appear that there is potential for severe erosion from water running over the berm. The discharge would flow across a heavily vegetated area prior to any discharge to Quantico Creek (photo 25). Samples have not been collected from this point.
- Ash Pond A has an additional area of flow along the southeastern edge adjacent to the closed sewage treatment lagoons (photos 26 - 28) that may have seepage through the berm.
- The facility's existing ash ponds, D and E, were also observed. No issues were noted.
- Ash Pond D is a lined structure with a surface area of 72 acres and a maximum depth of 120 feet. The pond was placed in to service in 1989 and serves as the permanent repository for sediment and ash generated at the Possum Point Power Station.
- Ash Pond E is an unlined structure with a surface area of approximately 40 acres.

April 15, 2014

On April 15, 2014, Susan Mackert conducted a site visit to observe the ash pond complex due to the heavy rains forecasted for the area. Dominion staff present included Jeff Marcell. Photographs taken during this site visit are provided in Attachment 3. The following are noted:

- Weather data for the Possum Point Power Station is obtained from the National Oceanic and Atmospheric Administration (NOAA) station at the Quantico Marine Corps Air Facility. Rainfall data for April 15, 2014, is provided in Attachment 4.
- Rain began falling at approximately 6:00 am on April 15, 2014. Rainfall was heavy at times with approximately one inch being recorded prior to the site visit.
- A visual observation of the breach area identified at Ash Pond A was made. The area appeared to be visually consistent with observations noted during the April 11, 2014, site visit. No water was noted as running over the berm (photo 1). Water collecting at the edge of Ash Pond A was noted as flowing (photo 2).

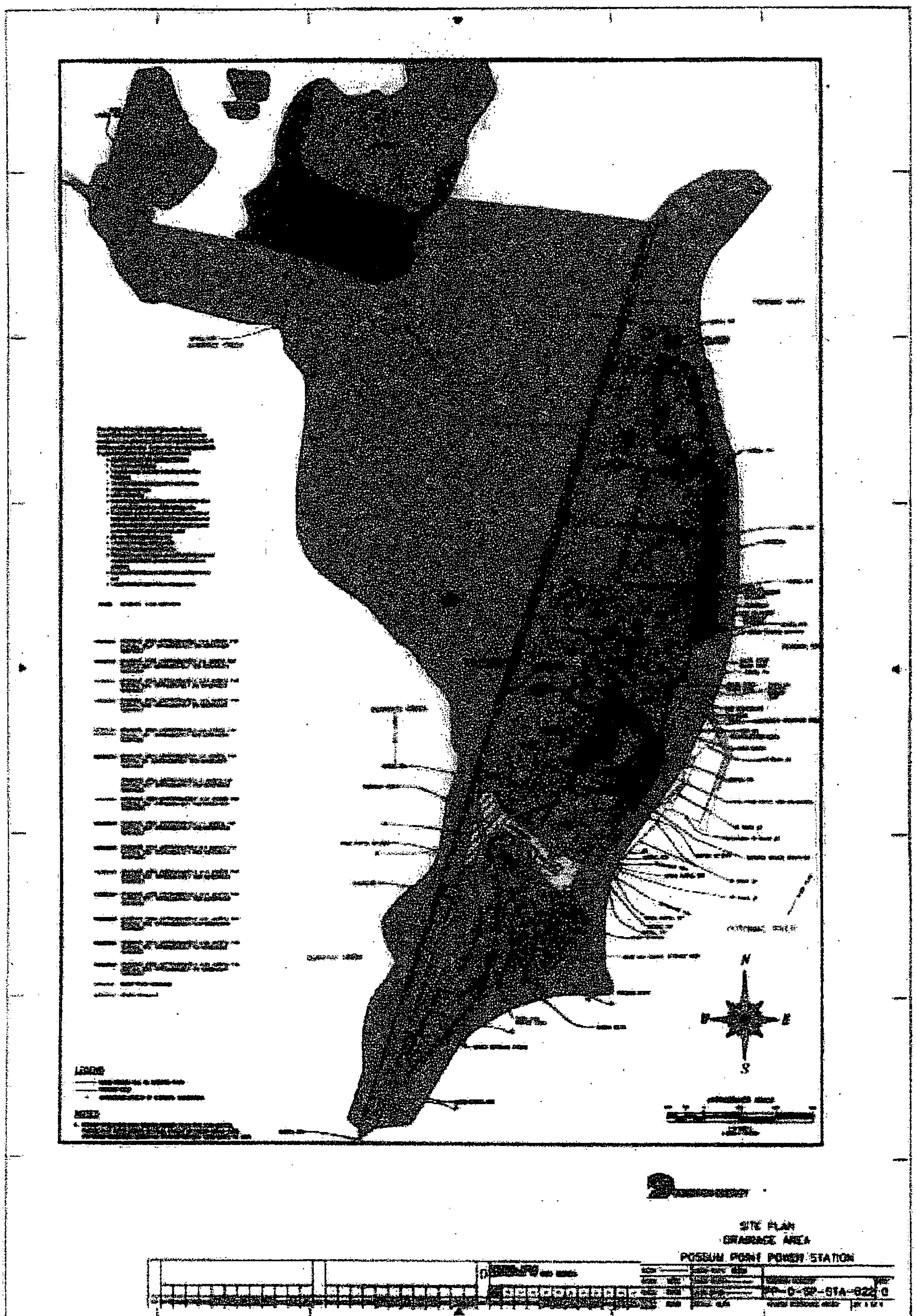
- Flow from the breach area was observed (photos 3 – 4). The flow was distinctly audible, which was not the case during the previous site visit on April 11, 2014.

- A visual observation of the suspected overflow point at Ash Pond B was made. The area appeared to be visually consistent with observations noted during the April 11, 2014, site visit. Water was observed collecting at the edge of Ash Pond B (photo 5). No water was observed running over the berm (photos 6 – 7).

- Clarification was provided by Dominion concerning the two groundwater monitoring wells located just off the access road in to the ash pond complex. The wells are included in a groundwater monitoring plan required by the facility's Virginia Pollutant Discharge Elimination System (VPDES) permit number VA0002071. The wells do not capture water from the ash pond complex.

- Dominion stated DCR staff will be on site Thursday, April 24, 2014.

Attachment 1 - Maps



N
W
E
S
SITE PLAN
DRAINAGE AREA
POSSUM POINT POWER STATION


COCKPIT PT. ROAD
ACCESS ROAD
POND C
Possum Point Rd
POND B
EMBANKMENT
POND A

Attachment 2: Photographs from April 11, 2014 Field Observations

Photo 1. Ash Pond C.

Photo 2. Ash Pond C.

Photo 3. Ash Pond C.

Photo 4. Ash Pond C.

Photo 5. Transition point from Ash Pond C to Ash Pond B.

Photo 6. Transition point from Ash Pond C to Ash Pond B.

Photo 7. Transition point from Ash Pond B to Ash Pond A.

Photo 8. Ash Pond A.

Photo 9. Ash Pond A.

Photo 10. Discharge structure at Ash Pond C.

Photo 11. Discharge structure at Ash Pond C.

Photo 12. Flow into discharge structure at Ash Pond C.

Photo 13. Discharge pipe associated with Ash Pond C. Flow is in the direction of the arrow.

Photo 14. Discharge path from pipe in photo 13 to Quantico Creek. Flow is in the direction of the arrow.

Photo 15. Groundwater monitoring wells located in proximity to Ash Pond C.

Photo 16. Berm wall.

Photo 17. Down slope of berm wall. Quantico Creek is in the direction of the arrow.

Photo 18. Overflow point from Ash Pond B.

Photo 19. Overflow point from Ash Pond B.

Photo 20. Overflow point from Ash Pond B reaching downward slope towards Quantico Creek.

Photo 21. The arrow points to the location of the breach associated with Ash Pond A.

Photo 22. Surface drainage to breach.

Photo 23. Surface drainage to breach.

Photo 24. Surface drainage to breach.

Photo 25. Flow from breach area would travel in the direction of the arrow towards Quantico Creek.

Photo 26. Southeastern edge of Ash Pond A adjacent to closed sewage treatment lagoons.

Photo 27. Flow noted in area shown in photo 26.

Photo 28. Flow noted in area shown in photo 26.

Attachment 3: Photographs from April 15, 2014 Field Observations

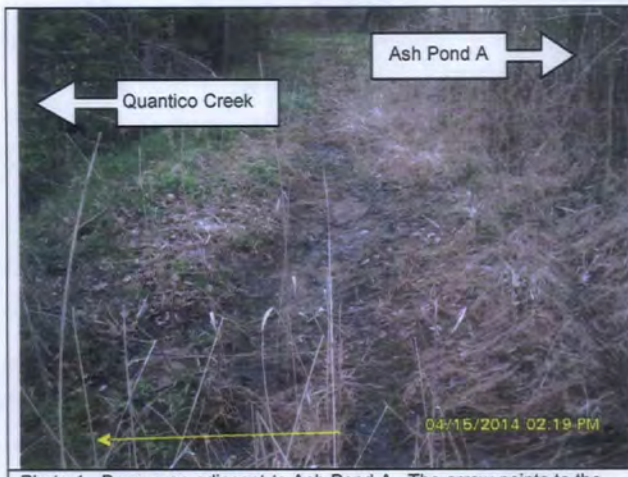


Photo 1. Berm area adjacent to Ash Pond A. The arrow points to the area of the breach. Note standing water on berm.

Photo 2. Water collected at the edge of Ash Pond A. Water was flowing in the direction of the arrow.

Photo 3. Breach area of Ash Pond A. Flow from the breach is in the direction of the arrow.

Photo 4. Close up of breach area of Ash Pond A.

Photo 5. Standing water adjacent to Ash Pond B.

Photo 6. Berm area adjacent to Ash Pond B. Note no water flowing over the berm.

Photo 7. Overflow point from Ash Pond B.

Attachment 4: Rain Data from April 15, 2014

weather.gov

Weather observations for the past three days

Quantico Marine Corps Air Facility

Enter Your "City, ST" or zip code Go

metric en español

Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour Max.	6 hour Min.				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
16	10:56	N 21 G 26	10.00	Fair and Breezy	CLR	41	14			33%	32	NA	30.46	1031.6			
16	09:56	N 21 G 26	10.00	Fair and Breezy	CLR	39	13			34%	29	NA	30.44	1030.8			
16	08:56	N 15 G 28	10.00	Fair	CLR	37	15			41%	28	NA	30.42	1030.0			
16	07:56	N 13 G 22	10.00	Fair	CLR	35	17	36	33	48%	26	NA	30.37	1028.5			
16	06:56	N 14 G 23	10.00	Fair	CLR	33	16			49%	23	NA	30.33	1027.3			
16	05:56	N 12 G 22	10.00	Fair	CLR	34	17			50%	25	NA	30.29	1025.6			
16	04:56	N 14 G 22	10.00	Fair	CLR	34	17			50%	25	NA	30.24	1024.1			
16	03:56	N 15 G 31	10.00	Fair	CLR	35	15			44%	25	NA	30.20	1022.6			
16	02:56	N 18 G 30	10.00	Fair	CLR	35	17			48%	24	NA	30.17	1021.6			
16	01:56	N 15 G 24	10.00	Fair	CLR	36	19	41	36	50%	27	NA	30.13	1020.4			0.04
16	00:56	N 24 G 38	10.00	A Few Clouds and Breezy	FEW048	37	21			52%	26	NA	30.11	1019.6			
15	23:56	N 13 G 25	10.00	Mostly Cloudy	BKN044	39	24			55%	31	NA	30.08	1018.6			
15	22:56	N 13	10.00	Overcast	OVC040	40	30			68%	32	NA	30.06	1018.1		0.04	
15	21:56	NE 9	10.00	Overcast	SCT010 BKN030 OVC050	39	34			82%	33	NA	30.00	1015.8	0.02		
15	20:56	N 15 G 22	6.00	Light Rain Fog/Mist	FEW015 BKN030 OVC060	39	35			86%	31	NA	29.95	1014.3	0.02		
15	19:56	N 17 G 26	5.00	Light Rain	SCT015 BKN030 OVC060	41	36	73	41	82%	33	NA	29.90	1012.5	0.09		0.36
15	18:56	N 14 G 30	7.00	Light Rain	SCT020 OVC050	43	37			80%	36	NA	29.86	1011.1	0.03		
15	17:56	N 21 G 35	6.00	Light Rain and Breezy	BKN020 OVC035	45	40			83%	37	NA	29.79	1008.8	0.08		
15	16:56	N 21	3.00	Light	FEW016	47	41			80%	39	NA	29.74	1007.3	0.08	0.16	

April

April

		G 30		Rain and Breezy	BKN021 OVC039												
15	15:56	N 21 G 31	4.00	Light Rain and Breezy	FEW010 OVC030	50	45			83%	43	NA	29.70	1005.7	0.08		
15	14:56	N 14 G 25	10.00	Light Rain	FEW014 OVC029	53	48			83%	NA	NA	29.65	1004.3			
15	13:56	SW 17 G 25	10.00	Overcast	BKN030 OVC100	72	59	72	63	64%	NA	NA	29.57	1001.5			0.98
15	12:56	SW 15	10.00	Overcast	SCT031 BKN041 OVC095	68	63			84%	NA	NA	29.58	1001.7			
15	11:56	S 13	10.00	Overcast	BKN018 OVC026	67	64			91%	NA	NA	29.59	1001.9			
15	10:56	S 12	10.00	Overcast	BKN028 BKN060 OVC110	64	62			93%	NA	NA	29.57	1001.5		0.98	
15	09:56	SW 6	10.00	Light Rain	SCT028 BKN060 OVC110	64	62			93%	NA	NA	29.62	1003.1	0.31		
15	08:56	SW 10 G 21	0.75	Heavy Rain Fog/Mist	BKN017 BKN027 OVC043	65	62			90%	NA	NA	29.63	1003.6	0.67		
15	07:56	S 16	6.00	Light Rain Fog/Mist	SCT020 BKN026 OVC045	64	60	66	64	87%	NA	NA	29.64	1003.8	0.04		0.05
15	06:56	S 18	10.00	Light Rain	BKN025 OVC031	65	60			84%	NA	NA	29.65	1004.3	0.01		
15	05:56	S 14	10.00	Light Rain	BKN028 BKN032 OVC044	65	60			84%	NA	NA	29.68	1005.0			
15	04:56	S 12	10.00	Overcast	OVC027	64	59			84%	NA	NA	29.70	1005.9			
15	03:56	S 13	10.00	Overcast	OVC026	66	59			78%	NA	NA	29.73	1006.8			
15	02:56	S 12	10.00	Mostly Cloudy	BKN031 BKN110	64	59			84%	NA	NA	29.75	1007.6			
15	01:56	S 12	10.00	Partly Cloudy	FEW042 SCT049 SCT060	65	59	70	64	81%	NA	NA	29.78	1008.6			0.01
15	00:56	SW 15	10.00	Overcast	OVC046	68	59			73%	NA	NA	29.81	1009.5			
14	23:56	SW 16	10.00	Light Rain	FEW036 BKN047 OVC055	69	59			70%	NA	NA	29.82	1009.9	0.01		
14	22:56	S 12	10.00	Overcast	OVC075	67	57			71%	NA	NA	29.84	1010.4			
14	21:56	SW 6	10.00	Mostly Cloudy	BKN090	67	55			66%	NA	NA	29.84	1010.6			
14	20:56	SW 6	10.00	Fair	CLR	66	56			70%	NA	NA	29.85	1010.8			
14	19:56	SW 8	10.00	Fair	CLR	67	56	78	65	68%	NA	NA	29.84	1010.5			
14	18:56	S 12	10.00	Fair	CLR	67	56			68%	NA	NA	29.85	1010.8			
14	17:56	SW 14 G 23	10.00	Overcast	FEW020 BKN060 OVC180	75	51			43%	NA	NA	29.87	1011.6			
14	16:56	SW 9	10.00	Overcast	FEW060	77	51			40%	NA	78	29.88	1012.1			

		G 20			OVC180									
14	15:56	SW 13 G 29	10.00	Overcast	SCT060 OVC200	75	53			46%	NA	NA	29.90	1012.6
14	14:56	SW 10 G 24	10.00	Mostly Cloudy	SCT070 BKN150	77	52			42%	NA	78	29.92	1013.1
14	13:56	SW 23 G 32	10.00	Mostly Cloudy and Breezy	SCT050 BKN080	75	53	76	65	46%	NA	NA	29.94	1013.8
14	12:56	SW 23 G 32	10.00	Mostly Cloudy and Breezy	SCT050 BKN060 BKN150	74	54			50%	NA	NA	29.96	1014.6
14	11:56	SW 16 G 30	10.00	Mostly Cloudy	BKN039 BKN049 BKN150	72	55			55%	NA	NA	29.99	1015.7
14	10:56	SW 16 G 26	10.00	Overcast	BKN034 BKN043 OVC050	71	56			59%	NA	NA	30.00	1015.9
14	09:56	SW 18 G 28	10.00	Overcast	OVC031	68	57			68%	NA	NA	30.00	1016.1
14	08:56	SW 18 G 24	10.00	Mostly Cloudy	BKN025 BKN150	67	57			71%	NA	NA	30.00	1015.8
14	07:56	SW 16	10.00	Mostly Cloudy	SCT120 BKN250	65	56	68	63	73%	NA	NA	30.00	1016.0
14	06:56	SW 15	10.00	Fair	CLR	64	55			73%	NA	NA	30.00	1015.9
14	05:56	SW 13	10.00	Fair	CLR	65	55			70%	NA	NA	29.99	1015.6
14	04:56	SW 15	10.00	Fair	CLR	66	54			65%	NA	NA	30.00	1016.0
14	03:56	SW 16	10.00	Fair	CLR	66	54			65%	NA	NA	30.00	1016.0
14	02:56	S 15	10.00	Fair	CLR	66	55			68%	NA	NA	30.01	1016.1
14	01:56	S 13	10.00	Fair	CLR	66	56	72	64	70%	NA	NA	30.02	1016.5
14	00:56	S 16	10.00	Fair	CLR	64	56			75%	NA	NA	30.03	1016.8
13	23:56	S 12	10.00	Fair	CLR	64	56			75%	NA	NA	30.02	1016.7
13	22:56	SW 9	10.00	Fair	CLR	66	56			70%	NA	NA	30.02	1016.6
13	21:56	SW 12	10.00	Fair	CLR	67	56			68%	NA	NA	30.03	1016.8
13	20:56	S 12	10.00	Fair	CLR	66	56			70%	NA	NA	30.01	1016.4
13	19:56	SW 13	10.00	Fair	CLR	72	56	82	71	57%	NA	NA	30.01	1016.3
13	18:56	SW 20	10.00	Fair	CLR	75	54			48%	NA	NA	30.00	1016.1
13	17:56	S 17	10.00	Fair	CLR	71	55			57%	NA	NA	30.01	1016.2
13	16:56	S 17	10.00	Fair	CLR	75	55			50%	NA	NA	30.00	1016.1
13	15:56	S 18	10.00	Fair	CLR	74	55			52%	NA	NA	30.01	1016.4
13	14:56	S 20	10.00	Fair	CLR	74	55			52%	NA	NA	30.03	1017.0

13	13:56	SW 16 G 26	10.00	Fair	CLR	81	51	81	56	35%	NA	80	30.06	1018.1			
13	12:56	S 10	10.00	Fair	CLR	70	56			61%	NA	NA	30.09	1018.9			
13	11:56	S 16	10.00	Fair	CLR	68	56			65%	NA	NA	30.12	1020.0			
Date	Time (edt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Air	Dwpt	Max. 6 hour	Min. 6 hour	Relative Humidity	Wind Chill (°F)	Heat Index (°F)	altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
						Temperature (°F)							Pressure		Precipitation (in.)		

National Weather Service
Southern Region Headquarters
Fort Worth, Texas
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May 2, 2014

Ms. Susan Mackert
Department of Environmental Quality
13901 Crown Court
Woodbridge, VA 22193

Dear Ms. Mackert,

Thank you for providing the April 15, 2014 memorandum summarizing your field observations from the April 11, 2014 and April 15, 2014 site visits to the Possum Point Power Station. We wanted to provide clarifying information relative to ash ponds A, B, C to ensure you have the most accurate information about how the ponds have been permitted, the times that they were in use, their capacity, and the integrity of the berm.

Concerning permitting, the drainage area containing Ash Ponds A, B and C and the associated storm water outfall (Outfall S104) for the area were addressed in Possum Point's historical and current permitting documents. A summary of the permitting history since 1991 is enclosed. As these permitting documents have shown, the coverage of this area has evolved in our SWPPP as the storm water requirements and our understanding has evolved. We would be happy to discuss this further with you if you need additional information.

Concerning the time frames various ponds were used, ash pond D was constructed and put into service before 1966, but the exact date is unknown. (The original ash pond D is shown as constructed on USGS maps in 1966). Ash pond D replaced ponds A, B and C. Accordingly, based on this construction date, we believe that ash ponds A, B and C were no longer active in 1966. Ash pond D was later expanded in 1988.

Concerning the amount of ash in ash ponds A, B, & C, they were designed as a contiguous area with the decant structure located in Ash Pond C. The quantity of ash deposited in the ash pond complex is approximately 170,000 cu yds. The acreage of the ash pond complex is approximately 12 acres.

Finally, there is moisture in discrete locations along the toe of the berm, but not along the entire length. This is not a structural concern since there is no evidence of seepage up the berm surface indicating a compromise of the berm other than the area identified where the erosion was observed. As for the area of erosion, we are pursuing the appropriate approvals to repair this area of the side slope.

Please contact Ken Roller or me to discuss any questions that you have about this information.

Sincerely,

Cathy C. Taylor
Director Electric Environmental Services

Permitting of discharge associated with Ash Pond C: Chronological history

1991 - VPDES permit reissued with effective date May 8. Permit and Fact Sheet do not contain any reference to Ponds A, B, & C. Stormwater requirements not included in individual permit.

1992- VPDES Individual Permit Application was submitted on 9/25/ 1992. VA#S104 was included in the permit application as a stormwater outfall. Form 2F monitoring was included in the application for that outfall.

1993- DEQ indicated that they will cover the stormwater outfall under a general permit in the next reissuance.

1995- VAR3 registration statement was submitted for stormwater outfalls, and individual application for the rest of the outfalls.

1996 - VPDES Storm Water General Permit (Permit No. VAR330109) issued with date of coverage March 12, 1996. Permit contained Part I. pages for "coal" and "oil" handling sites at steam electric generating facilities (other than coal pile runoff), with associated effluent monitoring requirements. The permit also contained a requirement to develop a storm water pollution prevention plan.

1996 - Storm Water Pollution Prevention Plan dated March 14, 1996 contains the following description of storm water Outfall S104. The plan clearly identifies the location of the old ponds but concludes no potential for contaminants due to nature of drainage area that time.

VA# S104

Outfall and Drop Inlets (pipes) and [manholes]: VA# S104 < (103) (102)

Outfall Location: Latitude 38° 32' 34", Longitude 77° 16' 45"

Description: Outfall VA# S104 is a 30" concrete pipe which is integral to an inactive decant structure that previously served Ash Ponds A, B, and C. The drainage area associated with VA# S104 is approximately 43.8 acres with 50% cleared, 10%, highway, 25% medium woods, and 15% brush. Three drainage areas contribute runoff to this outfall:

1. A small drainage area (two acres) located on the northwest side of the intersection of Possum Point Road and Cockpit Point Road contributes runoff to VA# S104 via pipe #102. This area consists of 5% cleared, 30% highway, and 65% medium woods.

2. Approximately 16.9 acres just northwest of area 1 above, and bounded to the southwest by Possum Point Road, contributes runoff to VA# S104 via pipe #103. This area contains approximately 5% cleared, 5% highway, 35% brush, and 55% medium woods.

3. Approximately 25 acres (43.8 acres total minus 16.9 acres #103 and 2 acres #102) located west of drainage areas 1 and 2 above across Possum Point Road. It is within this drainage area that the old Ash Ponds A, B, and C were located.

Potential Contaminants: None

1996 - VPDES permit reissued with and effective date of August 9, 1996. Permit does not contain specific reference to ponds A, B, C, but does include requirement for development of SWPPP.

1999- VAR5 registration statement was submitted for stormwater outfalls. VA#S104 was included in the permit application as a stormwater outfall. Individual permit for the rest of the outfalls.

2001 - Reissued VPDES Permit reissued effective date September 13. Previous permit had required development of a storm water pollution prevention plan. This permit also contained a condition (G. Storm Water Management) requiring that the SWPPP be updated.

2004 - VPDES permit modified to incorporate wastewater discharges associated with the new Unit 6.

2006 – Application for renewal of Possum Point's discharge permit submitted March 2006. The application includes a description of Outfall S104 and associated drainage area that is essentially identical to the one from 1996 SWPPP above.

2007 - VPDES permit reissued effective October 24, 2007. There is no specific reference to Outfall 104 in the permit; however, Table 3 of the Fact Sheet developed by DEQ to support the permit contains a list of stormwater outfalls and drainage area descriptions that include S104.

2008 – Possum Point's Stormwater Pollution Prevention Plan (SWPP) was updated and Outfall S104 no longer specifically recognized in the plan. The drainage areas contributing to S104 are shown as sheet flow. **NOTE: This was likely done given the status of ponds A, B, and C at that time and previous determinations concerning the lack of potential for pollutants to be present in the discharge.**

2012 - Application for reissuance of Possum Point's VPDES permit submitted April 5. Form 2F lists 15 stormwater discharges from Possum Point. S104 is not included on the list. The application includes the Stormwater Pollution Prevention Plan (SWPPP), which had been updated in 2011 and continued to show the drainage area associated with ponds A, B, & C as sheet flow. The list of Outfalls in the SWPPP is identical to the list in Form 2F and does not include S104.

2013 - Possum Point's VPDES permit is reissued and does not specifically reference the discharge from Pond C.

Attachment 17

DEPARTMENT OF ENVIRONMENTAL QUALITY
Northern Regional Office
Memorandum

To:	Susan Mackert
Through:	Cynthia Sale
From:	Kurt W. Kochan KWK
Date:	September 20, 2011
Re:	Possum Point Power Station, Ash Ponds D&E and Oily Water Basin, VPDES Permit No. VA0002071

As requested, I have reviewed the file for the above-referenced facility, including the most recent Groundwater Annual Report. The quarterly reporting and monitoring of the groundwater conditions at the site are required as part of VPDES permit #VA0002071. The purpose of this monitoring is to determine if the activities at this site are resulting or may result in violations of the State Water Control Board's Groundwater Standards and/or Antidegradation Policy for Groundwater. The requested review is part of the reissuing of the referenced permit.

Based upon my review of the file, it appears that the existing monitoring wells are placed in appropriate locations and that the monitoring wells are properly constructed to provide an accurate depiction of ground water conditions at the site. Groundwater samples are currently required to be collected from the monitoring well network for Ash Ponds D & E. The wells are identified as ED-15, -24R, -1, -3, -9R, - 32, - 5, -4, -17, -31, -26, - 33, ES-4, -1, and -3A. The wells are sampled on a annual or semi-annual basis and submitted for laboratory analysis for the following parameters/constituents from the wells surrounding the Ash Ponds: temperature, pH, specific conductivity, dissolved metals, and water quality parameters chlorides, fluoride, phenol, potassium, sodium, sulfate, and total organic carbon. The monitoring wells located in the vicinity of the Oily Waste Basin, OWB-1 through OWB-5 are sampled for the following: temperature, pH, specific conductivity, dissolved metals, and water quality parameters chlorides, fluoride, phenol, potassium, sodium, sulfate, and total organic carbon, BTEX, and Total Petroleum Hydrocarbons. It appears that all samples have been collected and reports submitted based upon the requirements of the permit issued on October 24, 2007, and revisions approved to the Groundwater Monitoring Plan in a letter dated February 25, 2008.

Based upon my review of the data provided since this date and compared to **9 VAC 25-280-10 et seq Groundwater Standards**, the following comments apply:

- While a review of the 2010 data indicates exceedances of Virginia Groundwater Quality Standards; as the latest report states, significant changes in the groundwater quality beneath the Facility do not appear to have occurred.

The latest report indicates that ED-15 is damaged. Since this well is utilized to monitor background groundwater conditions, it is recommended that the damaged well be properly abandoned and replaced. In addition, downgradient well, ED-4, has not had sufficient water to be sampled the last two annual sampling events. This well should be reinstalled so that the groundwater in the vicinity of this well is properly monitored. Also, Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO) analysis is currently performed on the groundwater samples collected from the monitoring wells surrounding the Oily Waste Basin. It is my professional opinion that TPH-Oil Range Organics (ORO) analysis be added to the list of required analytes, as this analysis might be more relevant to the contaminates discharged to this basin

In summary, based upon the ground water data submitted from the site for the period of 2007-2011, several constituents of concern (COCs) were detected at concentrations above the Groundwater Standards as listed in **9 VAC 25-280-10 et seq.** The levels of the COCs observed during this time appear to be stable. Therefore, only continued monitoring, as mentioned in the report, the reinstallation of ED-15 and possibly ED-4, and the addition of TPH-ORO analysis to monitoring wells OWB-1 through OWB-5 is recommended at this time.

Attachment 18

			From 2012 305(b) Guidance	
			Freshwater [1,2]	Estuarine [3,4]
	1aQUA001.09	1aQUA001.09	Consensus	ER-M
	09/13/01	07/16/14	PEC	
	mg/kg (ppm)	mg/kg (ppm)	mg/kg (ppm) dry weight	mg/kg (ppm) dry weight
Aluminum (Al)	77000.0	21500.0	N/A	N/A
Antimony (Sb)	0.0	0.2	N/A	N/A
Arsenic (As)	4.5	6.5	33.0	70.0
Cadmium (Cd)	0.76	1.0	5.0	9.60
Chromium (Cr)	83.5	37.3	111.0	370.0
Copper (Cu)	196.8	123.0	149.0	270.0
Iron (Fe)	41800.0	37700.0	N/A	N/A
Lead (Pb)	46.1	42.1	128.0	218.0
Manganese (Mn)	1622.8	1410.0	N/A	N/A
Mercury (Hg)	0.448	0.240	1.06	0.71
Nickel (Ni)	51.9	41.1	48.6	51.6
Selenium (Se)	2.1	1.4	N/A	N/A
Silver (Ag)	0.96	0.70	N/A	3.7
Zinc (Zn)	313.9	291.0	459.0	410.0

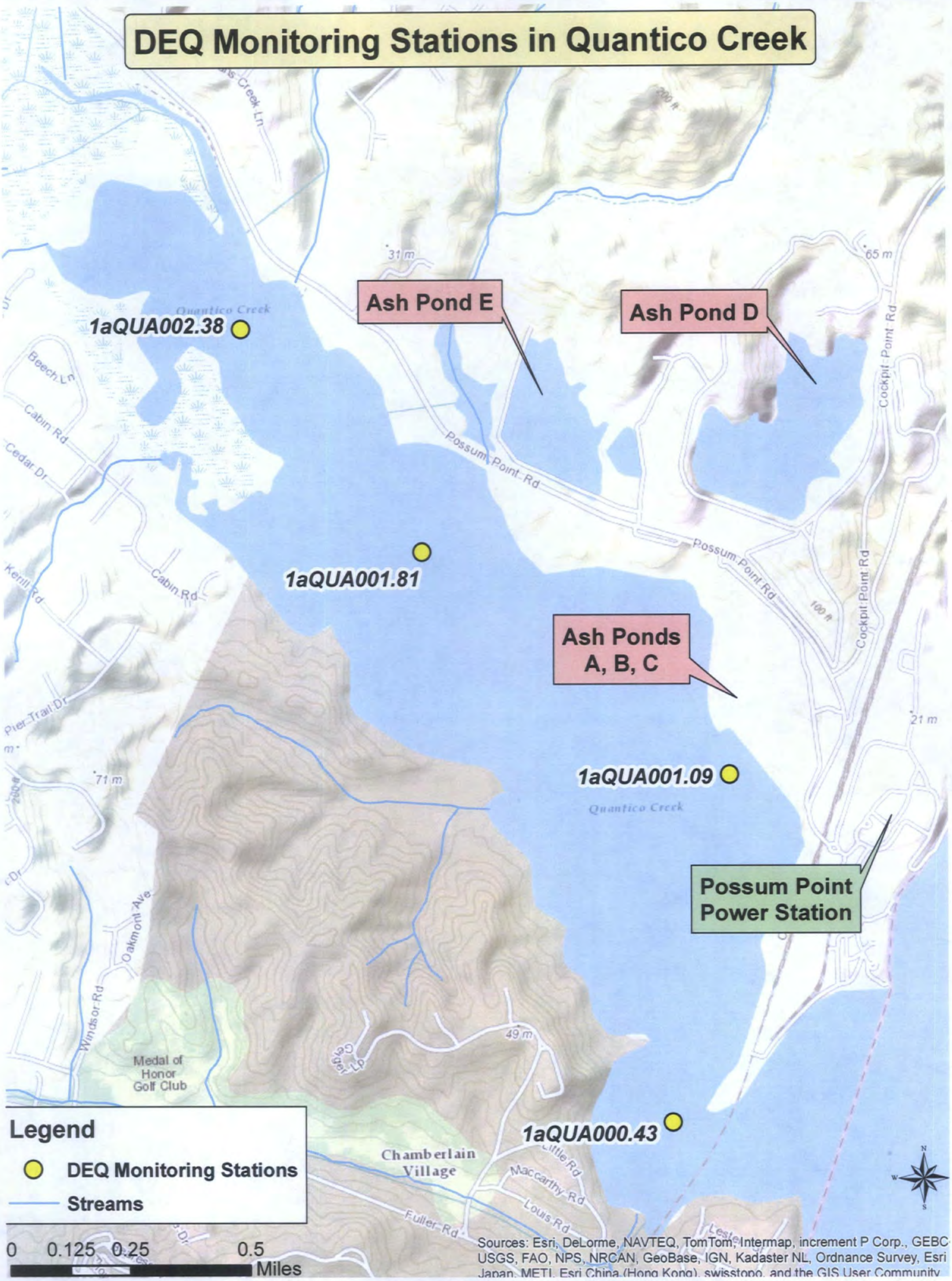
[1] Freshwater PECs: MacDonald, D.D., C.G. Ingersoll, T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.

[2] Quantico Creek is located in the tidal freshwater portion of the Potomac River watershed. As such, the consensus-based Probable Effects Concentrations (PEC) apply to the sediment metal data presented in the table.

[3] Estuarine ER-Ms: MacDonald, D.D., Long, E.R., Smith, S.L., Calder, F.D. 1993. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments.

[4] The effects-range median (ER-M) screening values for estuarine sediments are presented for informational and comparison purposes.

Attachment 19


DEQ Monitoring Stations in Quantico Creek
Ash Pond E
Ash Pond D
Ash Ponds
A, B, C
Possum Point
Power Station
1aQUA002.38
1aQUA001.81
1aQUA001.09
1aQUA000.43
Quantico Creek
Quantico Creek
Possum Point Rd
Possum Point Rd
Cockpit Point Rd
Cockpit Point Rd
Beech Ln
Cabin Rd
Cedar Dr
Cabin Rd
Kerill Rd
Pier Trail Dr
Oakmont Ave
Windsor Rd
Medal of
Honor
Golf Club
Chamberlain
Village
Little Rd
Maccarthy Rd
Louis Rd
Fuller Rd
31 m
65 m
21 m
71 m
49 m
Legend
DEQ Monitoring Stations
Streams
0 0.125 0.25 0.5
Miles
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBC
USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri
Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Attachment 20

									From 2012 305(b) Guidance	
									Freshwater [1,2]	Estuarine [3,4]
	1aQUA000.43 07/16/14	Percentiles Potomac Basin	1aQUA001.09 07/16/14	Percentiles Potomac Basin	1aQUA001.81 07/16/14	Percentiles Potomac Basin	1aQUA002.38 07/16/14	Percentiles Potomac Basin	Consensus PEC	ER-M
	mg/kg (ppm)	%	mg/kg (ppm)	%	mg/kg (ppm)	%	mg/kg (ppm)	%	mg/kg (ppm) dry weight	mg/kg (ppm) dry weight
Aluminum (Al)	22400.0	38.0%	21500.0	33.7%	21800.0	34.3%	22000.0	34.6%		
Antimony (Sb)	0.2	62.2%	0.22	63.1%	0.29	66.8%	0.21	62.7%		
Arsenic (As)	6.7	40.0%	6.5	39.2%	8.5	57.1%	8.0	51.5%	33	70
Cadmium (Cd)	0.66	46.0%	0.98	63.0%	1.57	86.0%	3.26	91.3%	4.98	9.6
Chromium (Cr)	37.7	29.7%	37.3	29.6%	39.3	30.1%	38.8	30.0%	111	370
Copper (Cu)	81.5	96.5%	123.0	97.3%	175.0	98.5%	**208.0**	100.0%	149	270
Iron (Fe)	37200.0	53.0%	37700.0	53.7%	38600.0	55.3%	35800.0	51.6%		
Lead (Pb)	41.2	77.7%	42.1	80.2%	50.1	95.1%	56.6	96.4%	128	218
Manganese (Mn)	1980.0	93.8%	1410.0	79.0%	1180.0	74.1%	888.0	68.6%		
Mercury (Hg)	0.890	22.0%	0.240	96.3%	0.240	94.1%	0.230	90.7%	1.06	0.71
Nickel (Ni)	38.6	80.5%	41.1	81.8%	48.8	94.1%	39.7	81.1%	48.6	51.6
Selenium (Se)	0.79	49.2%	1.4	70.1%	3.3	86.9%	2.7	85.5%		
Silver (Ag)	0.80	81.8%	0.70	76.8%	0.77	80.4%	0.65	73.6%		3.7
Zinc (Zn)	215.0	90.5%	291.0	95.8%	459.0	98.5%	**841.0**	100.0%	459	410

BOLD = Highest value recorded

[1] Freshwater PECs: MacDonald, D.D., C.G. Ingersoll, T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.

[2] Quantico Creek is located in the tidal freshwater portion of the Potomac River watershed. As such, the consensus-based Probable Effects Concentrations (PEC) apply to the sediment metal data presented in the table.

[3] Estuarine ER-Ms: MacDonald, D.D., Long, E.R., Smith, S.L., Calder, F.D. 1993. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments.

[4] The effects-range median (ER-M) screening values for estuarine sediments are presented for informational and comparison purposes.

Attachment 21

Possum Point Outfalls 001/002, 003 & 005

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		Spreadsheet for determination of WET test endpoints or WET limits													
3															
4		Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR							
5		Revision Date: 01/10/05													
6		File: WETLIM10.xls			ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa			
7		(MIX.EXE required also)													
8					ACUTE WLAa		0.6	Note: inform the permittee that if the mean of the data exceeds							
9								this TUa:	1.0	a limit may result using WLA.EXE					
10															
11					Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR							
12															
13					CHRONIC	2.92514937	TU_c	NOEC =	35	% Use as	2.86	TU_c			
14					BOTH*	6.00000015	TU_c	NOEC =	17	% Use as	5.88	TU_c			
15	Enter data in the cells with blue type:				AML	2.92514937	TU_c	NOEC =	35	% Use as	2.86	TU_c			
16															
17	Entry Date:		05/21/12		ACUTE WLAa,c		6		Note: inform the permittee that if the mean						
18	Facility Name:				CHRONIC WLAc		2		of the data exceeds this TUc:			1.20207464			
19	VPDES Number:		VA0002071		* Both means acute expressed as chronic				a limit may result using WLA.EXE						
20	Outfall Number:														
21					% Flow to be used from MIX.EXE				Diffuser /modeling study?						
22	Plant Flow:		1	MGD					Enter Y/N	Y					
23	Acute 1Q10:		1	MGD	100	%			Acute	2	:1				
24	Chronic 7Q10:		1	MGD	100	%			Chronic	2	:1				
25															
26	Are data available to calculate CV? (Y/N)				N	(Minimum of 10 data points, same species, needed)					Go to Page 2				
27	Are data available to calculate ACR? (Y/N)				N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3				
28															
29															
30	IWC_a		50	% Plant flow/plant flow + 1Q10			NOTE: If the IWCa is >33%, specify the								
31	IWC_c		50	% Plant flow/plant flow + 7Q10			NOAEC = 100% test/endpoint for use								
32															
33	Dilution, acute		2	100/IWCa											
34	Dilution, chronic		2	100/IWCc											
35															
36	WLA_a		0.6	Instream criterion (0.3 TUa) X's Dilution, acute											
37	WLA_c		2	Instream criterion (1.0 TUc) X's Dilution, chronic											
38	$WLA_{a,c}$		6	ACR X's WLA_a - converts acute WLA to chronic units											
39															
40	ACR -acute/chronic ratio		10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)											
41	CV-Coefficient of variation		0.6	Default of 0.6 - if data are available, use tables Page 2)											
42	Constants	eA	0.4109447	Default = 0.41											
43		eB	0.6010373	Default = 0.60											
44		eC	2.4334175	Default = 2.43											
45		eD	2.4334175	Default = 2.43 (1 samp)	No. of sample		1	**The Maximum Daily Limit is calculated from the lowest							
46								LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.							
47	$LTA_{a,c}$		2.4856682	WLAa,c X's eA											
48	LTA_c		1.2020746	WLAc X's eB							Rounded NOEC's		%		
49	MDL** with $LTA_{a,c}$		6.000000147	TU_c	NOEC =	16.666666	(Protects from acute/chronic toxicity)				NOEC =	17	%		
50	MDL** with LTA_c		2.925149368	TU_c	NOEC =	34.186288	(Protects from chronic toxicity)				NOEC =	35	%		
51	AML with lowest LTA		2.925149368	TU_c	NOEC =	34.186288	Lowest LTA X's eD				NOEC =	35			
52															
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a														
54											Rounded LC50's		%		
55	MDL with $LTA_{a,c}$		0.600000015	TU_a	LC50 =	166.666663	%	Use NOAEC=100%			LC50 =	NA	%		
56	MDL with LTA_c		0.292514937	TU_a	LC50 =	341.862884	%	Use NOAEC=100%			LC50 =	NA			
57															
58															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
59															
60		**Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)**													
61															
62		IF YOU HAVE AT LEAST 10 DATA POINTS THAT					Vertebrate			Invertebrate					
63		ARE QUANTIFIABLE (NOT "<" OR ">")					IC_{25} Data			IC_{25} Data					
64		FOR A SPECIES, ENTER THE DATA IN EITHER					or			or					
65		COLUMN "G" (VERTEBRATE) OR COLUMN					LC_{50} Data	LN of data		LC_{50} Data	LN of data				
66		"J" (INVERTEBRATE). THE 'CV' WILL BE					***********			************					
67		PICKED UP FOR THE CALCULATIONS				1	0		1	0					
68		BELOW. THE DEFAULT VALUES FOR eA,				2			2						
69		eB, AND eC WILL CHANGE IF THE 'CV' IS				3			3						
70		ANYTHING OTHER THAN 0.6.				4			4						
71						5			5						
72						6			6						
73						7			7						
74		Coefficient of Variation for effluent tests				8			8						
75						9			9						
76		CV =	0.6	(Default 0.6)		10			10						
77						11			11						
78		δ^2 =	0.3074847			12			12						
79		δ =	0.554513029			13			13						
80						14			14						
81		Using the log variance to develop eA				15			15						
82			(P. 100, step 2a of TSD)			16			16						
83		Z = 1.881 (97% probability stat from table				17			17						
84		A =	-0.88929666			18			18						
85		eA =	0.410944686			19			19						
86						20			20						
87		Using the log variance to develop eB													
88			(P. 100, step 2b of TSD)			St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA				
89		δ_4^2 =	0.086177696			Mean	0	0	Mean	0	0				
90		δ_4 =	0.293560379			Variance	0	0.000000	Variance	0	0.000000				
91		B =	-0.50909823			CV	0		CV	0					
92		eB =	0.601037335												
93															
94		Using the log variance to develop eC													
95			(P. 100, step 4a of TSD)												
96															
97		δ^2 =	0.3074847												
98		δ =	0.554513029												
99		C =	0.889296658												
100		eC =	2.433417525												
101															
102		Using the log variance to develop eD													
103			(P. 100, step 4b of TSD)												
104		n =	1	This number will most likely stay as "1", for 1 sample/month.											
105		δ_n^2 =	0.3074847												
106		δ_n =	0.554513029												
107		D =	0.889296658												
108		eD =	2.433417525												
109															

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

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:

enter it here:	NO DATA	$\%LC_{50}$
	NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	83.2	1.202075		
Dilution series to use for limit			35	2.8571429
Dilution factor to recommend:	0.9120829		0.591608	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	91.2	1.10	59.2	1.69
	83.2	1.20	35.0	2.86
	75.9	1.32	20.7	4.83
	69.20	1.44	12.3	8.16
Extra dilutions if needed	63.12	1.58	7.2	13.80
	57.57	1.74	4.3	23.32

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

Possum Point Outfall 004

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		**Spreadsheet for determination of WET test endpoints or WET limits**													
3															
4		Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR							
5		Revision Date: 01/10/05													
6		File: WETLIM10.xls			ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa			
7		(MIX.EXE required also)													
8					ACUTE WLAa		0.6	Note: Inform the permittee that if the mean of the data exceeds							
9								this TUa:	1.0	a limit may result using WLA.EXE					
10															
11					Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR							
12															
13					CHRONIC	6.00000015	TU_c	NOEC =	17	% Use as	5.88	TU_c			
14					BOTH*	6.00000015	TU_c	NOEC =	17	% Use as	5.88	TU_c			
15	Enter data in the cells with blue type:				AML	6.00000015	TU_c	NOEC =	17	% Use as	5.88	TU_c			
16															
17	Entry Date:		05/21/12		ACUTE WLAa,c		6		Note: Inform the permittee that if the mean						
18	Facility Name:				CHRONIC WLAc		50		of the data exceeds this TUc:			2.46666808			
19	VPDES Number:		VA0002071		* Both means acute expressed as chronic				a limit may result using WLA.EXE						
20	Outfall Number:														
21					% Flow to be used from MIX.EXE				Difuser /modeling study?						
22	Plant Flow:		1	MGD					Enter Y/N	Y					
23	Acute 1Q10:		1	MGD	100	%			Acute	2	:1				
24	Chronic 7Q10:		1	MGD	100	%			Chronic	50	:1				
25															
26	Are data available to calculate CV? (Y/N)				N	(Minimum of 10 data points, same species, needed)					Go to Page 2				
27	Are data available to calculate ACR? (Y/N)				N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3				
28															
29															
30	IWC_a		50	%	Plant flow/plant flow + 1Q10		NOTE: If the IWCa is >33%, specify the								
31	IWC_c		2	%	Plant flow/plant flow + 7Q10		NOAEC = 100% test/endpoint for use								
32															
33	Dilution, acute		2	100/IWCa											
34	Dilution, chronic		50	100/IWCc											
35															
36	WLA_a		0.6	Instream criterion (0.3 TUa) X's Dilution, acute											
37	WLA_c		50	Instream criterion (1.0 TUc) X's Dilution, chronic											
38	$WLA_{a,c}$		6	ACR X's WLA_a - converts acute WLA to chronic units											
39															
40	ACR -acute/chronic ratio		10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)											
41	CV-Coefficient of variation		0.6	Default of 0.6 - if data are available, use tables Page 2)											
42	Constants	eA	0.4109447	Default = 0.41											
43		eB	0.6010373	Default = 0.60											
44		eC	2.4334175	Default = 2.43											
45		eD	2.4334175	Default = 2.43 (1 samp)		No. of sample	1	**The Maximum Daily Limit is calculated from the lowest							
46								LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.							
47	$LTA_{a,c}$		2.4656682	WLAa,c X's eA											
48	LTA_c		30.051865	WLAc X's eB							Rounded NOEC's		%		
49	MDL** with $LTA_{a,c}$		6.000000147	TU_c	NOEC =	16.666666	(Protects from acute/chronic toxicity)				NOEC =	17	%		
50	MDL** with LTA_c		73.1287342	TU_c	NOEC =	1.367452	(Protects from chronic toxicity)				NOEC =	2	%		
51	AML with lowest LTA		6.000000147	TU_c	NOEC =	16.666666	Lowest LTA X's eD				NOEC =	17			
52															
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a														
54											Rounded LC50's		%		
55	MDL with $LTA_{a,c}$		0.600000015	TU_a	LC50 =	166.666663	%	Use NOAEC=100%			LC50 =	NA	%		
56	MDL with LTA_c		7.31287342	TU_a	LC50 =	13.674515	%				LC50 =	14			
57															
58															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
59															
60		**Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)**													
61															
62		IF YOU HAVE AT LEAST 10 DATA POINTS THAT					Vertebrate			Invertebrate					
63		ARE QUANTIFIABLE (NOT "<" OR ">")					IC_{25} Data			IC_{25} Data					
64		FOR A SPECIES, ENTER THE DATA IN EITHER					or			or					
65		COLUMN "G" (VERTEBRATE) OR COLUMN					LC_{50} Data	LN of data		LC_{50} Data	LN of data				
66		"J" (INVERTEBRATE). THE 'CV' WILL BE					************			************					
67		PICKED UP FOR THE CALCULATIONS				1	0		1	0					
68		BELOW. THE DEFAULT VALUES FOR eA,				2			2						
69		eB, AND eC WILL CHANGE IF THE 'CV' IS				3			3						
70		ANYTHING OTHER THAN 0.6.				4			4						
71						5			5						
72						6			6						
73						7			7						
74		Coefficient of Variation for effluent tests				8			8						
75						9			9						
76		CV =	0.6	(Default 0.6)		10			10						
77						11			11						
78		δ^2 =	0.3074847			12			12						
79		δ =	0.554513029			13			13						
80						14			14						
81		Using the log variance to develop eA				15			15						
82			(P. 100, step 2a of TSD)			16			16						
83		Z = 1.881 (97% probability stat from table				17			17						
84		A =	-0.88929666			18			18						
85		eA =	0.410944686			19			19						
86						20			20						
87		Using the log variance to develop eB													
88			(P. 100, step 2b of TSD)			St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA				
89		δ_4^2 =	0.086177696			Mean	0	0	Mean	0	0				
90		δ_4 =	0.293560379			Variance	0	0.000000	Variance	0	0.000000				
91		B =	-0.50909823			CV	0		CV	0					
92		eB =	0.601037335												
93															
94		Using the log variance to develop eC													
95			(P. 100, step 4a of TSD)												
96															
97		δ^2 =	0.3074847												
98		δ =	0.554513029												
99		C =	0.889296658												
100		eC =	2.433417525												
101															
102		Using the log variance to develop eD													
103			(P. 100, step 4b of TSD)												
104		n =	1	This number will most likely stay as "1", for 1 sample/month.											
105		δ_n^2 =	0.3074847												
106		δ_n =	0.554513029												
107		D =	0.889296658												
108		eD =	2.433417525												
109															

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

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:

enter it here:	NO DATA	$\%LC_{50}$
	NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	40.6	2.465668		
Dilution series to use for limit			17	5.8823529
Dilution factor to recommend:	0.6368435		0.4123106	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	63.7	1.57	41.2	2.43
	40.6	2.47	17.0	5.88
	25.8	3.87	7.0	14.27
	16.45	6.08	2.9	34.60
Extra dilutions if needed	10.48	9.55	1.2	83.92
	6.67	14.99	0.5	203.54

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: C136
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment 22

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment and announce a public hearing on a draft permit from the State Water Control Board that will allow the release of treated industrial wastewater and stormwater into a water body in Prince William County, Virginia.

PUBLIC COMMENT PERIOD: **October XX**, 2015 to **December XX**, 2015

PUBLIC HEARING: The Virginia Department of Environmental Quality – Northern Regional Office in Woodbridge, Virginia on **December XX, 2015**, from 7:00 p.m. to 9:00 p.m.

INFORMATIONAL BRIEFING: Staff will be available to answer questions during an informational briefing held at The Virginia Department of Environmental Quality in Woodbridge, Virginia on **December XX, 2015**, from 6:00 p.m. to 6:45 p.m

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 Virginia Power, 5000 Dominion Boulevard, Glen Allen, VA 23060, VA0002071

NAME AND ADDRESS OF FACILITY: Dominion – Possum Point Power Station, 19000 Possum Point Road, Dumfries, VA 22026

PROJECT DESCRIPTION: Virginia Electric and Power Company has applied for a modification of a permit for the private Dominion – Possum Point Power Station. The applicant proposes to release treated industrial wastewater and stormwater at a combined rate of 172 million gallons per day from eight outfalls into three water bodies. The modification addresses additional industrial wastewater and stormwater discharges associated with the closure of the facility's ash ponds pursuant to a 2015 U.S. Environmental Protection Agency (EPA) final Rule that regulates the disposal of coal combustion residuals (CCR). The facility proposes to release the treated industrial wastewater and stormwater in an unnamed tributary to Quantico Creek, Quantico Creek, and the Potomac River in Prince William County in the Potomac 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, Total Residual Chlorine, Free Available Chlorine, Heat Rejection, Oil and Grease, Total Suspended Solids, Total Chromium, Total Copper, Total Iron, Total Zinc, and 126 Priority Pollutants. The permit will monitor the following pollutants to protect water quality: Temperature, Total Dissolved Nickel, Total Nitrogen, Total Kjeldahl Nitrogen, Ammonia as N, Nitrate+Nitrite, Total Phosphorus, and Chronic Toxicity. The modification of the permit will limit the following pollutants associated with the closure of the facility's ash ponds to protect water quality: pH, Total Hardness, Total Suspended Solids, Oil and Grease, Total Recoverable Antimony, Total Recoverable Arsenic, Total Recoverable Cadmium, Chloride, Total Recoverable Chromium III, Total Recoverable Chromium VI, Total Recoverable Copper, Total Recoverable Lead, Total Recoverable Mercury, Total Recoverable Nickel, Total Recoverable Selenium, Total Recoverable Silver, Total Recoverable Thallium, Total Recoverable Zinc, Acute Toxicity and Chronic Toxicity.

HOW TO COMMENT: DEQ accepts comments by hand delivery, e-mail, fax 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.

The Board will also accept written and oral comments at the public hearing. To make a statement at a public hearing, write your name on a sign-up sheet available before the hearing. You may sign up only for yourself. The time allowed for each statement is set by the hearing officer.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents 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 Fax: (703) 583-3821

Attachment 23

Dominion Resource Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
dom.com

Dominion®

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

VA DEPARTMENT OF ENVIRONMENTAL QUALITY
OCT - 9 2015
NORTHERN REGIONAL OFFICE
WOODBRIDGE, VA

October 6, 2015

Ms. Susan Mackert
Virginia Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193

RE: Possum Point Power Station VPDES Permit No. VA0002071: Permit Modification Request Letters

Dear Ms. Mackert:

As you know, we have submitted three successive permit modification request letters to DEQ in connection with our ash pond closure project at the Possum Point Power Station (June 30, 2014, December 22, 2014, and August 18, 2015). When we met on September 28, 2015 to discuss the closure project, you requested additional clarification on the status of our requested modifications, which we respectfully offer below.

1. Clarification on June 30, 2014 Permit Modification Request:
   - **Modifications No Longer Necessary**
     - Ash Ponds A, B, and C are presently being decommissioned and the ponds will be permanently retired. Ash material in Ponds A, B and C is being relocated to Ash Pond D. Ash Dewatering and Contact Waters are currently being directed to Ash Pond D for storage. There is no discharge from Outfall S104. Upon clean closure of Ash Ponds A, B, and C, the decant structure associated with Pond C will be permanently decommissioned and Outfall S104 will be eliminated. Therefore, there is no longer a need to incorporate Outfall S104 into the VPDES permit.
   - **Modifications Still Requested**
     - Recognition of the Unit 6 Reverse Osmosis (RO) trailers as a permanent discharge.
     - Incorporation of the several additional minor changes to permit language and updates to outfall descriptions in the permit.
2. Clarification on December 22, 2014 Modification Request-Addendum:
   - **Modifications No Longer Necessary**
     - Clean-closure of Ponds A, B, C and E will eliminate the potential for contamination of stormwater by industrial activities within the drainage areas for Outfalls S105, S108, and S109. Consequently, a permit modification to incorporate these outfalls as industrial stormwater discharges is no longer necessary.
     - Given the permanent closure of Ponds A, B, C and E, we withdraw our request to include the proposed modifications to permit conditions I.F.1, I.F.3, II.R, I.A.12 and I.D.3.a.
   - **Modifications Still Requested**
     - Coverage of Outfall S35.
     - Modification of permit condition I.A.12 to recognize that industrially influenced storm water may be discharged through existing Outfall S107.
3. Clarification on August 18, 2015 Modification Request
   - Everything in our August 18, 2015 request remains necessary and is still requested.

Please feel free to contact Ken Roller at (804) 273-3494 or kenneth.roller@dom.com should you have any questions concerning this submittal.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Cathy C. Taylor
Director, Electric Environmental Services