Attachment A

Flow Frequency Memorandum 6/19/12
Ambient Stream Data (5AHZL000.77)
Ambient Hardness Data (5ACPP003.20)

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
James River Correctional Center – VA0020681

TO: Emilee Adamson

FROM: Jennifer Palmore, P.G.

DATE: January 11, 2013

COPIES: File

The James River Correctional Facility's wastewater treatment plant (WWTP) discharges to the James River at State Farm in Goochland County, VA. The outfall is located at rivermile 2-JMS136.05. Stream flow frequencies were requested for use in developing effluent limitations for the VPDES permit.

The flow frequencies were developed based on a drainage area comparison between the discharge point and the USGS continuous record gage at the Route 45 bridge in Cartersville (#02035000). The gage has been in operation from 1898 through present. However, the flow in the James is currently regulated by guaranteed releases from Gathwright Dam (Lake Moomaw); therefore, the flow frequencies for the gage only use data collected after the dam went into operation in 1979.

James River at Cartersville (#02035000)
Statistical Period = 1980-2003
Drainage Area: 6,257 mi^2
High Flow Months: Jan-May

1Q30 = 540 cfs	High Flow 1Q10 = 1530 cfs
1Q10 = 638 cfs	High Flow 7Q10 = 1810 cfs
7Q10 = 717 cfs	High Flow 30Q10 = 2220 cfs
30Q10 = 918 cfs	HM = 3020 cfs
30Q5 = 1020 cfs	

James River at Outfall 002:
Drainage area = 6,558 mi^2

1Q30 = 566 cfs (366 MGD)	High Flow 1Q10 = 1604 cfs (1036 MGD)
1Q10 = 669 cfs (432 MGD)	High Flow 7Q10 = 1897 cfs (1226 MGD)
7Q10 = 751 cfs (486 MGD)	High Flow 30Q10 = 2327 cfs (1504 MGD)
30Q10 = 962 cfs (622 MGD)	HM = 3165 cfs (2046 MGD)
30Q5 = 1069 cfs (691 MGD)	

The values at the discharge point were determined by drainage area proportions and do not address any withdrawals, discharges, or springs lying between the gage and the outfall.

During the 2010 and draft 305(b)/303(d) Integrated Water Quality Assessments, the receiving stream was considered a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list)."). The James River from Big Island dam to the I-95 bridge in Richmond is considered impaired of the Fish Consumption Use due to a VDH fish consumption restriction for PCBs; no more than two meals/month of gizzard shad, carp, American eel, flathead catfish, or quillback carpsucker are recommended. The remaining Designated Uses were not assessed. The river is not impaired for any Aquatic Life Use parameter at the discharge and has historically been considered a Tier 2 water.

Water quality data from monitoring station 2-JMS140.00 is attached. The station is located on the James River at the Route 522 bridge and is approximately 4 miles upstream of the discharge.

The James River Correctional Center discharge was included in the James River and Tributaries – Lower Piedmont Region Bacterial TMDL, which was approved by the EPA on 6/11/2008 and by the SWCB on 4/28/2009. The facility received an E. coli wasteload allocation of 3.76E+11 cfu/year based on a design flow of 0.216 MGD.

The facility was also addressed in the Chesapeake Bay TMDL, which was approved by the EPA on 12/29/2010. The TMDL allocates loads for total nitrogen, total phosphorus, and total suspended solids to protect the dissolved oxygen and submerged aquatic vegetation acreage criteria in the Chesapeake Bay and its tidal tributaries. The discharge was included in the aggregated loads for non-significant wastewater dischargers in the upper James River tidal freshwater estuary (JMSTF2). The nutrient allocations are administered through the Watershed Nutrient General Permit; the TSS allocations are considered aggregated and facilities with technology-based TSS limits are considered to be in conformance with the TMDL.

If you have any questions, please let me know.

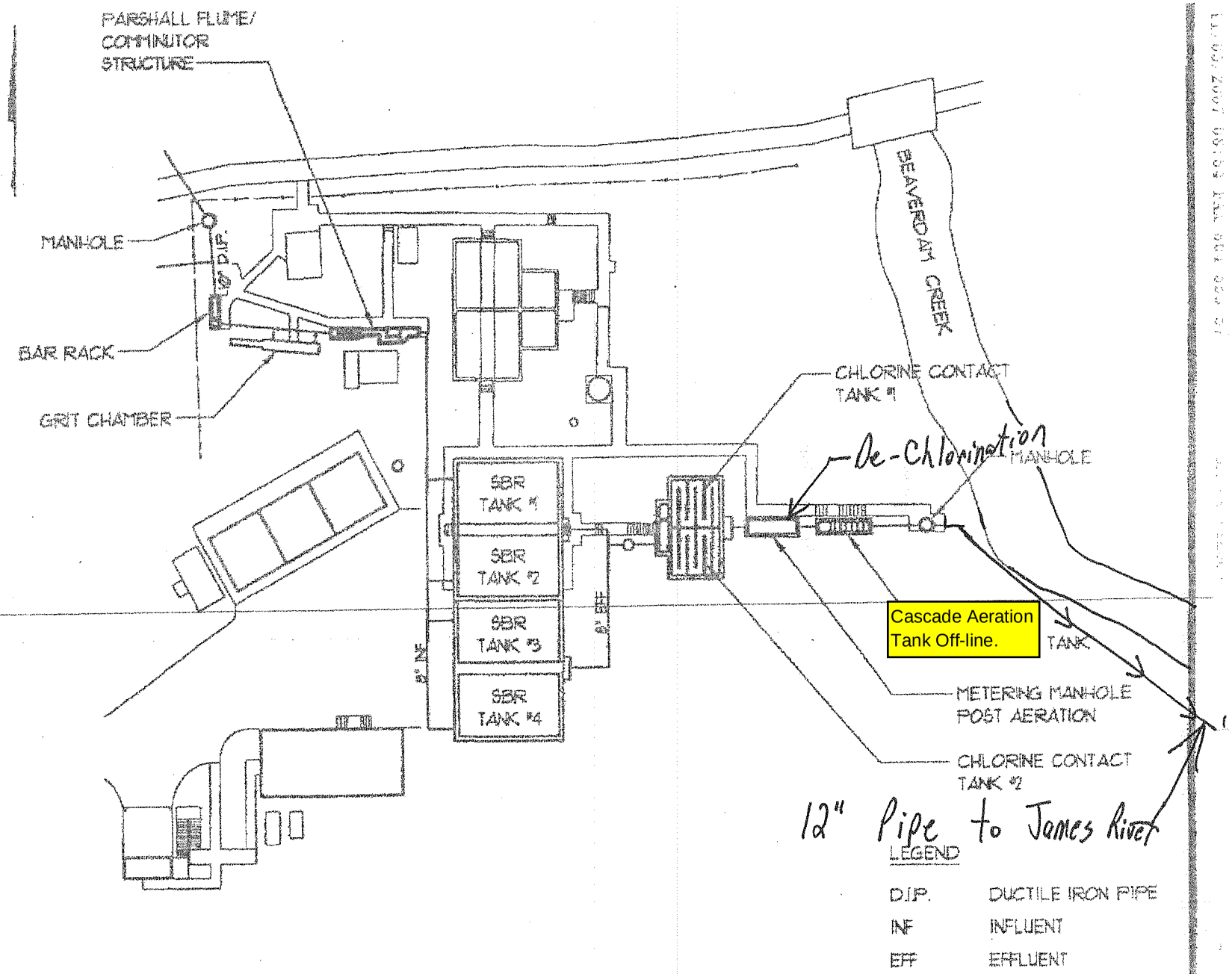
Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler
2-JMS140.00	4/17/1973	S	1	15.56	7		10
2-JMS140.00	6/18/1973	S	1	24.44	7.7		7.6
2-JMS140.00	7/30/1973	S	1	27.78	8.7		7
2-JMS140.00	10/5/1973	S	1	21.67	7.3		7.6
2-JMS140.00	11/12/1973	S	1	6.67	7.5		6.2
2-JMS140.00	11/30/1973	S	1	13.33	7.7		10.59
2-JMS140.00	1/16/1974	S	1	8.89	7.5		12.59
2-JMS140.00	3/5/1974	S	1	13.33			10.79
2-JMS140.00	4/19/1974	S	1	17.22	8		10
2-JMS140.00	5/8/1974	S	1	17.78	9		11.19
2-JMS140.00	6/10/1974	S	1	30	8		7.5
2-JMS140.00	7/17/1974	S	1	28.33	8.2		7.4
2-JMS140.00	7/21/1974	S	1	8.89	7.6		11.39
2-JMS140.00	8/14/1974	S	1	27.78	8.2		7.8
2-JMS140.00	10/28/1974	S	1	16.67	7.5		10.39
2-JMS140.00	11/5/1974	S	1	20	8		9
2-JMS140.00	1/30/1975	S	1	7.22	7		11.29
2-JMS140.00	2/11/1975	S	1	6.11	7		12.79
2-JMS140.00	3/3/1975	S	1	3.33	7.2		12
2-JMS140.00	4/24/1975	S	1	18.89	8		9.8
2-JMS140.00	5/2/1975	S	1	18.33	7.5		9
2-JMS140.00	6/23/1975	S	1	28.33	9		9.4
2-JMS140.00	7/1/1975	S	1	26.67	9		9.8
2-JMS140.00	8/26/1975	S	1	28.33	7.5		7
2-JMS140.00	9/18/1975	S	1	21.11	9		8
2-JMS140.00	10/21/1975	S	1	17.22	7.9		8.4
2-JMS140.00	11/14/1975	S	1	12.22	7		9.6
2-JMS140.00	12/29/1975	S	1	6.67	7.5		13
2-JMS140.00	3/3/1976	S	1	13.33	7.8		10
2-JMS140.00	5/14/1976	S	1	21	8.5		8.9
2-JMS140.00	6/25/1976	S	1	25.56	7.5		7.6
2-JMS140.00	7/2/1976	S	1	25	8		6.6
2-JMS140.00	8/10/1976	S	1	25.56	8.2		7.3
2-JMS140.00	10/28/1976	S	1	11.67	7.5		11
2-JMS140.00	12/13/1976	S	1	6.67	7.5		11
2-JMS140.00	2/22/1977	S	1	7	9		13.5
2-JMS140.00	3/24/1977	S	1	14	7.5		10.39
2-JMS140.00	5/9/1977	S	1	21	9		10
2-JMS140.00	6/2/1977	S	1	2.8	9		8.2
2-JMS140.00	7/20/1977	S	1	32	9.5		8
2-JMS140.00	8/16/1977	S	1	2	8.9		10.19
2-JMS140.00	11/14/1977	S	1	13	7.5		10
2-JMS140.00	12/13/1977	S	1	0.8	7.7		12.79
2-JMS140.00	2/28/1978	S	1	5	7.5		12.69
2-JMS140.00	5/4/1978	S	1	16	7.5		9.8
2-JMS140.00	6/2/1978	S	1	28	9		10.6
2-JMS140.00	8/4/1978	S	1	27.5	7.5		6.7
2-JMS140.00	9/12/1978	S	1	29	8.8		8.6

2-JMS140.00	10/10/1978	S	1	17	8.2		10.8
2-JMS140.00	12/11/1978	S	1	7	7.5		10.6
2-JMS140.00	3/15/1979	S	1	8	7.1		10.8
2-JMS140.00	4/16/1979	S	1	14	7.3		9.1
2-JMS140.00	6/15/1979	S	1	23	8		8.3
2-JMS140.00	7/28/1983	S	0.91	26.5	7.8		6.7
2-JMS140.00	8/16/1983	S	0.91	23	8.9		8.1
2-JMS140.00	8/30/1983	S	0.91	28	8.5		7.1
2-JMS140.00	9/20/1983	S	0.91	23	8.5		8.9
2-JMS140.00	9/27/1983	S	0.91	18.8	8.9		10.3
2-JMS140.00	10/3/1983	S	0.91	17.8	7.8		8.8
2-JMS140.00	6/18/2001	S	0.3	27.24	6.58	9.03	
2-JMS140.00	8/13/2001	S	0.3	28.07	7.76	6.98	
2-JMS140.00	10/10/2001	S	0.3	14.43	8.62	12.32	
2-JMS140.00	12/18/2001	S	0.3	10.69	7.26	10.82	
2-JMS140.00	2/19/2002	S	0.3	7.85	8.32	12.83	
2-JMS140.00	4/10/2002	S	0.3	17.35	7.57	9.58	
2-JMS140.00	6/10/2002	S	0.3	29.48	8.19	7.44	
2-JMS140.00	7/17/2002	S	0.3	30.4	8.86	10.69	
2-JMS140.00	1/22/2003	S	0.3	1.04	7.48	14.14	
2-JMS140.00	3/24/2003	S	0.3	13.13	7.04	10.04	
2-JMS140.00	5/20/2003	S	0.3	14.81	7.06	9.18	
2-JMS140.00	1/3/2006	S	0.3	5.57	6.43	12.6	
2-JMS140.00	2/1/2006	S	0.3	6.85	7.52	12.31	
2-JMS140.00	3/1/2006	S	0.3	6.8	7.8	12.5	
2-JMS140.00	4/10/2006	S	0.3	14.7	7	10.1	
2-JMS140.00	5/1/2006	S	0.3	16.8	7.1	9.2	
2-JMS140.00	6/5/2006	S	0.3	25.6	7.5	6.4	
2-JMS140.00	6/21/2006	S	0.3	27.9	8.6	8.3	
2-JMS140.00	6/21/2006	S	0.3	29.7	8.3	8	
2-JMS140.00	7/10/2006	S	0.3	26.9	7.7	7.9	
2-JMS140.00	7/26/2006	S	0.3	28.3	7.8	6.6	
2-JMS140.00	8/14/2006	S	0.3	26.9	8.5	7.8	
2-JMS140.00	9/11/2006	S	0.3	23.1	7.7	7.7	
2-JMS140.00	9/18/2006	S	0.3	22.8	7.6	7.7	
2-JMS140.00	10/2/2006	S	0.3	19	8.1	9.5	
2-JMS140.00	11/6/2006	S	0.3	8.9	7.4	11.3	
2-JMS140.00	12/12/2006	S	0.3	3.6	7.2	12.7	
2-JMS140.00	10/1/2007	S	0.3	22	8.6	10	
2-JMS140.00	10/22/2007	S	0.3	19.1	8.2	8.8	
2-JMS140.00	9/13/2010	S	0.3	26.5	8.5	10.1	
2-JMS140.00	9/20/2010	S	0.3	26.2	8.6	10.7	
2-JMS140.00	1/10/2013	S	0.3	5.6	8.11	13.72	
90th Percentile				**28.3**	**8.9**		
10th Percentile				**6.1**	**7.1**		

Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	HARDNESS, TOTAL (MG/L AS CACO3) Value	Com Code
2-JMS140.00	06/18/2001 12:10	S	0.3	R	31	
	10/10/2001 11:15	S	0.3	R	120	
	12/18/2001 13:00	S	0.3	R	74.4	
	02/19/2002 13:45	S	0.3	R	47.5	
	04/10/2002 13:00	S	0.3	R	70.2	
	06/10/2002 13:40	S	0.3	R	84	
	07/17/2002 13:15	S	0.3	R	118	
	09/18/2002 12:45	S	0.3	S1	229	
	11/12/2002 13:40	S	0.3	R	31	
	01/22/2003 12:35	S	0.3	R	65.3	
	03/24/2003 12:45	S	0.3	R	31.2	
Average					**82**	

Attachment B

Facility Diagram



WASTE WATER FLOW

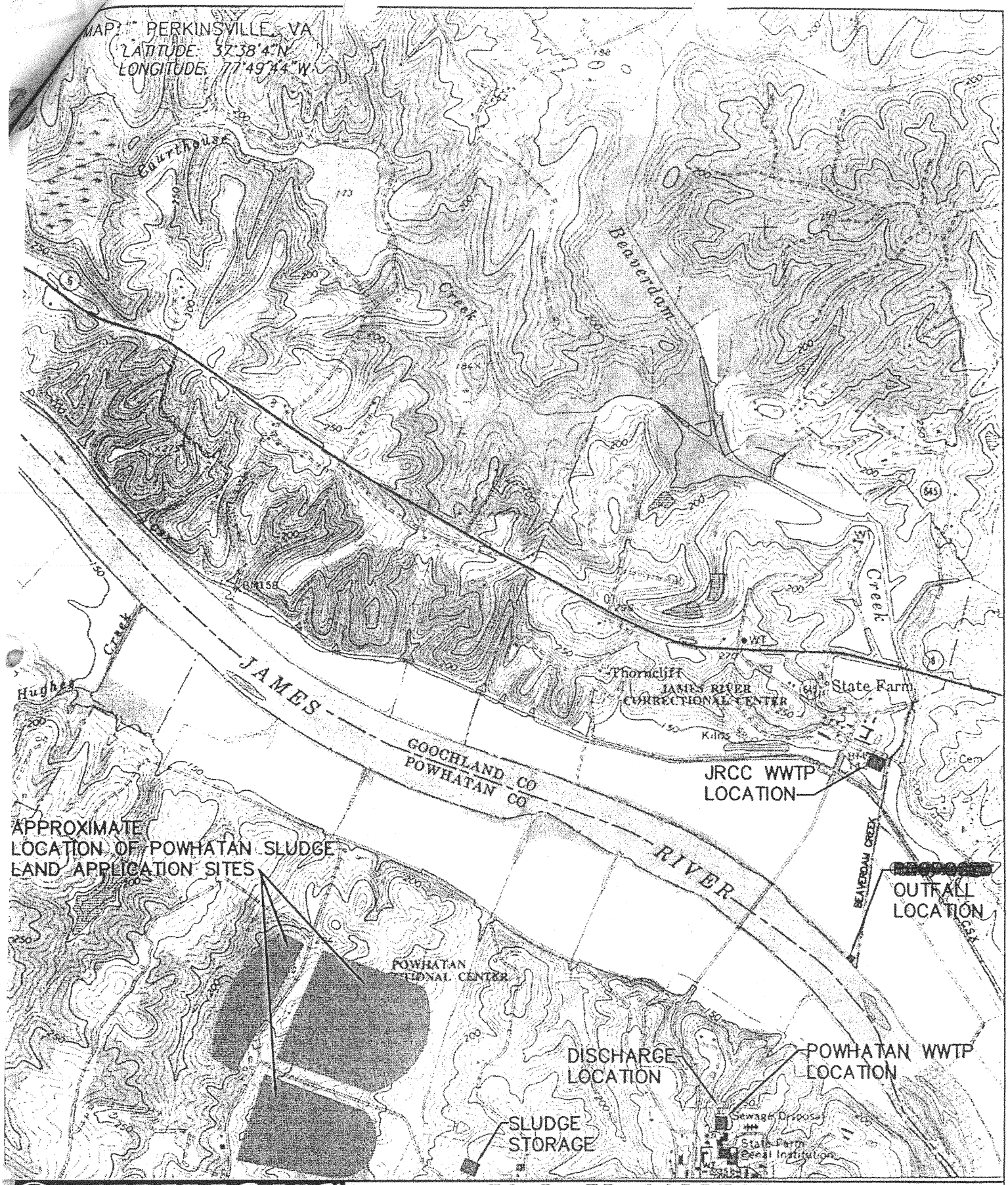
FIGURE V-1

JAMES RIVER CORRECTIONAL CENTER
WASTE WATER TREATMENT PLANT
GOOCHLAND COUNTY, VIRGINIA

Dewberry & Davis
Architects Engineers Planners Surveyors

Attachment C

Topographic Map:



TIMMONS

CIVIL ENGINEERS

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JAMES RIVER CORRECTIONAL CENTER

GOOCHLAND CO., VIRGINIA

VICINITY MAP

DATE: 2/5/02

SCALE: 1" = 2000'

DRAWN BY: DTN

SHEET 1 OF 1

Attachment D

Site Visit Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

Site Visit Memo
James River Correctional Center (VA0020681)
January 8, 2013

I met with Steve Spence and Randy Wilson of the Department of Corrections (DOC) at 2:30 p.m. on Tuesday, December 18, 2012 at the James River Correctional Center. The purpose of the visit was to observe facility operations and the condition of the receiving stream.

The James River Correctional Center was retired as a prison in 2010 due to agency budget cuts. The treatment facility has a design capacity of 216,000 gpd, but with the retirement of the prison, average daily flow has been reduced to 40,000 gpd. Current influent flows come from the James River Works Center and the Academy for Staff Development.

The treatment facility begins with screening and grit removal. Wastewater is then directed to the sequencing batch reactor (SBR) basins. Due to low influent flows, only two of the four basins are operating at a time. Mixed liquor in the aeration chambers had good color and settling characteristics at the time of my visit. Decant from the SBRs is sent to the chlorine contact tank. The operators alternate use of the two chlorine contact tanks weekly as only one of the tanks is required for the reduced flow. Wastewater is then dechlorinated and mechanically aerated prior to final effluent sampling. The effluent appeared clear with no signs of floating solids or visible foam. Final effluent is piped approximately 0.75 miles to the outfall.

Sludge is aerobically digested (only one of two digesters in use at a time) and dewatered in filter press or drying beds when the filter press is down for maintenance. The filter press is located inside the filter building. A polymer tank is also stored inside the building and feeds polymer prior to the filter press to improve sludge dewatering. All drains from the filter building feed back to the headworks of the plant. Dewatered sludge is stored undercover in either the drying beds or directly in a hauling truck parked below the filter building. Treated sludge is transported to the Powhatan Correctional Facility where it is lime stabilized and blended prior to biosolids application on the farm.

The only chemicals used on site are chlorination and dechlorination tablets and polymer. A 500 gallon double walled diesel tank is located outside the office/laboratory building. All chemicals are stored indoors or with appropriate spill containment.

Final effluent discharges to the James River approximately 0.5 miles downstream of the potable water supply intake. Visual inspection of the outfall showed no evidence of a plume or other indication of a discharge. There was no apparent adverse effect on the environment or aquatic life.

/eca

Attachment E

Effluent Data:

DMR Data
Application Data
Attachment A Data

Facility Name: DOC- James River Correctional Center
Permit No:VA0020681
Outfall Number: 002

DMR data

Due Date	FLOW (MGD)		PH (S.U.)		TSS (mg/L)		DO (mg/L)	TKN (mg/L)		cBOD5 (mg/L)	
	Monthly Average	Max	Min	Max	Monthly Average	Max	Min	Monthly Average	Max	Monthly Average	Max
10-Feb-10	0.097	0.138	6.8	7.5	<QL	<QL	8.7	0.45	0.6	<QL	<QL
10-Mar-10	0.098	0.171	6.7	7.3	1	1	8.9	0.53	0.6	<QL	<QL
10-Apr-10	0.101	0.163	6.6	7.3	1.6	1.6	6.9	0.58	0.6	<QL	<QL
10-May-10	0.097	0.115	6.7	7.3	<QL	<QL	7.8	0.65	1.1	<QL	<QL
10-Jun-10	0.112	0.203	6.8	7.7	<QL	<QL	6.8	0.63	0.9	<QL	<QL
10-Jul-10	0.107	0.152	6.8	7.8	<QL	<QL	6.8	0.52	0.8	<QL	<QL
10-Aug-10	0.105	0.134	6.7	7.7	<QL	<QL	6.7	0.57	0.7	<QL	<QL
10-Sep-10	0.101	0.132	6.6	8	<QL	<QL	6.7	0.77	0.9	<QL	<QL
10-Oct-10	0.1	0.181	7	7.7	<QL	<QL	6.8	0.7	0.9	<QL	<QL
10-Nov-10	0.098	0.131	6.5	7.5	<QL	<QL	7.1	0.5	0.7	<QL	<QL
10-Dec-10	0.083	0.106	6.3	7.6	2	2	6.8	0.95	1.1	<QL	<QL
10-Jan-11	0.087	0.099	6.8	7.6	<QL	<QL	8	0.54	0.93	<QL	<QL
10-Feb-11	0.077	0.105	6.8	7.8	1.5	1.5	9.3	0.67	0.83	<QL	<QL
10-Mar-11	0.051	0.068	6.7	7.7	<QL	<QL	9.6	0.6	0.9	<QL	<QL
10-Apr-11	0.04	0.067	6.7	7.8	<QL	<QL	8.7	0.54	0.8	<QL	<QL
10-May-11	0.031	0.053	6.6	7.5	<QL	<QL	7.8	0.675	0.9	<QL	<QL
10-Jun-11	0.037	0.219	6.7	7.3	<QL	<QL	6.8	0.87	1.2	<QL	<QL
10-Jul-11	0.027	0.037	6.8	7.5	<QL	<QL	6.7	0.74	0.8	<QL	<QL
10-Aug-11	0.035	0.193	6.7	7.8	3.4	3.4	6.7	0.78	1	<QL	<QL
10-Sep-11	0.033	0.066	7	7.8	<QL	<QL	6.7	0.68	0.9	1.42	7.1
10-Oct-11	0.036	0.218	7	7.7	2	2	6.8	0.88	1	<QL	<QL
10-Nov-11	0.027	0.049	6.9	7.8	<QL	<QL	7.2	0.95	1	<QL	<QL
10-Dec-11	0.028	0.054	6.9	7.6	<QL	<QL	8.1	0.86	1	<QL	<QL

10-Jan-12	0.025	0.063	6.8	7.4	<QL	<QL	8.7	0.97	1.09	<QL	<QL
10-Feb-12	0.022	0.039	6.7	7.4	<QL	<QL	9.3	0.62	0.24	<QL	<QL
10-Mar-12	0.025	0.064	6.6	7.8	<QL	<QL	9.4	0.79	0.51	<QL	<QL
10-Apr-12	0.029	0.072	6.7	7.7	<QL	<QL	7.8	1	2	<QL	<QL
10-May-12	0.028	0.04	6.9	7.9	<QL	<QL	8.4	0.74	0.82	<QL	<QL
10-Jun-12	0.029	0.04	7.2	7.9	0.19	0.19	7	1.4	2.8	<QL	<QL
10-Jul-12	0.024	0.011	6.8	8.1	<1	<1	7.1	0.84	1.2	<QL	<QL
10-Aug-12	0.018	0.033	7.4	8.2	<QL	<QL	6.9	4.4	12.1	1.75	6.9
10-Sep-12	0.022	0.031	6.9	8.3	1.6	1.6	6.8	6.4	24.4	7.38	14
10-Oct-12	0.02	0.044	7	8.1	1.5	1.5	7	1.02	1.11	3.5	4.7
10-Nov-12	0.019	0.042	7	8	<QL	<QL	7.3	0.9	1	<QL	<QL
10-Dec-12	0.016	0.029	7.2	8.1	<QL	<QL	8.1	0.8	0.82	<QL	<QL
10-Jan-13	0.018	0.03	7	8.1	1.3	1.3	9	1.33	2.1	<QL	<QL
Maximum	**0.112**	**0.219**	**7.4**	**8.3**	**3.4**	**3.4**	**9.60**	**6.40**	**24.40**	**7.38**	**14.00**
Average	**0.053**	**0.094**	**6.8**	**7.7**	**1.6**	**1.6**	**7.64**	**1.02**	**1.95**	**3.51**	**8.18**
90th %tile	**0.101**	**0.187**	**7.0**	**8.1**	**2.1**	**2.1**	**9.15**	**1.18**	**2.05**	**6.22**	**11.93**
10th %tile	**0.020**	**0.032**	**6.6**	**7.4**	**0.9**	**0.9**	**6.70**	**0.54**	**0.60**	**1.52**	**5.36**
2008 Effluent Limitation	**NL**	**NL**	**6.0**	**9.0**	**12**	**18**	**6.7**	**3**	**4.5**	**12**	**18**

Blue Highlight = Data used in MSTRANTI

Application Data:

EPA Form 2A & A.12

Value		
Parameter	**Max Daily**	**Average Daily**
Flow (MGD)	0.029	0.025
BOD5 (mg/L)	<2	<2
TSS (mg/L)	2.1	1.1
Temperature - Winter (^{0}C)	15.0	13.1
Temperature - Summer (^{0}C)	27.5	26.9
pH - Min (S.U.)	7.0	
pH - Max (S.U.)	7.8	
Fecal Coliform (MPN/100mL)	13	<6
Ammonia (as N) (mg/L)	0.14	0.1
Dissolved Oxygen (mg/L)	9.3	8.7
TKN (mg/L)	1.09	0.99
Nitrate + Nitrite (mg/L)	5.24	2.93
Oil and Grease (mg/L)	<5	<5
Total Phoshporus (mg/L)	9.48	5.63
Total Dissolved Solids (mg/L)	466	413

Blue Highlight = Values used in MSTRANTI

ATTACHMENT A
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
METALS						
7440-36-0	Antimony, dissolved	(3)	1.4	<1	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0	<1	G or C	1/5 YR
7440-39-3	Barium, dissolved	(3)	200	16	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.3	.1	G or C	1/5 YR
16065-83-1	Chromium III, dissolved [8]	(3)	3.6	<.1	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved [8]	(3)	1.6	<.1	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50	4.1	G or C	1/5 YR
7439-89-6	Iron, dissolved	(3)	30	<100	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50	.73	G or C	1/5 YR
7439-96-5	Manganese, dissolved	(3)	5.0	<5	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0	<.1	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94	<.5	G or C	1/5 YR
7782-49-2	Selenium, Total Recoverable	(3)	2.0	<.5	G or C	1/5 YR
7440-22-4	Silver, dissolved	(3)	0.20	<.1	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(4)	(5)	<.1	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6	57.5	G or C	1/5 YR
PESTICIDES/PCB'S						
309-00-2	Aldrin	608	0.05	<.10	G or C	1/5 YR
57-74-9	Chlordane	608	0.2	<.20	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	(4)	(5)	<.10	G or C	1/5 YR
72-54-8	DDD	608	0.1	<.10	G or C	1/5 YR
72-55-9	DDE	608	0.1	<.10	G or C	1/5 YR
50-29-3	DDT	608	0.1	<.10	G or C	1/5 YR
8065-48-3	Demeton	(4)	(5)	<.10	G or C	1/5 YR
333-41-5	Diazinon	(4)	(5)	<.10	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
60-57-1	Dieldrin	608	0.1	<.10	G or C	1/5 YR
959-98-8	Alpha-Endosulfan	608	0.1	<.10	G or C	1/5 YR
33213-65-9	Beta-Endosulfan	608	0.1	<.10	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608	0.1	<.10	G or C	1/5 YR
72-20-8	Endrin	608	0.1	<.10	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	(4)	(5)	<.10	G or C	1/5 YR
86-50-0	Guthion	(4)	(5)	<.10	G or C	1/5 YR
76-44-8	Heptachlor	608	0.05	<.10	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	(4)	(5)	<.10	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608	(5)	<.10	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608	(5)	<.10	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	608	(5)	<.10	G or C	1/5 YR
143-50-0	Kepone	(9)	(5)	<.60	G or C	1/5 YR
121-75-5	Malathion	(4)	(5)	<1	G or C	1/5 YR
72-43-5	Methoxychlor	(4)	(5)	<.10	G or C	1/5 YR
2385-85-5	Mirex	(4)	(5)	<.10	G or C	1/5 YR
56-38-2	Parathion	(4)	(5)	<1	G or C	1/5 YR
1336-36-3	PCB Total	608	7.0	<7.0	G or C	1/5 YR
8001-35-2	Toxaphene	608	5.0	<5.0	G or C	1/5 YR
BASE NEUTRAL EXTRACTABLES						
83-32-9	Acenaphthene	625	10.0	<10	G or C	1/5 YR
120-12-7	Anthracene	625	10.0	<10	G or C	1/5 YR
92-87-5	Benzidine	(4)	(5)	<10	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	625	10.0	<10	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	625	10.0	<10	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	625	10.0	<10	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	625	10.0	<10	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	(4)	(5)	<10	G or C	1/5 YR
108-60-1	Bis 2-Chloroisopropyl Ether	(4)	(5)	<10	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
85-68-7	Butyl benzyl phthalate	625	10.0	<10	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	(4)	(5)	<10	G or C	1/5 YR
218-01-9	Chrysene	625	10.0	<10	G or C	1/5 YR
53-70-3	Dibenz(a,h)anthracene	625	20.0	<10	G or C	1/5 YR
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	625	10.0	<10	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	624	10.0	<10	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	624	10.0	<10	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	624	10.0	<10	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	(4)	(5)	<10	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	<10	G or C	1/5 YR
117-81-7	Bis-2-ethylhexyl phthalate	625	10.0	<10	G or C	1/5 YR
131-11-3	Dimethyl phthalate	(4)	(5)	<10	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	<10	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	(4)	(5)	<10	G or C	1/5 YR
206-44-0	Fluoranthene	625	10.0	<10	G or C	1/5 YR
86-73-7	Fluorene	625	10.0	<10	G or C	1/5 YR
118-74-1	Hexachlorobenzene	(4)	(5)	<10	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	(4)	(5)	<10	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	(4)	(5)	<10	G or C	1/5 YR
67-72-1	Hexachloroethane	(4)	(5)	<10	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	625	20.0	<10	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	<10	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	<10	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	(4)	(5)	<10	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	(4)	(5)	<10	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	(4)	(5)	<10	G or C	1/5 YR
129-00-0	Pyrene	625	10.0	<10	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	<10	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
VOLATILES						
107-02-8	Acrolein	(4)	(5)	<50	G	1/5 YR
107-13-1	Acrylonitrile	(4)	(5)	<10	G	1/5 YR
71-43-2	Benzene	624	10.0	<10	G	1/5 YR
75-25-2	Bromoform	624	10.0	<10	G	1/5 YR
56-23-5	Carbon Tetrachloride	624	10.0	<10	G	1/5 YR
108-90-7	Chlorobenzene (synonym = monochlorobenzene)	624	50.0	<10	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	<10	G	1/5 YR
67-66-3	Chloroform	624	10.0	49	G	1/5 YR
75-09-2	Dichloromethane (synonym = methylene chloride)	624	20.0	<10	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	<10	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	<10	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	<10	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	(4)	(5)	<10	G	1/5 YR
78-87-5	1,2-Dichloropropane	(4)	(5)	<10	G	1/5 YR
542-75-6	1,3-Dichloropropene	(4)	(5)	<10	G	1/5 YR
100-41-4	Ethylbenzene	624	10.0	<10	G	1/5 YR
74-83-9	Methyl Bromide	(4)	(5)	<10	G	1/5 YR
79-34-5	1,1,2,2-Tetrachloroethane	(4)	(5)	<10	G	1/5 YR
127-18-4	Tetrachloroethylene	624	10.0	<10	G	1/5 YR
10-88-3	Toluene	624	10.0	<10	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	(4)	(5)	<10	G	1/5 YR
79-01-6	Trichloroethylene	624	10.0	<10	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	<10	G	1/5 YR
RADIONUCLIDES						
	Beta Particle & Photon Activity (mrem/yr)	(4)	(5)	3.87	G or C	1/5 YR
	Gross Alpha Particle Activity (pCi/L)	(4)	(5)	4.76	G or C	1/5 YR
	Combined Radium 226 and 228	(4)	(5)	<3.13	G or C	1/5 YR
	Uranium	(4)	(5)	.0143	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
ACID EXTRACTABLES [6]						
95-57-8	2-Chlorophenol	625	10.0	<10	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	<10	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	<10	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	(4)	(5)	<10	G or C	1/5 YR
534-52-1	2-Methyl-4,6-Dinitrophenol	(4)	(5)	<10	G or C	1/5 YR
25154-52-3	Nonylphenol	(3)	(5)	<10	G or C	1/5 YR
87-86-5	Pentachlorophenol	625	50.0	<10	G or C	1/5 YR
108-95-2	Phenol	625	10.0	<10	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	<10	G or C	1/5 YR
MISCELLANEOUS						
776-41-7	Ammonia as NH3-N	350.1	200	<.20 mg/l	C	1/5 YR
16887-00-6	Chlorides	(4)	(5)	98.5	C	1/5 YR
7782-50-5	Chlorine, Total Residual	(4)	100	0.02 mg/L	G	1/5 YR
57-12-5	Cyanide, Free	(3)	10.0	<10	G	1/5 YR
94-75-7	2,4 Dichlorophenoxy acetic acid (synonym = 2,4-D)	(4)	(5)	<2	G or C	1/5 YR
N/A	*E. coli* / *Enterococcus* (N/CML)	(4)	(5)	2	G	1/5 YR
N/A	Foaming Agents (as MBAS)	(4)	(5)	<.10	G	1/5 YR
18496-25-8	Dissolved Sulfide	(4)	(5)	<.10	G	1/5 YR
14797-55-8	Nitrate as N (mg/L)	(4)	(5)	8.7	C	1/5 YR
N/A	Sulfate (mg/L)	(4)	(5)	121	C	1/5 YR
N/A	Total Dissolved Solids (mg/L)	(4)	(5)	325	C	1/5 YR
60-10-5	Tributyltin [7]	NBSR 85-3295	(5)	<.03	G or C	1/5 YR
93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	(4)	(5)	<10	G or C	1/5 YR
471-34-1	Hardness (mg/L as $CaCO_3$)	(4)	(5)	107	G or C (10)	1/5 YR

Yellow Highlight = Observed Pollutants or Pollutants reported as "<QL," where the reported QL exceeded the Agency accepted QL.

FOOTNOTES:

(1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = An 8-hour composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however a target value for each metal has been established. An appropriate method to meet the target value shall be selected from the following list of EPA methods (or any approved method presented in 40 CFR Part 136). If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

Parameter	**Analytical Method**
Antimony	1638; 1639
Arsenic	1632
Chromium[8]	1639
Cadmium	1637; 1638; 1639; 1640
Chromium VI	1639
Copper	1638; 1640
Lead	1637; 1638; 1640
Mercury	1631
Nickel	1638; 1639; 1640
Selenium	1638; 1639
Silver	1638
Zinc	1638; 1639
Free Cyanide	*ASTM D4282-02, D7237-10, OIA 1677-09
Nonylphenol	*ASTM D7065-06

**Currently proposed EPA methods*

(4) Any approved method presented in 40 CFR Part 136.

(5) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.

(6) Testing for phenols requires continuous extraction.

(7) Analytical Methods: NBSR 85-3295 or DEQ's approved analysis for Tributyltin may also be used [See A Manual for the Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996].

(8) Both Chromium III and Chromium VI may be measured by the total chromium analysis. If the result of the total chromium analysis is less than or equal to the lesser of the Chromium III or Chromium VI method QL, the results for both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(9) The lab may use SW846 Method 8270D provided the lab has an Initial Demonstration of Capability, has passed a PT for Kepone, and meets the acceptance criteria for Kepone as given in Method 8270D

(10) The sample type for Hardness (as $CaCO_3$) shall match the sample type selected for Dissolved Metals.

Attachment F

Effluent Limitation Development:
Stream Sanitation Memo (5/13/02)
MSTRANTI Data Source Report- 2013
MIX.exe- 2013
MSTRANTI - 2013
STATS.exe - 2013
MSTRANTI - 2008
STATS.exe - 2008

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4900 Cox Road Glen Allen, VA 23060 804/527-5020

SUBJECT: Proposed Effluent Limits for Expansion of James River Correctional Center STP

TO: Curt Linderman

FROM: D. X. Ren

DATE: November 2, 1994

COPIES: Jon van Soestbergen, Technical Services, File

Modeling Purpose

James River Correctional Center submitted a request to have an expansion from the existing treatment capacity of 0.108 MGD to future 0.216 MGD. The James River Correctional Center discharges to the Beaverdam Creek in the Goochland County.

The purpose of this memorandum is to develop proposed effluent limits for future discharge flow of 0.216 MGD.

Site Inspection

The modeling effort was made based on the previous modeling information in the file. No site inspection was performed at this time. The last site inspection was made in 1987 by Paul Herman.

7Q10 Flow Estimates

In the previous stream analysis, the 7Q10 flow was determined to be 0.94 cfs (or 0.61 MGD), with the drainage area of 40 square miles (7Q10 value 0.02353 cfs/sq.mi) at the USGS Gage 02036500 on Fine Creek at Fine Creek Mills. In 1993, Paul Herman performed a flow frequency analysis for this discharge. Paul's analysis was based on several stream flow measurements on Beaverdam Creek at the Route 6 Bridge during 1951-1953. The new 7Q10 flows (i.e. 7Q10 = 0.0415 cfs or 0.0268 MGD under the drainage area 42 square miles) are significantly lower than those used for previous models and reissuance.

To be consistent with the previous approach, the new 7Q10 flow is not used in the model until validation. For the details, please refer to Paul's and Curt's memorandums in the modeling file.

Ambient Water Quality Monitoring Station

The subject discharge is located in watershed VAP-H02R. The Ambient Water Quality Monitoring Station (AQM) 2-FIN000.81 was selected as the representative one for this watershed. Therefore, the Storet information was retrieved to evaluate the receiving stream for determination of the values of temperature,

pH and Mean Hardness. As a result, the year round temperature, pH and mean hardness were determined based on monthly data. The 90 percentile temperature, pH, and mean hardness (n=16) are 23.9°C, 7.3 S.U., 63.6 mg/l respectively. For the details, please see attached Storet retrieval sheet for statistical approach.

Antidegradation

DO Antidegradation policy was applied in 1987 modeling efforts. However no water quality information for the subject receiving stream is available at this time. Therefore, the subject segment is assumed as a Tier 2 Water.

In the regional model, the antidegradation for DO was applied at Beaverdam Creek.

Modeling Approach

1987 modeling efforts resulted in a Streeter-Phelps model in Monroe version. An information conversion was made at this time to generate a Regional Model for this existing discharge. The regional model reflects the basic information contained in the Monroe version except temperature, and new discharge flow. The model starts at the existing discharge point (Point A on the map) at Beaverdam Creek about three tenth miles downstream at Route 6 Bridge, and it ends at James River mainstem 2.5 miles downstream of the confluence of Beaverdam with the James River (Point D). The total length of the simulated segment (4.1 miles) was kept unchanged, as well as segment slopes. Three segments were simulated in the model instead of two segments in the Monroe version to include Powhatan Correctional Center STP's discharge.

There are two discharges near the James River Correctional Center STP. One is the James River Correctional Center WTP which is non-BOD related discharge. Therefore, it is not included in the Regional model. The other is Powhatan Correctional Center STP with the discharge flow of 0.465 MGD. It is on the James River, about one mile downstream the confluence of Beaverdam Creek with the James River. The model include this discharge at the end of the second segment.

Comparing the 1987 modeling conditions (Q=0.106 MGD), the Regional model reflects three changes: a) The discharge flow has doubled (Q=0.216 MGD); b) TKN is required in the regional model; c) the temperature 23.9°C from Storet data is replaced instead of previous assumption 28°C. Therefore the effluent limits is expected to be more stringent than previous ones. The modeling results are indicated in Table 1.

Recommendations:

1) To keep consistency with the antidegradation applied, use the original 7Q10 flow and assume a Tier 2 Water for the receiving stream status;
2) Forewarn permittee that site-specific flow determination may result in significant reduction of in-stream flows and consequently in permit limits. The permittee may also wish to collect water quality data to verify Tier water atatus.

The limits for the ammonia nitrogen will be addressed separately by the permit writer for the ammonia toxicity concerns.

The computer printout copy, the topographic map, and schematic showing the discharge point are attached for your reference.

Table 1: Proposed Level Effluent Limitations
James River Correctional Center STP
(Q= 0.216 MGD)

Scenarios	Antidegradation is applied to Beaverdam Creek
Using Original 7Q10 Flow (0.93 cfs)	Q = 0.216 MGD*** $CBOD_5$ = 12.0 mg/l TKN = 3.0 mg/l DO = 6.7 mg/l @ Temperature = 23.9° C
Using New 7Q10 Flow (0.0415 cfs) (For planning purposes, only)	Q = 0.216 MGD $CBOD_5$ = 5.0 mg/l TKN = 3.0 mg/l DO = 7.5 mg/l @ Temperature = 23.9° C

*** Recommendated Effluent Limitations

If you have any questions, please let me know.

Attachments

DXR

MSTRANTI DATA SOURCE REPORT

(DOC-James River Correctional - Outfall 002- 0.216 MGD)

Stream Information	
Mean Hardness	Ambient Data (2-JMS140.00)
90% Temperature (annual)	Ambient Data (2-JMS140.00) *Wet season inputs are not applicable to this discharge*
90% Temperature (wet season)	
90% Maximum pH	
10% Maximum pH	
Tier Designation	Flow Frequency Memo (1/11/13)
Stream Flows	
All Data	Flow Frequency Memo (6/19/12)
Mixing Information	
Low Flow Analysis	MIX.exe
Effluent Information	
Mean Hardness	Application Data
90% Temperature (annual)	Application Data
90% Temperature (wet season)	Application Data
90% Maximum pH	DMR data
10% Maximum pH	DMR data
Discharge Flow	Design flow of the treatment facility

Data Location:

Ambient Data – Attachment A
Flow Frequency Memo – Attachment A
App Data – Attachment E
DMR Data – Attachment E

Mixing Zone Predictions for DOC-James River Correctional

Effluent Flow = 0.216 MGD
Stream 7Q10 = 486 MGD
Stream 30Q10 = 622 MGD
Stream 1Q10 = 432 MGD
Stream slope = 0.00038 ft/ft
Stream width = 750 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.2333 ft
Length = 273870.07 ft
Velocity = .4494 ft/sec
Residence Time = 7.054 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 28.35% of the 7Q10 is used.

Mixing Zone Predictions @ 30Q10

Depth = 2.5904 ft
Length = 241868.05 ft
Velocity = .4958 ft/sec
Residence Time = 5.6466 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 35.42% of the 30Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 2.0806 ft
Length = 290592.52 ft
Velocity = .4288 ft/sec
Residence Time = 188.2648 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .53% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: DOC-James River Correctional Permit No.: VA0067121

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

Stream Information		
Mean Hardness (as CaCO3) =	82	mg/L
90% Temperature (Annual) =	28.3	deg C
90% Temperature (Wet season) =		deg C
90% Maximum pH =	8.9	SU
10% Maximum pH =	7.1	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	432	MGD
7Q10 (Annual) =	486	MGD
30Q10 (Annual) =	622	MGD
1Q10 (Wet season) =		MGD
30Q10 (Wet season) =		MGD
30Q5 =	691	MGD
Harmonic Mean =	2046	MGD

Mixing Information		
Annual - 1Q10 Mix =	0.53	%
- 7Q10 Mix =	28.35	%
- 30Q10 Mix =	35.42	%
Wet Season - 1Q10 Mix =		%
- 30Q10 Mix =		%

Effluent Information		
Mean Hardness (as CaCO3) =	107	mg/L
90% Temp (Annual) =	27.5	deg C
90% Temp (Wet season) =		deg C
90% Maximum pH =	8.1	SU
10% Maximum pH =	7.4	SU
Discharge Flow =	0.216	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	--	--	6.7E+02	9.9E+02	--	--	2.1E+06	3.2E+06	--	--	7.2E+01	1.0E+02	--	--	2.1E+05	3.2E+05	**--**	**--**	**2.1E+05**	**3.2E+05**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	2.0E+04	3.0E+04	--	--	6.1E-01	9.3E-01	--	--	2.0E+03	3.0E+03	**--**	**--**	**2.0E+03**	**3.0E+03**
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	4.8E+03	2.4E+04	--	--	5.1E-02	2.5E-01	--	--	4.8E+02	2.4E+03	**--**	**--**	**4.8E+02**	**2.4E+03**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	3.5E+01	--	4.6E+00	4.7E+00	7.5E-01	--	4.9E-05	5.0E-05	1.5E+03	--	4.6E-01	4.7E-01	**3.5E+01**	**--**	**4.6E-01**	**4.7E-01**
Ammonia-N (mg/l) (Yearly)	0	2.06E+00	2.33E-01	--	--	2.40E+01	2.38E+02	--	--	3.90E-01	5.81E-02	--	--	7.80E+02	1.67E+02	--	--	**2.40E+01**	**1.67E+02**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	6.95E+00	2.10E+00	--	--	6.95E+00	2.10E+00	--	--	1.74E+00	5.24E-01	--	--	1.74E+00	5.24E-01	--	--	**1.74E+00**	**5.24E-01**	**--**	**--**
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	2.7E+07	1.3E+08	--	--	8.3E+02	4.0E+03	--	--	2.7E+06	1.3E+07	**--**	**--**	**2.7E+06**	**1.3E+07**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	1.8E+04	2.0E+06	--	--	5.6E-01	6.4E+01	--	--	1.8E+03	2.0E+05	**--**	**--**	**1.8E+03**	**2.0E+05**
Arsenic	o	3.4E+02	1.5E+02	1.0E+01	--	3.9E+03	9.6E+04	3.2E+04	--	8.5E+01	3.8E+01	1.0E+00	--	1.7E+05	8.4E+04	3.2E+03	--	**3.9E+03**	**8.4E+04**	**3.2E+03**	**--**
Barium	0	--	--	2.0E+03	--	--	--	6.4E+06	--	--	--	2.0E+02	--	--	--	6.4E+05	--	**--**	**--**	**6.4E+05**	**--**
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	2.1E+05	4.8E+06	--	--	2.2E+00	5.1E+01	--	--	2.1E+04	4.8E+05	**--**	**--**	**2.1E+04**	**4.8E+05**
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	8.1E+00	1.9E+01	--	--	8.6E-05	2.0E-04	--	--	8.1E-01	1.9E+00	**--**	**--**	**8.1E-01**	**1.9E+00**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	2.8E+03	5.0E+04	--	--	3.0E-02	5.3E-01	--	--	2.8E+02	5.0E+03	**--**	**--**	**2.8E+02**	**5.0E+03**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	4.5E+06	2.1E+08	--	--	1.4E+02	6.5E+03	--	--	4.5E+05	2.1E+07	**--**	**--**	**4.5E+05**	**2.1E+07**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	1.1E+05	2.1E+05	--	--	1.2E+00	2.2E+00	--	--	1.1E+04	2.1E+04	**--**	**--**	**1.1E+04**	**2.1E+04**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	4.1E+05	1.3E+07	--	--	4.3E+00	1.4E+02	--	--	4.1E+04	1.3E+06	**--**	**--**	**4.1E+04**	**1.3E+06**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	4.8E+06	6.1E+06	--	--	1.5E+02	1.9E+02	--	--	4.8E+05	6.1E+05	**--**	**--**	**4.8E+05**	**6.1E+05**
Cadmium	0	3.2E+00	9.7E-01	5.0E+00	--	3.7E+01	6.2E+02	1.6E+04	--	7.8E-01	2.4E-01	5.0E-01	--	1.6E+03	5.5E+02	1.6E+03	--	**3.7E+01**	**5.5E+02**	**1.6E+03**	**--**
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	2.2E+04	1.5E+05	--	--	2.3E-01	1.6E+00	--	--	2.2E+03	1.5E+04	**--**	**--**	**2.2E+03**	**1.5E+04**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.8E+01	2.7E+00	7.6E+01	7.7E+01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	1.2E+03	2.4E+00	7.6E+00	7.7E+00	**2.8E+01**	**2.4E+00**	**7.6E+00**	**7.7E+00**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	1.0E+07	1.5E+08	8.0E+08	--	2.2E+05	5.8E+04	2.5E+04	--	4.3E+08	1.3E+08	8.0E+07	--	**1.0E+07**	**1.3E+08**	**8.0E+07**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	2.2E+02	7.0E+03	--	--	4.8E+00	2.8E+00	--	--	9.5E+03	6.2E+03	--	--	**2.2E+02**	**6.2E+03**	**--**	**--**
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	4.2E+05	5.1E+06	--	--	1.3E+01	1.6E+02	--	--	4.2E+04	5.1E+05	**--**	**--**	**4.2E+04**	**5.1E+05**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	3.8E+04	1.2E+06	--	--	4.0E-01	1.3E+01	--	--	3.8E+03	1.2E+05	**--**	**--**	**3.8E+03**	**1.2E+05**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.1E+06	3.5E+07	--	--	3.4E+01	1.1E+03	--	--	1.1E+05	3.5E+06	**--**	**--**	**1.1E+05**	**3.5E+06**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	3.2E+06	5.1E+06	--	--	1.0E+02	1.6E+02	--	--	3.2E+05	5.1E+05	**--**	**--**	**3.2E+05**	**5.1E+05**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	2.6E+05	4.8E+05	--	--	8.1E+00	1.5E+01	--	--	2.6E+04	4.8E+04	**--**	**--**	**2.6E+04**	**4.8E+04**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	9.6E-01	2.6E+01	--	--	2.1E-02	1.0E-02	--	--	4.2E+01	2.3E+01	--	--	**9.6E-01**	**2.3E+01**	**--**	**--**
Chromium III	0	4.9E+02	6.3E+01	--	--	5.7E+03	4.0E+04	--	--	1.2E+02	1.6E+01	--	--	2.4E+05	3.5E+04	--	--	**5.7E+03**	**3.5E+04**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.9E+02	7.0E+03	--	--	4.0E+00	2.8E+00	--	--	8.0E+03	6.2E+03	--	--	**1.9E+02**	**6.2E+03**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	3.2E+05	--	--	--	1.0E+01	--	--	--	3.2E+04	--	**--**	**--**	**3.2E+04**	**--**
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	--	--	3.8E-04	1.8E-03	--	--	3.6E+00	1.7E+01	**--**	**--**	**3.6E+00**	**1.7E+01**
Copper	0	1.1E+01	7.6E+00	1.3E+03	--	1.3E+02	4.8E+03	4.2E+06	--	2.8E+00	1.9E+00	1.3E+02	--	5.6E+03	4.3E+03	4.2E+05	--	**1.3E+02**	**4.3E+03**	**4.2E+05**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.6E+02	3.3E+03	4.5E+05	5.1E+07	5.5E+00	1.3E+00	1.4E+01	1.6E+03	1.1E+04	2.9E+03	4.5E+04	5.1E+06	**2.6E+02**	**2.9E+03**	**4.5E+04**	**5.1E+06**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	2.9E+01	2.9E+01	--	--	3.1E-04	3.1E-04	--	--	2.9E+00	2.9E+00	**--**	**--**	**2.9E+00**	**2.9E+00**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	2.1E+01	2.1E+01	--	--	2.2E-04	2.2E-04	--	--	2.1E+00	2.1E+00	**--**	**--**	**2.1E+00**	**2.1E+00**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.3E+01	6.4E-01	2.1E+01	2.1E+01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	5.5E+02	5.6E-01	2.1E+00	2.1E+00	**1.3E+01**	**5.6E-01**	**2.1E+00**	**2.1E+00**
Demeton	0	--	1.0E-01	--	--	--	6.4E+01	--	--	--	2.5E-02	--	--	--	5.6E+01	--	--	**--**	**5.6E+01**	**--**	**--**
Diazinon	0	1.7E-01	1.7E-01	--	--	2.0E+00	1.1E+02	--	--	4.3E-02	4.3E-02	--	--	8.5E+01	9.6E+01	--	--	**2.0E+00**	**9.6E+01**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.3E+06	4.2E+06	--	--	4.2E+01	1.3E+02	--	--	1.3E+05	4.2E+05	**--**	**--**	**1.3E+05**	**4.2E+05**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.0E+06	3.1E+06	--	--	3.2E+01	9.6E+01	--	--	1.0E+05	3.1E+05	**--**	**--**	**1.0E+05**	**3.1E+05**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	2.0E+05	6.1E+05	--	--	6.3E+00	1.9E+01	--	--	2.0E+04	6.1E+04	**--**	**--**	**2.0E+04**	**6.1E+04**
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.0E+03	2.7E+03	--	--	2.1E-02	2.8E-02	--	--	2.0E+02	2.7E+02	**--**	**--**	**2.0E+02**	**2.7E+02**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	5.2E+04	1.6E+06	--	--	5.5E-01	1.7E+01	--	--	5.2E+03	1.6E+05	**--**	**--**	**5.2E+03**	**1.6E+05**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	3.6E+04	3.5E+06	--	--	3.8E-01	3.7E+01	--	--	3.6E+03	3.5E+05	**--**	**--**	**3.6E+03**	**3.5E+05**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.1E+06	2.3E+07	--	--	3.3E+01	7.1E+02	--	--	1.1E+05	2.3E+06	**--**	**--**	**1.1E+05**	**2.3E+06**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	4.5E+05	3.2E+07	--	--	1.4E+01	1.0E+03	--	--	4.5E+04	3.2E+06	**--**	**--**	**4.5E+04**	**3.2E+06**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	2.5E+05	9.3E+05	--	--	7.7E+00	2.9E+01	--	--	2.5E+04	9.3E+04	**--**	**--**	**2.5E+04**	**9.3E+04**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	3.2E+05	--	--	--	1.0E+01	--	--	--	3.2E+04	--	**--**	**--**	**3.2E+04**	**--**
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	4.7E+04	1.4E+06	--	--	5.0E-01	1.5E+01	--	--	4.7E+03	1.4E+05	**--**	**--**	**4.7E+03**	**1.4E+05**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	3.2E+04	2.0E+06	--	--	3.4E-01	2.1E+01	--	--	3.2E+03	2.0E+05	**--**	**--**	**3.2E+03**	**2.0E+05**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.8E+00	3.6E+01	4.9E+00	5.1E+00	6.0E-02	1.4E-02	5.2E-05	5.4E-05	1.2E+02	3.2E+01	4.9E-01	5.1E-01	**2.8E+00**	**3.2E+01**	**4.9E-01**	**5.1E-01**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	5.4E+07	1.4E+08	--	--	1.7E+03	4.4E+03	--	--	5.4E+06	1.4E+07	**--**	**--**	**5.4E+06**	**1.4E+07**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	1.2E+06	2.7E+06	--	--	3.8E+01	8.5E+01	--	--	1.2E+05	2.7E+05	**--**	**--**	**1.2E+05**	**2.7E+05**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	8.6E+08	3.5E+09	--	--	2.7E+04	1.1E+05	--	--	8.6E+07	3.5E+08	**--**	**--**	**8.6E+07**	**3.5E+08**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	6.4E+06	1.4E+07	--	--	2.0E+02	4.5E+02	--	--	6.4E+05	1.4E+06	**--**	**--**	**6.4E+05**	**1.4E+06**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	2.2E+05	1.7E+07	--	--	6.9E+00	5.3E+02	--	--	2.2E+04	1.7E+06	**--**	**--**	**2.2E+04**	**1.7E+06**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	4.2E+04	9.0E+05	--	--	1.3E+00	2.8E+01	--	--	4.2E+03	9.0E+04	**--**	**--**	**4.2E+03**	**9.0E+04**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.0E+04	3.2E+05	--	--	1.1E-01	3.4E+00	--	--	1.0E+03	3.2E+04	**--**	**--**	**1.0E+03**	**3.2E+04**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	1.6E-04	1.6E-04	--	--	5.0E-09	5.1E-09	--	--	1.6E-05	1.6E-05	**--**	**--**	**1.6E-05**	**1.6E-05**
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	3.4E+03	1.9E+04	--	--	3.6E-02	2.0E-01	--	--	3.4E+02	1.9E+03	**--**	**--**	**3.4E+02**	**1.9E+03**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.6E+00	3.6E+01	2.0E+05	2.8E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.1E+02	3.2E+01	2.0E+04	2.8E+04	**2.6E+00**	**3.2E+01**	**2.0E+04**	**2.8E+04**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.6E+00	3.6E+01	2.0E+05	2.8E+05	5.5E-02	1.4E-02	6.2E+00	8.9E+00	1.1E+02	3.2E+01	2.0E+04	2.8E+04	**2.6E+00**	**3.2E+01**	**2.0E+04**	**2.8E+04**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.6E+00	3.6E+01	--	--	5.5E-02	1.4E-02	--	--	1.1E+02	3.2E+01	--	--	**2.6E+00**	**3.2E+01**	**--**	**--**
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	2.0E+05	2.8E+05	--	--	6.2E+00	8.9E+00	--	--	2.0E+04	2.8E+04	**--**	**--**	**2.0E+04**	**2.8E+04**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.0E+00	2.3E+01	1.9E+02	1.9E+02	2.2E-02	9.0E-03	5.9E-03	6.0E-03	4.3E+01	2.0E+01	1.9E+01	1.9E+01	**1.0E+00**	**2.0E+01**	**1.9E+01**	**1.9E+01**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	9.3E+02	9.6E+02	--	--	2.9E-02	3.0E-02	--	--	9.3E+01	9.6E+01	**--**	**--**	**9.3E+01**	**9.6E+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	--	--	1.7E+06	6.7E+06	--	--	5.3E+01	2.1E+02	--	--	1.7E+05	6.7E+05	**--**	**--**	**1.7E+05**	**6.7E+05**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	4.2E+05	4.5E+05	--	--	1.3E+01	1.4E+01	--	--	4.2E+04	4.5E+04	**--**	**--**	**4.2E+04**	**4.5E+04**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	3.5E+06	1.7E+07	--	--	1.1E+02	5.3E+02	--	--	3.5E+05	1.7E+06	**--**	**--**	**3.5E+05**	**1.7E+06**
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.6E+06	--	--	--	5.0E+01	--	--	--	1.6E+05	--	**--**	**--**	**1.6E+05**	**--**
Guthion	0	--	1.0E-02	--	--	--	6.4E+00	--	--	--	2.5E-03	--	--	--	5.6E+00	--	--	**--**	**5.6E+00**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	6.0E+00	2.4E+00	7.5E+00	7.5E+00	1.3E-01	9.5E-04	7.9E-05	7.9E-05	2.6E+02	2.1E+00	7.5E-01	7.5E-01	**6.0E+00**	**2.1E+00**	**7.5E-01**	**7.5E-01**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	6.0E+00	2.4E+00	3.7E+00	3.7E+00	1.3E-01	9.5E-04	3.9E-05	3.9E-05	2.6E+02	2.1E+00	3.7E-01	3.7E-01	**6.0E+00**	**2.1E+00**	**3.7E-01**	**3.7E-01**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	2.7E+01	2.7E+01	--	--	2.8E-04	2.9E-04	--	--	2.7E+00	2.7E+00	**--**	**--**	**2.7E+00**	**2.7E+00**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	4.2E+04	1.7E+06	--	--	4.4E-01	1.8E+01	--	--	4.2E+03	1.7E+05	**--**	**--**	**4.2E+03**	**1.7E+05**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	2.5E+02	4.6E+02	--	--	2.6E-03	4.9E-03	--	--	2.5E+01	4.6E+01	**--**	**--**	**2.5E+01**	**4.6E+01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	8.6E+02	1.6E+03	--	--	9.1E-03	1.7E-02	--	--	8.6E+01	1.6E+02	**--**	**--**	**8.6E+01**	**1.6E+02**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.1E+01	--	9.3E+03	1.7E+04	2.4E-01	--	9.8E-02	1.8E-01	4.8E+02	--	9.3E+02	1.7E+03	**1.1E+01**	**--**	**9.3E+02**	**1.7E+03**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.3E+05	3.5E+06	--	--	4.0E+00	1.1E+02	--	--	1.3E+04	3.5E+05	**--**	**--**	**1.3E+04**	**3.5E+05**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	1.3E+05	3.1E+05	--	--	1.4E+00	3.3E+00	--	--	1.3E+04	3.1E+04	**--**	**--**	**1.3E+04**	**3.1E+04**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	1.3E+03	--	--	--	5.0E-01	--	--	--	1.1E+03	--	--	**--**	**1.1E+03**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.6E+02	1.7E+03	--	--	3.8E-03	1.8E-02	--	--	3.6E+01	1.7E+02	**--**	**--**	**3.6E+01**	**1.7E+02**
Iron	0	--	--	3.0E+02	--	--	--	9.6E+05	--	--	--	3.0E+01	--	--	--	9.6E+04	--	**--**	**--**	**9.6E+04**	**--**
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	3.3E+06	9.1E+07	--	--	3.5E+01	9.6E+02	--	--	3.3E+05	9.1E+06	**--**	**--**	**3.3E+05**	**9.1E+06**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	9.5E+01	1.0E+01	1.5E+01	--	1.1E+03	6.7E+03	4.8E+04	--	2.3E+01	2.6E+00	1.5E+00	--	4.6E+04	5.9E+03	4.8E+03	--	**1.1E+03**	**5.9E+03**	**4.8E+03**	**--**
Malathion	0	--	1.0E-01	--	--	--	6.4E+01	--	--	--	2.5E-02	--	--	--	5.6E+01	--	--	**--**	**5.6E+01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	1.6E+05	--	--	--	5.0E+00	--	--	--	1.6E+04	--	**--**	**--**	**1.6E+04**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.6E+01	4.9E+02	- -	- -	3.5E-01	1.9E-01	- -	--	7.0E+02	4.3E+02	- -	--	**1.6E+01**	**4.3E+02**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	1.5E+05	4.8E+06	--	--	4.7E+00	1.5E+02	--	--	1.5E+04	4.8E+05	**--**	**--**	**1.5E+04**	**4.8E+05**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	4.4E+05	5.6E+07	--	--	4.6E+00	5.9E+02	--	--	4.4E+04	5.6E+06	**--**	**--**	**4.4E+04**	**5.6E+06**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.9E+01	3.2E+05	--	--	7.5E-03	1.0E+01	--	--	1.7E+01	3.2E+04	--	**--**	**1.7E+01**	**3.2E+04**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	**--**	**0.0E+00**	**--**	**--**
Nickel	0	1.6E+02	1.7E+01	6.1E+02	4.6E+03	1.8E+03	1.1E+04	2.0E+06	1.5E+07	3.9E+01	4.3E+00	6.1E+01	4.6E+02	7.7E+04	9.6E+03	2.0E+05	1.5E+06	**1.8E+03**	**9.6E+03**	**2.0E+05**	**1.5E+06**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	3.2E+07	--	--	--	1.0E+03	--	--	--	3.2E+06	--	**--**	**--**	**3.2E+06**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	5.4E+04	2.2E+06	--	--	1.7E+00	6.9E+01	--	--	5.4E+03	2.2E+05	**--**	**--**	**5.4E+03**	**2.2E+05**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	6.5E+01	2.8E+05	--	--	6.9E-04	3.0E+00	--	--	6.5E+00	2.8E+04	**--**	**--**	**6.5E+00**	**2.8E+04**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	3.1E+05	5.7E+05	--	--	3.3E+00	6.0E+00	--	--	3.1E+04	5.7E+04	**--**	**--**	**3.1E+04**	**5.7E+04**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	4.7E+02	4.8E+04	--	--	5.0E-03	5.1E-01	--	--	4.7E+01	4.8E+03	**--**	**--**	**4.7E+01**	**4.8E+03**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.2E+02	4.2E+03	--	--	7.0E+00	1.7E+00	--	--	1.4E+04	3.7E+03	--	--	**3.2E+02**	**3.7E+03**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	7.5E-01	8.3E+00	--	--	1.6E-02	3.3E-03	--	--	3.3E+01	7.3E+00	--	--	**7.5E-01**	**7.3E+00**	**--**	**--**
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	8.9E+00	6.1E+00	6.1E+00	--	3.5E-03	6.4E-05	6.4E-05	--	7.9E+00	6.1E-01	6.1E-01	**--**	**7.9E+00**	**6.1E-01**	**6.1E-01**
Pentachlorophenol [C]	0	9.8E+00	7.4E+00	2.7E+00	3.0E+01	1.1E+02	4.7E+03	2.6E+04	2.8E+05	2.4E+00	1.9E+00	2.7E-01	3.0E+00	4.8E+03	4.2E+03	2.6E+03	2.8E+04	**1.1E+02**	**4.2E+03**	**2.6E+03**	**2.8E+04**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	3.2E+07	2.8E+09	--	--	1.0E+03	8.6E+04	--	--	3.2E+06	2.8E+08	**--**	**--**	**3.2E+06**	**2.8E+08**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	2.7E+06	1.3E+07	--	--	8.3E+01	4.0E+02	--	--	2.7E+05	1.3E+06	**--**	**--**	**2.7E+05**	**1.3E+06**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	4.8E+04	--	--	--	1.5E+00	--	--	--	4.8E+03	--	**--**	**--**	**4.8E+03**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	--	1.3E+04	--	--	--	4.0E-01	--	--	--	1.3E+03	--	**--**	**--**	**1.3E+03**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	1.6E+04	--	--	--	5.0E-01	--	--	--	1.6E+03	--	**--**	**--**	**1.6E+03**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	9.6E+04	--	--	--	3.0E+00	--	--	--	9.6E+03	--	**--**	**--**	**9.6E+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**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.3E+02	3.2E+03	5.4E+05	1.3E+07	5.0E+00	1.3E+00	1.7E+01	4.2E+02	1.0E+04	2.8E+03	5.4E+04	1.3E+06	**2.3E+02**	**2.8E+03**	**5.4E+04**	**1.3E+06**
Silver	0	2.6E+00	--	--	--	3.0E+01	--	--	--	6.1E-01	--	--	--	1.2E+03	--	--	--	**3.0E+01**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	8.0E+08	--	--	--	2.5E+04	--	--	--	8.0E+07	--	**--**	**--**	**8.0E+07**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.6E+04	3.8E+05	--	--	1.7E-01	4.0E+00	--	--	1.6E+03	3.8E+04	**--**	**--**	**1.6E+03**	**3.8E+04**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	6.5E+04	3.1E+05	--	--	6.9E-01	3.3E+00	--	--	6.5E+03	3.1E+04	**--**	**--**	**6.5E+03**	**3.1E+04**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	7.7E+02	1.5E+03	--	--	2.4E-02	4.7E-02	--	--	7.7E+01	1.5E+02	**--**	**--**	**7.7E+01**	**1.5E+02**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	1.6E+06	1.9E+07	--	--	5.1E+01	6.0E+02	--	--	1.6E+05	1.9E+06	**--**	**--**	**1.6E+05**	**1.9E+06**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.6E+09	--	--	--	5.0E+04	--	--	--	1.6E+08	--	**--**	**--**	**1.6E+08**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	8.5E+00	1.3E-01	2.7E+01	2.7E+01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	3.7E+02	1.1E-01	2.7E+00	2.7E+00	**8.5E+00**	**1.1E-01**	**2.7E+00**	**2.7E+00**
Tributyltin	0	4.6E-01	7.2E-02	--	--	5.3E+00	4.6E+01	--	--	1.2E-01	1.8E-02	--	--	2.3E+02	4.1E+01	--	--	**5.3E+00**	**4.1E+01**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.1E+05	2.2E+05	--	--	3.5E+00	7.0E+00	--	--	1.1E+04	2.2E+04	**--**	**--**	**1.1E+04**	**2.2E+04**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	5.6E+04	1.5E+06	--	--	5.9E-01	1.6E+01	--	--	5.6E+03	1.5E+05	**--**	**--**	**5.6E+03**	**1.5E+05**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	2.4E+05	2.8E+06	--	--	2.5E+00	3.0E+01	--	--	2.4E+04	2.8E+05	**--**	**--**	**2.4E+04**	**2.8E+05**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	1.3E+05	2.3E+05	--	--	1.4E+00	2.4E+00	--	--	1.3E+04	2.3E+04	**--**	**--**	**1.3E+04**	**2.3E+04**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.6E+05	--	--	--	5.0E+00	--	--	--	1.6E+04	--	**--**	**--**	**1.6E+04**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	2.4E+03	2.3E+05	--	--	2.5E-02	2.4E+00	--	--	2.4E+02	2.3E+04	**--**	**--**	**2.4E+02**	**2.3E+04**
Zinc	0	1.0E+02	1.0E+02	7.4E+03	2.6E+04	1.2E+03	6.4E+04	2.4E+07	8.3E+07	2.5E+01	2.5E+01	7.4E+02	2.6E+03	5.0E+04	5.6E+04	2.4E+06	8.3E+06	**1.2E+03**	**5.6E+04**	**2.4E+06**	**8.3E+06**

Notes:

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

Metal	Target Value (SSTV)
Antimony	1.8E+03
Arsenic	1.6E+03
Barium	6.4E+05
Cadmium	1.5E+01
Chromium III	2.3E+03
Chromium VI	7.4E+01
Copper	5.3E+01
Iron	9.6E+04
Lead	4.4E+02
Manganese	1.6E+04
Mercury	6.5E+00
Nickel	7.3E+02
Selenium	9.3E+01
Silver	1.2E+01
Zinc	4.7E+02

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

1/29/2013 12:30:04 PM

Facility = DOC-James River Correctional
Chemical = Aldrin (µg/L)
Chronic averaging period = 4
WLAa = 35
WLAc =
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .1
Variance = .0036
C.V. = 0.6
97th percentile daily values = .243341
97th percentile 4 day average = .166379
97th percentile 30 day average= .120605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
0.1

1/28/2013 3:14:22 PM

Facility = DOC-James River Correctional
Chemical = Ammonia (mg/L)
Chronic averaging period = 30
WLAa = 24.0
WLAc = 167
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 3
Variance = 3.24
C.V. = 0.6
97th percentile daily values = 7.30025
97th percentile 4 day average = 4.99137
97th percentile 30 day average= 3.61815
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
3.00

1/28/2013 3:20:26 PM

Facility = DOC-James River Correctional
Chemical = Dissolved Cadmium (µg/L)
Chronic averaging period = 4
WLAa = 37
WLAc = 550
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .1
Variance = .0036
C.V. = 0.6
97th percentile daily values = .243341
97th percentile 4 day average = .166379
97th percentile 30 day average= .120605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
0.1

1/29/2013 11:59:55 AM

Facility = DOC-James River Correctional
Chemical = chlorides (mg/L)
Chronic averaging period = 4
WLAa = 10000
WLAc = 130000
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 98.5
Variance = 3492.81
C.V. = 0.6
97th percentile daily values = 239.691
97th percentile 4 day average = 163.883
97th percentile 30 day average= 118.796
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
98.5

1/29/2013 12:02:51 PM

Facility = DOC-James River Correctional
Chemical = Dissolved Copper (µg/L)
Chronic averaging period = 4
WLAa = 130
WLAc = 4300
Q.L. = 0.5
# samples/mo. = 90
# samples/wk. = 21

Summary of Statistics:

observations = 1
Expected Value = 4.1
Variance = 6.0516
C.V. = 0.6
97th percentile daily values = 9.97701
97th percentile 4 day average = 6.82153
97th percentile 30 day average= 4.94481
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
4.1

1/29/2013 12:04:07 PM

Facility = DOC-James River Correctional
Chemical = Dissolved Lead (µg/L)
Chronic averaging period = 4
WLAa = 1100
WLAc = 5900
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .73
Variance = .191844
C.V. = 0.6
97th percentile daily values = 1.77639
97th percentile 4 day average = 1.21456
97th percentile 30 day average= .880418
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
0.73

1/28/2013 5:05:39 PM

Facility = DOC-James River Correctional
Chemical = Heptachlor (µg/L)
Chronic averaging period = 4
WLAa = 6.0
WLAc = 2.1
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .1
Variance = .0036
C.V. = 0.6
97th percentile daily values = .243341
97th percentile 4 day average = .166379
97th percentile 30 day average= .120605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
0.1

1/28/2013 6:22:03 PM

Facility = DOC-James River Correctional
Chemical = TRC (µg/L)
Chronic averaging period = 4
WLAa = 220
WLAc = 6200
Q.L. = 100
# samples/mo. = 90
# samples/wk. = 21

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average= 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 220
Average Weekly Limit = 114.556369426505
Average Monthly Limit = 101.163188089696

The data are:
20000

1/29/2013 12:22:21 PM

Facility = DOC-James River Correctional
Chemical = Dissolved Zinc (µg/L)
Chronic averaging period = 4
WLAa = 1200
WLAc = 56000
Q.L. = 3.6
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 57.5
Variance = 1190.25
C.V. = 0.6
97th percentile daily values = 139.921
97th percentile 4 day average = 95.6679
97th percentile 30 day average= 69.3480
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:
57.5

Water Quality Standards and Wasteload Allocations

Permittee:	James River Correctio	Flows (MGD):	Design	0.261		90th % stream pH	8.36		MIX% for chronic WLA	26
Permit No.	VA0020681		7Q10	448	(chronic)	10th % stream pH	6.944		MIX% for acute WLA	0.5
Receiving Stream:	James River		1Q10	404	(acute)	90th % stream temp	28.061			
WQ Tier	2	(1 or 2)	30Q5	661	(human health - noncarcinogen)	mean effluent hardness	37.5			
Public Water Supply?	1	(1 = yes, 2 = no)	HM	1936	(human health - carcinogen)	mean stream hardness	65.8	(note: 25 mg/l minimum)		

2-JMS157.28

Parameter	Background	Water Quality Standard				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			1.2E+03	2.7E+03			3.0E+06	6.8E+06			1.2E+02	2.7E+02			3.0E+05	6.8E+05			3.0E+05	6.8E+05
Aldrin [C]	0	3.0E+00	3.0E-01	1.3E-03	1.4E-03	2.6E+01	1.3E+02	9.6E+00	1.0E+01	7.5E-01	7.5E-02	1.3E-04	1.4E-04	1.2E+03	1.3E+02	9.6E-01	1.0E+00	2.6E+01	1.3E+02	9.6E-01	1.0E+00
Ammonia-N (mg/l)	0	2.7E+00	6.1E-01			2.3E+01	2.7E+02			6.7E-01	1.5E-01			1.0E+03	2.6E+02			2.3E+01	2.6E+02		
Anthracene	0			9.6E+03	1.1E+05			2.4E+07	2.8E+08			9.6E+02	1.1E+04			2.4E+06	2.8E+07			2.4E+06	2.8E+07
Antimony	0			1.4E+01	4.3E+03			3.5E+04	1.1E+07			1.4E+00	4.3E+02			3.5E+03	1.1E+06			3.5E+03	1.1E+06
Arsenic	0			5.0E+01				1.3E+05				5.0E+00				1.3E+04				1.3E+04	
Arsenic III	0	3.6E+02	1.9E+02			3.1E+03	8.5E+04			9.0E+01	4.8E+01			1.4E+05	8.2E+04			3.1E+03	8.2E+04		
Barium	0			2.0E+03				5.1E+06				2.0E+02				5.1E+05				5.1E+05	
Benzene [C]	0			1.2E+01	7.1E+02			8.9E+04	5.3E+06			1.2E+00	7.1E+01			8.9E+03	5.3E+05			8.9E+03	5.3E+05
Benzo(a)anthracene [C]	0			4.4E-02	4.9E-01			3.3E+02	1.2E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Benzo(b)fluoranthene [C]	0			4.4E-02	4.9E-01			3.3E+02	1.2E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Benzo(k)fluoranthene [C]	0			4.4E-02	4.9E-01			3.3E+02	1.2E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Benzo(a)pyrene [C]	0			4.4E-02	4.9E-01			3.3E+02	3.6E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Bromoform [C]	0			4.4E+01	3.6E+03			3.3E+05	2.7E+07			4.4E+00	3.6E+02			3.3E+04	2.7E+06			3.3E+04	2.7E+06
Butylbenzylphthalate	0			3.0E+03	5.2E+03			7.6E+06	1.3E+07			3.0E+02	5.2E+02			7.6E+05	1.3E+06				1.3E+06
Cadmium	0	2.3E+00	8.2E-01			2.0E+01	3.6E+02			6.1E-01	2.0E-01			9.5E+02	3.5E+02			2.0E+01	3.5E+02		
Carbon Tetrachloride [C]	0			2.5E+00	4.5E+01			1.9E+04	3.3E+05			2.5E-01	4.5E+00			1.9E+03	3.3E+04			1.9E+03	3.3E+04
Chlordane [C]	0	2.4E+00	4.3E-03	5.8E-03	5.9E-03	2.1E+01	1.9E+00	4.3E+01	4.4E+01	6.0E-01	1.1E-03	5.8E-04	5.9E-04	9.3E+02	1.8E+00	4.3E+00	4.4E+00	2.1E+01	1.8E+00	4.3E+00	4.4E+00
Chloride	0	8.6E+05	2.3E+05	2.5E+05		7.5E+06	1.0E+08	6.3E+08		2.2E+05	5.8E+04	2.5E+04		3.3E+08	9.9E+07	6.3E+07		7.5E+06	9.9E+07	6.3E+07	
TRC	0	1.9E+01	1.1E+01			1.7E+02	4.9E+03			4.8E+00	2.8E+00			7.4E+03	4.7E+03			1.7E+02	4.7E+03		
Chlorodibromomethane	0			6.9E+02	5.7E+04			1.7E+06	1.4E+08			6.9E+01	5.7E+03			1.7E+05	1.4E+07			1.7E+05	1.4E+07
Chloroform [C]	0			5.7E+01	4.7E+03			4.2E+05	3.5E+07			5.7E+00	4.7E+02			4.2E+04	3.5E+06			4.2E+04	3.5E+06
2-Chlorophenol	0			1.2E+02	4.0E+02			3.0E+05	1.0E+06			1.2E+01	4.0E+01			3.0E+04	1.0E+05			3.0E+04	1.0E+05
Chlorpyrifos	0	8.3E-02	4.1E-02			7.3E-01	1.8E+01			2.1E-02	1.0E-02			3.2E+01	1.8E+01			7.3E-01	1.8E+01		
Chromium III	0	1.2E+03	1.5E+02			1.0E+04	6.6E+04			3.1E+02	3.7E+01			4.8E+05	6.3E+04			1.0E+04	6.3E+04		
Chromium VI	0	1.6E+01	1.1E+01			1.4E+02	4.9E+03			4.0E+00	2.8E+00			6.2E+03	4.7E+03			1.4E+02	4.7E+03		
Chrysene [C]	0			4.4E-02	4.9E-01			3.3E+02	3.6E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Copper	0	1.1E+01	8.3E+00	1.3E+03		1.0E+02	3.7E+03	3.3E+06		3.0E+00	2.1E+00	1.3E+02		4.6E+03	3.5E+03	3.3E+05		1.0E+02	3.5E+03	3.3E+05	
Cyanide	0	2.2E+01	5.2E+00	7.0E+02	2.2E+05	1.9E+02	2.3E+03	1.8E+06	5.4E+08	5.5E+00	1.3E+00	7.0E+01	2.2E+04	8.5E+03	2.2E+03	1.8E+05	5.4E+07	1.9E+02	2.2E+03	1.8E+05	5.4E+07
DDD [C]	0			8.3E-03	8.4E-03			6.2E+01	6.2E+01			8.3E-04	8.4E-04			6.2E+00	6.2E+00			6.2E+00	6.2E+00
DDE [C]	0			5.9E-03	5.9E-03			4.4E+01	4.4E+01			5.9E-04	5.9E-04			4.4E+00	4.4E+00			4.4E+00	4.4E+00
DDT [C]	0	1.0E+00	1.0E-03	5.9E-03	5.9E-03	8.7E+00	4.5E-01	4.4E+01	4.4E+01	2.5E-01	2.5E-04	5.9E-04	5.9E-04	3.9E+02	4.3E-01	4.4E+00	4.4E+00	8.7E+00	4.3E-01	4.4E+00	4.4E+00
Demeton	0		1.0E-01				4.5E+01				2.5E-02				4.3E+01				4.3E+01		

Parameter	Background	Water Quality Standard				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
Dibenz(a,h)anthracene [C]	0			4.4E-02	4.9E-01			3.3E+02	3.6E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Dibutylphthalate	0			2.7E+03	1.2E+04			6.8E+06	3.0E+07			2.7E+02	1.2E+03			6.8E+05	3.0E+06			6.8E+05	3.0E+06
Dichloromethane [C]	0			4.7E+01	1.6E+04			3.5E+05	1.2E+08			4.7E+00	1.6E+03			3.5E+04	1.2E+07			3.5E+04	1.2E+07
1,2-Dichlorobenzene	0			2.7E+03	1.7E+04			6.8E+06	4.3E+07			2.7E+02	1.7E+03			6.8E+05	4.3E+06			6.8E+05	4.3E+06
1,3-Dichlorobenzene	0			4.0E+02	2.6E+03			1.0E+06	6.6E+06			4.0E+01	2.6E+02			1.0E+05	6.6E+05			1.0E+05	6.6E+05
1,4-Dichlorobenzene	0			4.0E+02	2.6E+03			1.0E+06	6.6E+06			4.0E+01	2.6E+02			1.0E+05	6.6E+05			1.0E+05	6.6E+05
Dichlorobromomethane [C]	0			5.6E+00	4.6E+02			4.2E+04	3.4E+06			5.6E-01	4.6E+01			4.2E+03	3.4E+05			4.2E+03	3.4E+05
1,2-Dichloroethane [C]	0			3.8E+00	9.9E+02			2.8E+04	7.3E+06			3.8E-01	9.9E+01			2.8E+03	7.3E+05			2.8E+03	7.3E+05
1,1-Dichloroethylene	0			3.1E+02	1.7E+04			7.9E+05	4.3E+07			3.1E+01	1.7E+03			7.9E+04	4.3E+06			7.9E+04	4.3E+06
2,4-Dichlorophenol	0			9.3E+01	7.9E+02			2.4E+05	2.0E+06			9.3E+00	7.9E+01			2.4E+04	2.0E+05			2.4E+04	2.0E+05
(2,4-Dichlorophenoxy) acetic acid (2,4-D)	0			7.1E+01				1.8E+05				7.1E+00				1.8E+04				1.8E+04	
Dieldrin [C]	0	2.5E+00	1.9E-03	1.4E-03	1.4E-03	2.2E+01	8.5E-01	1.0E+01	1.0E+01	6.3E-01	4.8E-04	1.4E-04	1.4E-04	9.7E+02	8.2E-01	1.0E+00	1.0E+00	2.2E+01	8.2E-01	1.0E+00	1.0E+00
Diethylphthalate	0			2.3E+04	1.2E+05			5.8E+07	3.0E+08			2.3E+03	1.2E+04			5.8E+06	3.0E+07			5.8E+06	3.0E+07
Di-2-ethylhexylphthalate [C]	0			1.8E+01	5.9E+01			1.3E+05	4.4E+05			1.8E+00	5.9E+00			1.3E+04	4.4E+04			1.3E+04	4.4E+04
2,4-Dimethylphenol	0			5.4E+02	2.3E+03			1.4E+06	5.8E+06			5.4E+01	2.3E+02			1.4E+05	5.8E+05			1.4E+05	5.8E+05
2,4-Dinitrotoluene [C]	0			1.1E+00	9.1E+01			8.2E+03	6.8E+05			1.1E-01	9.1E+00			8.2E+02	6.8E+04			8.2E+02	6.8E+04
Dioxin (ppq)	0			1.2E-06	1.2E-06			3.0E-03	3.0E-03			1.2E-07	1.2E-07			3.0E-04	3.0E-04			3.0E-04	3.0E-04
Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	1.9E+00	2.5E+01	2.8E+05	6.1E+05	5.5E-02	1.4E-02	1.1E+01	2.4E+01	8.5E+01	2.4E+01	2.8E+04	6.1E+04	1.9E+00	2.4E+01	2.8E+04	6.1E+04
Endrin	0	1.8E-01	2.3E-03	7.6E-01	8.1E-01	1.6E+00	1.0E+00	1.9E+03	2.1E+03	4.5E-02	5.8E-04	7.6E-02	8.1E-02	7.0E+01	9.9E-01	1.9E+02	2.1E+02	1.6E+00	9.9E-01	1.9E+02	2.1E+02
Ethylbenzene	0			3.1E+03	2.9E+04			7.9E+06	7.3E+07			3.1E+02	2.9E+03			7.9E+05	7.3E+06			7.9E+05	7.3E+06
Fluoranthene	0			3.0E+02	3.7E+02			7.6E+05	9.4E+05			3.0E+01	3.7E+01			7.6E+04	9.4E+04			7.6E+04	9.4E+04
Fluorene	0			1.3E+03	1.4E+04			3.3E+06	3.5E+07			1.3E+02	1.4E+03			3.3E+05	3.5E+06			3.3E+05	3.5E+06
Foaming Agents	0			5.0E+02				1.3E+06				5.0E+01				1.3E+05				1.3E+05	
Guthion	0		1.0E-02				4.5E+00				2.5E-03				4.3E+00				4.3E+00		
Heptachlor [C]	0	5.2E-01	3.8E-03	2.1E-03	2.1E-03	4.5E+00	1.7E+00	1.6E+01	1.6E+01	1.3E-01	9.5E-04	2.1E-04	2.1E-04	2.0E+02	1.6E+00	1.6E+00	1.6E+00	4.5E+00	1.6E+00	1.6E+00	1.6E+00
Hexachlorocyclohexane (Lindane)	0	2.0E+00	8.0E-02	7.0E+00	2.5E+01	1.7E+01	3.6E+01	1.8E+04	6.3E+04	5.0E-01	2.0E-02	7.0E-01	2.5E+00	7.7E+02	3.4E+01	1.8E+03	6.3E+03	1.7E+01	3.4E+01	1.8E+03	6.3E+03
Hydrogen Sulfide	0		2.0E+00				8.9E+02				5.0E-01				8.6E+02				8.6E+02		
Indeno(1,2,3-cd)pyrene C	0			4.4E-02	4.9E-01			3.3E+02	3.6E+03			4.4E-03	4.9E-02			3.3E+01	3.6E+02			3.3E+01	3.6E+02
Iron	0			3.0E+02				7.6E+05				3.0E+01				7.6E+04				7.6E+04	
Isophorone	0			6.9E+03	4.9E+05			1.7E+07	1.2E+09			6.9E+02	4.9E+04			1.7E+06	1.2E+08			1.7E+06	1.2E+08
Kepone	0		0.0E+00				0.0E+00				0.0E+00				0.0E+00				0.0E+00		
Lead	0	6.5E+01	7.9E+00	1.5E+01		5.7E+02	3.5E+03	3.8E+04		1.7E+01	2.0E+00	1.5E+00		2.7E+04	3.4E+03	3.8E+03		5.7E+02	3.4E+03	3.8E+03	
Malathion	0		1.0E-01				4.5E+01				2.5E-02				4.3E+01				4.3E+01		
Manganese	0			5.0E+01				1.3E+05				5.0E+00				1.3E+04				1.3E+04	
Mercury	0	2.4E+00	1.2E-02	5.2E-02	5.3E-02	2.1E+01	5.4E+00	1.3E+02	1.3E+02	6.0E-01	3.0E-03	5.2E-03	5.3E-03	9.3E+02	5.2E+00	1.3E+01	1.3E+01	2.1E+01	5.2E+00	1.3E+01	1.3E+01
Methoxychlor	0		3.0E-02	4.0E+01			1.3E+01	1.0E+05			7.5E-03	4.0E+00			1.3E+01	1.0E+04			1.3E+01	1.0E+04	
Mirex	0		0.0E+00				0.0E+00				0.0E+00				0.0E+00				0.0E+00		
Monochlorobenzene	0			6.8E+02	2.1E+04			1.7E+06	5.3E+07			6.8E+01	2.1E+03			1.7E+05	5.3E+06			1.7E+05	5.3E+06

Parameter	Background	Water Quality Standard				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
Nickel	0	1.2E+02	1.4E+01	6.1E+02	4.6E+03	1.1E+03	6.4E+03	1.5E+06	1.2E+07	3.2E+01	3.6E+00	6.1E+01	4.6E+02	5.0E+04	6.1E+03	1.5E+05	1.2E+06	1.1E+03	6.1E+03	1.5E+05	1.2E+06
Nitrate (as N)	0			1.0E+04				2.5E+07				1.0E+03				2.5E+06				2.5E+06	
Nitrobenzene	0			1.7E+01	1.9E+03			4.3E+04	4.8E+06			1.7E+00	1.9E+02			4.3E+03	4.8E+05			4.3E+03	4.8E+05
Parathion	0	6.5E-02	1.3E-02			5.7E-01	5.8E+00			1.6E-02	3.3E-03			2.5E+01	5.6E+00			5.7E-01	5.6E+00		
PCB-1016 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1221 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1232 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1242 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1248 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1254 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
PCB-1260 [c]	0		1.4E-02	4.4E-04	4.5E-04		6.3E+00	3.3E+00	3.3E+00		3.5E-03	4.4E-05	4.5E-05		6.0E+00	3.3E-01	3.3E-01		6.0E+00	3.3E-01	3.3E-01
Pentachlorophenol [c]	0	8.6E+00	5.4E+00	2.8E+00	8.2E+01	7.5E+01	2.4E+03	2.1E+04	6.1E+05	2.1E+00	1.4E+00	2.8E-01	8.2E+00	3.3E+03	2.3E+03	2.1E+03	6.1E+04	7.5E+01	2.3E+03	2.1E+03	6.1E+04
Phenol	0			2.1E+04	4.6E+06			5.3E+07	1.2E+10			2.1E+03	4.6E+05			5.3E+06	1.2E+09			5.3E+06	1.2E+09
Pyrene	0			9.6E+02	1.1E+04			2.4E+06	2.8E+07			9.6E+01	1.1E+03			2.4E+05	2.8E+06			2.4E+05	2.8E+06
Radionuclides (pCi/l except Beta/Photon)	0																				
Gross Alpha Activity	0			1.5E+01	1.5E+01			3.8E+04	3.8E+04			1.5E+00	1.5E+00			3.8E+03	3.8E+03			3.8E+03	3.8E+03
Beta and Photon Activity	0			4.0E+00	4.0E+00			1.0E+04	1.0E+04			4.0E-01	4.0E-01			1.0E+03	1.0E+03			1.0E+03	1.0E+03
Strontium-90	0			8.0E+00	8.0E+00			2.0E+04	2.0E+04			8.0E-01	8.0E-01			2.0E+03	2.0E+03			2.0E+03	2.0E+03
Tritium	0			2.0E+04	2.0E+04			5.1E+07	5.1E+07			2.0E+03	2.0E+03			5.1E+06	5.1E+06			5.1E+06	5.1E+06
Selenium	0	2.0E+01	5.0E+00	1.7E+02	1.1E+04	1.7E+02	2.2E+03	4.3E+05	2.8E+07	5.0E+00	1.3E+00	1.7E+01	1.1E+03	7.7E+03	2.1E+03	4.3E+04	2.8E+06	1.7E+02	2.1E+03	4.3E+04	2.8E+06
Silver	0	1.8E+00				1.6E+01				4.9E-01				7.6E+02				1.6E+01			
Sulfate	0			2.5E+05				6.3E+08				2.5E+04				6.3E+07				6.3E+07	
Tetrachloroethylene	0			3.2E+02	3.5E+03			8.1E+05	8.9E+06			3.2E+01	3.5E+02			8.1E+04	8.9E+05			8.1E+04	8.9E+05
Toluene	0			6.8E+03	2.0E+05			1.7E+07	5.1E+08			6.8E+02	2.0E+04			1.7E+06	5.1E+07			1.7E+06	5.1E+07
Total dissolved solids	0			5.0E+05				1.3E+09				5.0E+04				1.3E+08				1.3E+08	
Toxaphene [c]	0	7.3E-01	2.0E-04	7.3E-03	7.3E-03	6.4E+00	8.9E-02	5.4E+01	5.4E+01	1.8E-01	5.0E-05	7.3E-04	7.3E-04	2.8E+02	8.6E-02	5.4E+00	5.4E+00	6.4E+00	8.6E-02	5.4E+00	5.4E+00
1,2,4-Trichlorobenzene	0			2.6E+02	9.5E+02			6.6E+05	2.4E+06			2.6E+01	9.5E+01			6.6E+04	2.4E+05			6.6E+04	2.4E+05
Trichloroethylene [c]	0			2.7E+01	8.1E+02			2.0E+05	6.0E+06			2.7E+00	8.1E+01			2.0E+04	6.0E+05			2.0E+04	6.0E+05
2,4,6-Trichlorophenol [c]	0			2.1E+01	6.5E+01			1.6E+05	4.8E+05			2.1E+00	6.5E+00			1.6E+04	4.8E+04			1.6E+04	4.8E+04
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0			5.0E+01				1.3E+05				5.0E+00				1.3E+04				1.3E+04	
Tributyltin	0	4.6E-01	2.6E-02			4.0E+00	1.2E+01			1.2E-01	6.5E-03			1.8E+02	1.1E+01			4.0E+00	1.1E+01		
Vinyl Chloride	0			2.0E+01	5.3E+03			5.1E+04	1.3E+07			2.0E+00	5.3E+02			5.1E+03	1.3E+06			5.1E+03	1.3E+06
Zinc	0	7.9E+01	7.4E+01	5.0E+03		6.9E+02	3.3E+04	1.3E+07		2.1E+01	1.9E+01	5.0E+02		3.2E+04	3.2E+04	1.3E+06		6.9E+02	3.2E+04	1.3E+06	

[c] = carcinogenic

Regular WLA = [WQS((%MIX/100)(stream flow) + design flow) - (streamflow)(background conc.)]/design flow

Antideg. Baseline = (0.25(WQS - background conc.) + background conc.) for acute and chronic

= (0.1(WQS - background conc.) + background conc.) for human health

Antideg. WLA = [Baseline(stream flow + design flow) - (stream flow)(background conc.)]/design flow

= data entry cells

= protected cells

Metal	Target Value (SSTV)	
Antimony	3.5E+03	3500
Arsenic	1.3E+04	13000
Arsenic III	1.3E+03	1300
Barium	5.1E+05	510000
Cadmium	8.1E+00	8.1
Chromium III	4.1E+03	4100
Chromium VI	5.6E+01	56
Copper	4.0E+01	40
Iron	7.6E+04	76000
Lead	2.3E+02	230
Manganese	1.3E+04	13000
Mercury	3.1E+00	3.1
Nickel	4.3E+02	430
Selenium	7.0E+01	70
Silver	6.3E+00	6.3
Zinc	2.7E+02	270

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

Freshwater Ammonia Criteria			
	unionized	total	NH3-N
Acute	0.45374	3.26323	2.6823723
Chronic	0.10342	0.74376	0.6113669

	Regular WLA	Antideg. WLA
Eff. 7Q10	116.48	448
Eff. 1Q10	2.02	404
Acute hardness	62.5618	65.8
Chronic Hardness	65.7367	65.8

Facility = JRCC-002
Chemical = TR Copper
STD averaging period = 4
WLAa = 100
WLAc = 3600
Q.L. = 40
# per mo. = 1

Summary of Statistics

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

12.1 3/30/98

Facility = JRCC-002
Chemical = TR Silver
STD averaging period = 4
WLAa = 16
WLAc = 1010101010
Q.L. = 6.3
# per mo. = 1

Summary of Statistics

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

0.1 3/30/98

Facility = JRCC-002
Chemical = TR Zinc
STD averaging period = 4
WLAa = 690
WLAc = 32000
Q.L. = 270
# per mo. = 1

Summary of Statistics

observations = 1
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 1
Model used =

No Limit is required for this material

The data are:

69.9 3/30/98

Facility = JRCC-002
Chemical = TRC
STD averaging period = 4
WLAa = 0.17
WLAc = 4.7
Q.L. = .1
# per mo. = 30

Summary of Statistics

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.17
Average Weekly limit = 0.103820225147845 .1
Average Monthly LImit = 8.42555978575054E-02 .08

The data are:

20 per guidance, one datum of 20 is used to force the program to calculate a limit mm-23

Facility = JRCC-002
Chemical = Ammonia
STD averaging period = 30
WLAa = 23
WLAc = 260
Q.L. = .2
# per mo. = 1

Summary of Statistics

observations = 3
Expected Value = .185549
Variance = .012394
C.V. = 0.6
97th percentile daily values = .451520
97th percentile 4 day average = .308715
97th percentile 30 day average= .223782
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

1.55
0.05
0.04
} from application 2A

TKN limit is more stringent

Attachment G

Government Coordination:

VDH-ODW

RECEIVED
JAN 14 2013
PRO

COMMONWEALTH of VIRGINIA

DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER
East Central Field Office

300 Turner Road
Richmond, VA 23225
Phone: 804-674-2880
Fax: 804-674-2815

TO: Emilee Carpenter Adamson, Water Permit Writer
Department of Environmental Quality, Piedmont Regional Office

FROM: Bennett K. Ragnauth, P.E., Engineering Field Director
Office of Drinking Water, East Central Field Office

DATE: January 9, 2013

SUBJECT: VPDES Permit Application No. VA0020681 ■ Re-issuance (existing) □ Issuance (new)

OWNER/APPLICANT: Virginia Department of Corrections

LOCATION OF DISCHARGE / ACTIVITY: James River, just upstream of its confluence with Beaverdam Creek, on the Middle James River Basin

COMMENTS:

□ There are no public water supply intakes within 15 miles downstream of the discharge / activity.

■ The raw water intake for the 80 MGD Henrico Regional WTP waterworks is located 14.1 miles downstream from the discharge. We recommend a minimum Reliability Class II for this facility, which is the same as the existing Reliability Class.

□ The raw water intake for the _____ waterworks is located ___ miles downstream from the discharge.

□ Please forward a copy of the Draft Permit for our review and comment.

□ Other comments: _____

cc: VDH, ODW – Central Office

Reviewer: Randall L. Morrissette

VDH VIRGINIA DEPARTMENT OF HEALTH
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