Attachments

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D. USGS Topographic Map
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   - STATS Program Results
G. Regional Water Quality Model (Version 4.11)

Attachment A

Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
VDOT I-64 Rest Area, Alleghany County - #VA0075574

TO: Kevin Harlow, WCRO

FROM: VPDES Fact Sheet

DATE: March 5, 2013

COPIES: File

The VDOT I-64 Rest Area in Alleghany County discharges to the Jerrys Run near the West Virginia State line. Stream flow frequencies are required at this site for the purpose of calculating effluent limitations for the VPDES permit.

The VDEQ conducted several flow measurements on the Jerrys Run from 1995 to 2001. The measurements were made just above the discharge point as part of the site specific measurement program. The measurements correlated very well with the same day daily mean values from the continuous record gage on the Dunlap Creek near Covington, VA #02013000. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies at the measurement site/discharge point were calculated using the best fit line and the flow frequencies from the reference gage. The flow frequencies for the reference gage and the measurement site/discharge point are presented below:

Dunlap Creek near Covington, VA (#02013000):

Drainage Area = 164 mi^2

1Q10 = 10 cfs (6.46 MGD)	High Flow 1Q10 = 22 cfs (14.2 MGD)
7Q10 = 11 cfs (7.11 MGD)	High Flow 7Q10 = 26 cfs (16.8 MGD)
30Q5 = 14 cfs (9.04 MGD)	30Q10 = 13 cfs (8.40 MGD)
HM = 44 cfs (28.4 MGD)	1Q30 = 8.8 cfs (5.68 MGD)
	Annual Average = 170 CFS (110 MGD)

Jerrys Run at I-64 Rest Area, near Alleghany, VA (#02012900) at discharge point:

Drainage Area = 1.89 mi^2

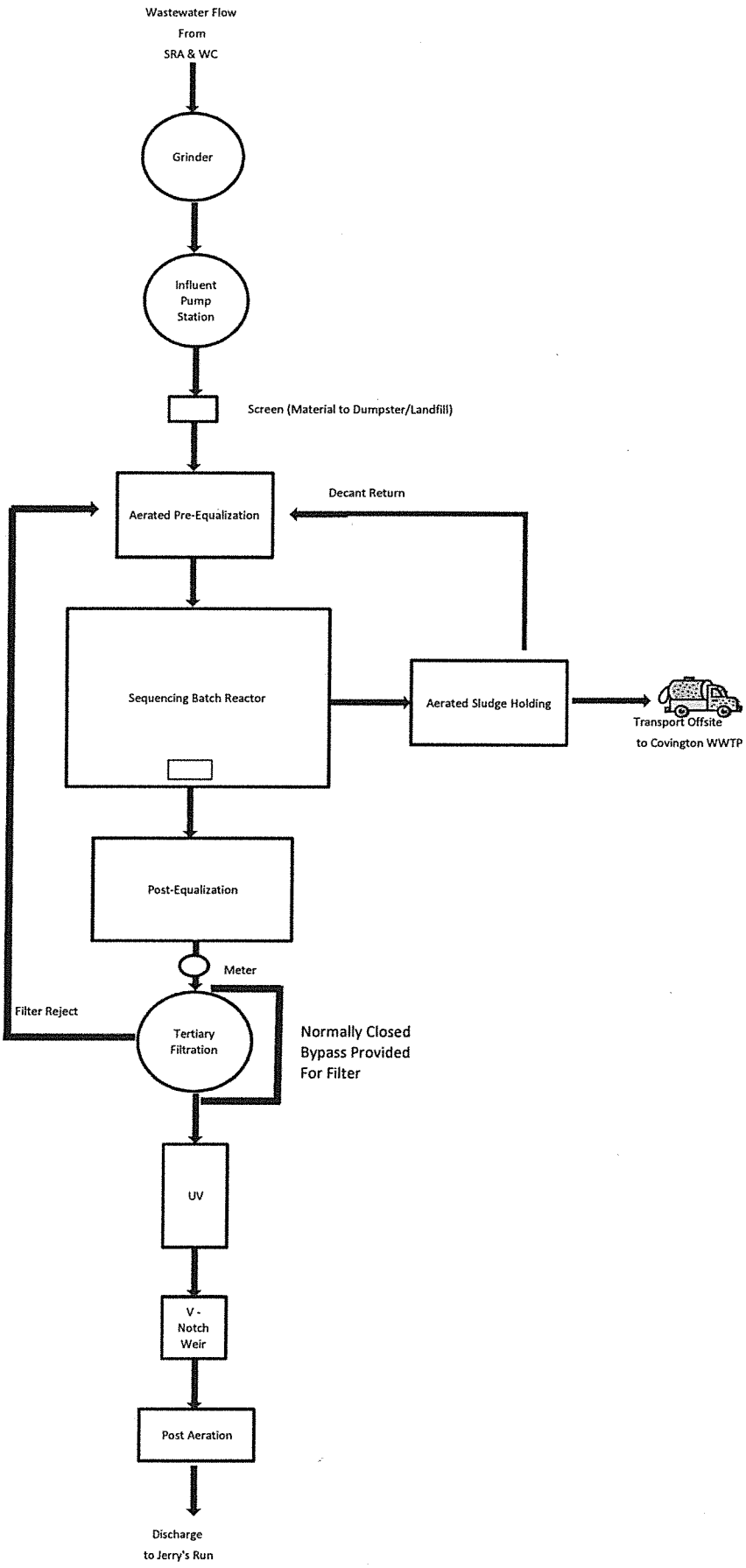
1Q10 = 0.000 cfs (0.000 MGD)	High Flow 1Q10 = 0.041 cfs (0.027 MGD)
7Q10 = 0.000 cfs (0.000 MGD)	High Flow 7Q10 = 0.057 cfs (0.037 MGD)
30Q5 = 0.017 cfs (0.011 MGD)	30Q10 = 0.015 cfs (0.010 MGD)
HM = 0.158 cfs (0.102 MGD)	1Q30 = 0.000 cfs (0.000 MGD)
	Annual Average = 15 CFS (9.7 MGD)

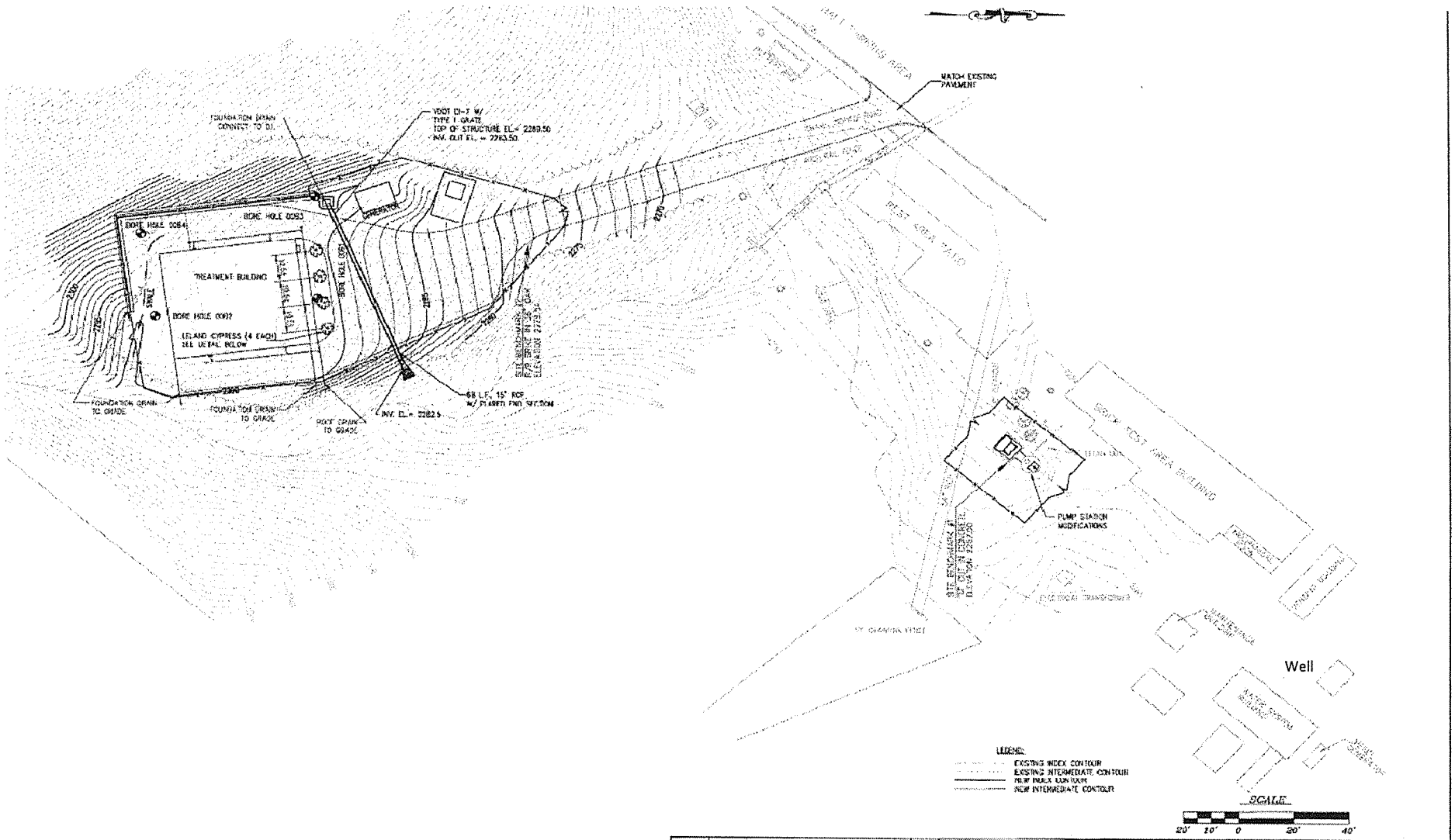
The high flow months are January through May.

Attachment B

Wastewater Treatment Diagrams

VIRGINIA DEPT. OF TRANSPORTATION
I-64 SRA ALLEGHANY CO. WWTP





REV. NO.	DATE	DESCRIPTION	BY
1	9/14/01	REVISED PER REVIEW COMMENTS	L.D.S.

REVISIONS

COMMONWEALTH OF VIRGINIA
TAYLOR F. TURNER, III
No. 17784
6-6-01
PROFESSIONAL ENGINEER

R. STUART ROYER & ASSOCIATES, INC.
CONSULTING ENGINEERS AND SURVEYORS
RICHMOND, VIRGINIA

VIRGINIA DEPARTMENT OF TRANSPORTATION
ALLEGHANY COUNTY I-64 REST AREA
WASTEWATER TREATMENT PLANT IMPROVEMENTS

SITE PLAN - GRADING

DATE: JUNE 2001
SCALE: 1" = 20'
DESIGNED: T.F.T.
DRAWN: L.D.S.
CHECKED:

DRAWING NO. 00251

SHEET 1 OF 35 SHEETS

Attachment C

Site Visit Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Site Visit Report for I-64 Rest Area - Alleghany County
Reissuance of VPDES Permit

TO: Permit File

FROM: Kevin A. Harlow, Environmental Engineer Senior

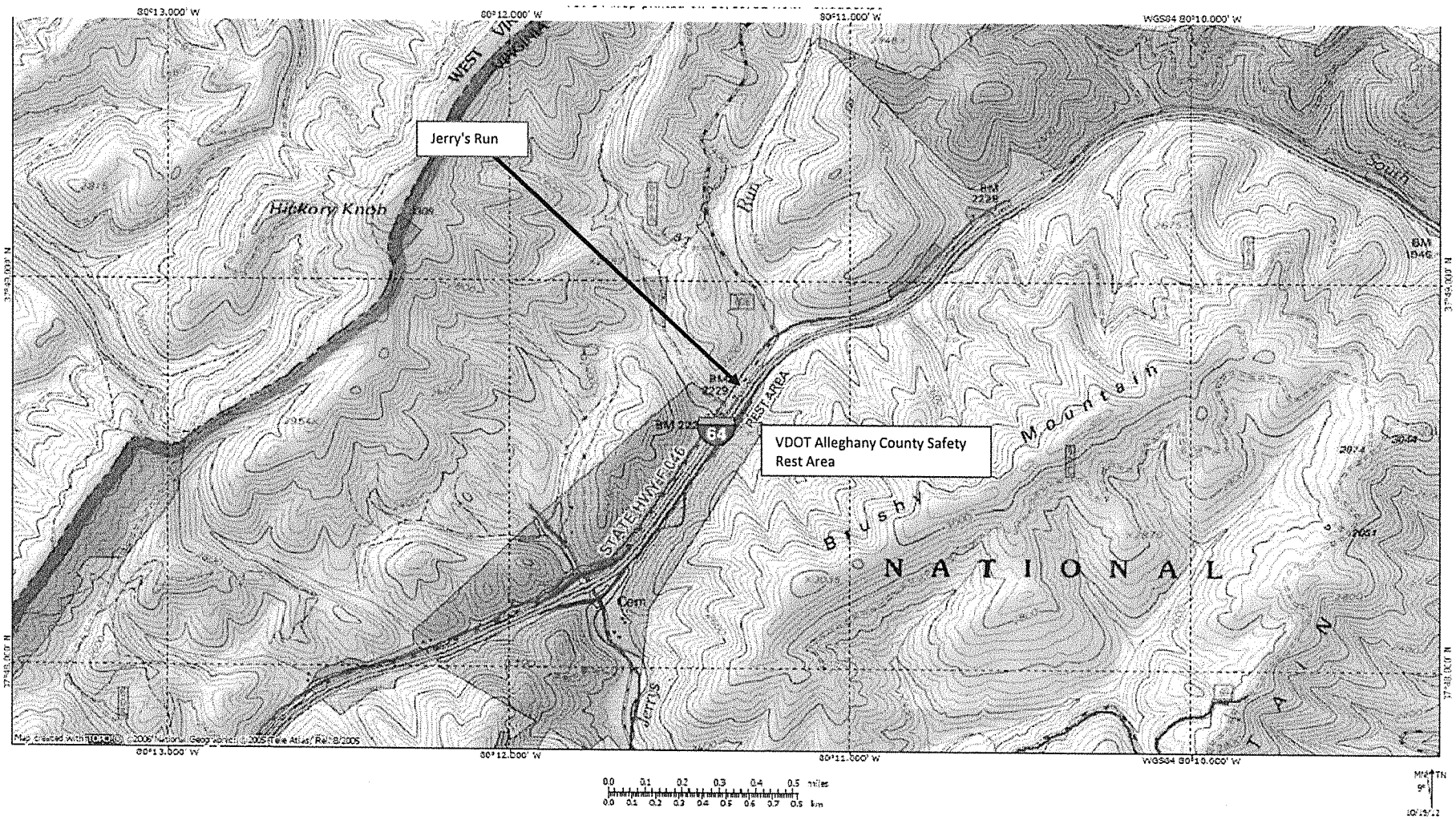
DATE: March 10, 2008

On March 10, 2008 I visited the I-64 Rest Area – Jerrys Run site for the purpose of ascertaining information required for the development of the VPDES permit for reissuance. The rest area is located on the eastbound lane side of I-64 just east of Exit 1. The existing 0.015 MGD treatment works consists of an SBR, sand filter, UV disinfection, and post-treatment aeration. The existing treatment works has been in operation since 2004. The treatment works is located within a separate building to the southwest of the primary rest area building. The treatment works is located within a fenced area for security and safety.

The effluent is conveyed to the other (North) side of I-64 and discharges into Jerrys Run, which at the discharge point flows between I-64 and the adjacent and parallel service road (Frontage Road). At the proposed discharge location, the stream was approximately 2.5 feet wide and approximately 6 inches deep. The creek bed was rectangular and characterized by small to medium rock. The stream bank was relatively shallow. The water appeared clear, and there was no evidence of algal or plant growth in the water. The stream is primarily linear but moderately meandered within the confines of I-64 and Frontage Road.

Attachment D

USGS Topographic Map


Jerry's Run
VDOT Alleghany County Safety Rest Area
Hickory Knob
WEST VIRGINIA
Run
South
Mountain
Bushy
NATIONAL
STATE HWY E 646
REST AREA
64
Cem
Jerrys
80°13.000' W
80°12.000' W
80°11.000' W
WGS84 80°10.000' W
37°49.000' N
37°48.000' N
0.0 0.1 0.2 0.3 0.4 0.5 miles
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 km
MN
GN
TN

Attachment E

Ambient Water Quality Information

- STORET Data (Station 2-DNP001.98)
- 2010 Integrated Report, 303(d) List (Excerpt)

VDOT I-64 Rest Area; VPDES Permit No. VA0075574; Discharge to Jerrys Run

Station_ID	Date	pH (s.u.)	Temp (C)	Flow Months
2-DNP001.98	1/3/1989	8.17	5	High Flow
2-DNP001.98	4/24/1989	8.78	15.2	High Flow
2-DNP001.98	1/2/1990	8.17	4.6	High Flow
2-DNP001.98	4/2/1990	8.27	13.5	High Flow
2-DNP001.98	1/2/1991	8.8	5.4	High Flow
2-DNP001.98	1/7/1992	8.8	4.3	High Flow
2-DNP001.98	4/6/1992	8.6	7	High Flow
2-DNP001.98	1/12/1993	7.7	6.6	High Flow
2-DNP001.98	4/7/1993	8.3	7.2	High Flow
2-DNP001.98	1/6/1994	8.4	1.6	High Flow
2-DNP001.98	4/5/1994	8.2	9.1	High Flow
2-DNP001.98	1/4/1995	8.6	1.8	High Flow
2-DNP001.98	4/4/1995	8.42	11.5	High Flow
2-DNP001.98	1/18/1996	8.06	6	High Flow
2-DNP001.98	4/23/1996	8.22	16.6	High Flow
2-DNP001.98	1/6/1997	8.22	8.5	High Flow
2-DNP001.98	4/7/1997	8.01	13.7	High Flow
2-DNP001.98	1/5/1998	7.87	3.3	High Flow
2-DNP001.98	4/8/1998	8.01	10.1	High Flow
2-DNP001.98	1/13/1999	7.94	3.3	High Flow
2-DNP001.98	4/7/1999	8.21	13.7	High Flow
2-DNP001.98	3/2/2000	6.6	9.5	High Flow
2-DNP001.98	3/27/2000	7	10	High Flow
2-DNP001.98	5/1/2000	7	13.6	High Flow
2-DNP001.98	2/6/2001	8.1	4.9	High Flow
2-DNP001.98	4/3/2001	8.1	7.9	High Flow
2-DNP001.98	1/12/2004	7.8	4.9	High Flow
2-DNP001.98	3/3/2004	7.7	7.5	High Flow
2-DNP001.98	5/4/2004	8	12	High Flow
2-DNP001.98	1/11/2005	8	6.9	High Flow
2-DNP001.98	3/15/2005	8	5.3	High Flow
2-DNP001.98	5/2/2005	8	10.4	High Flow
2-OGL004.32	3/2/2000	6.5	9	High Flow
2-OGL004.32	5/1/2000	7.4	14.5	High Flow
2-OGL004.32	2/6/2001	8.8	4.4	High Flow
2-OGL004.32	4/3/2001	8.2	7.3	High Flow
2-DNP001.98	10/5/1988	8.52	16.7	Low Flow
2-DNP001.98	7/5/1989	8.32	19.2	Low Flow
2-DNP001.98	10/25/1989	7.89	12.6	Low Flow
2-DNP001.98	7/2/1990	8.43	25.3	Low Flow
2-DNP001.98	11/5/1990		13.9	Low Flow
2-DNP001.98	7/2/1991			Low Flow
2-DNP001.98	10/1/1991	8.3	18.7	Low Flow
2-DNP001.98	10/8/1992	8.3	12.6	Low Flow
2-DNP001.98	7/12/1993	8.2	24	Low Flow
2-DNP001.98	10/18/1993	8.3	14.7	Low Flow
2-DNP001.98	7/6/1994	8.07	26.2	Low Flow
2-DNP001.98	10/26/1994	8.21	13.6	Low Flow
2-DNP001.98	7/11/1995	7.89	21.1	Low Flow
2-DNP001.98	10/3/1995	7.84	17.2	Low Flow
2-DNP001.98	7/9/1996		26.3	Low Flow
2-DNP001.98	10/1/1996			Low Flow
2-DNP001.98	7/28/1997	8.2	24.6	Low Flow
2-DNP001.98	10/16/1997	8	12.1	Low Flow
2-DNP001.98	7/16/1998	7.9	23.2	Low Flow
2-DNP001.98	10/28/1998	8.07	10.6	Low Flow
2-DNP001.98	7/6/1999	8.2	27	Low Flow
2-DNP001.98	9/1/1999	8	21.9	Low Flow
2-DNP001.98	11/2/1999	8.1	15	Low Flow
2-DNP001.98	12/2/1999	7.9	4.6	Low Flow
2-DNP001.98	8/8/2000	8.5	26.3	Low Flow
2-DNP001.98	12/11/2000	7.9	4.3	Low Flow
2-DNP001.98	6/7/2001	8.4	22.4	Low Flow
2-DNP001.98	7/22/2003	8.4	25	Low Flow
2-DNP001.98	9/2/2003	8.2	23.9	Low Flow
2-DNP001.98	11/13/2003	7.3	9.3	Low Flow
2-DNP001.98	7/7/2004	7.9	23.6	Low Flow
2-DNP001.98	9/15/2004	8.4	20	Low Flow
2-DNP001.98	11/8/2004	7.2	11.45	Low Flow
2-JED006.82	6/11/2002	6.45	16.46	Low Flow
2-OGL004.32	7/6/1999	8.1	29	Low Flow
2-OGL004.32	9/1/1999	8	23	Low Flow
2-OGL004.32	11/2/1999	7.8	14.5	Low Flow
2-OGL004.32	12/2/1999	7.5	7.3	Low Flow
2-OGL004.32	8/8/2000	7.7	21.4	Low Flow
2-OGL004.32	12/11/2000	7.6	6	Low Flow
2-OGL004.32	6/7/2001	7.6	18.2	Low Flow
2-OGL005.53	10/9/2001	7.85	11.6	Low Flow

	pH (s.u.)	Temp (C)	Flow Months
90%	8.69	13.7	High Flow
50%	8.03	8.2	High Flow
10%	7.20	3.8	High Flow
90%	8.40	26.2	Low Flow
50%	7.99	17.9	Low Flow
10%	7.57	9.1	Low Flow

Station_ID	Date	Hardness (mg/L CaCO3)
2-DNP001.98	10/5/1988	188
2-DNP001.98	1/3/1989	96
2-DNP001.98	4/24/1989	108
2-DNP001.98	7/5/1989	80
2-DNP001.98	10/25/1989	108
2-DNP001.98	1/2/1990	52
2-DNP001.98	4/2/1990	82
2-DNP001.98	7/2/1990	170
2-DNP001.98	11/5/1990	168
2-DNP001.98	1/2/1991	58
2-DNP001.98	7/2/1991	176
2-DNP001.98	10/1/1991	220
2-DNP001.98	1/7/1992	76
2-DNP001.98	4/6/1992	92
2-DNP001.98	10/8/1992	228
2-DNP001.98	1/12/1993	69
2-DNP001.98	4/7/1993	78
2-DNP001.98	7/12/1993	156
2-DNP001.98	10/18/1993	432
2-DNP001.98	1/6/1994	106
2-DNP001.98	4/5/1994	76
2-DNP001.98	7/6/1994	189
2-DNP001.98	10/26/1994	235
2-DNP001.98	1/4/1995	206
2-DNP001.98	4/4/1995	116
2-DNP001.98	7/11/1995	116
2-DNP001.98	10/3/1995	217
2-DNP001.98	1/18/1996	37
2-DNP001.98	4/23/1996	120
2-DNP001.98	7/9/1996	148
2-DNP001.98	10/1/1996	146
2-DNP001.98	1/6/1997	99
2-DNP001.98	4/7/1997	99
2-DNP001.98	7/28/1997	181
2-DNP001.98	10/16/1997	218
2-DNP001.98	1/5/1998	80
2-DNP001.98	4/8/1998	68
2-DNP001.98	7/16/1998	35
2-DNP001.98	10/28/1998	234
2-DNP001.98	1/13/1999	124
2-DNP001.98	4/7/1999	100
2-DNP001.98	7/6/1999	201
2-DNP001.98	9/1/1999	204
2-DNP001.98	12/2/1999	118
2-DNP001.98	3/27/2000	73
2-DNP001.98	5/1/2000	72
2-DNP001.98	8/8/2000	99
2-DNP001.98	12/11/2000	152
2-DNP001.98	2/6/2001	91
2-DNP001.98	4/3/2001	47
2-DNP001.98	6/7/2001	121
2-JED006.82	6/11/2002	23
2-OGL004.32	7/6/1999	39
2-OGL004.32	9/1/1999	40
2-OGL004.32	12/2/1999	22
2-OGL004.32	3/2/2000	17
2-OGL004.32	5/1/2000	12
2-OGL004.32	8/8/2000	22
2-OGL004.32	2/6/2001	15
2-OGL004.32	4/3/2001	28
2-OGL004.32	6/7/2001	20
2-OGL005.53	10/9/2001	18
	Average=	113

2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

James River Basin

Fact Sheet prepared for DCR Watershed: I07*

Cause Group Code: **I07R-01-BAC** **Dunlap Creek**

Location: Dunlap Creek mainstem waters from the confluence of Ogle Creek downstream to the Dunlap Creek mouth on the Jackson River.

City / County: Alleghany Co.

Use(s): Recreation

Cause(s) / VA Category: Escherichia coli/ 5A

2-DNP001.98- (Bridge above Boys Home) The 2010 and 2008 Integrated Reports (IR) find two of 11 escherichia coli (E.coli) samples exceed the 235 cfu/100 ml instantaneous criterion for this 2006 6.31 mile 303(d) Listed stream. Each exceeding value is 320 and 400 cfu/100 ml. There are no additional data beyond the 2008 IR.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I07R_DNP01A00 / Dunlap Creek / Dunlap Creek mainstem from its mouth on the Jackson River upstream to the Boys Home water intake.	5A Escherichia coli		2006	2018	2.54
VAW-I07R_DNP02A00 / Dunlap Creek / Dunlap Creek from the Boys Home water intake upstream to the mouth of Ogle Creek, a WQS public water supply designated section.	5A Escherichia coli		2006	2018	3.77

Dunlap Creek **DCR Watershed: I07***	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
Escherichia coli - Total Impaired Size by Water Type:			**6.31**

Sources:

- Livestock (Grazing or Feeding Operations)
- On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
- Unspecified Domestic Waste
- Wildlife Other than Waterfowl

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

Attachment F

Wasteload and Limit Calculations

- Mixing Zone Calculations (MIXER)
- Wasteload Allocation Spreadsheet
- STATS Program Results

VDOT I-64 Rest Area - VA0075574
Effluent NH3 and TKN

Due Date	NH3, Jan-May (mg/L)
10-May-2008	0
10-Jun-2008	0
10-Feb-2009	0
10-Mar-2009	0
10-Apr-2009	0.6
10-May-2009	0.457
10-Jun-2009	0
10-Feb-2010	0
10-Mar-2010	0
10-Apr-2010	0
10-May-2010	0
10-Jun-2010	0
10-Feb-2011	0.4
10-Mar-2011	0
10-Apr-2011	2.9
10-May-2011	0
10-Jun-2011	0
10-Feb-2012	0
10-Mar-2012	0
10-Apr-2012	0
10-May-2012	0
10-Jun-2012	0
10-Feb-2013	0

Due Date	NH3 Jun-Dec (mg/L)	TKN, Jun-Dec (mg/L)
10-Jul-2008	0	0
10-Aug-2008	0	0
10-Sep-2008	0.713	1.07
10-Oct-2008	0	0
10-Nov-2008	0	1.13
10-Dec-2008	0	0
10-Jan-2009	0	1.66
10-Jul-2009	0.249	1.3
10-Aug-2009	0.228	1.66
10-Sep-2009	0	1.16
10-Oct-2009	0	1.81
10-Nov-2009	0	1.18
10-Dec-2009	0	1.07
10-Jan-2010	0	1.01
10-Jul-2010	0	1.42
10-Aug-2010	0	0
10-Sep-2010	1.25	2.73
10-Oct-2010	0	0
10-Nov-2010	0	1.05
10-Dec-2010	0	0
10-Jan-2011	0	0
10-Jul-2011	0	0
10-Aug-2011	0	0
10-Sep-2011	0.34	0.56
10-Oct-2011	0	0
10-Nov-2011	0	0
10-Dec-2011	0	0
10-Jan-2012	0	0
10-Jul-2012	0	0
10-Aug-2012	0	0
10-Sep-2012	0	0
10-Oct-2012	1.32	0
10-Nov-2012	0	0
10-Dec-2012	0	0
10-Jan-2013	0	0

VDOT I-64 Rest Area - VA0075574
Effluent Metals Data

Due Date	Zinc (ug/L)	Cu (ug/L)
10-May-2008	26	0
10-Jun-2008	0	0
10-Jul-2008	134	14
10-Aug-2008	0	12
10-Sep-2008	0	0
10-Oct-2008	399	19
10-Nov-2008	0	0
10-Dec-2008	30	7
10-Jan-2009	0	10
10-Feb-2009	42	8
10-Mar-2009	57	5
10-Apr-2009	0	0
10-May-2009	20	0
10-Jun-2009	58	0
10-Jul-2009	201	9
10-Aug-2009	101	8
10-Sep-2009	214	13
10-Oct-2009	31	9
10-Nov-2009	34	6
10-Dec-2009	129	5
10-Jan-2010	0	0
10-Feb-2010	0	5
10-Mar-2010	21	0
10-Apr-2010	0	0
10-May-2010	32	0
10-Jun-2010	23	0
10-Jul-2010	76	14
10-Aug-2010	32	0
10-Sep-2010	240	15

Due Date	Zinc (ug/L)	Cu (ug/L)
10-Oct-2010	22	6
10-Nov-2010	35	8
10-Dec-2010	89	8
10-Jan-2011	30	7
10-Feb-2011	48	6.7
10-Mar-2011	0	0
10-Apr-2011	0	0
10-May-2011	0	0
10-Jun-2011	0	0
10-Jul-2011	127	0
10-Aug-2011	40	0
10-Sep-2011	0	0
10-Oct-2011	91	0
10-Nov-2011	0	0
10-Dec-2011	0	0
10-Jan-2012	0	0
10-Feb-2012	0	0
10-Mar-2012	0	0
10-Apr-2012	0	0
10-May-2012	0	0
10-Jun-2012	33	0
10-Jul-2012	24.5	0
10-Aug-2012	65.7	0
10-Sep-2012	62.9	5.3
10-Oct-2012	0	0
10-Nov-2012	27.2	0
10-Dec-2012	28.1	0
10-Jan-2013	23.3	0
10-Feb-2013	25.3	0

Mixing Zone Predictions for VDOT I-64 Rest Area

Effluent Flow = 0.015 MGD
Stream 7Q10 = 0.037 MGD
Stream 30Q10 = 0.01 MGD
Stream 1Q10 = 0.027 MGD
Stream slope = 6 ft/ft
Stream width = 4 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .0118 ft
Length = 616.88 ft
Velocity = 1.71 ft/sec
Residence Time = .0042 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = .0076 ft
Length = 891.31 ft
Velocity = 1.2768 ft/sec
Residence Time = .0081 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = .0103 ft
Length = 687.15 ft
Velocity = 1.5704 ft/sec
Residence Time = .1215 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: VDOT I-64 Rest Area

Permit No.: VA0075574

Receiving Stream: Jerrys Run

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	113	mg/L
90% Temperature (Annual) =	26.2	deg C
90% Temperature (Wet season) =	13.7	deg C
90% Maximum pH =	8.55	SU
10% Maximum pH =	7.4	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	N	
Trout Present Y/N? =	Y	
Early Life Stages Present Y/N? =	N	

Stream Flows

1Q10 (Annual) =	0	MGD
7Q10 (Annual) =	0	MGD
30Q10 (Annual) =	0.01	MGD
1Q10 (Wet season) =	0.027	MGD
30Q10 (Wet season)	0.01	MGD
30Q5 =	0.011	MGD
Harmonic Mean =	0.102	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) =	200	mg/L
90% Temp (Annual) =	19.5	deg C
90% Temp (Wet season) =	15.3	deg C
90% Maximum pH =	7.5	SU
10% Maximum pH =	7	SU
Discharge Flow =	0.015	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	5	--	--	na	9.9E+02	--	--	na	1.7E+03	--	--	na	1.0E+02	--	--	na	1.8E+02	--	--	na	1.8E+02
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.6E+01	--	--	na	9.3E-01	--	--	na	1.6E+00	--	--	na	1.6E+00
Acrylonitrile[c]	0	--	--	na	2.5E+00	--	--	na	2.0E+01	--	--	na	2.5E-01	--	--	na	2.0E+00	--	--	na	2.0E+00
Aldrin[c]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	3.9E-03	7.5E-01	--	na	5.0E-05	7.5E-01	--	na	3.9E-04	7.5E-01	--	na	3.9E-04
Ammonia-N (mg/l) (Yearly)	0	1.33E+01	2.19E+00	na	--	1.33E+01	3.65E+00	na	--	3.32E+00	5.48E-01	na	--	3.32E+00	9.13E-01	na	--	3.32E+00	9.13E-01	na	--
Ammonia-N (mg/l) (High Flow)	0	6.99E+00	3.56E+00	na	--	1.96E+01	5.93E+00	na	--	1.75E+00	8.90E-01	na	--	4.89E+00	1.48E+00	na	--	4.89E+00	1.48E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	6.9E+04	--	--	na	4.0E+03	--	--	na	6.9E+03	--	--	na	6.9E+03
Antimony	0.12	--	--	na	6.4E+02	--	--	na	1.1E+03	--	--	na	6.4E+01	--	--	na	1.1E+02	--	--	na	1.1E+02
Arsenic	0.45	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	8.5E+01	3.8E+01	na	--	8.5E+01	3.8E+01	na	--	8.5E+01	3.8E+01	na	--
Barium	52	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene[c]	0	--	--	na	5.1E+02	--	--	na	4.0E+03	--	--	na	5.1E+01	--	--	na	4.0E+02	--	--	na	4.0E+02
Benzidine[c]	0	--	--	na	2.0E-03	--	--	na	1.6E-02	--	--	na	2.0E-04	--	--	na	1.6E-03	--	--	na	1.6E-03
Benzo (a) anthracene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Benzo (b) fluoranthene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Benzo (k) fluoranthene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Benzo (a) pyrene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Bis2-Chloroethyl Ether[c]	0	--	--	na	5.3E+00	--	--	na	4.1E+01	--	--	na	5.3E-01	--	--	na	4.1E+00	--	--	na	4.1E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.1E+05	--	--	na	6.5E+03	--	--	na	1.1E+04	--	--	na	1.1E+04
Bis 2-Ethylhexyl Phthalate[c]	0	--	--	na	2.2E+01	--	--	na	1.7E+02	--	--	na	2.2E+00	--	--	na	1.7E+01	--	--	na	1.7E+01
Bromoform[c]	0	--	--	na	1.4E+03	--	--	na	1.1E+04	--	--	na	1.4E+02	--	--	na	1.1E+03	--	--	na	1.1E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.3E+03	--	--	na	1.9E+02	--	--	na	3.3E+02	--	--	na	3.3E+02
Cadmium	0	8.6E+00	2.0E+00	na	--	8.6E+00	2.0E+00	na	--	2.1E+00	4.9E-01	na	--	2.1E+00	4.9E-01	na	--	2.1E+00	4.9E-01	na	--
Carbon Tetrachloride[c]	0	--	--	na	1.6E+01	--	--	na	1.2E+02	--	--	na	1.6E+00	--	--	na	1.2E+01	--	--	na	1.2E+01
Chlordane[c]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	6.3E-02	6.0E-01	1.1E-03	na	8.1E-04	6.0E-01	1.1E-03	na	6.3E-03	6.0E-01	1.1E-03	na	6.3E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	2.2E+05	5.8E+04	na	--	2.2E+05	5.8E+04	na	--	2.2E+05	5.8E+04	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	4.8E+00	2.8E+00	na	--	4.8E+00	2.8E+00	na	--	4.8E+00	2.8E+00	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	2.8E+03	--	--	na	1.6E+02	--	--	na	2.8E+02	--	--	na	2.8E+02

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[c]	0	--	--	na	1.3E+02	--	--	na	1.0E+03	--	--	na	1.3E+01	--	--	na	1.0E+02	--	--	na	1.0E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.9E+04	--	--	na	1.1E+03	--	--	na	1.9E+03	--	--	na	1.9E+03
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	2.8E+03	--	--	na	1.6E+02	--	--	na	2.8E+02	--	--	na	2.8E+02
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	2.6E+02	--	--	na	1.5E+01	--	--	na	2.6E+01	--	--	na	2.6E+01
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	2.1E-02	1.0E-02	na	--	2.1E-02	1.0E-02	na	--	2.1E-02	1.0E-02	na	--
Chromium III	0	1.0E+03	1.3E+02	na	--	1.0E+03	1.3E+02	na	--	2.5E+02	3.3E+01	na	--	2.5E+02	3.3E+01	na	--	2.5E+02	3.3E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	4.0E+00	2.8E+00	na	--	4.0E+00	2.8E+00	na	--	4.0E+00	2.8E+00	na	--
Chromium, Total	0.13	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	1.7E+01	--	--	--	na	--
Chrysene[c]	0	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.8E-03	--	--	na	1.4E-02	--	--	na	1.4E-02
Copper	0.22	2.6E+01	1.6E+01	na	--	2.6E+01	1.6E+01	na	--	6.6E+00	4.2E+00	na	--	6.6E+00	4.2E+00	na	--	6.6E+00	4.2E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	2.8E+04	5.5E+00	1.3E+00	na	1.6E+03	5.5E+00	1.3E+00	na	2.8E+03	5.5E+00	1.3E+00	na	2.8E+03
DDD[c]	0	--	--	na	3.1E-03	--	--	na	2.4E-02	--	--	na	3.1E-04	--	--	na	2.4E-03	--	--	na	2.4E-03
DDE[c]	0	--	--	na	2.2E-03	--	--	na	1.7E-02	--	--	na	2.2E-04	--	--	na	1.7E-03	--	--	na	1.7E-03
DDT[c]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	1.7E-02	2.8E-01	2.5E-04	na	2.2E-04	2.8E-01	2.5E-04	na	1.7E-03	2.8E-01	2.5E-04	na	1.7E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	4.3E-02	4.3E-02	na	--	4.3E-02	4.3E-02	na	--	4.3E-02	4.3E-02	na	--
Dibenz(a,h)anthracene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.3E+03	--	--	na	1.3E+02	--	--	na	2.3E+02	--	--	na	2.3E+02
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.7E+03	--	--	na	9.6E+01	--	--	na	1.7E+02	--	--	na	1.7E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.3E+02	--	--	na	1.9E+01	--	--	na	3.3E+01	--	--	na	3.3E+01
3,3-Dichlorobenzidine[c]	0	--	--	na	2.8E-01	--	--	na	2.2E+00	--	--	na	2.8E-02	--	--	na	2.2E-01	--	--	na	2.2E-01
Dichlorobromomethane[c]	0	--	--	na	1.7E+02	--	--	na	1.3E+03	--	--	na	1.7E+01	--	--	na	1.3E+02	--	--	na	1.3E+02
1,2-Dichloroethane[c]	0	--	--	na	3.7E+02	--	--	na	2.9E+03	--	--	na	3.7E+01	--	--	na	2.9E+02	--	--	na	2.9E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.2E+04	--	--	na	7.1E+02	--	--	na	1.2E+03	--	--	na	1.2E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.7E+04	--	--	na	1.0E+03	--	--	na	1.7E+03	--	--	na	1.7E+03
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.0E+02	--	--	na	2.9E+01	--	--	na	5.0E+01	--	--	na	5.0E+01
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane[c]	0	--	--	na	1.5E+02	--	--	na	1.2E+03	--	--	na	1.5E+01	--	--	na	1.2E+02	--	--	na	1.2E+02
1,3-Dichloropropene[c]	0	--	--	na	2.1E+02	--	--	na	1.6E+03	--	--	na	2.1E+01	--	--	na	1.6E+02	--	--	na	1.6E+02
Dieldrin[c]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	4.2E-03	6.0E-02	1.4E-02	na	5.4E-05	6.0E-02	1.4E-02	na	4.2E-04	6.0E-02	1.4E-02	na	4.2E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	7.6E+04	--	--	na	4.4E+03	--	--	na	7.6E+03	--	--	na	7.6E+03
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.5E+03	--	--	na	8.5E+01	--	--	na	1.5E+02	--	--	na	1.5E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.9E+06	--	--	na	1.1E+05	--	--	na	1.9E+05	--	--	na	1.9E+05
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	7.8E+03	--	--	na	4.5E+02	--	--	na	7.8E+02	--	--	na	7.8E+02
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	9.2E+03	--	--	na	5.3E+02	--	--	na	9.2E+02	--	--	na	9.2E+02
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	4.9E+02	--	--	na	2.8E+01	--	--	na	4.9E+01	--	--	na	4.9E+01
2,4-Dinitrotoluene[c]	0	--	--	na	3.4E+01	--	--	na	2.7E+02	--	--	na	3.4E+00	--	--	na	2.7E+01	--	--	na	2.7E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	8.8E-08	--	--	na	5.1E-09	--	--	na	8.8E-09	--	--	na	8.8E-09
1,2-Diphenylhydrazine[c]	0	--	--	na	2.0E+00	--	--	na	1.6E+01	--	--	na	2.0E-01	--	--	na	1.6E+00	--	--	na	1.6E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	1.5E+02	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	1.5E+01	5.5E-02	1.4E-02	na	1.5E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	1.5E+02	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	1.5E+01	5.5E-02	1.4E-02	na	1.5E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	5.5E-02	1.4E-02	--	--	5.5E-02	1.4E-02	--	--	5.5E-02	1.4E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.5E+02	--	--	na	8.9E+00	--	--	na	1.5E+01	--	--	na	1.5E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	1.0E-01	2.2E-02	9.0E-03	na	6.0E-03	2.2E-02	9.0E-03	na	1.0E-02	2.2E-02	9.0E-03	na	1.0E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	5.2E-01	--	--	na	3.0E-02	--	--	na	5.2E-02	--	--	na	5.2E-02

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	3.6E+03	--	--	na	2.1E+02	--	--	na	3.6E+02	--	--	na	3.6E+02
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.4E+02	--	--	na	1.4E+01	--	--	na	2.4E+01	--	--	na	2.4E+01
Fluorene	0	--	--	na	5.3E+03	--	--	na	9.2E+03	--	--	na	5.3E+02	--	--	na	9.2E+02	--	--	na	9.2E+02
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	2.5E-03	na	--	--	2.5E-03	na	--	--	2.5E-03	na	--
Heptachlor[c]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	6.2E-03	1.3E-01	9.5E-04	na	7.9E-05	1.3E-01	9.5E-04	na	6.2E-04	1.3E-01	9.5E-04	na	6.2E-04
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.0E-03	1.3E-01	9.5E-04	na	3.9E-05	1.3E-01	9.5E-04	na	3.0E-04	1.3E-01	9.5E-04	na	3.0E-04
Hexachlorobenzene[c]	0	--	--	na	2.9E-03	--	--	na	2.3E-02	--	--	na	2.9E-04	--	--	na	2.3E-03	--	--	na	2.3E-03
Hexachlorobutadiene[c]	0	--	--	na	1.8E+02	--	--	na	1.4E+03	--	--	na	1.8E+01	--	--	na	1.4E+02	--	--	na	1.4E+02
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	na	4.9E-02	--	--	na	3.8E-01	--	--	na	4.9E-03	--	--	na	3.8E-02	--	--	na	3.8E-02
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	na	1.7E-01	--	--	na	1.3E+00	--	--	na	1.7E-02	--	--	na	1.3E-01	--	--	na	1.3E-01
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.4E+01	2.4E-01	--	na	1.8E-01	2.4E-01	--	na	1.4E+00	2.4E-01	--	na	1.4E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.9E+03	--	--	na	1.1E+02	--	--	na	1.9E+02	--	--	na	1.9E+02
Hexachloroethane[c]	0	--	--	na	3.3E+01	--	--	na	2.6E+02	--	--	na	3.3E+00	--	--	na	2.6E+01	--	--	na	2.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	5.0E-01	na	--	--	5.0E-01	na	--	--	5.0E-01	na	--
Indeno (1,2,3-cd) pyrene[c]	0	--	--	na	1.8E-01	--	--	na	1.4E+00	--	--	na	1.8E-02	--	--	na	1.4E-01	--	--	na	1.4E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone[c]	0	--	--	na	9.6E+03	--	--	na	7.5E+04	--	--	na	9.6E+02	--	--	na	7.5E+03	--	--	na	7.5E+03
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	2.9E+02	3.3E+01	na	--	2.9E+02	3.3E+01	na	--	7.2E+01	8.2E+00	na	--	7.2E+01	8.2E+00	na	--	7.2E+01	8.2E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--
Manganese	20	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.7E-01	- -	- -	3.5E-01	1.9E-01	- -	--	3.5E-01	1.9E-01	- -	--	3.5E-01	1.9E-01	- -	- -
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	2.6E+03	--	--	na	1.5E+02	--	--	na	2.6E+02	--	--	na	2.6E+02
Methylene Chloride[c]	0	--	--	na	5.9E+03	--	--	na	4.6E+04	--	--	na	5.9E+02	--	--	na	4.6E+03	--	--	na	4.6E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	7.5E-03	na	--	--	7.5E-03	na	--	--	7.5E-03	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Nickel	0.38	3.3E+02	3.6E+01	na	4.6E+03	3.3E+02	3.6E+01	na	8.0E+03	8.2E+01	9.4E+00	na	4.6E+02	8.2E+01	9.4E+00	na	8.0E+02	8.2E+01	9.4E+00	na	8.0E+02
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.2E+03	--	--	na	6.9E+01	--	--	na	1.2E+02	--	--	na	1.2E+02
N-Nitrosodimethylamine[c]	0	--	--	na	3.0E+01	--	--	na	2.3E+02	--	--	na	3.0E+00	--	--	na	2.3E+01	--	--	na	2.3E+01
N-Nitrosodiphenylamine[c]	0	--	--	na	6.0E+01	--	--	na	4.7E+02	--	--	na	6.0E+00	--	--	na	4.7E+01	--	--	na	4.7E+01
N-Nitrosodi-n-propylamine[c]	0	--	--	na	5.1E+00	--	--	na	4.0E+01	--	--	na	5.1E-01	--	--	na	4.0E+00	--	--	na	4.0E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	7.0E+00	1.7E+00	--	--	7.0E+00	1.7E+00	--	--	7.0E+00	1.7E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	1.6E-02	3.3E-03	na	--	1.6E-02	3.3E-03	na	--	1.6E-02	3.3E-03	na	--
PCB Total[c]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	5.0E-03	--	3.5E-03	na	6.4E-05	--	3.5E-03	na	5.0E-04	--	3.5E-03	na	5.0E-04
Pentachlorophenol[c]	0	8.7E+00	6.7E+00	na	3.0E+01	8.7E+00	6.7E+00	na	2.3E+02	2.2E+00	1.7E+00	na	3.0E+00	2.2E+00	1.7E+00	na	2.3E+01	2.2E+00	1.7E+00	na	2.3E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.5E+06	--	--	na	8.6E+04	--	--	na	1.5E+05	--	--	na	1.5E+05
Pyrene	0	--	--	na	4.0E+03	--	--	na	6.9E+03	--	--	na	4.0E+02	--	--	na	6.9E+02	--	--	na	6.9E+02
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	7.3E+03	5.0E+00	1.3E+00	na	4.2E+02	5.0E+00	1.3E+00	na	7.3E+02	**5.0E+00**	**1.3E+00**	**na**	**7.3E+02**
Silver	0	1.1E+01	--	na	--	1.1E+01	--	na	--	2.8E+00	--	na	--	2.8E+00	--	na	--	**2.8E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[c]	0	--	--	na	4.0E+01	--	--	na	3.1E+02	--	--	na	4.0E+00	--	--	na	3.1E+01	**--**	**--**	**na**	**3.1E+01**
Tetrachloroethylene[c]	0	--	--	na	3.3E+01	--	--	na	2.6E+02	--	--	na	3.3E+00	--	--	na	2.6E+01	**--**	**--**	**na**	**2.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	8.1E-01	--	--	na	4.7E-02	--	--	na	8.1E-02	**--**	**--**	**na**	**8.1E-02**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.0E+04	--	--	na	6.0E+02	--	--	na	1.0E+03	**--**	**--**	**na**	**1.0E+03**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene[c]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.2E-02	1.8E-01	5.0E-05	na	2.8E-04	1.8E-01	5.0E-05	na	2.2E-03	**1.8E-01**	**5.0E-05**	**na**	**2.2E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	1.2E-01	1.8E-02	na	--	1.2E-01	1.8E-02	na	--	**1.2E-01**	**1.8E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.2E+02	--	--	na	7.0E+00	--	--	na	1.2E+01	**--**	**--**	**na**	**1.2E+01**
1,1,2-Trichloroethane[c]	0	--	--	na	1.6E+02	--	--	na	1.2E+03	--	--	na	1.6E+01	--	--	na	1.2E+02	**--**	**--**	**na**	**1.2E+02**
Trichloroethylene[c]	0	--	--	na	3.0E+02	--	--	na	2.3E+03	--	--	na	3.0E+01	--	--	na	2.3E+02	**--**	**--**	**na**	**2.3E+02**
2,4,6-Trichlorophenol[c]	0	--	--	na	2.4E+01	--	--	na	1.9E+02	--	--	na	2.4E+00	--	--	na	1.9E+01	**--**	**--**	**na**	**1.9E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[c]	0	--	--	na	2.4E+01	--	--	na	1.9E+02	--	--	na	2.4E+00	--	--	na	1.9E+01	**--**	**--**	**na**	**1.9E+01**
Zinc	2.2	2.1E+02	2.1E+02	na	2.6E+04	2.1E+02	2.1E+02	na	4.5E+04	5.4E+01	5.5E+01	na	2.6E+03	5.4E+01	5.5E+01	na	4.5E+03	**5.4E+01**	**5.5E+01**	**na**	**4.5E+03**

Notes:

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

Metal	Target Value (SSTV)
Antimony	1.1E+02
Arsenic	2.3E+01
Barium	na
Cadmium	2.9E-01
Chromium III	2.0E+01
Chromium VI	1.6E+00
Copper	2.5E+00
Iron	na
Lead	4.9E+00
Manganese	na
Mercury	1.2E-01
Nickel	5.6E+00
Selenium	7.5E-01
Silver	1.1E+00
Zinc	2.2E+01

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

3/12/2013 10:48:01 AM

Facility = VDOT I-64 Annual
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 3.32
WLAc = 0.913
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.84213279528909
Average Weekly limit = 1.84213279528909
Average Monthly LImit = 1.84213279528909

The data are:

9

3/12/2013 10:48:59 AM

Facility = VDOT I-64 High-Flow
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 4.89
WLAc = 1.48
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.98615173825614
Average Weekly limit = 2.98615173825614
Average Monthly LImit = 2.98615173825614

The data are:

9

3/6/2008 2:27:39 PM

Facility = VDOT I-64 Rest Area
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 19
WLAc = 11
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 100
Variance = 3600
C.V. = 0.6
97th percentile daily values = 243.341
97th percentile 4 day average = 166.379
97th percentile 30 day average= 120.605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 16.0883226245856
Average Weekly limit = 9.59676626920107
Average Monthly LImit = 7.9737131838758

The data are:

100

3/6/2008 4:24:20 PM

Facility = VDOT I-64 Rest Area
Chemical = Copper
Chronic averaging period = 4
WLAa = 26
WLAc = 16
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 9.29854
Variance = 31.1266
C.V. = 0.6
97th percentile daily values = 22.6272
97th percentile 4 day average = 15.4708
97th percentile 30 day average= 11.2145
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

10
18
15
23
15
0
12
15
12
0

3/6/2008 4:25:50 PM

Facility = VDOT I-64 Rest Area
Chemical = Zinc
Chronic averaging period = 4
WLAa = 210
WLAc = 210
Q.L. = 20
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 9
Expected Value = 25.3608
Variance = 231.541
C.V. = 0.6
97th percentile daily values = 61.7135
97th percentile 4 day average = 42.1951
97th percentile 30 day average= 30.5865
< Q.L. = 4
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0
69.1
30
67.5
0
0
65
100
0

Attachment G

Regional Water Quality Model (v4.11)

```
"Model Run For C:\Users\pvu61777\Documents\000_kaharlow\VDOT I64 Alleghany -
VA0075574\VA0075574_13\Technical\DO Model - Low Flow2.mod On 3/12/2013 10:55:48 AM"

"Model is for JERRYS RUN."
"Model starts at the I-64 REST AREA - ALLEGHANY COUNTY discharge."

"Background Data"
"7Q10",  "cBOD5",  "TKN",     "DO",      "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0,       2,        0,        6.811,    26

"Discharge/Tributary Input Data for Segment 1"
"Flow",  "cBOD5",  "TKN",     "DO",      "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.015,    10,       4.1,      ,7.5,     17

"Hydraulic Information for Segment 1"
"Length","Width",  "Depth",  "Velocity"
"(mi)",  "(ft)",   "(ft)",   "(ft/sec)"
.6,      2.5,      .058,     .159

"Initial Mix Values for Segment 1"
"Flow",  "DO",     "cBOD",   "nBOD",   "DOSat",  "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.015,    7.5,      25,       4.763,    8.907,    17

"Rate Constants for Segment 1. - (All units Per Day)"
"k1",  "k1@T", "k2",   "k2@T", "kn",   "kn@T", "BD",   "BD@T"
1.4,   1.22,   20,     18.626, .45,    .357,   0,      0

"Output for Segment 1"
"Segment starts at I-64 REST AREA - ALLEGHANY COUNTY"
"Total", "Segm."
"Dist.", "Dist.",  "DO",     "cBOD",   "nBOD"
"(mi)",  "(mi)",   "(mg/l)", "(mg/l)", "(mg/l)"
0,       0,        7.5,      25,       4.763
.1,      .1,       7.357,    23.855,   4.698
.2,      .2,       7.325,    22.762,   4.634
.3,      .3,       7.346,    21.719,   4.571
.4,      .4,       7.391,    20.724,   4.509
.5,      .5,       7.446,    19.775,   4.448
.6,      .6,       7.504,    18.869,   4.387


"END OF FILE"
```

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JERRYS RUN.

File Information

File Name:	C:\Users\pvu61777\Documents\000_kaharlow\VDOT I64 Alleghany - VA(
Date Modified:	March 12, 2013

Water Quality Standards Information

Stream Name:	JERRYS RUN
River Basin:	James River Basin
Section:	12
Class:	VI - Natural Trout Waters
Special Standards:	None

Background Flow Information

Gauge Used:	Dunlap Creek
Gauge Drainage Area:	164 Sq.Mi.
Gauge 7Q10 Flow:	11 MGD
Headwater Drainage Area:	0 Sq.Mi.
Headwater 7Q10 Flow:	0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	6.707317E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	26 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	6.811442 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	2209 ft above MSL
Model End Elevation:	2180 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JERRYS RUN.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	I-64 REST AREA - ALLEGHANY COUNTY
VPDES Permit No.:	VA0075574

Discharger Flow Information

Flow:	0.015 MGD
cBOD5:	10 mg/l
TKN:	4.1 mg/l
D.O.:	7.5 mg/l
Temperature:	17 Degrees C

Geographic Information

Segment Length:	0.6 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	2209 Ft.
Downstream Elevation:	2180 Ft.

Hydraulic Information

Segment Width:	2.5 Ft.
Segment Depth:	0.058 Ft.
Segment Velocity:	0.159 Ft./Sec.
Segment Flow:	0.015 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	None

```
"Model Run For C:\Users\pvu61777\Documents\000_kaharlow\VDOT I64 Alleghany -
VA0075574\VA0075574_13\Technical\DO Model - High Flow3.mod On 3/12/2013 10:58:57 AM"

"Model is for JERRYS RUN."
"Model starts at the I-64 REST AREA - ALLEGHANY COUNTY discharge."

"Background Data"
"7Q10",  "cBOD5",  "TKN",     "DO",      "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.037,    2,        0,        8.596,    13.7

"Discharge/Tributary Input Data for Segment 1"
"Flow",  "cBOD5",  "TKN",     "DO",      "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.015,    25,       6.1,      ,7.5,     15.3

"Hydraulic Information for Segment 1"
"Length","Width",  "Depth",  "Velocity"
"(mi)",  "(ft)",   "(ft)",   "(ft/sec)"
.6,      5.998,    .072,     .186

"Initial Mix Values for Segment 1"
"Flow",  "DO",     "cBOD",   "nBOD",   "DOSat",  "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.052,    8.28,     21.587,   3.872,    9.459,    14.16154

"Rate Constants for Segment 1. - (All units Per Day)"
"k1",  "k1@T", "k2",   "k2@T", "kn",   "kn@T", "BD",   "BD@T"
1.4,   1.071,  20,     17.414, .45,    .287,   0,      0

"Output for Segment 1"
"Segment starts at I-64 REST AREA - ALLEGHANY COUNTY"
"Total", "Segm."
"Dist.", "Dist.",  "DO",     "cBOD",   "nBOD"
"(mi)",  "(mi)",   "(mg/l)", "(mg/l)", "(mg/l)"
0,       0,        8.28,     21.587,   3.872
.1,      .1,       8.199,    20.841,   3.836
.2,      .2,       8.173,    20.121,   3.8
.3,      .3,       8.177,    19.425,   3.764
.4,      .4,       8.198,    18.754,   3.729
.5,      .5,       8.228,    18.106,   3.694
.6,      .6,       8.262,    17.48,    3.659


"END OF FILE"
```

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JERRYS RUN.

File Information

File Name:	C:\Users\pvu61777\Documents\000_kaharlow\VDOT I64 Alleghany - VA(
Date Modified:	March 12, 2013

Water Quality Standards Information

Stream Name:	JERRYS RUN
River Basin:	James River Basin
Section:	12
Class:	VI - Natural Trout Waters
Special Standards:	None

Background Flow Information

Gauge Used:	Dunlap Creek
Gauge Drainage Area:	164 Sq.Mi.
Gauge 7Q10 Flow:	16.8 MGD
Headwater Drainage Area:	0 Sq.Mi.
Headwater 7Q10 Flow:	0.037 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.102439 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	13.7 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	8.595529 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	2209 ft above MSL
Model End Elevation:	2180 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JERRYS RUN.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	I-64 REST AREA - ALLEGHANY COUNTY
VPDES Permit No.:	VA0075574

Discharger Flow Information

Flow:	0.015 MGD
cBOD5:	25 mg/l
TKN:	6.1 mg/l
D.O.:	7.5 mg/l
Temperature:	15.3 Degrees C

Geographic Information

Segment Length:	0.6 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	2209 Ft.
Downstream Elevation:	2180 Ft.

Hydraulic Information

Segment Width:	5.998 Ft.
Segment Depth:	0.072 Ft.
Segment Velocity:	0.186 Ft./Sec.
Segment Flow:	0.052 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	None