ATTACHMENT 8

To:	Alison Thompson
From:	Rebecca Shoemaker
Date:	April 27, 2016 (revision)
Subject:	Planning Statement for Broad Run WRF
Permit Number:	VA0091383

Information for Outfall 001:

Discharge Type: Municipal
Discharge Flow: Outfall 001: 11 MGD (with future expansion to 22 MGD)
Waterbody: VAN-A09R/PL19

Outfall	Latitude	Longitude	Receiving Stream	Streamcode	Rivermile	Water Quality Standards	Drainage Area
001	39 01 46.4	77 26 27.6	Broad Run	BRB	4.50	Class III, Section 8, Special Standard PWS	60 sq mi
002	39 02 36	-77 25 43	UT to UT to Broad Run	XOE	0.05		<1 sq mi
003	39 01 27	-77 27 15	UT to UT to Broad Run	XOG	0.60	Class III, Section 9, no special standards	<1 sq mi
004	39 01 15	-77 27 10			0.22		<1 sq mi
005	39 00 57	-77 27 27	UT to UT to Broad Run	XOI	0.13		<1 sq mi
006	39 01 08	-77 27 34	Broad Run, UT	XOH	1.03		<1 sq mi

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

   A. Outfall 001 discharges to a segment of Broad Run (streamcode BRB) that was assessed based on biological monitoring stations located in downstream and upstream segments of Broad Run: 1aBRB002.15 is located at Route 7, approximately 2.35 miles downstream from Outfall 001, within a segment that begins approximately 1.6 miles downstream from Outfall 001 and 1aBRB006.97 is located upstream from Route 625, approximately 2.47 miles upstream from Outfall 001, within a segment that begins approximately 0.71 mile upstream from Outfall 001.

   The following is the water quality summary for this segment of Broad Run, as taken from the draft 2014 Integrated Report:

   Class III, Section 8, special stds. PWS.

   DEQ monitoring stations for this segment of Broad Run:
   - *biological monitoring station 1aBRB002.15, at Route 7*
   - *biological monitoring station 1aBRB006.97, upstream from Route 625*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. Biological monitoring finds a benthic macroinvertebrate impairment, resulting in an impaired classification for the aquatic life use. The public water supply, recreation, and wildlife uses were not assessed.

The nearest DEQ ambient monitoring station is located within the segment of Broad Run that is located approximately 0.71 mile upstream from Outfall 001: 1aBRB006.33 is located at Route 625, approximately 1.83 miles upstream from Outfall 001. The following is the water quality summary for this segment of Broad Run, as taken from the draft 2014 Integrated Report:

Class III, Section 9.

DEQ monitoring stations located in this segment of the Broad Run:

- *ambient water quality monitoring station 1aBRB006.33, at Route 625 (Waxpool Road)*
- *biological monitoring station 1aBRB006.97, upstream from Waxpool Road*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. Biological monitoring finds a benthic macroinvertebrate impairment, resulting in an impaired classification for the aquatic life use. E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.

B. Outfall 002 discharges to an unnamed tributary (streamcode XOE) that has been neither monitored nor assessed. This unnamed tributary drains to another unnamed tributary (streamcode XOD) that drains to Broad Run (BRB). DEQ ambient monitoring station 1aBRB002.15 is located on Broad Run at Route 7, approximately 0.4 mile downstream from Outfall 002. The following is the water quality summary for this segment of Broad Run, as taken from the draft 2014 Integrated Report:

Class III, Section 8, special stds. PWS.

DEQ monitoring stations located in this segment of Broad Run:

- *ambient and biological 1aBRB002.15, at Route 7*

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. Additionally, from previous assessments, excursions above the water quality criterion based fish tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue were recorded in 2 species of fish in 2004: smallmouth bass and yellow bullheaded catfish and there was one excursion above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for total PCBs in fish tissue were recorded in 1 species of fish in 2004: American eel. There was an excursion above the risk-based tissue screening value (TSV) of 72 ppb for arsenic (As) in 2004 (American eel). This excursion is also above the updated (in 2010) TSV of 270 ppb for arsenic. Also, there was an excursion above the water quality criterion based tissue value (TV) of 12 ppb for heptachlor epoxide in 2001 (American eel) at monitoring station 1aBRB002.15 (the TV for heptachlor epoxide was been updated to 4.4 ppb in 2010). The arsenic and heptachlor epoxide exceedances were noted as observed effects for the fish consumption use.

DEQ biological monitoring finds a benthic macroinvertebrate impairment, resulting in an impaired classification for the aquatic life use. Additionally, citizen monitoring indicates a high probability of adverse conditions for biota. Chemical monitoring at the USGS station finds one exceedance of the

chloride acute freshwater criterion in 2007. An observed effect is noted for the aquatic life and wildlife uses. The wildlife use is otherwise considered fully supporting.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The public water supply use is considered fully supporting.

C. Outfalls 003 and 004 discharge to an unnamed tributary (streamcode XOG) that has been neither monitored nor assessed. This unnamed tributary drains to another unnamed tributary (streamcode XOF) that drains to Broad Run (BRB). Outfall 006 drains to unnamed tributary XOH, which has been neither monitored nor assessed and drains to Broad Run (streamcode BRB). Outfall 005 drains to an unnamed tributary (streamcode XOI) that has been neither monitored nor assessed and that drains to unnamed tributary XOH. Outfalls 003, 004, 005, and 006 all ultimately drain to the same assessed segment of Broad Run, which is located approximately 0.87 mile downstream from Outfall 003, approximately 0.49 mile downstream from Outfall 004, approximately 0.81 mile downstream from Outfall 005, and approximately 0.90 mile downstream from Outfall 006.

DEQ ambient monitoring station 1aBRB006.33 is located on Broad Run at Route 625, approximately 0.80 mile upstream from the confluence of unnamed tributary XOF with Broad Run and approximately 0.44 mile upstream from the confluence of unnamed tributary XOH with Broad Run.

The following is the water quality summary for this segment of Broad Run, as taken from the draft 2014 Integrated Report:

Class III, Section 9.

DEQ monitoring stations located in this segment of Broad Run:

- *ambient water quality monitoring station 1aBRB006.33, at Route 625 (Waxpool Road)*
- *biological monitoring station 1aBRB006.97, upstream from Waxpool Road*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. Biological monitoring finds a benthic macroinvertebrate impairment, resulting in an impaired classification for the aquatic life use. E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.

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

   Yes (Outfall 001).

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

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the Draft 2014 Integrated Report						
Broad Run	Aquatic Life	Benthic Macroinvertebrates	---	---	---	2020
	Fish Consumption	PCBs	---	---	---	2018

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

Yes.

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

Waterbody Name	Impaired Use	Cause	Distance From Outfall (miles)	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the Draft 2014 Integrated Report							
Broad Run	Aquatic Life	Benthic Macroinvertebrates	Outfall 002: 0.4 Outfall 003: 0.9 Outfall 004: 0.5 Outfall 005: 0.8 Outfall 006: 0.9	---	---	---	Outfall 002: 2018 Outfalls 003, 004, 005, 006: 2020
	Recreation	*E. coli*	Outfall 001: 1.6 Outfall 002: 0.4 Outfall 003: 0.9 Outfall 004: 0.5 Outfall 005: 0.8 Outfall 006: 0.9	---	---	---	Outfalls 001 and 002: 2026 Outfalls 003, 004, 005, 006: 2022
	Fish Consumption	Mercury	Outfall 001: 1.6 Outfall 002: 0.4 Outfall 003: 2.7 Outfall 004: 3.1 Outfall 005: 3.8 Outfall 006: 3.9	---	---	---	2022
		PCBs	Outfall 002: 0.4 Outfall 003: 0.9 Outfall 004: 0.5 Outfall 005: 0.8 Outfall 006: 0.9	---	---	---	2018

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

   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.

   DEQ planning staff requests this facility continue nutrient monitoring for Outfall 001, specifically total phosphorus, nitrate, nitrite, ammonia, and TKN. Nutrient monitoring is requested of facilities that are located within a five mile distance upstream of a benthic impairment.

   Broad Run is listed with a PCB impairment and, in support of the PCB TMDL that is scheduled for development by 2018, this facility is a candidate for low-level PCB monitoring, based upon its designation as a municipal facility. This facility conducted PCB monitoring during the last permit cycle; the PCB monitoring data will be evaluated, and source reductions through pollution minimization plans may be needed.

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

   There is one drinking water intake for Fairfax County located within a five mile radius of Outfall 002.

   There is one drinking water intake for Loudoun Water located within a five mile radius of Outfalls 001, 003, 004, 005, and 006.

ATTACHMENT 9

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Broad Run WRF 11 MGD Permit No.: VA0091383

Receiving Stream: Broad Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	102	mg/L
90% Temperature (Annual) =	25.74	deg C
90% Temperature (Wet season) =	15	deg C
90% Maximum pH =	7.85	SU
10% Maximum pH =	7.24	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0.23	MGD
7Q10 (Annual) =	0.27	MGD
30Q10 (Annual) =	0.65	MGD
1Q10 (Wet season) =	2.12	MGD
30Q10 (Wet season)	5.19	MGD
30Q5 =	1.21	MGD
Harmonic Mean =	4.76	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) =	132	mg/L
90% Temp (Annual) =	24.25	deg C
90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.6	SU
10% Maximum pH =	7.2	SU
Discharge Flow =	11	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	--	--	6.7E+02	9.9E+02	--	--	7.4E+02	1.1E+03	--	--	--	--	--	--	--	--	--	--	**7.4E+02**	**1.1E+03**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.8E+00	1.0E+01	--	--	--	--	--	--	--	--	--	--	**6.8E+00**	**1.0E+01**
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	7.3E-01	3.6E+00	--	--	--	--	--	--	--	--	--	--	**7.3E-01**	**3.6E+00**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	3.1E+00	--	7.0E-04	7.2E-04	--	--	--	--	--	--	--	--	**3.1E+00**	--	**7.0E-04**	**7.2E-04**
Ammonia-N (mg/l) (Yearly)	0	1.69E+01	2.09E+00	--	--	1.73E+01	2.21E+00	--	--	--	--	--	--	--	--	--	--	**1.73E+01**	**2.21E+00**	--	--
Ammonia-N (mg/l) (High Flow)	0	1.62E+01	3.60E+00	--	--	1.93E+01	5.30E+00	--	--	--	--	--	--	--	--	--	--	**1.93E+01**	**5.30E+00**	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	9.2E+03	4.4E+04	--	--	--	--	--	--	--	--	--	--	**9.2E+03**	**4.4E+04**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	6.2E+00	7.1E+02	--	--	--	--	--	--	--	--	--	--	**6.2E+00**	**7.1E+02**
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	3.5E+02	1.5E+02	1.1E+01	--	--	--	--	--	--	--	--	--	**3.5E+02**	**1.5E+02**	**1.1E+01**	--
Barium	0	--	--	2.0E+03	--	--	--	2.2E+03	--	--	--	--	--	--	--	--	--	--	--	**2.2E+03**	--
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	3.2E+01	7.3E+02	--	--	--	--	--	--	--	--	--	--	**3.2E+01**	**7.3E+02**
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	1.2E-03	2.9E-03	--	--	--	--	--	--	--	--	--	--	**1.2E-03**	**2.9E-03**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	**5.4E-02**	**2.6E-01**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	**5.4E-02**	**2.6E-01**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	**5.4E-02**	**2.6E-01**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	**5.4E-02**	**2.6E-01**
Bis2-Chloroethyl Ether[C]	0	--	--	3.0E-01	5.3E+00	--	--	4.3E-01	7.6E+00	--	--	--	--	--	--	--	--	--	--	**4.3E-01**	**7.6E+00**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.6E+03	7.2E+04	--	--	--	--	--	--	--	--	--	--	**1.6E+03**	**7.2E+04**
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	1.2E+01	2.2E+01	--	--	1.7E+01	3.2E+01	--	--	--	--	--	--	--	--	--	--	**1.7E+01**	**3.2E+01**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	6.2E+01	2.0E+03	--	--	--	--	--	--	--	--	--	--	**6.2E+01**	**2.0E+03**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.7E+03	2.1E+03	--	--	--	--	--	--	--	--	--	--	**1.7E+03**	**2.1E+03**
Cadmium	0	5.3E+00	1.4E+00	5.0E+00	--	5.4E+00	1.4E+00	5.6E+00	--	--	--	--	--	--	--	--	--	**5.4E+00**	**1.4E+00**	**5.6E+00**	--
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	3.3E+00	2.3E+01	--	--	--	--	--	--	--	--	--	--	**3.3E+00**	**2.3E+01**
Chlordane[C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.5E+00	4.4E-03	1.1E-02	1.2E-02	--	--	--	--	--	--	--	--	**2.5E+00**	**4.4E-03**	**1.1E-02**	**1.2E-02**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	8.8E+05	2.4E+05	2.8E+05	--	--	--	--	--	--	--	--	--	**8.8E+05**	**2.4E+05**	**2.8E+05**	--
TRC	0	1.9E+01	1.1E+01	--	--	1.9E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	**1.9E+01**	**1.1E+01**	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.4E+02	1.8E+03	--	--	--	--	--	--	--	--	--	--	**1.4E+02**	**1.8E+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	--	--	4.0E+00	1.3E+02	--	--	5.7E+00	1.9E+02	--	--	--	--	--	--	--	--	--	--	5.7E+00	1.9E+02
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.8E+02	1.2E+04	--	--	--	--	--	--	--	--	--	--	3.8E+02	1.2E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.1E+03	1.8E+03	--	--	--	--	--	--	--	--	--	--	1.1E+03	1.8E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	9.0E+01	1.7E+02	--	--	--	--	--	--	--	--	--	--	9.0E+01	1.7E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	8.5E-02	4.2E-02	--	--	--	--	--	--	--	--	--	--	8.5E-02	4.2E-02	--	--
Chromium III	0	7.1E+02	9.3E+01	--	--	7.3E+02	9.5E+01	--	--	--	--	--	--	--	--	--	--	7.3E+02	9.5E+01	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.6E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.1E+02	--	--	--	--	--	--	--	--	--	--	--	1.1E+02	--
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	5.4E-03	2.6E-02	--	--	--	--	--	--	--	--	--	--	5.4E-03	2.6E-02
Copper	0	1.7E+01	1.1E+01	1.3E+03	--	1.8E+01	1.2E+01	1.4E+03	--	--	--	--	--	--	--	--	--	1.8E+01	1.2E+01	1.4E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.2E+01	5.3E+00	1.6E+02	1.8E+04	--	--	--	--	--	--	--	--	2.2E+01	5.3E+00	1.6E+02	1.8E+04
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	4.4E-03	4.4E-03	--	--	--	--	--	--	--	--	--	--	4.4E-03	4.4E-03
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	3.2E-03	3.2E-03	--	--	--	--	--	--	--	--	--	--	3.2E-03	3.2E-03
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.1E+00	1.0E-03	3.2E-03	3.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	3.2E-03	3.2E-03
Demeton	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	1.0E-01	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.7E-01	1.7E-01	--	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	--	--
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	5.4E-02	2.6E-01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.7E+02	1.4E+03	--	--	--	--	--	--	--	--	--	--	4.7E+02	1.4E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.6E+02	1.1E+03	--	--	--	--	--	--	--	--	--	--	3.6E+02	1.1E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	7.0E+01	2.1E+02	--	--	--	--	--	--	--	--	--	--	7.0E+01	2.1E+02
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	3.0E-01	4.0E-01	--	--	--	--	--	--	--	--	--	--	3.0E-01	4.0E-01
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	7.9E+00	2.4E+02	--	--	--	--	--	--	--	--	--	--	7.9E+00	2.4E+02
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	5.4E+00	5.3E+02	--	--	--	--	--	--	--	--	--	--	5.4E+00	5.3E+02
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.7E+02	7.9E+03	--	--	--	--	--	--	--	--	--	--	3.7E+02	7.9E+03
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.6E+02	1.1E+04	--	--	--	--	--	--	--	--	--	--	1.6E+02	1.1E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	8.5E+01	3.2E+02	--	--	--	--	--	--	--	--	--	--	8.5E+01	3.2E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.1E+02	--	--	--	--	--	--	--	--	--	--	--	1.1E+02	--
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	7.2E+00	2.1E+02	--	--	--	--	--	--	--	--	--	--	7.2E+00	2.1E+02
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	4.9E+00	3.0E+02	--	--	--	--	--	--	--	--	--	--	4.9E+00	3.0E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.5E-01	5.7E-02	7.5E-04	7.7E-04	--	--	--	--	--	--	--	--	2.5E-01	5.7E-02	7.5E-04	7.7E-04
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.9E+04	4.9E+04	--	--	--	--	--	--	--	--	--	--	1.9E+04	4.9E+04
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	4.2E+02	9.4E+02	--	--	--	--	--	--	--	--	--	--	4.2E+02	9.4E+02
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	3.0E+05	1.2E+06	--	--	--	--	--	--	--	--	--	--	3.0E+05	1.2E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.2E+03	5.0E+03	--	--	--	--	--	--	--	--	--	--	2.2E+03	5.0E+03
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	7.7E+01	5.9E+03	--	--	--	--	--	--	--	--	--	--	7.7E+01	5.9E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.4E+01	3.1E+02	--	--	--	--	--	--	--	--	--	--	1.4E+01	3.1E+02
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.6E+00	4.9E+01	--	--	--	--	--	--	--	--	--	--	1.6E+00	4.9E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.6E-08	5.7E-08	--	--	--	--	--	--	--	--	--	--	5.6E-08	5.7E-08
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	5.2E-01	2.9E+00	--	--	--	--	--	--	--	--	--	--	5.2E-01	2.9E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.7E-02	6.9E+01	9.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	6.9E+01	9.9E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.7E-02	6.9E+01	9.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	6.9E+01	9.9E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.7E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.9E+01	9.9E+01	--	--	--	--	--	--	--	--	--	--	6.9E+01	9.9E+01
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	8.8E-02	3.7E-02	6.5E-02	6.7E-02	--	--	--	--	--	--	--	--	8.8E-02	3.7E-02	6.5E-02	6.7E-02
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.2E-01	3.3E-01	--	--	--	--	--	--	--	--	--	--	3.2E-01	3.3E-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	--	--	5.3E+02	2.1E+03	--	--	5.9E+02	2.3E+03	--	--	--	--	--	--	--	--	--	--	5.9E+02	2.3E+03
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.4E+02	1.6E+02	--	--	--	--	--	--	--	--	--	--	1.4E+02	1.6E+02
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.2E+03	5.9E+03	--	--	--	--	--	--	--	--	--	--	1.2E+03	5.9E+03
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.6E+02	--	--	--	--	--	--	--	--	--	--	--	5.6E+02	--
Guthion	0	--	1.0E-02	--	--	--	1.0E-02	--	--	--	--	--	--	--	--	--	--	--	1.0E-02	--	--
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	5.3E-01	3.9E-03	1.1E-03	1.1E-03	--	--	--	--	--	--	--	--	5.3E-01	3.9E-03	1.1E-03	1.1E-03
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	5.3E-01	3.9E-03	5.6E-04	5.6E-04	--	--	--	--	--	--	--	--	5.3E-01	3.9E-03	5.6E-04	5.6E-04
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	4.0E-03	4.2E-03	--	--	--	--	--	--	--	--	--	--	4.0E-03	4.2E-03
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	6.3E+00	2.6E+02	--	--	--	--	--	--	--	--	--	--	6.3E+00	2.6E+02
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	3.7E-02	7.0E-02	--	--	--	--	--	--	--	--	--	--	3.7E-02	7.0E-02
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	1.3E-01	2.4E-01	--	--	--	--	--	--	--	--	--	--	1.3E-01	2.4E-01
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	9.7E-01	--	1.4E+00	2.6E+00	--	--	--	--	--	--	--	--	9.7E-01	--	1.4E+00	2.6E+00
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.4E+01	1.2E+03	--	--	--	--	--	--	--	--	--	--	4.4E+01	1.2E+03
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	2.0E+01	4.7E+01	--	--	--	--	--	--	--	--	--	--	2.0E+01	4.7E+01
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.0E+00	--	--	--	--	--	--	--	--	--	--	--	2.0E+00	--	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	5.4E-02	2.6E-01	--	--	--	--	--	--	--	--	--	--	5.4E-02	2.6E-01
Iron	0	--	--	3.0E+02	--	--	--	3.3E+02	--	--	--	--	--	--	--	--	--	--	--	3.3E+02	--
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	5.0E+02	1.4E+04	--	--	--	--	--	--	--	--	--	--	5.0E+02	1.4E+04
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	0.0E+00	--	--
Lead	0	1.7E+02	1.9E+01	1.5E+01	--	1.7E+02	2.0E+01	1.7E+01	--	--	--	--	--	--	--	--	--	1.7E+02	2.0E+01	1.7E+01	--
Malathion	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	1.0E-01	--	--
Manganese	0	--	--	5.0E+01	--	--	--	5.6E+01	--	--	--	--	--	--	--	--	--	--	--	5.6E+01	--
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.9E-01	- -	- -	--	--	--	--	--	--	--	--	1.4E+00	7.9E-01	- -	- -
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	5.2E+01	1.7E+03	--	--	--	--	--	--	--	--	--	--	5.2E+01	1.7E+03
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	6.6E+01	8.5E+03	--	--	--	--	--	--	--	--	--	--	6.6E+01	8.5E+03
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.1E-02	1.1E+02	--	--	--	--	--	--	--	--	--	--	3.1E-02	1.1E+02	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	0.0E+00	--	--
Nickel	0	2.3E+02	2.6E+01	6.1E+02	4.6E+03	2.3E+02	2.6E+01	6.8E+02	5.1E+03	--	--	--	--	--	--	--	--	2.3E+02	2.6E+01	6.8E+02	5.1E+03
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.1E+04	--	--	--	--	--	--	--	--	--	--	--	1.1E+04	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.9E+01	7.7E+02	--	--	--	--	--	--	--	--	--	--	1.9E+01	7.7E+02
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	9.9E-03	4.3E+01	--	--	--	--	--	--	--	--	--	--	9.9E-03	4.3E+01
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	4.7E+01	8.6E+01	--	--	--	--	--	--	--	--	--	--	4.7E+01	8.6E+01
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	7.2E-02	7.3E+00	--	--	--	--	--	--	--	--	--	--	7.2E-02	7.3E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+01	6.8E+00	--	--	--	--	--	--	--	--	--	--	2.9E+01	6.8E+00	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	6.6E-02	1.3E-02	--	--	--	--	--	--	--	--	--	--	6.6E-02	1.3E-02	--	--
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.4E-02	9.2E-04	9.2E-04	--	--	--	--	--	--	--	--	--	1.4E-02	9.2E-04	9.2E-04
Pentachlorophenol [C]	0	1.1E+01	8.2E+00	2.7E+00	3.0E+01	1.1E+01	8.4E+00	3.9E+00	4.3E+01	--	--	--	--	--	--	--	--	1.1E+01	8.4E+00	3.9E+00	4.3E+01
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.1E+04	9.5E+05	--	--	--	--	--	--	--	--	--	--	1.1E+04	9.5E+05
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	9.2E+02	4.4E+03	--	--	--	--	--	--	--	--	--	--	9.2E+02	4.4E+03
Radionudides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.7E+01	--	--	--	--	--	--	--	--	--	--	--	1.7E+01	--
(mrem/yr)	0	--	--	4.0E+00	--	--	--	4.4E+00	--	--	--	--	--	--	--	--	--	--	--	4.4E+00	--
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.6E+00	--	--	--	--	--	--	--	--	--	--	--	5.6E+00	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.3E+01	--	--	--	--	--	--	--	--	--	--	--	3.3E+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**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.0E+01	5.1E+00	1.9E+02	4.7E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.1E+00**	**1.9E+02**	**4.7E+03**
Silver	0	5.5E+00	--	--	--	5.6E+00	--	--	--	--	--	--	--	--	--	--	--	**5.6E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	2.8E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.8E+05**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	2.4E+00	5.7E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E+00**	**5.7E+01**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	9.9E+00	4.7E+01	--	--	--	--	--	--	--	--	**--**	**--**	**9.9E+00**	**4.7E+01**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.7E-01	5.2E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E-01**	**5.2E-01**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.7E+02	6.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.7E+02**	**6.7E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.6E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+05**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	7.5E-01	2.0E-04	4.0E-03	4.0E-03	--	--	--	--	--	--	--	--	**7.5E-01**	**2.0E-04**	**4.0E-03**	**4.0E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	4.7E-01	7.4E-02	--	--	--	--	--	--	--	--	--	--	**4.7E-01**	**7.4E-02**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.9E+01	7.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.9E+01**	**7.8E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	8.5E+00	2.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**8.5E+00**	**2.3E+02**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	3.6E+01	4.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+01**	**4.3E+02**
2,4,6-Trichlorophenol[C]	0	--	--	1.4E+01	2.4E+01	--	--	2.0E+01	3.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.0E+01**	**3.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.6E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+01**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	3.6E-01	3.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E-01**	**3.4E+01**
Zinc	0	1.5E+02	1.5E+02	7.4E+03	2.6E+04	1.5E+02	1.5E+02	8.2E+03	2.9E+04	--	--	--	--	--	--	--	--	**1.5E+02**	**1.5E+02**	**8.2E+03**	**2.9E+04**

Notes:

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

Metal	Target Value (SSTV)
Antimony	6.2E+00
Arsenic	1.1E+01
Barium	2.2E+03
Cadmium	8.6E-01
Chromium III	5.7E+01
Chromium VI	6.5E+00
Copper	6.9E+00
Iron	3.3E+02
Lead	1.2E+01
Manganese	5.6E+01
Mercury	4.7E-01
Nickel	1.6E+01
Selenium	3.1E+00
Silver	2.3E+00
Zinc	6.0E+01

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

ATTACHMENT 10

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Broad Run WRF 22 MGD Permit No.: VA0091383

Receiving Stream: Broad Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	102	mg/L
90% Temperature (Annual) =	25.74	deg C
90% Temperature (Wet season) =	15	deg C
90% Maximum pH =	7.85	SU
10% Maximum pH =	7.24	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0.23	MGD
7Q10 (Annual) =	0.27	MGD
30Q10 (Annual) =	0.65	MGD
1Q10 (Wet season) =	2.12	MGD
30Q10 (Wet season)	5.19	MGD
30Q5 =	1.21	MGD
Harmonic Mean =	4.76	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) =	132	mg/L
90% Temp (Annual) =	24.25	deg C
90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.6	SU
10% Maximum pH =	7.2	SU
Discharge Flow =	22	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	--	--	6.7E+02	9.9E+02	--	--	7.1E+02	1.0E+03	--	--	--	--	--	--	--	--	--	--	7.1E+02	1.0E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.4E+00	9.8E+00	--	--	--	--	--	--	--	--	--	--	6.4E+00	9.8E+00
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	6.2E-01	3.0E+00	--	--	--	--	--	--	--	--	--	--	6.2E-01	3.0E+00
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	3.0E+00	--	6.0E-04	6.1E-04	--	--	--	--	--	--	--	--	3.0E+00	--	6.0E-04	6.1E-04
Ammonia-N (mg/l) (Yearly)	0	1.70E+01	2.11E+00	--	--	1.72E+01	2.17E+00	--	--	--	--	--	--	--	--	--	--	1.72E+01	2.17E+00	--	--
Ammonia-N (mg/l) (High Flow)	0	1.66E+01	3.71E+00	--	--	1.82E+01	4.58E+00	--	--	--	--	--	--	--	--	--	--	1.82E+01	4.58E+00	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	8.8E+03	4.2E+04	--	--	--	--	--	--	--	--	--	--	8.8E+03	4.2E+04
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	5.9E+00	6.8E+02	--	--	--	--	--	--	--	--	--	--	5.9E+00	6.8E+02
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	3.4E+02	1.5E+02	1.1E+01	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	1.1E+01	--
Barium	0	--	--	2.0E+03	--	--	--	2.1E+03	--	--	--	--	--	--	--	--	--	--	--	2.1E+03	--
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	2.7E+01	6.2E+02	--	--	--	--	--	--	--	--	--	--	2.7E+01	6.2E+02
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	1.0E-03	2.4E-03	--	--	--	--	--	--	--	--	--	--	1.0E-03	2.4E-03
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	--	--	4.6E-02	2.2E-01
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	--	--	4.6E-02	2.2E-01
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	--	--	4.6E-02	2.2E-01
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	--	--	4.6E-02	2.2E-01
Bis2-Chloroethyl Ether[C]	0	--	--	3.0E-01	5.3E+00	--	--	3.6E-01	6.4E+00	--	--	--	--	--	--	--	--	--	--	3.6E-01	6.4E+00
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.5E+03	6.9E+04	--	--	--	--	--	--	--	--	--	--	1.5E+03	6.9E+04
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	1.2E+01	2.2E+01	--	--	1.5E+01	2.7E+01	--	--	--	--	--	--	--	--	--	--	1.5E+01	2.7E+01
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	5.2E+01	1.7E+03	--	--	--	--	--	--	--	--	--	--	5.2E+01	1.7E+03
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.6E+03	2.0E+03	--	--	--	--	--	--	--	--	--	--	1.6E+03	2.0E+03
Cadmium	0	5.4E+00	1.4E+00	5.0E+00	--	5.4E+00	1.4E+00	5.3E+00	--	--	--	--	--	--	--	--	--	5.4E+00	1.4E+00	5.3E+00	--
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	2.8E+00	1.9E+01	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.9E+01
Chlordane[C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.4E+00	4.4E-03	9.7E-03	9.9E-03	--	--	--	--	--	--	--	--	2.4E+00	4.4E-03	9.7E-03	9.9E-03
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	8.7E+05	2.3E+05	2.6E+05	--	--	--	--	--	--	--	--	--	8.7E+05	2.3E+05	2.6E+05	--
TRC	0	1.9E+01	1.1E+01	--	--	1.9E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.4E+02	1.7E+03	--	--	--	--	--	--	--	--	--	--	1.4E+02	1.7E+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	--	--	4.0E+00	1.3E+02	--	--	4.9E+00	1.6E+02	--	--	--	--	--	--	--	--	--	--	4.9E+00	1.6E+02
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.6E+02	1.2E+04	--	--	--	--	--	--	--	--	--	--	3.6E+02	1.2E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.1E+03	1.7E+03	--	--	--	--	--	--	--	--	--	--	1.1E+03	1.7E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.5E+01	1.6E+02	--	--	--	--	--	--	--	--	--	--	8.5E+01	1.6E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	8.4E-02	4.2E-02	--	--	--	--	--	--	--	--	--	--	8.4E-02	4.2E-02	--	--
Chromium III	0	7.1E+02	9.3E+01	--	--	7.2E+02	9.4E+01	--	--	--	--	--	--	--	--	--	--	7.2E+02	9.4E+01	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.6E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.1E+02	--	--	--	--	--	--	--	--	--	--	--	1.1E+02	--
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	4.6E-03	2.2E-02	--	--	--	--	--	--	--	--	--	--	4.6E-03	2.2E-02
Copper	0	1.7E+01	1.1E+01	1.3E+03	--	1.8E+01	1.1E+01	1.4E+03	--	--	--	--	--	--	--	--	--	1.8E+01	1.1E+01	1.4E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.2E+01	5.3E+00	1.5E+02	1.7E+04	--	--	--	--	--	--	--	--	2.2E+01	5.3E+00	1.5E+02	1.7E+04
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	3.8E-03	3.8E-03	--	--	--	--	--	--	--	--	--	--	3.8E-03	3.8E-03
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	2.7E-03	2.7E-03	--	--	--	--	--	--	--	--	--	--	2.7E-03	2.7E-03
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.1E+00	1.0E-03	2.7E-03	2.7E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	2.7E-03	2.7E-03
Demeton	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	1.0E-01	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.7E-01	1.7E-01	--	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	--	--
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	--	--	4.6E-02	2.2E-01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.4E+02	1.4E+03	--	--	--	--	--	--	--	--	--	--	4.4E+02	1.4E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.4E+02	1.0E+03	--	--	--	--	--	--	--	--	--	--	3.4E+02	1.0E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.6E+01	2.0E+02	--	--	--	--	--	--	--	--	--	--	6.6E+01	2.0E+02
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.6E-01	3.4E-01	--	--	--	--	--	--	--	--	--	--	2.6E-01	3.4E-01
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	6.7E+00	2.1E+02	--	--	--	--	--	--	--	--	--	--	6.7E+00	2.1E+02
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	4.6E+00	4.5E+02	--	--	--	--	--	--	--	--	--	--	4.6E+00	4.5E+02
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.5E+02	7.5E+03	--	--	--	--	--	--	--	--	--	--	3.5E+02	7.5E+03
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.5E+02	1.1E+04	--	--	--	--	--	--	--	--	--	--	1.5E+02	1.1E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	8.1E+01	3.1E+02	--	--	--	--	--	--	--	--	--	--	8.1E+01	3.1E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.1E+02	--	--	--	--	--	--	--	--	--	--	--	1.1E+02	--
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	6.1E+00	1.8E+02	--	--	--	--	--	--	--	--	--	--	6.1E+00	1.8E+02
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	4.1E+00	2.6E+02	--	--	--	--	--	--	--	--	--	--	4.1E+00	2.6E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.4E-01	5.7E-02	6.3E-04	6.6E-04	--	--	--	--	--	--	--	--	2.4E-01	5.7E-02	6.3E-04	6.6E-04
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.8E+04	4.6E+04	--	--	--	--	--	--	--	--	--	--	1.8E+04	4.6E+04
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	4.0E+02	9.0E+02	--	--	--	--	--	--	--	--	--	--	4.0E+02	9.0E+02
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.8E+05	1.2E+06	--	--	--	--	--	--	--	--	--	--	2.8E+05	1.2E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.1E+03	4.7E+03	--	--	--	--	--	--	--	--	--	--	2.1E+03	4.7E+03
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	7.3E+01	5.6E+03	--	--	--	--	--	--	--	--	--	--	7.3E+01	5.6E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.4E+01	3.0E+02	--	--	--	--	--	--	--	--	--	--	1.4E+01	3.0E+02
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.3E+00	4.1E+01	--	--	--	--	--	--	--	--	--	--	1.3E+00	4.1E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.3E-08	5.4E-08	--	--	--	--	--	--	--	--	--	--	5.3E-08	5.4E-08
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	4.4E-01	2.4E+00	--	--	--	--	--	--	--	--	--	--	4.4E-01	2.4E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.7E-02	6.5E+01	9.4E+01	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	6.5E+01	9.4E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.7E-02	6.5E+01	9.4E+01	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	6.5E+01	9.4E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.7E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.7E-02	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.5E+01	9.4E+01	--	--	--	--	--	--	--	--	--	--	6.5E+01	9.4E+01
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	8.7E-02	3.6E-02	6.2E-02	6.3E-02	--	--	--	--	--	--	--	--	8.7E-02	3.6E-02	6.2E-02	6.3E-02
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.1E-01	3.2E-01	--	--	--	--	--	--	--	--	--	--	3.1E-01	3.2E-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	--	--	5.3E+02	2.1E+03	--	--	5.6E+02	2.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+02**	**2.2E+03**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.4E+02	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+02**	**1.5E+02**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.2E+03	5.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+03**	**5.6E+03**
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.3E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+02**	**--**
Guthion	0	--	1.0E-02	--	--	--	1.0E-02	--	--	--	--	--	--	--	--	--	--	**--**	**1.0E-02**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	5.3E-01	3.8E-03	9.6E-04	9.6E-04	--	--	--	--	--	--	--	--	**5.3E-01**	**3.8E-03**	**9.6E-04**	**9.6E-04**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	5.3E-01	3.8E-03	4.7E-04	4.7E-04	--	--	--	--	--	--	--	--	**5.3E-01**	**3.8E-03**	**4.7E-04**	**4.7E-04**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	3.4E-03	3.5E-03	--	--	--	--	--	--	--	--	**--**	**--**	**3.4E-03**	**3.5E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	5.4E+00	2.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E+00**	**2.2E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	3.2E-02	6.0E-02	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E-02**	**6.0E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	1.1E-01	2.1E-01	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E-01**	**2.1E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	9.6E-01	--	1.2E+00	2.2E+00	--	--	--	--	--	--	--	--	**9.6E-01**	**--**	**1.2E+00**	**2.2E+00**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.2E+01	1.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.2E+01**	**1.2E+03**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	1.7E+01	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+01**	**4.0E+01**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**2.0E+00**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.6E-02	2.2E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.6E-02**	**2.2E-01**
Iron	0	--	--	3.0E+02	--	--	--	3.2E+02	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+02**	**--**
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	4.3E+02	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+02**	**1.2E+04**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	1.7E+02	1.9E+01	1.5E+01	--	1.7E+02	1.9E+01	1.6E+01	--	--	--	--	--	--	--	--	--	**1.7E+02**	**1.9E+01**	**1.6E+01**	**--**
Malathion	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	5.3E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+01**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.8E-01	- -	- -	--	--	--	--	--	--	--	--	**1.4E+00**	**7.8E-01**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	5.0E+01	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**1.6E+03**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	5.6E+01	7.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+01**	**7.2E+03**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.0E-02	1.1E+02	--	--	--	--	--	--	--	--	--	**--**	**3.0E-02**	**1.1E+02**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Nickel	0	2.3E+02	2.6E+01	6.1E+02	4.6E+03	2.3E+02	2.6E+01	6.4E+02	4.9E+03	--	--	--	--	--	--	--	--	**2.3E+02**	**2.6E+01**	**6.4E+02**	**4.9E+03**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.1E+04	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+04**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.8E+01	7.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+01**	**7.3E+02**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	8.4E-03	3.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**8.4E-03**	**3.6E+01**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	4.0E+01	7.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E+01**	**7.3E+01**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	6.1E-02	6.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E-02**	**6.2E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.7E+00	--	--	--	--	--	--	--	--	--	--	**2.8E+01**	**6.7E+00**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	6.6E-02	1.3E-02	--	--	--	--	--	--	--	--	--	--	**6.6E-02**	**1.3E-02**	**--**	**--**
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.4E-02	7.8E-04	7.8E-04	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**7.8E-04**	**7.8E-04**
Pentachlorophenol [C]	0	1.1E+01	8.2E+00	2.7E+00	3.0E+01	1.1E+01	8.3E+00	3.3E+00	3.6E+01	--	--	--	--	--	--	--	--	**1.1E+01**	**8.3E+00**	**3.3E+00**	**3.6E+01**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.1E+04	9.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+04**	**9.1E+05**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	8.8E+02	4.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**8.8E+02**	**4.2E+03**
Radionudides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.6E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.6E+01**	**--**
(mrem/yr)	0	--	--	4.0E+00	--	--	--	4.2E+00	--	--	--	--	--	--	--	--	--	**--**	**--**	**4.2E+00**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.3E+00	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+00**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.2E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+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**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.0E+01	5.1E+00	1.8E+02	4.4E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.1E+00**	**1.8E+02**	**4.4E+03**
Silver	0	5.5E+00	--	--	--	5.6E+00	--	--	--	--	--	--	--	--	--	--	--	**5.6E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	2.6E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.6E+05**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	2.1E+00	4.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+00**	**4.9E+01**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	8.4E+00	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**8.4E+00**	**4.0E+01**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.5E-01	5.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E-01**	**5.0E-01**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.4E+02	6.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E+02**	**6.3E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.3E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+05**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	7.4E-01	2.0E-04	3.4E-03	3.4E-03	--	--	--	--	--	--	--	--	**7.4E-01**	**2.0E-04**	**3.4E-03**	**3.4E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	4.6E-01	7.3E-02	--	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.3E-02**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.7E+01	7.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.7E+01**	**7.4E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	7.2E+00	1.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**7.2E+00**	**1.9E+02**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	3.0E+01	3.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E+01**	**3.6E+02**
2,4,6-Trichlorophenol[C]	0	--	--	1.4E+01	2.4E+01	--	--	1.7E+01	2.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+01**	**2.9E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.3E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.3E+01**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	3.0E-01	2.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E-01**	**2.9E+01**
Zinc	0	1.5E+02	1.5E+02	7.4E+03	2.6E+04	1.5E+02	1.5E+02	7.8E+03	2.7E+04	--	--	--	--	--	--	--	--	**1.5E+02**	**1.5E+02**	**7.8E+03**	**2.7E+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	5.9E+00
Arsenic	1.1E+01
Barium	2.1E+03
Cadmium	8.5E-01
Chromium III	5.6E+01
Chromium VI	6.5E+00
Copper	6.9E+00
Iron	3.2E+02
Lead	1.2E+01
Manganese	5.3E+01
Mercury	4.7E-01
Nickel	1.6E+01
Selenium	3.0E+00
Silver	2.2E+00
Zinc	6.0E+01

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

ATTACHMENT 11

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Broad Run WRF - Outfalls 002-006 Permit No.: VA0091383

Receiving Stream: Broad Run, Uts Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	102	mg/L
90% Temperature (Annual) =	25.74	deg C
90% Temperature (Wet season) =	15	deg C
90% Maximum pH =	7.85	SU
10% Maximum pH =	7.24	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0	MGD
7Q10 (Annual) =	0	MGD
30Q10 (Annual) =	0	MGD
1Q10 (Wet season) =	0	MGD
30Q10 (Wet season)	0	MGD
30Q5 =	0	MGD
Harmonic Mean =	0	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) =	132	mg/L
90% Temp (Annual) =	24.25	deg C
90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.6	SU
10% Maximum pH =	7.2	SU
Discharge Flow =	0.045	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	--	--	6.7E+02	9.9E+02	--	--	6.7E+02	9.9E+02	--	--	--	--	--	--	--	--	--	--	6.7E+02	9.9E+02
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.1E+00	9.3E+00	--	--	--	--	--	--	--	--	--	--	6.1E+00	9.3E+00
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	5.1E-01	2.5E+00	--	--	--	--	--	--	--	--	--	--	5.1E-01	2.5E+00
Aldrin[C]	0	3.0E+00	--	4.9E-04	5.0E-04	3.0E+00	--	4.9E-04	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	4.9E-04	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	1.70E+01	2.12E+00	--	--	1.70E+01	2.12E+00	--	--	--	--	--	--	--	--	--	--	1.70E+01	2.12E+00	--	--
Ammonia-N (mg/l) (High Flow)	0	1.70E+01	3.85E+00	--	--	1.70E+01	3.85E+00	--	--	--	--	--	--	--	--	--	--	1.70E+01	3.85E+00	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	8.3E+03	4.0E+04	--	--	--	--	--	--	--	--	--	--	8.3E+03	4.0E+04
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	5.6E+00	6.4E+02	--	--	--	--	--	--	--	--	--	--	5.6E+00	6.4E+02
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	3.4E+02	1.5E+02	1.0E+01	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	1.0E+01	--
Barium	0	--	--	2.0E+03	--	--	--	2.0E+03	--	--	--	--	--	--	--	--	--	--	--	2.0E+03	--
Benzene[C]	0	--	--	2.2E+01	5.1E+02	--	--	2.2E+01	5.1E+02	--	--	--	--	--	--	--	--	--	--	2.2E+01	5.1E+02
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	8.6E-04	2.0E-03	--	--	--	--	--	--	--	--	--	--	8.6E-04	2.0E-03
Benzo (a) anthracene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
Benzo (b) fluoranthene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
Benzo (k) fluoranthene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
Benzo (a) pyrene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
Bis2-Chloroethyl Ether[C]	0	--	--	3.0E-01	5.3E+00	--	--	3.0E-01	5.3E+00	--	--	--	--	--	--	--	--	--	--	3.0E-01	5.3E+00
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.4E+03	6.5E+04	--	--	--	--	--	--	--	--	--	--	1.4E+03	6.5E+04
Bis 2-Ethylhexyl Phthalate[C]	0	--	--	1.2E+01	2.2E+01	--	--	1.2E+01	2.2E+01	--	--	--	--	--	--	--	--	--	--	1.2E+01	2.2E+01
Bromoform[C]	0	--	--	4.3E+01	1.4E+03	--	--	4.3E+01	1.4E+03	--	--	--	--	--	--	--	--	--	--	4.3E+01	1.4E+03
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.5E+03	1.9E+03	--	--	--	--	--	--	--	--	--	--	1.5E+03	1.9E+03
Cadmium	0	5.4E+00	1.4E+00	5.0E+00	--	5.4E+00	1.4E+00	5.0E+00	--	--	--	--	--	--	--	--	--	5.4E+00	1.4E+00	5.0E+00	--
Carbon Tetrachloride[C]	0	--	--	2.3E+00	1.6E+01	--	--	2.3E+00	1.6E+01	--	--	--	--	--	--	--	--	--	--	2.3E+00	1.6E+01
Chlordane[C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.4E+00	4.3E-03	8.0E-03	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	8.0E-03	8.1E-03
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	8.6E+05	2.3E+05	2.5E+05	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	2.5E+05	--
TRC	0	1.9E+01	1.1E+01	--	--	1.9E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.3E+02	1.6E+03	--	--	--	--	--	--	--	--	--	--	1.3E+02	1.6E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	4.0E+00	1.3E+02	--	--	--	--	--	--	--	--	--	--	4.0E+00	1.3E+02
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.4E+02	1.1E+04	--	--	--	--	--	--	--	--	--	--	3.4E+02	1.1E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.0E+03	1.6E+03	--	--	--	--	--	--	--	--	--	--	1.0E+03	1.6E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.1E+01	1.5E+02	--	--	--	--	--	--	--	--	--	--	8.1E+01	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	8.3E-02	4.1E-02	--	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	--	--
Chromium III	0	7.2E+02	9.3E+01	--	--	7.2E+02	9.3E+01	--	--	--	--	--	--	--	--	--	--	7.2E+02	9.3E+01	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.6E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	--	--	1.0E+02	--
Chrysene[C]	0	--	--	3.8E-03	1.8E-02	--	--	3.8E-03	1.8E-02	--	--	--	--	--	--	--	--	--	--	3.8E-03	1.8E-02
Copper	0	1.7E+01	1.1E+01	1.3E+03	--	1.7E+01	1.1E+01	1.3E+03	--	--	--	--	--	--	--	--	--	1.7E+01	1.1E+01	1.3E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.2E+01	5.2E+00	1.4E+02	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	1.4E+02	1.6E+04
DDD[C]	0	--	--	3.1E-03	3.1E-03	--	--	3.1E-03	3.1E-03	--	--	--	--	--	--	--	--	--	--	3.1E-03	3.1E-03
DDE[C]	0	--	--	2.2E-03	2.2E-03	--	--	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	--	--	2.2E-03	2.2E-03
DDT[C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.1E+00	1.0E-03	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	2.2E-03	2.2E-03
Demeton	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	1.0E-01	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.7E-01	1.7E-01	--	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	--	--
Dibenz(a,h)anthracene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.2E+02	1.3E+03	--	--	--	--	--	--	--	--	--	--	4.2E+02	1.3E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.2E+02	9.6E+02	--	--	--	--	--	--	--	--	--	--	3.2E+02	9.6E+02
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.3E+01	1.9E+02	--	--	--	--	--	--	--	--	--	--	6.3E+01	1.9E+02
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.1E-01	2.8E-01	--	--	--	--	--	--	--	--	--	--	2.1E-01	2.8E-01
Dichlorobromomethane[C]	0	--	--	5.5E+00	1.7E+02	--	--	5.5E+00	1.7E+02	--	--	--	--	--	--	--	--	--	--	5.5E+00	1.7E+02
1,2-Dichloroethane[C]	0	--	--	3.8E+00	3.7E+02	--	--	3.8E+00	3.7E+02	--	--	--	--	--	--	--	--	--	--	3.8E+00	3.7E+02
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.3E+02	7.1E+03	--	--	--	--	--	--	--	--	--	--	3.3E+02	7.1E+03
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.4E+02	1.0E+04	--	--	--	--	--	--	--	--	--	--	1.4E+02	1.0E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	7.7E+01	2.9E+02	--	--	--	--	--	--	--	--	--	--	7.7E+01	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	--	--	1.0E+02	--
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	5.0E+00	1.5E+02	--	--	--	--	--	--	--	--	--	--	5.0E+00	1.5E+02
1,3-Dichloropropene[C]	0	--	--	3.4E+00	2.1E+02	--	--	3.4E+00	2.1E+02	--	--	--	--	--	--	--	--	--	--	3.4E+00	2.1E+02
Dieldrin[C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.4E-01	5.6E-02	5.2E-04	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	5.2E-04	5.4E-04
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.7E+04	4.4E+04	--	--	--	--	--	--	--	--	--	--	1.7E+04	4.4E+04
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	3.8E+02	8.5E+02	--	--	--	--	--	--	--	--	--	--	3.8E+02	8.5E+02
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.7E+05	1.1E+06	--	--	--	--	--	--	--	--	--	--	2.7E+05	1.1E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.0E+03	4.5E+03	--	--	--	--	--	--	--	--	--	--	2.0E+03	4.5E+03
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	6.9E+01	5.3E+03	--	--	--	--	--	--	--	--	--	--	6.9E+01	5.3E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.3E+01	2.8E+02	--	--	--	--	--	--	--	--	--	--	1.3E+01	2.8E+02
2,4-Dinitrotoluene[C]	0	--	--	1.1E+00	3.4E+01	--	--	1.1E+00	3.4E+01	--	--	--	--	--	--	--	--	--	--	1.1E+00	3.4E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.0E-08	5.1E-08	--	--	--	--	--	--	--	--	--	--	5.0E-08	5.1E-08
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	3.6E-01	2.0E+00	--	--	--	--	--	--	--	--	--	--	3.6E-01	2.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.6E-02	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	6.2E+01	8.9E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.6E-02	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	6.2E+01	8.9E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	--	--	6.2E+01	8.9E+01
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	8.6E-02	3.6E-02	5.9E-02	6.0E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	5.9E-02	6.0E-02
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	2.9E-01	3.0E-01	--	--	--	--	--	--	--	--	--	--	2.9E-01	3.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	5.3E+02	2.1E+03	--	--	--	--	--	--	--	--	--	--	5.3E+02	2.1E+03
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.3E+02	1.4E+02	--	--	--	--	--	--	--	--	--	--	1.3E+02	1.4E+02
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.1E+03	5.3E+03	--	--	--	--	--	--	--	--	--	--	1.1E+03	5.3E+03
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.0E+02	--	--	--	--	--	--	--	--	--	--	--	5.0E+02	--
Guthion	0	--	1.0E-02	--	--	--	1.0E-02	--	--	--	--	--	--	--	--	--	--	--	1.0E-02	--	--
Heptachlor[C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	5.2E-01	3.8E-03	7.9E-04	7.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	7.9E-04	7.9E-04
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	5.2E-01	3.8E-03	3.9E-04	3.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	3.9E-04	3.9E-04
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	2.8E-03	2.9E-03	--	--	--	--	--	--	--	--	--	--	2.8E-03	2.9E-03
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	4.4E+00	1.8E+02	--	--	--	--	--	--	--	--	--	--	4.4E+00	1.8E+02
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	2.6E-02	4.9E-02	--	--	--	--	--	--	--	--	--	--	2.6E-02	4.9E-02
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	9.1E-02	1.7E-01	--	--	--	--	--	--	--	--	--	--	9.1E-02	1.7E-01
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	9.5E-01	--	9.8E-01	1.8E+00	--	--	--	--	--	--	--	--	9.5E-01	--	9.8E-01	1.8E+00
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.0E+01	1.1E+03	--	--	--	--	--	--	--	--	--	--	4.0E+01	1.1E+03
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	1.4E+01	3.3E+01	--	--	--	--	--	--	--	--	--	--	1.4E+01	3.3E+01
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.0E+00	--	--	--	--	--	--	--	--	--	--	--	2.0E+00	--	--
Indeno (1,2,3-cd) pyrene[C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	3.8E-02	1.8E-01
Iron	0	--	--	3.0E+02	--	--	--	3.0E+02	--	--	--	--	--	--	--	--	--	--	--	3.0E+02	--
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	3.5E+02	9.6E+03	--	--	--	--	--	--	--	--	--	--	3.5E+02	9.6E+03
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	0.0E+00	--	--
Lead	0	1.7E+02	1.9E+01	1.5E+01	--	1.7E+02	1.9E+01	1.5E+01	--	--	--	--	--	--	--	--	--	1.7E+02	1.9E+01	1.5E+01	--
Malathion	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	1.0E-01	--	--
Manganese	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	--	--	5.0E+01	--
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.7E-01	- -	- -	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	- -	- -
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	4.7E+01	1.5E+03	--	--	--	--	--	--	--	--	--	--	4.7E+01	1.5E+03
Methylene Chloride[C]	0	--	--	4.6E+01	5.9E+03	--	--	4.6E+01	5.9E+03	--	--	--	--	--	--	--	--	--	--	4.6E+01	5.9E+03
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.0E-02	1.0E+02	--	--	--	--	--	--	--	--	--	--	3.0E-02	1.0E+02	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	0.0E+00	--	--
Nickel	0	2.3E+02	2.6E+01	6.1E+02	4.6E+03	2.3E+02	2.6E+01	6.1E+02	4.6E+03	--	--	--	--	--	--	--	--	2.3E+02	2.6E+01	6.1E+02	4.6E+03
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.0E+04	--	--	--	--	--	--	--	--	--	--	--	1.0E+04	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.7E+01	6.9E+02	--	--	--	--	--	--	--	--	--	--	1.7E+01	6.9E+02
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	6.9E-03	3.0E+01	--	--	--	--	--	--	--	--	--	--	6.9E-03	3.0E+01
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	3.3E+01	6.0E+01	--	--	--	--	--	--	--	--	--	--	3.3E+01	6.0E+01
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	5.0E-02	5.1E+00	--	--	--	--	--	--	--	--	--	--	5.0E-02	5.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	--	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	6.5E-02	1.3E-02	--	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	--	--
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.4E-02	6.4E-04	6.4E-04	--	--	--	--	--	--	--	--	--	1.4E-02	6.4E-04	6.4E-04
Pentachlorophenol[C]	0	1.1E+01	8.2E+00	2.7E+00	3.0E+01	1.1E+01	8.2E+00	2.7E+00	3.0E+01	--	--	--	--	--	--	--	--	1.1E+01	8.2E+00	2.7E+00	3.0E+01
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.0E+04	8.6E+05	--	--	--	--	--	--	--	--	--	--	1.0E+04	8.6E+05
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	8.3E+02	4.0E+03	--	--	--	--	--	--	--	--	--	--	8.3E+02	4.0E+03
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.5E+01	--	--	--	--	--	--	--	--	--	--	--	1.5E+01	--
(mrem/yr)	0	--	--	4.0E+00	--	--	--	4.0E+00	--	--	--	--	--	--	--	--	--	--	--	4.0E+00	--
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.0E+00	--	--	--	--	--	--	--	--	--	--	--	5.0E+00	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.0E+01	--	--	--	--	--	--	--	--	--	--	--	3.0E+01	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.0E+01	5.0E+00	1.7E+02	4.2E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**1.7E+02**	**4.2E+03**
Silver	0	5.6E+00	--	--	--	5.6E+00	--	--	--	--	--	--	--	--	--	--	--	**5.6E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	2.5E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+05**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.7E+00	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+00**	**4.0E+01**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	6.9E+00	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+00**	**3.3E+01**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.4E-01	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E-01**	**4.7E-01**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.1E+02	6.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+02**	**6.0E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.0E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+05**	**--**
Toxaphene[C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	7.3E-01	2.0E-04	2.8E-03	2.8E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**2.8E-03**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	4.6E-01	7.2E-02	--	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.2E-02**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.5E+01	7.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+01**	**7.0E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	5.9E+00	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E+00**	**1.6E+02**
Trichloroethylene[C]	0	--	--	2.5E+01	3.0E+02	--	--	2.5E+01	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+01**	**3.0E+02**
2,4,6-Trichlorophenol[C]	0	--	--	1.4E+01	2.4E+01	--	--	1.4E+01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+01**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	2.5E-01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E-01**	**2.4E+01**
Zinc	0	1.5E+02	1.5E+02	7.4E+03	2.6E+04	1.5E+02	1.5E+02	7.4E+03	2.6E+04	--	--	--	--	--	--	--	--	**1.5E+02**	**1.5E+02**	**7.4E+03**	**2.6E+04**

Notes:

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

Metal	Target Value (SSTV)
Antimony	5.6E+00
Arsenic	1.0E+01
Barium	2.0E+03
Cadmium	8.5E-01
Chromium III	5.6E+01
Chromium VI	6.4E+00
Copper	6.8E+00
Iron	3.0E+02
Lead	1.2E+01
Manganese	5.0E+01
Mercury	4.6E-01
Nickel	1.5E+01
Selenium	3.0E+00
Silver	2.2E+00
Zinc	5.9E+01

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

ATTACHMENT 12

VA0091383 Effluent Maximum pH values
January 2011-April 2015

	pH value (S.U.)
10-Apr-15	7.2
10-Mar-15	7.4
10-Feb-15	7.2
10-Jan-15	7.2
10-Dec-14	7.2
10-Nov-14	7.4
10-Oct-14	7.5
10-Sep-14	7.3
10-Aug-14	7.3
10-Jul-14	7.1
10-Jun-14	7.6
10-May-14	7.7
10-Apr-14	7.8
10-Mar-14	7.3
10-Feb-14	7.4
10-Jan-14	7.2
10-Dec-13	7.3
10-Nov-13	7.5
10-Oct-13	7.7
10-Sep-13	7.6
10-Aug-13	7.7
10-Jul-13	7.5
10-Jun-13	7.4
10-May-13	7.4
10-Apr-13	7.5
10-Mar-13	7.4
10-Feb-13	7.2
10-Jan-13	7.5
10-Dec-12	7.4
10-Nov-12	7.2
10-Oct-12	7.3
10-Sep-12	7.5
10-Aug-12	7.4
10-Jul-12	7.4
10-Jun-12	7.5
10-May-12	7.6
10-Apr-12	7.4
10-Mar-12	7.3
10-Feb-12	7.1
10-Jan-12	7.2
10-Dec-11	7.4
10-Nov-11	7.4
10-Oct-11	7.3
10-Sep-11	7.3
10-Aug-11	7.4
10-Jul-11	7.4
10-Jun-11	7.2
10-May-11	7.2
10-Apr-11	7.2
10-Mar-11	7.2
10-Feb-11	7.3
10-Jan-11	7.4

90th percentile pH =	7.6 S.U.
10th percentile pH =	7.2 S.U.

VA0091383 Effluent Temperature

	Temperature (°C)
10-Dec-09	17.5
10-Nov-09	20.5
10-Oct-09	22.4
10-Sep-09	24.1
10-Aug-09	25.0
10-Jul-09	23.7
10-Jun-09	21.6
10-May-09	19.4
10-Apr-09	17.5
10-Mar-09	16.5
10-Feb-09	15.9
10-Jan-09	16.1
10-Dec-08	17.4
10-Nov-08	20.3
10-Oct-08	22.0
10-Sep-08	24.0
10-Aug-08	24.6
10-Jul-08	23.9
10-Jun-08	72.0
10-May-08	19.0

24.25 90th percentile effluent temperature

VA0091383 Effluent Total Hardness

	Total Hardness (mg/L as CaCO3)
First Quarter 2015	120
Fourth Quarter 2014	93
Third Quarter 2014	137
Second Quarter 2014	145
First Quarter 2014	106
Fourth Quarter 2013	143
Third Quarter 2013	147
Second Quarter 2013	100
First Quarter 2013	142
Fourth Quarter 2012	160
Third Quarter 2012	140
Second Quarter 2012	160
First Quarter 2012	120
Fourth Quarter 2011	170
Third Quarter 2011	125
Second Quarter 2011	115
First Quarter 2011	110
Fourth Quarter 2010	150

132 Average Effluent Total Hardness

ATTACHMENT 13

Field Data for DEQ Monitoring Station 1ABRB002.15 from April 2001 to March 2015

Station ID	Collection Date	Depth (m)	Temp (C)	pH (SU)	Dissolved Oxygen (mg/L)	Specific Conductance (uS/cm)
1ABRB002.15	3-Apr-01	0.3	9.06	7.2	11.79	287.4
1ABRB002.15	1-May-01	0.3	18.29	7.58	8.97	400.3
1ABRB002.15	6-Jun-01	0.3	21.26	7.44	7.54	305.6
1ABRB002.15	5-Mar-03	0.3	3.89	8.12	12.03	566.2
1ABRB002.15	14-Apr-03	0.3	15.81	7.55	8.16	305.4
1ABRB002.15	23-Jun-03	0.3	18.8	7.35	8.08	246.2
1ABRB002.15	7-Jul-03	0.3	25.41	7.38	5.73	345.9
1ABRB002.15	16-Sep-03	0.3	20.68	7.22	7.23	312.9
1ABRB002.15	18-Nov-03	0.3	9.78	7.24	10.46	381.4
1ABRB002.15	22-Jan-04	0.3	0.47	6.85	15.08	694.2
1ABRB002.15	22-Mar-04	0.3	6.14	7.89	11.3	497.4
1ABRB002.15	24-Jun-04	0.3	22.9	7.39	5.48	352.7
1ABRB002.15	12-Jul-04	0.3	25.68	7.34	4.58	339
1ABRB002.15	8-Sep-04	0.3	22.07	7.44	6.47	468
1ABRB002.15	19-Jan-05	0.3	0.12	7.81	13.87	277.8
1ABRB002.15	7-Mar-05	0.3	8.13	7.67	9.99	201.3
1ABRB002.15	6-Jun-05	0.3	22.36	7.45	7.39	385.8
1ABRB002.15	13-Jul-05	0.3	25.65	7.42	5.65	320.8
1ABRB002.15	6-Sep-05	0.3	21.13	7.69	7.48	544.5
1ABRB002.15	29-Nov-06	0.3	9	7.4	11.1	291
1ABRB002.15	16-Jan-07	0.3	10.3	7.5	10.1	294
1ABRB002.15	6-Mar-07	0.3	3	7.4	12.2	527
1ABRB002.15	2-May-07	0.3	19.7	7.4	7.4	458
1ABRB002.15	9-Jul-07	0.3	26.8	7.6	7.4	507
1ABRB002.15	5-Sep-07	0.3	23.3	7.6	6.6	513
1ABRB002.15	5-Nov-07	0.3	10.2	7.6	9.5	452
1ABRB002.15	9-Jan-08	0.3	9.1	7.5	10.2	587
1ABRB002.15	5-Mar-08	0.3	11.5	7.3	9	616
1ABRB002.15	14-May-08	0.3	14.4	7.2	9	227
1ABRB002.15	9-Jul-08	0.3	25.5	7.6	5.9	508
1ABRB002.15	3-Sep-08	0.3	23.1	7.5	6.6	484
1ABRB002.15	5-Nov-08	0.3	14.3	7.5	7.8	496
1ABRB002.15	14-Jan-09	0.3	2.4	7.3	12	388
1ABRB002.15	12-Mar-09	0.3	10.2	7.5	6.1	1135
1ABRB002.15	7-May-09	0.3	16.1	7.3	8.6	208
1ABRB002.15	9-Jul-09	0.3	23.6	7.8	7.8	487
1ABRB002.15	2-Sep-09	0.3	20.7	7.5	7	373
1ABRB002.15	4-Nov-09	0.3	11.5	7.5	9.4	347
1ABRB002.15	6-Jan-10	0.3	1.4	7.6	12.5	729
1ABRB002.15	4-Mar-10	0.3	4.8	7.6	13	476
1ABRB002.15	13-May-10	0.3	16.5	7.6	7.6	490
1ABRB002.15	8-Jul-10	0.3	28.6	7.7	7.2	583
1ABRB002.15	9-Sep-10	0.3	23.1	7.8	7.5	612
1ABRB002.15	3-Nov-10	0.3	10.3	7.7	10.2	483
1ABRB002.15	6-Jan-11	0.3	3.7	8.2	14	646
1ABRB002.15	3-Mar-11	0.3	6.3	7.6	11.2	921
1ABRB002.15	5-May-11	0.3	14.9	7.5	9.3	396
1ABRB002.15	6-Jul-11	0.3	25.8	7.6	6.5	586
1ABRB002.15	8-Sep-11	0.3	20.3	6.9 NULL		181
1ABRB002.15	1-Nov-11	0.3	9.8	7.5 NULL		352
1ABRB002.15	5-Jan-12	0.3	3.47	7.74	13.28	423
1ABRB002.15	23-Feb-12	0.3	9.55	7.52	10.44	668
1ABRB002.15	1-Mar-12	0.3	8.85	7.29	11.04	319
1ABRB002.15	21-Mar-12	0.3	17.6	7.52	8.29	553
1ABRB002.15	1-May-12	0.3	16.34	7.76 NULL		526
1ABRB002.15	15-May-12	0.3	18.92	7.53	7.61	406
1ABRB002.15	26-Jun-12	0.3	24.54	7.89 NULL		522
1ABRB002.15	31-Jul-12	0.3	26.33	7.95 NULL		549
1ABRB002.15	7-Aug-12	0.3	27.3	7.9 NULL		492
1ABRB002.15	6-Sep-12	0.3	25.87	7.72 NULL		504
1ABRB002.15	11-Sep-12	0.3	20.96	7.24	8.36	476
1ABRB002.15	5-Nov-12	0.3	9.9	7.76	10.75	405
1ABRB002.15	21-Feb-13	0.3	2.96	7.69 NULL		619
1ABRB002.15	25-Apr-13	0.3	15.83	7.47 NULL		505
1ABRB002.15	10-Jun-13	0.3	20.96	7.15	7.67	148
1ABRB002.15	26-Aug-13	0.3	22.03	7.81	7.72	509
1ABRB002.15	28-Oct-13	0.3	10.51	7.91	10.34	523
1ABRB002.15	12-Dec-13	0.3	3.76	7.74	13.13	784
1ABRB002.15	9-Jan-14	0.3	2.18	7.46	12.8	786
1ABRB002.15	19-Mar-14	0.3	5.75	7.55	12.94	1518
1ABRB002.15	25-Jun-14	0.3	25.84	7.87 NULL		489
1ABRB002.15	28-Jul-14	0.3	25.9	7.08 NULL		578
1ABRB002.15	6-Oct-14	0.3	16.29	7.83 NULL		527
1ABRB002.15	5-Nov-14	0.3	12.4	7.77 NULL		575
1ABRB002.15	12-Feb-15	0.3	5.25	7.64 NULL		842
1ABRB002.15	30-Mar-15	0.3	8.08	7.75 NULL		695
	90th percentile		25.74	7.85		
	10th percentile			7.24		

Parameter HARDNESS, EDTA (MG/L AS CACO3)

Sta Id	Collection Date Time	Depth	Des Depth	Value
1ABRB002.15	06/12/1990 13:00	S	0.3	78
	06/12/1991 11:00	S	0.3	90
	09/25/1991 11:12	S	0.3	60
	10/30/1991 11:00	S	0.3	156
	11/26/1991 10:35	S	0.3	92
	12/11/1991 09:55	S	0.3	62
	01/02/1992 10:00	S	0.3	82
	02/03/1992 10:44	S	0.3	100
	02/05/1992 10:05	S	0.3	108
	03/04/1992 09:25	S	0.3	88
	04/07/1992 09:55	S	0.3	92
	05/06/1992 09:07	S	0.3	100
	06/03/1992 10:26	S	0.3	86
	07/15/1992 10:15	S	0.3	130
	08/05/1992 10:12	S	0.3	76
	09/02/1992 10:49	S	0.3	124
	10/21/1992 10:06	S	0.3	106
	11/18/1992 10:35	S	0.3	96
	12/02/1992 10:17	S	0.3	101
	01/12/1993 09:55	S	0.3	76
	03/03/1993 10:17	S	0.3	84
	04/07/1993 09:54	S	0.3	70
	05/06/1993 10:05	S	0.3	70
	06/09/1993 09:42	S	0.3	100
	07/07/1993 09:58	S	0.3	120
	08/04/1993 09:58	S	0.3	56
	09/22/1993 13:00	B	0.98	64
		S	0.3	64
	10/06/1993 09:58	S	0.3	132
	10/22/1993 13:00	S	0.3	64
	11/09/1993 10:15	S	0.3	134
	01/26/1994 09:30	S	0.3	60
	02/02/1994 09:44	S	0.3	68
	03/22/1994 09:29	S	0.3	70
	04/13/1994 09:35	S	0.3	86
	05/18/1994 09:33	S	0.3	99
	06/08/1994 10:00	S	0.3	123
	07/06/1994 09:29	S	0.3	90
	09/07/1994 09:23	S	0.3	135
	10/18/1994 10:00	S	0.3	146
	11/09/1994 09:32	S	0.3	148
	12/07/1994 09:53	S	0.3	92
	01/04/1995 09:15	S	0.3	136
	02/01/1995 09:11	S	0.3	102
	03/01/1995 09:20	S	0.3	84
	04/04/1995 09:07	S	0.3	120
	05/03/1995 09:20	S	0.3	110
	06/14/1995 09:16	S	0.3	94
	07/12/1995 09:10	S	0.3	62
	08/02/1995 09:07	S	0.3	148
	09/13/1995 09:12	S	0.3	190
	12/07/1995 09:20	S	0.3	109
	01/17/1996 09:05	S	0.3	125
	02/08/1996 09:20	S	0.3	106
	04/03/1996 09:05	S	0.3	60
	06/05/1996 08:45	S	0.3	110
	07/17/1996 08:50	S	0.3	104
	08/21/1996 09:41	S	0.3	98
	09/12/1996 09:00	S	0.3	92
	11/13/1996 08:45	S	0.3	96
	12/03/1996 09:00	S	0.3	49
	01/07/1997 08:30	S	0.3	110
	02/04/1997 08:50	S	0.3	104.6
	03/27/1997 10:20	S	0.3	89.9
	05/06/1997 08:15	S	0.3	117.4
	06/05/1997 08:55	S	0.3	113

Average Total Hardness = 102.4171

07/08/1997 08:55	S	0.3		146
08/06/1997 09:00	S	0.3		180
09/03/1997 10:30	S	0.3		111
10/07/1997 09:15	S	0.3		148
11/13/1997 08:55	S	0.3		97.3
02/03/1998 09:00	S	0.3		82.3
03/03/1998 08:40	S	0.3		69.3
04/01/1998 08:50	S	0.3		84.9
11/09/1998 09:31	S	0.3		214
12/15/1998 10:05	S	0.3		143
02/02/1999 11:15	S	0.3	-	
03/09/1999 11:16	S	0.3	-	
04/06/1999 13:46	S	0.3	-	
05/05/1999 11:50	S	0.3	-	
06/15/1999 09:30	S	0.3	-	
07/15/1999 08:10	S	0.3	-	
08/10/1999 10:00	S	0.3	-	
09/08/1999 11:00	S	3	-	
11/29/1999 08:30	S	0.3	-	
12/29/1999 13:05	S	0.3	-	
03/01/2000 12:30	S	0.3	-	
04/04/2000 12:00	S	0.3	-	
05/02/2000 11:11	S	0.3	-	
06/05/2000 10:00	S	0.3	-	
07/10/2000 13:45	S	0.3	-	
08/01/2000 10:30	S	0.3	-	
09/07/2000 09:35	S	0.3	-	
10/10/2000 11:30	S	0.3	-	
11/01/2000 09:15	S	0.3	-	
12/11/2000 09:50	S	0.3	-	
01/23/2001 09:10	S	0.3	-	
02/06/2001 09:15	S	0.3	-	
04/03/2001 12:35	S	0.3	-	
05/01/2001 13:00	S	0.3	-	
06/06/2001 12:45	S	0.3	-	
03/05/2003 10:30	S	0.3	-	
04/14/2003 11:15	S	0.3	-	
06/23/2003 10:25	S	0.3	-	

ATTACHMENT 15

2/3/2016 7:03:55 AM

Facility = Broad Run WRF Flushing Outfalls
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.019
WLAc = 0.011
Q.L. = .1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

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

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

The data are:

0.2

3/8/2016 2:19:27 PM

Facility = Broad Run WRF
Chemical = Zinc
Chronic averaging period = 4
WLAa = 150
WLAc = 150
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 21
Expected Value = 56.4426
Variance = 4513.72
C.V. = 1.190310
97th percentile daily values = 217.605
97th percentile 4 day average = 136.645
97th percentile 30 day average= 79.5152
< Q.L. = 1
Model used = delta lognormal

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 150
Average Weekly limit = 150
Average Monthly LImit = 150

The data are:

72.1
78.9
68.2
48.4
54.6
70.2
46.2
28.1
0
44
44.5
63
2
5
46.2
70.3
32.9
54.5
52.8
54.6

3/8/2016 2:21:17 PM

Facility = Broad Run WRF
Chemical = Copper
Chronic averaging period = 4
WLAa = 18
WLAc = 12
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 19
Expected Value = 3.77619
Variance = 11.1734
C.V. = 0.885193
97th percentile daily values = 11.8901
97th percentile 4 day average = 7.23831
97th percentile 30 day average= 4.84480
< Q.L. = 5
Model used = delta lognormal

No Limit is required for this material

The data are:

7.2
7.5
5.6
6.3
0
0
0
0
0
1.23
6.3
1
3
4.7
5.26
2.31
3.46
3.35
6.18

ATTACHMENT 16

MEMORANDUM

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

SUBJECT: TOXICS MANAGEMENT PROGRAM (TMP) DATA REVIEW
Broad Run Water Reclamation Facility VA0091383
REVIEWER: Douglas Frasier
DATE: 14 January 2015

PREVIOUS REVIEW: 5 March 2014

DATA REVIEWED:

This review covers the second (2nd) annual chronic toxicity tests conducted in April 2014 at Outfall 001.

DISCUSSION:

The results of these toxicity tests are summarized in Table 1.

The chronic toxicity of the effluent samples was determined with a 3-brood static daily renewal survival and reproduction chronic test using *C. dubia* as the test species and a 7-day daily renewal larval survival and growth test using *P. promelas* as the test species.

The chronic tests for *C. dubia* and *P. promelas* yielded a No Observed Effect Concentration (NOEC) of 100% effluent, respectively. The results passed the chronic endpoint as stated in the permit.

CONCLUSION:

The chronic toxicity tests are valid and the results are acceptable. The effluent samples from this facility exhibit no chronic toxicity to the test species.

BIOMONITORING RESULTS
Broad Run Water Reclamation Facility (VA0091383)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	48-h LC_{50} (%)	IC_{25} (%)	NOEC (%)	% SURV	TU_c	LAB	REMARKS
10/14/08	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	1st quarter
10/14/08	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
01/27/09	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	2nd quarter
01/27/09	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
01/27/09	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	3rd quarter
01/27/09	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
07/02/09	Chronic *C. dubia*	>100	2.2	100 S **6.5 R**	100	**> 15**	CBI	4th quarter
07/02/09	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
09/29/09	Chronic *C. dubia*	>100	3.0	100 S **<6.5 R**	90	**> 16**	CBI	Retest
09/29/09	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
11/17/09	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	Retest after chemical removal
11/17/09	Chronic *P. promelas*	>100	>100	100 SG	100	1	CBI	
CTO for 11 MGD Plant Issued 3 May 2010 Permit Reissued 25 August 2010								
10/26/10	Chronic *C. dubia*	>100	>100	100 SR	100	1	BMI	1st Quarterly
10/26/10	Chronic *P. promelas*	>100	>100	100 SG	100	1		
01/11/11	Chronic *C. dubia*	>100	>100	100 S 84 R	100	1	BMI	2nd Quarterly
01/11/11	Chronic *P. promelas*	>100	>100	100 SG	100	1		
05/10/11	Chronic *C. dubia*	>100	74	100 S 82.5 R	90	1.21	CBI	3rd Quarterly
05/10/11	Chronic *P. promelas*	>100	>100	100 SG	100	1		
06/07/11	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	4th Quarterly
06/07/11	Chronic *P. promelas*	>100	>100	100 SG	100	1		
10/04/11	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	5th Quarterly
10/04/11	Chronic *P. promelas*	>100	>100	100 SG	98	1		
12/13/11	Chronic *C. dubia*	>100	>100	100 SR	90	1	CBI	6th Quarterly
12/13/11	Chronic *P. promelas*	>100	>100	100 SG	100	1		
03/06/12	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	7th Quarterly
03/06/12	Chronic *P. promelas*	>100	>100	100 SG	100	1		
06/12/12	Chronic *C. dubia*	>100	>100	100 SR	100	1	CBI	8th Quarterly
06/12/12	Chronic *P. promelas*	>100	>100	100 SG	100	1		
09/11/12	Chronic *C. dubia*	>100	>100	100 SR	90	1	CBI	9th Quarterly
09/11/12	Chronic *P. promelas*	>100	>100	100 SG	93	1		
08/06/13	Chronic *C. dubia*	>100	>100	100 SR	100	1	Reed	1st Annual
08/06/13	Chronic *P. promelas*	>100	>100	100 SG	100	1		
04/29/14	Chronic *C. dubia*	>100	>100	100 SR	100	1	Reed	2nd Annual
04/29/14	Chronic *P. promelas*	>100	>100	100 SG	98	1		

FOOTNOTES:

A **boldfaced** LC50 or NOEC value indicates that the test failed the toxicity criterion.

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth
% SURV – Percent survival in 100% effluent
CBI – Coastal Bioanalysts, Inc
BMI – Biological Monitoring, Inc
Reed – James R. Reed & Associates

Spreadsheet for determination of WET test endpoints or WET limits

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

				Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR				
				ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa
				ACUTE WLAa		0.30763636	Note: Inform the permittee that if the mean of the data exceeds				
							this TUa:	1.0	a limit may result using STATS.EXE		
				Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR				
				CHRONIC	1.50778154	TU_c	NOEC =	67	% Use as	1.49	TU_c
				BOTH*	3.07636371	TU_c	NOEC =	33	% Use as	3.03	TU_c
Enter data in the cells with blue type:				AML	1.50778154	TU_c	NOEC =	67	% Use as	1.49	TU_c
Entry Date:		02/03/16		ACUTE WLAa,c		3.07636364		Note: Inform the permittee that if the mean			
Facility Name:		Broad Run		CHRONIC WLAc		1.03090909		of the data exceeds this TUc:		1.0	
VPDES Number:		VA0091383		* Both means acute expressed as chronic				a limit may result using STATS.EXE			
Outfall Number:		1									
				% Flow to be used from MIX.EXE				**Diffuser /modeling study?**			
Plant Flow:		11	MGD					Enter Y/N	n		
Acute 1Q10:		0.28	MGD	100	%			Acute	1	:1	
Chronic 7Q10:		0.34	MGD	100	%			Chronic	1	:1	
Are data available to calculate CV? (Y/N)				N	(Minimum of 10 data points, same species, needed)					Go to Page 2	
Are data available to calculate ACR? (Y/N)				N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3	
IWC_a		97.5177305	%	Plant flow/plant flow + 1Q10		NOTE: If the IWCa is >33%, specify the					
IWC_c		97.00176367	%	Plant flow/plant flow + 7Q10		NOAEC = 100% test/endpoint for use					
Dilution, acute		1.025454545		100/IWCa							
Dilution, chronic		1.030909091		100/IWCc							
WLA_a		0.307636364	Instream criterion (0.3 TUa) X's Dilution, acute								
WLA_c		1.030909091	Instream criterion (1.0 TUc) X's Dilution, chronic								
$WLA_{a,c}$		3.076363636	ACR X's WLA_a - converts acute WLA to chronic units								
ACR -acute/chronic ratio		10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)								
CV-Coefficient of variation		0.6	Default of 0.6 - if data are available, use tables Page 2)								
Constants	eA	0.4109447	Default = 0.41								
	eB	0.6010373	Default = 0.60								
	eC	2.4334175	Default = 2.43								
	eD	2.4334175	Default = 2.43 (1 samp)	No. of sample	1		**The Maximum Daily Limit is calculated from the lowest				
							LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.				
$LTA_{a,c}$		1.264215332	WLAa,c X's eA								
LTA_c		0.619614817	WLAc X's eB						Rounded NOEC's		%
MDL** with $LTA_{a,c}$		3.076363712	TU_c	NOEC =	32.505909	(Protects from acute/chronic toxicity)			NOEC =	33	%
MDL** with LTA_c		1.507781538	TU_c	NOEC =	66.322605	(Protects from chronic toxicity)			NOEC =	67	%
AML with lowest LTA		1.507781538	TU_c	NOEC =	66.322605	Lowest LTA X's eD			NOEC =	67	
IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a											
									Rounded LC50's		%
MDL with $LTA_{a,c}$		0.307636371	TU_a	LC50 =	325.059094	%	Use NOAEC=100%		LC50 =	NA	%
MDL with LTA_c		0.150778154	TU_a	LC50 =	663.226054	%	Use NOAEC=100%		LC50 =	NA	

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

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

Table 3. ACR used: 10

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

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,

enter it here:	NO DATA	$\%LC_{50}$
	NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			67	1.4925373
Dilution factor to recommend:	0.5		0.8185353	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	81.9	1.22
	25.0	4.00	67.0	1.49
	12.5	8.00	54.8	1.82
	6.25	16.00	44.9	2.23
Extra dilutions if needed	3.12	32.05	36.7	2.72
	1.56	64.10	30.1	3.32

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

Spreadsheet for determination of WET test endpoints or WET limits

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

Acute Endpoint/Permit Limit						Use as LC_{50} in Special Condition, as TUa on DMR					
ACUTE	100% =	NOAEC				LC_{50} =	NA	% Use as	NA	TUa	
ACUTE WLAa		0.30381818	Note: Inform the permittee that if the mean of the data exceeds								
			this TUa:	1.0	a limit may result using STATS.EXE						
Chronic Endpoint/Permit Limit						Use as NOEC in Special Condition, as TUc on DMR					
CHRONIC	1.48517811	TU_c	NOEC =	68	% Use as	1.47	TU_c				
BOTH*	3.03818189	TU_c	NOEC =	33	% Use as	3.03	TU_c				
AML	1.48517811	TU_c	NOEC =	68	% Use as	1.47	TU_c				
ACUTE WLAa,c		3.03818182									
CHRONIC WLAc		1.01545455									
* Both means acute expressed as chronic											

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using STATS.EXE

Enter data in the cells with blue type:

Entry Date:	02/03/16								
Facility Name:	Broad Run								
VPDES Number:	VA0091383								
Outfall Number:	1								
			% Flow to be used from MIX.EXE				**Diffuser /modeling study?**		
Plant Flow:	22	MGD					Enter Y/N	n	
Acute 1Q10:	0.28	MGD	100	%			Acute	1	:1
Chronic 7Q10:	0.34	MGD	100	%			Chronic	1	:1

Are data available to calculate CV? (Y/N)	N	(Minimum of 10 data points, same species, needed)	Go to Page 2
Are data available to calculate ACR? (Y/N)	N	(NOEC<LC50, do not use greater/less than data)	Go to Page 3

IWC_a	98.7432675	%	Plant flow/plant flow + 1Q10
IWC_c	98.47806625	%	Plant flow/plant flow + 7Q10

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

Dilution, acute	1.012727273	100/IWCa
Dilution, chronic	1.015454545	100/IWCc
WLA_a	0.303818182	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.015454545	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3.038181818	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variatior	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of sample 1

**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	1.248524716	WLAa,c X's eA							
LTA_c	0.610326058	WLAc X's eB					Rounded NOEC's		%
MDL** with $LTA_{a,c}$	3.038181893	TU_c	NOEC =	32.914422	(Protects from acute/chronic toxicity)		NOEC =	33	%
MDL** with LTA_c	1.485178111	TU_c	NOEC =	67.331992	(Protects from chronic toxicity)		NOEC =	68	%
AML with lowest LTA	1.485178111	TU_c	NOEC =	67.331992	Lowest LTA X's eD		NOEC =	68	

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

							Rounded LC50's		%
MDL with $LTA_{a,c}$	0.303818189	TU_a	LC50 =	329.144217	%	Use NOAEC=100%	LC50 =	NA	%
MDL with LTA_c	0.148517811	TU_a	LC50 =	673.319915	%	Use NOAEC=100%	LC50 =	NA	

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

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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:	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	100	1.0		
Dilution series to use for limit			68	1.4705882
Dilution factor to recommend:	0.5		0.8246211	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	82.5	1.21
	25.0	4.00	68.0	1.47
	12.5	8.00	56.1	1.78
	6.25	16.00	46.2	2.16
Extra dilutions if needed	3.12	32.05	38.1	2.62
	1.56	64.10	31.4	3.18

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

ATTACHMENT 17

This document gives pertinent information concerning the reclamation and reuse for the effluent of Broad Run WRF for cooling water, landscape irrigation, fire protection, toilet flushing and non-potable wastewater treatment plant operations. Part IV of this permit implements the standards, monitoring and technical requirements of the Water Reclamation and Reuse Regulation (9VAC25-740-10 et seq).

1.	Facility Producing the effluent for Reuse:	Broad Run WRF	SIC Code :	4952 WWTP
	Facility Location:	44865 Loudoun Water Way Ashburn, VA 20147	County:	Loudoun
	Reuse Project Contact Name:	Micah Vieux	Telephone Number:	571-442-3427
2.	Permit No.:	VA0091383		
3.	Owner Name:	Loudoun County Sanitation Authority d/b/a Loudoun Water		
	Owner Contact:	Micah Vieux	Telephone Number:	571-291-7976

Reclaimed Water Standards and Monitoring Summary.

The reclaimed water standards are presented in the following table; the basis for the standards is 9VAC25-740 for Level 1 reclaimed water. Standards are established for *E. coli*, Turbidity, pH, BOD, COD, and Total Residual Chlorine. Monitoring is included for Total Nitrogen, Total Phosphorus, Reclamation System Flow, and Influent Flow.

A standard was established for COD in lieu of BOD; 9VAC25-740-70 requires that Level 1 reclaimed water meet a BOD monthly average of $\leq$ 10 mg/L. The Broad Run WRF is also subject to the effluent limits established by the Dulles Policy. 9VAC25-400 of the State Water Control Law was established to regulate the discharge from sewage treatment plants in the Dulles Area Watershed, which is located upstream of several major public water supply intakes serving the Washington, D.C. metropolitan area. This Policy prescribes the effluent limitations for the sewage treatment works, the design requirements for the sewage treatment plants and pumping stations, and the requirement for an instream monitoring program. The Broad Run WRF has a COD limit of 10.0 mg/L as prescribed in 9VAC25-400-30B. With the stringent COD limit of 10 mg/L, it is staff's best professional judgment that there is no chance for detectable BOD values. BOD methodology in Standard Methods 18th edition allows for the lowest quantification level for BOD of at best 2 mg/L.

Subdivision 9VAC25-740-80.A.3 states that "Sampling for TSS and BOD_5 or $CBOD_5$ shall be at least weekly or more frequently based on the design flow of the reclamation system, and shall be the same sampling type and frequency specified for sewage treatment works in the Sewage Collection and Treatment Regulations (9VAC25-790)." Subdivision 9VAC25-790-960.A (Sampling test and frequency) of the SCAT Regulations states that "Table C lists the typical recommended minimum sampling program schedules for all sewage treatment works". Therefore, other sampling program schedules, including other effluent monitoring parameters not shown in Table C, may be considered. In addition, subdivision 9VAC25-790-960.B indicates that effluent testing and frequency "of other sampling for a treatment works will be provided in the VPDES permit or the VPA permit." For the Broad Run WRF, the use of a COD effluent limit in lieu of a BOD effluent limit represents "other sampling for a treatment works" provided in the VPDES permit for this facility.

The water for reuse and reclamation is pulled from the permeate storage tanks which are prior to the carbon filters, so the COD concentrations are higher than those found in the final effluent. COD in these tanks has averaged 15 mg/L in the 18 month history of the plant's operation. High values have been seen in the mid-20 mg/L range. As such, staff proposes a monthly average standard of $\leq$ 50 for this administrative authorization since there is a limited history for the plant's performance. To demonstrate that the BOD standard is met, staff proposes a monthly BOD sample frequency.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual and the Water Reclamation and Reuse Regulation.

Part IV. A. Standards and Monitoring Requirements

1. Outfall 650 -Level 1 for Cooling Towers, Chilling Water, Non-residential Fire Protection, Landscape Irrigation, Non-residential Toilet Flushing, WWTP Non-potable water
   a. During the period beginning with the issuance of a Certificate to Operate (CTO) for the reclamation system and ending with the permit expiration date, the permittee is required to monitor pollutants in the reclaimed water as described below for reuses specified in the Reclaimed Water Management Plan:

Parameters	Standard (1)	Units	Frequency	Sample Type
E. coli (2)	Geometric mean (3): ≤ 11	colonies/100 ml	5D/W(4)	Grab
	CAT: 35	colonies/100 ml	NA	Grab
Total Residual Chlorine (TRC) (5)	NL	mg/L	Continuous	Recorded
	CAT: < 1.0	mg/L	Continuous	Recorded
pH	6.0 – 9.0	Standard Units	1/Day	Grab
BOD_5	≤ 10	mg/L	1/Month	Grab
COD	Monthly average: ≤ 50	mg/L	1/Day	Grab
Turbidity (6)	Daily average : ≤ 2	NTU	Continuous	Recorded
	CAT: > 5	NTU	Continuous	Recorded
Reclamation System Flow (8)	Monthly average: NL	MGD	Continuous	TIRE
	Monthly maximum: NL	MGD	Continuous	TIRE
Influent Flow (9)	Monthly average: NL	MGD	Continuous	TIRE
	Monthly maximum: NL	MGD	Continuous	TIRE(10)
Total Nitrogen (11)	NL	mg/L	1/Day	24 HC
Total Phosphorus (11)	NL	mg/L	1/Day	24 HC

NA = Not Applicable MGD = Million gallons per day TIRE = Totalizing, indicating, and recording equipment
CAT = Corrective action threshold NL = No Limit NTU = nephelometric turbidity unit

(1) With the exception of turbidity, standards must be met at the point of compliance (POC) designated as internal outfall 650. The POC shall be just upstream of disinfection for turbidity, at the end of the contact tank or contact period for total residual chlorine, and as specified in the approved operations and maintenance manual of the reclamation system for all other standards.
(2) After disinfection.
(3) For the purpose of calculating the geometric mean, bacterial analytical results below the detection level of the analytical method used shall be reported as values equal to the detection level.
(4) For reclamation systems treating municipal wastewater, bacterial samples shall be collected between 10:00 a.m. and 4:00 p.m. to coincide with peak flows to the reclamation system
(5) The TRC standard applies only if chlorine is used for disinfection. TRC is measured after a minimum contact time of 30 minutes at average flow or 20 minutes at peak flow.
(6) Turbidity analysis shall be performed by a continuous, on-line turbidity meter equipped with an automated data logging or recording device and an alarm to notify the operator when the CAT for turbidity in the standard for Level 1 has been reached. Compliance with the average turbidity standard shall be determined daily, based on the arithmetic mean of hourly or more frequent discrete measurements recorded during a 24-hour period. See Part III.B.8 for additional information regarding turbidity monitoring.
(7) Daily average is the arithmetic mean of hourly or more frequent discrete turbidity measurements recorded during a 24-hour period.
(8) The designated design capacity for the reclamation system is 11MGD.
(9) The design capacity of the wastewater treatment works that will divert source water or effluent to the reclamation system is 11 MGD.
(10) Influent flow shall be monitored at the head of the wastewater treatment works that will divert source water or effluent to the reclamation system/calculated as the sum of all authorized discharges to surface waters, land treatment and to reclaimed water distributions systems for reuse or directly to a reuse.
(11) There shall be no nutrient management requirements for irrigation reuse of the reclaimed water produced by the reclamation system based on an annual average concentration of total nitrogen (N) and total phosphorus (P) ≤ 8.0 and ≤ 1.0 mg/l, respectively. Annual average concentrations of total N and total P shall be the arithmetic mean of the monthly average concentrations of these nutrients for the most recent 12 consecutive months of monitoring.

Part IV.B. Reuse and Reclamation Special Conditions

1. Prohibitions for Reuse and Reclamation. The Reuse and Reclamation Regulation at 9VAC25-740-50.B outlines prohibited uses for reuse and reclamation, including direct potable reuse, filling swimming pools.

2. Nuisance Conditions. The Reuse and Reclamation Regulation at 9VAC25-740-170.D prohibits nuisance conditions resulting from the distribution, use or storage of reclaimed water.

3. Reclamation and Reuse Reopener. It is staff's best professional judgment that the permit contain this reopener that would allow the Board to modify or revoke and reissue this permit if any applicable standards or requirements for water reclamation and reuse promulgated under the Water Reclamation and Reuse Regulation (9VAC25-740) are more stringent than or are in addition to any standards or requirements for water reclamation and reuse contained in this permit.

4. Submittal of Monitoring Reports. The Reuse and Reclamation Regulation at 9VAC25-740-80.C states that "A reclamation system that produces reclaimed water intermittently or seasonally shall monitor only when the reclamation system discharges to a reclaimed water distribution system, a non-system storage facility, or directly to a reuse." Reports shall be submitted no later than 10 days following the end of the monitoring period.

5. Corrective Action Threshold. The Reuse and Reclamation Regulation at 9VAC25-740-70.C.1 requires corrective action when the reclaimed water reaches the corrective action threshold (CAT) for turbidity or Total Residual Chlorine specified in Part III.A. of the permit. This special condition also provides instructions for actions to be taken for resampling and diversion of the reclaimed water.

6. Corrective Action Threshold for Bacteria. The Reuse and Reclamation Regulation at 9VAC25-740-70.C.2 describes the actions to be taken when the reclaimed water reaches the CAT for bacteria.

7. Failure to Resample. The Reuse and Reclamation Regulation at 9VAC25-740-70.C.3 states that failure to resample after determination that monitoring results are not in compliance with the CAT standards for reclaimed water in Part III.A, or to divert or discharge substandard or reject water in accordance with Part III.B.5 shall be deemed a violation of this permit.

8. Online Turbidity Meter. The Reuse and Reclamation Regulation at 9VAC25-740-80.A.1 states that should the on-line turbidity meter for the reclamation system go out of service for either planned or unplanned repair, samples shall be manually collected for turbidity analysis at four-hour intervals up to a maximum of five days. Following the five-day period of repair, continuous, on-line monitoring with a turbidity meter shall resume.

9. Operations & Maintenance Manual. The Reuse and Reclamation Regulation at 9VAC25-740-120.B.3.f, 9VAC25-740-140.A, and 9VAC25-740-140.D.1 and F, "Ultraviolet Disinfection: Guidelines for Drinking Water and Water Reuse, 2nd Ed." (NWRI, 2003) state that within 90 days of placing the new reclamation system into operation, the permittee shall submit a new or revised operations and maintenance manual for the system to the DEQ-NRO. This special condition outlines the required sections of the O&M Manual. This special condition also outlines the requirements for an O&M Manual for the reclaimed water distribution system as required by items a through e at 9VAC25-740-140.B, D.2 and F; item f – 9VAC25-740-110.B.9.

10. 95% Capacity Reopener. The Reuse and Reclamation Regulation at 9VAC25-740-180 states that when the monthly average flow into the reclamation system reaches 95% of the designated design capacity authorized by this permit for each month of any 3 consecutive month period, a written notice and a plan of action for ensuring continued compliance with the terms of this permit shall be submitted to the DEQ-NRO.

11. BNR Reopener. It is staff's best professional judgment that when the annual average concentration of total nitrogen (N) or total phosphorus (P) in the reclaimed water exceeds 8.0 mg/l or 1.0 mg/l, respectively, for the preceding calendar year (January through December), a written notice of such nutrient reduction failure and a plan of action for ensuring the reclamation system achieves BNR treatment of the reclaimed water shall be submitted by the permittee to the DEQ-NRO for review and approval. This condition, although not specifically stated in law or regulation, is intended to address those situations where the permittee's reclamation system or satellite reclamation system is unable to produce BNR reclaimed water as indicated in their permit application, and the additional nutrients in the non-BNR

reclaimed water are consequently unmanaged for irrigation reuses. The permittee has the option to correct treatment of the reclaimed water to achieve BNR or in the absence of any action, face possible enforcement action that may ultimately result in a staff initiated modification of the permit to add nutrient management requirements for irrigation reuse of the non-BNR reclaimed water.

12. Minimizing Losses. The Reuse and Reclamation Regulation at 9VAC25-740-110.B.9 and 9VAC25-740-100.C.1.a requires that the reclaimed water distribution system shall be maintained to minimize losses and to ensure safe and reliable conveyance of reclaimed water, such that the reclaimed water in the distribution system will not be degraded to a quality that violates the standards in this permit for the intended reuses of the reclaimed water specified in the approved Reclaimed Water Management (RWM) Plan.

13. Storage of Reject Water. The Reuse and Reclamation Regulation at 9VAC25-740-110 C.14 requires all storage facilities of reject water and reclaimed water (system and non-system), including landscape impoundments used for non-system storage of reclaimed water, shall be designed and operated to prevent a discharge to surface waters of the state except in the event of a storm greater than the 25-year 24-hour storm.

14. Freeboard. The Reuse and Reclamation Regulation at 9VAC25-740-110 C.14; 9VAC25-32-80.I.5 and 6; 9VAC25-31-190.L.5 through 7 requires the permittee to maintain a minimum freeboard of two feet at all times in the reject water and system storage facility.

15. Storage Inventory. The Reuse and Reclamation Regulation at 9VAC25-740-110 C.15 requires the permittee to maintain a current inventory of reject water storage, system storage and non-system storage facilities located within the service area of the approved RWM plan shall be maintained.

16. Preliminary engineering report. The Reuse and Reclamation Regulation at 9VAC25-740-120.A that a preliminary engineering report shall be submitted for new reclamation system, satellite reclamation system or reclaimed water distribution system; or for the modification or expansion of the same facilities where they already exist. At the request of the permittee, the DEQ-NRO may waive the need for a preliminary engineering report or portions of a preliminary engineering report.

17. CTC/CTO. The Reuse and Reclamation Regulation at 9VAC25-740-120.B.1 requires that the permittee shall not cause or allow the construction, expansion or modification, and the operation of the reclamation system except in compliance with a certificate to construct (CTC) and a certificate to operate (CTO), respectively, issued by the DEQ.

18. Public Access. The Reuse and Reclamation Regulation at 9VAC25-740-160.A states that there shall be no uncontrolled public access to the reclamation system.

19. Advisory Signs. The Reuse and Reclamation Regulation at 9VAC25-740-160.B and D requires advisory signs for all reuses of reclaimed water treated to Level 1.

20. Placement of Advisory Signs. The Reuse and Reclamation Regulation at 9VAC25-740-160.E states that advisory signs shall be posted adjacent to impoundments or ponds, including landscape impoundments, used for non-system storage of reclaimed water.

21. Advisory Signs for Industrial Sites. The Reuse and Reclamation Regulation at 9VAC25-740-160.F requires that advisory signs shall be posted around those areas of the industrial site where reclaimed water is used and at the main entrances to the industrial site to notify employees and the visiting public of the reclaimed water reuse. Access control beyond what is normally provided by the industry is not required.

22. Supplemental Irrigation and Salt Accumulation. The Reuse and Reclamation Regulation at 9VAC25-740-10 and 9VAC25-740-100.C.2 requires that all irrigation reuses of reclaimed water shall be supplemental irrigation, which in combination with rainfall, meets but does not exceed the water necessary to maximize production or optimize growth of the irrigated vegetation. This special condition also limits salt accumulation from supplemental irrigation.

23. Irrigation Requirements. The Reuse and Reclamation Regulation at 9VAC25-740-170.E requires the minimization for human contact, no application when the ground is saturated or frozen, or contact with drinking water fountains and coolers.

24. Overspray from Irrigation. The Reuse and Reclamation Regulation at 9VAC25-740-170.G prohibits overspray of surface waters, including wetlands, from irrigation or other reuses of reclaimed water.

25. Irrigation Setbacks. The Reuse and Reclamation Regulation at 9VAC25-740-170.H.1 and 2 requires minimum setbacks from potable water supply wells, non-potable wells, limestone outcrops, and sinkholes.

26. Irrigation Setback Waivers. The Reuse and Reclamation Regulation at 9VAC25-740-170.H.4 allows for a reduction of setback distances if the permittee receives approval from DEQ and meets the requirements of this special condition.

27. Multiple Setbacks. The Reuse and Reclamation Regulation at 9VAC25-740-170.H.5 requires that for irrigation reuses where more than one setback distance may apply, the greater setback distance shall govern.

28. Measurement of Setbacks. The Reuse and Reclamation Regulation at 9VAC25-740-170.H.6 requires all setback distances shall be measured horizontally.

29. Cooling Tower Spray. The Reuse and Reclamation Regulation at 9VAC25-740-90.A, footnote h, states that the windblown spray generated by once-through cooling or recirculating cooling towers shall not reach areas accessible to workers or the public unless Level 1 disinfection specified in 9VAC25-740 is provided.

30. Worker Contact. The Reuse and Reclamation Regulation at 9VAC25-740-90.A, footnote e states that worker contact shall be minimized.

31. Reclaimed Water Failure. The Reuse and Reclamation Regulation at 9VAC25-740-100.C.1.f, 9VAC25-740-170.A.2 and 9VAC25-740-200.B have specific requirements where treatment of the reclaimed water fails more than once during a seven-day period to comply with Level 1 disinfection.

32. New End Users. The Reuse and Reclamation Regulation at 9VAC25-740-100.C.8For the addition of new end users not contained in the original reclaimed water management (RWM) plan submitted with the application for a permit, the permittee shall submit to the DEQ-NRO an amendment to the RWM plan identifying new end users not less than 30 days prior to connection and reclaimed water service to these users. For each new end user, the permittee shall also provide all applicable information required by the Water Reclamation and Reuse Application Addendum.

33. Interruption of Reclaimed Water Supply. The Reuse and Reclamation Regulation at 9VAC25-740-200.B requires the interruption or loss of reclaimed water supply to be reported. It is staff's best professional judgment that specific information listed in the special condition is to be reported for such an occurrence.

34. Recordkeeping. The Reuse and Reclamation Regulation at 9VAC25-740-190.A and B requires recordkeeping specifically for the water reclamation system operation. This special condition specifies what is required in the records.

35. Annual Water Reclamation and Reuse Report. The Reuse and Reclamation Regulation at 9VAC25-740-200.C requires the permittee to submit an annual report for the reclaimed water distribution system covering a 12-month period from January 1 through December 31 to the DEQ-NRO on or before February 10 of the following year. This special condition includes the annual report requirements.

36. Determining Supplemental Irrigation Rates. The Reuse and Reclamation Regulation at 9VAC25-740-10 and 9VAC25-740-100.C.2 requires that all irrigation reuses of reclaimed water shall be supplemental irrigation, which in combination with rainfall, meets but does not exceed the water necessary to maximize production or optimize growth of the irrigated vegetation. This special condition requires the permittee to submit the method for calculating supplemental irrigation rates prior to initiating supplemental irrigation.

37. Notification of Fairfax Water. This special condition requires the permittee to have procedures in place to notify Fairfax Water of any release from the reclaimed water distribution system. This is based on staff's best professional judgment and the Virginia Department of Health recommendation because of the proximity of the intake for the water system.

ATTACHMENT 18

Public Notice – Environmental Permit

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

PUBLIC COMMENT PERIOD: XXX, 2016 to XXX, 2016

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

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Loudoun Water, PO Box 4000, Leesburg, VA 20146 VA0091383

NAME AND ADDRESS OF FACILITY: Broad Run Water Reclamation Facility, 44961 Loudoun Water Way, Ashburn, VA 20146

PROJECT DESCRIPTION: Loudoun Water has applied for a reissuance of a permit for the public Broad Run WRF. The applicant proposes to release treated sewage wastewaters from residential areas and flushing water from the reclaimed water distribution system at a rate of up to 22 million gallons per day from Outfall 001 and up to 0.0014 million gallons per day from Outfalls 002, 003, 004, 005 and 006 into a water body. The permit allows for the reuse of reclaimed wastewater for cooling water, fire protection, landscape irrigation, non-residential toilet flushing and non-potable water use at the Broad Run WRF. The sludge will be disposed by land application by an approved land applier. The facility proposes to release the treated sewage and flushing water in Broad Run and unnamed tributaries to Broad Run in Loudoun 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: Chemical Oxygen Demand, pH, Total Suspended Solids, BOD (reclaimed water), Total Kjeldahl Nitrogen, Total Nitrogen, Total Phosphorus, Turbidity, *E. coli*, Total Recoverable Zinc, and Total Residual Chlorine. The permittee shall monitor without limitation for Nitrate+Nitrite, Dissolved Zinc, Total Hardness Whole Effluent Toxicity, and Flow.

This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

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

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.
Name: Alison Thompson
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3834 E-mail: alison.thompson@deq.virginia.gov