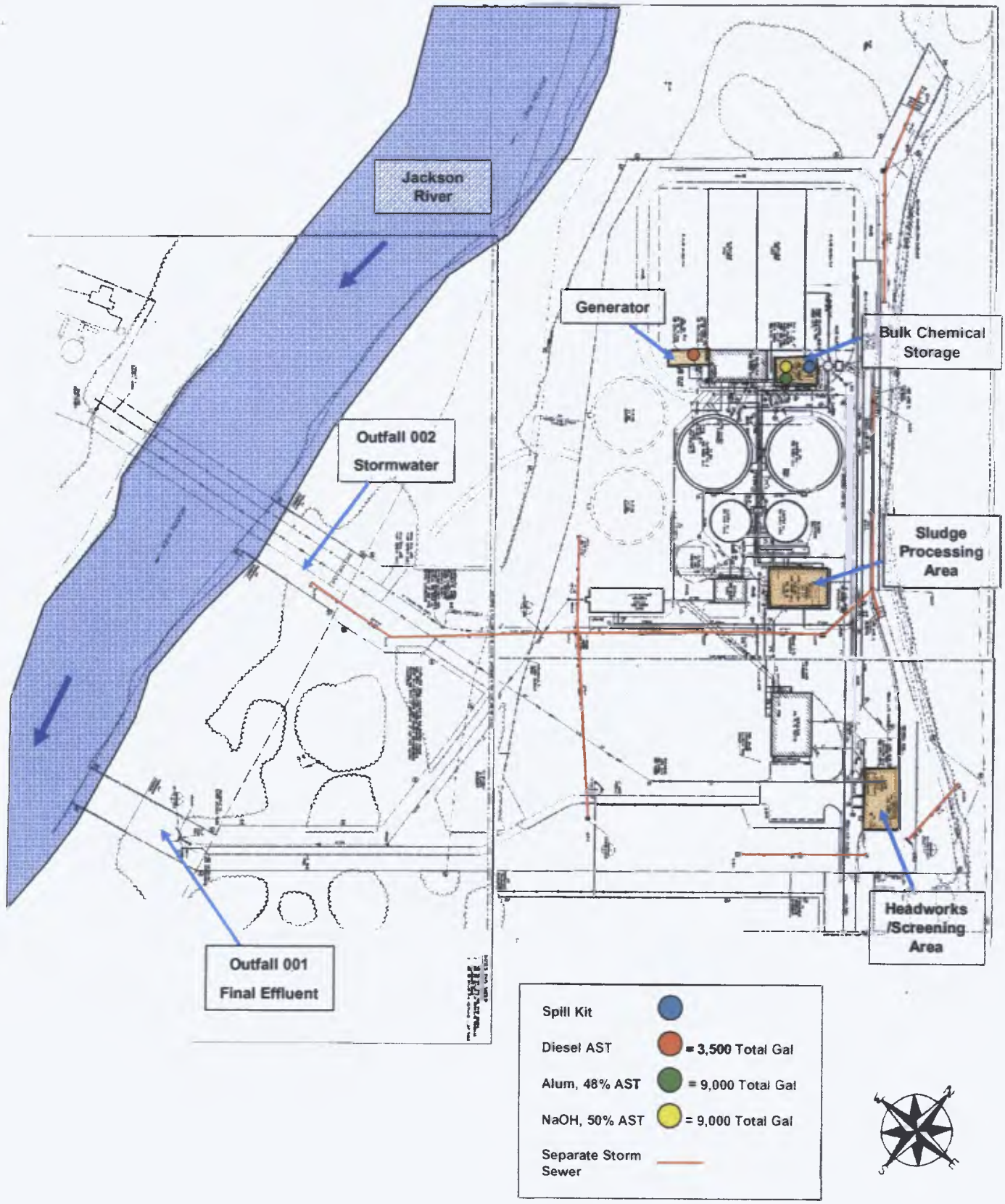
APPENDIX A

Facility Information

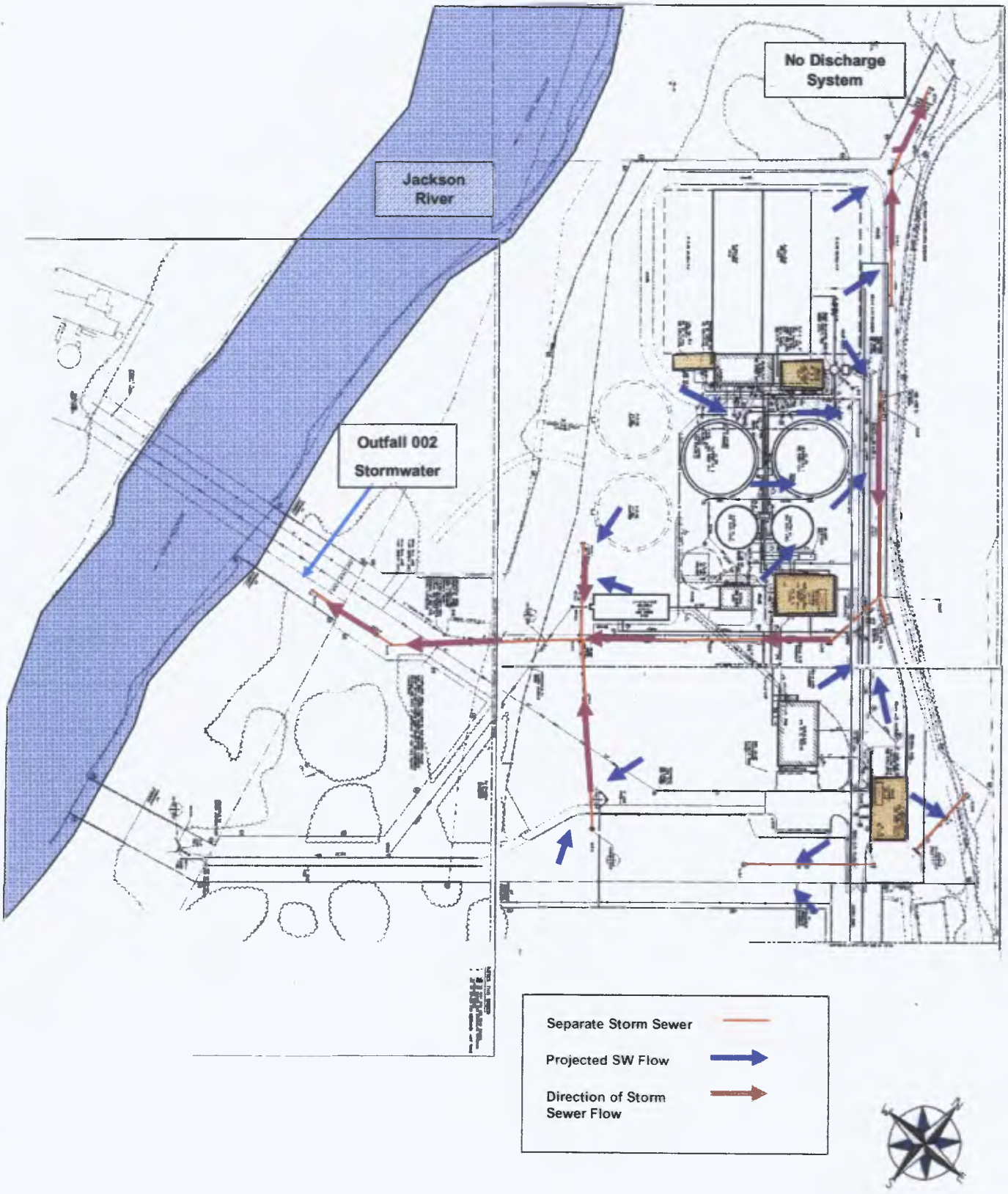
-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 700 ft Scale: 1 : 24,000 Detail: 13-1 Datum: WGS84

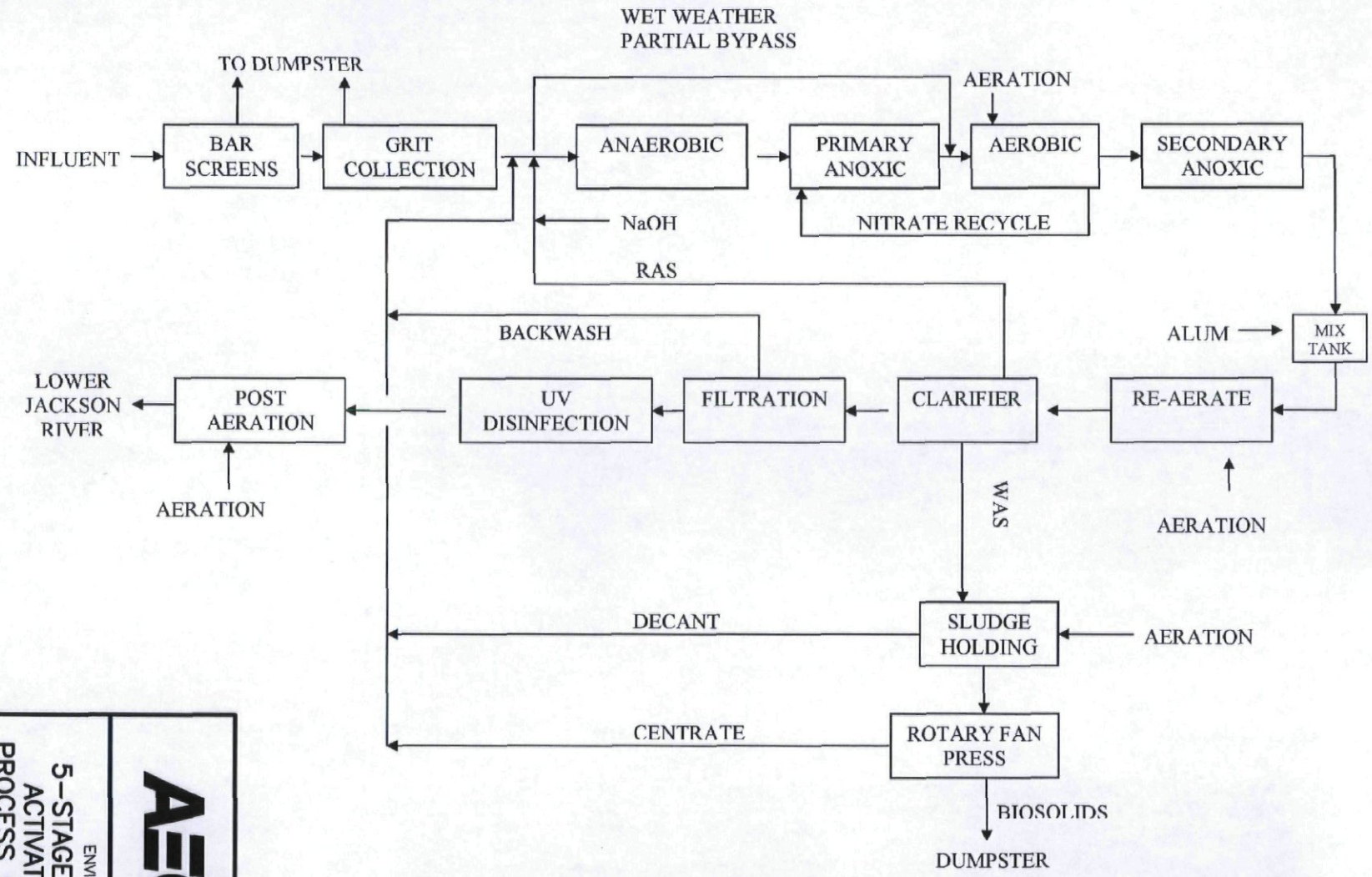
Attachment One

Lower Jackson Regional WWTP
Facility Map



Lower Jackson Regional WWTP
Projected SW Flow Map





LOWER JACKSON RIVER REGIONAL WWTP– 2.6 MGD

ATTACHMENT #2

AECOM

ENVIRONMENTAL

5-STAGE BARDENPHO ACTIVATED SLUDGE PROCESS FLOW DIAGRAM

ALLEGHANY COUNTY, VIRGINIA

MARCH 2011 | 60186P | FIG.5

Lower Jackson River Regional WWTP

Form 2A Item B.3 – Process Narrative

The Lower Jackson River Regional WWTP is 2.6 MGD wastewater treatment facility which includes Pretreatment, biological and chemical removal, filtration, ultra-violet disinfection, post aeration and sludge management processes.

Wastewater enters the treatment facility at the Headworks Building via a 20" force main from the Iron Gate Pump station. I traveling screen is utilized for screening debris from the wastewater. A manual bar screen is also provided. Grit removal is accomplished using a vortex grit removal system. From the Headworks Building wastewater is conveyed to the Aeration Basins via a 24" gravity pipeline.

The treatment facility is equipped with two Aeration Basins utilizing the Bardenpho Activated sludge process. Wastewater enters the first pre-anoxic zone where it is mixed with Return Activated Sludge from the clarifiers before entering the second pre-anoxic zone. In the second pre-anoxic zone flow is mixed with recycled flow from the end of the aeration tank before flowing into the third and fourth pre-anoxic zones. Nitrogen removal is accomplished in the pre-anoxic zones by converting nitrate and nitrite to oxygen and nitrogen gas, which escapes to the atmosphere.

Flow from the fourth pre-anoxic zone enters the aeration basin. In the aeration tank biological oxygen demand is reduced and ammonia is converted to nitrite and nitrate. The aeration tank is provided with an internal recirculation pump which recirculates up to 300% of the influent zone to the second pre-anoxic zone. From the end of the aeration basin flow enters four post-anoxic zones where additional nitrogen removal is accomplished. In the final post-anoxic zone aluminum sulfate is added prior to flowing to the clarifiers.

The facility is equipped with two centerflow clarifiers. In the clarifiers solidsx from the mixed liquor from the aeration tank are settled which is pumped back to first pre-anoxic basin tank and mixed with incoming wastewater from the headworks. Clear water overflows the clarifier weirs and flows to the tertiary filters.

The facility is equipped with two cloth media filters which further reduce any particulate matter in the wastewater from the clarifiers. The filters are equipped with filter back wash filters and sludge pumps. Material from the filter back wash is pumped to the filter back wash pump station and subsequently back to the headworks building. Sludge that accumulates in the bottom of the filter tanks is pumped to the aerobic digesters. The filters are equipped with continuous turbidity meters. Effluent from the filters then flows to the UV and NPW shed.

Filter effluent flows to the UV channel which is equipped with two banks of UV lights consisting of forty UV bulbs per bank. The UV system is equipped with an automatic cleaning system to insure the bulbs remain free of debris. From the UV channel, wastewater flows to the post aeration tanks and NPW tank.

The Post Aeration tank is equipped with two blowers and series of diffusers which aerates the wastewater to insure adequate dissolved oxygen content prior to discharge to the Jackson River. The aeration tanks have continuous pH and dissolve oxygen meters.

The NPW tank is equipped with three NPW pumps which supply all the hydrants, wash down equipment and HVAC water demands inside the plant.

Two aerobic digesters are provided. Waste activated sludge is pumped from the return sludge from the clarifiers. Three positive displacement pumps are used to aerate the digester sludge. Sludge from the digesters is pumped to a rotary fan press located in the Solids building.

Sludge from the digesters are pumped to the Rotary fan press which dewaters the sludge. Dewatered sludge is collected in to a hopper which is transported to Amelia Landfill for discposal.

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Site Visit, Lower Jackson River Regional WWTP, Alleghany County

TO: File

FROM: Lewis Pillis

DATE: April 22, 2011

COPIES:

Today, Christopher Clark, Alleghany County Public Works Director, and Brian White, of ESS, accompanied me on a brief tour of the site. All buildings are under roof and the major treatment units have been constructed. One of the bioreactor basins was full of water for testing. Construction is expected to be complete by the end of summer.

ESC measures have been installed, but a lot of the storm water is ponding on the site. A storm water outlet to the River is present about 200 feet upstream of outfall 001. Some of the inlets were observed. Contributions to the outlet are 1) off site storm water, 2) a grated inlet adjacent to the solids handling building and 3) a grade inlet south of the clarifiers and west of the UV area. Off-site storm water empties into earthen ditches on the east, west and south sides of the WWTP and reenters the storm drain in a manhole south of the plant before being discharged. The site has not been brought to final grade, so it was not possible to determine flow directions on the site.

Both the effluent and storm water outfalls appeared to be constructed according to DCR specs, with the outlets at grade and the ditches protected with riprap.

Effluent will enter the River just upstream of a riffle area. The pool behind the riffle area is small and the river is moving fairly rapidly in this area. At the Rt. 727 bridge, small rocks line the River bottom and the rocks appear to have a brown coating on them.

Alleghany Co - Lower Jackson River Regional WWTP
VA0090671

data reported to DEQ on DMRs

		FLOW, MGD			BOD, mg/L		TSS, mg/L		pH, SU		*E. coli*
		Mo ave	Max wk ave	Ann ave	Mo ave	Max wk ave	Mo ave	Max wk ave	Min	Max	#/100ml
limit =>		*2.6*			*30*	*45*	*30*	*45*	*6.0*	*9.0*	*126*
2013	1	1.1	3.587		2	0	5	2	7.1	7.8	1
	2	1	3.404		<QL	<QL	1	1	7.1	7.8	1
	3	1.2	2.117		0.3	1	1	1	6.9	7.6	1
	4	1.1	2.298		<QL	<QL	2	3	6.9	7.6	1
	5	1.3	3.899		<QL	<QL	1	2	6.8	7.7	1
	6	1.4	4.731		<QL	<QL	1	2	7	7.8	1
	7	1.6	4.875		<QL	<QL	1	2	7	7.7	1
	8	0.6	0.917		<QL	<QL	<QL	<QL	7.2	7.8	1
	9	0.6	1.388		<QL	<QL	0.1	0.3	7.1	7.8	1
	10	0.5	1.271		<QL	<QL	0.04	0.2	7.2	7.9	1
	11	0.6	2.695		<QL	<QL	0.18	0.76	7.1	7.9	2
	12	1.5	3.606	1.04	<QL	<QL	1	3	6.8	7.4	1
2014	1	1.1	2.829		<QL	<QL	1	1	6.8	7.2	1
	2	1.7	3.44		<QL	<QL	1	1	6.6	7.1	1
	3	1.3	2.842		<QL	<QL	1	1	6.9	7.4	1
	4	1.2	2.599		<QL	<QL	1	1	6.7	7.3	1
	5	1.1	2.667		<QL	<QL	0.4	1	6.5	7.8	1
	6	0.6	1.322		<QL	<QL	<QL	<QL	7.1	8	1
	7	0.6	1.247		<QL	<QL	0.1	0.2	7.4	7.9	1
	8	0.6	1.271		<QL	<QL	0.4	1	7.4	7.9	1
	9	0.5	0.788		<QL	<QL	<QL	<QL	7.5	7.9	1
	10	0.8	2.189		<QL	<QL	<QL	<QL	6.9	8	2
	11	0.7	2.361		<QL	<QL	0.4	1	6.9	7.8	1
	12	0.9	2.129	0.925	<QL	<QL	<QL	<QL	7	7.7	1
2015	1	0.9	1.909		<QL	<QL	0.2	1	6.9	7.7	1
	2	0.7	1.557		<QL	<QL	<QL	<QL	6.8	7.7	1
	3	1.6	4.254		<QL	<QL	0.3	1	6.9	7.6	1
	4	1.7	4.772		<QL	<QL	1	1	7	7.7	1
	5	0.7	1.814		<QL	<QL	1	2	7.1	8.2	1
	6	0.7	2.403		<QL	<QL	<QL	<QL	7	7.9	1
	7	0.9	2.556		0.2	1	0.2	0.2	7.1	7.7	1
	8	0.5	1.311		<QL	<QL	0.11	0.24	7.3	8	1
	9	0.6	3.7		<QL	<QL	0.3	0.5	7.3	7.9	1
	10	1.1	3.295		<QL	<QL	0.1	0.2	7.1	7.8	1
	11	1	2.816		<QL	<QL	0.1	1	7.1	8.1	1
	12	1.6	3.472	1.00	<QL	<QL	0.2	1	7	7.8	1
2016	1	0.9	1.596		<QL	<QL	<QL	<QL	7	7.5	1
	2	2.1	4.459		<QL	<QL	1	1	6.9	7.4	1
min/max		*0.5/2.1*							*6.5*	*8.2*	

Alleghany Co - Lower Jackson River Regional WWTP
VA0090671

data reported to DEQ on DMRs

		NITROGEN, TOTAL (AS N)				PHOSPHORUS, TOTAL (AS P)			
		mg/L	lb	lb	mg/L	mg/L	lb	lb	mg/L
		Mo ave	Mo total	Jun-Oct	An ave	Mo ave	Mo total	Jun-Oct	An ave
limit =>				*19906*	*6.0*			*1659*	*0.3*
2013	1	3.6	946			0.07	31		
	2	4.4	1249			0.06	28		
	3	3.3	1104			0.07	25		
	4	3.5	846			0.11	30		
	5	3.8	1404			0.14	53		
	6	4.1	2013			0.14	60		
	7	8.6	3007			0.2	78		
	8	5.5	806			0.2	31		
	9	5.9	870			0.23	30		
	10	7.9	1094	7790		0.21	31	230	
	11	10.1	1128			0.15	16		
	12	6.3	3410		5.6	0.2	155		0.3
2014	1	6	1305			0.21	33		
	2	6	2632			0.08	20		
	3	5.1	1891			0.14	43		
	4	3.9	1170			0.15	46		
	5	5.4	1395			0.21	42		
	6	2.9	414			0.16	23		
	7	5	682			0.4	17		
	8	4.6	632			0.14	21		
	9	5.2	747			0.13	17		
	10	7.2	1364	3839		<QL	36	107	
	11	6.6	900			0.17	24		
	12	5.1	1516		5.3	0.1	23		0.1
2015	1	4.1	822			0.08	17		
	2	5.9	1008			0.11	18		
	3	4.5	*1612*			0.06	21		
	4	4.9	2175			0.1	48		
	5	4.1	791			0.12	22		
	6	4.7	570			0.12	14		
	7	4.7	1274			0.21	58		
	8	3.6	524			0.11	15		
	9	5	780			0.1	16		
	10	7.8	1736	4884		0.11	28	131	
	11	5.7	1440			0.07	22		
	12	4.6	1860		4.9	0.06	29		0.1
2016	1	4.6	1163			0.14	32		
	2	4.1	2624			0.06	48		
min/max		*2.9/10.1*	*414/3410*			*0.06/0.4*	*14/155*		

Table 1 Acute Toxicity Test Data for the LJRR WWTP; VA0090671; Outfall 001; Endpoint LC_{50} = 33%

Test Date - Quarter	Test Organism	LC_{50} (%)	% Survival in 100% Effluent	Testing Laboratory
3/6/12 – 1*	*C. dubia*	>100	100	CBI
3/6/12 – 1*	*P. promelas*	>100	100	CBI
6/20/12 - 2	*C. dubia*	>100	100	CBI
6/20/12 - 2	*P. promelas*	>100	100	CBI
8/29/12 - 3	*C. dubia*	>100	100	CBI
8/29/12 - 3	*P. promelas*	>100	100	CBI
11/13/12 - 4	*C. dubia*	>100	100	CBI
11/13/12 - 4	*P. promelas*	>100	100	CBI
3/20/13 – 5	*C. dubia*	>100	100	CBI
3/20/13 – 5	*P. promelas*	>100	100	CBI
6/19/13 – 6	*C. dubia*	>100	100	CBI
6/19/13 - 6	*P. promelas*	>100	100	CBI
8/28/13 - 7	*C. dubia*	>100	100	CBI
8/28/13 - 7	*P. promelas*	>100	100	CBI
10/30/13 - 8	*C. dubia*	>100	100	CBI
10/30/13 – 8	*P. promelas*	>100	100	CBI
3/12/14 – 9	*C. dubia*	>100	100	CBI
3/12/14 – 9	*P. promelas*	>100	100	CBI
6/18/14 - 10	*C. dubia*	>100	100	CBI
6/18/14 - 10	*P. promelas*	>100	100	CBI
7/22/15 – A1	*C. dubia*	>100	100	CBI
7/22/15 – A1	*P. promelas*	>100	100	CBI

* Notes:
Q1 samples collected as time composites rather than flow proportional composites

Table 2 Chronic Toxicity Test Data for the LJRR WWTP; VA0090671; Outfall 001; Endpoint NOEC ≥ 4%

Test Date - Quarter	Test Organism	NOEC Survival (%)	NOEC Growth or Reproduction (%)	% Survival in 100% Effluent	Testing Laboratory
3/5/12 – 1*	*C. dubia*	100	100	100	CBI
3/5/12 – 1*	*P. promelas*	100	100	93	CBI
6/19/12 - 2	*C. dubia*	100	100	100	CBI
6/19/12 - 2	*P. promelas*	100	100	88	CBI
8/24/12 - 3	*C. dubia*	100	100	100	CBI
8/24/12 - 3	*P. promelas*	100	100	100	CBI
11/13/12 - 4	*C. dubia*	100	100	100	CBI
11/13/12 - 4	*P. promelas*	100	100	100	CBI
3/19/13 – 5	*C. dubia*	100	100	90	CBI
3/19/13 – 5	*P. promelas*	100	100	98	CBI
6/18/13 - 6	*C. dubia*	100	100	100	CBI
6/18/13 - 6	*P. promelas*	100	100	98	CBI
8/27/13 - 7	*C. dubia*	100	100	100	CBI
8/27/13 - 7	*P. promelas*	100	100	92.5	CBI
10/29/13 – 8	*C. dubia*	100	100	100	CBI
10/29/13 – 8	*P. promelas*	100	100	97.5[c]	CBI
3/11/14 - 9	*C. dubia*	100	100	100	CBI
3/11/14 - 9	*P. promelas*	100	100	100	CBI
6/17/14 - 10	*C. dubia*	100	100	100	CBI
6/17/14 - 10	*P. promelas*	100	100	100	CBI
7/22/15 – A1	*C. dubia*	100	100	100	CBI
7/22/15 – A1	*P. promelas*	100	100	97.5c	CBI

* Notes:

c indicates same % survival as control

Q1 samples collected as time composites rather than flow proportional composites

APPENDIX B

Receiving Stream Information

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Flow Frequency Determination, Lower Jackson River STP, VPDES Permit No. VA0090671

TO: File

FROM: Lewis Pillis

DATE: March 6, 2006

COPIES:

Critical flows for the gages used in preparing the referenced permit have changed since development of the last permit. Eugene Powell, DEQ-Office of Surface Water Investigations, updated the gage statistics in 2005. Critical flows for the Jackson and James River gages includes flows released from Gathright dam in these calculations. Using the same method that was employed in the issuance of the subject permit, flows from the Cowpasture River near Clifton Forge (# 02016000), were subtracted from flows of the James River at Lick Run (# 02016500), which is about 4 miles downstream of the discharge point. Drainage area proportions were then used to project critical flows at the discharge point. Since the Clifton Forge STP will simultaneously go offline when discharge from the Lower Jackson River STP begins, this flow is also subtracted from the critical river flow. The attached spreadsheet details these calculations.

Critical flows at the discharge point once the Clifton Forge STP goes offline are:

1Q10 – 119 MGD
7Q10 – 129 MGD
30Q10 – 141 MGD
30Q5 – 156 MGD
HF 1Q10 – 154 MGD
HF 7Q10 – 191 MGD
HF 30Q10 – 226 MGD
Harmonic Mean – 353 MGD

High Flow Months – JAN - MAY
Period Used – 1980– 2003

		QUAD	REGION	DAAREA	HARMEAN	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	**Z7Q10**	Z1Q10	Z1Q30
					cfs								
02016500	James River at Lick Run, Va.	Clifton Forge	WCRO	1373	745	479	393	325	315	286	**261**	242	200
02016000	Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO	461	191	124	92	82	69	63	**56**	53	47
	James River at Lick Run, Va. MINUS Cowpasture River			912	554	355	301	243	246	223	**205**	189	153
James River	at outfall for Lower Jackson River STP	Drainage area proportions		904.5/912	549	352	299	241	244	221	**203**	187	152
				0.991776									
				convert to MGD:									
	James River at Lick Run, Va.	Clifton Forge	WCRO		481	310	254	210	204	185	**169**	156	129
	Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO		123	80	59	53	45	41	**36.2**	34.3	30.4
					355	228	193	156	158	143	**131**	121	98
Less Clifton Forge STP contribution					2	2	2	2	2	2	**2**	2	2
Final critical flows at Lower Jackson STP					**353**	**226**	**191**	**154**	**156**	**141**	**129**	**119**	**96**

Mixing Zone Predictions for Lower Jackson 2.6 MGD

Effluent Flow = 2.6 MGD
Stream 7Q10 = 129 MGD
Stream 30Q10 = 141 MGD
Stream 1Q10 = 119 MGD
Stream slope = 0.0016 ft/ft
Stream width = 148 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7662 ft
Length = 12816.15 ft
Velocity = .7793 ft/sec
Residence Time = .1903 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.8619 ft
Length = 12254.82 ft
Velocity = .8066 ft/sec
Residence Time = .1758 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.6837 ft
Length = 13347.09 ft
Velocity = .7554 ft/sec
Residence Time = 4.908 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.37% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

Mixing Zone Predictions for LJRR WWTP 3.5MGD

Effluent Flow = 3.5 MGD
Stream 7Q10 = 129 MGD
Stream 30Q10 = 141 MGD
Stream 1Q10 = 119 MGD
Stream slope = 0.0016 ft/ft
Stream width = 148 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7735 ft
Length = 12771.32 ft
Velocity = .7814 ft/sec
Residence Time = .1892 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.8692 ft
Length = 12213.94 ft
Velocity = .8086 ft/sec
Residence Time = .1748 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.6912 ft
Length = 13296.84 ft
Velocity = .7576 ft/sec
Residence Time = 4.8753 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.51% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

Dischargers and Sampling Stations on the Jackson - James River

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	Diurnal model mile	2006 DEQ model mile
APXB station	One Mile below McClintic - Sta. No. 4			A	2-JKS053.48-TL		53.48		
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-BL		48.90		
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-TL		48.90		
APXB station	WQS - Lake Moomaw (Lower Lake)			C	2-JKS047.06		47.06		
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-BL		46.40		
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-TL		46.40		
APXB station	Dam - Station No. 1			A	2-JKS044.60-BL		44.60		
APXB station	Dam - Station No. 1			A	2-JKS044.60-TL		44.60		
APXB station	Below Gathwright Dam at gage			A	2-JKS044.10		44.10		
U.S. Army Corps of Engineers	Morris Hill STP	005	001	0.01500	Sewage	JKS	43.55		
APXB station	Near Camp Appalachia			B	2-JKS039.01		39.01		
Sponaugle, Frank	Sponaugle Subd.	005	001	0.01600	Sewage	JKS	34.93		
APXB station	Rt. 687 Bridge - Clearwater Park			A,B,SS	2-JKS030.65		30.65		
APXB station	Covington Water Filtration Plant			SS1, SS2	2-JKS026.01		26.01		
Covington, City of	Jackson R. WTP		001	4.0000	Intake	Jackson R.	26.00		
WESTVACO	WESTVACO		002		Intake	Jackson R.	25.88		
WESTVACO	WESTVACO		003		Intake	Jackson R.	25.56		
WESTVACO	WESTVACO		004		Intake	Jackson R.	25.52		
WESTVACO	WESTVACO	005	007		Storm Water	JKS	25.44		
WESTVACO	WESTVACO	005	005		Storm Water	JKS	25.36		
WESTVACO	WESTVACO	005	006		Storm Water	JKS	25.20		
WESTVACO	WESTVACO		005		Intake	Jackson R.	25.09		
WESTVACO	WESTVACO		006		Intake	Jackson R.	25.08		
Martin County Coal Corporation	Coal Handling Facility	005	006	0.00000	Storm Water	JKS	24.96		
WESTVACO	WESTVACO	005	001	33.00000	Storm Water	JKS	24.92		
WESTVACO	WESTVACO	005	008	0.00000	Storm Water	JKS	24.84		
WESTVACO	WESTVACO		007		Intake	Jackson R.	24.80		
WESTVACO	WESTVACO		008		Intake	Jackson R.	24.69		
WESTVACO	WESTVACO	005	002	23.20000	Storm Water	JKS	24.68		
WESTVACO	WESTVACO	005	003	27.60000	Process	JKS	24.64		
WESTVACO	WESTVACO	005	009	0.00000	Storm Water	JKS	24.52		
WESTVACO	WESTVACO	005	010	0.00000	Storm Water	JKS	24.48		
WESTVACO	WESTVACO	005	011	0.00000	Storm Water	JKS	24.47		
WESTVACO	WESTVACO	005	012	0.00000	Storm Water	JKS	24.26		
WESTVACO	WESTVACO	005	013	0.00000	Storm Water	JKS	24.25		
APXB station	Rt. 60 Bridge			SS	2-JKS024.20		24.20		
APXB station	City Park - Covington at gage			A,B	2-JKS023.61		23.61		
APXB station	City Park - Covington at gage			SS	2-JKS023.61		23.61		
APXB station	Swinging Bridge			SS	2-JKS023.32		23.32		
APXB station	Fudge's Bridge, Rt. 154, Covington			SS	2-JKS022.78		22.78		
APXB station	Industrial Park behind Walmart			SS1, SS2	2-JKS022.15		22.15		
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	004		Storm Water	JKS	21.07		
APXB station	S. Rayon Dr. Bridge, Covington			SS	2-JKS021.06		21.06		
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	002	0.60000	Fire Water Storage Tanks	JKS	19.72		
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	001	0.90000	Process	JKS	19.22		
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	003	0.00000	Storm Water	JKS	19.22		
Covington, City of	Covington STP	580	001	3.00000	Sewage	JKS	19.03		
APXB station	Rt. 18 Bridge at Covington			A,B,SS	2-JKS018.68		18.68		
APXB station	Byrd's Farm East of Covington			SS	2-JKS017.30		17.30		
APXB station	Byrd's Farm #2			SS	2-JKS017.03		17.03		
APXB station	Between I-64 & CSX Railroad N/Mallow			SS	2-JKS015.80		15.80		

Dischargers and Sampling Stations on the Jackson - James River

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	Diurnal model mile	2006 DEQ model mile
APXB station	Island Ford Cave above Low Moor			SS	2-JKS013.45		13.45		
APXB station	Off Rt. 696 above Lowmoor			A,B	2-JKS013.29		13.29		
APXB station	Island Ford Bridge, Rt. 1101			SS	2-JKS011.92		11.92		
Alleghany County	Low Moor STP	005	001	0.5	Sewage	JKS	10.05		
APXB station	Low Water Bridge - near Dabney Lancaster			A,B	2-JKS006.67		6.67	**0**	
CSX Transportation, Inc.	Clifton Forge	560	001	0.05470	Process	JKS	4.72	**1.95**	
Clifton Forge, City of	Clifton Forge STP	560	001	2.00000	Sewage	JKS	3.46	**3.21**	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	002	0.32300	Cooling-Contact	JKS	1.21	**5.46**	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	001	0.02300	Process	JKS	1.17	**5.50**	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	999	0.02300	Process	JKS	1.17	**5.50**	
Alleghany Co.	Proposed Lower Jackson river STP				Sewage		0.76	**5.91**	0
APXB station	Rt. 727 Bridge - near Iron Gate			A	2-JKS000.38		0.38	**6.29**	0.38
Confluence of Cowpasture and Jackson						**JMS**	**346.49**	**6.67**	**0.76**
APXB station	Rt. 220 Bridge - near Gage			B	2-JMS345.73		345.73	**7.43**	1.52
Botetourt County	Glen Wilton STP	023	001	0.02000	Sewage	JMS	342.85	**10.31**	4.40
APXB station	James R. at Salisbury			A,B	2-JMS326.30		326.30	**26.86**	20.95
Botetourt County	Buchanan STP	023	001	0.23750	Sewage	JMS	308.51	**44.65**	38.74
APXB station	Rt. 501 Bridge - S.E. of Glasgow			A	2-JMS282.28		282.28	**70.88**	64.97
Georgia Pacific Co	GP, Big Island Plant	019	021	0.00600	Storm Water - Unloading Area	JMS	278.89	**74.27**	68.36

Station ID 2-JKS000.38

SR 727 at Iron Gate

Field data 0.4 mi downstream of LJRR WWTP

Collection Date Time	Temp Celc	Do Probe	Field pH	
01/05/2005 11:30	12.34	10.39	7.74	
03/29/2005 13:30	10.42	10.95	8.06	
05/02/2005 11:00	12.24	10.04	8.08	
07/12/2005 11:00	23.4	7.9	7.9	
09/28/2005 11:00	20.5	9.7	8.25	
11/09/2005 09:30	13.7	9.7	8.1	
01/24/2006 10:30	6.6	12.4	7.8	
03/30/2006 10:30	10.8	12.7	7.5	
05/01/2006 11:00	15.3	10	7	
07/31/2006 11:00	24.6	8.4	7.3	
09/07/2006 10:30	20.3	9.8	8.1	
11/14/2006 15:00	11.4	9.9	8.1	
01/10/2007 10:00	6.3	11.1	7.8	
03/22/2007 10:00	11	11.2	7.7	
05/15/2007 11:30	NULL	NULL	NULL	
07/26/2007 10:00	21	8.9	6.8	
09/27/2007 11:00	22.6	8.1	6.5	
11/19/2007 11:30	9.8	12.5	6.1	
01/08/2008 10:30	8.6	8.6	6.2	
03/13/2008 10:30	14.2	9.2	6.6	
03/25/2008 10:30	9.7	12.3	7	
05/07/2008 10:30	15.9	9.4	6.5	
07/29/2008 11:00	24.2	9.5	7.2	
09/22/2008 10:30	18.9	8.9	6.8	
11/24/2008 10:00	4.5	13.7	7.1	
01/22/2009 11:00	1.9	15.9	7.3	
03/11/2009 11:30	13.4	11.1	7.3	
05/05/2009 11:30	10.2	11.4	6.6	
07/07/2009 10:30	20.7	8.4	7.1	
09/02/2009 12:00	21.1	9.2	7.2	
11/30/2009 11:00	11.1	NULL	7.4	
02/24/2010 14:10	5.6	12.2	7.7	
04/01/2010 10:15	10.3	11.1	7.8	
06/16/2010 10:45	25.3	8.2	7.9	
08/17/2010 07:46	24.3	7.3	7.8	
10/26/2010 15:00	16.8	10.1	8.1	
12/29/2010 14:40	3.5	NULL	8.4	
02/17/2011 09:30	7.7	11.9	8	
04/20/2011 13:10	11.8	NULL	7.9	
06/23/2011 10:30	23.4	7.4	7.4	
08/17/2011 11:00	23.1	9.4	8.2	
90% =>	**23.48**		**8.1**	
10/13/2011 11:45	17.9	9.7	8.2	*
12/29/2011 12:20	6.1	11.6	7.7	*
02/22/2012 11:30	6.5	12.2	7.4	*
03/08/2012 11:00	9.4	11.7	7.1	*
05/24/2012 11:45	17.8	9.3	8.1	*

* after discharge from LJRR WWTP began

	25.3	*7.3*	*8.4*	
	max	*min*	*max*	
90% =>	**23.44**		**8.1**	using all data listed

Station 2-JKS006.67

upstream at Dabney Lancaster

Field data

	Collection Date Time	Temp Celcius	Do Probe	Field pH
	01/09/2001	4.1	12.5	8.41
	02/01/2001	6	12.3	7.99
	03/01/2001	7.5	12.1	9.05
	04/02/2001	7.7	11.8	8.64
	05/01/2001	21.1	10.34	8.89
	06/05/2001	20	8.51	8.09
	07/19/2001	23.8	7.89	8.2
	09/10/2001	23.9	8.38	8.59
	11/28/2001	15.2	9.59	8.28
	01/22/2002	7	12.67	8.57
	03/26/2002	11.9	9.26	7.53
	05/23/2002	18.39	12.23	8.56
	07/18/2002	24.33	6.59	7.7
	09/17/2002	23.45	8.57	8.27
	11/18/2002	9.4	10.53	8.19
	02/03/2003	8	14.1	8.8
	03/25/2003	12.01	11.77	8.43
	05/27/2003	14.79	9.78	7.51
	10/24/2006	10.6	12.3	8.4
	10/26/2006	12.7	10.1	7.8
	10/30/2006	12.7	11.9	8.2
	02/24/2010	5.4	12.2	7.6
	04/01/2010	9.7	11.3	7.7
	06/16/2010	27.3	9.9	8
	08/16/2010	26.3	9.2	8.3
	08/17/2010	26.8	9.5	8.4
	08/18/2010	21.1	9.7	8.1
	10/26/2010	18.3	9.9	8
	12/29/2010	4.3	NULL	8.4
	02/16/2011	9.3	14.2	8.3
	04/19/2011	9.6	NULL	7.8
	06/22/2011	23	7.5	7.1
	08/16/2011	22.3	8.5	7.9
	10/12/2011	17	8.9	8
	12/28/2011	7.2	11.5	7
Max =>		27.3	14.2	9.05
Min =>		4.1	6.59	7
90% =>		**24.2**		**8.6**

Station ID 2-JKS000.38

most recent data

	00900 HARDNESS, TOTAL (MG/L AS CACO3)
01/13/2000	129
02/24/2000	87
03/28/2000	90
04/19/2000	50
05/15/2000	NULL
05/15/2000	166
06/01/2000	94
07/10/2000	165
08/01/2000	124
09/07/2000	114
10/04/2000	137
11/02/2000	215
12/06/2000	224
01/16/2001	233
02/01/2001	124
03/01/2001	187.9
04/02/2001	29.2
05/01/2001	144
06/05/2001	119
06/28/2001	NULL
07/19/2001	138
08/16/2001	90.3
09/10/2001	200
10/10/2001	209
11/28/2001	182
12/18/2001	159
01/22/2002	217
02/19/2002	205
03/26/2002	143
04/17/2002	104
05/23/2002	144
06/17/2002	163
07/18/2002	171
08/07/2002	182
09/17/2002	191
10/21/2002	195
11/18/2002	68.4
12/16/2002	63.6
02/03/2003	175
03/03/2003	61.3
03/25/2003	45.9
05/01/2003	98.1
06/19/2003	56.9
average =	*139*

APPENDIX C

Permit Development

Dissolved Oxygen Model
2.6 MGD WWTP

"Model Run For C:\Documents and Settings\ljpillis\My Documents\water\Models\stream model\model runs\lower Jackson\5 segments using Mannings 30BOD 9TKN 6.5 MGD.mod On 2/24/2009 2:18:21 PM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"

"7Q10",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
129.436,	5,	1.1,	5.609,	31

"Discharge/Tributary Input Data for Segment 1"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
2.6,	30,	9,	,6,	31

"Hydraulic Information for Segment 1"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
.78,	147.999,	1.927,	.716

"Initial Mix Values for Segment 1"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
132.036,	5.617,	13.731,	.512,	7.344,	31

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.846,	4.993,	.25,	.583,	0,	0

"Output for Segment 1"
"Segment starts at LOWER JACKSON RIVER WWTP"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	5.617,	13.731,	.512
.1,	.1,	5.554,	13.596,	.509
.2,	.2,	5.495,	13.462,	.506
.3,	.3,	5.44,	13.329,	.503
.4,	.4,	5.388,	13.198,	.501
.5,	.5,	5.34,	13.068,	.499
.6,	.6,	5.295,	12.939,	.497
.7,	.7,	5.253,	12.812,	.495
.78,	.78,	5.222,	12.711,	.493

"Discharge/Tributary Input Data for Segment 2"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
36.2,	2,	0,	,6.611,	31

"Incremental Flow Input Data for Segment 2"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.922,	5,	1.1,	,6.611,	31

"Hydraulic Information for Segment 2"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
.76,	155.001,	1.775,	.689

"Initial Mix Values for Segment 2"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
169.158,	5.527,	11.06,	.385,	7.346,	31

"Rate Constants for Segment 2. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.947,	5.124,	.25,	.583,	0,	0

"Output for Segment 2"
"Segment starts at COWPASTURE RIVER"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
.78,	0,	5.527,	11.06,	.385
.88,	.1,	5.495,	10.947,	.383
.98,	.2,	5.466,	10.835,	.381
1.08,	.3,	5.439,	10.724,	.379
1.18,	.4,	5.414,	10.614,	.377
1.28,	.5,	5.392,	10.505,	.375
1.38,	.6,	5.372,	10.397,	.373
1.48,	.7,	5.354,	10.291,	.371
1.54,	.76,	5.344,	10.228,	.37

"Discharge/Tributary Input Data for Segment 3"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.5,	2,	0,	,6.612,	31

"Incremental Flow Input Data for Segment 3"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.614,	31

"Hydraulic Information for Segment 3"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
2.88,	155.001,	1.778,	.613

"Initial Mix Values for Segment 3"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
169.658,	5.348,	10.213,	.369,	7.348,	31

"Rate Constants for Segment 3. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.125,	4.056,	.25,	.583,	0,	0

"Output for Segment 3"
"Segment starts at LICK RUN"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
1.54,	0,	5.348,	10.213,	.369
1.64,	.1,	5.31,	10.096,	.367
1.74,	.2,	5.275,	9.98,	.365
1.84,	.3,	5.243,	9.865,	.363
1.94,	.4,	5.213,	9.752,	.361
2.04,	.5,	5.186,	9.64,	.359

2.14,	.6,	5.161,	9.529,	.357
2.24,	.7,	5.138,	9.419,	.355
2.34,	.8,	5.117,	9.311,	.353
2.44,	.9,	5.099,	9.204,	.351
2.54,	1,	5.082,	9.098,	.349
2.64,	1.1,	5.067,	8.993,	.347
2.74,	1.2,	5.054,	8.89,	.345
2.84,	1.3,	5.043,	8.788,	.343
2.94,	1.4,	5.033,	8.687,	.341
3.04,	1.5,	5.025,	8.587,	.339
3.14,	1.6,	5.018,	8.488,	.337
3.24,	1.7,	5.013,	8.39,	.335
3.34,	1.8,	5.009,	8.294,	.333
3.44,	1.9,	5.006,	8.199,	.331
3.54,	2,	5.005,	8.105,	.329
3.64,	2.1,	5.005,	8.012,	.327
3.74,	2.2,	5.006,	7.92,	.325
3.84,	2.3,	5.008,	7.829,	.323
3.94,	2.4,	5.011,	7.739,	.321
4.04,	2.5,	5.015,	7.65,	.319
4.14,	2.6,	5.019,	7.562,	.317
4.24,	2.7,	5.024,	7.475,	.315
4.34,	2.8,	5.03,	7.389,	.313
4.42,	2.88,	5.035,	7.321,	.312

"Discharge/Tributary Input Data for Segment 4"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.02,	30,	15,	,5,	31

"Incremental Flow Input Data for Segment 4"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.616,	31

"Hydraulic Information for Segment 4"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
1.1,	160.002,	1.815,	.581

"Initial Mix Values for Segment 4"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
169.678,	5.035,	7.329,	.318,	7.351,	31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.829,	2.727,	3.54,	.25,	.583,	0,	0

"Output for Segment 4"
"Segment starts at GLEN WILTON STP"

"Total",	"Segm."			
"Dist.",	"Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
4.42,	0,	5.035,	7.329,	.318
4.52,	.1,	5.055,	7.265,	.316
4.62,	.2,	5.075,	7.202,	.314
4.72,	.3,	5.095,	7.139,	.312
4.82,	.4,	5.115,	7.077,	.31
4.92,	.5,	5.135,	7.016,	.308

```
5.02,    .6,       5.154,    6.955,    .306
5.12,    .7,       5.173,    6.895,    .304
5.22,    .8,       5.192,    6.835,    .302
5.32,    .9,       5.211,    6.776,    .3
5.42,    1,        5.23,     6.717,    .298
5.52,    1.1,      5.249,    6.659,    .296


"Discharge/Tributary Input Data for Segment 5"
"Flow",  "cBOD5",  "TKN",    "DO",     "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.24,     2,        0,        ,6.617,   31

"Incremental Flow Input Data for Segment 5"
"Flow",  "cBOD5",  "TKN",    "DO",     "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0,       5,        1.1,      ,6.622,   31

"Hydraulic Information for Segment 5"
"Length","Width",  "Depth",  "Velocity"
"(mi)",  "(ft)",   "(ft)",   "(ft/sec)"
6.24,    149.998,  1.679,    .671

"Initial Mix Values for Segment 5"
"Flow",  "DO",     "cBOD",   "nBOD",   "DOSat",  "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
169.918, 5.251,    6.657,    .296,     7.357,    31

"Rate Constants for Segment 5. - (All units Per Day)"
"k1",  "k1@T", "k2",   "k2@T", "kn",   "kn@T", "BD",   "BD@T"
.5,    .829,   4.038,  5.242,  .25,    .583,   0,      0

"Output for Segment 5"
"Segment starts at BIG CREEK"
"Total", "Segm."
"Dist.", "Dist.",  "DO",     "cBOD",   "nBOD"
"(mi)",  "(mi)",   "(mg/l)", "(mg/l)", "(mg/l)"
5.52,    0,        5.251,    6.657,    .296
5.62,    .1,       5.299,    6.607,    .294
5.72,    .2,       5.345,    6.557,    .292
5.82,    .3,       5.389,    6.508,    .29
5.92,    .4,       5.431,    6.459,    .288
6.02,    .5,       5.472,    6.41,     .286
6.12,    .6,       5.511,    6.362,    .284
6.22,    .7,       5.549,    6.314,    .282
6.32,    .8,       5.585,    6.267,    .281
6.42,    .9,       5.62,     6.22,     .28
6.52,    1,        5.654,    6.173,    .279
6.62,    1.1,      5.687,    6.127,    .278
6.72,    1.2,      5.718,    6.081,    .277
6.82,    1.3,      5.748,    6.035,    .276
6.92,    1.4,      5.777,    5.99,     .275
7.02,    1.5,      5.805,    5.945,    .274
7.12,    1.6,      5.832,    5.9,      .273
7.22,    1.7,      5.858,    5.856,    .272
7.32,    1.8,      5.884,    5.812,    .271
7.42,    1.9,      5.909,    5.768,    .27
7.52,    2,        5.933,    5.725,    .269
7.62,    2.1,      5.956,    5.682,    .268
7.72,    2.2,      5.978,    5.639,    .267
7.82,    2.3,      6,        5.597,    .266
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7.92,	2.4,	6.021,	5.555,	.265
8.02,	2.5,	6.041,	5.513,	.264
8.12,	2.6,	6.061,	5.472,	.263
8.22,	2.7,	6.08,	5.431,	.262
8.32,	2.8,	6.098,	5.39,	.261
8.42,	2.9,	6.116,	5.349,	.26
8.52,	3,	6.133,	5.309,	.259
8.62,	3.1,	6.15,	5.269,	.258
8.72,	3.2,	6.166,	5.229,	.257
8.82,	3.3,	6.182,	5.19,	.256
8.92,	3.4,	6.197,	5.151,	.255
9.02,	3.5,	6.212,	5.112,	.254
9.12,	3.6,	6.227,	5.074,	.253
9.22,	3.7,	6.241,	5.036,	.252
9.32,	3.8,	6.255,	5,	.251
9.42,	3.9,	6.305,	5,	.25
9.52,	4,	6.353,	5,	.249
9.62,	4.1,	6.399,	5,	.248
9.72,	4.2,	6.442,	5,	.247
9.82,	4.3,	6.483,	5,	.246
9.92,	4.4,	6.522,	5,	.245
10.02,	4.5,	6.56,	5,	.244
10.12,	4.6,	6.596,	5,	.243
10.22,	4.7,	6.622,	5,	.242
10.32,	4.8,	6.622,	5,	.241
10.42,	4.9,	6.622,	5,	.24
10.52,	5,	6.622,	5,	.239
10.62,	5.1,	6.622,	5,	.238
10.72,	5.2,	6.622,	5,	.237
10.82,	5.3,	6.622,	5,	.236
10.92,	5.4,	6.622,	5,	.235
11.02,	5.5,	6.622,	5,	.234
11.12,	5.6,	6.622,	5,	.233
11.22,	5.7,	6.622,	5,	.232
11.32,	5.8,	6.622,	5,	.231
11.42,	5.9,	6.622,	5,	.23
11.52,	6,	6.622,	5,	.229
11.62,	6.1,	6.622,	5,	.228
11.72,	6.2,	6.622,	5,	.227
11.76,	6.24,	6.622,	5,	.227

"END OF FILE"

Dissolved Oxygen Model
3.5 MGD WWTP

"Model Run For C:\water\Models\stream model\model runs\lower Jackson\5 segments using Mannings 26BOD.mod On 4/4/2006 10:16:04 AM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"

"7Q10",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
129.436,	5,	1.1,	5.609,	31

"Discharge/Tributary Input Data for Segment 1"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
3.5,	26,	5,	,6,	31

"Hydraulic Information for Segment 1"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
.78,	147.999,	1.935,	.718

"Initial Mix Values for Segment 1"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
132.936,	5.62,	13.882,	.228,	7.344,	31

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.846,	4.993,	.25,	.583,	0,	0

"Output for Segment 1"
"Segment starts at LOWER JACKSON RIVER WWTP"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	5.62,	13.882,	.228
.1,	.1,	5.557,	13.746,	.227
.2,	.2,	5.498,	13.611,	.226
.3,	.3,	5.443,	13.477,	.225
.4,	.4,	5.391,	13.345,	.224
.5,	.5,	5.343,	13.214,	.223
.6,	.6,	5.298,	13.084,	.222
.7,	.7,	5.256,	12.955,	.221
.78,	.78,	5.225,	12.853,	.22

"Discharge/Tributary Input Data for Segment 2"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
36.2,	2,	0,	,6.611,	31

"Incremental Flow Input Data for Segment 2"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.922,	5,	1.1,	,6.611,	31

"Hydraulic Information for Segment 2"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
.76,	155.001,	1.78,	.69

"Initial Mix Values for Segment 2"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.058,	5.528,	11.179,	.172,	7.346,	31

"Rate Constants for Segment 2. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.947,	5.124,	.25,	.583,	0,	0

"Output for Segment 2"
"Segment starts at COWPASTURE RIVER"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
.78,	0,	5.528,	11.179,	.172
.88,	.1,	5.496,	11.065,	.171
.98,	.2,	5.467,	10.952,	.17
1.08,	.3,	5.44,	10.84,	.169
1.18,	.4,	5.415,	10.729,	.168
1.28,	.5,	5.393,	10.619,	.167
1.38,	.6,	5.373,	10.51,	.166
1.48,	.7,	5.355,	10.403,	.165
1.54,	.76,	5.345,	10.339,	.164

"Discharge/Tributary Input Data for Segment 3"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.5,	2,	0,	,6.612,	31

"Incremental Flow Input Data for Segment 3"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.614,	31

"Hydraulic Information for Segment 3"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
2.88,	155.001,	1.784,	.615

"Initial Mix Values for Segment 3"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.558,	5.349,	10.323,	.164,	7.348,	31

"Rate Constants for Segment 3. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.7,	1.16,	3.125,	4.056,	.25,	.583,	0,	0

"Output for Segment 3"
"Segment starts at LICK RUN"

"Total", "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
1.54,	0,	5.349,	10.323,	.164
1.64,	.1,	5.311,	10.205,	.163
1.74,	.2,	5.276,	10.088,	.162
1.84,	.3,	5.244,	9.972,	.161
1.94,	.4,	5.214,	9.858,	.16
2.04,	.5,	5.187,	9.745,	.159
2.14,	.6,	5.162,	9.633,	.158

2.24,	.7,	5.139,	9.523,	.157
2.34,	.8,	5.118,	9.414,	.156
2.44,	.9,	5.099,	9.306,	.155
2.54,	1,	5.082,	9.199,	.154
2.64,	1.1,	5.067,	9.094,	.153
2.74,	1.2,	5.054,	8.99,	.152
2.84,	1.3,	5.043,	8.887,	.151
2.94,	1.4,	5.033,	8.785,	.15
3.04,	1.5,	5.025,	8.684,	.149
3.14,	1.6,	5.018,	8.584,	.148
3.24,	1.7,	5.013,	8.486,	.147
3.34,	1.8,	5.009,	8.389,	.146
3.44,	1.9,	5.006,	8.293,	.145
3.54,	2,	5.005,	8.198,	.144
3.64,	2.1,	5.005,	8.104,	.143
3.74,	2.2,	5.006,	8.011,	.142
3.84,	2.3,	5.008,	7.919,	.141
3.94,	2.4,	5.011,	7.828,	.14
4.04,	2.5,	5.015,	7.738,	.139
4.14,	2.6,	5.019,	7.649,	.138
4.24,	2.7,	5.024,	7.561,	.137
4.34,	2.8,	5.03,	7.474,	.136
4.42,	2.88,	5.035,	7.405,	.135

"Discharge/Tributary Input Data for Segment 4"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.02,	30,	15,	,5,	31

"Incremental Flow Input Data for Segment 4"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.616,	31

"Hydraulic Information for Segment 4"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
1.1,	160.003,	1.821,	.582

"Initial Mix Values for Segment 4"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.578,	5.035,	7.413,	.141,	7.351,	31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.829,	2.727,	3.54,	.25,	.583,	0,	0

"Output for Segment 4"
"Segment starts at GLEN WILTON STP"

"Total",	"Segm."			
"Dist.",	"Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
4.42,	0,	5.035,	7.413,	.141
4.52,	.1,	5.056,	7.349,	.14
4.62,	.2,	5.076,	7.285,	.139
4.72,	.3,	5.096,	7.222,	.138
4.82,	.4,	5.116,	7.159,	.137
4.92,	.5,	5.136,	7.097,	.136
5.02,	.6,	5.156,	7.036,	.135

5.12,	.7,	5.175,	6.975,	.134
5.22,	.8,	5.194,	6.915,	.133
5.32,	.9,	5.213,	6.855,	.132
5.42,	1,	5.232,	6.796,	.131
5.52,	1.1,	5.251,	6.737,	.13

"Discharge/Tributary Input Data for Segment 5"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.24,	2,	0,	,6.617,	31

"Incremental Flow Input Data for Segment 5"

"Flow",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.622,	31

"Hydraulic Information for Segment 5"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
6.24,	149.998,	1.685,	.673

"Initial Mix Values for Segment 5"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.818,	5.253,	6.735,	.13,	7.357,	31

"Rate Constants for Segment 5. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.829,	4.038,	5.242,	.25,	.583,	0,	0

"Output for Segment 5"
"Segment starts at BIG CREEK"

"Total",	"Segm."			
"Dist.",	"Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
5.52,	0,	5.253,	6.735,	.13
5.62,	.1,	5.301,	6.685,	.129
5.72,	.2,	5.347,	6.635,	.128
5.82,	.3,	5.391,	6.585,	.127
5.92,	.4,	5.434,	6.536,	.126
6.02,	.5,	5.475,	6.487,	.125
6.12,	.6,	5.514,	6.438,	.124
6.22,	.7,	5.552,	6.39,	.123
6.32,	.8,	5.589,	6.342,	.122
6.42,	.9,	5.624,	6.294,	.121
6.52,	1,	5.658,	6.247,	.12
6.62,	1.1,	5.691,	6.2,	.119
6.72,	1.2,	5.722,	6.154,	.118
6.82,	1.3,	5.752,	6.108,	.117
6.92,	1.4,	5.781,	6.062,	.116
7.02,	1.5,	5.809,	6.017,	.115
7.12,	1.6,	5.836,	5.972,	.114
7.22,	1.7,	5.862,	5.927,	.113
7.32,	1.8,	5.888,	5.883,	.112
7.42,	1.9,	5.913,	5.839,	.111
7.52,	2,	5.937,	5.795,	.11
7.62,	2.1,	5.96,	5.752,	.109
7.72,	2.2,	5.982,	5.709,	.108
7.82,	2.3,	6.004,	5.666,	.107
7.92,	2.4,	6.025,	5.624,	.106

8.02,	2.5,	6.045,	5.582,	.105
8.12,	2.6,	6.065,	5.54,	.104
8.22,	2.7,	6.084,	5.498,	.103
8.32,	2.8,	6.102,	5.457,	.102
8.42,	2.9,	6.12,	5.416,	.101
8.52,	3,	6.137,	5.375,	.1
8.62,	3.1,	6.154,	5.335,	.099
8.72,	3.2,	6.17,	5.295,	.098
8.82,	3.3,	6.186,	5.255,	.097
8.92,	3.4,	6.201,	5.216,	.096
9.02,	3.5,	6.216,	5.177,	.095
9.12,	3.6,	6.231,	5.138,	.094
9.22,	3.7,	6.245,	5.099,	.094
9.32,	3.8,	6.259,	5.061,	.094
9.42,	3.9,	6.273,	5.023,	.094
9.52,	4,	6.286,	5,	.094
9.62,	4.1,	6.335,	5,	.094
9.72,	4.2,	6.382,	5,	.094
9.82,	4.3,	6.427,	5,	.094
9.92,	4.4,	6.47,	5,	.094
10.02,	4.5,	6.511,	5,	.094
10.12,	4.6,	6.55,	5,	.094
10.22,	4.7,	6.587,	5,	.094
10.32,	4.8,	6.622,	5,	.094
10.42,	4.9,	6.622,	5,	.094
10.52,	5,	6.622,	5,	.094
10.62,	5.1,	6.622,	5,	.094
10.72,	5.2,	6.622,	5,	.094
10.82,	5.3,	6.622,	5,	.094
10.92,	5.4,	6.622,	5,	.094
11.02,	5.5,	6.622,	5,	.094
11.12,	5.6,	6.622,	5,	.094
11.22,	5.7,	6.622,	5,	.094
11.32,	5.8,	6.622,	5,	.094
11.42,	5.9,	6.622,	5,	.094
11.52,	6,	6.622,	5,	.094
11.62,	6.1,	6.622,	5,	.094
11.72,	6.2,	6.622,	5,	.094
11.76,	6.24,	6.622,	5,	.094

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

File Information

File Name:	C:\water\Models\stream model\model runs\lower Jackson\5 segments using
Date Modified:	April 04, 2006

Water Quality Standards Information

Stream Name:	JACKSON - JAMES RIVER
River Basin:	James River Basin
Section:	12
Class:	IV - Mountainous Zones Waters
Special Standards:	none

Background Flow Information

Gauge Used:	James River at Lick Run
Gauge Drainage Area:	1373 Sq.Mi.
Gauge 7Q10 Flow:	168.7 MGD
Headwater Drainage Area:	904.5 Sq.Mi.
Headwater 7Q10 Flow:	129.436 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	18.3 MGD
Incremental Flow in Segments:	0.1228696 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	31 Degrees C
Background cBOD5:	5 mg/l
Background TKN:	1.1 mg/l
Background D.O.:	5.609402 mg/l

Model Segmentation

Number of Segments:	5
Model Start Elevation:	995 ft above MSL
Model End Elevation:	923 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	LOWER JACKSON RIVER WWTP
VPDES Permit No.:	

Discharger Flow Information

Flow:	3.5 MGD
cBOD5:	26 mg/l
TKN:	5 mg/l
D.O.:	6 mg/l
Temperature:	31 Degrees C

Geographic Information

Segment Length:	0.78 miles
Upstream Drainage Area:	904.5 Sq.Mi.
Downstream Drainage Area:	912 Sq.Mi.
Upstream Elevation:	995 Ft.
Downstream Elevation:	990 Ft.

Hydraulic Information

Segment Width:	147.999 Ft.
Segment Depth:	1.935 Ft.
Segment Velocity:	0.718 Ft./Sec.
Segment Flow:	132.936 MGD
Incremental Flow:	0.922 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	COWPASTURE RIVER

Tributary Flow Information

Flow:	36.2 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	6.611 mg/l
Temperature:	31 Degrees C

Geographic Information

Segment Length:	0.76 miles
Upstream Drainage Area:	1373 Sq.Mi.
Downstream Drainage Area:	1373 Sq.Mi.
Upstream Elevation:	990 Ft.
Downstream Elevation:	985 Ft.

Hydraulic Information

Segment Width:	155.001 Ft.
Segment Depth:	1.78 Ft.
Segment Velocity:	0.69 Ft./Sec.
Segment Flow:	169.136 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	LICK RUN

Tributary Flow Information

Flow:	0.5 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	6.612 mg/l
Temperature:	31 Degrees C

Geographic Information

Segment Length:	2.88 miles
Upstream Drainage Area:	1377 Sq.Mi.
Downstream Drainage Area:	1377 Sq.Mi.
Upstream Elevation:	985 Ft.
Downstream Elevation:	970 Ft.

Hydraulic Information

Segment Width:	155.001 Ft.
Segment Depth:	1.784 Ft.
Segment Velocity:	0.615 Ft./Sec.
Segment Flow:	169.636 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

Segment Information for Segment 4

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	GLEN WILTON STP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.02 MGD
cBOD5:	30 mg/l
TKN:	15 mg/l
D.O.:	5 mg/l
Temperature:	31 Degrees C

Geographic Information

Segment Length:	1.1 miles
Upstream Drainage Area:	1378 Sq.Mi.
Downstream Drainage Area:	1378 Sq.Mi.
Upstream Elevation:	970 Ft.
Downstream Elevation:	965 Ft.

Hydraulic Information

Segment Width:	160.003 Ft.
Segment Depth:	1.821 Ft.
Segment Velocity:	0.582 Ft./Sec.
Segment Flow:	169.656 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	Only On Edges

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to JACKSON - JAMES RIVER.

Segment Information for Segment 5

Definition Information	
Segment Definition:	A tributary enters.
Tributary Name:	BIG CREEK
Tributary Flow Information	
Flow:	0.24 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	6.617 mg/l
Temperature:	31 Degrees C
Geographic Information	
Segment Length:	6.24 miles
Upstream Drainage Area:	1378 Sq.Mi.
Downstream Drainage Area:	1416 Sq.Mi.
Upstream Elevation:	965 Ft.
Downstream Elevation:	923 Ft.
Hydraulic Information	
Segment Width:	149.998 Ft.
Segment Depth:	1.685 Ft.
Segment Velocity:	0.673 Ft./Sec.
Segment Flow:	169.896 MGD
Incremental Flow:	4.669 MGD (Applied at end of segment.)
Channel Information	
Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	Only On Edges

Table 7-7: Phosphorus Waste Load Allocations - Major Dischargers						
Facility Name	**VPDES Permit**	**Discharge Flow (MGD)**	**TP Conc. (mg/L)**	**TP Load Allocation (lbs/growing season)**	**PO4-P Conc. (mg/L)**	**PO4-P Load Allocation (lbs/growing season)**
MeadWestvaco	VA0003646	35	1.5	66,991	0.21*	9,379
Covington STP	VA0025542	3	0.5	1,914	0.335	1,282
Low Moor WWTP	VA0027979	0.3	1.15	440	0.7705	295
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659	0.335	1,111
			Total	**71,004**	**-**	**12,068**

*Measured as filtered orthophosphorus

Table 7-8: Total Nitrogen Waste Load Allocations During the Growing Season Major Dischargers				
Facility Name	**VPDES Permit**	**Discharge Flow (MGD)**	**TN Conc. (mg/L)**	**TN Load (lbs/growing season)**
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
			Total	**213,478**

The allocation for Low Moor WWTP and Lower Jackson River WWTP reflect the aggregated mass load nutrient given to Alleghany County pursuant to 9VAC 25-820-70, Part 1.B.2, otherwise referred to as a "bubble". Accordingly, compliance is determined solely on an aggregate basis rather than by comparison of individual facility waste load allocations.

In addition to the major dischargers, there are 9 active minor facilities holding active individual discharge permits in the Jackson River watershed (4 industrial facilities and 5 municipal facilities). The 4 minor industrial facilities discharge very low level of nutrients. Based on DMR data for a few industrial facilities, the average discharge TP is approximated at 0.34 mg/L and 0.14 mg/l for total nitrogen and total phosphorus, respectively. **Table 7-9** presents the WLAs for the 4 minor industrial facilities for total phosphorus and total nitrogen respectively.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP 2.6 MGD Permit No.: VA0090671

Receiving Stream: Jackson River

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

Stream Information		
Mean Hardness (as CaCO3) =	139	mg/L
90% Temperature (Annual) =	23.5	deg C
90% Temperature (Wet season) =	14.2	deg C
90% Maximum pH =	8.1	SU
10% Maximum pH =	6.5	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	119	MGD
7Q10 (Annual) =	129	MGD
30Q10 (Annual) =	141	MGD
1Q10 (Wet season) =	154	MGD
30Q10 (Wet season)	182	MGD
30Q5 =	156	MGD
Harmonic Mean =	353	MGD

Mixing Information		
Annual - 1Q10 Mix =	20.37	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	20.37	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	131	mg/L
90% Temp (Annual) =	24.4	deg C
90% Temp (Wet season) =	23	deg C
90% Maximum pH =	8.2	SU
10% Maximum pH =	7	SU
Discharge Flow =	2.6	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	6.0E+04	--	--	na	9.9E+01	--	--	na	6.0E+03	**--**	**--**	**na**	**6.0E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	5.7E+02	--	--	na	9.3E-01	--	--	na	5.7E+01	**--**	**--**	**na**	**5.7E+01**
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	3.4E+02	--	--	na	2.5E-01	--	--	na	3.4E+01	**--**	**--**	**na**	**3.4E+01**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.1E+01	--	na	6.8E-02	7.5E-01	--	na	5.0E-05	3.5E+01	--	na	6.8E-03	**3.1E+01**	**--**	**na**	**6.8E-03**
Ammonia-N (mg/l) (Yearly)	0.1	6.83E+00	1.17E+00	na	--	6.96E+01	5.93E+01	na	--	1.81E+00	3.68E-01	na	--	7.99E+01	1.49E+01	na	--	**6.96E+01**	**1.49E+01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0.1	6.86E+00	2.09E+00	na	--	8.84E+01	1.42E+02	na	--	1.81E+00	5.98E-01	na	--	1.03E+02	3.55E+01	na	--	**8.84E+01**	**3.55E+01**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.4E+06	--	--	na	4.0E+03	--	--	na	2.4E+05	**--**	**--**	**na**	**2.4E+05**
Antimony	0	--	--	na	6.4E+02	--	--	na	3.9E+04	--	--	na	6.4E+01	--	--	na	3.9E+03	**--**	**--**	**na**	**3.9E+03**
Arsenic		3.4E+02	1.5E+02	na	--	3.5E+03	7.6E+03	na	--	8.5E+01	3.8E+01	na	--	4.0E+03	1.9E+03	na	--	**3.5E+03**	**1.9E+03**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	7.0E+04	--	--	na	5.1E+01	--	--	na	7.0E+03	**--**	**--**	**na**	**7.0E+03**
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.7E-01	--	--	na	2.0E-04	--	--	na	2.7E-02	**--**	**--**	**na**	**2.7E-02**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	7.2E+02	--	--	na	5.3E-01	--	--	na	7.2E+01	**--**	**--**	**na**	**7.2E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	4.0E+06	--	--	na	6.5E+03	--	--	na	4.0E+05	**--**	**--**	**na**	**4.0E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	3.0E+03	--	--	na	2.2E+00	--	--	na	3.0E+02	**--**	**--**	**na**	**3.0E+02**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.9E+05	--	--	na	1.4E+02	--	--	na	1.9E+04	**--**	**--**	**na**	**1.9E+04**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.2E+05	--	--	na	1.9E+02	--	--	na	1.2E+04	**--**	**--**	**na**	**1.2E+04**
Cadmium	0	5.7E+00	1.5E+00	na	--	5.8E+01	7.4E+01	na	--	1.4E+00	3.7E-01	na	--	6.6E+01	1.9E+01	na	--	**5.8E+01**	**1.9E+01**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	2.2E+03	--	--	na	1.6E+00	--	--	na	2.2E+02	**--**	**--**	**na**	**2.2E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+01	2.2E-01	na	1.1E+00	6.0E-01	1.1E-03	na	8.1E-04	2.8E+01	5.4E-02	na	1.1E-01	**2.5E+01**	**5.4E-02**	**na**	**1.1E-01**
Chloride	0	8.6E+05	2.3E+05	na	--	8.9E+06	1.2E+07	na	--	2.2E+05	5.8E+04	na	--	1.0E+07	2.9E+06	na	--	**8.9E+06**	**2.9E+06**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	2.0E+02	5.6E+02	na	--	4.8E+00	2.8E+00	na	--	2.2E+02	1.4E+02	na	--	**2.0E+02**	**1.4E+02**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	na	1.6E+02	--	--	na	9.8E+03	**--**	**--**	**na**	**9.8E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.8E+04	--	--	na	1.3E+01	--	--	na	1.8E+03	**--**	**--**	**na**	**1.8E+03**
Chloroform	0	--	--	na	1.1E+04	--	--	na	6.7E+05	--	--	na	1.1E+03	--	--	na	6.7E+04	**--**	**--**	**na**	**6.7E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	na	1.6E+02	--	--	na	9.8E+03	**--**	**--**	**na**	**9.8E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	9.2E+03	--	--	na	1.5E+01	--	--	na	9.2E+02	**--**	**--**	**na**	**9.2E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.6E-01	2.1E+00	na	--	2.1E-02	1.0E-02	na	--	9.7E-01	5.2E-01	na	--	**8.6E-01**	**5.2E-01**	**na**	**--**
Chromium III	0	7.4E+02	9.7E+01	na	--	7.7E+03	4.9E+03	na	--	1.9E+02	2.4E+01	na	--	8.7E+03	1.2E+03	na	--	**7.7E+03**	**1.2E+03**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.7E+02	5.6E+02	na	--	4.0E+00	2.8E+00	na	--	1.9E+02	1.4E+02	na	--	**1.7E+02**	**1.4E+02**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	6.1E+02	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	1.8E-03	--	--	na	2.5E-01	**--**	**--**	**na**	**2.5E-01**
Copper	0	1.8E+01	1.2E+01	na	--	1.9E+02	6.0E+02	na	--	4.6E+00	3.0E+00	na	--	2.1E+02	1.5E+02	na	--	**1.9E+02**	**1.5E+02**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.3E+02	2.6E+02	na	9.8E+05	5.5E+00	1.3E+00	na	1.6E+03	2.6E+02	6.6E+01	na	9.8E+04	**2.3E+02**	**6.6E+01**	**na**	**9.8E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	4.2E-01	--	--	na	3.1E-04	--	--	na	4.2E-02	**--**	**--**	**na**	**4.2E-02**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	3.0E-01	--	--	na	2.2E-04	--	--	na	3.0E-02	**--**	**--**	**na**	**3.0E-02**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+01	5.1E-02	na	3.0E-01	2.8E-01	2.5E-04	na	2.2E-04	1.3E+01	1.3E-02	na	3.0E-02	**1.1E+01**	**1.3E-02**	**na**	**3.0E-02**
Demeton	0	--	1.0E-01	na	--	--	5.1E+00	na	--	--	2.5E-02	na	--	--	1.3E+00	na	--	**--**	**1.3E+00**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.8E+00	8.6E+00	na	--	4.3E-02	4.3E-02	na	--	2.0E+00	2.2E+00	na	--	**1.8E+00**	**2.2E+00**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	7.9E+04	--	--	na	1.3E+02	--	--	na	7.9E+03	**--**	**--**	**na**	**7.9E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	5.9E+04	--	--	na	9.6E+01	--	--	na	5.9E+03	**--**	**--**	**na**	**5.9E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.2E+04	--	--	na	1.9E+01	--	--	na	1.2E+03	**--**	**--**	**na**	**1.2E+03**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	3.8E+01	--	--	na	2.8E-02	--	--	na	3.8E+00	**--**	**--**	**na**	**3.8E+00**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	2.3E+04	--	--	na	1.7E+01	--	--	na	2.3E+03	**--**	**--**	**na**	**2.3E+03**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	5.1E+04	--	--	na	3.7E+01	--	--	na	5.1E+03	**--**	**--**	**na**	**5.1E+03**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	4.3E+05	--	--	na	7.1E+02	--	--	na	4.3E+04	**--**	**--**	**na**	**4.3E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	6.1E+05	--	--	na	1.0E+03	--	--	na	6.1E+04	**--**	**--**	**na**	**6.1E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.8E+04	--	--	na	2.9E+01	--	--	na	1.8E+03	**--**	**--**	**na**	**1.8E+03**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	2.1E+04	--	--	na	1.5E+01	--	--	na	2.1E+03	**--**	**--**	**na**	**2.1E+03**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.9E+04	--	--	na	2.1E+01	--	--	na	2.9E+03	**--**	**--**	**na**	**2.9E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E+00	2.8E+00	na	7.4E-02	6.0E-02	1.4E-02	na	5.4E-05	2.8E+00	7.1E-01	na	7.4E-03	**2.5E+00**	**7.1E-01**	**na**	**7.4E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.7E+06	--	--	na	4.4E+03	--	--	na	2.7E+05	**--**	**--**	**na**	**2.7E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	5.2E+04	--	--	na	8.5E+01	--	--	na	5.2E+03	**--**	**--**	**na**	**5.2E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	6.7E+07	--	--	na	1.1E+05	--	--	na	6.7E+06	**--**	**--**	**na**	**6.7E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.7E+05	--	--	na	4.5E+02	--	--	na	2.7E+04	**--**	**--**	**na**	**2.7E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	na	5.3E+02	--	--	na	3.2E+04	**--**	**--**	**na**	**3.2E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.7E+04	--	--	na	2.8E+01	--	--	na	1.7E+03	**--**	**--**	**na**	**1.7E+03**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	4.7E+03	--	--	na	3.4E+00	--	--	na	4.7E+02	**--**	**--**	**na**	**4.7E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	3.1E-06	--	--	na	5.1E-09	--	--	na	3.1E-07	**--**	**--**	**na**	**3.1E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.7E+02	--	--	na	2.0E-01	--	--	na	2.7E+01	**--**	**--**	**na**	**2.7E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	5.5E-02	1.4E-02	na	8.9E+00	2.6E+00	7.1E-01	na	5.4E+02	**2.3E+00**	**7.1E-01**	**na**	**5.4E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	5.5E-02	1.4E-02	na	8.9E+00	2.6E+00	7.1E-01	na	5.4E+02	**2.3E+00**	**7.1E-01**	**na**	**5.4E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.3E+00	2.8E+00	--	--	5.5E-02	1.4E-02	--	--	2.6E+00	7.1E-01	--	--	**2.3E+00**	**7.1E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	5.4E+03	--	--	na	8.9E+00	--	--	na	5.4E+02	**--**	**--**	**na**	**5.4E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.9E-01	1.8E+00	na	3.7E+00	2.2E-02	9.0E-03	na	6.0E-03	1.0E+00	4.6E-01	na	3.7E-01	**8.9E-01**	**4.6E-01**	**na**	**3.7E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.8E+01	--	--	na	3.0E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.3E+05	--	--	na	2.1E+02	--	--	na	1.3E+04	**--**	**--**	**na**	**1.3E+04**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	8.5E+03	--	--	na	1.4E+01	--	--	na	8.5E+02	**--**	**--**	**na**	**8.5E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	na	5.3E+02	--	--	na	3.2E+04	**--**	**--**	**na**	**3.2E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	5.1E-01	na	--	--	2.5E-03	na	--	--	1.3E-01	na	--	**--**	**1.3E-01**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.4E+00	1.9E-01	na	1.1E-01	1.3E-01	9.5E-04	na	7.9E-05	6.1E+00	4.8E-02	na	1.1E-02	**5.4E+00**	**4.8E-02**	**na**	**1.1E-02**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.4E+00	1.9E-01	na	5.3E-02	1.3E-01	9.5E-04	na	3.9E-05	6.1E+00	4.8E-02	na	5.3E-03	**5.4E+00**	**4.8E-02**	**na**	**5.3E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	4.0E-01	--	--	na	2.9E-04	--	--	na	4.0E-02	**--**	**--**	**na**	**4.0E-02**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	2.5E+04	--	--	na	1.8E+01	--	--	na	2.5E+03	**--**	**--**	**na**	**2.5E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	6.7E+00	--	--	na	4.9E-03	--	--	na	6.7E-01	**--**	**--**	**na**	**6.7E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	2.3E+01	--	--	na	1.7E-02	--	--	na	2.3E+00	**--**	**--**	**na**	**2.3E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.8E+00	--	na	2.5E+02	2.4E-01	--	na	1.8E-01	1.1E+01	--	na	2.5E+01	**9.8E+00**	**--**	**na**	**2.5E+01**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	6.7E+04	--	--	na	1.1E+02	--	--	na	6.7E+03	**--**	**--**	**na**	**6.7E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	na	3.3E+00	--	--	na	4.5E+02	**--**	**--**	**na**	**4.5E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.0E+02	na	--	--	5.0E-01	na	--	--	2.5E+01	na	--	**--**	**2.5E+01**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	**--**	**--**	**na**	**2.5E+00**
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	1.3E+06	--	--	na	9.6E+02	--	--	na	1.3E+05	**--**	**--**	**na**	**1.3E+05**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	1.8E+02	2.1E+01	na	--	1.9E+03	1.0E+03	na	--	4.5E+01	5.1E+00	na	--	2.1E+03	2.6E+02	na	--	**1.9E+03**	**2.6E+02**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	5.1E+00	na	--	--	2.5E-02	na	--	--	1.3E+00	na	--	**--**	**1.3E+00**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+01	3.9E+01	- -	- -	3.5E-01	1.9E-01	- -	--	1.6E+01	9.7E+00	- -	--	**1.4E+01**	**9.7E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	9.2E+04	--	--	na	1.5E+02	--	--	na	9.2E+03	**--**	**--**	**na**	**9.2E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	8.1E+05	--	--	na	5.9E+02	--	--	na	8.1E+04	**--**	**--**	**na**	**8.1E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	1.5E+00	na	--	--	7.5E-03	na	--	--	3.8E-01	na	--	**--**	**3.8E-01**	**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	2.4E+02	2.7E+01	na	4.6E+03	2.5E+03	1.4E+03	na	2.8E+05	6.0E+01	6.7E+00	na	4.6E+02	2.8E+03	3.4E+02	na	2.8E+04	**2.5E+03**	**3.4E+02**	**na**	**2.8E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	4.2E+04	--	--	na	6.9E+01	--	--	na	4.2E+03	**--**	**--**	**na**	**4.2E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	4.1E+03	--	--	na	3.0E+00	--	--	na	4.1E+02	**--**	**--**	**na**	**4.1E+02**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	8.2E+03	--	--	na	6.0E+00	--	--	na	8.2E+02	**--**	**--**	**na**	**8.2E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	7.0E+02	--	--	na	5.1E-01	--	--	na	7.0E+01	**--**	**--**	**na**	**7.0E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+02	3.3E+02	na	--	7.0E+00	1.7E+00	--	--	3.3E+02	8.4E+01	--	--	**2.9E+02**	**8.4E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	6.7E-01	6.6E-01	na	--	1.6E-02	3.3E-03	na	--	7.6E-01	1.6E-01	na	--	**6.7E-01**	**1.6E-01**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	7.1E-01	na	8.8E-02	--	3.5E-03	na	6.4E-05	--	1.8E-01	na	8.8E-03	**--**	**1.8E-01**	**na**	**8.8E-03**
Pentachlorophenol [C]	0	5.4E+00	4.1E+00	na	3.0E+01	5.6E+01	2.1E+02	na	4.1E+03	1.3E+00	1.0E+00	na	3.0E+00	6.2E+01	5.2E+01	na	4.1E+02	**5.6E+01**	**5.2E+01**	**na**	**4.1E+02**
Phenol	0	--	--	na	8.6E+05	--	--	na	5.2E+07	--	--	na	8.6E+04	--	--	na	5.2E+06	**--**	**--**	**na**	**5.2E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	2.4E+05	--	--	na	4.0E+02	--	--	na	2.4E+04	**--**	**--**	**na**	**2.4E+04**
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	2.1E+02	2.5E+02	na	2.6E+05	5.0E+00	1.3E+00	na	4.2E+02	2.3E+02	6.3E+01	na	2.6E+04	**2.1E+02**	**6.3E+01**	**na**	**2.6E+04**
Silver	0	6.0E+00	--	na	--	6.2E+01	--	na	--	1.5E+00	--	na	--	7.1E+01	--	na	--	**6.2E+01**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	5.5E+03	--	--	na	4.0E+00	--	--	na	5.5E+02	**--**	**--**	**na**	**5.5E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	na	3.3E+00	--	--	na	4.5E+02	**--**	**--**	**na**	**4.5E+02**
Thallium	0	--	--	na	4.7E-01	--	--	na	2.9E+01	--	--	na	4.7E-02	--	--	na	2.9E+00	**--**	**--**	**na**	**2.9E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	3.7E+05	--	--	na	6.0E+02	--	--	na	3.7E+04	**--**	**--**	**na**	**3.7E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E+00	1.0E-02	na	3.8E-01	1.8E-01	5.0E-05	na	2.8E-04	8.5E+00	2.5E-03	na	3.8E-02	**7.5E+00**	**2.5E-03**	**na**	**3.8E-02**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E+00	3.6E+00	na	--	1.2E-01	1.8E-02	na	--	5.4E+00	9.1E-01	na	--	**4.7E+00**	**9.1E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	4.3E+03	--	--	na	7.0E+00	--	--	na	4.3E+02	**--**	**--**	**na**	**4.3E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	2.2E+04	--	--	na	1.6E+01	--	--	na	2.2E+03	**--**	**--**	**na**	**2.2E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	4.1E+04	--	--	na	3.0E+01	--	--	na	4.1E+03	**--**	**--**	**na**	**4.1E+03**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	na	2.4E+00	--	--	na	3.3E+02	**--**	**--**	**na**	**3.3E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	na	2.4E+00	--	--	na	3.3E+02	**--**	**--**	**na**	**3.3E+02**
Zinc	0	1.5E+02	1.6E+02	na	2.6E+04	1.6E+03	7.9E+03	na	1.6E+06	3.9E+01	3.9E+01	na	2.6E+03	1.8E+03	2.0E+03	na	1.6E+05	**1.6E+03**	**2.0E+03**	**na**	**1.6E+05**

Notes:

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

Metal	Target Value (SSTV)
Antimony	3.9E+03
Arsenic	1.1E+03
Barium	na
Cadmium	1.1E+01
Chromium III	7.4E+02
Chromium VI	6.6E+01
Copper	7.5E+01
Iron	na
Lead	1.6E+02
Manganese	na
Mercury	5.8E+00
Nickel	2.0E+02
Selenium	3.8E+01
Silver	2.5E+01
Zinc	6.4E+02

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

2.600 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGI 2.600

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	24.240	31.370	26.840	33.970
7Q10	129.000	N/A	131.600	N/A
30Q10	141.000	182.000	143.600	184.600
30Q5	156.000	N/A	158.600	N/A
Harm. Mean	353.000	N/A	355.600	N/A
Annual Avg.	0.000	N/A	2.600	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.587	14.874
30Q10 90th% Temp. Mix (deg C)	23.516	14.324
1Q10 90th% pH Mix (SU)	8.109	8.107
30Q10 90th% pH Mix (SU)	8.102	8.101
1Q10 10th% pH Mix (SU)	6.530	N/A
7Q10 10th% pH Mix (SU)	6.506	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	138.2	138.2
7Q10 Hardness (mg/L as CaCO3)	138.8	138.8

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	8.109
(7.204 - pH)	-0.905
(pH - 7.204)	0.905
Trout Present Criterion (mg N/	4.563
Trout Absent Criterion (mg N/L	6.832
Trout Present?	n
Effective Criterion (mg N/L)	6.832

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.516
90th Percentile pH (SU)	8.102
MIN	1.596
MAX	23.516
(7.688 - pH)	-0.414
(pH - 7.688)	0.414
Early LS Present Criterion (mg N	1.171
Early LS Absent Criterion (mg N/	1.171
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.171

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.107
(7.204 - pH)	-0.903
(pH - 7.204)	0.903
Trout Present Criterion (mg N/	4.580
Trout Absent Criterion (mg N/L	6.857
Trout Present?	n
Effective Criterion (mg N/L)	6.857

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.324
90th Percentile pH (SU)	8.101
MIN	2.850
MAX	14.324
(7.688 - pH)	-0.413
(pH - 7.688)	0.413
Early LS Present Criterion (mg N	2.093
Early LS Absent Criterion (mg N/	2.120
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.093

2.600 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGI 2.600

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	119.000	154.000	121.600	156.600
7Q10	129.000	N/A	131.600	N/A
30Q10	141.000	182.000	143.600	184.600
30Q5	156.000	N/A	158.600	N/A
Harm. Mean	353.000	N/A	355.600	N/A
Annual Avg.	0.000	N/A	2.600	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.519	14.346
30Q10 90th% Temp. Mix (deg C)	23.516	14.324
1Q10 90th% pH Mix (SU)	8.102	8.101
30Q10 90th% pH Mix (SU)	8.102	8.101
1Q10 10th% pH Mix (SU)	6.506	N/A
7Q10 10th% pH Mix (SU)	6.506	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	138.829	138.829
7Q10 Hardness (mg/L as CaCO3) =	138.842	138.842

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	8.102
(7.204 - pH)	-0.898
(pH - 7.204)	0.898
Trout Present Criterion (mg N/	4.624
Trout Absent Criterion (mg N/L	6.923
Trout Present?	n
Effective Criterion (mg N/L)	6.923

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.516
90th Percentile pH (SU)	8.102
MIN	1.596
MAX	23.516
(7.688 - pH)	-0.414
(pH - 7.688)	0.414
Early LS Present Criterion (mg N	1.171
Early LS Absent Criterion (mg N/	1.171
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.171

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.101
(7.204 - pH)	-0.897
(pH - 7.204)	0.897
Trout Present Criterion (mg N/	4.627
Trout Absent Criterion (mg N/L	6.929
Trout Present?	n
Effective Criterion (mg N/L)	6.929

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.324
90th Percentile pH (SU)	8.101
MIN	2.850
MAX	14.324
(7.688 - pH)	-0.413
(pH - 7.688)	0.413
Early LS Present Criterion (mg N	2.093
Early LS Absent Criterion (mg N/	2.120
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.093

7/5/2016 3:21:50 PM

Facility = Lower Jackson River Regional
Chemical = Ammonia for 2.6 MGD
Chronic averaging period = 30
WLAa   = 69.6
WLAc   = 14.9
Q.L.   = 0.2
samples/mo. = 4
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

No Limit is required for this material

The data are:

9

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP 3.5 MGD Permit No.: VA0090671

Receiving Stream: Jackson River

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

Stream Information		
Mean Hardness (as CaCO3) =	139	mg/L
90% Temperature (Annual) =	23.5	deg C
90% Temperature (Wet season) =	14.2	deg C
90% Maximum pH =	8	SU
10% Maximum pH =	6.5	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	119	MGD
7Q10 (Annual) =	129	MGD
30Q10 (Annual) =	141	MGD
1Q10 (Wet season) =	154	MGD
30Q10 (Wet season)	182	MGD
30Q5 =	156	MGD
Harmonic Mean =	353	MGD

Mixing Information		
Annual - 1Q10 Mix =	20.37	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	20.37	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	131	mg/L
90% Temp (Annual) =	24.4	deg C
90% Temp (Wet season) =	23	deg C
90% Maximum pH =	7.9	SU
10% Maximum pH =	7	SU
Discharge Flow =	3.5	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	4.5E+04	--	--	na	9.9E+01	--	--	na	4.5E+03	**--**	**--**	**na**	**4.5E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.2E+02	--	--	na	9.3E-01	--	--	na	4.2E+01	**--**	**--**	**na**	**4.2E+01**
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	2.5E+02	--	--	na	2.5E-01	--	--	na	2.5E+01	**--**	**--**	**na**	**2.5E+01**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	2.4E+01	--	na	5.1E-02	7.5E-01	--	na	5.0E-05	2.6E+01	--	na	5.1E-03	**2.4E+01**	**--**	**na**	**5.1E-03**
Ammonia-N (mg/l) (Yearly)	0.1	8.63E+00	1.37E+00	na	--	6.77E+01	5.24E+01	na	--	2.19E+00	4.17E-01	na	--	7.32E+01	1.32E+01	na	--	**6.77E+01**	**1.32E+01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0.1	8.59E+00	2.44E+00	na	--	8.46E+01	1.24E+02	na	--	2.19E+00	6.85E-01	na	--	9.40E+01	3.11E+01	na	--	**8.46E+01**	**3.11E+01**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.8E+06	--	--	na	4.0E+03	--	--	na	1.8E+05	**--**	**--**	**na**	**1.8E+05**
Antimony	0	--	--	na	6.4E+02	--	--	na	2.9E+04	--	--	na	6.4E+01	--	--	na	2.9E+03	**--**	**--**	**na**	**2.9E+03**
Arsenic		3.4E+02	1.5E+02	na	--	2.7E+03	5.7E+03	na	--	8.5E+01	3.8E+01	na	--	3.0E+03	1.4E+03	na	--	**2.7E+03**	**1.4E+03**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	5.2E+04	--	--	na	5.1E+01	--	--	na	5.2E+03	**--**	**--**	**na**	**5.2E+03**
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.0E-01	--	--	na	2.0E-04	--	--	na	2.0E-02	**--**	**--**	**na**	**2.0E-02**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	5.4E+02	--	--	na	5.3E-01	--	--	na	5.4E+01	**--**	**--**	**na**	**5.4E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.0E+06	--	--	na	6.5E+03	--	--	na	3.0E+05	**--**	**--**	**na**	**3.0E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.2E+03	--	--	na	2.2E+00	--	--	na	2.2E+02	**--**	**--**	**na**	**2.2E+02**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.4E+05	--	--	na	1.4E+02	--	--	na	1.4E+04	**--**	**--**	**na**	**1.4E+04**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	8.7E+04	--	--	na	1.9E+02	--	--	na	8.7E+03	**--**	**--**	**na**	**8.7E+03**
Cadmium	0	5.6E+00	1.5E+00	na	--	4.5E+01	5.6E+01	na	--	1.4E+00	3.7E-01	na	--	5.0E+01	1.4E+01	na	--	**4.5E+01**	**1.4E+01**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.6E+03	--	--	na	1.6E+00	--	--	na	1.6E+02	**--**	**--**	**na**	**1.6E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	1.9E+01	1.6E-01	na	8.3E-01	6.0E-01	1.1E-03	na	8.1E-04	2.1E+01	4.1E-02	na	8.3E-02	**1.9E+01**	**4.1E-02**	**na**	**8.3E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	6.8E+06	8.7E+06	na	--	2.2E+05	5.8E+04	na	--	7.5E+06	2.2E+06	na	--	**6.8E+06**	**2.2E+06**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.5E+02	4.2E+02	na	--	4.8E+00	2.8E+00	na	--	1.7E+02	1.0E+02	na	--	**1.5E+02**	**1.0E+02**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	**--**	**--**	**na**	**7.3E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+04	--	--	na	1.3E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
Chloroform	0	--	--	na	1.1E+04	--	--	na	5.0E+05	--	--	na	1.1E+03	--	--	na	5.0E+04	**--**	**--**	**na**	**5.0E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	**--**	**--**	**na**	**7.3E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	6.8E+03	--	--	na	1.5E+01	--	--	na	6.8E+02	**--**	**--**	**na**	**6.8E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	6.6E-01	1.6E+00	na	--	2.1E-02	1.0E-02	na	--	7.3E-01	3.9E-01	na	--	**6.6E-01**	**3.9E-01**	**na**	**--**
Chromium III	0	7.4E+02	9.7E+01	na	--	5.9E+03	3.7E+03	na	--	1.9E+02	2.4E+01	na	--	6.5E+03	9.2E+02	na	--	**5.9E+03**	**9.2E+02**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.3E+02	4.2E+02	na	--	4.0E+00	2.8E+00	na	--	1.4E+02	1.0E+02	na	--	**1.3E+02**	**1.0E+02**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	4.6E+02	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E-03	--	--	na	1.8E-01	**--**	**--**	**na**	**1.8E-01**
Copper	0	1.8E+01	1.2E+01	na	--	1.4E+02	4.5E+02	na	--	4.6E+00	3.0E+00	na	--	1.6E+02	1.1E+02	na	--	**1.4E+02**	**1.1E+02**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.7E+02	2.0E+02	na	7.3E+05	5.5E+00	1.3E+00	na	1.6E+03	1.9E+02	4.9E+01	na	7.3E+04	**1.7E+02**	**4.9E+01**	**na**	**7.3E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	3.2E-01	--	--	na	3.1E-04	--	--	na	3.2E-02	**--**	**--**	**na**	**3.2E-02**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	2.2E-01	--	--	na	2.2E-04	--	--	na	2.2E-02	**--**	**--**	**na**	**2.2E-02**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	8.7E+00	3.8E-02	na	2.2E-01	2.8E-01	2.5E-04	na	2.2E-04	9.6E+00	9.5E-03	na	2.2E-02	**8.7E+00**	**9.5E-03**	**na**	**2.2E-02**
Demeton	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	**--**	**9.5E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.3E+00	6.4E+00	na	--	4.3E-02	4.3E-02	na	--	1.5E+00	1.6E+00	na	--	**1.3E+00**	**1.6E+00**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	5.9E+04	--	--	na	1.3E+02	--	--	na	5.9E+03	**--**	**--**	**na**	**5.9E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.4E+04	--	--	na	9.6E+01	--	--	na	4.4E+03	**--**	**--**	**na**	**4.4E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	8.7E+03	--	--	na	1.9E+01	--	--	na	8.7E+02	**--**	**--**	**na**	**8.7E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.9E+01	--	--	na	2.8E-02	--	--	na	2.9E+00	**--**	**--**	**na**	**2.9E+00**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.7E+04	--	--	na	1.7E+01	--	--	na	1.7E+03	**--**	**--**	**na**	**1.7E+03**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	3.8E+04	--	--	na	3.7E+01	--	--	na	3.8E+03	**--**	**--**	**na**	**3.8E+03**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.2E+05	--	--	na	7.1E+02	--	--	na	3.2E+04	**--**	**--**	**na**	**3.2E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	4.6E+05	--	--	na	1.0E+03	--	--	na	4.6E+04	**--**	**--**	**na**	**4.6E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.3E+04	--	--	na	2.9E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+04	--	--	na	1.5E+01	--	--	na	1.5E+03	**--**	**--**	**na**	**1.5E+03**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.1E+04	--	--	na	2.1E+01	--	--	na	2.1E+03	**--**	**--**	**na**	**2.1E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	1.9E+00	2.1E+00	na	5.5E-02	6.0E-02	1.4E-02	na	5.4E-05	2.1E+00	5.3E-01	na	5.5E-03	**1.9E+00**	**5.3E-01**	**na**	**5.5E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.0E+06	--	--	na	4.4E+03	--	--	na	2.0E+05	**--**	**--**	**na**	**2.0E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	3.9E+04	--	--	na	8.5E+01	--	--	na	3.9E+03	**--**	**--**	**na**	**3.9E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.0E+07	--	--	na	1.1E+05	--	--	na	5.0E+06	**--**	**--**	**na**	**5.0E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.1E+05	--	--	na	4.5E+02	--	--	na	2.1E+04	**--**	**--**	**na**	**2.1E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	**--**	**--**	**na**	**2.4E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.3E+04	--	--	na	2.8E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	3.5E+03	--	--	na	3.4E+00	--	--	na	3.5E+02	**--**	**--**	**na**	**3.5E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.3E-06	--	--	na	5.1E-09	--	--	na	2.3E-07	**--**	**--**	**na**	**2.3E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+02	--	--	na	2.0E-01	--	--	na	2.0E+01	**--**	**--**	**na**	**2.0E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.7E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	**1.7E+00**	**5.3E-01**	**na**	**4.1E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.7E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	**1.7E+00**	**5.3E-01**	**na**	**4.1E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.7E+00	2.1E+00	--	--	5.5E-02	1.4E-02	--	--	1.9E+00	5.3E-01	--	--	**1.7E+00**	**5.3E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.1E+03	--	--	na	8.9E+00	--	--	na	4.1E+02	**--**	**--**	**na**	**4.1E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	6.8E-01	1.4E+00	na	2.7E+00	2.2E-02	9.0E-03	na	6.0E-03	7.5E-01	3.4E-01	na	2.7E-01	**6.8E-01**	**3.4E-01**	**na**	**2.7E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.4E+01	--	--	na	3.0E-02	--	--	na	1.4E+00	**--**	**--**	**na**	**1.4E+00**

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	9.6E+04	--	--	na	2.1E+02	--	--	na	9.6E+03	**--**	**--**	**na**	**9.6E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	6.4E+03	--	--	na	1.4E+01	--	--	na	6.4E+02	**--**	**--**	**na**	**6.4E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	**--**	**--**	**na**	**2.4E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	3.8E-01	na	--	--	2.5E-03	na	--	--	9.5E-02	na	--	**--**	**9.5E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	4.1E+00	1.4E-01	na	8.0E-02	1.3E-01	9.5E-04	na	7.9E-05	4.6E+00	3.6E-02	na	8.0E-03	**4.1E+00**	**3.6E-02**	**na**	**8.0E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	4.1E+00	1.4E-01	na	4.0E-02	1.3E-01	9.5E-04	na	3.9E-05	4.6E+00	3.6E-02	na	4.0E-03	**4.1E+00**	**3.6E-02**	**na**	**4.0E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	3.0E-01	--	--	na	2.9E-04	--	--	na	3.0E-02	**--**	**--**	**na**	**3.0E-02**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.8E+04	--	--	na	1.8E+01	--	--	na	1.8E+03	**--**	**--**	**na**	**1.8E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	5.0E+00	--	--	na	4.9E-03	--	--	na	5.0E-01	**--**	**--**	**na**	**5.0E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.7E+01	--	--	na	1.7E-02	--	--	na	1.7E+00	**--**	**--**	**na**	**1.7E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	7.5E+00	--	na	1.8E+02	2.4E-01	--	na	1.8E-01	8.3E+00	--	na	1.8E+01	**7.5E+00**	**--**	**na**	**1.8E+01**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.0E+04	--	--	na	1.1E+02	--	--	na	5.0E+03	**--**	**--**	**na**	**5.0E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	**--**	**--**	**na**	**3.4E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	7.6E+01	na	--	--	5.0E-01	na	--	--	1.9E+01	na	--	**--**	**1.9E+01**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	9.8E+05	--	--	na	9.6E+02	--	--	na	9.8E+04	**--**	**--**	**na**	**9.8E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	1.8E+02	2.1E+01	na	--	1.4E+03	7.8E+02	na	--	4.5E+01	5.1E+00	na	--	1.6E+03	1.9E+02	na	--	**1.4E+03**	**1.9E+02**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	**--**	**9.5E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.1E+01	2.9E+01	- -	- -	3.5E-01	1.9E-01	- -	--	1.2E+01	7.3E+00	- -	--	**1.1E+01**	**7.3E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	6.8E+04	--	--	na	1.5E+02	--	--	na	6.8E+03	**--**	**--**	**na**	**6.8E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	6.0E+05	--	--	na	5.9E+02	--	--	na	6.0E+04	**--**	**--**	**na**	**6.0E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	1.1E+00	na	--	--	7.5E-03	na	--	--	2.8E-01	na	--	**--**	**2.8E-01**	**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	2.4E+02	2.7E+01	na	4.6E+03	1.9E+03	1.0E+03	na	2.1E+05	6.0E+01	6.7E+00	na	4.6E+02	2.1E+03	2.5E+02	na	2.1E+04	**1.9E+03**	**2.5E+02**	**na**	**2.1E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.1E+04	--	--	na	6.9E+01	--	--	na	3.1E+03	**--**	**--**	**na**	**3.1E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	3.1E+03	--	--	na	3.0E+00	--	--	na	3.1E+02	**--**	**--**	**na**	**3.1E+02**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	6.1E+03	--	--	na	6.0E+00	--	--	na	6.1E+02	**--**	**--**	**na**	**6.1E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	5.2E+02	--	--	na	5.1E-01	--	--	na	5.2E+01	**--**	**--**	**na**	**5.2E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.2E+02	2.5E+02	na	--	7.0E+00	1.7E+00	--	--	2.5E+02	6.2E+01	--	--	**2.2E+02**	**6.2E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	5.2E-01	4.9E-01	na	--	1.6E-02	3.3E-03	na	--	5.7E-01	1.2E-01	na	--	**5.2E-01**	**1.2E-01**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	5.3E-01	na	6.5E-02	--	3.5E-03	na	6.4E-05	--	1.3E-01	na	6.5E-03	**--**	**1.3E-01**	**na**	**6.5E-03**
Pentachlorophenol [C]	0	5.5E+00	4.1E+00	na	3.0E+01	4.4E+01	1.5E+02	na	3.1E+03	1.3E+00	1.0E+00	na	3.0E+00	4.7E+01	3.9E+01	na	3.1E+02	**4.4E+01**	**3.9E+01**	**na**	**3.1E+02**
Phenol	0	--	--	na	8.6E+05	--	--	na	3.9E+07	--	--	na	8.6E+04	--	--	na	3.9E+06	**--**	**--**	**na**	**3.9E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.8E+05	--	--	na	4.0E+02	--	--	na	1.8E+04	**--**	**--**	**na**	**1.8E+04**
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	1.6E+02	1.9E+02	na	1.9E+05	5.0E+00	1.3E+00	na	4.2E+02	1.8E+02	4.7E+01	na	1.9E+04	**1.6E+02**	**4.7E+01**	**na**	**1.9E+04**
Silver	0	6.0E+00	--	na	--	4.8E+01	--	na	--	1.5E+00	--	na	--	5.3E+01	--	na	--	**4.8E+01**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.1E+03	--	--	na	4.0E+00	--	--	na	4.1E+02	**--**	**--**	**na**	**4.1E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	**--**	**--**	**na**	**3.4E+02**
Thallium	0	--	--	na	4.7E-01	--	--	na	2.1E+01	--	--	na	4.7E-02	--	--	na	2.1E+00	**--**	**--**	**na**	**2.1E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	2.7E+05	--	--	na	6.0E+02	--	--	na	2.7E+04	**--**	**--**	**na**	**2.7E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	5.8E+00	7.6E-03	na	2.9E-01	1.8E-01	5.0E-05	na	2.8E-04	6.4E+00	1.9E-03	na	2.9E-02	**5.8E+00**	**1.9E-03**	**na**	**2.9E-02**
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.6E+00	2.7E+00	na	--	1.2E-01	1.8E-02	na	--	4.0E+00	6.8E-01	na	--	**3.6E+00**	**6.8E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.2E+03	--	--	na	7.0E+00	--	--	na	3.2E+02	**--**	**--**	**na**	**3.2E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+04	--	--	na	1.6E+01	--	--	na	1.6E+03	**--**	**--**	**na**	**1.6E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.1E+04	--	--	na	3.0E+01	--	--	na	3.1E+03	**--**	**--**	**na**	**3.1E+03**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	**--**	**--**	**na**	**2.4E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	**--**	**--**	**na**	**2.4E+02**
Zinc	0	1.5E+02	1.6E+02	na	2.6E+04	1.2E+03	5.9E+03	na	1.2E+06	3.9E+01	3.9E+01	na	2.6E+03	1.4E+03	1.5E+03	na	1.2E+05	**1.2E+03**	**1.5E+03**	**na**	**1.2E+05**

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	2.9E+03
Arsenic	8.5E+02
Barium	na
Cadmium	8.3E+00
Chromium III	5.5E+02
Chromium VI	5.1E+01
Copper	5.8E+01
Iron	na
Lead	1.2E+02
Manganese	na
Mercury	4.4E+00
Nickel	1.5E+02
Selenium	2.8E+01
Silver	1.9E+01
Zinc	4.9E+02

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

3.500 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGI 3.500

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	24.240	31.370	27.740	34.870
7Q10	129.000	N/A	132.500	N/A
30Q10	141.000	182.000	144.500	185.500
30Q5	156.000	N/A	159.500	N/A
Harm. Mean	353.000	N/A	356.500	N/A
Annual Avg.	0.000	N/A	3.500	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.614	15.083
30Q10 90th% Temp. Mix (deg C)	23.522	14.366
1Q10 90th% pH Mix (SU)	7.986	7.989
30Q10 90th% pH Mix (SU)	7.997	7.998
1Q10 10th% pH Mix (SU)	6.539	N/A
7Q10 10th% pH Mix (SU)	6.508	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	138.0	138.0
7Q10 Hardness (mg/L as CaCO3)	138.8	138.8

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.986
(7.204 - pH)	-0.782
(pH - 7.204)	0.782
Trout Present Criterion (mg N/	5.765
Trout Absent Criterion (mg N/L	8.632
Trout Present?	n
Effective Criterion (mg N/L)	8.632

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.522
90th Percentile pH (SU)	7.997
MIN	1.595
MAX	23.522
(7.688 - pH)	-0.309
(pH - 7.688)	0.309
Early LS Present Criterion (mg N	1.367
Early LS Absent Criterion (mg N/	1.367
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.367

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.989
(7.204 - pH)	-0.785
(pH - 7.204)	0.785
Trout Present Criterion (mg N/	5.734
Trout Absent Criterion (mg N/L	8.586
Trout Present?	n
Effective Criterion (mg N/L)	8.586

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.366
90th Percentile pH (SU)	7.998
MIN	2.850
MAX	14.366
(7.688 - pH)	-0.310
(pH - 7.688)	0.310
Early LS Present Criterion (mg N	2.441
Early LS Absent Criterion (mg N/	2.465
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.441

3.500 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGI 3.500

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	119.000	154.000	122.500	157.500
7Q10	129.000	N/A	132.500	N/A
30Q10	141.000	182.000	144.500	185.500
30Q5	156.000	N/A	159.500	N/A
Harm. Mean	353.000	N/A	356.500	N/A
Annual Avg.	0.000	N/A	3.500	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.526	14.396
30Q10 90th% Temp. Mix (deg C)	23.522	14.366
1Q10 90th% pH Mix (SU)	7.997	7.998
30Q10 90th% pH Mix (SU)	7.997	7.998
1Q10 10th% pH Mix (SU)	6.509	N/A
7Q10 10th% pH Mix (SU)	6.508	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	138.771	138.771
7Q10 Hardness (mg/L as CaCO3) =	138.789	138.789

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.997
(7.204 - pH)	-0.793
(pH - 7.204)	0.793
Trout Present Criterion (mg N/	5.649
Trout Absent Criterion (mg N/L	8.459
Trout Present?	n
Effective Criterion (mg N/L)	8.459

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.522
90th Percentile pH (SU)	7.997
MIN	1.595
MAX	23.522
(7.688 - pH)	-0.309
(pH - 7.688)	0.309
Early LS Present Criterion (mg N	1.367
Early LS Absent Criterion (mg N/	1.367
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.367

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.998
(7.204 - pH)	-0.794
(pH - 7.204)	0.794
Trout Present Criterion (mg N/	5.642
Trout Absent Criterion (mg N/L	8.447
Trout Present?	n
Effective Criterion (mg N/L)	8.447

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.366
90th Percentile pH (SU)	7.998
MIN	2.850
MAX	14.366
(7.688 - pH)	-0.310
(pH - 7.688)	0.310
Early LS Present Criterion (mg N	2.441
Early LS Absent Criterion (mg N/	2.465
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.441

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP 3.5 MGD Permit No.: VA0090671

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

Stream Information		
Mean Hardness (as CaCO3) =	139	mg/L
90% Temperature (Annual) =	23.5	deg C
90% Temperature (Wet season) =	14.2	deg C
90% Maximum pH =	8	SU
10% Maximum pH =	6.5	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	119	MGD
7Q10 (Annual) =	129	MGD
30Q10 (Annual) =	141	MGD
1Q10 (Wet season) =	154	MGD
30Q10 (Wet season)	182	MGD
30Q5 =	156	MGD
Harmonic Mean =	353	MGD

Mixing Information		
Annual - 1Q10 Mix =	20.51	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	20.51	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	131	mg/L
90% Temp (Annual) =	24.4	deg C
90% Temp (Wet season) =	23	deg C
90% Maximum pH =	7.9	SU
10% Maximum pH =	7	SU
Discharge Flow =	3.5	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	4.5E+04	--	--	na	9.9E+01	--	--	na	4.5E+03	**--**	**--**	**na**	**4.5E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.2E+02	--	--	na	9.3E-01	--	--	na	4.2E+01	**--**	**--**	**na**	**4.2E+01**
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	2.5E+02	--	--	na	2.5E-01	--	--	na	2.5E+01	**--**	**--**	**na**	**2.5E+01**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	2.4E+01	--	na	5.1E-02	7.5E-01	--	na	5.0E-05	2.6E+01	--	na	5.1E-03	**2.4E+01**	**--**	**na**	**5.1E-03**
Ammonia-N (mg/l) (Yearly)	0.1	8.63E+00	1.37E+00	na	--	6.81E+01	5.24E+01	na	--	2.19E+00	4.17E-01	na	--	7.32E+01	1.32E+01	na	--	**6.81E+01**	**1.32E+01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0.1	8.59E+00	2.44E+00	na	--	8.52E+01	1.24E+02	na	--	2.19E+00	6.85E-01	na	--	9.40E+01	3.11E+01	na	--	**8.52E+01**	**3.11E+01**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.8E+06	--	--	na	4.0E+03	--	--	na	1.8E+05	**--**	**--**	**na**	**1.8E+05**
Antimony	0	--	--	na	6.4E+02	--	--	na	2.9E+04	--	--	na	6.4E+01	--	--	na	2.9E+03	**--**	**--**	**na**	**2.9E+03**
Arsenic		3.4E+02	1.5E+02	na	--	2.7E+03	5.7E+03	na	--	8.5E+01	3.8E+01	na	--	3.0E+03	1.4E+03	na	--	**2.7E+03**	**1.4E+03**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	5.2E+04	--	--	na	5.1E+01	--	--	na	5.2E+03	**--**	**--**	**na**	**5.2E+03**
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.0E-01	--	--	na	2.0E-04	--	--	na	2.0E-02	**--**	**--**	**na**	**2.0E-02**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	5.4E+02	--	--	na	5.3E-01	--	--	na	5.4E+01	**--**	**--**	**na**	**5.4E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.0E+06	--	--	na	6.5E+03	--	--	na	3.0E+05	**--**	**--**	**na**	**3.0E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.2E+03	--	--	na	2.2E+00	--	--	na	2.2E+02	**--**	**--**	**na**	**2.2E+02**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.4E+05	--	--	na	1.4E+02	--	--	na	1.4E+04	**--**	**--**	**na**	**1.4E+04**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	8.7E+04	--	--	na	1.9E+02	--	--	na	8.7E+03	**--**	**--**	**na**	**8.7E+03**
Cadmium	0	5.6E+00	1.5E+00	na	--	4.5E+01	5.6E+01	na	--	1.4E+00	3.7E-01	na	--	5.0E+01	1.4E+01	na	--	**4.5E+01**	**1.4E+01**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.6E+03	--	--	na	1.6E+00	--	--	na	1.6E+02	**--**	**--**	**na**	**1.6E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	1.9E+01	1.6E-01	na	8.3E-01	6.0E-01	1.1E-03	na	8.1E-04	2.1E+01	4.1E-02	na	8.3E-02	**1.9E+01**	**4.1E-02**	**na**	**8.3E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	6.9E+06	8.7E+06	na	--	2.2E+05	5.8E+04	na	--	7.5E+06	2.2E+06	na	--	**6.9E+06**	**2.2E+06**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.5E+02	4.2E+02	na	--	4.8E+00	2.8E+00	na	--	1.7E+02	1.0E+02	na	--	**1.5E+02**	**1.0E+02**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	**--**	**--**	**na**	**7.3E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+04	--	--	na	1.3E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
Chloroform	0	--	--	na	1.1E+04	--	--	na	5.0E+05	--	--	na	1.1E+03	--	--	na	5.0E+04	**--**	**--**	**na**	**5.0E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	**--**	**--**	**na**	**7.3E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	6.8E+03	--	--	na	1.5E+01	--	--	na	6.8E+02	**--**	**--**	**na**	**6.8E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	6.6E-01	1.6E+00	na	--	2.1E-02	1.0E-02	na	--	7.3E-01	3.9E-01	na	--	**6.6E-01**	**3.9E-01**	**na**	**--**
Chromium III	0	7.4E+02	9.7E+01	na	--	5.9E+03	3.7E+03	na	--	1.9E+02	2.4E+01	na	--	6.5E+03	9.2E+02	na	--	**5.9E+03**	**9.2E+02**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.3E+02	4.2E+02	na	--	4.0E+00	2.8E+00	na	--	1.4E+02	1.0E+02	na	--	**1.3E+02**	**1.0E+02**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	4.6E+02	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E-03	--	--	na	1.8E-01	**--**	**--**	**na**	**1.8E-01**
Copper	0	1.8E+01	1.2E+01	na	--	1.5E+02	4.5E+02	na	--	4.6E+00	3.0E+00	na	--	1.6E+02	1.1E+02	na	--	**1.5E+02**	**1.1E+02**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.8E+02	2.0E+02	na	7.3E+05	5.5E+00	1.3E+00	na	1.6E+03	1.9E+02	4.9E+01	na	7.3E+04	**1.8E+02**	**4.9E+01**	**na**	**7.3E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	3.2E-01	--	--	na	3.1E-04	--	--	na	3.2E-02	**--**	**--**	**na**	**3.2E-02**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	2.2E-01	--	--	na	2.2E-04	--	--	na	2.2E-02	**--**	**--**	**na**	**2.2E-02**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	8.8E+00	3.8E-02	na	2.2E-01	2.8E-01	2.5E-04	na	2.2E-04	9.6E+00	9.5E-03	na	2.2E-02	**8.8E+00**	**9.5E-03**	**na**	**2.2E-02**
Demeton	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	**--**	**9.5E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.4E+00	6.4E+00	na	--	4.3E-02	4.3E-02	na	--	1.5E+00	1.6E+00	na	--	**1.4E+00**	**1.6E+00**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	5.9E+04	--	--	na	1.3E+02	--	--	na	5.9E+03	**--**	**--**	**na**	**5.9E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.4E+04	--	--	na	9.6E+01	--	--	na	4.4E+03	**--**	**--**	**na**	**4.4E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	8.7E+03	--	--	na	1.9E+01	--	--	na	8.7E+02	**--**	**--**	**na**	**8.7E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.9E+01	--	--	na	2.8E-02	--	--	na	2.9E+00	**--**	**--**	**na**	**2.9E+00**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.7E+04	--	--	na	1.7E+01	--	--	na	1.7E+03	**--**	**--**	**na**	**1.7E+03**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	3.8E+04	--	--	na	3.7E+01	--	--	na	3.8E+03	**--**	**--**	**na**	**3.8E+03**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.2E+05	--	--	na	7.1E+02	--	--	na	3.2E+04	**--**	**--**	**na**	**3.2E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	4.6E+05	--	--	na	1.0E+03	--	--	na	4.6E+04	**--**	**--**	**na**	**4.6E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.3E+04	--	--	na	2.9E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+04	--	--	na	1.5E+01	--	--	na	1.5E+03	**--**	**--**	**na**	**1.5E+03**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.1E+04	--	--	na	2.1E+01	--	--	na	2.1E+03	**--**	**--**	**na**	**2.1E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	1.9E+00	2.1E+00	na	5.5E-02	6.0E-02	1.4E-02	na	5.4E-05	2.1E+00	5.3E-01	na	5.5E-03	**1.9E+00**	**5.3E-01**	**na**	**5.5E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.0E+06	--	--	na	4.4E+03	--	--	na	2.0E+05	**--**	**--**	**na**	**2.0E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	3.9E+04	--	--	na	8.5E+01	--	--	na	3.9E+03	**--**	**--**	**na**	**3.9E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.0E+07	--	--	na	1.1E+05	--	--	na	5.0E+06	**--**	**--**	**na**	**5.0E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.1E+05	--	--	na	4.5E+02	--	--	na	2.1E+04	**--**	**--**	**na**	**2.1E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	**--**	**--**	**na**	**2.4E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.3E+04	--	--	na	2.8E+01	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	3.5E+03	--	--	na	3.4E+00	--	--	na	3.5E+02	**--**	**--**	**na**	**3.5E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.3E-06	--	--	na	5.1E-09	--	--	na	2.3E-07	**--**	**--**	**na**	**2.3E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+02	--	--	na	2.0E-01	--	--	na	2.0E+01	**--**	**--**	**na**	**2.0E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.8E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	**1.8E+00**	**5.3E-01**	**na**	**4.1E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.8E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	**1.8E+00**	**5.3E-01**	**na**	**4.1E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.8E+00	2.1E+00	--	--	5.5E-02	1.4E-02	--	--	1.9E+00	5.3E-01	--	--	**1.8E+00**	**5.3E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.1E+03	--	--	na	8.9E+00	--	--	na	4.1E+02	**--**	**--**	**na**	**4.1E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	6.9E-01	1.4E+00	na	2.7E+00	2.2E-02	9.0E-03	na	6.0E-03	7.5E-01	3.4E-01	na	2.7E-01	**6.9E-01**	**3.4E-01**	**na**	**2.7E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.4E+01	--	--	na	3.0E-02	--	--	na	1.4E+00	**--**	**--**	**na**	**1.4E+00**

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	9.6E+04	--	--	na	2.1E+02	--	--	na	9.6E+03	**--**	**--**	**na**	**9.6E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	6.4E+03	--	--	na	1.4E+01	--	--	na	6.4E+02	**--**	**--**	**na**	**6.4E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	**--**	**--**	**na**	**2.4E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	3.8E-01	na	--	--	2.5E-03	na	--	--	9.5E-02	na	--	**--**	**9.5E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	4.1E+00	1.4E-01	na	8.0E-02	1.3E-01	9.5E-04	na	7.9E-05	4.6E+00	3.6E-02	na	8.0E-03	**4.1E+00**	**3.6E-02**	**na**	**8.0E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	4.1E+00	1.4E-01	na	4.0E-02	1.3E-01	9.5E-04	na	3.9E-05	4.6E+00	3.6E-02	na	4.0E-03	**4.1E+00**	**3.6E-02**	**na**	**4.0E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	3.0E-01	--	--	na	2.9E-04	--	--	na	3.0E-02	**--**	**--**	**na**	**3.0E-02**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.8E+04	--	--	na	1.8E+01	--	--	na	1.8E+03	**--**	**--**	**na**	**1.8E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	5.0E+00	--	--	na	4.9E-03	--	--	na	5.0E-01	**--**	**--**	**na**	**5.0E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.7E+01	--	--	na	1.7E-02	--	--	na	1.7E+00	**--**	**--**	**na**	**1.7E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	7.6E+00	--	na	1.8E+02	2.4E-01	--	na	1.8E-01	8.3E+00	--	na	1.8E+01	**7.6E+00**	**--**	**na**	**1.8E+01**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.0E+04	--	--	na	1.1E+02	--	--	na	5.0E+03	**--**	**--**	**na**	**5.0E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	**--**	**--**	**na**	**3.4E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	7.6E+01	na	--	--	5.0E-01	na	--	--	1.9E+01	na	--	**--**	**1.9E+01**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	**--**	**--**	**na**	**1.8E+00**
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	9.8E+05	--	--	na	9.6E+02	--	--	na	9.8E+04	**--**	**--**	**na**	**9.8E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	1.8E+02	2.1E+01	na	--	1.4E+03	7.8E+02	na	--	4.5E+01	5.1E+00	na	--	1.6E+03	1.9E+02	na	--	**1.4E+03**	**1.9E+02**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	**--**	**9.5E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.1E+01	2.9E+01	- -	- -	3.5E-01	1.9E-01	- -	--	1.2E+01	7.3E+00	- -	--	**1.1E+01**	**7.3E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	6.8E+04	--	--	na	1.5E+02	--	--	na	6.8E+03	**--**	**--**	**na**	**6.8E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	6.0E+05	--	--	na	5.9E+02	--	--	na	6.0E+04	**--**	**--**	**na**	**6.0E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	1.1E+00	na	--	--	7.5E-03	na	--	--	2.8E-01	na	--	**--**	**2.8E-01**	**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	2.4E+02	2.7E+01	na	4.6E+03	1.9E+03	1.0E+03	na	2.1E+05	6.0E+01	6.7E+00	na	4.6E+02	2.1E+03	2.5E+02	na	2.1E+04	**1.9E+03**	**2.5E+02**	**na**	**2.1E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.1E+04	--	--	na	6.9E+01	--	--	na	3.1E+03	**--**	**--**	**na**	**3.1E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	3.1E+03	--	--	na	3.0E+00	--	--	na	3.1E+02	**--**	**--**	**na**	**3.1E+02**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	6.1E+03	--	--	na	6.0E+00	--	--	na	6.1E+02	**--**	**--**	**na**	**6.1E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	5.2E+02	--	--	na	5.1E-01	--	--	na	5.2E+01	**--**	**--**	**na**	**5.2E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.2E+02	2.5E+02	na	--	7.0E+00	1.7E+00	--	--	2.5E+02	6.2E+01	--	--	**2.2E+02**	**6.2E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	5.2E-01	4.9E-01	na	--	1.6E-02	3.3E-03	na	--	5.7E-01	1.2E-01	na	--	**5.2E-01**	**1.2E-01**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	5.3E-01	na	6.5E-02	--	3.5E-03	na	6.4E-05	--	1.3E-01	na	6.5E-03	**--**	**1.3E-01**	**na**	**6.5E-03**
Pentachlorophenol [C]	0	5.5E+00	4.1E+00	na	3.0E+01	4.4E+01	1.5E+02	na	3.1E+03	1.3E+00	1.0E+00	na	3.0E+00	4.7E+01	3.9E+01	na	3.1E+02	**4.4E+01**	**3.9E+01**	**na**	**3.1E+02**
Phenol	0	--	--	na	8.6E+05	--	--	na	3.9E+07	--	--	na	8.6E+04	--	--	na	3.9E+06	**--**	**--**	**na**	**3.9E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.8E+05	--	--	na	4.0E+02	--	--	na	1.8E+04	**--**	**--**	**na**	**1.8E+04**
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	1.6E+02	1.9E+02	na	1.9E+05	5.0E+00	1.3E+00	na	4.2E+02	1.8E+02	4.7E+01	na	1.9E+04	**1.6E+02**	**4.7E+01**	**na**	**1.9E+04**
Silver	0	6.0E+00	--	na	--	4.8E+01	--	na	--	1.5E+00	--	na	--	5.3E+01	--	na	--	**4.8E+01**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.1E+03	--	--	na	4.0E+00	--	--	na	4.1E+02	**--**	**--**	**na**	**4.1E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	**--**	**--**	**na**	**3.4E+02**
Thallium	0	--	--	na	4.7E-01	--	--	na	2.1E+01	--	--	na	4.7E-02	--	--	na	2.1E+00	**--**	**--**	**na**	**2.1E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	2.7E+05	--	--	na	6.0E+02	--	--	na	2.7E+04	**--**	**--**	**na**	**2.7E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	5.8E+00	7.6E-03	na	2.9E-01	1.8E-01	5.0E-05	na	2.8E-04	6.4E+00	1.9E-03	na	2.9E-02	**5.8E+00**	**1.9E-03**	**na**	**2.9E-02**
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.7E+00	2.7E+00	na	--	1.2E-01	1.8E-02	na	--	4.0E+00	6.8E-01	na	--	**3.7E+00**	**6.8E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.2E+03	--	--	na	7.0E+00	--	--	na	3.2E+02	**--**	**--**	**na**	**3.2E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+04	--	--	na	1.6E+01	--	--	na	1.6E+03	**--**	**--**	**na**	**1.6E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.1E+04	--	--	na	3.0E+01	--	--	na	3.1E+03	**--**	**--**	**na**	**3.1E+03**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	**--**	**--**	**na**	**2.4E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	**--**	**--**	**na**	**2.4E+02**
Zinc	0	1.5E+02	1.6E+02	na	2.6E+04	1.2E+03	5.9E+03	na	1.2E+06	3.9E+01	3.9E+01	na	2.6E+03	1.4E+03	1.5E+03	na	1.2E+05	**1.2E+03**	**1.5E+03**	**na**	**1.2E+05**

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	2.9E+03
Arsenic	8.5E+02
Barium	na
Cadmium	8.3E+00
Chromium III	5.5E+02
Chromium VI	5.1E+01
Copper	5.8E+01
Iron	na
Lead	1.2E+02
Manganese	na
Mercury	4.4E+00
Nickel	1.5E+02
Selenium	2.8E+01
Silver	1.9E+01
Zinc	4.9E+02

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

3.500 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGI 3.500

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	24.407	31.585	27.907	35.085
7Q10	129.000	N/A	132.500	N/A
30Q10	141.000	182.000	144.500	185.500
30Q5	156.000	N/A	159.500	N/A
Harm. Mean	353.000	N/A	356.500	N/A
Annual Avg.	0.000	N/A	3.500	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.613	15.078
30Q10 90th% Temp. Mix (deg C)	23.522	14.366
1Q10 90th% pH Mix (SU)	7.986	7.989
30Q10 90th% pH Mix (SU)	7.997	7.998
1Q10 10th% pH Mix (SU)	6.539	N/A
7Q10 10th% pH Mix (SU)	6.508	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	138.0	138.0
7Q10 Hardness (mg/L as CaCO3)	138.8	138.8

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.986
(7.204 - pH)	-0.782
(pH - 7.204)	0.782
Trout Present Criterion (mg N/	5.764
Trout Absent Criterion (mg N/L	8.630
Trout Present?	n
Effective Criterion (mg N/L)	8.630

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.522
90th Percentile pH (SU)	7.997
MIN	1.595
MAX	23.522
(7.688 - pH)	-0.309
(pH - 7.688)	0.309
Early LS Present Criterion (mg N	1.367
Early LS Absent Criterion (mg N/	1.367
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.367

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.989
(7.204 - pH)	-0.785
(pH - 7.204)	0.785
Trout Present Criterion (mg N/	5.734
Trout Absent Criterion (mg N/L	8.585
Trout Present?	n
Effective Criterion (mg N/L)	8.585

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.366
90th Percentile pH (SU)	7.998
MIN	2.850
MAX	14.366
(7.688 - pH)	-0.310
(pH - 7.688)	0.310
Early LS Present Criterion (mg N	2.441
Early LS Absent Criterion (mg N/	2.465
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.441

3.500 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGI 3.500

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	119.000	154.000	122.500	157.500
7Q10	129.000	N/A	132.500	N/A
30Q10	141.000	182.000	144.500	185.500
30Q5	156.000	N/A	159.500	N/A
Harm. Mean	353.000	N/A	356.500	N/A
Annual Avg.	0.000	N/A	3.500	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	23.526	14.396
30Q10 90th% Temp. Mix (deg C)	23.522	14.366
1Q10 90th% pH Mix (SU)	7.997	7.998
30Q10 90th% pH Mix (SU)	7.997	7.998
1Q10 10th% pH Mix (SU)	6.509	N/A
7Q10 10th% pH Mix (SU)	6.508	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	138.771	138.771
7Q10 Hardness (mg/L as CaCO3) =	138.789	138.789

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.997
(7.204 - pH)	-0.793
(pH - 7.204)	0.793
Trout Present Criterion (mg N/	5.649
Trout Absent Criterion (mg N/L	8.459
Trout Present?	n
Effective Criterion (mg N/L)	8.459

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	23.522
90th Percentile pH (SU)	7.997
MIN	1.595
MAX	23.522
(7.688 - pH)	-0.309
(pH - 7.688)	0.309
Early LS Present Criterion (mg N	1.367
Early LS Absent Criterion (mg N/	1.367
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.367

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.998
(7.204 - pH)	-0.794
(pH - 7.204)	0.794
Trout Present Criterion (mg N/	5.642
Trout Absent Criterion (mg N/L	8.447
Trout Present?	n
Effective Criterion (mg N/L)	8.447

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	14.366
90th Percentile pH (SU)	7.998
MIN	2.850
MAX	14.366
(7.688 - pH)	-0.310
(pH - 7.688)	0.310
Early LS Present Criterion (mg N	2.441
Early LS Absent Criterion (mg N/	2.465
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.441

7/8/2016 11:23:59 AM

Facility = LJRR WWTP 3.5 MGD
Chemical = Ammonia
Chronic averaging period = 30
WLAa   = 68.1
WLAc   = 13.2
Q.L.   = 0.02
samples/mo. = 30
samples/wk. = 8

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

No Limit is required for this material

The data are:

9

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	3.101076999	TUa	LC_{50} =	33	%	Use as	3.03	TUa

ACUTE WLAa 3.10107692

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

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	31.01076999	TU_c	NOEC =	4	%	Use as	25.00	TU_c
BOTH*	31.01076999	TU_c	NOEC =	4	%	Use as	25.00	TU_c
AML	31.01076999	TU_c	NOEC =	4	%	Use as	25.00	TU_c

ACUTE WLAa,c 31.0107692
CHRONIC WLAc 50.6153846
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 12.7437107 a limit may result using WLA.EXE

Enter data in the cells with blue type:

Entry Date:	06/14/11
Facility Name:	Lower Jackson River
VPDES Number:	VA0090671
Outfall Number:	001

% Flow to be used from MIX.EXE

Plant Flow:	2.6	MGD	
Acute 1Q10:	119	MGD	20.4 %
Chronic 7Q10:	129	MGD	100 %

Difuser /modeling study?

Enter Y/N	N	
Acute	1	:1
Chronic	1	:1

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

IWC_a	9.67405864	%	Plant flow/plant flow + 1Q10
IWC_c	1.975683891	%	Plant flow/plant flow + 7Q10

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

Dilution, acute	10.33692308	100/IWCa
Dilution, chronic	50.61538462	100/IWCc

WLA_a	3.101076923	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	50.61538462	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	31.01076923	ACR X's WLA_a - converts acute WLA to chronic units

ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variatior	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of sample: 1

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

$LTA_{a,c}$	12.74371126	WLAa,c X's eA						
LTA_c	30.42173411	WLAc X's eB					Rounded NOEC's	%
MDL** with $LTA_{a,c}$	31.01076999	TU_c	NOEC =	3.224686	(Protects from acute/chronic toxicity)		NOEC =	4 %
MDL** with LTA_c	74.02878016	TU_c	NOEC =	1.350826	(Protects from chronic toxicity)		NOEC =	2 %
AML with lowest LTA	31.01076999	TU_c	NOEC =	3.224686	Lowest LTA X's eD		NOEC =	4

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

						Rounded LC50's	%
MDL with $LTA_{a,c}$	3.101076999	TU_a	LC50 =	32.246861	%	LC50 =	33 %
MDL with LTA_c	7.402878016	TU_a	LC50 =	13.508260	%	LC50 =	14

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

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.889296658

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.509098225

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

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

Table 3. **ACR used:** **10**

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

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

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	7.8	12.743711		
Dilution series to use for limit			4	25
Dilution factor to recommend:	0.2801251		0.2	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	28.0	3.57	20.0	5.00
	7.8	12.74	4.0	25.00
	2.2	45.49	0.8	125.00
	0.62	162.40	0.2	625.00
Extra dilutions if needed	0.17	579.75	0.0	3125.00
	0.05	2069.61	0.0	15625.00

APPENDIX D

TMDL Assessment Information

2012 Impaired Waters

Category 4 & 5 by 2012 Impaired Area ID*

James River Basin

Cause Group Code: **I09R-01-BEN** - **Jackson River**

Location:	Jackson River mainstem from the Westvaco main processing outfall downstream to the confluence of the Jackson and Cowpasture Rivers.
City/County	Alleghany Co., Covington City
Use(s):	Aquatic Life
Cause(s) / VA Category:	Benthic-Macroinvertebrate Bioassessments / 4A

The Jackson River General Standard - Benthic TMDL received U.S. EPA approval on 7/21/2010. The SWCB approved the Benthic TMDL on 12/9/2010. Federal IDs follow below by 2012 Assessment Units. The original 1996 VAW-I04R and VAW-I09R impairments were combined into one in 2002.

The 1996/1998 originally 303(d) Listed impairments to the benthic community are believed due to nutrient and organic enrichment (deposition) for 24.18 miles. Based on previous ambient station solids data, the nutrients and organics are mainly dissolved. Maxima have been greatly reduced since 1996.

The waters are partially de-listed (shortened- Category 2C) for 9.81 miles from the mouth of Karnes Creek downstream to the confluence of the Cowpasture and Jackson Rivers. The de-listing is based on Virginia Stream Condition Index (VSCI) scores of the 1996-1998 Listed reach currently achieving VSCI scores above 60 from station 2-JKS006.67. VSCI scores at 2-JKS006.67 have steadily increased since 2001. Improvements at discharging facilities have had a positive effect on the benthic community. Both the 2006 and 2012 flow adjusted trend analysis show a significant declining trend for total phosphorus and total nitrogen in both upstream station 2-JKS023.61 and downstream station 2-JKS000.38. 2007 - 2010 VSCI scores from four surveys have an average of 64.10. Benthic trend analysis also shows improving conditions at 2-JKS006.67 (+10 points) over the time period of 1994 - 2010. The VSCI is a multi-metric statewide stream index of biotic integrity that is based on data collected from minimally impacted reference sites throughout Virginia. This index shows that an SCI score of 60.0 is the lower limit for reference (or, unimpaired) conditions in a benthic community.

Federal IDs by Assessment Unit:
VAW-I04R_JKS01A00 - Total Phosphorus - 38981. Total Nitrogen - 39001.
VAW-I09R_JKS01A00 - Total Phosphorus - 39017. Total Nitrogen - 39022. De-list 2012- 3.48 miles.
VAW-I09R_JKS02A00 - Total Phosphorus - 38996. Total Nitrogen - 39003. De-list 2012- 1.71 miles.
VAW-I09R_JKS03A00 - Total Phosphorus - 38997. Total Nitrogen - 39004. De-list 2012- 4.62 miles.
VAW-I09R_JKS03B10 - Total Phosphorus - 38997. Total Nitrogen - 39004.
VAW-I09R_JKS04A00 - Total Phosphorus - 38995. Total Nitrogen - 39002.
VAW-I09R_JKS05A00 - Total Phosphorus - 38998. Total Nitrogen - 39005.
VAW-I09R_JKS06A00 - Total Phosphorus - 38999. Total Nitrogen - 39006.

2012 Benthic Assessment station locations are:
2-JKS000.38 - Rt. 727 Bridge - near Iron Gate (I09R)
2-JKS006.67 - Low Water Bridge - near Dabney Lancaster CC (I09R)
2-JKS013.29 - Off Rt. 696 above Lowmoor (I09R)
2-JKS018.68 - Rt. 18 Bridge at Covington (I09R)
2-JKS020.41- Upper Horse Shoe at Rayon Terrace (I09R)
2-JKS022.78- Fudge's Bridge, Rt. 154, Covington (I09R)
2-JKS023.61 - City Park - Covington at gage (I09R)

General Standard (Benthic):
2-JKS023.61-Bio 'IM' The 2012 data window reports an average Virginia Stream Condition Index (VSCI) score of 35.95 from five surveys (2006-2008 & 2010). The lowest score occurs in spring 2007 at 32.92 and the highest 38.47 fall 2008. Seven VSCI surveys (2003 - 2008) for 2010 have an average score of 45.15 with the lowest score in spring 2007 32.92 and highest score 57.38 spring 2004. The 2008 Integrated Report (IR) assessed seven VSCI surveys (2001 - 2006) with an average score of 34.36; lowest score spring 2001 at 31.03 and highest score 52.38 spring 2004. The invertebrate community at this site has been dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e.

Tubificidae, Tricladida, Chironomidae, Lumbriculidae and Simulidae). The VSCI scores display a negative alteration in the taxonomic diversity and pollution sensitivity of the benthic community. Recent improvement in the historical trend of the benthic community may be due to a reduction in cooling water discharges and efforts in the watershed to reduce nutrient discharge to the river. However, a recently discovered and repaired sewer line contributed pollution to the river and may be responsible for the VSCI decline since 2007.

Both 2006 and 2012 flow adjusted trend analysis find significant declining trends for total phosphorus and total nitrogen at 2-JKS023.61. The 2012 data window finds five of 41 total phosphorus samples are elevated above 0.20 mg/l ranging from 0.24 to 0.52 mg/l; although maxima are reduced. An 'Observed effect' is noted for these waters. Past values above 0.20 have been greater than 1.40 mg/l. The 2010 assessment finds elevated total phosphorus levels in six of 40 samples are above 0.20 mg/l. The maximum value is 0.40 mg/l and the lowest 0.28 mg/l. 2008 elevated total phosphorus levels were 17 of 51 samples- 'Observed Effect'. The maximum value is 1.40 mg/l and the lowest 0.23 mg/l.

2-JKS022.78- There are no additional data beyond the 2010 Integrated Report (IR) where elevated TP values greater than 0.20 mg/l are found in two of 12 samples with excessive values at 0.28 and 0.39 mg/l.

2-JKS020.41- A 2007 probability station. Bio 'IM' Two VSCI surveys (2007), average score 48.13. The invertebrate community at this site is dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tricladida and Asellidae).

2-JKS018.68- Bio 'IM' The 2012 assessment finds from five surveys (2006-2008 & 2010) an average score of 50.37. Five VSCI surveys within the 2010 data window (2004, 2006-2008) have an average score of 54.28. The 2008 assessment reports two VSCI scores from the fall of 2004 (67.3) and 2006 (51.8). The benthic community shows some improvement at this station relative to the station at City Park (2-JKS023.61). However, the benthic community remains dominated by pollution tolerant taxa.

Two total phosphorus observations are elevated within the 2012 data window from 22 samples. Samples greater than 0.20 mg/l are 0.22 and 0.30 mg/l. The 2010 assessment finds two of 16 total phosphorus observations are elevated with excessive values the same as 2012. 2008 assessment TP results find no elevated TP levels above 0.20 mg/l from nine observations (no additional data). The 2006 IR reported six of 18 observations greater than 0.20 mg/l. Elevated TP values ranged from 0.30 to 0.70 mg/l- 'Observed Effect'.

2-JKS013.29- The average VSCI score within the 2012 data window (2006-2008 & 2010) is 54.04. The lowest score is 36.68 (spring 2007) and the highest 61.26 (fall 2006). 2010 results also find an impaired condition with the lowest at 38.6; fall 2004 and the highest 61.26; fall 2006 from six VSCI survey scores (2003, 2004, 2006 & 2007). Lower VSCI scores are the result of the low taxonomic diversity and lack of pollution sensitive taxa. The 2008 IR found impairment from four VSCI surveys (2003 - 2004 & 2006). The Low Moor station through the 2008 assessment has consistently had lower assessment scores and higher numbers of pollution tolerant organisms than at 2-JKS018.68. The 2006 sample showed an increase in pollution sensitive taxa and a decrease in pollution tolerant taxa.

One TP observation from a total of six is greater than 0.20 mg/l at 0.43 mg/L in 2012. There are no additional total phosphorous data within the 2010 data window. 2008 elevated TP samples are found in six of 12 samples with excessive values ranging from 0.29 to 1.41 mg/l- 'Observed Effect'.

2-JKS006.67- Bio 'FS The 2012 assessment finds 'full support' from four VSCI surveys (2007-2008 & 2010) with an average score of 64.1. 2010 results also find 'full support' from six VSCI surveys (2003-2008) with an average score of 61.2. Benthic trend analysis also shows improving conditions (+10 points) over the time period of 1994 - 2010. VSCI scores have increased by 14 points from 2000-2005; and with an additional increase of 11 points from 2006-2010. There have been slight differences in scores over the current six-year period. Spring scores have been lower than fall scores. Lower VSCI scores are the result of the decrease in pollution sensitive taxa. Recent improvements in the benthic community may be due to a reduction in cooling water discharges and efforts to reduce nutrient discharge to the river. A recently discovered and repaired sewer line may be responsible for the VSCI decline since 2007. The waters in this portion of the of the original 303(d) Listing (9.81 miles) are de-listed with the 2012 assessment based on VSCI scores from both the 2010 and 2012 assessments, Benthic trend analysis and 2006 / 2012 flow adjusted trend analysis at upstream station 2-JKS023.61 and downstream station 2-JKS000.38.

2-JKS000.38- 2006 and 2012 flow adjusted trend analysis reveals significant declining trends in total phosphorus and total nitrogen at this station. The 2012 Integrated Report (IR) finds no elevated TP observations (greater than 0.20 mg/L) from 36 samples. The 2010 assessment finds a single elevated TP observation from 38 observations at 0.22 mg/l. The 2008 assessment reported elevated TP observations in 15 of 50 observations- 'Observed Effect'. Values above 0.20 mg/l range from 0.22 to 1.24 mg/l.

Assessment Unit	Water name	Location Description	Cause Category	Cause Name	Cycle First Listed	TMDL Schedule	Size
VAW-I04R_JKS01A00	Jackson River	Jackson River mainstem from the Westvaco main processing outfall downstream to Dunlap Creek mouth at the watershed boundary with I09R.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	0.46

VAW-I09R_JKS03B10	Jackson River	Jackson River mainstem from upstream of the Lowmoor community downstream to near the mouth of Karnes Creek.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	3.18
VAW-I09R_JKS04A00	Jackson River	Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	5.81
VAW-I09R_JKS05A00	Jackson River	Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	3.26
VAW-I09R_JKS06A00	Jackson River	Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	1.66

Jackson River		**Estuary (sq. miles)**	**Reservoir (acres)**	**River (miles)**
Impaired area ID: VAW-I04R-01	Benthic-Macroinvertebrate Bioassessments / 4A Total impaired size by water type:			14.37
Aquatic Life				

Sources:

- Industrial Point Source Discharge
- Municipal (Urbanized High Density Area)
- Municipal Point Source Discharges

* Narrative descriptions, location and city/county describe the entire extent of the impairment. Sizes may not represent the total size of the impairment.