VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **Minor, Municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et.seq. The discharge results from the operation of a 1.25 MGD WWTP, consisting of: Influent pump station, influent Isco Unimag in pipe flow meter, mechanical (rotating) and manual (bypass) bar screen, aerated grit channel, aerated flow equalization tank, five sequencing batch reactors, dual chlorinators and dual chlorine contact tanks, dual sulfonators for dechlorination, effluent Parshall flume with Isco 3010 ultrasonic flow meter, effluent discharge diffuser, three aerobic digesters, dual sludge pumps, sludge belt press, septage receiving/screening station, septage holding tank, dual vacuum assisted drying beds, alarm system, and 500 kw generator. The collection system includes ten pump stations in addition to the main (influent) pump station This permit action consists of limiting pH, $CBOD_5$, suspended solids, total Kjeldahl nitrogen, E.coli, and dissolved oxygen; and including special conditions regarding biosolids use and disposal, biosolids limitations and monitoring requirements and soil monitoring requirements for land application sites, compliance reporting, control of significant dischargers, water quality criteria monitoring, and other requirements and special conditions. The effluent limitations are being tiered for future expansions to 1.5 MGD, 2.0 MGD, and 2.5 MGD. SIC Code: 4952.

1. Facility Name and Address:
   Fort Chiswell Wastewater Treatment Plant
   613 Locust Hill Road
   Max Meadows, VA 24360

   Facility Contact:
   Don Crisp, Jr., Director
   Phone: (276) 637-4544
   E-mail: dtcrisp@wytheco.org

2. Permit No. VA0074161
   (Previous) Effective Date: November 28, 2006
   (Previous) Expiration Date: November 27, 2011

3. Owner: Wythe County Board of Supervisors
   Owner Contact: R. Cellell Dalton
   Title: County Administrator
   Telephone No: 276-223-6020
   Owner Address: 340 South Sixth Street
   Administration Building
   Wytheville, VA 24382-2598

4. Application Complete Date:
   Permit Drafted By: Fred M. Wyatt Date: August 30, 2011
   Reviewed By: Date: 9/26/2011
   Public Comment Period Dates: from _____ to _____

5. Receiving Stream Name: Reed Creek; River Mile: 9-RDC014.11; Basin: New River; Subbasin: None; Section: 2; Class: IV; Special Standards: v (New-5 is listed in the Water Quality Standards as a special standard but is not applicable to this section). Lat.: 36°57'32"; Long.: 80°55'40"

   7-Day, 10-Year Low Flow (7Q10): 32.3 MGD (June - Dec.)
   1-Day, 10-Year Low Flow (1Q10): 26.5 MGD (June - Dec.)

7Q10 High Flow: 44.0 MGD (Jan. - May)
1Q10 High Flow: 34.9 MGD (Jan. - May)
30-Day, 10-Year Low Flow (30Q10): 37.2 MGD (June-Dec.)
30Q10 High Flow: 58 MGD (Jan.-May)
30-Day, 5-Year Low Flow (30Q5): 39.7 MGD
Harmonic Mean Flow (HM): 85.3 MGD

Tidal? No

On 303(d) list? Yes (See Item # 13 below)

6. Operator License Requirements: Class II

7. Reliability Class: III

8. Permit Characterization:
( ) Private ( ) Federal ( ) State (X) POTW ( ) PVOTW
( ) Possible Interstate Effect ( ) Interim Limits in Other Document

9. Attach a schematic of wastewater treatment system, and provide a general description of the activities of the facility.

Discharge Description

OUTFALL NUMBER	DISCHARGE SOURCE (1)	TREATMENT (2)	FLOW (3)
001	Communities of Ft. Chiswell and Max Meadows	See Page 1 above, first paragraph	Existing: 1.25 MGD Future: 1.5, 2.0, & 2.5 MGD

(1) List operations contributing to flow (2) List treatment units
(3) Design flow

10. Sewage Sludge Use or Disposal: The sludge disposal plan consists of two options (1) Disposal at the New River Solid Waste Management Area Landfill in Pulaski County; (2) Land application to 1 farm site in Wythe County, Virginia owned by Agnes C. Davis and land application to 3 farm sites in Wythe County, Virginia owned by the Wythe County Board of Supervisors.

Since the land application of biosolids has been chosen as a disposal option on the VPDES Sewage Sludge Permit Application Form, permit limits and monitoring requirements are necessary based on the VPA Permit Regulation (9VAC25-32 Sections 310 through 760) and the VPDES Permit Regulation (9VAC25-31 Sections 420 through 720), and 40 CFR Part 503.

Pathogen Reduction and Vector Attraction Reduction: The sewage treatment works must achieve the following treatment standards:
a. Class B pathogen reduction by one of the applicable reduction

alternatives specified in 9VAC25-31-710.

b. Vector attraction reduction by one of the applicable alternatives specified in 9VAC25-31-720.

The permit authorizes the land application of biosolids to four fields in Wythe County, Virginia consisting of 81.8 gross acres:

Site	Owner	Acreage (acres)	County
S01	Agnes C. Davis	24.0	Wythe
S03	Wythe County Board of Supervisors	15.0	Wythe
S04	Wythe County Board of Supervisors	10.4	Wythe
S05	Wythe County Board of Supervisors	32.4	Wythe

Biosolids Characterization: The attached sludge analyses indicate that all metals concentrations in the sludge are less than the Ceiling Concentration Limits presented in Table 1 of the permit regulation (9VAC25-31-540). Therefore, the sludge meets the land application requirement for the Pollutant Concentration Option (Table 3, 9VAC25-31-540) and may only be applied in bulk.

Table A
LIMITATIONS AND MONITORING REQURIEMENTS FOR POLLUTANT CONCENTRATIONS BIOSOLIDS (PC BIOSOLIDS):

PARAMETER	BASIS FOR LIMITS	MONITORING REQUIREMENTS			
		Maximum[a]	Monthly[b]	Frequency[c]	Sample Type
Total Arsenic (mg/kg)	1,2,3,4,5	75	41	1/Year	Composite
Total Cadmium (mg/kg)	1,2,3,4,5	85	39	1/Year	Composite
Total Copper (mg/kg)	1,2,3,4,5	4,300	1,500	1/Year	Composite
Total Lead (mg/kg)	1,2,3,4,5	840	300	1/Year	Composite
Total Mercury (mg/kg)	1,2,3,4,5	57	17	1/Year	Composite
Total Molybdenum (mg/kg)	1,2,3,4	75	NA	1/Year	Composite
Total Nickel (mg/kg)	1,2,3,4,5	420	420	1/Year	Composite
Total Selenium (mg/kg)	1,2,3,4,5	100	100	1/Year	Composite
Total Zinc (mg/kg)	1,2,3,4,5	7,500	2,800	1/Year	Composite
Percent Solids (%)	1,2,3	NA	NL	1/Year	Composite
Volatile Solids (%)	1,2,3	NA	NL	1/Year	Composite
TKN (mg/kg)	1,2,3	NA	NL	1/Year	Composite
Ammonium Nitrogen (mg/kg)	1,2,3	NA	NL	1/Year	Composite
Nitrate Nitrogen (mg/kg)	1,2,3	NA	NL	1/Year	Composite
Total P (mg/kg)	1,2,3	NA	NL	1/Year	Composite
Total K (mg/kg)	1,2,3	NA	NL	1/Year	Composite
pH (SU)	1,2,3	NA	NL	1/Year	Composite
CCE as $CaCO_3$ (%)	1,2,3	NA	NL	1/Year	Composite

NL = No Limitation, monitoring required
NA = Not Applicable

a. If the concentration of any metal in Table A above exceeds the maximum concentration, for any single sample of biosolids, then the biosolids *shall not* be land applied.

b. If the concentration of any metal in Table A above exceeds the monthly average concentration but is less than the maximum concentration, the cumulative loading of the metals must be tracked. See *Cumulative Pollutant Loading Rate Limitations Table below.*

c. If the annual amount of biosolids produced at the facility exceeds 290 dry metric tons the facility shall increase the sampling to the monitoring frequency listed below:

Amount of biosolids (dry metric tons per 365-day period)	Frequency
Greater than zero but less than 290	Once per year
Equal to or greater than 290 but less than 1,500	Once per quarter (four times per year)
Equal to or greater than 1,500 but less than 15,000	Once per 60 days (six times per year)
Equal to or greater than 15,000	Per month (12 times per year)

Bases for Effluent Limitations
1. 9VAC25-31-570
2. 9VAC25-31-490
3. 9VAC25-31-560
4. 9VAC25-31-540, Table 1
5. 9VAC25-31-540, Table 3

Table B
Cumulative Pollutant Loading Rate Limitations (CPLR) Biosolids:

PARAMETER	BASIS FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		CPLR[a]		Frequency[b]	Sample Type
		(kg/ha)	(lb/A)		
Total Arsenic (mg/kg)	1	41	36	Each Application	Calculated
Total Cadmium (mg/kg)	1	39	35	Each Application	Calculated
Total Copper (mg/kg)	1	1,500	1,340	Each Application	Calculated
Total Lead (mg/kg)	1	300	270	Each Application	Calculated
Total Mercury (mg/kg)	1	17	16	Each Application	Calculated
Total Nickel (mg/kg)	1	420	375	Each Application	Calculated
Total Selenium (mg/kg)	1	100	89	Each Application	Calculated
Total Zinc (mg/kg)	1	2,800	2,500	Each Application	Calculated

a. Cumulative Pollutant Loading Rates must be tracked *only* if the monthly average concentrations for the metals listed in Table B above are exceeded.

b. Samples shall be collected prior to each land application activity.

Bases for Effluent Limitations
1. 9VAC25-31-540, Table 2

Unless otherwise stated, all biosolids parameters are reported on a dry weight basis

Table C
Soils Monitoring Requirements for each Land Application Field:

PARAMETER	BASIS FOR LIMITS	LIMITATIONS	MONITORING REQUIREMENTS	
			Frequency[c]	Sample Type[d]
Soil pH[a] (SU)	1,2	NL	Prior to Application	Composite
Cation Exchange Capacity (meq/100 g)	1,2	NL	Prior to Application	Composite
Available Phosphorus[b] (mg/kg)	1,2	NL	Prior to Application	Composite
Exchangeable Potassium (mg/kg)	1,2	NL	Prior to Application	Composite
Exchangeable Magnesium (mg/kg)	1,2	NL	Prior to Application	Composite

NL = No Limitation, monitoring required

a. 9VAC25-32-560.B.3.a. Lime amended biosolids shall be applied at rates that are not expected to result in a target soil pH in the plow layer above a pH of 6.5 for soils located in the coastal plain and above a pH of 6.8 in other areas of the state.

b. 9VAC25-32-660. If soils exhibit very high soil test phosphorus of 55 or more parts per million phosphorus (Mehlich I analytical test procedure or equivalent procedure approved by the Department of Conservation and Recreation), the maximum application rates for phosphorus contained in biosolids together with phosphorus contained in other applied nutrient sources to the site and all applicable phosphorus management practices shall be consistent with the nutrient management plan (prepared by a certified nutrient management planner as stipulated in regulations promulgated pursuant to §10.1-104.2 of the Code of Virginia).

c. Soil samples shall be collected prior to biolsolids application and analyzed no more than 3 years prior to the application. For biosolids with a cadmium concentration greater than or equal to 21 mg/kg the soil pH sample must be less than 1 year old.

d. Soil composite samples shall be representative of soil types delineated by the SCS Soil Survey (or the equivalent). Samples shall be taken at 0-6 inches soil depth for each land applications site. Soil testing used to develop a Nutrient Management Plan must be conducted by a DCR

approved laboratory in accordance with the Virginia Nutrient Management Standards and Criteria.

Bases for Effluent Limitations:

1. 9VAC25-32-460
2. 9VAC25-32, Table 5

Land Area Determination:

Nutrients: All nutrient loading issues are addressed in the Nutrient Management Plan. (*See Special Conditions*).

11. Discharge Location Description: See attached Max Meadows, VA Quadrangle, Number: 053B.

12. Material Storage: None reported

13. Ambient Water Quality Information: The segment is not supporting the recreation use goal. The impairment is listed as Escherichia coli. The source is listed as animal feeding. A VDH fish consumption restriction was imposed on 12/13/2004 due to PCBs in fish tissue. A TMDL is scheduled to be developed by 2018.

14. Antidegradation Review & Comments:
Tier 1_____ Tier 2 (X) Tier 3 _____
The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. Since the original effluent limitations for this facility were based on Tier 2 restrictions, the receiving stream is Tier 2.

15. Site Inspection: Technical Inspection by Wade Carico 07/20/2011.

16. Effluent Screening & Limitation Development:

Since the receiving stream flows have not significantly changed since the previous issuance, effluent limitations are not being reevaluated.

On January 15, 2003, new bacteria standards in 9 VAC 25-260-170.A became effective, as did the revised disinfection policy of 9 VAC 25-260-170.B.

These standards replaced the existing fecal coliform standard and disinfection policy of 9 VAC 25-160-170. E.coli (fresh water) and enterococci (saltwater and transition zone) criteria replaced the existing fecal coliform criteria. Since this facility disinfects with chlorine, the previous permit included fecal coliform limits which were applicable only if alternate disinfection was used. In accordance with the agency guidance for the new standards, permittees which use chlorine may perform a study to demonstrate that chlorine limits can be used as a surrogate for bacteria limits in a permit for an individual discharge. However, several surrogate studies have been completed state-wide of facilities with a wide range of design flows and treatment schemes and all the facilities have passed the criteria for using chlorine as a surrogate for E.coli testing. Therefore, surrogate testing is not being required in this permit.

Basis for Effluent Limitations: 1.25 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating & Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5	1,5	30 mg/l 140 kg/l	45 mg/l 210 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Suspended Solids	1	30 mg/l 140 kg/d	45 mg/l 210 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Residual Chlorine**	2,5	0.018 mg/l	0.020 mg/l	NA	NA	4/Day at 4 Hour Intervals	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	4/Month Between 10:00 am & 4:00 pm	Grab
Ammonia Nitrogen	2,5	8.0 mg/l	11 mg/l	NA	NA	3 Days/Week	24 Hour Comp.
Dissolved Oxygen	2,5	NA	NA	6.0	NA	1/Day	Grab

Basis for Effluent Limitations: 1.50 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating & Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5	1,5	30 mg/l 170 kg/l	45 mg/l 260 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Suspended Solids	1	30 mg/l 170 kg/d	45 mg/l 260 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Residual Chlorine**	2,5	0.016 mg/l	0.018 mg/l	NA	NA	4/Day at 4 Hour Intervals	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	4/Month Between 10:00 am & 4:00 pm	Grab
Ammonia Nitrogen	2,5	6.9 mg/l	9.2 mg/l	NA	NA	3 Days/Week	24 Hour Comp.
Dissolved Oxygen	2,5	NA	NA	6.0	NA	1/Day	Grab

Basis for Effluent Limitations: 2.0 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating & Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5	1,5	30 mg/l 230 kg/l	45 mg/l 340 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Suspended Solids	1	30 mg/l 230 kg/d	45 mg/l 340 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Residual Chlorine**	2,5	0.015 mg/l	0.017 mg/l	NA	NA	4/Day at 4 Hour Intervals	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	4/Month Between 10:00 am & 4:00 pm	Grab
Ammonia Nitrogen	2,5	5.2 mg/l	7.0 mg/l	NA	NA	3 Days/Week	24 Hour Comp.
Dissolved Oxygen	2,5	NA	NA	6.0	NA	1/Day	Grab

Basis for Effluent Limitations: 2.5 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating & Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5 (June-Nov.)	1,5	30 mg/l 280 kg/l	45 mg/l 430 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Suspended Solids	1	30 mg/l 280 kg/d	45 mg/l 430 kg/d	NA	NA	3 Days/Week	24 Hour Comp.
Total Residual Chlorine**	2,5	0.012 mg/l	0.013 mg/l	NA	NA	1/Every 2 Hours	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	4/Month Between 10:00 am & 4:00 pm	Grab
Ammonia Nitrogen (June-Dec.)	2,5	4.4 mg/l	5.9 mg/l	NA	NA	3 Days/Week	24 Hour Comp.
Ammonia Nitrogen (Jan.- May)	2,5	7.1 mg/l	9.5 mg/l	NA	NA	3 Days/Week	24 Hour Comp.
Dissolved Oxygen	2,5	NA	NA	6.0	NA	1/Day	Grab

* 1. Federal Effluent guidelines
2. Water Quality-based Limits:
3. Best Engineering Judgment
4. Best Professional Judgment
5. Other (e.g. wasteload allocation model)

****Additional TRC Limitations and Monitoring Requirements (PART I.B. of Permit), for 1.25, 1.5, and 2.0 MGD Facilities**

1. The permittee shall monitor the Total Residual Chlorine (TRC) at the outlet of each operating chlorine contact tank, 4/day at 4 hour intervals.
2. No more than twelve ((12) of all samples for TRC taken at the outlet of each chlorine contact tank shall be less than 1.0 mg/l for any one calendar month.
3. No TRC sample collected at each outlet of the chlorine contact tank shall be less than 0.6 mg/l.
4. If dechlorination facilities exist, the samples above shall be collected prior to dechlorination.
5. If chlorine disinfection is not used, E.coli shall be limited and monitored by the permittee as specified below and this requirement, if applicable, shall substitute for the TRC and E.coli requirement delineated elsewhere in Part I of this permit:

	Discharge Limitations		Monitoring Requirements	
	Monthly Avg.	Weekly Avg.	Frequency	Sample Type
E.coli (N/100ml)	126*	NA	5 Days/Week**	Grab

* Geometric Mean
** Between 10:00 a.m. and 4:00 p.m.

****Additional TRC Limitations and Monitoring Requirements (PART I.B. of Permit), for 2.5 MGD Facility:**

1. The permittee shall monitor the Total Residual Chlorine (TRC) at the outlet of each operating chlorine contact tank, once every 2 hours, by grab sample.
2. No more than thirty six (36) of all samples for TRC taken at the outlet of each chlorine contact tank shall be less than 1.0mg/l for any one calendar month.
3. No TRC sample collected at each outlet of the chlorine contact tank shall be less than 0.6 mg/l.
4. If dechlorination facilities exist, the samples above shall be collected prior to dechlorination.
5. If chlorine disinfection is not used, E.coli shall be limited and monitored by the permittee as specified below and this requirement, if applicable, shall substitute for the TRC and E.coli requirement delineated elsewhere in Part I of this permit:

	Discharge Limitations		Monitoring Requirements	
	Monthly Avg.	Weekly Avg.	Frequency	Sample Type
E.coli (N/100ml)	126*	NA	1/Day**	Grab

* Geometric Mean
** Between 10:00 a.m. and 4:00 p.m.

17. Sludge use and disposal: See Items 10 and 20

18. Antibacksliding Statement:
Since no effluent limitations are being relaxed in this reissuance, the antibacksliding provisions of the Permit Regulation (9 VAC 25-31-220.1) do not apply.

19. Compliance Schedule: NA.

20. Special Conditions:

PART I.B. Additional TRC Limitations and Monitoring Requirements
Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC 25-790. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

PART I.C. Special Condition - Compliance Reporting
Rationale: Authorized by VPDES Permit Regulation, 9VAC25-31-190J4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

PART I.D. Special Condition - Control of Significant Dischargers
Rationale: VPDES Permit Regulation, 9VAC25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.

PART I.E. Special Condition - Whole Effluent Toxicity Testing

Rationale: VPDES Permit Regulation, 9 VAC25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act.

PART I.F. Sludge Use and Disposal

Rationale: VPDES Permit Regulation, 9VAC25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

Sludge Reopener

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-220 C 4, for all permits issued to treatment works treating domestic sewage.

PART I.G. Biosolids Land Application Special Conditions

1. Nutrient Management Plan Requirement: (Part I.G.1)

Rationale: State Water Control Law § 62.1-44.19.3.C.8 requires that a NMP be developed by a person certified in accordance with § 10.1-104.2 for each biosolids land application site, prior to application of biosolids at the site. The statute also establishes conditions where the NMP must be approved by the Department of Conservation and Recreation prior to submittal at the time of permit application.

2. Loading Rates: (Part I.G.2)

Rationale: 9VAC25-31-505.A - Site specific nutrient management plans and the cumulative trace element loading rates (9VAC25-32-540 Table 2) 9VAC25-31-220.I.4.a. states that mass or other measurements for each pollutant of concern may be specified in the VPDES Permit. 9VAC25-31-220.I.4.c. allows for other measurements as appropriate.

3. 14 Day Notification: (Part I.G.3)

Rationale: State Water Control Law § 62.1-44.19.3.L. and 9VAC25-31-485.D. require notification to the Department 14 days prior to land application at a specific site.

4. Signage Requirements: (Part I.G.4)

Rationale: 9VAC25-32-530.B. requires a sign be posted at a land application site at least 48 hours prior to delivery of biosolids at the site and remain on site until 48 hours after application is complete. 9VAC25-32-530.C-D specifies construction, content and maintenance of the sign.

5. 100 Day Notification to the Locality: (Part I.G.5)

Rationale: 9VAC25-31-485.C. requires notification to the locality 100 days prior to the initial land application at a specific site.

6. Certified Land Applicator Requirement: (Part I.G.6)
Rationale: State Water Control Law § 62.1-44.19.3.1.B. states that Class B biosolids shall not be land applied unless a certified land applicator is onsite at all times during the application.

7. Threatened or Endangered Species: (Part I.G.7)
Rationale: 9VAC25-31-550.A requires that land application of biosolids in accordance with the regulations is not to result in harm to threatened or endangered species listed in 9VAC25-260-320 nor result in the destruction or adverse modification of the critical habitat of a threatened or endangered species.

8. 100 Day Notification to the Locality: (Part I.G.5)
Rationale: 9VAC25-31-485.C. requires notification to the locality 100 days prior to the initial land application at a specific site.

9. Certified Land Applicator Requirement: (Part I.G.6)
Rationale: State Water Control Law § 62.1-44.19.3.1.B. states that Class B biosolids shall not be land applied unless a certified land applicator is onsite at all times during the application.

10. Threatened or Endangered Species: (Part I.G.7)
Rationale: 9VAC25-31-550.A requires that land application of biosolids in accordance with the regulations is not to result in harm to threatened or endangered species listed in 9VAC25-260-320 nor result in the destruction or adverse modification of the critical habitat of a threatened or endangered species.

11. Infrequent Application: (Part I.G.8)
Rationale: 9VAC25-32-560.B.3.a(1) specifies requirements for infrequent application.

12. Frequent Application Below Agronomic Rate: (Part I.G.9)
Rationale: 9VAC25-32-560.B.3.a(5) specifies requirements for frequent, below agronomic rate application.

13. Liquid Application Rate Limitation: (Part I.G.10)
Rationale: 9VAC25-32-560.B.3.c(1) specifies requirements for application of liquid biosolids.

14. Operational Limitations During Periods of Inclement Weather (Part I.G.11)
Rationale: 9VAC25-31-505.A - NMP specifies requirements for application during inclement weather.

15. Injection or Incorporation Requirements: (Part I.G.12)
Rationale: 9VAC25-32-560.B.3.b. requires direct injection or incorporation within 48 hours of application on sites with less than 60% uniform residue cover or at times when the site is subject to frequent flooding as defined by soil survey information.

16. Slope Restrictions: (Part I.G.13)
Rationale: 9VAC25-32-560.B.3.b.c. specifies maximum slope restrictions and management practices to follow when applying on fields with slopes between 5% and 15%.

17. Buffer Zones: (Part I.G.14)
Rationale: 9VAC25-32-560.B.3.d(1) establishes setback distances.

18. Transport Vehicles: (Part I.G.15)
Rationale: 9VAC25-32-540.A. requires that vehicles transporting biosolids be sealed and watertight if carrying liquid biosolids.

19. Soil pH and Cadmium: (Part I.G.16)
Rationale: 9VAC25-32-560.B.2. requires that the biosolids/soil mixture have a final pH of 6.0 S.U. or greater if the soil cadmium concentration is greater than 21 mg/kg.

20. Landowner Consent and Notice: (Part I.G.17)
Rationale: 9VAC25-32-60.A.1.d. requires the submission of landowner consent forms. 9VAC25-32-80.H.2. requires the consent forms to be maintained for a minimum of 5 years or for the duration of the permit. 9VAC25-32-530.A. requires the permittee to maintain the agreement.

21. Site Restrictions for Land Application of Class B Biosolids: (Part I.G.18.)
Rationale: 9VAC25-31-710.B.5. requires restricted access for sites based on type of food crops, grazing livestock and human access.

22. Depth to Water Table: (Part I.G.19)
Rationale: Required for biosolids based on 9VAC25-32-560.B.2.

23. Depth to Bedrock: (Part I.G.20)
Rationale: Required for biosolids based on 9VAC25-32-560.B.2.

24. Restrictions for CPLR Biosolids Application: (Part I.G.21)
Rationale: 9VAC25-32-640 establishes maximum cumulative pollutant loading of trace elements on soils.

25. Restrictions for CPLR Biosolids Application to Sites Previously Used: (Part I.G.22)
Rationale: 40 CFR Part 503.12(e)(2)(i-iv), which applies to all biosolids applied in the USA, establishes July 20, 1993 as the date to begin accounting for pollutant loading to soils.

26. CPLR Biosolids Tracking: (Part I.G.23)
Rationale: Required in order to comply with Part I.G.22.

27. Recordkeeping for PC and CPLR Biosolids: (Part I.G.24)
Rationale: 9VAC25-31-190.J.2. requires the maintenance of all biosolids monitoring and reporting records for at least 5 years.

28. Additional Recordkeeping for CPLR Biosolids: (Part I.G.25)
Rationale: 9VAC25-31-580.A.5. requires the maintenance of all biosolids monitoring and reporting records for at least 5 years. Items g through m are required indefinitely in order to comply with Part I.D.24, as identified in 40 CFR Part 503.17(2).

29. Reporting Land Application of Biosolids Upon Attaining 90% of CPLR: (Part I.G.26)
Rationale: 40 CFR Part 503.18(2), which applies to all biosolids applied in the USA, requires this reporting.

Part H. Special Condition - Biosolids Reporting Requirements

1. Monitoring Report: (Part I.H.1)
Rationale: 9VAC25-31-590 states that biosolids monitoring is to be submitted annually unless otherwise required.

2. Monthly Activity Report: (Part I.H.2)
Rationale: 9VAC25-32-440-B and Fee Regulation 9VAC25-20-147.B require submittal of a report by the 15th of the month following the month in which land application occurred.

3. Land Application Fee: (Part I.H.3)
Rationale: State Water Control Law § 62.1-44.19.3.P. requires that a fee be charged to the generator of biosolids to be land applied in Virginia. The fee of $7.50/dry ton of biosolids applied in the Commonwealth of Virginia is established by the Fee Regulation 9VAC25-20-146 and 9VAC25-20-40 A.3. Exemptions to the fee are provided in 9VAC25-20-50.C. 9VAC20-60.D establishes the due date.

4. Annual Report: (Part I.H.4)
Rationale: 9VAC25-31-590 requires the submittal of an annual report postmarked by February 19th for the previous year.

5. Records Retention: (Part I.H.5)
Rationale: 9VAC25-31-580 specifies that all records of biosolids activities, monitoring and reporting shall be maintained for at least 5 years.

PART I. Biosolids Storage Special Conditions:

1. Storage Regulatory Basis: (Part I.I.1)
Rationale: Requirements pursuant to § 62.1-44.19.3.R. of the Code of Virginia.

2. Emergency Storage: (Part I.I.2)
Rationale: 9VAC25-32-550 B and C require certain conditions to be met for temporary storage of biosolids.

3. Temporary Storage: (Part I.I.3)

Rationale: 9VAC25-32-550 B and D require certain conditions be met for temporary storage of biosolids.

PART J. Other Requirements and Special Conditions:

1. **95% Capacity Reopener**
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits

2. **Indirect Dischargers**
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

3. **CTC, CTO Requirement**
Rationale: Required by the Code of Virginia § 62.1-44.19: Sewage Collection and Treatment Regulations, 9VAC25-790.

4. **Operation and Maintenance Manual Requirement**
Rationale: Required by the Code of Virginia § 62.1-44.19: Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190 E.

5. **Licensed Operator Requirement**
Rationale: The VPDES Permit Regulation, 9VAC25-31-200 C and the Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.), require licensure of operators.

6. **Reliability Class**
Rationale: Required by the Sewage Collection and Treatment Regulations, 9 VAC25-790 for all municipal facilities.

7. **Treatment Works Closure Plan**
Rationale: State Water Control Law § 62.1-44.19. This condition is used to notify the owner of the need for a closure plan where a treatment works is being replaced or is expected to close.

8. **Section 303(d) List (TMDL) Reopener**
Rationale: Section 303(d) of the Clean Water Act requires the total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it in compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1)of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in the permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

9. **Instream pH and Temperature Monitoring:**

Rationale: Accurate instream pH and temperature data is required for determining acute and chronic ammonia nitrogen criteria for use in calculating ammonia effluent limitations.

PART II, Conditions Applicable to All Permits

Rationale: VPDES Permit Regulation, 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes from the previous permit contained in the reissuance permit:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001, 1.25 MGD, 1.5 MGD, 2.0 MGD	Total Residual Chlorine	1/Day	4/Day at 4 Hour Intervals			Permit manual revisions	11/28/2011
001	E.coli	3/Week @ 48 Hr. Intervals	5 Days/Week			Permit manual revisions	11/28/2011
Special Condition Changes: See paragraph below							

Using Storet data 5 miles downstream of the discharge point and best professional judgment, ammonia effluent limitations were recalculated for all effluent flow tiers. A special condition requiring instream pH and temperature monitoring at the point of complete mix (to be determined by the permittee) has been included in PART I.J. so that more accurate ammonia effluent limitations may be calculated.

Effluent limitations and monitoring requirements tier for a 2.5 MGD design flow and whole effluent toxicity testing for a 2.5 MGD design flow, have been added.

The permit format for sewage biosolids/soil limitations and monitoring requirements have been updated. New and updated special conditions for biosolids land application, reporting and storage are included.

The water quality criteria monitoring requirement and Attachment A, in the previous permit, are not being included, since the permittee has completed the required monitoring for the substances listed in Attached A and no water quality violations were noted.

This permit was drafted using guidance provided in the January, 2010 permit manual, which is revised on a continuous basis, resulting in minor

changes to permit requirements and conditions and the standard Part II boilerplate,

Due to warning letters during the previous permit cycle, the treatment facility does not qualify for reduced monitoring under EPA's Interim Guidance for Performance Based Reductions of NPDES Permit Monitoring Frequencies.

22. Variances/Alternate Limits or Conditions: None

23. Regulation of Users: 9 VAC 25-31-280 B 9 - NA

24. Public Notice Information required by 9 VAC 25-31-280 B:

All pertinent information is on file and may be inspected, and copied by contacting Fred M. Wyatt, Department of Environmental Quality, Southwest Regional Office, P.O. Box 1688, Abingdon, VA 24212. Telephone: (276) 676-4810 E-mail: frederick.wyatt@deq.virginia.gov.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Southwest **Office]** Regional Office by appointment.

25. Additional Comments:

Previous Board Action: None

Staff Comments:

Permit History: VPDES Permit No.VA0074161 for this facility was issued on June 22, 1987, was reissued on June 22, 1992; June 22, 1997; and June 22, 2002; was revoked and reissued on November 28, 2006 and has an expiration date of November 27, 2011.

Permit Fee: A permit fee is not required. Only an annual maintenence fee of $8,138 is required, to be paid by October 1 of each year.

Threatened or Endangered (T&E) Species: No T&E species have been confirmed in this section of Reed Creek. This facility is not on the list for coordination by the Department of Game & Inland Fisheries (DFIF) and the Department of Conservation & Recreation (DCR).

Federal Storm Water Regulations: The permittee has complied with the Phase 2 requirements by submitting a VIRGINIA NO EXPOSURE CERTIFICATION FOR EXCLUSION FROM VPDES STORM WATER PERMITTING.

Public Comment: None

26. TMDL: See item # 13 above.

PLANNING CONCURRENCE FOR MUNICIPAL VPDES PERMIT

PERMIT NO. VA0074161
FACILITY: Ft. Chiswell WWTP
COUNTY: Wythe

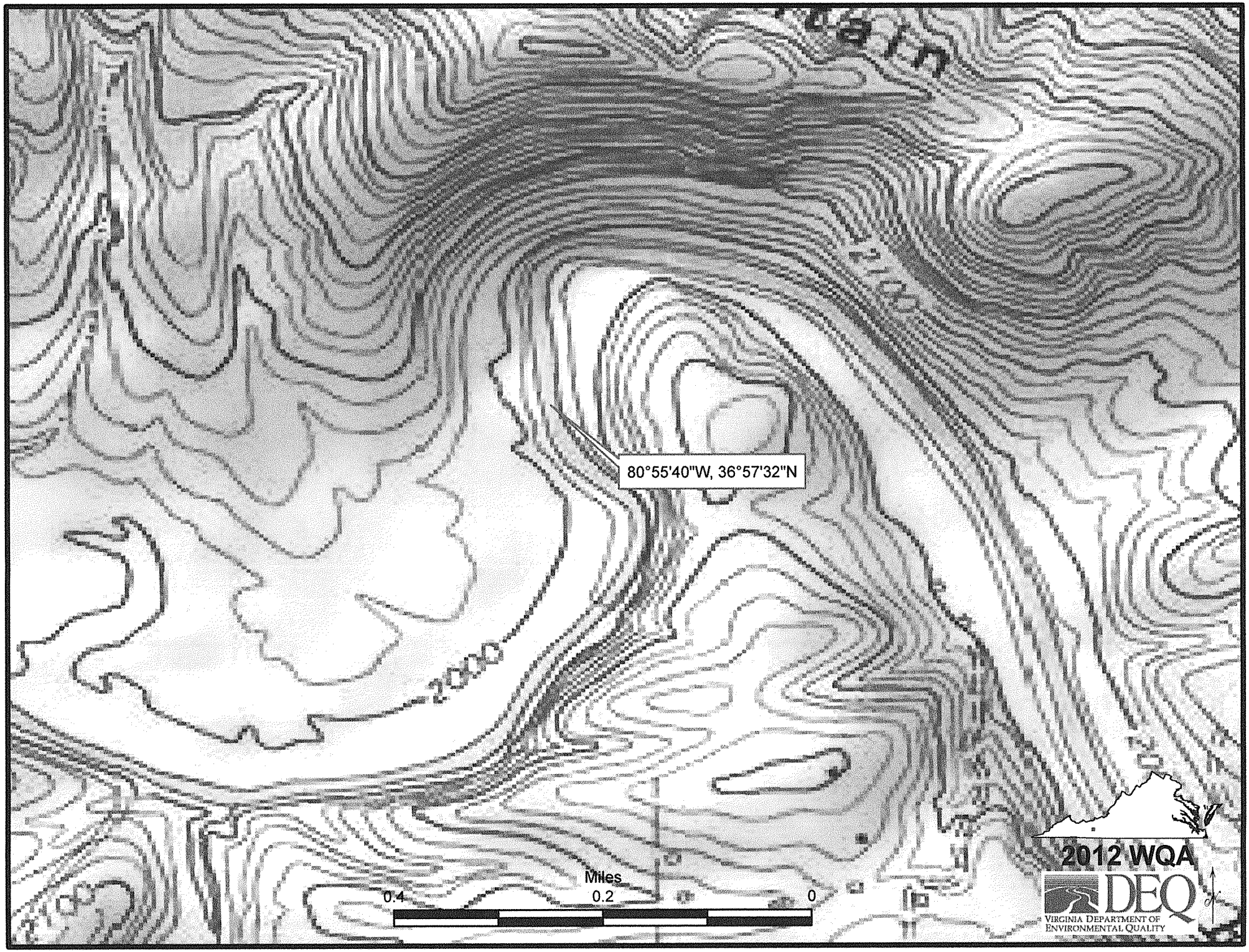
[ ] 1. The discharge is in conformance with the existing planning documents for the area.

[ ] 2. The discharge is not addressed in any planning document but will be included, if required, when the plan is updated.

[ ] 3. Other.

_____
Date

80°55'40"W, 36°57'32"N
Miles
0.4
0.2
0
2012 WQA
DEQ
Virginia Department of
Environmental Quality


80°55'40"W, 36°57'32"N
2012 WQA
DEQ
Virginia Department of Environmental Quality
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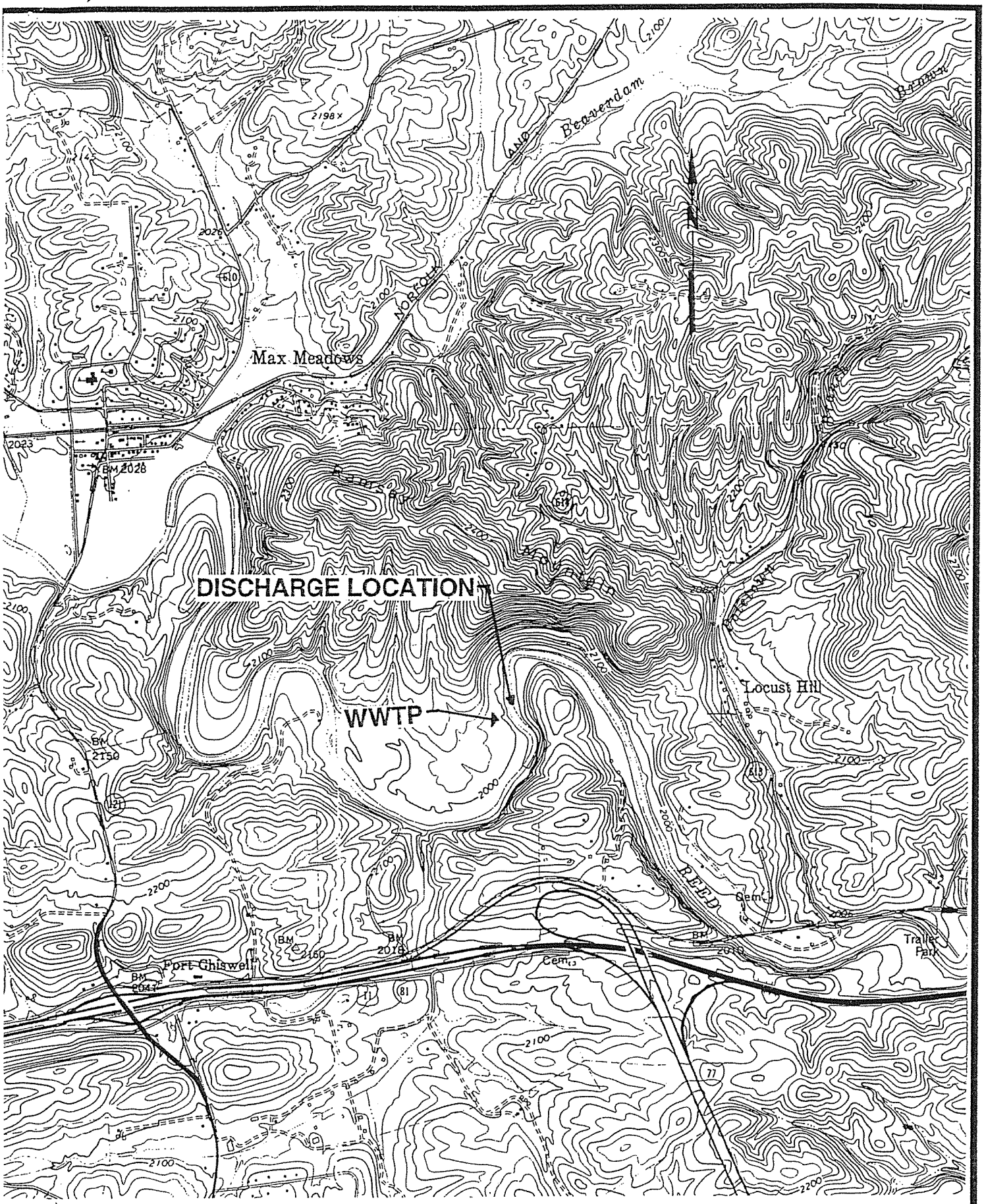

ANDERSON AND ASSOCIATES, Inc.

Engineers
Surveyors
Planners

Blacksburg, VA
Greensboro, NC
Richmond, VA
Tri-Cities, TN

DRAWN	SCALE	DATE	DOCUMENT NO.
SEC	1"=2000'	19 SEP 96	11833-002

DAVNAME | 930220.2000 | A&A

ATTACHMENT A
VPDES PERMIT NO. VA0074161
PERMIT LIMITS

Flow	-	0.500 MGD
BOD_5	-	30 mg/l
Total Suspended Solids	-	30 mg/l
Total Residual Chlorine	-	0.7 mg/l
pH	-	6.0 - 9.0

ATTACHMENT B
RELIABILITY DESIGNATIONS

Facility Name	Reliability Classification	Provisions for meeting Reliability Classification
Pump Station No. 1	III	on-site audio/visual alarm with telephone auto dialer to 24 hour/day manned site
Pump Station No. 2	II	50 KW diesel powered electric generator with on-site audio/visual alarm with telephone auto dialer to 24 hour/day manned site
Pump Station No. 3	I	50 KW diesel powered electric generator with on-site audio/visual alarm with telephone auto dialer to 24 hour/day manned site
Pump Station No. 4	II	30 KW diesel powered electric generator with on-site audio/visual alarm with telephone auto dialer to 24 hour/day manned site
Sewage Treatment Works	III	500 KW diesel powered electric generator with on-site audio/visual alarm with telephone auto dialer to 24-hour/day manned site.

ATTACHMENT C

Fort Chiswell/Max Meadows Wastewater Project

Division I

Collection System for the Community of Max Meadows

I. Gravity Sewer Line
   A. Six inch diameter - 3841 linear feet
   B. Eight inch diameter - 24213 linear feet

II. Force Main
   A. Six inch diameter force main - 8384 linear feet

Division II

Collection System for the Community of Fort Chiswell

I. Gravity Sewer Line
   A. Six inch diameter - 112 linear feet
   B. Eight inch diameter - 19786 linear feet
   C. Ten inch diameter - 4521 linear feet
   D. Twelve inch diameter - 5294 linear feet
   E. Eighteen inch diameter - 6843 linear feet
   F. Twenty-four inch diameter - 2804 linear feet

Division III

Collection System for the Area Adjacent to Interstate 81 and Between Exit Nos. 77 and 80

I. Gravity Sewer Line
   A. Six inch diameter - 68 linear feet
   B. Eight inch diameter - 16377 linear feet
   C. Ten inch diameter - 23737 linear feet

II. Force Main
   A. Four inch diameter force main - 3482 linear feet
   B. Eight inch diameter force main - 2684 linear feet

Division IV

Collection System Pump Stations

I. Pump Station No. 1
   A. Pump Station Location - Intersection of Route 614 and Railroad Avenue in the Community of Max Meadows
   B. Number of pumps - 2
   C. Type of pumps - Submersible
   D. Wet well diameter - 6 feet
      Wet well volume (pump off level to high water alarm) - 677 gallons
   E. Pump rated capacity - 190 gpm at 102 feet TDH (each pump)
   F. Pump controls - floats
   G. Ventilation - 4-inch diameter mushroom capped vent
   H. Reliability Classification - III
   I. Alarm system
      1. Functions monitored
         a. Wet well high water level
         b. Lag pump on
         c. Power outage
      2. Type of alarm - on-site audio/visual with auto dialer to site manned 24 hours per day

3. Battery backup power provided
J. Hoist provided for pump maintenance
K. Fence provided around pump station

II. Pump Station No. 2
A. Pump Station Location - Intersection of Route 750 and Route 121 south of the Community of Max Meadows
B. Number of pumps - 2
C. Type of pumps - Submersible
D. Wet well diameter - 6 feet
E. Wet well volume (pump off level to high water alarm) - 677 gallons
F. Pump rated capacity - 195 gpm at 185 feet TDH (each pump)
G. Pump controls - floats
H. Ventilation - 4-inch diameter mushroom capped vent
I. Wet well odor control system - 100 cfm fan discharging to a pit filled with pine bark mulch
J. Reliability Classification - II
K. Generator provided
1. Size - 50 KW
2. Fuel type - diesel
3. Manual power transfer switch
L. Alarm system
1. Functions monitored
a. Wet well high water level
b. Lag pump on
c. Power outage
2. Type of alarm - on-site audio/visual with auto dialer to site manned 24 hours per day
3. Battery backup power provided
M. Hoist provided for pump maintenance
N. Fence is provided around pump station

III. Pump Station No. 3
A. Pump Station Location - Adjacent to Frontage Road midway between Interstate 81 Exit Nos. 77 and 81
B. Number of pumps - 2
C. Type of pumps - Submersible
D. Wet well diameter - 10 feet
E. Wet well volume (pump off level to high water alarm) - 1616 gallons
F. Pump rated capacity - 430 gpm at 63 feet TDH (each pump)
G. Pump controls - floats
H. Ventilation - 4-inch diameter mushroom capped vent
I. Wet well odor control system - 100 cfm fan discharging to a pit filled with pine bark mulch
J. Reliability Classification - I
K. Generator provided
1. Size - 50 KW
2. Fuel type - diesel
3. Automatic power transfer switch
L. Alarm system
1. Functions monitored
a. Wet well high water level
b. Lag pump on
c. Power outage
2. Type of alarm - on-site audio/visual with auto dialer to site manned 24 hours per day
3. Battery backup power provided
M. Hoist provided for pump maintenance
N. No fence provided due to aesthetic considerations

IV. Pump Station No. 4
- A. Pump Station Location - Adjacent to Route 758 near the intersection with Frontage Road
- B. Number of pumps - 2
- C. Type of pumps - Submersible grinder
- D. Wet well diameter - 6 feet
- E. Wet well volume (pump off level to high water alarm) - 423 gallons
- F. Pump rated capacity - 86 gpm at 69 feet TDH (each pump)
- G. Pump controls - floats
- H. Ventilation - 4-inch diameter mushroom capped vent
- I. Reliability Classification - II
- J. Generator provided
  1. Size - 30 KW
  2. Fuel type - diesel
  3. Manual power transfer switch
- K. Alarm system
  1. Functions monitored
     - a. Wet well high water level
     - b. Lag pump on
     - c. Power outage
  2. Type of alarm - on-site audio/visual with auto dialer to site manned 24 hours per day
  3. Battery backup power provided
- L. Hoist provided for pump maintenance

Division V
Fort Chiswell/Max Meadows Sewage Treatment Works Unit Descriptions

I. Influent Pump Station

- A. Number of Pumps - 2
- B. Type of Pump - submersible
- C. Capacity - 868 gpm at 62 feet TDH (each)
- D. Wet well surface area - 16 feet by 12 feet
- E. Automatic pump alternation provided
- F. Type of pump control - constant speed
- G. Wet well ventilation system capacity - 3525 cfm
- H. Pump room ventilation system capacity - 1100 cfm

II. Bar Screen

- A. Mechanical
  1. Number - 1
  2. Capacity - 2.97 MGD maximum
  3. Clear openings - 0.25 inches
  4. Operational Control - Float
- B. Manual (By-pass around mechanical screen)
  1. Number - 1
  2. Clear opening - 2.0 inches
  3. Velocity through screen at 868 gpm - 1.24 fps

III. Aerated Grit Channel

- A. Number of channels - 1
- B. Mechanically cleaned
- C. Basin volume - 1200 cubic feet (8976 gallons)
- D. Velocity control - aeration

1. Blower capacity - 60 cfm
2. Number of blowers - 1 with backup provided by SBR blowers
3. Air control - flow control valves

IV. Sequencing Batch Reactor System

A. Number of Basins - 2
B. Total basin volume - 475,230 gallons at 10.5 feet minimum side water depth
C. Hydraulic Retention time at 0.5 MGD = 22.8 hours
D. Design criteria at 0.5 MGD
1. F/M ratio - 0.08 lb. BOD_5/lb. MLSS
2. MLSS at low water level - 4000 mg/l
3. Cycles per day - 5
4. Diffuser submergence - 10.7 feet
5. Organic loading - 303 mg/l
6. Total suspended solids loading - 303 mg/l
7. NH3-N loading - 40 mg/l

E. Type of aeration - coarse bubble diffused aeration
1. Number of blowers - 3
2. Capacity of blowers - 650 cfm each
3. Air control - flow control valve
F. Mechanical floating mixer
1. Number of mixers - 1 per basin
2. Motor HP - 10 HP
G. Decanter assembly
1. Number of decanter assemblies - 1 per basin
2. Decant rate - 1953 gpm (Average)
H. Sludge pumping to digester
1. Number of pumps - 1 per basin (Spare pump in storage)
2. Type of pump - submersible (on guide rails to facilitate removal)
3. Capacity - 100 gpm at 23 feet TDH

V. Flow Equalization
A. Number of Basins - 1
B. Volume - 362,032 gallons at 16 feet maximum side water depth
C. Type - sideline
D. Type of aeration - coarse bubble diffused aeration
E. Number of blowers - 1 with flexibility to use SBR blowers
F. Air control - flow control valve
G. Effluent returned to influent pump station
H. Overflow to chlorine contact tank

VI. Chlorination

A. Contact Basin
1. Number - 2
2. Dimensions - 52.83 feet x 5.5 feet x 9.5 feet deep (each basin)
3. Configuration - over and under baffle arrangement
4. Channel length to width - 20.7:1
5. Channel depth to width - 0.73:1
6. Contact time at decant rate of 1953 gpm - 21.1 minutes
7. Mixing - injector located on inlet line to splitter box

B. Chlorinators
1. Type of injection - vacuum type
2. Number - 2

3. Capacity - 100 lb./day
4. Dosage control - manual, with operation based on decant flow from SBR

C. Chlorinator Housing
1. Room Dimensions - 10 feet x 12 feet x 8 feet
2. Chlorine storage - provided
3. Scales - 150 lb. cylinder scales
4. Ventilation location - fan (960 cfm) located at back wall with inlet louver located in access door
5. Entrance/exit - To outside of Mechanical Building
6. Safety Equipment - Chlorine gas leak detector, air pack
7. Alarm system - monitors gas leak detector

II. Sulfur Dioxide Dechlorination
1. Type of Injection - vacuum type
2. Number - 2
3. Capacity - 100 lb./day
4. Dosage control - manual, with operation based on decant flow from SBR
5. Sulfur Dioxide Housing
   a. Room Dimensions - 10 feet x 12 feet x 8 feet
   b. 150 lb. Cylinder storage provided
   c. Scales - 150 lb. cylinder scales
   d. Ventilation location - fan (960 cfm) located at back wall with inlet louver located in access door
   e. Entrance/exit - To outside of Mechanical Building
   f. Safety Equipment - sulfur dioxide gas leak detector, air pack
   g. Alarm system - monitors gas leak detector

III. Flow Measurement - Effluent
A. Type - Parshall flume
B. Size - 1 foot
C. Indicating, Totalizing and recording provided

IV. Effluent Discharge Diffuser
A. Location - 1979 feet elevation (bottom of Reed Creek)
B. Minimum water level - 1982 feet
C. Diffuser - 17.25 feet long 18-inch diameter ductile iron pipe with 2.5-inch diameter holes on 4 foot centers. Additional plugged holes will be located on 1 foot centers for future upgrades.

V. Sludge Handling

A. Aerobic Digestion
1. Sludge treated - WAS
2. Number of digesters - 2
3. Dimensions - 26.875 feet x 55 feet x 15 feet (each basin)
4. Volume - 165,846 gallons (each basin)
5. Retention time - 27.5 days/basin
6. Aeration - Draft tube aerators
   a. Number of aerators - 2/basin
   b. Oxygen transfer rate - 55.1 lb./hour/aerator at 12 feet submergence
   c. Motor HP - 25 HP

B. Sludge Pumping
1. Number of pumps - 2 (one installed, one in storage)
2. Type - centrifugal, conical screw type

3. Maximum solid handling capacity - 3% solid concentration
4. Capacity - 410 gpm at 26 feet TDH (each pump)
5. Sludge route - to vacuum drying beds
6. Motor HP - 5.0 HP
7. Control - manual

C. Septage Receiving/Screening Station
1. Number of mechanically cleaned screens - 1
2. Bar spacing - 0.25 inches
3. Screening basket diameter - 31 inches
4. Screening chamber width - 40 inches
5. Type of Conveyor - screw
6. Screenings discharged to dumpster

D. Septage Holding Tank
1. Number - 1
2. Dimensions - 9 feet x 16 feet x 9.875 feet
3. Septage Pumping
   a. Number of pumps - 2
   b. Type of pumps - positive displacement diaphragm type
   c. Pump capacity - 80 gpm at 22.5 feet TDH (each pump)
   d. Discharge pipe diameter - 3 inches
   e. Septage route - to aerobic digesters
   f. Control - manual

E. Vacuum Assisted Drying Beds
1. Number of beds - 2
2. Dimensions - 40 feet x 16 feet 2-inches (each bed)
3. Type of Drying Bed Cover - fiberglass
4. Type of sludge applied - aerobically digested
5. Design loading rate - 2 lb. dry solids/square foot (2.5% solids concentration)
6. Number of applications per week - 4
7. Discharge cake (% solids) - 20
8. Media - filter plates coated with aluminum oxide supported by 4-inches of No. 57 gravel
9. Number of vacuum pumps - 2
10. Vacuum pump capacity - 15 cfm at 10 inches of mercury
11. Conditioning chemical addition
    a. Location of addition - prior to sludge pump
    b. Number of chemical feed pumps - 2
    c. Type of chemical feed pumps - positive displacement
    d. Range of chemical feed pumps operation - 3 to 22 gpm
    e. Number of chemical storage tanks - 2
    f. Size of chemical storage tanks - 575 gallons each
    g. Underdrain size - 4-inch diameter
12. Dried sludge storage provided adjacent to vacuum assisted drying beds on a 40 feet x 33 feet covered concrete pad

VI. Laboratory
A. Floor Space - 784 ft^2
B. Bench Space - 162 ft^2

VII. Alarm System
A. Functions monitored
1. Influent wet well high water level
2. SBR system failure
3. Chlorine leak detector
4. Sulfur dioxide leak detector
5. Power outage

B. Type of alarm - auto-dialer to 24-hour manned site
C. Battery backup power provided
D. Lights provided for status of all major equipment

VIII. Generator
A. Size - 500 KW
B. Fuel type - diesel
C. Automatic transfer switch provided
D. Programmable automatic testing of generator provided
E. Units operated by Generator - entire treatment works.

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	3.28920008	TUa	LC_{50} =	31	% Use as	3.22	TUa
ACUTE WLAa		3.2892	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	32.8920008	TU_c	NOEC =	4	% Use as	25.00	TU_c
BOTH*	32.8920008	TU_c	NOEC =	4	% Use as	25.00	TU_c
AML	32.8920008	TU_c	NOEC =	4	% Use as	25.00	TU_c

Enter data in the cells with blue type:

Entry Date:	09/21/11	ACUTE WLAa,c	32.892	Note: Inform the permittee that if the mean	
Facility Name:	Ft Chiswell WWTP	CHRONIC WLAc	26.84	of the data exceeds this TUc:	13.5167924
VPDES Number:	VA0074161	* Both means acute expressed as chronic		a limit may result using WLA.EXE	
Outfall Number:	1				

			% Flow to be used from MIX.EXE		Difuser /modeling study?		
Plant Flow:	1.25	MGD			Enter Y/N	N	
Acute 1Q10:	26.5	MGD	47	%	Acute	1	:1
Chronic 7Q10:	32.3	MGD	100	%	Chronic	1	:1

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

IWC_a	9.120758847	%	Plant flow/plant flow + 1Q10
IWC_c	3.725782414	%	Plant flow/plant flow + 7Q10

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

Dilution, acute	10.964	100/IWCa
Dilution, chronic	26.84	100/IWCc

WLA_a	3.2892	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	26.84	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	32.892	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.

$LTA_{a,c}$	13.51679307	WLAa,c X's eA						
LTA_c	16.13184113	WLAc X's eB				Rounded NOEC's		%
MDL** with $LTA_{a,c}$	32.89200081	TU_c	NOEC =	3.040253	(Protects from acute/chronic toxicity)	NOEC =	4	%
MDL** with LTA_c	39.25550452	TU_c	NOEC =	2.547413	(Protects from chronic toxicity)	NOEC =	3	%
AML with lowest LTA	32.89200081	TU_c	NOEC =	3.040253	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 $LTA_{a,c}$	3.289200081	TU_a	LC50 =	30.402529	%	LC50 =	31	%
MDL with LTA_c	3.925550452	TU_a	LC50 =	25.474134	%	LC50 =	26	

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data **********	LN of data	Invertebrate IC_{25} Data or LC_{50} Data **********	LN of data
1	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	

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

Table 4. DILUTION SERIES TO RECOMMEND

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	7.4	13.51679		
Dilution series to use for limit			4	25
Dilution factor to recommend:	0.2719964		0.2	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	27.2	3.68	20.0	5.00
	7.4	13.52	4.0	25.00
	2.0	49.69	0.8	125.00
	0.55	182.70	0.2	625.00
Extra dilutions if needed	0.15	671.71	0.0	3125.00
	0.04	2469.57	0.0	15625.00

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

Table 3. ACR used: 10

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

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

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

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 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	2.79100007	TUa	LC_{50} =	36	% Use as	2.77	TUa
ACUTE WLAa		2.791	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	27.9100007	TU_c	NOEC =	4	% Use as	25.00	TU_c
BOTH*	27.9100007	TU_c	NOEC =	4	% Use as	25.00	TU_c
AML	27.9100007	TU_c	NOEC =	4	% Use as	25.00	TU_c
ACUTE WLAa,c		27.91	Note: Inform the permittee that if the mean of the data exceeds this TUc:			11.469466	
CHRONIC WLAc		22.5333333	a limit may result using WLA.EXE				

* Both means acute expressed as chronic

Enter data in the cells with blue type:

Entry Date:	09/21/11	
Facility Name:	Ft Chiswell WWTP	
VPDES Number:	VA0074161	
Outfall Number:	1	
Plant Flow:	1.5	MGD
Acute 1Q10:	26.5	MGD
Chronic 7Q10:	32.3	MGD

% Flow to be used from MIX.EXE	
47	%
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	10.74883554	% Plant flow/plant flow + 1Q10
IWC_c	4.437869822	% Plant flow/plant flow + 7Q10

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

Dilution, acute	9.303333333	100/IWCa
Dilution, chronic	22.53333333	100/IWCc
WLA_a	2.791	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	22.53333333	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	27.91	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of sample 1

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

$LTA_{a,c}$	11.46946658	WLAa,c X's eA						
LTA_c	13.54337383	WLAc X's eB				Rounded NOEC's		%
MDL** with $LTA_{a,c}$	27.91000068	TU_c	NOEC =	3.582945	(Protects from acute/chronic toxicity)	NOEC =	4	%
MDL** with LTA_c	32.95668288	TU_c	NOEC =	3.034286	(Protects from chronic toxicity)	NOEC =	4	%
AML with lowest LTA	27.91000068	TU_c	NOEC =	3.582945	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 $LTA_{a,c}$	2.791000068	TU_a	LC50 =	35.829451	%	LC50 =	36	%
MDL with LTA_c	3.295668288	TU_a	LC50 =	30.342860	%	LC50 =	31	

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1	0		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
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	

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

Convert LC_{50}'s and NOEC's to Chronic TU's

Table 3.

for use in WLA.EXE
ACR used: 10

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

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

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

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	8.7	11.46947		
Dilution series to use for limit			4	25
Dilution factor to recommend:	0.2952762		0.2	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	29.5	3.39	20.0	5.00
	8.7	11.47	4.0	25.00
	2.6	38.84	0.8	125.00
	0.76	131.55	0.2	625.00
Extra dilutions if needed	0.22	445.51	0.0	3125.00
	0.07	1508.79	0.0	15625.00

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			**Acute Endpoint/Permit Limit**			**Use as LC_{50} in Special Condition, as TUa on DMR**						
	Revision Date: 01/10/05												
	File: WETLIM10.xls			**ACUTE**	**2.16825005**	**TUa**	**LC_{50} =**	**47**	% Use as	**2.12**	**TUa**		
	(MIX.EXE required also)												
				ACUTE WLAa		**2.16825**	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	**21.6825005**	**TU_c**	**NOEC =**	**5**	% Use as	**20.00**	**TU_c**		
				BOTH*	**21.6825005**	**TU_c**	**NOEC =**	**5**	% Use as	**20.00**	**TU_c**		
	Enter data in the cells with blue type:			**AML**	**21.6825005**	**TU_c**	**NOEC =**	**5**	% Use as	**20.00**	**TU_c**		
	Entry Date:	09/21/11		**ACUTE WLAa,c**		**21.6825**		Note: Inform the permittee that if the mean					
	Facility Name:	Ft Chiswell WWTP		**CHRONIC WLAc**		**17.15**		of the data exceeds this TUc:			**8.91030804**		
	VPDES Number:	**VA0074161**		* Both means acute expressed as chronic				a limit may result using WLA.EXE					
	Outfall Number:	1											
				% Flow to be used from MIX.EXE				**Difuser /modeling study?**					
	Plant Flow:	2	MGD					Enter Y/N	N				
	Acute 1Q10:	26.5	MGD	47	%			Acute	1	:1			
	Chronic 7Q10:	32.3	MGD	100	%			Chronic	1	:1			
	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)					Go to Page 2			
	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3			
	IWC_a	13.83604289	%	Plant flow/plant flow + 1Q10			**NOTE: If the IWCa is >33%, specify the**						
	IWC_c	5.83090379	%	Plant flow/plant flow + 7Q10			**NOAEC = 100% test/endpoint for use**						
	Dilution, acute	7.2275		100/IWCa									
	Dilution, chronic	17.15		100/IWCc									
	WLA_a	2.16825	Instream criterion (0.3 TUa) X's Dilution, acute										
	WLA_c	17.15	Instream criterion (1.0 TUc) X's Dilution, chronic										
	$WLA_{a,c}$	21.6825	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.						
	$LTA_{a,c}$	8.910308458	WLAa,c X's eA										
	LTA_c	10.3077897	WLAc X's eB							Rounded NOEC's		%	
	MDL** with $LTA_{a,c}$	21.68250053	TU_c	NOEC =	4.612014	(Protects from acute/chronic toxicity)				NOEC =	5	%	
	MDL** with LTA_c	25.08315583	TU_c	NOEC =	3.986739	(Protects from chronic toxicity)				NOEC =	4	%	
	AML with lowest LTA	21.68250053	TU_c	NOEC =	4.612014	Lowest LTA X's eD				NOEC =	5		
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a												
										Rounded LC50's		%	
	MDL with $LTA_{a,c}$	2.168250053	TU_a	LC50 =	46.120142	%				LC50 =	47	%	
	MDL with LTA_c	2.508315583	TU_a	LC50 =	39.867392	%				LC50 =	40		

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 = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

ACR used: 10

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

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA $\%LC_{50}$

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	11.2	8.910308		
Dilution series to use for limit			5	20
Dilution factor to recommend:	0.3350068		0.2236068	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	33.5	2.99	22.4	4.47
	11.2	8.91	5.0	20.00
	3.8	26.60	1.1	89.44
	1.26	79.39	0.3	400.00
Extra dilutions if needed	0.42	236.99	0.1	1788.85
	0.14	707.42	0.0	8000.00

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 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	1.79460004	TUa	LC_{50} =	56	% Use as	1.78	TUa			
ACUTE WLAa		1.7946	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	17.9460004	TU_c	NOEC =	6	% Use as	16.66	TU_c			
BOTH*	17.9460004	TU_c	NOEC =	6	% Use as	16.66	TU_c			
AML	17.9460004	TU_c	NOEC =	6	% Use as	16.66	TU_c			
ACUTE WLAa,c		17.946	Note: Inform the permittee that if the mean							
CHRONIC WLAc		13.92	of the data exceeds this TUc:				7.37481324			
* Both means acute expressed as chronic			a limit may result using WLA.EXE							

Enter data in the cells with blue type:

Entry Date:	09/21/11						
Facility Name:	Ft Chiswell WWTP						
VPDES Number:	VA0074161						
Outfall Number:	1						
			% Flow to be used from MIX.EXE		**Difuser /modeling study?**		
Plant Flow:	2.5	MGD			Enter Y/N	N	
Acute 1Q10:	26.5	MGD	47	%	Acute	1	:1
Chronic 7Q10:	32.3	MGD	100	%	Chronic	1	:1

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

IWC_a	16.71681712	%	Plant flow/plant flow + 1Q10
IWC_c	7.183908046	%	Plant flow/plant flow + 7Q10

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

Dilution, acute	5.982	100/IWCa
Dilution, chronic	13.92	100/IWCc

WLA_a	1.7946	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	13.92	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	17.946	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.**

$LTA_{a,c}$	7.374813586	WLAa,c X's eA						
LTA_c	8.366439216	WLAc X's eB				Rounded NOEC's		%
MDL** with $LTA_{a,c}$	17.94600044	TU_c	NOEC =	5.572272	(Protects from acute/chronic toxicity)	NOEC =	6	%
MDL** with LTA_c	20.3590396	TU_c	NOEC =	4.911823	(Protects from chronic toxicity)	NOEC =	5	%
AML with lowest LTA	17.94600044	TU_c	NOEC =	5.572272	Lowest LTA X's eD	NOEC =	6	

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

						Rounded LC50's		%
MDL with $LTA_{a,c}$	1.794600044	TU_a	LC50 =	55.722722	%	LC50 =	56	%
MDL with LTA_c	2.03590396	TU_a	LC50 =	49.118231	%	LC50 =	50	

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

		Vertebrate IC_{25} Data or LC_{50} Data **********	LN of data		Invertebrate IC_{25} Data or LC_{50} Data **********	LN of data
	1	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	

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

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

Table 3. ACR used: 10

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

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

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

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	13.6	7.374813		
Dilution series to use for limit			6	16.666667
Dilution factor to recommend:	0.3682345		0.244949	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	36.8	2.72	24.5	4.08
	13.6	7.37	6.0	16.67
	5.0	20.03	1.5	68.04
	1.84	54.39	0.4	277.78
Extra dilutions if needed	0.68	147.70	0.1	1134.02
	0.25	401.10	0.0	4629.63

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Calculation of Total Ammonia Nitrogen Limits

Facility Name: Ft. Chiswell WWTP
VPDES Permit No: VA0074161
Stream Name: Reed Creek
Stream Tier Designation: II

NH_3-N limits are derived from the ammonia tables or formulas in the Water Quality Standards. Human Health standards are not applicable for ammonia.

The following stream parameter values are being used for the calculations. The dry season is June - December and the wet season is January - May.

Dry Season pH = 8.1 Dry Season Temperature (deg.C) = 22
Wet Season pH = 8.1 Wet Season Temperature (deg.C) = 12

The ammonia nitrogen water quality standards (WQS) are:

Acute: AC_{dry} = 6.95 AC_{wet} = 6.95

Chronic: CC_{dry} = 1.29 CC_{wet} = 2.10

The following flows apply:

Q_e = Design Flow of STP (MGD) = 1.25
Q_{s-1} = 1Q10 Flow (MGD) = 26.5
Q_{s-1w} = 1Q10 High Flow (MGD) = 34.9
Q_{s-30} = 30Q10 Flow (MGD) = 37.2
Q_{s-30w} = 30Q10 High Flow (MGD) = 58

The water quality wasteload allocations (WLAs) are calculated as follows:

f = fraction of stream flow to use from MIX Program

Acute:

Dry WLA_a = [AC_{dry}((f)Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3-N background)] / (Q_e) mg/l
Dry WLA_a = [6.95((.25)(.38)(26.5+1.25) - ( )( )( )] / (1.25) mg/l
Dry WLA_a = 14.7 mg/l

Wet WLA_a = [AC_{wet}((f)Q_{s-1w} + Q_e) - (f)(Q_{s-1w})(NH_3-N background)] / (Q_e) mg/l
Wet WLA_a = [6.95((.25)(.38)(34.9+1.25) - ( )( )( )] / (1.25) mg/l
Wet WLA_a = 24.0 mg/l

Chronic:

Dry WLA_c = [CC_{dry}((f)Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3-N background)] / (Q_e)
Dry WLA_c = [1.29((.25)( )(37.2+1.25) - ( )( )( )] / (1.25) mg/l
Dry WLA_c = 9.9 mg/l

Wet WLA_c = [CC_{wet}((f)Q_{s-30w} + Q_e) - (f)(Q_{s-30w})(NH_3-N background)] / (Q_e)
Wet WLA_c = [2.10((.25)( )(58+1.25) - ( )( )( )] / (1.25) mg/l
Wet WLA_c = 24.9 mg/l

Mixing Zone Predictions for Ft. Chiswell WWTP

Effluent Flow = 1.25 MGD
Stream 7Q10 = 32.3 MGD
Stream 30Q10 = 37.2 MGD
Stream 1Q10 = 26.5 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.2655 ft
Length = 4317.29 ft
Velocity = .5472 ft/sec
Residence Time = .0913 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.3749 ft
Length = 4021.64 ft
Velocity = .5772 ft/sec
Residence Time = .0806 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.1277 ft
Length = 4764.07 ft
Velocity = .5079 ft/sec
Residence Time = 2.6056 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 38.38% of the 1Q10 is used.

Mixing Zone Predictions for Ft. Chiswell WWTP-Wet

Effluent Flow = 1.25 MGD
Stream 7Q10 = 44.0 MGD
Stream 30Q10 = 58 MGD
Stream 1Q10 = 34.9 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.5183 ft
Length = 3693.53 ft
Velocity = .6151 ft/sec
Residence Time = .0695 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.7898 ft
Length = 3205.39 ft
Velocity = .6833 ft/sec
Residence Time = .0543 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.3243 ft
Length = 4152.92 ft
Velocity = .5634 ft/sec
Residence Time = 2.0475 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 48.84% of the 1Q10 is used.

9/16/2011 1:36:00 PM

Facility = Ft Chiswell WWTP, Dry, 1.25 MGD
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 14.7
WLAc = 9.9
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 14.7
Average Weekly limit = 10.7522223888485 ≈ 10 mg/l
Average Monthly LImit = 8.00900031447701 ≈ 8.0 mg

The data are:

15

9/16/2011 1:37:52 PM

Facility = Ft Chiswell WWTP, Wet, 1.25 MGD
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 24.6
WLAc = 24.9
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 24.6
Average Weekly limit = 17.9935150180731 ≈ 18 mg/l
Average Monthly LImit = 13.4028168527983 ≈ 13 mg/l

The data are:

15

Calculation of Total Ammonia Nitrogen Limits

Facility Name: Ft. Chiswell WWTP
VPDES Permit No: VA0074161
Stream Name: Reed Creek
Stream Tier Designation: II

NH_3-N limits are derived from the ammonia tables or formulas in the Water Quality Standards. Human Health standards are not applicable for ammonia.

The following stream parameter values are being used for the calculations. The dry season is June - December and the wet season is January - May.

Dry Season pH = 8.1 Dry Season Temperature (deg.C) = 22
Wet Season pH = 8.1 Wet Season Temperature (deg.C) = 12

The ammonia nitrogen water quality standards (WQS) are:

Acute: AC_{dry} = 6.95 AC_{wet} = 6.95

Chronic: CC_{dry} = 1.29 CC_{wet} = 2.10

The following flows apply:

Q_e = Design Flow of STP(MGD) = 1.5
Q_{s-1} = 1Q10 Flow (MGD) = 26.5
Q_{s-1w} = 1Q10 High Flow (MGD) = 34.9
Q_{s-30} = 30Q10 Flow (MGD) = 37.2
Q_{s-30w} = 30Q10 High Flow (MGD) = 58

The water quality wasteload allocations (WLAs) are calculated as follows:

f = fraction of stream flow to use from MIX Program

Acute:

Dry WLA_a = [AC_{dry}((f)Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3-N background)] / (Q_e) mg/l
Dry WLA_a = [6.95((.25)(.397)(26.5+1.5) - ( )( )( )] / (1.5) mg/l
Dry WLA_a = 12.6 mg/l

Wet WLA_a = [AC_{wet}((f)Q_{s-1w} + Q_e) - (f)(Q_{s-1w})(NH_3-N background)] / (Q_e) mg/l
Wet WLA_a = [6.95((.25)(.49)(34.9+1.5) - ( )( )( )] / (1.5) mg/l
Wet WLA_a = 20.6 mg/l

Chronic:

Dry WLA_c = [CC_{dry}((f)Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3-N background)] / (Q_e)
Dry WLA_c = [1.29((.25)( )(37.2+1.5) - ( )( )( )] / (1.5) mg/l
Dry WLA_c = 8.8 mg/l

Wet WLA_c = [CC_{wet}((f)Q_{s-30w} + Q_e) - (f)(Q_{s-30w})(NH_3-N background)] / (Q_e)
Wet WLA_c = [2.10((.25)( )(58+1.5) - ( )( )( )] / (1.5) mg/l
Wet WLA_c = 20.8 mg/l

Mixing Zone Predictions for Ft. Chiswell WWTP

Effluent Flow = 1.5 MGD
Stream 7Q10 = 32.3 MGD
Stream 30Q10 = 37.2 MGD
Stream 1Q10 = 26.5 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.2713 ft
Length = 4300.66 ft
Velocity = .5488 ft/sec
Residence Time = .0907 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.3804 ft
Length = 4007.91 ft
Velocity = .5787 ft/sec
Residence Time = .0802 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.1339 ft
Length = 4742.04 ft
Velocity = .5097 ft/sec
Residence Time = 2.5844 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 38.69% of the 1Q10 is used.

Mixing Zone Predictions for Ft. Chiswell WWTP-Wet

Effluent Flow = 1.5 MGD
Stream 7Q10 = 44.0 MGD
Stream 30Q10 = 58 MGD
Stream 1Q10 = 34.9 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.5234 ft
Length = 3682.76 ft
Velocity = .6165 ft/sec
Residence Time = .0691 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.7944 ft
Length = 3198.28 ft
Velocity = .6844 ft/sec
Residence Time = .0541 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.3298 ft
Length = 4138.13 ft
Velocity = .5649 ft/sec
Residence Time = 2.0347 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 49.15% of the 1Q10 is used.

9/16/2011 1:50:06 PM

Facility = Ft Chiswell WWTP, 1.5 MGD, Dry
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 12.6
WLAc = 8.3
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 12.6
Average Weekly limit = 9.21619061901303 ≈ 9.2 mg/l
Average Monthly LImit = 6.86485741240887 ≈ 6.9 mg/l

The data are:

15

9/16/2011 1:46:27 PM

Facility = Ft Chiswell WWTP, 1.5 MGD, Wet
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 20.6
WLAc = 20.8
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 20.6
Average Weekly limit = 15.0677402183864 ≈ 15 mg/l
Average Monthly LImit = 11.2234970393351 ≈ 11 mg/l

The data are:

15

Calculation of Total Ammonia Nitrogen Limits

Facility Name: Ft. Chiswell WWTP
VPDES Permit No: VA0074161
Stream Name: Reed Creek
Stream Tier Designation: II

NH_3-N limits are derived from the ammonia tables or formulas in the Water Quality Standards. Human Health standards are not applicable for ammonia.

The following stream parameter values are being used for the calculations. The dry season is June - December and the wet season is January - May.

Dry Season pH = 8.1 Dry Season Temperature (deg.C) = 22
Wet Season pH = 8.1 Wet Season Temperature (deg.C) = 12

The ammonia nitrogen water quality standards (WQS) are:

Acute: AC_{dry} = 6.95 AC_{wet} = 6.95

Chronic: CC_{dry} = 1.29 CC_{wet} = 2.10

The following flows apply:

Q_e = Design Flow of STP(MGD) = 2.0
Q_{s-1} = 1Q10 Flow (MGD) = 26.5
Q_{s-1w} = 1Q10 High Flow (MGD) = 34.9
Q_{s-30} = 30Q10 Flow (MGD) = 37.2
Q_{s-30w} = 30Q10 High Flow (MGD) = 58

The water quality wasteload allocations (WLAs) are calculated as follows:

f = fraction of stream flow to use from MIX Program

Acute:

Dry WLA_a = [AC_{dry}((f)Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3-N background)] / (Q_e) mg/l
Dry WLA_a = [6.95((.25)(.39)(26.5+2.0) - ( )( )( )] / (2.0) mg/l
Dry WLA_a = 9.6 mg/l

Wet WLA_a = [AC_{wet}((f)Q_{s-1w} + Q_e) - (f)(Q_{s-1w})(NH_3-N background)] / (Q_e) mg/l
Wet WLA_a = [6.95((.25)(.50)(34.9+2.0) - ( )( )( )] / (2.0) mg/l
Wet WLA_a = 16.0 mg/l

Chronic:

Dry WLA_c = [CC_{dry}((f)Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3-N background)] / (Q_e)
Dry WLA_c = [1.29((.25)( )(37.2+2.0) - ( )( )( )] / (2.0) mg/l
Dry WLA_c = 6.3 mg/l

Wet WLA_c = [CC_{wet}((f)Q_{s-30w} + Q_e) - (f)(Q_{s-30w})(NH_3-N background)] / (Q_e)
Wet WLA_c = [2.10((.25)( )(58+2.0) - ( )( )( )] / (2.0) mg/l
Wet WLA_c = 15.8 mg/l

Mixing Zone Predictions for Ft. Chiswell WWTP

Effluent Flow = 2.0 MGD
Stream 7Q10 = 32.3 MGD
Stream 30Q10 = 37.2 MGD
Stream 1Q10 = 26.5 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.2826 ft
Length = 4268.03 ft
Velocity = .5519 ft/sec
Residence Time = .0895 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.3912 ft
Length = 3981.21 ft
Velocity = .5816 ft/sec
Residence Time = .0792 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.1461 ft
Length = 4698.9 ft
Velocity = .5132 ft/sec
Residence Time = 2.5431 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 39.32% of the 1Q10 is used.

Mixing Zone Predictions for Ft. Chiswell WWTP-Wet

Effluent Flow = 2.0 MGD
Stream 7Q10 = 44.0 MGD
Stream 30Q10 = 58 MGD
Stream 1Q10 = 34.9 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.5336 ft
Length = 3661.78 ft
Velocity = .6191 ft/sec
Residence Time = .0685 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.8036 ft
Length = 3184.25 ft
Velocity = .6866 ft/sec
Residence Time = .0537 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.3409 ft
Length = 4108.67 ft
Velocity = .568 ft/sec
Residence Time = 2.0095 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 49.76% of the 1Q10 is used.

9/16/2011 1:52:31 PM

Facility = Ft Chiswell WWTP, 2.0 MGD, Dry
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 9.6
WLAc = 6.3
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 9.6
Average Weekly limit = 7.02185951924802 ≈ 7.0 mg/l
Average Monthly LImit = 5.23036755231152 ≈ 5.2 mg/l

The data are:

15

9/16/2011 2:00:05 PM

Facility = Ft CHiswell WWTP, 2.0 MGD Wet
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 16
WLAc = 15.8
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 16
Average Weekly limit = 11.7030991987467 ≈ 12 mg/l
Average Monthly LImit = 8.71727925385253 ≈ 8.7 mg/l

The data are:

15

Calculation of Total Ammonia Nitrogen Limits

Facility Name: Ft. Chiswell WWTP
VPDES Permit No: VA0074161
Stream Name: Reed Creek
Stream Tier Designation: II

NH_3-N limits are derived from the ammonia tables or formulas in the Water Quality Standards. Human Health standards are not applicable for ammonia.

The following stream parameter values are being used for the calculations. The dry season is June - December and the wet season is January - May.

Dry Season pH = 8.1 Dry Season Temperature (deg.C) = 22
Wet Season pH = 8.1 Wet Season Temperature (deg.C) = 12

The ammonia nitrogen water quality standards (WQS) are:

Acute: AC_{dry} = 6.95 AC_{wet} = 6.95

Chronic: CC_{dry} = 1.29 CC_{wet} = 2.10

The following flows apply:

Q_e = Design Flow of STP(MGD) = 2.5
Q_{s-1} = 1Q10 Flow (MGD) = 26.5
Q_{s-1w} = 1Q10 High Flow (MGD) = 34.9
Q_{s-30} = 30Q10 Flow (MGD) = 37.2
Q_{s-30w} = 30Q10 High Flow (MGD) = 58

The water quality wasteload allocations (WLAs) are calculated as follows:

f = fraction of stream flow to use from MIX Program

Acute:

Dry WLA_a = [AC_{dry}((f)Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3-N background)] / (Q_e) mg/l
Dry WLA_a = [6.95((.25)(.40)(26.5+2.5) - ( )( )( )] / (2.5) mg/l
Dry WLA_a = 8.0 mg/l

Wet WLA_a = [AC_{wet}((f)Q_{s-1w} + Q_e) - (f)(Q_{s-1w})(NH_3-N background)] / (Q_e) mg/l
Wet WLA_a = [6.95((.25)(.50)(34.9+2.5) - ( )( )( )] / (2.5) mg/l
Wet WLA_a = 13 mg/l

Chronic:

Dry WLA_c = [CC_{dry}((f)Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3-N background)] / (Q_e)
Dry WLA_c = [1.29((.25)( )(37.2+2.5) - ( )( )( )] / (2.5) mg/l
Dry WLA_c = 5.1 mg/l

Wet WLA_c = [CC_{wet}((f)Q_{s-30w} + Q_e) - (f)(Q_{s-30w})(NH_3-N background)] / (Q_e)
Wet WLA_c = [2.10((.25)( )(58+2.5) - ( )( )( )] / (2.5) mg/l
Wet WLA_c = 12.7 mg/l

Mixing Zone Predictions for Ft. Chiswell WWTP

Effluent Flow = 2.5 MGD
Stream 7Q10 = 32.3 MGD
Stream 30Q10 = 37.2 MGD
Stream 1Q10 = 26.5 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.294 ft
Length = 4235.95 ft
Velocity = .5551 ft/sec
Residence Time = .0883 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.402 ft
Length = 3954.92 ft
Velocity = .5845 ft/sec
Residence Time = .0783 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.1583 ft
Length = 4656.52 ft
Velocity = .5168 ft/sec
Residence Time = 2.5031 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 39.95% of the 1Q10 is used.

Mixing Zone Predictions for Ft. Chiswell WWTP-Wet

Effluent Flow = 2.5 MGD
Stream 7Q10 = 44.0 MGD
Stream 30Q10 = 58 MGD
Stream 1Q10 = 34.9 MGD
Stream slope = 0.001246 ft/ft
Stream width = 75 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.5437 ft
Length = 3641.31 ft
Velocity = .6217 ft/sec
Residence Time = .0678 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = 1.8127 ft
Length = 3170.42 ft
Velocity = .6888 ft/sec
Residence Time = .0533 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = 1.3519 ft
Length = 4080.11 ft
Velocity = .571 ft/sec
Residence Time = 1.985 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 50.38% of the 1Q10 is used.

9/16/2011 2:02:11 PM

Facility = Ft Chiswell WWTP, 2.5 MGD, Dry
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 8.1
WLAc = 5.1
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 8.1
Average Weekly limit = 5.92469396936552 ≈ 5.9 mg/l
Average Monthly LImit = 4.41312262226284 ≈ 4.4 mg/l

The data are:

15

9/16/2011 2:02:42 PM

Facility = Ft Chiswell WWTP, 2.5 MGD, Wet
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 13
WLAc = 12.7
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 13
Average Weekly limit = 9.5087680989817 ≈ 9.5 mg/l
Average Monthly LImit = 7.08278939375518 ≈ 7.1 mg/l

The data are:

15

Calculation of Total Residual Chlorine

Facility Name: Ft. Chiswell WWTP

Assumimg a background value of 0 and Tier II Waters:

For 1.25 MGD Facility

ACUTE

$$WQ\text{-}WLA = \frac{(0.25)Ao_d\ (Qs\text{-}1_{dry} + Qe)}{Qe}$$

$$WQ\text{-}WLA_{ad} = (0.25)(0.019)(0.38)(26.5 + 1.25)/1.25 = 0.040\ mg/l$$

CHRONIC

$$AWLA_{cd} = \frac{(0.25)Co_d(Qs\text{-}7_{dry} + Qe)]}{Qe}$$

$$AWLA_{cd} = (0.25)(0.011)(32.3 + 1.25/1.25 = 0.074\ mg/l$$

For 1.5 MGD Facility

ACUTE

$$WQ\text{-}WLA = \frac{(0.25)Ao_d\ (Qs\text{-}1_{dry} + Qe)}{Qe}$$

$$WQ\text{-}WLA_{ad} = (0.25)(0.019)(0.39)(26.5 + 1.5)/1.5 = 0.035\ mg/l$$

CHRONIC

$$AWLA_{cd} = \frac{(0.25)Co_d(Qs\text{-}7_{dry} + Qe)]}{Qe}$$

$$AWLA_{cd} = (0.25)(0.011)(32.3 + 1.5)/1.5 = 0.06\ mg/l$$

For 2.0 MGD Facility

ACUTE

$$WQ\text{-}WLA = \frac{(0.25)Ao_d\ (Qs\text{-}1_{dry} + Qe)}{Qe}$$

$$WQ\text{-}WLA_{ad} = (0.25)(0.019)(0.50)(26.5 + 2.0)/2.0 = 0.034\ mg/l$$

Calculation of Total Residual Chlorine

Facility Name: Ft. Chiswell WWTP

CHRONIC

$$AWLA_{cd} = \frac{(0.25)Co_d(Qs\text{-}7_{dry} + Qe)]}{Qe}$$

$$AWLA_{cd} = (0.25)(0.011)(32.3 + 2.0)/2.0 = 0.047 \text{ mg/l}$$

<u>For 2.5 MGD Facility</u>

ACUTE

$$WQ\text{-}WLA = \frac{(0.25)Ao_d\ (Qs\text{-}1_{dry} + Qe)}{Qe}$$

$$WQ\text{-}WLA_{ad} = (0.25)(0.019)(0.50)(26.5 + 2.5)/2.5 = 0.028 \text{ mg/l}$$

CHRONIC

$$AWLA_{cd} = \frac{(0.25)Co_d(Qs\text{-}7_{dry} + Qe)]}{Qe}$$

$$AWLA_{cd} = (0.25)(0.011)(32.3 + 2.5)/2.5 = 0.038 \text{ mg/l}$$

9/9/2011 9:08:30 AM

Facility = Ft Chiswell WWTP - 1.25 MGD
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.04
WLAc = 0.074
Q.L. = 0.1
# samples/mo. = 112
# samples/wk. = 28

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.04
Average Weekly limit = 2.02023659857805E-02 ≈ 0.020 mg/l
Average Monthly LImit = 1.81907570647663E-02 ≈ 0.018 mg/l

The data are:

1

9/9/2011 9:09:52 AM

Facility = Ft Chiswell WWTP - 1.5 MGD
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.035
WLAc = 0.06
Q.L. = 0.1
# samples/mo. = 112
# samples/wk. = 28

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.035
Average Weekly limit = 1.76770702375579E-02 ≈ 0.018 mg/l
Average Monthly LImit = 1.59169124316705E-02 ≈ 0.016 mg/l

The data are:

1

9/9/2011 9:11:10 AM

Facility = Ft Chiswell WWTP - 2.0 MGD
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.034
WLAc = 0.047
Q.L. = 0.1
# samples/mo. = 112
# samples/wk. = 28

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.034
Average Weekly limit = 1.71720110879134E-02 ≈ 0.017 mg/l
Average Monthly LImit = 1.54621435050514E-02 ≈ 0.015 mg/l

The data are:

1

9/9/2011 9:01:06 AM

Facility = Ft Chiswell WWTP - 2.5 MGD
Chemical = Total Residual Chlorine
Chronic averaging period = 30
WLAa = 0.028
WLAc = 0.038
Q.L. = 0.1
# samples/mo. = 336
# samples/wk. = 84

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.028
Average Weekly limit = 1.29847851397461E-02 ≈ 0.013 mg/l
Average Monthly LImit = 1.22149054429514E-02 ≈ 0.012 mg/l

The data are:

1

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to REED CREEK.

File Information

File Name:	C:\ABGDN\FREDWORK\Ft. Chiswell Model.mod
Date Modified:	April 17, 2006

Water Quality Standards Information

Stream Name:	REED CREEK
River Basin:	New River Basin
Section:	2
Class:	IV - Mountainous Zones Waters
Special Standards:	v

Background Flow Information

Gauge Used:	Reed Creek at Grahams Forge
Gauge Drainage Area:	247 Sq.Mi.
Gauge 7Q10 Flow:	34.2 MGD
Headwater Drainage Area:	233 Sq.Mi.
Headwater 7Q10 Flow:	32.26154 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.1384615 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	22 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.346845 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	1979 ft above MSL
Model End Elevation:	1960 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to REED CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	FT. CHISWELL WWTP
VPDES Permit No.:	

Discharger Flow Information

Flow:	2 MGD
cBOD5:	24 mg/l
TKN:	11.6 mg/l
D.O.:	6 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.9 miles
Upstream Drainage Area:	233 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	1979 Ft.
Downstream Elevation:	1960 Ft.

Hydraulic Information

Segment Width:	95 Ft.
Segment Depth:	1.11 Ft.
Segment Velocity:	0.503 Ft./Sec.
Segment Flow:	34.262 MGD
Incremental Flow:	-32.262 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	Yes
Percent Pools:	50
Percent Riffles:	50
Pool Depth:	1.5 Ft.
Riffle Depth:	0.75 Ft.
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	None

"Model Run For C:\ABGDN\FREDWORK\Ft. Chiswell Model.mod On 4/17/2006 9:48:59 AM"

"Model is for REED CREEK."
"Model starts at the FT. CHISWELL WWTP discharge."

"Background Data"

"7Q10",	"cBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
32.2615,	2,	0,	7.347,	22

"Discharge/Tributary Input Data for Segment 1"

"Flow",	~~"cBOD5"~~,	~~"TKN"~~,	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
2,	~~24~~, 30 BOD5	~~11.6~~, 8.6 NH3-N	6,	25

"Hydraulic Information for Segment 1"

"Length",	"Width",	"Depth",	"Velocity"
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"
2.9,	95,	1.11,	.503

"Initial Mix Values for Segment 1"

"Flow",	"DO",	"cBOD",	"nBOD",	"DOSat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
34.2615,	7.268,	8.211,	2.174,	8.141,	22.17512

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

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.3,	.332,	3.931,	4.139,	.15,	.177,	0,	0

"Output for Segment 1"
"Segment starts at FT. CHISWELL WWTP"

"Total" "Dist.",	"Segm." "Dist.",	"DO",	"cBOD",	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	7.268,	8.211,	2.174
.1,	.1,	7.274,	8.178,	2.169
.2,	.2,	7.28,	8.145,	2.164
.3,	.3,	7.286,	8.112,	2.159
.4,	.4,	7.292,	8.079,	2.154
.5,	.5,	7.297,	8.047,	2.149
.6,	.6,	7.302,	8.015,	2.144
.7,	.7,	7.307,	7.983,	2.139
.8,	.8,	7.312,	7.951,	2.134
.9,	.9,	7.317,	7.919,	2.129
1,	1,	7.322,	7.887,	2.124
1.1,	1.1,	7.327,	7.855,	2.119
1.2,	1.2,	7.327,	7.823,	2.114
1.3,	1.3,	7.327,	7.792,	2.109
1.4,	1.4,	7.327,	7.761,	2.104
1.5,	1.5,	7.327,	7.73,	2.099
1.6,	1.6,	7.327,	7.699,	2.094
1.7,	1.7,	7.327,	7.668,	2.089
1.8,	1.8,	7.327,	7.637,	2.085
1.9,	1.9,	7.327,	7.606,	2.081
2,	2,	7.327,	7.575,	2.077
2.1,	2.1,	7.327,	7.545,	2.073
2.2,	2.2,	7.327,	7.515,	2.069
2.3,	2.3,	7.327,	7.485,	2.065
2.4,	2.4,	7.327,	7.455,	2.061
2.5,	2.5,	7.327,	7.425,	2.057
2.6,	2.6,	7.327,	7.395,	2.053
2.7,	2.7,	7.327,	7.365,	2.049
2.8,	2.8,	7.327,	7.335,	2.045

				modout
2.9,	2.9,	7.327,	7.306,	2.041

"END OF FILE"

VaFWIS Initial Project Assessment Report Compiled on 8/25/2011, 1:50:40 PM

Help

Known or likely to occur within a **2 mile radius around point 36,57,32.0 80,55,40.0** in **197 Wythe County, VA**

View Map of Site Location

438 Known or Likely Species ordered by Status Concern for Conservation (displaying first 25) (25 species with Status* or Tier I** or Tier II**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
050035	FESE	II	Bat, Virginia big -eared	Corynorhinus townsendii virginianus		HU6
070118	FSSE	II	Crayfish, Big Sandy	Cambarus veteranus		BOVA
040096	ST	I	Falcon, peregrine	Falco peregrinus		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus		BOVA,HU6
100155	FSST	I	Skipper, Appalachian grizzled	Pyrgus wyandot		HU6
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus		BOVA,HU6
060081	ST	II	Floater, green	Lasmigona subviridis		BOVA,HU6,Habitat
060140	ST	IV	Pistolgrip	Tritogonia verrucosa		HU6
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BOVA,HU6
070010	FS	III	Amphipod, James Cave	Stygobromus abditus		BOVA
100001	FS	IV	fritillary, Diana	Speyeria diana		BOVA
010199	CC	II	Darter, candy	Etheostoma osburni	Yes	BOVA,SppObs,HU6,Habitat

020020	CC	II	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis		BOVA,HU6
030012	CC	IV	Rattlesnake, timber	Crotalus horridus		BOVA,HU6
040372		I	Crossbill, red	Loxia curvirostra		BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius		BOVA,HU6,Habitat
040319		I	Warbler, black-throated green	Dendroica virens		BOVA
040306		I	Warbler, golden-winged	Vermivora chrysoptera		BOVA,HU6
020011		II	Frog, mountain chorus	Pseudacris brachyphona		BOVA,HU6,Habitat
040052		II	Duck, American black	Anas rubripes		BOVA,HU6
040213		II	Owl, northern saw-whet	Aegolius acadicus		BOVA,HU6
040320		II	Warbler, cerulean	Dendroica cerulea		BOVA,HU6
040304		II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA,HU6
040266		II	Wren, winter	Troglodytes troglodytes		BOVA

To view **All 438 species** View 438

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Anadromous Fish Use Streams

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters

N/A

Managed Trout Streams

N/A

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests

N/A

Habitat Predicted for Aquatic WAP Tier I & II Species (2 Reaches)

View Map Combined Reaches from Below of Habitat Predicted for WAP Tier I & II Aquatic Species

Stream Name	Tier Species						View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					
Miller Creek (50500011)	SS	010199	CC	II	Darter, candy	Etheostoma osburni	Yes
Reed Creek (50500011)	ST	010199	CC	II	Darter, candy	Etheostoma osburni	Yes
		060081	ST	II	Floater, green	Lasmigona subviridis	

(2 Species)

ordered by Status Concern for Conservation

Habitat Predicted for Terrestrial WAP Tier I & II Species

View Map of Combined Terrestrial Habitat Predicted for 2 WAP Tier I & II Species Listed Below

BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius	Yes
020011		II	Frog, mountain chorus	Pseudacris brachyphona	Yes

Public Holdings: (1 names)

Name	Agency	Level
Wytheville National Fish Hatchery	U.S. Fish and Wildlife Service	Federal

Compiled on 8/25/2011, 1:50:40 PM I353934.0 report= IPA searchType= R dist= 3218
poi= 36,57,32.0 80,55,40.0

Division Contacts
Publications A - Z
Beach Monitoring
Harmful Algal Blooms
Fish Consumption Advisories
Public Health Toxicology
Mold
Rabies
Toxic Substances Surveillance
Vector-borne Diseases Control
Waterborne Hazards Control
West Nile Virus
Zoonotic Diseases
Related Links
DEE Home
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New River Basin

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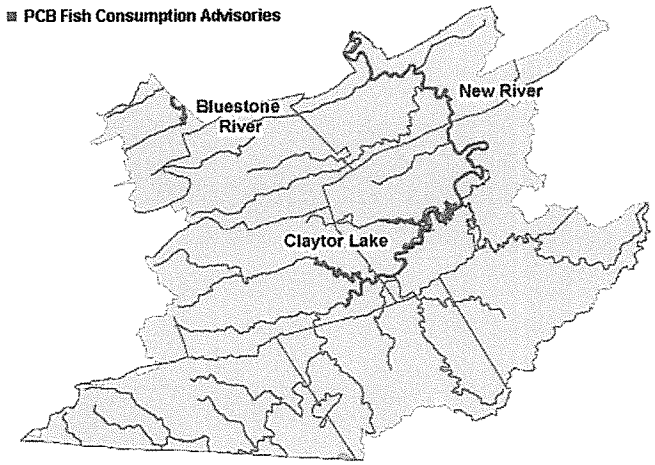

Waterbody and Affected Boundaries	Affected Localities	Contaminant	Species	Advisories/Restriction
New River from below Claytor Lake Dam downstream ~ 68 miles to the VA/WV state line near the town of Glen Lyn in Giles County, VA (8/6/01; modified 12/13/04)	Giles Co., Montgomery Co., Pulaski Co. and Radford City	PCBs	Carp	**DO NOT EAT**
		PCBs	Flathead Catfish	No more than two meals/month
		PCBs	Channel Catfish	
		PCBs	Carp	

New River/Claytor Lake from the Rt. 77 bridge near Jackson Ferry downstream to Claytor Lake Dam including its tributaries Peak Creek up to the confluence with North Fork Peak Creek (Tract Fork) in Pulaski and Reed Creek up to the confluence with Miller near Rt. 121 bridge near Max Meadows. These river segments comprise ~68 miles. (12/13/04)	Pulaski Co. and Wythe Co.	PCBs	Smallmouth Bass	No more than two meals/month
Bluestone River from the Rt. 460 bridge just south of Bluefield, VA downstream ~ 9 miles to VA/WV state line near the town of Yards in Tazewell County, VA (8/6/01; modified 12/13/04)	Tazewell Co.	PCBs	Carp	**DO NOT EAT**
		PCBs	White Sucker	No more than two meals/month
		PCBs	Rock Bass	
		PCBs	Largemouth Bass	

Virginia Department of Health | Office of Epidemiology | Division of Public Health Toxicology | 109 Governor Street Room 338C | Richmond, Virginia 23219 | Phone: (804)864-8182 | Fax: (804)864-8190

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Summary Report for Reed Creek

ID: VAS-N11R_RDC02B02 | **State:** VA - 2010 | **Single Cat.(User Cat.):** 5(5A)

Water Information:	**Reed Creek**	
	Location: Reed Creek from Beaverdam Creek downstream to the New River confluence, WQS Section 2g.	**Water Type:** RIVER **Size:** 6.01 MILES **Next Scheduled Montitoring Date:** N/A

Use Information

	Attainment Status	Uses (Class: IV)
Assessed:	Fully Supporting	Aquatic Life Wildlife
	Not Supporting	Recreation (VAS-N11R-01) Fish Consumption (VAS-N11R-01)
Not Assessed:	Not Assessed	Public Water Supply

Types of Assessment

Assessment Type	Uses	Assessment Confidence
PHYSICAL/CHEMICAL	Aquatic Life Fish Consumption Wildlife	
PATHOGEN INDICATORS	Recreation	
OTHER PUBLIC HEALTH INDICATORS	Fish Consumption	

Assessment Method	Uses

(STATE) VDH Fish Consumption ADVISORY	Fish Consumption
Bacteria - E. Coli	Recreation
Chemical monitoring of sediments	Aquatic Life
Fixed station physical/chemical (conventional plus toxic pollutants)	Aquatic Life
Non-fixed station physical/chemical (conventional + toxicants)	Aquatic Life Wildlife
Probabilistic biological monitoring	Aquatic Life

Additional Location Information

COUNTY	WYTHE CO
HUC	05050001

Cause Information

Causes	Associated Uses	Pollutant?	Confidence
Escherichia coli (N11R-01-BAC)	Recreation	Yes	H
PCB in Fish Tissue (N29R-01-PCB)	Fish Consumption	Yes	H

Listing Information

Causes	Cycle First Listed	TMDL Schedule	TMDL Completed?
Escherichia coli	2006	2018	No
PCB in Fish Tissue	2006	2018	No

Source Information

Sources	Associated Causes	Confirmed?
Animal Feeding	Escherichia coli	N

Operations (NPS)		
Source Unknown	PCB in Fish Tissue	N

Comments On:

Overall Assessment

2010 WQA: No data is available within the current assessment window. Since this segment is bracketed with stations with excessive violations, this segment is also listed as impaired. Additional DEQ monitoring in nearby segments follows: 9-RDC000.79 17% e. coli 2/12 violations 9-RDC009.00 17% e. coli 2/12 violations 9-RDC023.24 33% e. coli 4/12 violations

Uses

Recreation	E. coli at 9-RDC000.79 2/12, at 9-RDC009.00, 2/12 violations, at 9-RDC023.24 4/12 exceedences

Causes

Escherichia coli	E. coli at 9-RDC000.79 2/12, at 9-RDC009.00, 2/12 violations, at 9-RDC023.24 4/12 exceedences
PCB in Fish Tissue	VDH fish consumption restriction imposed 12.13.2004.

Wythe County Water & Wastewater

340 South Sixth Street - Administration Building
Wytheville, Virginia 24382-2598
Telephone (276) 223-6021
FAX (276) 223-6030

Received
JUN 22 2010
DEQ-SWRO

R. Cellell Dalton
County Administrator

Don T. Crisp
Director

Dawn Harmon
Secretary

June 18, 2010

Mr. Fred Wyatt
Dept. of Environmental Quality
PO Box 1688
Abingdon, VA 24212

Re: Toxicity Testing VPDES Permit No. VA0074161

Dear Mr. Wyatt,

Please find enclosed the retest results for one of the fourth quarter toxicity tests as we previously outlined in my April 29th, letter. The test results passed. This should complete the required toxicity testing.

Should you have any questions or need additional information, please contact me.

Sincerely,

Donald T Crisp Jr.
Director, Water & Wastewater

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC051810-1	Start Test	05/18/10	1415
Sample Tested	Outfall 001	End Test	05/24/10	1400

RESULTS

Water Chemistry Analyses Survival and Reproduction
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Total Offspring
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	48h	6d	
0	25	25-26	7.65	6.99-7.75	7.47	6.96-7.91	66	64-66	80	80-84	259	256-274	100	100	267
6.25	25	25-26	7.59	6.97-7.68	7.35	7.19-7.82					359	344-366	100	90	300
12.5	25	25-26	7.52	6.92-7.76	7.37	7.28-7.85					460	428-462	100	100	296
25	25	25-26	7.40	6.24-7.81	7.47	7.42-8.04					665	600-665	100	100	282
62.5	25	25-26	7.03	4.96-7.79	7.51	7.51-8.42					1257	1111-1257	100	100	240
100	25	25-26	7.14	4.13-7.70	7.54	7.54-8.64	1015	625-1015	975	735-975	1840	1617-1840	90	70	120

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 051410	25	7.65	7.47	66	80	259	<0.01
MHRW 051910	25	7.68	7.45	64	84	257	<0.01
MHRW 052110	25	7.72	7.48	64	82	256	<0.01
FC 051710	25	7.14	7.54	1015	975	1840	<0.01
FC 051910	25	7.42	7.60	625	765	1631	<0.01
FC 052110	25	7.70	7.74	720	735	1702	<0.01

STATISTICAL ANALYSES

Test Method	End Point		
Fisher's Exact	Survival	NOEC = 100% TUc = 1.0 48 hr LC50 > 100%	LOEC = N/A
Steel's Many One Rank Test	Reproduction	NOEC = 62.5% TUc = 1.6	LOEC = 100%
Linear Interpolation	Reproduction	IC25 (95% C.I.) = 70.08% (60.70%-76.56%)	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. No transformation was used.
2. Organism survival in all effluent concentrations were not significantly different than the organism survival in the control group using Fisher's Exact test (p = 0.05).

REPRODUCTION DATA

1. No transformation was used.
2. Data PASS normality test using Chi-Square test.
3. Data FAIL homogeneity test using Bartlett's test.
4. Organism reproduction in effluent concentration 100% was significantly different than the organism reproduction in the control group using Steel's Many One Rank Test (alpha = 0.05).

Comments: Reproduction PMSD = 21.8%

Wythe County Water & Wastewater

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Received
MAY 04 2010
DEQ-SWRO

R. Cellell Dalton
County Administrator

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Secretary

April 29, 2010

Mr. Fred Wyatt
Dept. of Environmental Quality
PO Box 1688
Abingdon VA, 24212

Re: Toxicity Testing VPDES Permit No. VA0074161

Dear Mr. Wyatt,

Per our conversation concerning the fourth round of toxicity testing, the STC Cd test showed a failed result. As I stated in my letter to Ruby Scott dated March 31, 2010, the lab reported a chlorine concentration of 2.5 mg/l in the sample. However, the concentration at the time of collection was shown to be 0 mg/l. Furthermore, we reviewed our daily chlorine sample results for the sample period and did not find any concentrations that would indicate the concentration reported by the lab. Therefore, we feel there must have been a lab error that caused this failed test and request that this failed test be omitted from the evaluation.

We will resample and run this test again to be included in the evaluation. We will have the testing completed by the end of May and submit the results to DEQ for inclusion in the evaluation.

Should you have any questions or need additional information, please contact me.

Sincerely,

Don Crisp

Donald T Crisp Jr.
Director, Water & Wastewater

BIOLOGICAL MONITORING, INC.

1800 Kraft Drive, Suite 101 • Blacksburg,VA 24060
Tel 540-953-2821 • Fax 540-951-1481 • Toll Free 877-CLENWTR
www.biomon.com

Received
APR 07 2010
DEQ-SWRO

December 31, 2009

Mr. Don Crisp
Fort Chiswell WWTP
340 South Six Street
Wytheville, VA 24382

Dear Mr. Crisp:

Enclosed are the results of the toxicity tests which Biological Monitoring, Inc. (BMI) recently performed for Fort Chiswell WWTP. The following table summarizes your results:

SAMPLE	TEST	RESULTS		Pass/Fail*	Next Step (if any)
		Survival	Reproduction/ Growth		
Outfall 001	STC Pp	NOEC = 29.1% LOEC = 100% TUc = 3.44 48h LC50 > 100%	NOEC = 29.1% LOEC = 100% TUc = 3.44 IC25 = 41.47%	Pass	N/A
	STC Cd	NOEC = 2.5% LOEC = 8.5% TUc = 40 48h LC50 > 100%	NOEC = 2.5% LOEC = 8.5% TUc = 40 IC25 = 4.27%	Fail	N/A
	SA Pp	LC50 > 100%		Pass	N/A
	SA Cd	LC50 > 100%		Pass	N/A

* Pass = Test results were likely in compliance with your NPDES permit requirements. To confirm, please refer to your permit.

* Fail = Test results may not be in compliance with your NPDES permit requirements. To confirm, please refer to your permit. It may be prudent and/or required to repeat a failed test within 30 days.

BMI thanks you for the opportunity to provide your group with our services.

Sincerely,

Tina Paugh
Laboratory Manager

enc: as stated

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	**NPDES PERMIT** VA0074161		
Test Organism	*Pimephales promelas*		**Date**	**Time**
Experiment ID	FC121509-3	**Start Test**	12/15/09	1450
Sample Tested	Outfall 001	**End Test**	12/17/09	1400

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C)			D.O. (mg/L)			pH			Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos)			Survival (%) 48 h
	0h	24h	48h	0h	24h	48h	0h	24h	48h			0h	24h	48h	
0	25	26	25	7.44	7.08	6.82	7.61	7.43	7.41	68	92	334	338	340	100
6.25	25	26	25	7.42	6.78	6.48	7.59	7.52	7.45			400	404	407	95
12.5	25	26	25	7.43	6.84	6.66	7.60	7.68	7.63			467	478	480	85
25	25	26	25	7.46	6.86	6.65	7.58	7.84	7.81			601	611	615	85
50	25	26	25	7.45	6.88	6.51	7.58	7.94	8.03			872	870	878	100
100	25	26	25	7.37	6.80	6.64	7.47	8.11	8.27	248	400	1382	1388	1402	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
Spearman-Karber	**> 100%**	**1.0**

COMMENTS:

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC121509-4	Start Test	12/15/09	1500
Sample Tested	Outfall 001	End Test	12/17/09	1410

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C) 0h	24h	48h	D.O. (mg/L) 0h	24h	48h	pH 0h	24h	48h	Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos) 0h	48h	Survival (%) 48 h
0	25	26	26	7.44		7.36	7.61		7.68	68	92	334	352	100
6.25	25	26	26	7.42		7.39	7.59		7.79			400	410	100
12.5	25	26	26	7.43		7.32	7.60		7.88			467	472	100
25	25	26	26	7.46		7.31	7.58		8.05			601	601	100
50	25	26	26	7.45		7.28	7.58		8.27			872	848	100
100	25	26	26	7.37		7.17	7.47		8.53	248	400	1382	1369	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
Spearman-Karber	> 100%	1.0

COMMENTS:

BIOLOGICAL MONITORING, INC.

1800 Kraft Drive, Suite 101 • Blacksburg,VA 24060
Tel 540-953-2821 • Fax 540-951-1481 • Toll Free 877-CLENWTR
www.biomon.com

October 2, 2009

Mr. Don Crisp
Fort Chiswell WWTP
340 South Six Street
Wytheville, VA 24382

Dear Mr. Crisp:

Enclosed are the results of the toxicity tests which Biological Monitoring, Inc. (BMI) recently performed for Fort Chiswell WWTP. The following table summarizes your results:

SAMPLE	TEST	RESULTS		Pass/Fail*	Next Step (if any)
		Survival	Reproduction/ Growth		
Outfall 001	STC Pp	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 100% LOEC = N/A TUc = 1.0 IC25 = N/A	Pass	N/A
	STC Cd	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 29.1% LOEC = 100% TUc = 3.44 IC25 = 91.62	Pass	N/A
	SA Pp	LC50 > 100%		Pass	N/A
	SA Cd	LC50 > 100%		Pass	N/A

* Pass = Test results were likely in compliance with your NPDES permit requirements. To confirm, please refer to your permit.

* Fail = Test results may not be in compliance with your NPDES permit requirements. To confirm, please refer to your permit. It may be prudent and/or required to repeat a failed test within 30 days.

BMI thanks you for the opportunity to provide your group with our services.

Sincerely,

Tina Paugh
Laboratory Manager

enc: as stated

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC091509-1	Start Test	09/15/09	1400
Sample Tested	Outfall 001	End Test	09/22/09	1430

RESULTS

Water Chemistry Analyses Survival and Growth
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Mean Weight (mg)
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	96h	7d	
0	25	24-26	7.97	6.08-7.98	8.10	7.75-8.10	68	68	88	88	277	277-354	100	100	0.785
0.72	25	24-26	8.00	5.88-8.00	8.09	7.67-8.10					287	270-339	97.5	97.5	0.796
2.5	25	24-26	7.97	5.82-7.98	8.10	7.58-8.13					312	286-361	100	100	0.781
8.5	25	24-26	7.95	5.88-7.97	8.21	7.88-8.32					410	368-438	100	100	0.758
29.1	25	24-26	8.01	5.71-8.01	8.20	8.03-8.88					715	654-758	100	100	0.793
100	25	24-26	8.30	5.63-8.88	8.00	7.80-9.17	760	654-760	810	780-810	1780	1567-1836	100	100	0.867

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 091409	25	7.97	8.10	68	88	277	<0.1
FC 091409	25	8.30	8.00	760	810	1780	<0.1
FC 091609	25	8.75	8.09	654	800	1740	<0.1
FC 091809	25	8.76	7.86	696	780	1567	<0.1

STATISTICAL ANALYSES

Test Method	End Point		
Steel's Many-One Rank Sum	Survival	NOEC = 100% TUc = 1.0 48 hr LC50 > 100%	LOEC = N/A
Dunnett's	Growth	NOEC = 100% TUc = 1.0	LOEC = N/A
Linear Interpolation	Growth	IC25 Growth (95% Confidence Intervals) = N/A	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA
1. Arc Sine transformation was used.
2. Data FAIL normality test using Shapiro-Wilke's Test.
3. Data FAIL homogeneity test using Bartlett's Test.
4. *Pimephales promelas* survival in all effluent concentrations was not significantly different from survival in the control using Steel's Many-One Rank Sum Test (alpha = 0.05).

GROWTH DATA
1. No transformation was used.
2. Data PASS normality test using Shapiro-Wilke's Test.
3. Data PASS homogeneity test using Bartlett's Test.
4. *Pimephales promelas* growth in all effluent concentrations was not significantly different from growth in the control using Dunnett's Test (p = 0.05).

Comments: Growth PMSD = 15.2%

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		**NPDES Permit #**	VA0074161
Test Organism	*Ceriodaphnia dubia*		**Date**	**Time**
Experiment ID	FC091509-2	**Start Test**	09/15/09	1445
Sample Tested	Outfall 001	**End Test**	09/21/09	1530

RESULTS

Water Chemistry Analyses Survival and Reproduction
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Total Offspring
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	48h	6d	
0	25	25-26	7.97	6.92-7.97	8.10	7.75-8.20	68	68	88	88	277	277-294	100	100	327
0.72	25	25-26	8.00	6.95-8.00	8.09	7.78-8.32					287	270-310	100	100	281
2.5	25	25-26	7.97	6.97-7.98	8.10	7.97-8.40					312	286-335	100	100	323
8.5	25	25-26	7.95	6.99-7.97	8.21	7.88-8.62					410	368-416	100	100	308
29.1	25	25-26	8.01	7.00-8.01	8.20	7.90-9.06					715	654-746	100	100	315
100	25	25-26	8.30	7.15-8.88	8.00	7.80-9.17	760	654-760	810	780-810	1780	1567-1836	100	100	237

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 091409	25	7.97	8.10	68	88	277	<0.1
FC 091409	25	8.30	8.00	760	810	1780	<0.1
FC 091609	25	8.75	8.09	654	800	1740	<0.1
FC 091809	25	8.76	7.86	696	780	1567	<0.1

STATISTICAL ANALYSES

Test Method	End Point		
Fisher's Exact	**Survival**	**NOEC = 100%** **TUc = 1.0** **48 hr LC50 > 100%**	**LOEC = N/A**
Steel's Many One Rank Test	**Reproduction**	**NOEC = 29.1%** **TUc = 3.44**	**LOEC = 100%**
Linear Interpolation	**Reproduction**	**IC25 (95% C.I.) = 91.62% (N/A)**	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. No transformation was used.
2. Organism survival in all effluent concentrations was not significantly different than the organism survival in the control group using Fisher's Exact test (p = 0.05).

REPRODUCTION DATA

1. No transformation was used.
2. Data FAIL normality test using Chi-Square test.
3. Data FAIL homogeneity test using Bartlett's test.
4. Organism reproduction in effluent concentration 100% was significantly different than the organism reproduction in the control group using Steel's Many One Rank Test (alpha = 0.05).

Comments: Reproduction PMSD = 12.5%

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC091709-3	Start Test	09/17/09	1315
Sample Tested	Outfall 001	End Test	09/19/09	1230

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C)			D.O. (mg/L)			pH			Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos)			Survival (%) 48 h
	0h	24h	48h	0h	24h	48h	0h	24h	48h			0h	24h	48h	
0	25	26	25	7.67	6.81	6.80	8.06	7.56	7.78	68	88	280	287	267	100
6.25	25	26	25	7.70	6.87	6.96	8.19	7.95	8.15			362	360	346	100
12.5	25	26	25	7.72	6.85	6.68	8.21	8.06	8.28			454	471	431	100
25	25	26	25	7.89	6.55	6.74	8.21	8.25	8.48			654	670	603	95
50	25	26	25	8.08	6.77	6.75	8.15	8.37	8.65			1041	1045	936	100
100	25	26	25	9.23	6.57	6.66	8.05	8.45	8.75	654	800	1780	1650	1531	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0

COMMENTS:

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC091709-4	Start Test	09/17/09	1315
Sample Tested	Outfall 001	End Test	09/19/09	1245

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C)			D.O. (mg/L)			pH			Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos)		Survival (%) 48 h
	0h	24h	48h	0h	24h	48h	0h	24h	48h			0h	48h	
0	25	26	26	7.67		7.42	8.06		8.05	68	88	280	306	100
6.25	25	26	26	7.70		7.28	8.19		8.31			362	344	100
12.5	25	26	26	7.70		7.31	8.21		8.46			454	430	100
25	25	26	26	7.89		7.32	8.21		8.63			654	601	100
50	25	26	26	8.08		7.22	8.15		8.82			1041	910	95
100	25	26	26	9.23		7.28	8.05		8.94	654	800	1780	1485	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0

COMMENTS:

FMW

Received

SEP 17 2009

DEQ-SWRO

Wythe County Water & Wastewater

340 South Sixth Street - Administration Building
Wytheville, Virginia 24382-2598
Telephone (276) 223-6020
FAX (276) 223-6030

R. Cellell Dalton
County Administrator

Don T. Crisp
Director

September 10, 2009

Ruby Scott
Department of Environmental Quality
P.O. Box 1688
Abingdon, VA 24212-1688

RE: VPDES Permit No. 0074161 Fort Chiswell WWTP

Dear Mrs. Scott:

This letter is to report the completion of our second quarterly Short Term Chronic test on the effluent from outfall 001. The effluent water samples passed all four tests required by our NPDES permit with a 100% survival rate. A copy of the test results will be provided with this letter in the event you would need any further information regarding these tests. We plan on conducting the third quarter's testing from September 13, 2009 to September 17, 2009.

If you have any questions or concerns, please contact me at 276-637-4544.

Sincerely,

Don T. Crisp
Director, Water & Wastewater

BIOLOGICAL MONITORING, INC.

1800 Kraft Drive, Suite 101 • Blacksburg,VA 24060
Tel 540-953-2821 • Fax 540-951-1481 • Toll Free 877-CLENWTR
www.biomon.com

Received
SEP 17 2009
DEQ-SWRO

July 21, 2009

Mr. Don Crisp
Fort Chiswell WWTP
340 South Six Street
Wytheville, VA 24382

Dear Mr. Crisp:

Enclosed are the results of the toxicity tests which Biological Monitoring, Inc. (BMI) recently performed for Fort Chiswell WWTP. The following table summarizes your results:

SAMPLE	TEST	RESULTS		Pass/Fail*	Next Step (if any)
		Survival	Reproduction/ Growth		
Outfall 001	STC Pp	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 100% LOEC = N/A TUc = 1.0 IC25 = N/A	Pass	N/A
	STC Cd	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 100% LOEC = N/A TUc = 1.0 IC25 = N/A	Pass	N/A
	SA Pp	LC50 > 100%		Pass	N/A
	SA Cd	LC50 > 100%		Pass	N/A

* Pass = Test results were likely in compliance with your NPDES permit requirements. To confirm, please refer to your permit.

* Fail = Test results may not be in compliance with your NPDES permit requirements. To confirm, please refer to your permit. It may be prudent and/or required to repeat a failed test within 30 days.

BMI thanks you for the opportunity to provide your group with our services.

Sincerely,

Tina Paugh
Laboratory Manager

enc: as stated

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC070709-1	Start Test	07/07/09	1400
Sample Tested	Outfall 001	End Test	07/14/09	1315

RESULTS

Water Chemistry Analyses Survival and Growth
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Mean Weight (mg)
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	96h	7d	
0	25	24-25	8.10	5.97-8.10	7.88	7.77-8.63	64	64	92	92	294	260-294	100	97.5	0.726
0.72	25	24-25	8.12	5.77-8.12	7.87	7.80-8.50					301	262-380	100	97.5	0.851
2.5	25	24-25	8.11	5.84-8.11	7.87	7.76-8.40					329	310-382	100	100	0.882
8.5	25	24-25	8.12	5.59-8.25	7.79	7.72-8.27					409	387-476	100	97.5	0.824
29.1	25	24-25	8.28	5.60-8.28	7.66	7.66-8.13					635	635-807	95	87.5	0.774
100	25	24-25	8.05	5.64-8.85	7.46	7.46-8.40	618	480-706	580	580-766	1530	1300-1887	100	100	0.803

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 070609	25	8.10	7.88	64	92	294	<0.01
FC 070609	25	8.05	7.46	618	580	1530	<0.01
FC 070809	25	7.66	7.61	480	600	1426	<0.01
FC 071009	25	8.24	7.73	706	766	1887	<0.01

STATISTICAL ANALYSES

Test Method	End Point		
Steel's Many-One Rank Sum	**Survival**	**NOEC = 100%** **TUc = 1.0** **48 hr LC50 > 100%**	**LOEC = N/A**
Dunnett's	**Growth**	**NOEC = 100%** **TUc = 1.0**	**LOEC = N/A**
Linear Interpolation	**Growth**	**IC25 Growth (95% Confidence Intervals) = N/A**	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. Arc Sine transformation was used.
2. Data FAIL normality test using Shapiro-Wilke's Test.
3. Data FAIL homogeneity test using Bartlett's Test.
4. *Pimephales promelas* survival in all effluent concentrations was not significantly different from survival in the control using Steel's Many-One Rank Sum Test (alpha = 0.05).

GROWTH DATA

1. No transformation was used.
2. Data PASS normality test using Shapiro-Wilke's Test.
3. Data PASS homogeneity test using Bartlett's Test.
4. *Pimephales promelas* growth in all effluent concentrations was not significantly different from growth in the control using Dunnett's Test (p = 0.05).

Comments: Growth PMSD = 20.2%

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC070709-2	Start Test	07/07/09	1315
Sample Tested	Outfall 001	End Test	07/14/09	1330

RESULTS

Water Chemistry Analyses Survival and Reproduction
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Total Offspring
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	48h	6d	
0	25	24-26	8.10	7.12-8.10	7.88	7.60-8.36	64	64	92	92	294	260-294	100	90	362
0.72	25	24-26	8.12	7.12-8.12	7.87	7.68-8.29					301	262-313	100	80	319
2.5	25	24-26	8.11	7.19-8.11	7.87	7.72-8.28					329	310-337	100	90	382
8.5	25	24-26	8.12	7.21-8.25	7.79	7.76-8.21					409	387-450	100	100	399
29.1	25	24-26	8.28	7.24-8.28	7.66	7.66-8.14					635	635-800	100	80	403
100	25	24-26	8.05	7.30-8.85	7.46	7.46-8.62	618	480-706	580	580-766	1530	1300-1887	100	70	310

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 070609	25	8.10	7.88	64	92	294	<0.01
FC 070609	25	8.05	7.46	618	580	1530	<0.01
FC 070809	25	7.66	7.61	480	600	1426	<0.01
FC 071009	25	8.30	7.60	706	766	1705	<0.01

STATISTICAL ANALYSES

Test Method	End Point		
Fisher's Exact	Survival	NOEC = 100% TUc = 1.0 48 hr LC50 > 100%	LOEC = N/A
Dunnett's Test	Reproduction	NOEC = 100% TUc = 1.0	LOEC = N/A
Linear Interpolation	Reproduction	IC25 (95% C.I.) = N/A	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. No transformation was used.
2. Organism survival in all effluent concentrations was not significantly different than the organism survival in the control group using Fisher's Exact test (p = 0.05).

REPRODUCTION DATA

1. No transformation was used.
2. Data PASS normality test using Chi-Square test.
3. Data PASS homogeneity test using Bartlett's test.
4. Organism reproduction in all effluent concentrations was not significantly different than the organism reproduction in the control group using Dunnett's Test (p = 0.05).

Comments: Reproduction PMSD = 37.4%

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC070909-3	Start Test	07/09/09	1145
Sample Tested	Outfall 001	End Test	07/11/09	1130

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C)			D.O. (mg/L)			pH			Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos)		Survival (%) 48 h
	0h	24h	48h	0h	24h	48h	0h	24h	48h			0h	48h	
0	25	25	25	8.03	7.18	7.15	7.94	7.82	7.96	64	92	284	303	95
6.25	25	25	25	8.09	7.20	7.05	7.88	7.85	7.97			374	394	100
12.5	25	25	25	8.07	7.10	7.7	7.85	7.92	8.05			456	469	100
25	25	25	25	8.08	7.05	7.03	7.91	8.02	8.11			653	657	100
50	25	25	25	8.09	7.03	7.01	7.78	8.12	8.28			1011	995	100
100	25	25	25	8.18	7.04	7.11	7.54	8.27	8.51	480	600	1435	1635	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0
COMMENTS:		

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC070909-4	Start Test	07/09/09	1230
Sample Tested	Outfall 001	End Test	07/11/09	1200

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C) 0h	Temp. (C) 24h	Temp. (C) 48h	D.O. (mg/L) 0h	D.O. (mg/L) 24h	D.O. (mg/L) 48h	pH 0h	pH 24h	pH 48h	Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos) 0h	Cond. (umhos) 48h	Survival (%) 48 h
0	25	25	25	8.03		7.51	7.94		8.43	64	92	284	334	100
6.25	25	25	25	8.09		7.52	7.88		8.37			374	391	100
12.5	25	25	25	8.07		7.4	7.85		8.38			456	476	100
25	25	25	25	8.08		7.47	7.91		8.52			653	652	100
50	25	25	25	8.09		7.45	7.78		8.54			1011	995	100
100	25	25	25	8.18		7.41	7.54		8.73	480	600	1435	1586	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0
COMMENTS:		

Wythe County Water & Wastewater

340 South Sixth Street - Administration Building
Wytheville, Virginia 24382-2598
Telephone (276) 223-6020
FAX (276) 223-6030

Received
APR 28 2009
DEQ-SWRO

R. Cellell Dalton
County Administrator

Don T. Crisp
Director

January 7, 2009

Ruby Scott
Department of Environmental Quality
P.O. Box 1688
Abingdon, VA 24212-1688

RE: VPDES Permit No. 0074161 Fort Chiswell WWTP

Dear Mr. Doss:

This letter is to report the completion of our first quarterly Short Term Chronic test on the effluent from outfall 001. The water samples passed all four tests required by our NPDES permit. A copy of the test results will be provided with this letter in the event you would need any further information regarding these tests. We plan on conducting the second quarter's testing from June 15, 2009 to June 20,2009.

If you have any questions or concerns, please contact me at 276-637-4544.

Sincerely,

Don T. Crisp
Director, Water & Wastewater

BIOLOGICAL MONITORING, INC.

1800 Kraft Drive, Suite 101 • Blacksburg,VA 24060
Tel 540-953-2821 • Fax 540-951-1481 • Toll Free 877-CLENWTR
www.biomon.com

March 31, 2009

Mr. Don Crisp
Fort Chiswell WWTP
613 Locust Hill Road
Max Meadows, VA 24360

Dear Mr. Crisp:

Enclosed are the results of the toxicity tests which Biological Monitoring, Inc. (BMI) recently performed for The City of Emporia WWTP. The following table summarizes your results:

SAMPLE	TEST	RESULTS		Pass/Fail*	Next Step (if any)
		Survival	Reproduction/ Growth		
Outfall 001	STC Pp	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 100% LOEC = N/A TUc = 1.0 IC25 = N/A	Pass	N/A
	STC Cd	NOEC = 100% LOEC = N/A TUc = 1.0 48h LC50 > 100%	NOEC = 29.1% LOEC = 100% TUc = 3.44 IC25 = 77.06%	Pass	N/A
	SA Pp	LC50 > 100%		Pass	N/A
	SA Cd	Lc50 > 100%		Pass	N/A

* Pass = Test results were likely in compliance with your NPDES permit requirements. To confirm, please refer to your permit.

* Fail = Test results may not be in compliance with your NPDES permit requirements. To confirm, please refer to your permit. It may be prudent and/or required to repeat a failed test within 30 days.

BMI thanks you for the opportunity to provide your group with our services.

Sincerely,

Tina Paugh
Laboratory Manager

enc: as stated

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC031709-1	Start Test	03/17/09	1650
Sample Tested	Outfall 001	End Test	03/24/09	1620

RESULTS

Water Chemistry Analyses Survival and Growth
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Mean Weight (mg)
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	96h	7d	
0	25	24-25	7.49	6.13-7.83	8.00	7.70-8.43	68	68	94	94	280	260-300	97.5	95	0.735
0.72	25	24-25	7.48	5.90-7.80	8.09	7.62-8.36					285	280-305	100	100	0.826
2.5	25	24-25	7.53	5.63-7.86	7.94	7.57-8.33					310	300-330	100	85	0.697
8.5	25	24-25	7.51	5.60-7.88	7.91	7.57-8.26					410	390-430	100	97.5	0.756
29.1	25	24-25	7.48	5.43-7.94	7.94	7.90-8.38					700	600-700	95	90	0.692
100	25	24-25	7.73	5.43-8.57	7.80	7.74-8.79	732	732-820	908	780-908	2000	1550-2000	100	95	0.850

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 031209	25	7.49	8.00	68	94	280	<0.1
FC 031609	25	7.73	7.80	820	908	2000	<0.1
FC 031809	25	8.57	7.84	732	780	1600	<0.1
FC 032009	25	8.50	7.74	800	904	1800	<0.1

STATISTICAL ANALYSES

Test Method	End Point		
Steel's Many-One Rank Sum	Survival	NOEC = 100% TUc = 1.0 48 hr LC50 > 100%	LOEC = N/A
Dunnett's	Growth	NOEC = 100% TUc = 1.0	LOEC = N/A
Linear Interpolation	Growth	IC25 Growth (95% Confidence Intervals) = N/A	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. Arc Sine transformation was used.
2. Data PASS normality test using Shapiro-Wilke's Test.
3. Data FAIL homogeneity test using Bartlett's Test.
4. *Pimephales promelas* survival in all effluent concentrations was not significantly different from survival in the control using Steel's Many-One Rank Sum Test (alpha = 0.05).

GROWTH DATA

1. No transformation was used.
2. Data PASS normality test using Shapiro-Wilke's Test.
3. Data PASS homogeneity test using Bartlett's Test.
4. *Pimephales promelas* growth in all effluent concentrations was not significantly different from growth in the control using Dunnett's Test (p = 0.05).

Comments: Growth PMSD = 23.7%

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC031709-2	Start Test	03/17/09	2020
Sample Tested	Outfall 001	End Test	03/24/09	1920

RESULTS

Water Chemistry Analyses Survival and Reproduction
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Total Offspring
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	48h	6d	
0	25	24-25	7.49	6.97-7.83	8.00	7.78-8.60	68	68	94	94	280	260-300	100	100	317
0.72	25	24-25	7.48	6.95-7.80	8.09	7.83-8.46					285	280-305	100	100	320
2.5	25	24-25	7.53	6.98-7.86	7.94	7.87-8.38					310	310-330	100	100	328
8.5	25	24-25	7.51	7.06-7.88	7.91	7.91-8.32					410	390-420	100	100	329
29.1	25	24-25	7.48	7.16-7.94	7.94	7.90-8.70					700	600-700	100	100	334
100	25	24-25	7.73	7.13-8.57	7.80	7.74-8.85	820	732-820	908	780-908	2000	1550-2000	90	80	204

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 031209	25	7.49	8.00	68	94	280	<0.1
FC 031609	25	7.73	7.80	820	908	2000	<0.1
FC 031809	25	8.57	7.84	732	780	1600	<0.1
FC 032009	25	8.50	7.74	800	904	1800	<0.1

STATISTICAL ANALYSES

Test Method	End Point		
Fisher's Exact	Survival	NOEC = 100% TUc = 1.0 48 hr LC50 > 100%	LOEC = N/A
Steel's Many-One Rank Test	Reproduction	NOEC = 29.1% TUc = 3.44	LOEC = 100%
Linear Interpolation	Reproduction	IC25 (95% C.I.) = 77.06 (95% C.I. = N/A)	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. No transformation was used.
2. Organism survival in all effluent concentrations was not significantly different than the organism survival in the control group using Fisher's Exact test (p = 0.05).

REPRODUCTION DATA

1. No transformation was used.
2. Data PASS normality test using Chi-Square test.
3. Data FAIL homogeneity test using Bartlett's test.
4. Organism reproduction in 100% effluent concentration was significantly different than the organism reproduction of the control group using Steel's Many-One Rank Test (alpha = 0.05).

Comments: Reproduction PMSD = 18.5%

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC031909-3	Start Test	03/19/09	1600
Sample Tested	Outfall 001	End Test	03/21/09	1640

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C)			D.O. (mg/L)			pH			Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos)		Survival (%) 48 h
	0h	24h	48h	0h	24h	48h	0h	24h	48h			0h	48h	
0	25	25	25	7.43	6.71	7.10	7.94	8.18	8.20	68	94	270	290	100
6.25	25	25	25	7.52	6.69	7.16	7.89	8.07	8.13			375	390	95
12.5	25	25	25	7.55	6.77	7.08	7.92	8.13	8.10			450	470	100
25	25	25	25	7.61	6.82	7.02	7.94	8.30	8.18			500	550	100
50	25	25	25	7.71	6.70	6.94	7.96	8.49	8.48			850	800	100
100	25	25	25	8.03	6.62	6.87	7.95	8.53	8.64	732	780	1500	1550	100

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0

COMMENTS:

BIOLOGICAL MONITORING, INC.
Acute Toxicity Test Data Summary

Client	Fort Chiswell	NPDES PERMIT VA0074161		
Test Organism	*Ceriodaphnia dubia*		Date	Time
Experiment ID	FC031909-4	Start Test	03/19/09	1630
Sample Tested	Outfall 001	End Test	03/21/09	1630

RESULTS

Water Chemistry Analyses & Survival

Conc. %	Temp. (C) 0h	Temp. (C) 24h	Temp. (C) 48h	D.O. (mg/L) 0h	D.O. (mg/L) 24h	D.O. (mg/L) 48h	pH 0h	pH 24h	pH 48h	Initial Alkalinity mg/L as $CaCO_3$	Initial Hardness mg/L as $CaCO_3$	Cond. (umhos) 0h	Cond. (umhos) 48h	Survival (%) 48 h
0	25	25	25	7.43		7.51	7.94		8.28	68	94	270	280	100
6.25	25	25	25	7.52		7.46	7.89		8.16			375	390	100
12.5	25	25	25	7.55		7.44	7.92		8.17			450	470	100
25	25	25	25	7.61		7.48	7.94		8.21			500	600	100
50	25	25	25	7.71		7.39	7.96		8.57			850	890	100
100	25	25	25	8.03		7.54	7.95		8.83	732	780	1500	1500	95

STATISTICAL ANALYSES

Test Method	LC50 (%)	TUa
N/A	> 100%	1.0
COMMENTS:		

BIOLOGICAL MONITORING, INC.
Chronic Toxicity Test Data Summary

Client	Fort Chiswell		NPDES Permit # VA0074161	
Test Organism	*Pimephales promelas*		Date	Time
Experiment ID	FC121009-1	Start Test	12/10/09	1250
Sample Tested	Outfall 001	End Test	12/17/09	1240

RESULTS

Water Chemistry Analyses Survival and Growth
Initial (Range)

Conc. (%)	Temp. (°C)		D.O. (mg/L)		pH		Alkalinity (mg/L as $CaCO_3$)		Hardness (mg/L as $CaCO_3$)		Cond. (µmhos)		Survival (%)		Mean Weight (mg)
	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	0h	Range	96h	7d	
0	25	25-26	7.78	5.95-8.04	7.46	7.27-7.93	68	68	88	88-92	329	333-355	100	100	0.726
0.72	25	25-26	7.77	5-67-7.95	7.45	7.23-7.91					339	336-353	100	100	0.778
2.5	25	25-26	7.82	5.62-7.87	7.46	7.13-7.84					365	348-371	100	100	0.755
8.5	25	25-26	7.83	5.55-7.96	7.55	7.25-7.89					454	400-454	95	95	0.672
29.1	25	25-26	7.82	5.38-7.89	7.62	7.52-8.17					754	573-754	92.5	92.5	0.695
100	25	25-26	8.14	5.41-8.76	7.58	7.28-8.48	590	230-590	810	400-636	1747	1149-1747	0	0	

Dilution Water and Test Sample
Initial Use Chemistry

Batch/Sample ID	Temp. (°C)	D.O. (mg/L)	pH	Alkalinity (mg/L as $CaCO_3$)	Hardness (mg/L as $CaCO_3$)	Cond. (µmhos)	TRC (mg/L)
MHRW 120709	25	7.78	7.46	68	88	329	<0.1
MHRW 121109	25	7.71	7.89	68	92	338	<0.1
FC 120909	25	8.14	7.58	590	636	1747	<0.1
FC 121109	25	8.76	7.45	230	408	1149	2.5
FC 121409	25	7.37	7.47	248	400	400	<0.1

STATISTICAL ANALYSES

Test Method	End Point		
Steel's Many-One Rank Sum	**Survival**	**NOEC = 29.1 %** **TUc = 3.44** **48 hr LC50 > 100%**	**LOEC = 100 %**
Dunnett's	**Growth**	**NOEC = 29.1%** **TUc = 3.44**	**LOEC = 100%**
Linear Interpolation	**Growth**	**IC25 Growth (95% Confidence Intervals) = 41.47% (33.33%-45.41%)**	

NOEC = No Observed Effect Concentration LOEC = Lowest Observed Effect Concentration

SURVIVAL DATA

1. Arc Sine transformation was used.
2. Data FAIL normality test using Shapiro-Wilke's Test.
3. Data FAIL homogeneity test using Bartlett's Test.
4. *Pimephales promelas* survival in effluent concentration 100% was significantly different from survival in the control using Steel's Many-One Rank Sum Test (alpha = 0.05).

GROWTH DATA

1. No transformation was used.
2. Data PASS normality test using Shapiro-Wilke's Test.
3. Data PASS homogeneity test using Bartlett's Test.
4. *Pimephales promelas* growth in effluent concentration 100% was significantly different from growth in the control using Dunnett's Test (p = 0.05).

Comments: Growth PMSD = 18.8%

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Fort Chiswell Wastewater Treatment Plant

NPDES Permit Number: VA0074161

Permit Writer Name: Fred M. Wyatt

Date: August 30, 2011

Major [X] **Minor** [ ] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit– entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?		X	
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilties?			X

I.B. Permit/Facility Characteristics	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics– cont.	Yes	No	N/A
4. Does the review of PCS/DMR data for atleast the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?	X		
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?		X	
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within thelife of the permit?		X	
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?		X	
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistentwith 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?		X	

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was perfomed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		
List of Standard Conditions – 40 CFR 122.41 Duty to comply Duty to reapply Need to halt or reduce activity not a defense Duty to mitigate Proper O & M Permit actions Property rights Duty to provide information Inspections and entry Monitoring and records Signatory requirement Bypass Upset Reporting Requirements Planned change Anticipated noncompliance Transfers Monitoring reports Compliance schedules 24-Hour reporting Other non-compliance			
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Fred M. Wyatt
Title	Environmental Engineer Sr.
Signature	
Date	08/30/2011