VPDES PERMIT PROGRAM FACT SHEET

This document gives pertinent information concerning the VPDES Permit listed below. This permit is being processed as a MAJOR, MUNICIPAL permit. The effluent limitations contained in this permit will maintain the water quality standards of 9 VAC 25-260-00 et seq.

1. **PERMIT NO.:** VA0061751

EXISTING PERMIT EXPIRATION DATE: September 25, 2015

2. **FACILITY NAME AND LOCAL MAILING ADDRESS**

Town of Christiansburg WWTP
100 East Main Street
Christiansburg, Virginia 24073

FACILITY PHYSICAL LOCATION (IF DIFFERENT)

2557 Crab Creek Road
Christiansburg, Virginia 24073

FACILITY CONTACT:
NAME: Ryan L. Hendrix
TITLE: Wastewater Operations Superintendent
PHONE: (540) 382-8221 - Office
PHONE: (540) 357-0430 - Mobile
E-MAIL: rhendrix@christiansburg.org

ALTERNATE CONTACT:
NAME: R. Lawrence Hoffman
TITLE: Vice President, CHA Consulting, Inc.
PHONE: (540) 552-5548 - Office
PHONE: (540) 230-2335 – Mobile
E-MAIL: LHoffman@chacompanies.com

3. **OWNER CONTACT:** (TO RECEIVE PERMIT)
NAME: Barry Helms
TITLE: Christiansburg Town Manager
COMPANY NAME: (IF DIFFERENT)
ADDRESS: 100 East Main Street
Christiansburg, Virginia 24073
PHONE: (540) 382-6128
E-MAIL: bhelms@christiansburg.org

4. **PERMIT DRAFTED BY:** DEQ, Water Permits, Blue Ridge Regional Office - Lynchburg

Permit Writer: Kirk A. Batsel — Date(s): 8/17/15, 8/18/15, 8/25/15, 9/24/15
Reviewed By: Leah R. Revelle — Date(s): 8/21/15

5. **PERMIT CHARACTERIZATION:** (Check as many as appropriate)

( ) Issuance
(X) Reissuance
( ) Revoke & Reissue
( ) Owner Modification
( ) Board Modification
( ) Change of Ownership/Name
Effective Date:

(X) Municipal
SIC Code(s) 4952
____
( ) Industrial
SIC Code(s) ____
____
____

(X) POTW
( ) PVOTW
( ) Private
( ) Federal
( ) State
( ) Publicly-Owned Industrial

( ) Site-Specific WQ Criteria
( ) Variance to WQ Standards
( ) Water Effects Ratio

( ) Interim Limits in Other Document (attach to fact sheet)
( ) Concept Engineering Report Being Approved with Permit
( ) Possible Interstate Effect

6. **APPLICATION COMPLETE DATE:** May 11, 2015 (receipt of VDH comments)

7. **RECEIVING WATERS CLASSIFICATION:** River basin information.

Outfall No(s): 001

Receiving Stream:	New River	7-Day/10-Year Low Flow:	577 MGD
River Mile:	77.64	7-Day/10-Year High Flow:	786 MGD*
Basin:	New River	1-Day/10-Year Low Flow:	467 MGD
Subbasin:	NA	1-Day/10-Year High Flow:	546 MGD*
Section:	2a	30-Day/5-Year Low Flow:	741 MGD
Class:	IV	30-Day/10-Year Low Flow:	663 MGD
Special Standard(s):	PWS, v	Harmonic Mean Flow:	1527 MGD

(*High Flow Months = January through May)

8. **FACILITY DESCRIPTION:** Describe the type facility from which the discharges originate.

Existing municipal discharge resulting from the discharge of treated domestic sewage.

9. **LICENSED WASTEWATER OPERATOR REQUIREMENTS:** ( ) No (X) Yes Class: I

10. **RELIABILITY CLASS:** I

11. **SITE INSPECTION DATE:** 7/31/14 **REPORT DATE:** August 27, 2014

Performed By: Gerald A. Duff, Water Compliance Inspector, Sr.

SEE ATTACHMENT 1

An additional inspection conducted by Bob Tate, Water Permit Writer (retired) and Kirk A. Batsel, Water Permit Writer on May 6, 2014. No written report generated for this site visit.

12. **DISCHARGE(S) LOCATION DESCRIPTION:** Provide **USGS Topo** which indicates the discharge location, significant (large) discharger(s) to the receiving stream, water intakes, and other items of interest.

Name of Topo: Radford North **Quadrant No.: 082A**

SEE ATTACHMENT 2

13. **ATTACH A SCHEMATIC OF THE WASTEWATER TREATMENT SYSTEM(S) [IND. & MUN.]. FOR INDUSTRIAL FACILITIES, ALSO PROVIDE A GENERAL DESCRIPTION OF THE PRODUCTION CYCLE(S) AND ACTIVITIES. FOR MUNICIPAL FACILITIES, PROVIDE A GENERAL DESCRIPTION OF THE TREATMENT PROVIDED.**

Narrative: Wastewater Treatment unit processes include flow equalization (five equalization basins), pretreatment (mechanical screening and two aerated grit chambers) then primary treatment consisting of four rectangular primary clarifiers with wastewater flow split evenly, the wastewater is then recombined and is introduced equally to two secondary treatment aeration basins (activated sludge basins), followed by two secondary clarifiers. The treated supernatant (treated wastewater) then flows to one of two UV disinfection channels, while the settled sludge is either wasted to sludge handling or is recycled to the aeration basins. Treated wastewater flows from the UV treatment channels to one of two former chlorine contact tanks retrofitted with air diffusers that serve as post aeration tanks. The treated effluent then flows to the New River via a 24-inch force main equipped with a submerged multiport diffuser within the New River. Sludge management includes a sludge mixing tank, a gravity belt thickener (w/ polymer addition) available if needed, an enclosed primary digester (heated using gas produced) to stabilize sludge, followed by an enclosed secondary digester (maintains anaerobic conditions), a gravity belt thickener, followed by sludge (biosolids) holding tanks. Final treated biosolids are land applied as thickened sludge or may be applied as liquid biosolids.

SEE ATTACHMENT 3

14. **DISCHARGE DESCRIPTION:** Describe each discharge originating from this facility.

SEE ATTACHMENT 4

15. **COMBINED TOTAL FLOW:**

TOTAL: 8.0 MGD (for public notice)

PROCESS FLOW:	MGD (IND.)
NONPROCESS FLOW:	MGD (IND.)
DESIGN FLOW:	6.0 MGD current, with expansion to 8.0 MGD (MUN.)

16. **STATUTORY OR REGULATORY BASIS FOR EFFLUENT LIMITATIONS AND SPECIAL CONDITIONS:** (Check all which are appropriate)

- X State Water Control Law
- X Clean Water Act
- X VPDES Permit Regulation (9 VAC 25-31-10 et seq.)
- X EPA NPDES Regulation (Federal Register)
- ___ EPA Effluent Guidelines [40 CFR 400 – 471 (industrial)]
- X EPA Effluent Guidelines [40 CFR 133 (municipal 2^0 treatment)]
- X Water Quality Standards (9 VAC 25-260-00 et seq.)
- ___ Waste load Allocation from a TMDL or River Basin Plan

17. **LIMITATIONS/MONITORING:** Include **all effluent limitations and monitoring requirements** being placed in the permit for each outfall, including any WET limits. If applicable, include any limitations and monitoring requirements being included for sludge and ground water.

There are no applicable limitations and monitoring requirements for ground water.

SEE ATTACHMENT 5

18. **SPECIAL CONDITIONS:** Provide **all actual permit special conditions**, including compliance schedules, toxic monitoring, sludge, ground water, storm water and pretreatment.

SEE ATTACHMENT 6

19. **EFFLUENT/SLUDGE/GROUND WATER LIMITATIONS/MONITORING RATIONALE:** For outfalls, attach any analyses completed (**MIX.EXE and WLA.EXE) and STATS printouts** for individual toxic parameters. As a minimum, it will include: waste load allocation (acute, chronic and human health); statistics summary (number of data values, quantification level, expected value, variance, covariance, 97th percentile, and statistical method); input data listing; and, effluent limitations determination. Include **all calculations** used for each outfall's set of effluent limits and incorporate the results of **any water quality model(s)**. Include all calculations/documentation of any antidegradation or anti-backsliding issues in the development of any limitations; complete the review statements below. Provide a rationale for **limited internal waste streams** and indicator pollutants. Attach any additional information used to develop the limitations, including any applicable water quality standards calculations (acute, chronic and human health).

OTHER CONSIDERATIONS IN LIMITATIONS DEVELOPMENT:

WAIVERS/VARIANCES/ALTERNATE LIMITATIONS: Provide justification or refutation rationale for requested **waivers to the permit application (e.g., testing requirements)** or variances/alternatives to required permit conditions/ limitations. This includes, but is not limited to: variances from technology guidelines or water quality standards; WER/translator study consideration; variances from standard permit limits/conditions.

N/A

SUITABLE DATA: What, if any, effluent data were considered in the establishment of effluent limitations and provide all appropriate information/calculations.

All suitable effluent data were reviewed.

ANTIDEGRADATION REVIEW: Provide all appropriate information/calculations for the antidegradation review.

Tier I: _____ **Tier II:** __X__ **Tier III:** _____

The State Water Control Board's Water Quality Standards regulations include an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I, existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters. The limitations in this permit were developed in accordance with section 303(d)(4) of the Clean Water Act. Therefore, antidegradation restrictions do not apply.

The antidegradation review begins with the Tier determination. The facility discharges directly to the New River. This receiving stream is listed as Category 5A on the 303(d) list for non-attainment based on PCB contamination in fish tissue. Non-attainment based on fish consumption advisories, bans, and prohibitions (e.g., PCB fish consumption advisory based on PCBs in fish tissue) is also no longer used as a sole basis for classifying a receiving stream as Tier I. Therefore, the New River, at the point of this facility's discharge, is designated as Tier II and no significant degradation of the existing water quality will be allowed.

As documented in the 2010 reissuance Fact Sheet, antidegradation baselines were established for this expanded discharge. The baselines were calculated as not more than 25% of the unused assimilative capacity for the protection of aquatic life (acute and chronic) and not more than 10% for the protection of human health. The unused assimilative capacity is defined as the difference between existing water quality and the criterion for a specific pollutant. These antidegradation baselines are contained in the MSTRANTI spread sheet dated 6/9/2010 a copy of which is included in Attachment 7. These baselines were used in evaluation of effluent data.

See antidegradation calculations/determinations.

ANTIBACKSLIDING REVIEW: Indicate if antibacksliding applies to this permit and, if so, provide all appropriate information.

There are no backsliding issues to address in this permit (i.e., limits as stringent or more stringent when compared to the previous permit).

SEE ATTACHMENT 7

20. **SPECIAL CONDITIONS RATIONALE:** Provide a rationale **for each of the permit's special conditions**, including compliance schedules, toxic monitoring, sludge, ground water, storm water and pretreatment.

SEE ATTACHMENT 8

21. **SLUDGE DISPOSAL PLAN:** Provide a brief description of the sludge disposal plan (e.g., type sludge, treatment provided and disposal method). Indicate if any of the plan elements are included within the permit.

Treated residual solids (biosolids) are is thickened by gravity belt thickener, stabilized by anaerobic digestion, and stored at the facility. The treated biosolids are then land applied to local farm land for the nutrient value by the Town of Christiansburg in accordance with the biosolids regulations and conditions of this permit. As a backup, the facility also the ability to landfill sludge in the New River Resource Authority (NRRA) Landfill.

22. **MATERIAL STORED:** List the type and quantity of wastes, fluids, or pollutants being stored at this facility. Briefly describe the storage facilities and list, if any, measures taken to prevent the stored material from reaching State waters.

Chemicals stored at the STP include diesel fuel (capacity 5,000 gallons), unleaded gasoline (capacity 300 gallons), polymers, HTH, caustic, lime, and small quantities of cleaning chemicals and paint. Waste oil is not stored at the facility but is collected in 5 gallon drums and taken to be recycled off site.

23. **RECEIVING WATERS INFORMATION:** Refer to the State Water Control Board's Water Quality Standards [e.g., River Basin Section Tables (9 VAC 25-260 - Part IX) [along with Parts VII and VIII]. Use 9 VAC 25-260-140 C (introduction and numbered paragraph) to address tidal waters where fresh water standards would be applied or transitional waters where the most stringent of fresh or salt water standards would be applied. Attach any memoranda or other information which helped to develop permit conditions (i.e. **flow determination memo**, **tier determinations**, PReP complaints, special water quality studies, **STORET data** and other biological and/or chemical data, etc.

SEE ATTACHMENT 9

24. **303(d) LISTED SEGMENTS:** Indicate if the facility **discharges directly** to a segment that is listed on the current 303(d) list, if the allocations are specified by an approved TMDL and, if so, provide all appropriate information/calculations. If the facility discharges directly to a stream segment that is on the current 303(d) list, the fact sheet must include a description of how the TMDL requirements are being met.

This facility discharges directly to the New River. This stream segment receiving the effluent is listed as Category 5A on the current approved 303(d) list for non-attainment of PCBs. While development is underway, a TMDL has not completed preparation or been approved for this stream segment. If appropriate, the TMDL prepared for this segment will have a waste load allocation for this discharge for the above listed parameter. No limitation has been included in the permit at this time. The permit contains a reopener clause which may allow limits to be added or modified, in compliance with section 303(d)(4) of the Act, once a TMDL is approved, if necessary.

SEE ATTACHMENT 10

25. **CHANGES TO PERMIT:** Use **TABLE A** to record any **changes from the previous permit** and the rationale for those changes. Use **TABLE B** to record any **changes made to the permit during the permit processing period** and the rationale for those changes [i.e., use for comments from the applicant, VDH, EPA, other agencies and/or the public where comments resulted in changes to the permit limitations or any other changes associated with the special conditions or reporting requirements].

SEE ATTACHMENT 11

26. **NPDES INDUSTRIAL PERMIT RATING WORKSHEET:**

N/A - This is a municipal facility.

27. **EPA/VIRGINIA DRAFT PERMIT SUBMISSION CHECKLIST:**

SEE ATTACHMENT 12

28. **DEQ PLANNING COMMENTS RECEIVED ON DRAFT PERMIT:** Document any comments received from DEQ planning.

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

29. **PUBLIC PARTICIPATION:** Document comments/responses received during the public participation process. If comments/responses provided, especially if they result in changes to the permit, place in the attachment.

VDH COMMENTS RECEIVED ON DRAFT PERMIT: Document any comments received from the Virginia Dept. of Health and noted how resolved.

Based on their review of the application, the VDH noted that the raw water intake for the NRV Regional Water Authority, PWSID No. 1121057, is located approximately 2 miles downstream. The VDH had no objections in the response letter dated May 11, 2015.

EPA COMMENTS RECEIVED ON DRAFT PERMIT: Document any comments received from the U.S. Environmental Protection Agency and noted how resolved.

By email dated September 15, 2015, EPA has no objections to the adequacy of the draft permit.

ADJACENT STATE COMMENTS RECEIVED ON DRAFT PERMIT: Document any comments received from an adjacent state and noted how resolved.

No comments or objections were received as to the adequacy of the draft permit.

OTHER AGENCY COMMENTS RECEIVED ON DRAFT PERMIT: Document any comments received from any other agencies (e.g., VIMS, VMRC, DGIF, etc.) and noted how resolved.

The draft permit was sent to DCR and DGIF for T&E review July 27, 2015 and no initial review objections were received from DCR. The DCR report and DGIF geographical report indicates the presence of T&E species in the receiving stream of this existing discharge.

By email dated 8/17/15 the DGIF indicated support of UV disinfection and noted that compliance with the permit limitations and monitoring requirements should result in no impact to T&E species.

DCR provided comments on the draft permit via email 8/24/15. They noted the presence of the Hellbender and Green Floater in the receiving stream. DCR recommended the use of UV verses Chlorination which the plant already utilizes. They also suggested that due to the presence of freshwater mussels, that "the EPA ammonia limits" be adopted. At this time, the DEQ has not adopted a new ammonia standard, however, the discharge was assessed for the need for an ammonia limitation based on the current water quality standard. This assessment indicated that no limitation is needed for ammonia at this time.

OTHER COMMENTS RECEIVED FROM RIPARIAN OWNERS/CITIZENS ON DRAFT PERMIT: Document any comments received from other sources and note how resolved.

The application and draft permit have received public notice in accordance with the VPDES Permit Regulation, and no comments were received.

PUBLIC NOTICE INFORMATION: Comment Period: **Start Date: August 23, 2015**
End Date: September 22, 2015

Persons may comment in writing or by e-mail to the DEQ on the proposed reissuance of the permit within 30 days from the date of the first notice. Address all comments to the contact person listed below. Written or e-mail comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The Director of the DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requestor's interests would be directly and adversely affected by the proposed permit action.

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Kirk A. Batsel at: Department of Environmental Quality (DEQ), Blue Ridge Regional Office, 7705 Timberlake Road, Lynchburg, VA 24502. Telephone: 434-582-6204 E-mail: kirk.batsel@deq.virginia.gov

Following the comment period, the Board will make a determination regarding the proposed reissuance. This determination will become effective, unless the Director grants a public hearing. Due notice of any public hearing will be given.

30. **ADDITIONAL FACT SHEET COMMENTS/PERTINENT INFORMATION:**

The permittee is current with their annual permit maintenance fees.

31. **SUMMARY OF SPECIFIC ATTACHMENTS LABELED AS:**

Attachment 1 Site Inspection Report/Memorandum
Attachment 2 Discharge Location/Topographic Map
Attachment 3 Schematic/Plans & Specs/Site Map/Water Balance
Attachment 4 Discharge/Outfall Description
Attachment 5 Limitations/Monitoring
Attachment 6 Special Conditions
Attachment 7 Effluent/Sludge/Ground Water Limitations/Monitoring Rationale/Suitable Data/ Stream Modeling/Antidegradation/Antibacksliding
Attachment 8 Special Conditions Rationale
Attachment ___ Material Stored
Attachment 9 Receiving Waters Info./Tier Determination/STORET Data
Attachment 10 303(d) Listed Segments
Attachment 11 TABLE A and TABLE B - Change Sheets
Attachment ___ NPDES Industrial Permit Rating Worksheet
Attachment 12 EPA/Virginia Draft Permit Submission Checklist

ATTACHMENT 1

SITE INSPECTION REPORT/MEMORANDUM

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Blue Ridge Regional Office

www.deq.virginia.gov

Doug Domenech
Secretary of Natural Resources

David K. Paylor
Director

Robert J. Weld
Regional Director

Lynchburg Office
7705 Timberlake Road
Lynchburg, Virginia 24502
(434) 582-5120
Fax (434) 582-5125

Roanoke Office
3019 Peters Creek Road
Roanoke, Virginia 24019
(540) 562-6700
Fax (540) 562-6725

AUG 2 7 2014

Mr. Ryan L. Hendrix
Superintendent
Town of Christiansburg
Wastewater Treatment Facility
2557 Crab Creek Road
Christiansburg, VA 24073

Re: Recon Inspection Report
Town of Christiansburg Wastewater Treatment Plant
VPDES Permit No. VA0061751

Dear ~~Mr. Hendrix~~ Ryan:

Enclosed is a copy of the Recon Inspection Report for the above referenced facility. I conducted the inspection on July 31, 2014.

Please note there are no requests for action related to the operation of the wastewater treatment system.

This letter is not intended as a case decision under the Virginia Administration Process Act, VA Code §2.-4000 *et seq* (APA). If you have any questions regarding my inspection, please contact me at the DEQ Blue Ridge Regional Office, Roanoke (540-562-6829).

Sincerely,

Gerald A. Duff
Compliance Inspector Senior

Copies: S. C. Hale, File – DEQ/BRRO, Roanoke

VA DEQ Recon Inspection Report

Virginia Department of Environmental Quality

Blue Ridge Regional Office, Roanoke

RECON INSPECTION REPORT

FACILITY NAME: Town of Christiansburg Wastewater Treatment Plant		**INSPECTION DATE:**	07/31/2014
		INSPECTOR	Gerald A. Duff
PERMIT No.: VA0061751		**REPORT DATE:**	08/11/2014
TYPE OF FACILITY: ☑ Municipal ☑ Major; ☐ Industrial ☐ Minor; ☐ Federal ☐ Small Minor; ☐ HP ☐ LP		**TIME OF INSPECTION:**	14:15 Arrival / 15:45 Departure
		TOTAL TIME SPENT	8 hours w/report
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☑ Yes ☐ No
REVIEWED BY / Date: [illegible] 8/12/14			
PRESENT DURING INSPECTION: Ryan Hendrix and John Shelor (Christiansburg), Chad Williams (DEQ)			

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

On July 31, 2014, the writer visited the above referenced facility to perform an unscheduled inspection and to allow for our new DEQ compliance inspector to tour and observe the operations of this particular wastewater treatment process.

Sewage Pumping	**No problems were noted.**
Flow Equalization	**No problems were noted.**
Mechanical Screening	**No problems were noted.**
Aerated Grit	**No problems were noted.**
Primary Sedimentation	**No problems were noted.**
Activated Sludge Aeration	**No problems were noted. A portion of anoxic RAS is returned to the head of this unit and mixed with primary effluent to improve nitrogen removal.**
Secondary Sedimentation	**No problems were noted.**
UV Disinfection	**No problems were noted.**
Post Aeration	**No problems were noted.**
Anaerobic Digestion	**No problems were noted. Excess gas production was being flared off.**
Gravity Belt Thickening	**No problems were noted. Unit was in standby mode.**

EFFLUENT FIELD DATA:

Flow	MGD	**Dissolved Oxygen**	mg/L	**TRC (Contact Tank)**	mg/L
pH	S.U.	**Temperature**	°C	**TRC (Final Effluent)**	mg/L
Was a Sampling Inspection conducted?		☐ Yes (see Sampling Inspection Report)		☑ No	
The final effluent appeared clear after UV disinfection.					

VA DEQ Recon Inspection Report

Permit #	VA0061751

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☐ Shore Based ☑ Submerged Diffuser? ☑ Yes ☐ No

2. Are the outfall and supporting structures in good condition? ☐ Yes ☐ No

3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen

4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☐ No

5. Receiving stream: ☑ No observed problems ☐ Indication of problems (explain below)

Comments: **The final effluent at Outfall 001 was not observed due to its remote location in the New River.**

REQUESTED CORRECTIVE ACTIONS:

There are no requests for corrective actions regarding this inspection.

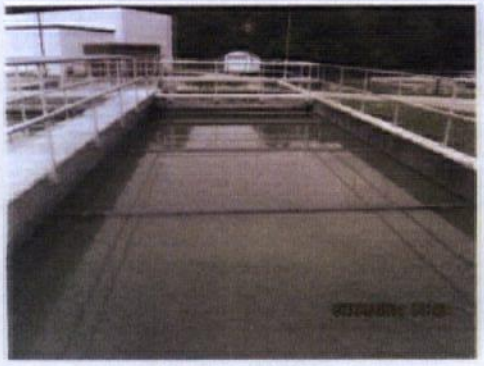
NOTES and COMMENTS:

Facility Inspection Photos

Screw Lift Pumps

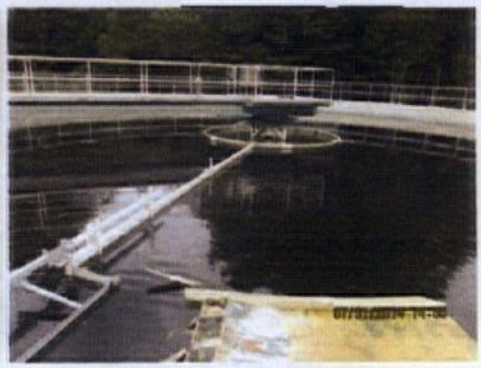
Equalization Basin

Aerated Grit

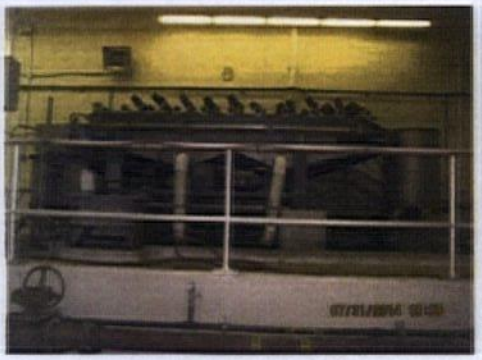


Primary Clarification

Activated Sludae Aeration



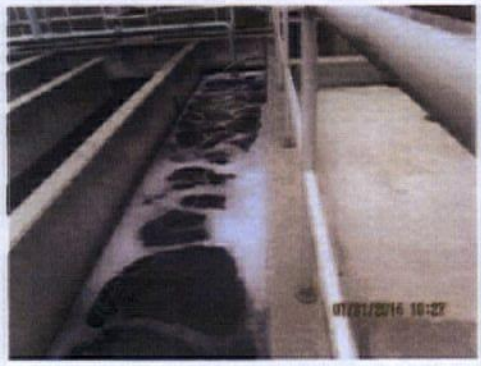
Secondary Clarification



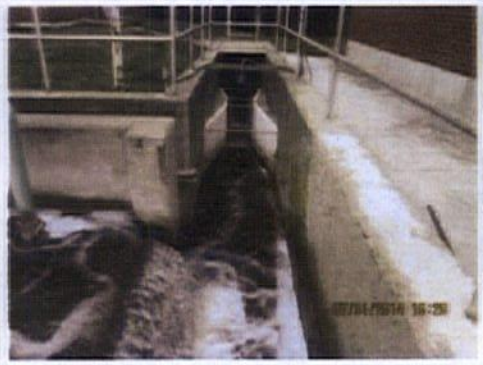
Gravity Belt Thickener

Excess Gas Production Flare

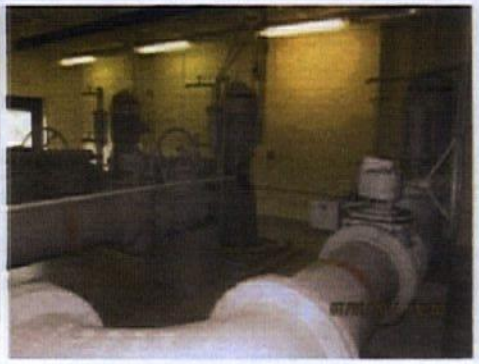
UV Disinfection



Post Aeration



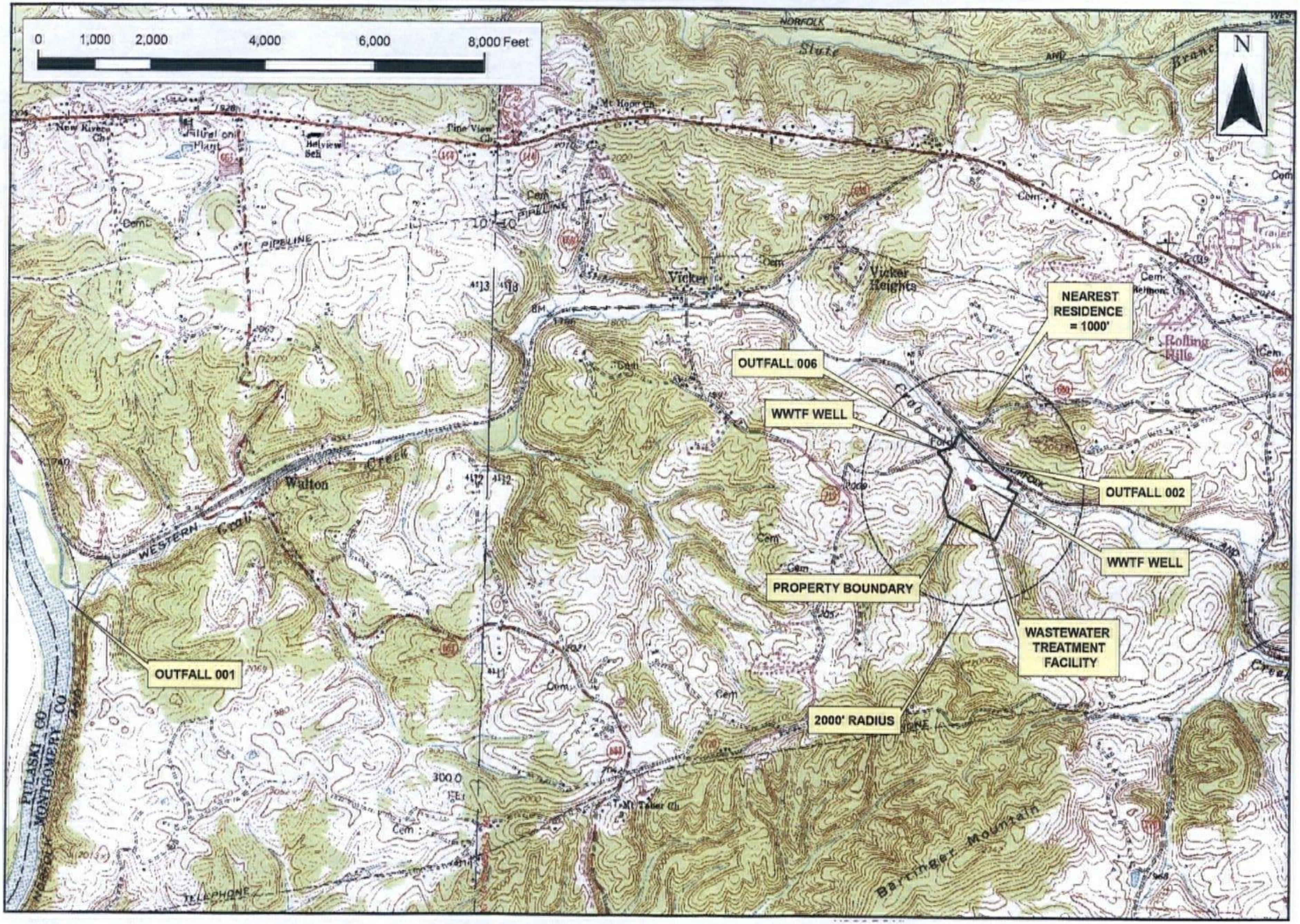
Flow Measurement



Effluent Pump Station

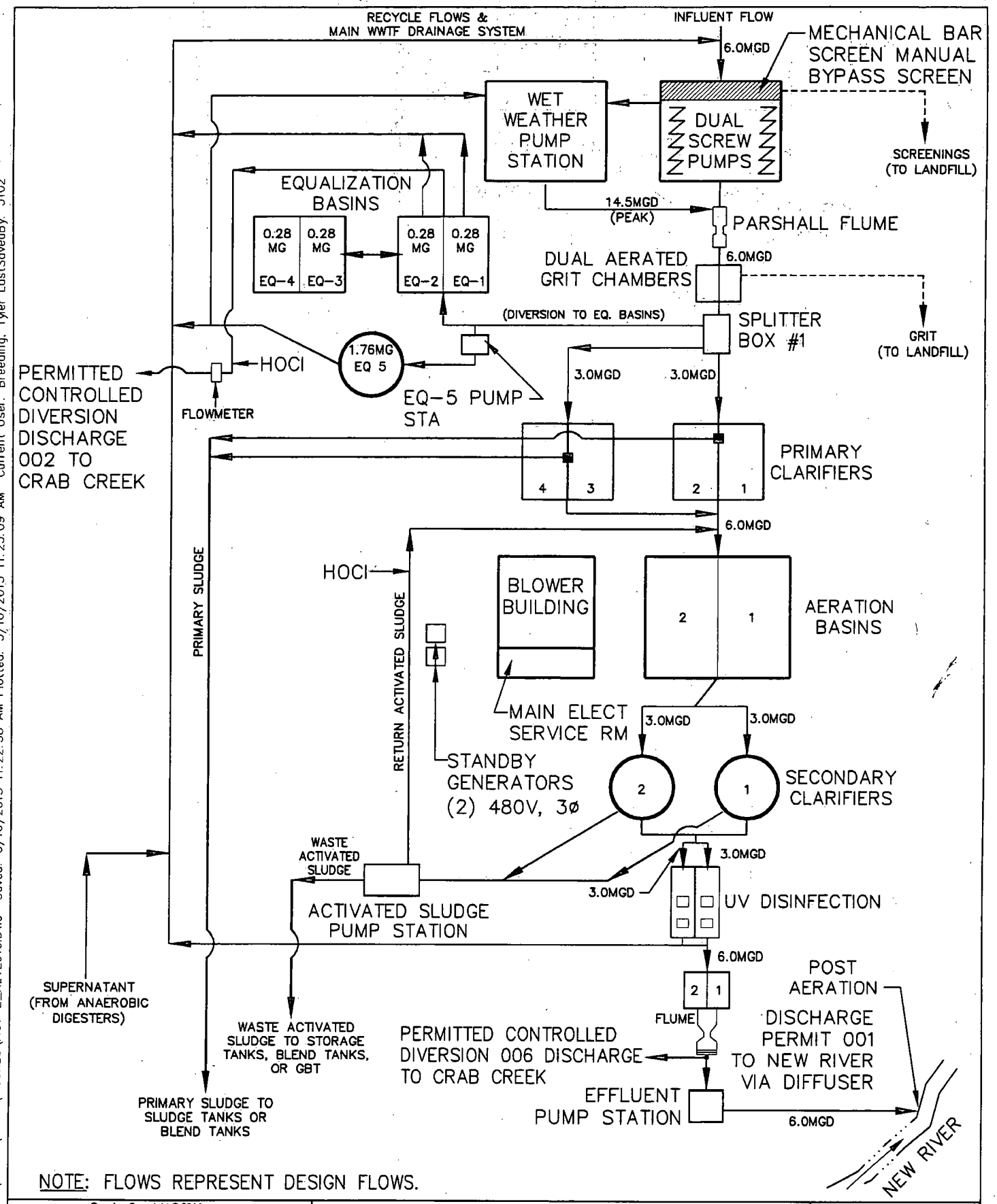
ATTACHMENT 2

DISCHARGE LOCATION/TOPOGRAPHIC MAP


0
1,000
2,000
4,000
6,000
8,000 Feet
N
NEAREST RESIDENCE = 1000'
OUTFALL 006
WWTF WELL
OUTFALL 002
WWTF WELL
PROPERTY BOUNDARY
WASTEWATER TREATMENT FACILITY
OUTFALL 001
2000' RADIUS
Vicker
Vicker Heights
Walton
Rolling Hills
Barringer Mountain
PULASKI CO.
MONTGOMERY CO.

ATTACHMENT 3

SCHEMATIC/PLANS & SPECS/SITE MAP/ WATER BALANCE



NOTE: FLOWS REPRESENT DESIGN FLOWS.

CHA
1901 Innovation Drive, Suite 2100
Blacksburg, VA 24060
Main: (540) 552-5548 · www.chacompanies.com

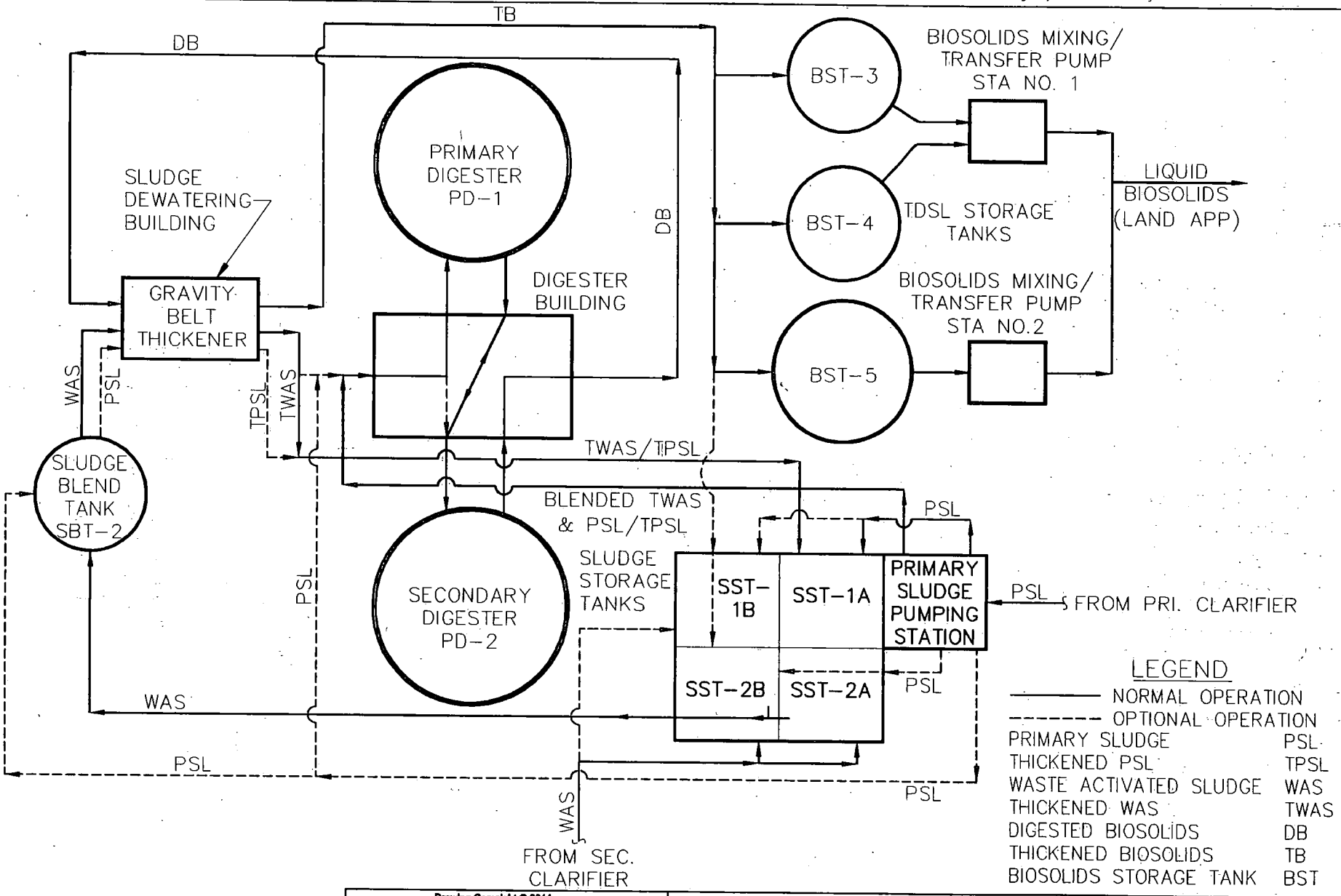
TOWN OF CHRISTIANSBURG WASTEWATER TREATMENT FACILITY

GENERAL FLOW SCHEMATIC/LIQUID TREATMENT

PROJECT NO. 21490

DATE: FEB 2015

FIGURE 2



CHA
1901 Innovation Drive, Suite 2100
Blacksburg, VA 24060
Main: (540) 552-5548 · www.chacompanies.com

TOWN OF CHRITIANSBURG
WASTEWATER TREATMENT FACILITY

PROCESS FLOW DIAGRAM (SOLIDS)

PROJECT NO. 21490

DATE: FEB 2015

FIGURE 3

ATTACHMENT 4

DISCHARGE/OUTFALL DESCRIPTION

TABLE I

NUMBER AND DESCRIPTION OF OUTFALLS

OUTFALL NO.	DISCHARGE LOCATION	DISCHARGE SOURCE (1)	TREATMENT (2)	FLOW (3)
001	36°-41'54" 78°-07'-54"	Treated Municipal Waste Water	Wastewater Treatment unit processes include flow equalization (five equalization basins), pretreatment (mechanical screening and two aerated grit chambers) then primary treatment consisting of four rectangular primary clarifiers with wastewater flow split evenly, the wastewater is then recombined and is introduced equally to two secondary treatment aeration basins (activated sludge basins), followed by two secondary clarifiers. The treated supernatant (treated wastewater) then flows to one of two UV disinfection channels, while the settled sludge is either wasted to sludge handling or is recycled to the aeration basins. Treated wastewater flows from the UV treatment channels to one of two former chlorine contact tanks retrofitted with air diffusers that serve as post aeration tanks. The treated effluent then flows to the New River via a 24-inch force main equipped with a submerged multiport diffuser within the New River.	6.0 MGD w/ expansion to 8.0 MGD

(1) List operations contributing to flow
(2) Give brief description, unit by unit
(3) Give maximum 30-day average flow for industry and design flow for municipal

PROCESS FLOW DESCRIPTION

The following process description for the Christiansburg Wastewater Treatment Facility is graphically illustrated by Figure 2, Schematic of Wastewater Flow/Liquid Treatment and Figure 3, Solids Process Flow Diagram.

The major operations of the treatment plant are as follows:

1. Pretreatment

Pretreatment facilities consisting of one mechanical bar screen, a manual bypass screen, and two aerated grit chambers operate at the head of the treatment plant. As further described in Item 10, five equalization basins provide surge suppression and flow equalization, maintaining design flow for optimum treatment.

2. Primary Treatment

After passing through the aerated grit chambers, the flow is split between four primary rectangular clarifiers. The purpose of the clarifiers is to remove floating and settleable solids from the process flow. The flow enters each clarifier at one end and a weir at the opposite end maintains even flow distribution and prevents short circuiting of the flow. After passing over the weir the wastewater is collected in effluent troughs, and recombined in a single pipe to the aeration basins. The settled sludge will be managed in the sludge handling operation discussed later.

3. Secondary Treatment

The wastewater from the primary clarifiers is introduced equally into each of the two aeration basins. In the aeration basins the wastewater is mixed with biological floc (activated sludge) being maintained in the aeration basins and the mixture undergoes diffused aeration. The microorganisms present in the biological floc accomplish the treatment (biochemical) of the wastewater. The aeration basin effluent flows to two secondary clarifiers where the activated sludge biomass is separated from the mixture by gravity and settling. The clear liquid supernatant is then discharged to the UV channel system.

The activated sludge from the secondary clarifier is either wasted to the sludge handling operations or recycled to the aeration basins. Recycling the activated sludge ensures that the microorganisms' viability by reintroducing the microorganisms present in the activated sludge to the nutrients found in the untreated wastewater. Three variations of this process can be used; the conventional, the complete mix, and the step aeration process modifications.

4. Disinfection

The effluent from the secondary clarifiers flows to the to the two UV channels in the UV Building. Flow into the UV channel can be controlled by influent gate while the effluent weir at the end of the UV tank controls the water level in the UV channel. UV radiation inactivates bacteria and viruses remaining in the wastewater after the activated sludge treatment and secondary clarification. Exposure of these organisms to UV light, at

wavelengths between 250 and 265 nanometers (nm), results in a photochemical change in the organism's DNA which either kills the organism or makes it unable to reproduce. Flow from the UV channel discharges to former chlorine contact tanks, which are retrofitted with air diffusers to serve as a post aeration facility for the WTF.

5. Post Aeration

Disinfected effluent from the UV building flows to two post aeration units located in the old chlorine contact basins. Each post-aeration unit consists of a fine bubble diffuser system. The treated wastewater is aerated in order to ensure a dissolved oxygen level above the effluent limitations of 6.0 mg/L.

6. Outfall Line

The treated, disinfected, and aerated effluent is discharged into an outfall line (Outfall 001). The outfall line transports the effluent to the outfall pump station, which pumps final effluent to the New River.

7. Sludge Handling

Primary sludge, digested sludge and waste activated sludge are usually pumped to a sludge blend tank where they are mixed and held prior to thickening. The mixed sludge is then thickened using a gravity belt thickener. Flow that is not removed as thickened sludge is recycled to the head of the plant.

Alternatively, if sludge thickening is not required, the sludge can be pumped directly to the primary digester for treatment (stabilization). Polymer may be added to the sludge (if needed), while being fed to the sludge belt thickener.

8. Sludge Digestion

The thickened sludge is pumped to the primary digester. The primary digester consists of an enclosed tank, with a floating, airtight cover. In this unit the sludge is stabilized by anaerobic mesophilic bacteria. In order to provide optimum conditions for this process, a heater/heat exchanger is used to maintain a constant temperature. Sludge in the primary digester is mixed by recirculation of the gas produced by bacteria. The airtight cover collects the gas, which consists primarily of methane and carbon dioxide. The heating value of this gas is significant, and it is used as a fuel for a turbine generator and/or for the heater/heat exchanger. Any excess gas is flared as waste to the waste gas burner. In the future, the digester gas may be used for combined power generation and digester heat generation using a microturbine.

Once stabilized in the primary digester, the biosolids (sludge) are pumped to the secondary digester. This unit is also enclosed in order to store the gas produced and to maintain anaerobic conditions in the digester. The biosolids in the secondary digester are typically not mixed. Recent upgrades to the Anaerobic Digesters provide mixing and the ability to use both the primary and secondary digesters. The biosolids settles out in fairly discrete layers. Supernatant is decanted off the top layer and recycled back to the head of the plant. Biosolids removed from the secondary digester are thickened via a gravity belt

thickener and then may be stored in the biosolids holding tanks, or pumped directly to the tanker trucks for land application as a liquid biosolids.

9. Flow Equalization

Flow equalization is provided to accommodate normal variations in influent wastewater flow which typically occurs several times a day. The existing five equalization basins of 0.28 MG (four) and 1.76 MG (one) are used to collect and store wastewater during periods of high flow, returning the stored wastewater to the head of the plant when the influent flow decreases. The equalization basins are designed to handle flows exceeding the average treatment plant design flow and then subsequently release store wastewater during low flow periods to maintain average design flow.

The equalization basins are also intended to hold excessive flows which occur during heavy rain events. Typically, high flows are diverted to the equalization basins after passing through the grit chambers. If the flows are high enough, the equalization basins may overflow. The only possible measure to control excessive flows is to ensure that the equalization basins are empty when rain is anticipated.

Four of the existing 0.28 MG equalization basins are equipped with floating aerators. The water level in these basins is controlled by a separate bubbler type liquid level controller. Operation of the other two 0.28 MG equalization basins is controlled by a motorized effluent valve that is controlled by the influent magnetic flow meter. The fifth equalization basin (1.76 MG) is equipped with a jet mixing system.

Using all five operational equalization basins, the plant has an equalization capacity of 2.72 million gallons. Equalization basin overflows (if any) will be diverted to Outfall 002, which flows to Crab Creek.

ATTACHMENT 5

LIMITATIONS/MONITORING

MUNICIPAL EFFLUENT LIMITATIONS/MONITORING

OUTFALL # 001 DESIGN FLOW: 6.0 MGD
Outfall Description:
SIC CODE: 4952 NAICS CODE:

(X) Final Limits ( ) Interim Limits Effective Dates - From: Permit Effective date To: Permit expiration date or issuance of CTO for 8.0 MGD Plant

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS	
	MONTHLY AVERAGE		WEEKLY AVERAGE		MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
	mg/l*	kg/day*	mg/l*	kg/d*	mg/l*	mg/l*		
Flow (MGD) [a]	NL		NA		NA	NL	Continuous	TIRE
pH (standard units)	NA		NA		6.0	9.0	1/Day	Grab
BOD5 [d]	30	681	45	1022	NA	NA	1/Week	24-HC
Total Suspended Solids [d]	30	681	45	1022	NA	NA	1/Week	24-HC
Dissolved Oxygen	NA		NA		6.0	NA	1/Day	Grab
E. coli (N/CML - geometric mean) [c]	126		NA		NA	NA	1/Day	Grab

* = UNLESS OTHERWISE NOTED NA = NOT APPLICABLE NL = NO LIMIT, MONITORING REQUIREMENT ONLY

TIRE = TOTALIZING, INDICATING AND RECORDING EQUIPMENT

[a] See Part I.B.6. for additional flow requirements.

[b] See Parts I.B.7.a. and I.B.7.b. for quantification levels and reporting requirements, respectively.

[c] Samples shall be taken between the hours of 10:00 a.m. and 4:00 p.m.

[d] See Part I.B.9. for additional instructions regarding effluent monitoring frequencies.

The design flow of this treatment facility is 6.0 MGD.
The 30-day average percent removal for BOD5 and TSS shall not be less than 85 percent for this effluent.
There shall be no discharge of floating solids or visible foam in other than trace amounts.

BASES FOR LIMITATIONS/MONITORING:

PARAMETER	MULTIPLIER OR PRODUCTION	TECHNOLOGY	WATER QUALITY	BEST PROFESSIONAL JUDGMENT
Flow	Design flow (6.0 MGD)			X
pH	NA			X
BOD5 (mg/l)	Water quality model (monthly avg.) 1.5 x monthly avg. (max. weekly avg.)		X	
BOD5 (kg/day)	Design flow (6.0 MGD)		X	
TSS (mg/l)	30/45	X		
TSS (kg/day)	Design flow (6.0 MGD)	X		
Dissolved oxygen	NA		X	
E. coli	NA		X	

MUNICIPAL EFFLUENT LIMITATIONS/MONITORING

OUTFALL # 001 DESIGN FLOW: 8.0 MGD

Outfall Description:

SIC CODE: 4952 NAICS CODE:

( ) Final Limits ( ) Interim Limits Effective Dates - From: Issuance of CTO for 8 MGD plant To: Permit expiration date

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS	
	MONTHLY AVERAGE		WEEKLY AVERAGE		MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
	mg/l*	kg/day*	mg/l*	kg/d*	mg/l*	mg/l*		
Flow (MGD) [a]	NL		NA		NA	NL	Continious	TIRE
pH (standard units)	NA		NA		6.0	9.0	1/Day	Grab
BOD5 [d]	30	908	45	1363	NA	NA	1/Day	24-HC
Total Suspended Solids [d]	30	908	45	1363	NA	NA	1/Day	24-HC
Dissolved Oxygen	NA		NA		6.0	NA	1/Day	Grab
E. coli (N/CML - geometric mean) [c]	126		NA		NA	NA	1/Day	Grab

* = UNLESS OTHERWISE NOTED NA = NOT APPLICABLE NL = NO LIMIT, MONITORING REQUIREMENT ONLY

TIRE = TOTALIZING, INDICATING AND RECORDING EQUIPMENT

[a] See Part I.B.6. for additional flow requirements.

[b] See Parts I.B.7.a. and I.B.7.b. for quantification levels and reporting requirements, respectively.

[c] Samples shall be taken between the hours of 10:00 a.m. and 4:00 p.m.

[d] See Part I.B.9. for additional instructions regarding effluent monitoring frequencies.

The design flow of this treatment facility is 8.0 MGD.
The 30-day average percent removal for BOD5 and TSS shall not be less than 85 percent for this effluent.
There shall be no discharge of floating solids or visible foam in other than trace amounts.

BASES FOR LIMITATIONS/MONITORING:

PARAMETER	MULTIPLIER OR PRODUCTION	TECHNOLOGY	WATER QUALITY	BEST PROFESSIONAL JUDGMENT
Flow	Design flow (8.0 MGD)			X
pH	NA			X
BOD5 (mg/l)	Water quality model (monthly avg.) 1.5 x monthly avg. (max. weekly avg.)		X	
BOD5 (kg/day)	Design flow (8.0 MGD)		X	
TSS (mg/l)	30/45	X		
TSS (kg/day)	Design flow (8.0 MGD)	X		
Dissolved oxygen	NA		X	
E. coli	NA		X	

ATTACHMENT 6

SPECIAL CONDITIONS

VPDES PERMIT PROGRAM
LIST OF SPECIAL CONDITIONS

B. OTHER REQUIREMENTS OR SPECIAL CONDITIONS

1. Total Maximum Daily Load (TMDL) Reopener

This permit shall be modified or, alternatively, revoked and reissued if any approved waste load allocation procedure, pursuant to section 303(d) of the Clean Water Act, imposes waste load allocations, limits or conditions on the facility that are not consistent with the requirements of this permit.

2. Licensed Wastewater Operator Requirement

The permittee shall employ or contract at least one Class I licensed wastewater works operator for the facility. The license shall be issued in accordance with Title 54.1 of the Code of Virginia and the regulations of the Board for Waterworks and Wastewater Works Operators. The permittee shall notify the DEQ Regional Office, in writing, whenever he is not complying, or has grounds for anticipating he will not comply with this requirement. The notification shall include a statement of reasons and a prompt schedule for achieving compliance.

3. Reliability Class Requirement

The permitted treatment works shall meet Reliability Class I.

4. Certificate to Construct (CTC) and Certificate to Operate (CTO) Requirements

The permittee shall, in accordance with the Sewage Collection and Treatment Regulations, obtain a CTC and a CTO from the DEQ prior to constructing wastewater treatment facilities and operating the facilities, respectively.

5. Operations and Maintenance (O & M) Manual

The permittee shall maintain a current Operations and Maintenance (O&M) Manual for the treatment works that is in accordance with Virginia Pollutant Discharge Elimination System Regulations, 9VAC25-31 and Sewage Collection and Treatment Regulations, 9VAC25-790.

The O&M Manual and subsequent revisions shall include the manual effective date and meet Part II.K.2 and Part II.K.4 Signatory Requirements of the permit. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M manual available to Department personnel for review during facility inspections. Within 30 days of a request by DEQ, the current O&M Manual shall be submitted to the DEQ Regional Office for review and approval.

The O&M manual shall detail the practices and procedures which will be followed to ensure compliance with the requirements of this permit. This manual shall include, but not necessarily be limited to, the following items, as appropriate:

a. Permitted outfall locations and techniques to be employed in the collection, preservation, and analysis of effluent, storm water and sludge samples;
b. Procedures for measuring and recording the duration and volume of treated wastewater discharged;
c. Discussion of Best Management Practices, if applicable;

d. Procedures for handling, storing, and disposing of all wastes, fluids, and pollutants characterized In Part I.B.8. that will prevent these materials from reaching state waters. List type and quantity of wastes, fluids, and pollutants (e.g. chemicals) stored at this facility;
e. Discussion of treatment works design, treatment works operation, routine preventative maintenance of units within the treatment works, critical spare parts inventory and record keeping;
f. Plan for the management and/or disposal of waste solids and residues;
g. Hours of operation and staffing requirements for the plant to ensure effective operation of the treatment works and maintain permit compliance;
h. List of facility, local and state emergency contacts; and,
i. Procedures for reporting and responding to any spills/overflows/treatment works upsets.

6. 95% Design Capacity Notification

A written notice and a **plan of action** for ensuring continued compliance with the terms of this permit shall be submitted to the DEQ Regional Office when the monthly average flow influent to the sewage treatment plant reaches 95 percent of the design capacity authorized in this permit for each month of any three consecutive month period. The written notice shall be submitted within 30 days and the plan of action shall be received at the DEQ Regional Office **no later than 90 days from the third consecutive month for which the flow reached 95 percent of the design capacity.** The plan shall include the necessary steps and a prompt schedule of implementation for controlling any current or reasonably anticipated problem resulting from high influent flows. Failure to submit an adequate plan in a timely manner shall be deemed a violation of this permit.

7. Compliance Reporting Under Part I.A.

a. The quantification levels (QL) shall be less than or equal to the following concentrations:

Effluent Characteristic	Quantification Level
BOD_5	2.0 mg/l
TSS	1.0 mg/l

The QL is defined as the lowest concentration used to calibrate a measurement system in accordance with the procedures published for the method. It is the responsibility of the permittee to ensure that proper quality assurance/quality control (QA/QC) protocols are followed during the sampling and analytical procedures. QA/QC information shall be documented to confirm that appropriate analytical procedures have been used and the required QLs have been attained. The permittee shall use any method in accordance with Part II A of this permit. .

b. **Monthly Average** -- Compliance with the monthly average limitations and/or reporting requirements for the parameters listed in subsection a. of this permit condition shall be determined as follows: All concentration data below the QL used for the analysis (QL must be less than or equal to the QL listed in a. above) shall be treated as zero. All concentration data equal to or above the QL used for the analysis (QL must be less than or equal to the QL listed in a. above) shall be treated as it is reported. An arithmetic average shall be calculated using all reported data for the month, including the defined zeros. This arithmetic average shall be reported on the Discharge Monitoring Report (DMR) as calculated. If all data are below the QL used for the analysis (QL must be less than or equal to the QL listed in a. above), then the average shall be reported as "<QL". If reporting for quantity is required on the DMR and the reported monthly average concentration is <QL, then report "<QL" for the quantity. Otherwise use the reported concentration data (including the defined zeros) and flow data for each sample day to determine the daily quantity and report the monthly average of the calculated daily quantities.

c. **Weekly Average** -- Compliance with the weekly average limitations and/or reporting requirements for the parameters listed in subsection a. of this permit condition shall be determined as follows: All concentration data below the QL used for the analysis (QL must be less than or equal to the QL listed in a. above) shall be treated as zero. All concentration data equal to or above the QL used for the analysis (QL must be less than or equal to the QL listed in a. above) shall be treated as reported. An arithmetic average shall be calculated using all reported data, including the defined zeros, collected within each complete calendar week and entirely contained within the reporting month. The maximum value of the weekly averages thus determined shall be reported on the DMR. If all data are below the QL used for the analysis (QL must be less than or equal to the QL listed in a. above), then the weekly average shall be reported as "<QL". If reporting for quantity is required on the DMR and the reported weekly average concentration is <QL, then report "<QL" for the quantity. Otherwise use the reported concentration data (including the defined zeros) and flow data for each sample day to determine the daily quantity and report the maximum weekly average of the calculated daily quantities.

d. **Single Datum** - Any single datum required shall be reported as "<QL" if it is less than the QL used for the analysis (QL must be less than or equal to the QL listed in a. above). Otherwise the numerical value shall be reported.

e. **Significant Digits** -- The permittee shall report at least the same number of significant digits as the permit limit for a given parameter. Regardless of the rounding convention used by the permittee (i.e., 5 always rounding up or to the nearest even number), the permittee shall use the convention consistently, and shall ensure that consulting laboratories employed by the permittee use the same convention.

8. Materials Handling and Storage

Any and all product, materials, industrial wastes, and/or other wastes resulting from the purchase, sale, mining, extraction, transport, preparation and/or storage of raw or intermediate materials, final product, by-product or wastes, shall be handled, disposed of and/or stored in such a manner so as not to permit a discharge of such product, materials, industrial wastes and/or other wastes to State waters, except as expressly authorized.

9. Effluent Monitoring Frequencies

If the facility permitted herein is issued a Notice of Violation for any of the parameters listed below, then the following effluent monitoring frequencies shall become effective upon written notice from DEQ and remain in effect until permit expiration date.

Effluent Parameter	Frequency
BOD5	1/Day
TSS	1/Day

No other effluent limitations or monitoring requirements are affected by this special condition.

10. Indirect Dischargers

The permittee shall provide adequate notice to the DEQ Regional Office of the following:

a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Section 301 or 306 of Clean Water Act and the State Water Control Law if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of this permit.

Adequate notice shall include information on (i) the quality and quantity of effluent introduced into the treatment works, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the treatment works.

11. Facility Closure Plan

If the permittee does not intend to apply for reissuance of this permit or if any part of the facility presently permitted will not be included in a future permit application, an **approvable closure plan** shall be submitted to the DEQ regional office **90 days before the facility is taken out of service**. The closure plan shall include a plan of action and a schedule.

12. Permit Application Requirement

In accordance with Part II. M. of this permit, a new and complete permit application shall be submitted for the reissuance of this permit.

Application Due: No later than March 04, 2020.

C. PRETREATMENT

1. The permittee's pretreatment program has been approved. The program is an enforceable part of this permit. The permittee shall:

   a. Implement a pretreatment program that complies with the Clean Water Act, Water Control Law, State regulations and the approved program.

   b. Submit to the DEQ Regional Office an annual report that describes the permittee's program activities over the previous year.

      Annual Report Due: No later than January 31 of each year.

      The annual report shall include:

      (1) An updated list of the Significant Industrial Users* showing the categorical standards and local limits applicable to each.
      (2) A summary of the compliance status of each Significant Industrial User with pretreatment standards and permit requirements.
      (3) A summary of the number and types of Significant Industrial User sampling and inspections performed by the POTW.
      (4) All information concerning any interference, upset, VPDES permit or Water Quality Standards violations directly attributable to Significant Industrial Users and enforcement actions taken to alleviate said events.
      (5) A description of all enforcement actions taken against Significant Industrial Users over the previous 12 months.
      (6) A summary of any changes to the submitted pretreatment program that have not been previously reported to the DEQ Regional Office.
      (7) A summary of the permits issued to Significant Industrial Users since the last annual report.
      (8) POTW and self-monitoring results for Significant Industrial Users determined to be in significant non-compliance during the reporting period.
      (9) Results of the POTW's influent/effluent/sludge sampling, not previously submitted to DEQ.
      (10) Copies of newspaper publications of all Significant Industrial Users in significant non-compliance during the reporting period. This is due no later than March 31 of each year.
      (11) Signature of an authorized representative.

   c. Submit any changes to the approved pretreatment program to the DEQ Regional Office and obtain approval before implementation of the changes.

   d. Ensure all Significant Industrial Users' permits are issued and reissued in a timely manner and that the Significant Industrial User permits issued by the POTW are effective and enforceable.

   e. Inspect and sample all Significant Industrial Users at a minimum of once a year.

      (1) Sampling shall include all regulated parameters, and shall be representative of the wastewater discharged.

      (2) Inspection of the Significant Industrial Users shall cover all areas which could result in wastewater discharge to the treatment works including manufacturing, chemical storage, pretreatment facilities, spill prevention and control procedures, hazardous waste generation and Significant Industrial User's self-monitoring and records.

f. Implement the reporting requirements of Part VII of the VPDES Permit Regulation.

g. Review the Enforcement Response Plan (ERP) and ensure it meets state and federal regulatory requirements. The approved ERP is an enforceable part of this permit and shall be implemented.

h. Develop local limits or reevaluate local limits using current influent, effluent and sludge monitoring data and submit the data and results of the evaluation to the DEQ Regional Office within one year of the effective or modification date. All Significant Industrial Users shall be sampled at the end of any categorical process and at the entrance to the treatment works.

i. Ensure that adequate resources are available to implement the approved program.

j. Meet all public participation requirements and annually public notice Significant Industrial Users in significant non-compliance with pretreatment standards and requirements for the previous 12 months.

k. Submit to the DEQ Regional Office a survey of all Industrial Users discharging to the POTW. The information shall be submitted to the POTW on the DEQ's Discharger Survey Form or an equivalent form that includes the quantity and quality of the wastewater. Survey results shall include the identification of significant industrial users of the POTW.

Survey Due: No later than April 10, 2016.

In lieu of the survey, the permittee may elect to develop, submit for approval and implement the plan to continuously survey the industrial community in their jurisdiction.

2. The DEQ may require the POTW to institute changes to its pretreatment program:

a. If the approved program is not implemented in a way satisfying the requirements of the Clean Water Act, Water Control Law or State regulations;

b. If problems such as pass-through, interference, water quality standards violations or sludge contamination develop or continue; and

c. If federal, state or local requirements change.

* A <u>significant industrial user</u> is one that:

- Has a process wastewater (**) flow of 25,000 gallons or more per average workday;
- Contributes a process wastestream which makes up 5-percent or more of the average dry weather hydraulic or organic capacity of the POTW;
- Is subject to the categorical pretreatment standards; or
- Has significant impact, either singularly or in combination with other Significant Dischargers, on the treatment works or the quality of its effluent.

** Excludes sanitary, non-contact cooling water and boiler blowdown.

D. TOXICS MANAGEMENT PROGRAM

1. Biological Monitoring:

a. In accordance with the schedule in 2. below, the permittee shall conduct annual chronic toxicity tests using 24-hour flow-proportioned composite samples of final effluent from outfall 001.

The chronic tests to use are:

Chronic 7-Day Static Renewal Survival and Growth Test using *Pimephales promelas*.
Chronic 3-Brood Static Renewal Survival and Reproduction Test using *Ceriodaphnia dubia*.

These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction or growth. Results which cannot be determined (i.e., a "less than" NOEC value) are not acceptable, and a retest will have to be performed. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. Report the LC_{50} at 48 hours and the IC_{25} with the NOEC's in the test report.

b. The permittee may provide additional chronic tests to address data variability during the period of data generation. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

c. The test dilutions should be able to determine compliance with the following endpoints:

(1) Chronic NOEC of 6% effluent which is equivalent to a TU_c of 16.66.

d. The test data will be evaluated by STATS.EXE for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests of 1.a. may be discontinued.

e. In the event that the CTO for the expanded 8.0 MGD facility is issued, the permittee shall conduct quarterly chronic toxicity tests, as in 1.a. above, until there are a minimum of 10 sets of valid tests completed. Quarterly chronic toxicity tests for the expanded facility shall begin with six months of CTO issuance. These tests will be evaluated as in 1.d. above.

2. Reporting Schedule:

The permittee shall supply a copy of the toxicity test reports specified in this Toxics Management Program in accordance with the following schedule:

Period	Compliance Periods	DMR/Report Submission
Annual 1	Permit Effective Date to 12/31/15	2/10/16
Annual 2	1/1/16 to 12/31/16	2/10/17
Annual 3	1/1/17 to 12/31/17	2/10/18
Annual 4	1/1/18 to 12/31/18	2/10/19
Annual 5	1/1/19 to 12/31/19	2/10/20

PART III

BIOSOLIDS - BASES FOR LIMITATIONS AND MONITORING REQUIREMENTS

Monitoring Type: Biosolids Monitoring –
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.a Sewage Sludge Annual Production Monitoring. [Basis 1,2]

Bases for Residuals Limitations
1. 9VAC25-31-220.B.2

Part III.A.1.b. Metals Limitations

PARAMETER	BASIS FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Arsenic (mg/kg)	1,2,3,4,5	41	75	Part III.A.1.h	Composite
Cadmium (mg/kg)	1,2,3,4,5	39	85	Part III.A.1.h	Composite
Copper (mg/kg)	1,2,3,4,5	1,500	4,300	Part III.A.1.h	Composite
Lead (mg/kg)	1,2,3,4,5	300	840	Part III.A.1.h	Composite
Mercury (mg/kg)	1,2,3,4,5	17	57	Part III.A.1.h	Composite
Molybdenum (mg/kg)	1,2,3,4,5	NA	75	Part III.A.1.h	Composite
Nickel (mg/kg)	1,2,3,4,5	420	420	Part III.A.1.h	Composite
Selenium (mg/kg)	1,2,3,4,5	100	100	Part III.A.1.h	Composite
Zinc (mg/kg)	1,2,3,4,5	2,800	7,500	Part III.A.1.h	Composite

NL = No Limitation, monitor and report

(1) All constituents are subject to cumulative pollutant loading rates (CPLR), pollutant concentrations (PC), and ceiling limits. PC biosolids contain the constituents identified above at concentrations below the monthly average specified in Part III.A.1.b. CPLR biosolids contain the constituents identified above at concentrations above the monthly average and each sample must be below the maximum concentration specified in Part III.A.1.b. If the concentration of any of these constituents in biosolids from any source exceeds the monthly average concentration, then the biosolids from the source are subject to CPLR rules (Part III.A.1.c. and Part III.H.16.) [Bases 1 & 6]

(2) All limits and criteria are expressed on a dry weight basis. [Basis 1]

(3) The monthly average concentration for molybdenum is currently under study by USEPA. Research suggests that a monthly average Molybdenum concentration below 40 mg/kg may be appropriate to reduce the risk of copper deficiency in grazing animals. [Basis 4]

Bases for Residuals Limitations
1. 9VAC25-31-540
2. 9VAC25-31-540, Table 1
3. 9VAC25-31-540, Table 2
4. 9VAC25-31-540, Table 4
5. 9VAC25-31-570, Table 1
6. 9VAC25-31-530.B. & E.

Monitoring Type: Biosolids Monitoring (only applicable to biosolids subject to Cumulative Pollutant Loading Rates (CPLRs))
Monitoring Location: Calculated for each land application field where biosolids subject to CPLRs are land applied

Part III.A.1.c Site Specific Metals Loading Limitations

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

NL = No Limitations, monitor and report.

(1) The CPLR is the maximum cumulative application of trace elements that can be applied to soils used for crop production. The maximum cumulative application rate is limited for all ranges of cation exchange capacity due to soil background pH in Virginia of less than 6.5 S.U. and lack of regulatory controls of soil pH adjustment after biosolids application ceases. [Bases 2 & 3]
(2) All limits and criteria are expressed on a dry weight basis. [Basis 4]
(3) No person shall apply bulk biosolids subject to the CPLRs identified above to agricultural land, forest, a public contact site, or a reclamation site if any of the CPLRs identified above has been reached. [Basis 5]
(4) The maximum cumulative application for molybdenum is currently under study by USEPA. Research suggests that for Molybdenum a cumulative pollutant loading rate below 40 kg/hectare may be appropriate to reduce the risk of copper deficiency in grazing animals. [Basis 1]

Bases for Residuals Limitations
1. 9VAC25-31-540, Table 3
2. 9VAC25-31-530.B. & E.
3. 9VAC25-31-540.B.
4. 9VAC25-31-540.A.

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.d. Pathogen Reduction Requirements

BASIS FOR LIMITS	PATHOGEN REDUCTION ALTERNATIVE	PROCESS TO SIGNIFICANTLY REDUCE PATHOGENS (PSRP) OPTION	CLASS B PATHOGEN REDUCTION TREATMENT STANDARDS	MONITORING REQUIREMENTS
1,2,3,4,5	1	NA	Fecal coliform monitoring: <2,000,000 MPN/gm or <2,000,000 CFU/gm, geometric mean of 7 samples. (9VAC25-31-710.B.2.)	Part I.A.3.(1)
1,2,3,4,5	2	1	PSRP: Aerobic Digestion: Sludge mean cell residence time from 40 days at 20°C to 60 days at 15°C. (9VAC25-31-710.D.1.)	(2)
1,2,3,4,5	2	2	PSRP: Air dry in a drying bed for three months. Ambient average daily temperature must be above 0°C for 2 of the 3 months. (9VAC25-31-710.D.2.)	(2)

1,2,3,4,5	2	3	PSRP: Anaerobic digestion for a mean cell residence time between 15 days at 35°C - 55°C up to 60 days at 20°C. (9VAC25-31-710.D.3.)	(2)
1,2,3,4,5	2	4	PSRP: Composting at 40°C or above for 5 or more days, maintaining > 55°C for 4 consecutive hours during the 5 days. (9VAC25-31-710.D.4.)	(2)
1,2,3,4,5	2	5	PSRP: Sufficient lime is added to the sewage sludge to raise the pH of the sewage sludge to 12 after two hours of contact. (9VAC25-1-.D.5.)	(2)
1,2,3,4,5	3	PROCESS AS APPROVED	Process equivalent to PSRP: PROCESS AS APPROVED (9VAC25-31-710 B.4.)	(2)

(1) Between sampling events, operating records must demonstrate that the Wastewater Treatment Plant (WWTP) is operating at a performance level known to meet pathogen reduction. [Bases 1. & 5]
(2) Process monitoring must be sufficient to demonstrate compliance with PSRP treatment requirements. [Bases 1,2,3,5,]

Bases for Residuals Limitations

1. 9VAC25-31-560.A
2. 9VAC25-31-710.B
3. 9VAC25-31-710.D.
4. 9VAC25-31-570.A.1, Table 1
5. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.e. Vector Attraction Reduction Requirements

BASIS FOR LIMITS	VAR OPTION	VECTOR ATTRACTION REDUCTION TREATMENT STANDARD	MONITORING REQUIREMENTS
1,2,3,4	1	38% Reduction of volatile solids by digestion (9VAC25-31-720.B.1.)	Part I.A.3.(1)
1,2,3,4	2	When 38% reduction is not achieved by anaerobic digestion, 40 day bench study at temperatures between 30°C and 37°C to demonstrate further reduction of volatile solids <17%. (9VAC25-31-720.B.2.)	Part I.A.3. (1)
1,2,3,4	3	When 38% reduction is not achieved by aerobic digestion, 30 day bench study at 20°C to demonstrate further reduction of volatile solids <15%. (9VAC25-31-720.B.3.)	Part I.A.3. (1)
1,2,3,4	4	Specific Oxygen Uptake Rate of <= 1.5 mg O_2/hour/gram total solids at 20°C (aerobically processes sludge) (9VAC25-31-720.B.4.)	Part I.A.3.(1)
1,2,3,4	5	14 day aerobic process, temperatures above 40°C with an average temperature of >45°C. (9VAC25-31-720.B.5.)	(2)
1,2,3,4	6	Sufficient alkali is added to the sewage sludge to raise the pH of the sewage sludge to 12 or higher, and without the addition of more alkali, maintain the pH at 12 S.U. for two hours and then at 11.5 S.U. or higher for an additional 22 hours. (9VAC25-31-720.B.6.)	(2)
1,2,3,4	7	Where biosolids do not contain unstabilized solids from primary wastewater treatment, the percent solids of the biosolids shall be >= 75% (9VAC25-31-720.B.7.)	Part I.A.3.(1)
1,2,3,4	8	Where biosolids contain unstabilized solids from primary wastewater treatment, the percent solids of the biosolids shall be >= 90% (9VAC25-31-720.B.8.)	Part I.A.3.(1)
1,2,3,4	9	Sewage Sludge shall be injected below the surface of the land. (9VAC25-31-720.B.9.)	NA
1,2,3,4	10	Sewage sludge land applied shall be incorporated into the soil within 6 hours after application. (9VAC25-31-720.B.10.)	NA

NA = Not applicable

(1) Between sampling events, operating records must demonstrate that the Wastewater Treatment Plant (WWTP) is operating at a performance level known to meet VAR standards. [Bases 2 & 3.]
(2) Process monitoring must be sufficient to demonstrate compliance with VAR treatment requirements. [Bases 1,2,3,4]

Bases for Residuals Limitations

1. 9VAC25-31-570.A.1, Table 1
2. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)
3. 9VAC25-31-560.C.
4. 9VAC25-31-720

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.1. f Biosolids Characteristics

PARAMETERS	LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Minimum and Maximum	Frequency	Sample Type
Percent Solids (%)	NL	NA	Part III.A.1.h	Composite
Volatile Solids (%)	NL	NA	Part III.A.1.h	Composite
Total Kjeldahl Nitrogen (mg/kg)[(1)]	NL	NA	Part III.A.1.h	Composite
Ammonium Nitrogen (mg/kg)[(1)]	NL	NA	Part III.A.1.h	Composite
Nitrate Nitrogen (mg/kg)[(1)]	NL	NA	Part III.A.1.h	Composite
Total Phosphorus (mg/kg)[(1)]	NL	NA	Part III.A.1.h	Composite
Total Potassium (mg/kg)[(1)]	NL	NA	Part III.A.1.h	Composite
pH (S.U.)	NA	NL	Part III.A.1.h	Composite
Alkalinity as $CaCO_3$ (mg/kg) (If lime by weight is less than 10%)	NL	NA	Part III.A.1.h	Composite
CCE as $CaCO_3$ (%) (If lime by weight is 10% or more)	NL	NA	Part III.A.1.h	Composite

NL = No Limit, monitor and report
NA = Not applicable

(1) Expressed on a dry weight basis. [Basis 1.]

Bases for Residuals Limitations
1. 9VAC25-31-550.A and 9VAC25-32-356.A
2. 9VAC25-31-570.A.1, Table 1

Monitoring Type: Biosolids & WTP Residuals Monitoring
Monitoring Location: Nutrient loading rates shall be calculated for each source of biosolids/WTP residuals land applied and each application of biosolids/WTP residuals to an application

Part III.A.1.g Nutrient Loading Rates

		LIMITATIONS				MONITORING REQUIREMENTS	
PARAMETERS	**Basis for limits**	**Conc. Lbs/Dry Ton**	**Field Application Rate**	**12 Month Field Loading**	**NMP Application Rate**	**Frequency**	**Sample Type**
Biosolids/ WTP Residuals	1,2,3,4	N/A	(Dry Tons/Ac) (1)	(Dry Tons/Ac) (1)	(Dry Tons/Ac) (1)	Each application	Calculated
Plant Available Nitrogen (PAN)	1,2,3,4	NL	(Lbs/Ac) (1)	(Lbs/Ac) (1)	(Lbs/Ac) (1)	Each application	Calculated
Phosphate (P_2O_5)	1,2,3,4,5	NL	(Lbs/Ac) (1)	(Lbs/Ac) (1)	(Lbs/Ac) (1)	Each application	Calculated
K_2O	1,3,4,6	NL	(Lbs/Ac) (2)	(Lbs/Ac) (2)	(Lbs/Ac) (3)	(2,3)	Calculated
$CaCO_3$	1,3,4,7	NL	(Lbs/Ac) (4)	(Lbs/Ac) (4)	(Lbs/Ac) (5)	(4,5)	Calculated

NL = No Limit, monitor and report

(1) The field application rate and 12 Month Field Loading shall not exceed the application rate specified in the nutrient management plan (NMP) for the application method used. [Basis 1,2]
(2) Report the amount of K_2O provided by the biosolids/residuals and supplemental K_2O applied for each application where the soil test K is < 38 ppm Mehlich I. [Basis 5]
(3) Report the K_2O application rate recommended in the NMP for each application where the soil test K is < 38 ppm Mehlich I. [Basis 5]
(4) Report the amount of $CaCO_3$ provided by the biosolids/residuals and supplemental $CaCO_3$ applied for each application where the soil test pH is < 5.5 S.U. Mehlich I. [Basis 6]
(5) Report the $CaCO_3$ application rate recommended in the NMP for each application where the soil test pH is < 5.5 S.U. [Basis 6]

Bases for Residuals Limitations
1. 9VAC25-31-550.A and 9VAC25-32-560.B.3.a.
2. 9VAC25-31-485.G
3. 9VAC25-32-360.C.
4. 9VAC25-31-220.B.2. & I.
5. 9VAC25-31-505.A.4
6. 9VAC25-32-560.B.2.e.
7. 9VAC25-32-560.B.2.d.

Monitoring Type: Frequency of Monitoring - Biosolids
Monitoring Location:.

Part III.A.1.h.Frequency of Monitoring – The frequency of monitoring for each biosolids source is based on the amount of bulk biosolids from that source applied to the land, as indicated in the table below: [Basis 1]

AMOUNT OF BIOSOLIDS LAND APPLIED PER 365-DAY PERIOD		
dry tons	metric dry tons	Frequency
Greater than zero but less than 320	Greater than zero but less than 290	Once per year
Equal to or greater than 320 but less than 1,653	Equal to or greater than 290 but less than 1500	Four times per year (Once per quarter)
Equal to or greater than 1,653 but less than 16,535	Equal to or greater than 1,500 but less than 15,000	Six times per year (Once per 60 days)
Equal to or greater than 16,535	Equal to or greater than 15,000	12 times per year (Once per month)

(1) Either the amount of bulk biosolids applied to the land or the amount of sewage sludge received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis).

(2) Minimum monitoring frequency is 1/yr; 4/yr; 6/yr; 12/yr, as identified in table. Monitoring shall be conducted at routine intervals, i.e. quarterly, bi-monthly, monthly by facilities that generate biosolids routinely throughout the year.

Bases for Effluent Limitations
1. 9VAC25-31-570.A., Table 1.

Monitoring Type: Soils Monitoring
Monitoring Location: All land application sites before sludge is applied.

Part III.A.2 Soil

PARAMETER	BASIS FOR LIMITS	LIMITATIONS	MONITORING REQUIREMENTS	
			Frequency	Sample Type
Soil pH (S.U.)	1,2	NL	Prior to Biosolids Application ***	Composite
Available Phosphorus (Mehlich I - P)* (ppm)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Potassium (Mehlich I – K)**(ppm)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Calcium (mg/100 g)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Magnesium (mg/100 g)	1,2	NL	Prior to Biosolids Application	Composite
Zinc (mg/kg)	1,2	NL	Prior to Biosolids Application	Composite
Manganese (mg/kg)	1,2	NL	Prior to Biosolids Application	Composite

NL = No Limitation, monitoring required

* Available Phosphorus shall be analyzed using Mehlich I or Mehlich III analytical procedure. If sample is analyzed using Mehlich III, results shall be converted to Mehlich I for reporting purposes. [Basis 1]
** Extractable Potassium shall be analyzed using Mehlich I analytical procedure or equivalent. If sample is analyzed using an equivalent procedure, results shall be converted to Mehlich I for reporting purposes. [Basis 2]
*** 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. [Basis 3]

(1) Soil samples shall be collected and analyzed in accordance with regulations promulgated under § 10.1-104.2 of the Code of Virginia and as outlined in the Biosolids Management Plan (BSMP). [Basis 1]
(2) All parameters except for pH shall be monitored on a dry weight basis. [Basis 1]
(3) Results of the soil monitoring specified above shall be used to develop the NMP in accordance with Part III.C.2. [Basis 4]
(4) No sample analysis used to determine application rates shall be more than 3 years old at the time of the biosolids land application. [Basis 1 and 4]

Bases for Effluent Limitations
1. 9VAC25-31-543.A – C, Table 1
2. 9VAC25-31-550.A and 9VAC25-32-560.B.2.e.
3. 9VAC25-31-550.A and 9VAC25-32-560.B.2.c.
4. 4VAC5-15 Nutrient Management Training and Certification Regulations

BASES FOR SPECIAL CONDITIONS

Tabulated below are the special condition sections of the permit, with the bases for each of the permit special conditions.

Special Condition	Description and Basis for Special Condition
Part III.B.1	**Monthly Reporting:** 9VAC25-31-590.B and the Fee Regulation 9VAC25-20-147.B requires submittal of a report by the 15th of the month following the month in which land application occurred.
Part III.B.1a-b	**Biosolids Monitoring Data:** 9VAC25-31-220-I.3 Reporting of monitoring to assure compliance with the permit limits shall be no less frequent than as required by the regulation. 9VAC25-31-190.L.4 Monitoring results shall be reported at the intervals specified in the permit on a Discharge Monitoring Report (DMR) or forms provided or specified by the department for reporting results of monitoring of sludge use or disposal practices. 9VAC25-31-220.I.4.a. states monitoring requirements may include mass (or other measurements specified in the permit) for each pollutant limited in the permit.
Part III.B.1.c	**Monthly Activity Report:** 9VAC25-31-590.B and Fee Regulation 9VAC25-20-147.B requires submittal of a report by the 15th of the month following the month in which land application occurred. Specific information to be provided is identified in 9VAC25-20-147.A. and B. 9VAC25-31-590.C refers to maintaining a report and adequate records on biosolids application rates, and methods of application for each site.
Part III.B.1.d	**Electronic Submittal Attestation Statement:** § 59.1-479 – 498, the Uniform Electronic Transactions Act provides for submission of paperwork electronically and the use of electronic signatures. No laws or regulations require hard copy submittal of original signatures in the biosolids program. 9VAC25-31-590.B. requires electronic or postmarked submittals.
Part III.B.2	**Biosolids Land Application Fee:** § 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 Class B biosolids land 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. 9VAC 20-60.D. establishes the due date.
Part III.B.3.	**Annual Report:** 9VAC25-31-590.A requires the submittal of an annual report postmarked by February 19 for the previous year. 9VAC25-31-220.I.3. provides for the VPDES permit to require monitoring the volume of biosolids and other measurements as appropriate. 9VAC25-31-590.C requires reports be maintained verifying that sludge treatment for pathogen and vector attraction reduction be maintained by the generator and owner (of the permit). 9VAC25-31-190.H. requires the permittee to submit information requested by the board, within a reasonable time, to determine compliance with the permit. Other specific information and maintenance requirements are identified in 9VAC25-20-147.A.
Part III.C.1.	**Records Retention:** VPDES Permit Regulation 9VAC25-31-580 requires permittees who prepare sewage sludge to develop records as well as retain those records for a minimum of five (5) years.
Part III.C.2.	**Class B/PC Biosolids Record Keeping:** VPDES Permit regulation 9VAC25-31-580 outlines record keeping requirements for Class B/PC biosolids.

Part III.C.3.	**Class B/CPLR Biosolids Record Keeping:** VPDES Permit regulation 9VAC25-31-580.A.5 outlines record keeping requirements for Class B/CPLR biosolids.
Part III.D.1	**Biosolids Management Plan (BSMP):** VPDES Permit Regulation 9VAC25-31-485.G requires the permit holder to maintain and implement a BSMP and specifies its components. In addition to all materials submitted with permit application, which includes an Odor Control Plan (OCP), a Nutrient Management Plan (NMP) and Operation and Maintenance (O&M) Manual are required.
Part III.D.2.	**Nutrient Management Plan (NMP) Requirement:** § 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. 9VAC25-31-505.A.1.e states that if conditions at the site change so that it meets one or more special conditions, the NMP will be approved prior to application at the site. 9VAC25-31-505.A.3., with which all biosolids operations must comply, requires that the NMP be submitted to the farmer/operator of the site, the Department of Conservation and Recreation, and the local government, unless requested in writing to not receive the NMP. 9VAC25-31-505.A.4, Table 1 requires the NMP to be approved by DCR prior to application based on soil phosphorus levels (Mehlich I).
Part III.D.3	**Operation and Maintenance (O&M) Manual Requirement:** 9VAC25-31-485.G.3, 9VAC25-790-140 and 9VAC25-790-260 – 300 identify minimum requirements to be included in an O&M Manual. Additional requirements are included in the BSMP 9VAC25-31-100.Q.12.
Part III.D.4	**Odor Control Plan (OCP) Requirement:** 9VAC25-31-100.Q.6. requires Generator's OCP and minimum content. .
Part III.D.5.	**Permittee Source List - Biosolids:** 9VAC25-31-440.D states *no person shall land apply, market, or distribute biosolids in Virginia unless the biosolids source has been approved by the board.* 9VAC25-31-100.Q.8.b. requires identification of sources that the permittee proposes to land apply in the permit application, which becomes part of the BSMP. Water Control Law and the VPDES Permit Regulation do not require a permit modification to add a new source; therefore a source that is approved may be added to the Permittee Source List with administrative authorization. A source not previously or currently approved, must obtain approval before it can be land applied under a VPDES permit.
Under the VPDES Permit Regulation these special conditions are applicable "to any person who prepares sewage sludge or biosolids, or applies biosolids to the land". However the DOC also has an agreement with a third party contractor who holds a VPA permit authorizing land application on the DOC property, as well as other sites. Therefore, the special conditions included in Parts III.D.–I. are not the responsibility of the DOC when land application activities are conducted by the contractor under the authority of a separate VPA permit, with the exception of Parts III.D.7 - 8.	
Part III.E.1.	**100 Day Notification:** 9VAC25-31-485.D.1. requires written notification to the chief executive officer (CEO) or designee for the locality 100 days prior to the initial land application at a specific site and clarifies that the notice may be satisfied by DEQ's notice of

	the permit application, if necessary site information was provided in that notification.
Part III.E.2.	**14 Day Notification:** § 62.1-44.19.3.L. and 9VAC25-31-485.D.2. requires written notification to the department and the CEO or designee for the locality at least 14 days prior to land application at a specific site.
Part III.E.3.	**Signage Requirements:** 9VAC25-31-485.F.1. requires a sign be posted at a land application site at least 5 business days prior to delivery of biosolids at the site and maintained on site until 5 business days after application is complete; the sign will not be removed until 30 days after land application is complete. 9VAC25-31-485.F.1.a. – b. addresses placement of the signs. 9VAC25-31-485.F.3.– 4. specifies construction, content, and maintenance of the sign.
Part III.E.4.	**Notification of Sign Posting:** 9VAC25-31-485.F.2. requires written notification to DEQ and the CEO or designee for the locality within 24 hours of posting, identifying where the signs have been posted, and identifies information required in the notice.
Part III.E.5.	**24 Hour Notification:** 9VAC25-31-485.D.3. requires written notice to DEQ and the CEO or designee for the locality no more than 24 hours prior to commencing activity at a site, including delivery. Include the source of material and only sites where land application activities or staging will commence within 24 hours.
Part III.E.6.	**Site Operator Notification and Information:** VPDES Permit Regulation 9VAC25-31-530.H. states *The person who applies bulk biosolids to the land shall provide the owner or lease holder of the land on which the bulk biosolids is applied notice and necessary information to comply with the requirements in this article.*
Part III.E.7.	**Handling of Complaints:** VPDES Permit Regulation 9VAC25-31-485.H requires the permittee to respond within 24 hours of receiving a complaint related to the land application of biosolids, and provide notification of the complaint to DEQ, the local government where the complaint is based and the generator(s) of the biosolids involved.
Part III.E.8.	**Generator NANI:** : 9VAC25-31-530.F requires the generator of biosolids who provides biosolids to a land applier, to give notice and necessary information to the land applier. 9VAC25-31-480 states that the preparer of biosolids shall ensure that the applicable requirements in 9VAC25-31 Part VI are met when biosolids are land applied.
Most of the following **Special Conditions** have their basis in the VPA regulation. 9VAC25-31-505.C of the VPDES Permit Regulation states *Bulk biosolids meeting Class B pathogen reduction standards shall be land applied in accordance with the Virginia Pollution Abatement Permit Regulation, Article 3, Biosolids Use Standards and Practices, set forth in 9VAC25-32-490 through 9VAC25-32-580.*	
Part III.F.1. – 5.	**TRANSPORT requirements:** 9VAC25-32-540.A. – E. identifies requirements for transport routes, vehicles, prevention of drag-out and track-out, clean-up of such drag-out and track-out and clean-up and reporting of spills.
Part III.G.1. – 11.	**STAGING:** 9VAC25-32-545.A. – B. Defines staging and provides procedural requirements for staging up to 7 days and daily inspections by certified land applier; procedural and notification requirements to be implemented if biosolids cannot be applied by the end of the 7th day; and prohibits overnight staging in areas of Karst, areas identified by U.S. Department

	of Agriculture - Natural Resources Conservation Service (USDA-NRCS) as frequently flooded, and sites with on-site storage.
Part III.H.1. - 2.	**ON-SITE STORAGE Requirements:** 9VAC25-32-550.D.1., 3. - 10. Describes on-site storage and provides procedural requirements for staging up to 45 days, routine inspections by certified land applier; procedural and notification requirements; 9VAC25-32-550.D specifies on-site storage shall take place on a constructed surface at a location preapproved by DEQ and that biosolids stored on the site shall be land applied only at sites under control of the owner/operator of the site where the on-site storage is located; 9VAC25-32-550.C and D.2., 6. specifies permeability requirements for the pad and requires existing storage facilities to come into compliance with the amended regulation by 9/1/2014.
Part III.I.1.	**Infrequent Application:** 9VAC25-32-560.B.3.c. establishes infrequent application based on total crop needs for nitrogen.
Part III.I.2.	**Depth to Bedrock or Restrictive Layers:** 9VAC25-32-560.B.2.a. states depth to bedrock or restrictive layers shall be a minimum of 18 inches.
Part III.I.3.	**Depth to Groundwater:** 9VAC25-32-560.B.2.b. prohibits land application when seasonal high water table is within 18" of ground surface and requires use of USDA-NRCS soil survey maps and soil borings to verify groundwater depth.
Part III.I.4.	**pH Management:** 9VAC25-32-560.B.2.c. requires the biosolids soil mixture have a pH of 6>0 S.U. or higher where cadmium in the biosolids is >= 21 mg/kg. 9VAC25-32-560.B.2.c.d. requires the addition of lime or use of lime amended biosolids if soil pH is < 5.5 S.U..
Part III.I.5.	**Soil Potassium < 38 ppm:** 9VAC25-32-560.B.2.e. requires addition of potash prior to or concurrently with the biosolids if the soil potassium (Mehlich I) is < 38 ppm.
Part III.I.6.	**Equipment Calibration:** 9VAC25-32-560.B.3.d.(1) requires routine measurement of the field application rate of application equipment.
Part III.I.7.	**Liquid Biosolids:** 9VAC25-32-560.B.3.d.(1) limits application of liquid biosolids to 14,000 gallons per acre, per application with drying time between applications.
Part III.I.8.	**Grass Height:** 9VAC25-32-560.B.3.d.(1) requires hay and pasture to be grazed or clipped to approximately 6 inches prior to biosolids application.
Part III.I.9.	**Uniform Application:** 9VAC25-32-560.B.3.d.(1) requires a uniform application of biosolids on a field. If application is not uniform additional operational methods are required followed by clipping.
Part III.I.10.	**Odor Control by Incorporation:** 9VAC25-32-560.B.3.d.(2) allows DEQ or the local monitor to require incorporation, when practical or compatible with a soil conservation plan, to mitigate malodor.

Part III.I.11.	**Slope Restrictions:** 9VAC25-32-560.B.3.d.(3) prohibits application on slopes >15%, but allows the restriction to be waived by DEQ for the establishment and maintenance of perennial vegetation or based on BMPs.
Part III.I.12.	**Snow Covered Ground:** 9VAC25-32-560.B.3.d.(5) allows land application of biosolids on snow cover that is 1 inch or less in depth and the snow and biosolids are incorporated within 24 hours. If the snow melts with application, incorporation is not required.
Part III.I.13.	**Setbacks:** 9VAC25-32-560.B.3.e.(1) – (4) establishes setback distances and procedures for extending or waiving residential and property line setbacks.
Part III.I.14.	**Site Access Restrictions:** 9VAC25-32-675.B.5. establishes access restrictions for sites where Class B biosolids have been land applied.
Part III.I.15.	**Forestland (Silviculture):** 9VAC25-32-560.C. establishes requirements for land application on silvicultural sites.
Part III.I.16.	**CPLR Biosolids:** VPDES Permit Regulation 9VAC25-31-530 establishes criteria for determining the need to track the metals loadings on individual sites where metals subject to the cumulative pollutant loading rates have been applied.
Part III.J.1.	**Biosolids Sources**: 9VAC25-31-440.D. states that no person shall land apply, market or distribute biosolids in Virginia unless the biosolids source has been approved by the board.
Part III.J.2.	**Land Application Sites**: 9VAC25-31-440.C. states that no person shall land apply Class B biosolids on any land in Virginia unless that land has been identified in an application to issue, reissue or modify a permit and approved by the board.
Part III.J.3	**Pollution Liability and General Liability Requirement:** 9VAC25-31-485.E requires the permit holder to provide evidence of financial responsibility in accordance with 9VAC25-32-770 et seq. 9VAC25-32-780 establishes liability requirements. 9VAC25-32-790 – 850 provides specific requirements for each type of liability demonstration.
Part III.J.4.	**Alteration of Biosolids Composition:** 9VAC25-31-505.B.2. prohibits the alteration of the biosolids composition at the land application site.
Part III.J.5.	**Site Specific Application Rates**: 9VAC25-32-560 states site specific application rates shall not exceed the rates established in the nutrient management plan nor result in exceedance of the cumulative trace element loading rates specified in 9VAC25-32-356 Table 3.
Part III.J.6.	**Land Owner Consent Requirement**: 9VAC25-31-100.F.6. requires the submission of landowner consent forms with the permit application 9VAC25-31-485.B.2.requires the written agreement between the permittee and the landowner, specifies required information and use of the most current form approved by the board. 9VAC25-31-485.C. requires the permittee to maintain the agreement. 9VAC25-31-485.B.4. Requires the permittee to notify landowners with landowner agreements on old forms to notify the landowner of the need to sign and submit new landowner agreements on the current form.

Part III.J.7	**Threatened and Endangered Species Protection:** 9VAC25-31-550.B states no one shall apply bulk biosolids to the land if it is likely to adversely affect a threatened or endangered species listed in 9VAC25-260-320 or § 4 of the Endangered Species Act (16 USC § 1533) or if the land application is likely to adversely affect its designated critical habitat.
Part III.J.8.	**Certified Land Applicator Requirement**: § 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. 9VAC25-31-485.A. prohibits land application of Class B biosolids unless a person certified as a Land Applicator in accordance with VPA Permit Regulation 9VAC25-32-690 - 760 is on site at all times during the land application. 9VAC25-32-690 requires the land applier to maintain a field log and identifies minimum requirements and sign monthly reports, attesting that they were onsite at all times reported.
Part III.J.9.	**Reopener:** 9VAC25-31-220.C requires inclusion of a reopener clause in the permit to authorize immediate modification of the permit to address changes to standards or requirements for the use or disposal of biosolids, industrial wastewater sludge, or septage.
Part III.J.10.	**Storm Water Discharge Exception:** 9VAC25-32-30.A States that all pollutant management activities covered under a VPA permit shall maintain no point source discharge of pollutants to surface waters except in the case of a storm event greater than the 25-year, 24-hour storm. : 9VAC25-32-30.B states that except in compliance with the VPA or another permit issued by the board that it is unlawful to discharge into, or adjacent to, state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances.

ATTACHMENT 7

EFFLUENT/SLUDGE/GROUND WATER LIMITATIONS/MONITORING RATIONALE/SUITABLE DATA/STREAM MODELING/ ANTIDEGRADATION/ANTIBACKSLIDING

THE RATIONALE FOR MODIFICATIONS TO THE PERMIT ARE BASED ON THE FOLLOWING:

General

The subject facility is currently covered by a VPDES permit that became effective September 26, 2010 and which expires September 25, 2015. The 2010 permit was drafted with two flow tiers (6.0 MGD and 8.0 MGD) to allow for a requested future plant expansion. The 2010 permit and the current reissuance permit also include the two flow tiers. The discharge is a continuous discharge to the New River via a multiport diffuser. This is an expanded plant and antidegradation baselines established in the 2010 reissuance fact sheet apply.

Outfall 001

FLOW – The design of the facility is 6.0 million gallons per day (MGD) with a proposed expansion to 8.0 MGD. Flow monitoring is continuous by totalizing, indicating and recording equipment (in MGD). This monitoring frequency and sample type is in accordance with guidance for this size facility and should be appropriate for assessment of treatment plant capacity.

pH – The limits of 6.0 S.U. (minimum) to 9.0 S.U. (maximum) are based on technology [secondary treatment limits as per Federal effluent guidelines (40 CFR 133)] and are protective of water quality. The monitoring frequency is set at once per day and the sample type is grab (required for pH). This monitoring frequency and sample type are in accordance with guidance for this size facility and should provide enough data for proper assessment of compliance with the effluent limits.

BOD5 – EXISTING FACILITY - The BOD5 limits of 30 mg/l (681 kg/day) monthly average and 45 mg/l (1022 kg/day) weekly average are based on secondary treatment limits and are applicable up to the point of issuance of the Certificate-to-Operate for the expanded facility. These limits are being carried forward with this reissuance and will ensure compliance with water quality standards. The monitoring frequency has been reduced to once per week with this reissuance. The sample type is 24-hour composite. This monitoring frequency and sample type should provide enough data for proper assessment of compliance with the effluent limits.

EXPANDED FACILITY - The BOD5 limits of 30 mg/l (908 kg/day) monthly average and 45 mg/l (1363 kg/day) weekly average are based on a water quality model and are applicable during the period beginning with issuance of the Certificate-to-Operate for the expanded facility until permit expiration. The limits are protective of water quality. The monitoring frequency is set at once per day. The sample type is 24-hour composite. This monitoring frequency and sample type should provide enough data for proper assessment of compliance with the effluent limits.

TSS - EXISTING FACILITY - The limits for the existing facility are 30 mg/l (26.1 kg/day) monthly average and 45 mg/l (39.2 kg/day) weekly average and are being carried forward with this reissuance. These limits are based on secondary treatment. The monitoring frequency has been reduced to once per week with this reissuance based on plant performance. The sample type is 24-hour composite. This monitoring frequency and sample type should be appropriate for assessment of compliance with the effluent limits.

EXPANDED FACILITY - The limits for the expanded facility are 30 mg/l (39.7 kg/day) monthly average and 45 mg/l (59.6 kg/day) weekly average. These limits are based on secondary treatment. The monitoring frequency is set at once per day. The sample type is 24-hour composite. This monitoring frequency and sample type should be appropriate for assessment of compliance with the effluent limits.

Dissolved Oxygen - The dissolved oxygen (DO) limits of 6.0 mg/l for current design flow of 6.0 MGD and 6.0 mg/l for the expanded 8.0 MGD design facility are water quality based and will ensure protection of water quality standards. These levels of dissolved oxygen are necessary in order to allow the BOD5 limits noted for both the existing and expanded facilities. The monitoring frequency is once per discharge day and the sample type is grab. This monitoring frequency and sample type should provide enough data for proper assessment of compliance with the effluent limit.

E. coli - The limit of 126 N/CML (monthly average expressed as a geometric mean) is based on water quality. This limit is beinig carried forward from the previous permit and is based on WQS 9 VAC 25-260-170. The *E. coli* limit repl;aced the fecal coliform limitation in the 2000-2005 permit and monitors effectiveness of the ultraviolet light (UV) disinfection system. The monitoring frequency is once per day. The sample type is grab. This monitoring frequency and sample type are in accordance with guidance for this size facility and should provide enough data for proper assessment of compliance with the effluent limit and water quality standards.

Reduced Monitoring

In accordance with the VPDES Permit Manual, this facility was evaluated for reduced monitoring during this reissuance. Based on an assessment of plant performance, in relation to permit limitations, the facility is eligible for reduced monitoring for both BOD5 and TSS. Please see the parameter by parameter analyses attached. As a result, the TSS and BOD_5 monitoring frequency was reduced to once per week with this reissuance. See Attachment 7 for analytical results reported and reduced frequency analysis. Should problems arise with effluent limit compliance, the permit also contains a condition requiring that 1/Day monitoring be resumed should a Notice of Violation be issued for either parameter.

PART III

BIOSOLIDS - BASES FOR LIMITATIONS AND MONITORING REQUIREMENTS

Monitoring Type: Biosolids Monitoring –
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.a Sewage Sludge Annual Production Monitoring. [Basis 1,2]

Bases for Residuals Limitations
1. 9VAC25-31-220.B.2

Part III.A.1.b. Metals Limitations

PARAMETER	BASIS FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Arsenic (mg/kg)	1,2,3,4,5	41	75	Part III.A.1.h	Composite
Cadmium (mg/kg)	1,2,3,4,5	39	85	Part III.A.1.h	Composite
Copper (mg/kg)	1,2,3,4,5	1,500	4,300	Part III.A.1.h	Composite
Lead (mg/kg)	1,2,3,4,5	300	840	Part III.A.1.h	Composite
Mercury (mg/kg)	1,2,3,4,5	17	57	Part III.A.1.h	Composite
Molybdenum (mg/kg)	1,2,3,4,5	NA	75	Part III.A.1.h	Composite
Nickel (mg/kg)	1,2,3,4,5	420	420	Part III.A.1.h	Composite
Selenium (mg/kg)	1,2,3,4,5	100	100	Part III.A.1.h	Composite
Zinc (mg/kg)	1,2,3,4,5	2,800	7,500	Part III.A.1.h	Composite

NL = No Limitation, monitor and report

(1) All constituents are subject to cumulative pollutant loading rates (CPLR), pollutant concentrations (PC), and ceiling limits. PC biosolids contain the constituents identified above at concentrations below the monthly average specified in Part III.A.1.b. CPLR biosolids contain the constituents identified above at concentrations above the monthly average and each sample must be below the maximum concentration specified in Part III.A.1.b. If the concentration of any of these constituents in biosolids from any source exceeds the monthly average concentration, then the biosolids from the source are subject to CPLR rules (Part III.A.1.c. and Part III.H.16.) [Bases 1 & 6]

(2) All limits and criteria are expressed on a dry weight basis. [Basis 1]

(3) The monthly average concentration for molybdenum is currently under study by USEPA. Research suggests that a monthly average Molybdenum concentration below 40 mg/kg may be appropriate to reduce the risk of copper deficiency in grazing animals. [Basis 4]

Bases for Residuals Limitations
1. 9VAC25-31-540
2. 9VAC25-31-540, Table 1
3. 9VAC25-31-540, Table 2
4. 9VAC25-31-540, Table 4
5. 9VAC25-31-570, Table 1
6. 9VAC25-31-530.B. & E.

Monitoring Type: Biosolids Monitoring (only applicable to biosolids subject to Cumulative Pollutant Loading Rates (CPLRs))
Monitoring Location: Calculated for each land application field where biosolids subject to CPLRs are land applied

Part III.A.1.c Site Specific Metals Loading Limitations

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

NL = No Limitations, monitor and report.

(1) The CPLR is the maximum cumulative application of trace elements that can be applied to soils used for crop production. The maximum cumulative application rate is limited for all ranges of cation exchange capacity due to soil background pH in Virginia of less than 6.5 S.U. and lack of regulatory controls of soil pH adjustment after biosolids application ceases. [Bases 2 & 3]
(2) All limits and criteria are expressed on a dry weight basis. [Basis 4]
(3) No person shall apply bulk biosolids subject to the CPLRs identified above to agricultural land, forest, a public contact site, or a reclamation site if any of the CPLRs identified above has been reached. [Basis 5]
(4) The maximum cumulative application for molybdenum is currently under study by USEPA. Research suggests that for Molybdenum a cumulative pollutant loading rate below 40 kg/hectare may be appropriate to reduce the risk of copper deficiency in grazing animals. [Basis 1]

Bases for Residuals Limitations

1. 9VAC25-31-540, Table 3
2. 9VAC25-31-530.B. & E.
3. 9VAC25-31-540.B.
4. 9VAC25-31-540.A.

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.d. Pathogen Reduction Requirements

BASIS FOR LIMITS	PATHOGEN REDUCTION ALTERNATIVE	PROCESS TO SIGNIFICANTLY REDUCE PATHOGENS (PSRP) OPTION	CLASS B PATHOGEN REDUCTION TREATMENT STANDARDS	MONITORING REQUIREMENTS
1,2,3,4,5	2	1	PSRP: Aerobic Digestion: Sludge mean cell residence time from 40 days at 20°C to 60 days at 15°C. (9VAC25-31-710.D.1.)	(2)

(1) Between sampling events, operating records must demonstrate that the Wastewater Treatment Plant (WWTP) is operating at a performance level known to meet pathogen reduction. [Bases 1. & 5]
(2) Process monitoring must be sufficient to demonstrate compliance with PSRP treatment requirements. [Bases 1,2,3,5,]

Bases for Residuals Limitations

1. 9VAC25-31-560.A
2. 9VAC25-31-710.B
3. 9VAC25-31-710.D.
4. 9VAC25-31-570.A.1, Table 1
5. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.A.1.e. Vector Attraction Reduction Requirements

BASIS FOR LIMITS	VAR OPTION	VECTOR ATTRACTION REDUCTION TREATMENT STANDARD	MONITORING REQUIREMENTS
1,2,3,4	1	38% Reduction of volatile solids by digestion (9VAC25-31-720.B.1.)	Part I.A.3.(1)

NA = Not applicable

(1) Between sampling events, operating records must demonstrate that the Wastewater Treatment Plant (WWTP) is operating at a performance level known to meet VAR standards. [Bases 2 & 3.]
(2) Process monitoring must be sufficient to demonstrate compliance with VAR treatment requirements. [Bases 1,2,3,4]

Bases for Residuals Limitations
1. 9VAC25-31-570.A.1, Table 1
2. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)
3. 9VAC25-31-560.C.
4. 9VAC25-31-720

Monitoring Type: Biosolids Monitoring
Monitoring Location: Final Biosolids product after all treatment, prior to land application

Part III.1. f Biosolids Characteristics

	LIMITATIONS		MONITORING	
PARAMETERS	Monthly Average	Minimum and Maximum	Frequency	Sample Type
Percent Solids (%)	NL	NA	Part III.A.1.h	Composite
Volatile Solids (%)	NL	NA	Part III.A.1.h	Composite
Total Kjeldahl Nitrogen (mg/kg)(1)	NL	NA	Part III.A.1.h	Composite
Ammonium Nitrogen (mg/kg)(1)	NL	NA	Part III.A.1.h	Composite
Nitrate Nitrogen (mg/kg)(1)	NL	NA	Part III.A.1.h	Composite
Total Phosphorus (mg/kg)(1)	NL	NA	Part III.A.1.h	Composite
Total Potassium (mg/kg)(1)	NL	NA	Part III.A.1.h	Composite
pH (S.U.)	NA	NL	Part III.A.1.h	Composite
Alkalinity as $CaCO_3$ (mg/kg) (If lime by weight is less than	NL	NA	Part III.A.1.h	Composite
CCE as $CaCO_3$ (%) (If lime by weight is 10% or	NL	NA	Part III.A.1.h	Composite

NL = No Limit, monitor and report
NA = Not applicable

(1) Expressed on a dry weight basis. [Basis 1.]

Bases for Residuals Limitations
1. 9VAC25-31-550.A and 9VAC25-32-356.A
2. 9VAC25-31-570.A.1, Table 1

Monitoring Type: Biosolids & WTP Residuals Monitoring
Monitoring Location: Nutrient loading rates shall be calculated for each source of biosolids/WTP residuals land applied and each application of biosolids/WTP residuals to an application

Part III.A.1.g Nutrient Loading Rates

		LIMITATIONS				MONITORING REQUIREMENTS	
PARAMETERS	**Basis for limits**	**Conc. Lbs/Dry Ton**	**Field Application Rate**	**12 Month Field Loading**	**NMP Application Rate**	**Frequency**	**Sample Type**
Biosolids/ WTP Residuals	1,2,3,4	N/A	(Dry Tons/Ac) (1)	(Dry Tons/Ac) (1)	(Dry Tons/Ac) (1)	Each application	Calculated
Plant Available Nitrogen (PAN)	1,2,3,4	NL	(Lbs/Ac) (1)	(Lbs/Ac) (1)	(Lbs/Ac) (1)	Each application	Calculated
Phosphate (P_2O_5)	1,2,3,4,5	NL	(Lbs/Ac) (1)	(Lbs/Ac) (1)	(Lbs/Ac) (1)	Each application	Calculated
K_2O	1,3,4,6	NL	(Lbs/Ac) (2)	(Lbs/Ac) (2)	(Lbs/Ac) (3)	(2,3)	Calculated
$CaCO_3$	1,3,4,7	NL	(Lbs/Ac) (4)	(Lbs/Ac) (4)	(Lbs/Ac) (5)	(4,5)	Calculated

NL = No Limit, monitor and report

(1) The field application rate and 12 Month Field Loading shall not exceed the application rate specified in the nutrient management plan (NMP) for the application method used. [Basis 1,2]
(2) Report the amount of K_2O provided by the biosolids/residuals and supplemental K_2O applied for each application where the soil test K is < 38 ppm Mehlich I. [Basis 5]
(3) Report the K_2O application rate recommended in the NMP for each application where the soil test K is < 38 ppm Mehlich I. [Basis 5]
(4) Report the amount of $CaCO_3$ provided by the biosolids/residuals and supplemental $CaCO_3$ applied for each application where the soil test pH is < 5.5 S.U. Mehlich I. [Basis 6]
(5) Report the $CaCO_3$ application rate recommended in the NMP for each application where the soil test pH is < 5.5 S.U. [Basis 6]

Bases for Residuals Limitations

1. 9VAC25-31-550.A and 9VAC25-32-560.B.3.a.
2. 9VAC25-31-485.G
3. 9VAC25-32-360.C.
4. 9VAC25-31-220.B.2. & I.
5. 9VAC25-31-505.A.4
6. 9VAC25-32-560.B.2.e.
7. 9VAC25-32-560.B.2.d.

Monitoring Type: Frequency of Monitoring - Biosolids
Monitoring Location:.

Part III.A.1.h.Frequency of Monitoring – The frequency of monitoring for each biosolids source is based on the amount of bulk biosolids from that source applied to the land, as indicated in the table below: [Basis 1]

AMOUNT OF BIOSOLIDS LAND APPLIED PER 365-DAY PERIOD		
dry tons	metric dry tons	Frequency
Greater than zero but less than 320	Greater than zero but less than 290	Once per year
Equal to or greater than 320 but less than	Equal to or greater than 290 but less than	Four times per year (Once per
Equal to or greater than 1,653 but less than	Equal to or greater than 1,500 but less than	Six times per year (Once per 60
Equal to or greater than 16,535	Equal to or greater than 15,000	12 times per year (Once per

(1) Either the amount of bulk biosolids applied to the land or the amount of sewage sludge received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis).

(2) Minimum monitoring frequency is 1/yr; 4/yr; 6/yr; 12/yr, as identified in table. Monitoring shall be conducted at routine intervals, i.e. quarterly, bi-monthly, monthly by facilities that generate biosolids routinely throughout the year.

Bases for Effluent Limitations

1. 9VAC25-31-570.A., Table 1.

Monitoring Type: Soils Monitoring
Monitoring Location: All land application sites before sludge is applied.

Part III.A.2 Soil

PARAMETER	BASIS FOR LIMITS	LIMITATIONS	MONITORING REQUIREMENTS	
			Frequency	Sample Type
Soil pH (S.U.)	1,2	NL	Prior to Biosolids Application ***	Composite
Available Phosphorus (Mehlich I - P)* (ppm)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Potassium (Mehlich I – K)**(ppm)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Calcium (mg/100 g)	1,2	NL	Prior to Biosolids Application	Composite
Extractable Magnesium (mg/100 g)	1,2	NL	Prior to Biosolids Application	Composite
Zinc (mg/kg)	1,2	NL	Prior to Biosolids Application	Composite
Manganese (mg/kg)	1,2	NL	Prior to Biosolids Application	Composite

NL = No Limitation, monitoring required

* Available Phosphorus shall be analyzed using Mehlich I or Mehlich III analytical procedure. If sample is analyzed using Mehlich III, results shall be converted to Mehlich I for reporting purposes. [Basis 1]

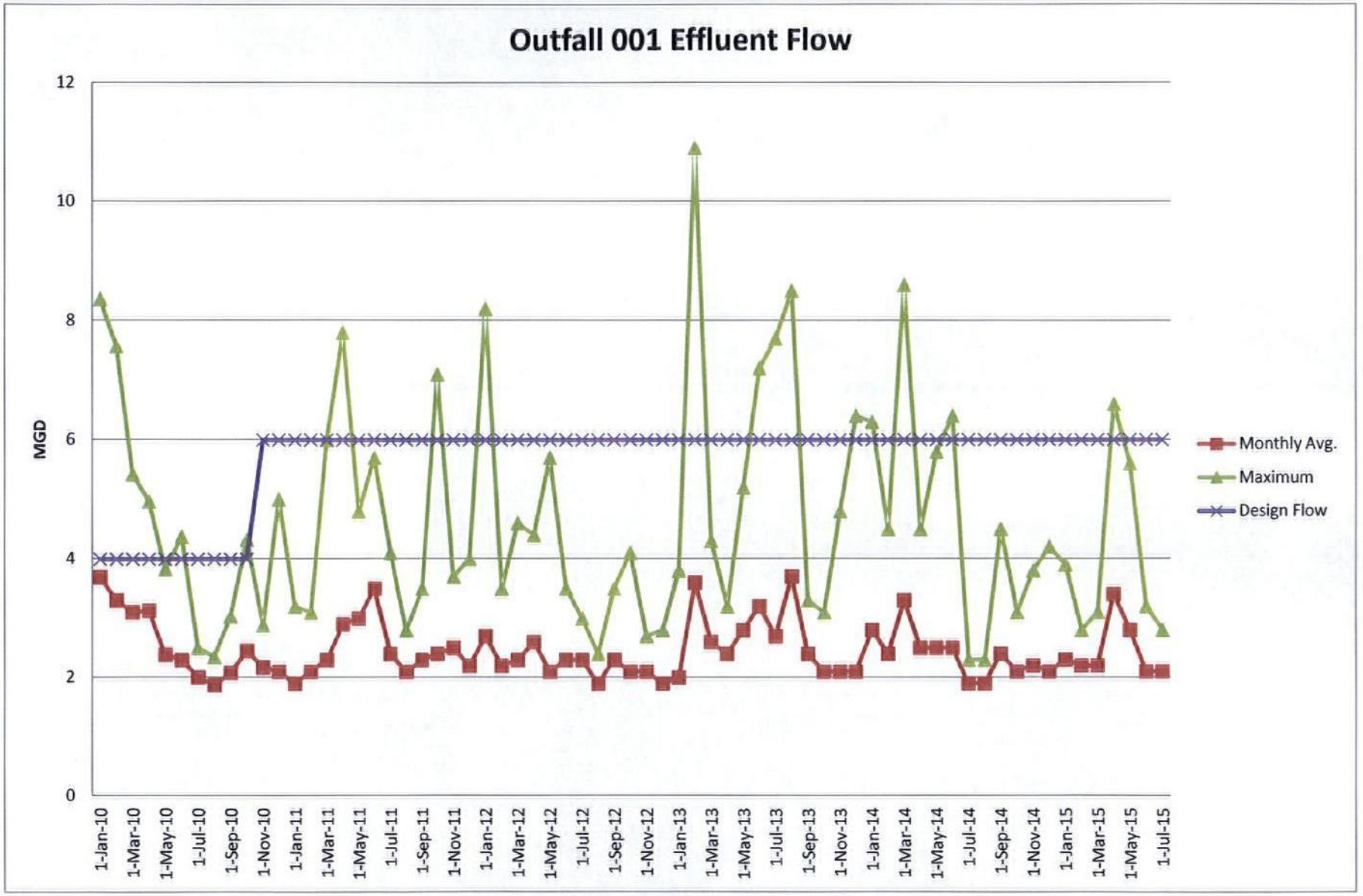
** Extractable Potassium shall be analyzed using Mehlich I analytical procedure or equivalent. If sample is analyzed using an equivalent procedure, results shall be converted to Mehlich I for reporting purposes. [Basis 2]

*** 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. [Basis 3]

(1) Soil samples shall be collected and analyzed in accordance with regulations promulgated under § 10.1-104.2 of the Code of Virginia and as outlined in the Biosolids Management Plan (BSMP). [Basis 1]
(2) All parameters except for pH shall be monitored on a dry weight basis. [Basis 1]
(3) Results of the soil monitoring specified above shall be used to develop the NMP in accordance with Part III.C.2. [Basis 4]
(4) No sample analysis used to determine application rates shall be more than 3 years old at the time of the biosolids land application. [Basis 1 and 4]

Bases for Effluent Limitations

1. 9VAC25-31-543.A – C, Table 1
2. 9VAC25-31-550.A and 9VAC25-32-560.B.2.e.
3. 9VAC25-31-550.A and 9VAC25-32-560.B.2.c.
4. 4VAC5-15 Nutrient Management Training and Certification Regulations


Outfall 001 Effluent Flow
MGD
12
10
8
6
4
2
0
1-Jan-10
1-Mar-10
1-May-10
1-Jul-10
1-Sep-10
1-Nov-10
1-Jan-11
1-Mar-11
1-May-11
1-Jul-11
1-Sep-11
1-Nov-11
1-Jan-12
1-Mar-12
1-May-12
1-Jul-12
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1-Sep-13
1-Nov-13
1-Jan-14
1-Mar-14
1-May-14
1-Jul-14
1-Sep-14
1-Nov-14
1-Jan-15
1-Mar-15
1-May-15
1-Jul-15
Monthly Avg.
Maximum
Design Flow

Town of Christiansburg WWTP
Effluent Flow Data (MGD)

Date	Flow		Design Flow
	Monthly Avg.	Maximum	
10-Jan-10	3.694	8.364	4
10-Feb-10	3.303	7.571	4
10-Mar-10	3.104	5.421	4
10-Apr-10	3.131	4.966	4
10-May-10	2.386	3.828	4
10-Jun-10	2.299	4.374	4
10-Jul-10	2.005	2.499	4
10-Aug-10	1.875	2.348	4
10-Sep-10	2.082	3.031	4
10-Oct-10	2.452	4.325	4
10-Nov-10	2.175	2.886	6
10-Dec-10	2.1	5	6
10-Jan-11	1.9	3.2	6
10-Feb-11	2.1	3.1	6
10-Mar-11	2.3	6	6
10-Apr-11	2.9	7.8	6
10-May-11	3	4.8	6
10-Jun-11	3.5	5.7	6
10-Jul-11	2.4	4.1	6
10-Aug-11	2.1	2.8	6
10-Sep-11	2.3	3.5	6
10-Oct-11	2.4	7.1	6
10-Nov-11	2.5	3.7	6
10-Dec-11	2.2	4	6
10-Jan-12	2.7	8.2	6
10-Feb-12	2.2	3.5	6
10-Mar-12	2.3	4.6	6
10-Apr-12	2.6	4.4	6
10-May-12	2.1	5.7	6
10-Jun-12	2.3	3.5	6
10-Jul-12	2.3	3	6
10-Aug-12	1.9	2.4	6
10-Sep-12	2.3	3.5	6
10-Oct-12	2.1	4.1	6
10-Nov-12	2.1	2.7	6
10-Dec-12	1.9	2.8	6
10-Jan-13	2	3.8	6
10-Feb-13	3.6	10.9	6
10-Mar-13	2.6	4.3	6
10-Apr-13	2.4	3.2	6
10-May-13	2.8	5.2	6
10-Jun-13	3.2	7.2	6
10-Jul-13	2.7	7.7	6
10-Aug-13	3.7	8.5	6
10-Sep-13	2.4	3.3	6
10-Oct-13	2.1	3.1	6
10-Nov-13	2.1	4.8	6
10-Dec-13	2.1	6.4	6
10-Jan-14	2.8	6.3	6
10-Feb-14	2.4	4.5	6
10-Mar-14	3.3	8.6	6
10-Apr-14	2.5	4.5	6

Town of Christiansburg WWTP
Effluent Flow Data (MGD)

Date	Flow		
	Monthly Avg.	Maximum	Design Flow
10-May-14	2.5	5.8	6
10-Jun-14	2.5	6.4	6
10-Jul-14	1.9	2.3	6
10-Aug-14	1.9	2.3	6
10-Sep-14	2.4	4.5	6
10-Oct-14	2.1	3.1	6
10-Nov-14	2.2	3.8	6
10-Dec-14	2.1	4.2	6
10-Jan-15	2.3	3.9	6
10-Feb-15	2.2	2.8	6
10-Mar-15	2.2	3.1	6
10-Apr-15	3.4	6.6	6
10-May-15	2.8	5.6	6
10-Jun-15	2.1	3.2	6
10-Jul-15	2.1	2.8	6

Christiansburg WWTP - Outfall 001 Effluent pH Monthly Values

Date	pH Values (SU)	
	Min	Max
10-Jan-10	6.5	7.3
10-Feb-10	6.4	6.9
10-Mar-10	6.4	6.9
10-Apr-10	6.6	7.2
10-May-10	6.7	7.1
10-Jun-10	6.6	7.8
10-Jul-10	6.6	7.1
10-Aug-10	6.6	7.1
10-Sep-10	6.5	7
10-Oct-10	6.4	6.9
10-Nov-10	6.4	7
10-Dec-10	6.5	7.2
10-Jan-11	6.4	7.3
10-Feb-11	7.1	7.5
10-Mar-11	7.1	7.6
10-Apr-11	6.6	7.6
10-May-11	6.7	7.3
10-Jun-11	6.9	7.2
10-Jul-11	6.8	7.2
10-Aug-11	6.6	7.3
10-Sep-11	7	7.4
10-Oct-11	6.8	7.1
10-Nov-11	6.8	7.1
10-Dec-11	6.7	7.4
10-Jan-12	6.7	7.1
10-Feb-12	6.5	7
10-Mar-12	6.6	7.1
10-Apr-12	6.9	7.4
10-May-12	6.9	7.3
10-Jun-12	6.9	7.5
10-Jul-12	6.8	7.3
10-Aug-12	6.6	7.4
10-Sep-12	6.7	7.3
10-Oct-12	6.7	7.2
10-Nov-12	6.7	7.1
10-Dec-12	6.6	7
10-Jan-13	6.5	7.3
10-Feb-13	6.5	7.3
10-Mar-13	6.7	7.4
10-Apr-13	6.8	7.2
10-May-13	6.8	7.5
10-Jun-13	7.1	7.4
10-Jul-13	7.1	7.6
10-Aug-13	7.1	7.5
10-Sep-13	7	7.4
10-Oct-13	6.9	7.3
10-Nov-13	6.9	7.5
10-Dec-13	6.8	7.3
10-Jan-14	6.6	7.3

Date	pH Values (SU)	
	Min	Max
10-Jun-14	7	7.4
10-Jul-14	7	7.4
10-Aug-14	7.1	7.4
10-Sep-14	6.9	7.2
10-Oct-14	6.9	7.4
10-Nov-14	6.9	7.4
10-Dec-14	6.7	7.3
10-Jan-15	6.9	7.5
10-Feb-15	6.8	7.9
10-Mar-15	6.8	7.7
10-Apr-15	6.8	7.4
10-May-15	7	7.5
10-Jun-15	6.9	7.2
10-Jul-15	6.9	7.4

Reduced Monitoring analysis indicates several data points at or below 0.5 SU from lower limit = **Not eligible at this time**

Christiansburg WWTP - Outfall 001 Effluent BOD_5 Data

	Quanity kg/d		Concentration mg/l	
DMR Due Date	Monthly Average	Weekly Max	Average	Max
10-Jan-10	277.2	387.7	18.5	21.8
10-Feb-10	214.3	295.6	17.2	20.2
10-Mar-10	265.5	321.4	22.7	25.1
10-Apr-10	192.1	208.3	16.1	17.8
10-May-10	185.8	205	20.5	22.9
10-Jun-10	156.9	187.9	18	19.1
10-Jul-10	86.8	123.1	11.3	16
10-Aug-10	63.3	92.7	8.9	12.6
10-Sep-10	66.7	77.5	8.5	10.8
10-Oct-10	113.1	144	11.6	16
10-Nov-10	104.1	116.2	12.6	14.1
10-Dec-10	170.6	164.1	20.8	24.2
10-Jan-11	113.8	114.3	15.3	16.1
10-Feb-11	189.3	255.4	24.3	32.1
10-Mar-11	183.9	183.2	21.6	20.7
10-Apr-11	144.5	256.3	12.6	14.2
10-May-11	171.6	213.4	15.2	19
10-Jun-11	291.8	396.5	21.8	29.3
10-Jul-11	164.3	240.9	17.2	22.2
10-Aug-11	41.6	100.3	5	11.6
10-Sep-11	45.2	75.6	4.9	7.8
10-Oct-11	80	139.4	8	10.4
10-Nov-11	75	119.2	8.2	13.4
10-Dec-11	93.8	107.1	10.7	12.5
10-Jan-12	88.6	118.7	8.5	14.4
10-Feb-12	184.4	257.2	22	28.9
10-Mar-12	136	184.6	15.3	18.6
10-Apr-12	44.4	67.3	3.9	6.3
10-May-12	69.6	175.5	7.3	12.6
10-Jun-12	7.6	16.6	0.9	2.1
10-Jul-12	12.7	27.4	1.7	4.3
10-Aug-12	52.7	79.3	7.1	10.8
10-Sep-12	18.7	33.6	2	3.5
10-Oct-12	13.8	17.9	1.7	2.6
10-Nov-12	37.6	50.6	4.7	6.7
10-Dec-12	37.4	39.1	5.1	5.3
10-Jan-13	30.6	49.7	3.9	5.1
10-Feb-13	329.5	256	12.7	9.3
10-Mar-13	77.2	93.1	7.9	8.5
10-Apr-13	47.4	68.5	5.1	7.1
10-May-13	47.9	70.7	4	6
10-Jun-13	33.4	77.6	2.2	3.9
10-Jul-13	10.8	32.5	0.6	1.1
10-Aug-13	7.1	0	0.2	0
10-Sep-13	20.4	49.5	2.2	4.9
10-Oct-13	23.5	59.9	3	7.9
10-Nov-13	40.9	70.9	4.8	6.3

Christiansburg WWTP - Outfall 001 Effluent BOD_5 Data

DMR Due Date	Quanity kg/d		Concentration mg/l	
	Monthly Average	Weekly Max	Average	Max
10-Dec-13	37	92.4	3.6	6.6
10-Jan-14	58.2	82.2	5.2	8.1
10-Feb-14	29.3	38.9	3.3	4.2
10-Mar-14	200.9	336.7	17.8	38.7
10-Apr-14	80.3	96.4	8.3	9.1
10-May-14	61.5	86.6	6.1	6.9
10-Jun-14	29.4	63	2.9	4.9
10-Jul-14	<QL	<QL	<QL	<QL
10-Aug-14	1.3	6	0.18	0.83
10-Sep-14	<QL	<QL	<QL	<QL
10-Oct-14	7.2	24.3	1	3.4
10-Nov-14	<QL	<QL	<QL	<QL
10-Dec-14	17.1	40.5	2	3.9
10-Jan-15	1.6	7.3	0.2	0.8
10-Feb-15	41.3	54.3	4.9	6.5
10-Mar-15	37.8	60.1	4.5	7.8
10-Apr-15	95.2	191.2	6.7	10.3
10-May-15	19.2	21.7	2	2.5
10-Jun-15	<QL	<QL	<QL	<QL
10-Jul-15	3.6	15.3	0.3	1.5

Note 3 year Composite Average =	3.748

Permit Limit =	30 mg/l

Reduced Frequency Analyses

3.748/30 = 12.49%

<25% of limit, so facility is eligible for reduced monitoring

Facility eligible for 1/Week monitoring

Christiansburg WWTP - Outfall 001 Effluent TSS Data

	Quanity		Concentration	
Date	Average kg/d	Maximum kg/d	Average mg/l	Maximum mg/l
10-Jan-10	186.9	286.6	12.8	16.7
10-Feb-10	141	194.4	11.6	14.8
10-Mar-10	146.4	167.6	12.8	15.9
10-Apr-10	111.4	117.6	9.3	10.2
10-May-10	121.7	152.2	13.8	18
10-Jun-10	89.2	104.3	10.5	13.1
10-Jul-10	79.3	117.7	10.5	15.3
10-Aug-10	59	85.7	8.3	11.8
10-Sep-10	49	55.8	6.2	7.3
10-Oct-10	90.4	114.8	9.4	13.1
10-Nov-10	64.9	73.4	7.9	9
10-Dec-10	106	102	12.7	15
10-Jan-11	59	72.3	7.9	10.2
10-Feb-11	88.1	115.9	11.3	14.6
10-Mar-11	108.6	119.6	12.6	13.3
10-Apr-11	70	120.9	6.1	6.7
10-May-11	81	102.3	7.1	7.6
10-Jun-11	161	197.3	11.9	14.3
10-Jul-11	89.4	175.6	9	15.7
10-Aug-11	55.6	119.7	6.8	13.9
10-Sep-11	54.7	88.4	5.9	8.7
10-Oct-11	80.8	159.1	8	10.3
10-Nov-11	65.1	110.7	7	12.2
10-Dec-11	81.3	89.9	9.4	10.6
10-Jan-12	70.3	97	6.7	9.5
10-Feb-12	146.5	180.8	17.7	21.4
10-Mar-12	122.6	187.6	13.5	15.2
10-Apr-12	68	78.2	6.2	7.5
10-May-12	79.6	182.1	8.9	16.3
10-Jun-12	27	29.4	3	3.2
10-Jul-12	38.7	46.9	4.7	6.8
10-Aug-12	88.2	112.7	12	15.3
10-Sep-12	79.4	95.1	9.1	10.9
10-Oct-12	50.9	55.8	6.5	8.2
10-Nov-12	65.4	75	8.3	10.1
10-Dec-12	71.6	71.4	9.9	10
10-Jan-13	53.4	83.9	7	9.1
10-Feb-13	507.2	302.9	18.9	11.4
10-Mar-13	83.7	99.2	8.3	8.9
10-Apr-13	43.6	47.3	4.8	5
10-May-13	48.9	51	4.1	4
10-Jun-13	53.3	80	4.2	5.4
10-Jul-13	48.3	65.4	4.3	4.8
10-Aug-13	60.3	58.7	4.1	5
10-Sep-13	60.1	103.9	6.6	10.3
10-Oct-13	54.3	87.7	6.9	11.5
10-Nov-13	79.3	140.2	9.4	13.2
10-Dec-13	63.8	120.2	6.8	8.5
10-Jan-14	83.1	122.5	7.3	8.8
10-Feb-14	41.3	52.3	4.5	5.3
10-Mar-14	123	168.1	10.3	19.3
10-Apr-14	48.9	54.5	5.1	5.6
10-May-14	42.7	54	4.4	4.3

Christiansburg WWTP - Outfall 001 Effluent TSS Data

Date	Quanity		Concentration	
	Average kg/d	Maximum kg/d	Average mg/l	Maximum mg/l
10-Jun-14	47.7	90.1	4.7	6.6
10-Jul-14	24.6	30.9	3.4	4.4
10-Aug-14	26.5	32.5	3.7	4.6
10-Sep-14	28.4	36.5	3.1	3.8
10-Oct-14	36	56.5	4.5	6.2
10-Nov-14	29.9	33.8	3.5	4.3
10-Dec-14	37.7	42.9	4.9	5.5
10-Jan-15	33.2	30.9	3.8	4.1
10-Feb-15	44	59	5.3	7.1
10-Mar-15	41.4	47.2	4.9	6.1
10-Apr-15	93.9	203.1	6.4	10.5
10-May-15	37.3	50.1	3.5	3.3
10-Jun-15	20.7	22.1	2.5	2.9
10-Jul-15	24.9	29.1	3.1	3.7

3 year composite average = 6.08

Permit Limit = 30 mg/l

Reduced Frequency Analyses

6.08/30 = 20.26%

<25% of limit, so facility is eligible for reduced monitoring

Facility eligible for 1/Week monitoring

Christiansburg WWTP - Outfall 001 Effluent DO Data

Date	Concentration Minimum mg/l
10-Jan-10	6.4
10-Feb-10	6.6
10-Mar-10	6.2
10-Apr-10	7
10-May-10	7.6
10-Jun-10	6.1
10-Jul-10	7.2
10-Aug-10	6.6
10-Sep-10	7
10-Oct-10	6.2
10-Nov-10	7.3
10-Dec-10	6.3
10-Jan-11	6
10-Feb-11	6
10-Mar-11	6.3
10-Apr-11	6.5
10-May-11	6.9
10-Jun-11	6.2
10-Jul-11	6.9
10-Aug-11	6.9
10-Sep-11	6.7
10-Oct-11	6.5
10-Nov-11	6.2
10-Dec-11	6.2
10-Jan-12	6
10-Feb-12	6.1
10-Mar-12	6.1
10-Apr-12	6
10-May-12	7.8
10-Jun-12	7.1
10-Jul-12	6.1
10-Aug-12	6.1
10-Sep-12	6.2
10-Oct-12	6.9
10-Nov-12	7.4
10-Dec-12	8.3
10-Jan-13	8.5
10-Feb-13	6.1
10-Mar-13	6.8
10-Apr-13	6.8
10-May-13	6.4
10-Jun-13	7.2
10-Jul-13	6
10-Aug-13	6.2
10-Sep-13	6.2
10-Oct-13	6
10-Nov-13	6.5
10-Dec-13	6.5
10-Jan-14	6.9
10-Feb-14	7.4
10-Mar-14	6.2
10-Apr-14	7.8

Min Limit = 6.0 mg/l

Reduced Monitoring analysis indicates several data points at or below 0.5 mg/l from minimum limit = **Not eligible at this time**

Date	Concentration Minimum mg/l
10-May-14	6
10-Jun-14	6.5
10-Jul-14	6.7
10-Aug-14	6.1
10-Sep-14	6.2
10-Oct-14	6
10-Nov-14	6.9
10-Dec-14	7.1
10-Jan-15	6.6
10-Feb-15	8.4
10-Mar-15	7.9
10-Apr-15	6.3
10-May-15	7.3
10-Jun-15	6.7
10-Jul-15	6.7

8/14/2015 4:47:24 PM

Facility = Christiansburg WWTP 001 @ 6.0MGD
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 110
WLAc = 28
Q.L. = 0.2
# samples/mo. = 20
# samples/wk. = 4

Summary of Statistics:

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

No Limit is required for this material

The data are:

9

8/14/2015 5:02:08 PM

Facility = Christiansburg WWTP 001 @ 8 MGD
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 84
WLAc = 21
Q.L. = 0.2
# samples/mo. = 20
# samples/wk. = 4

Summary of Statistics:

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

No Limit is required for this material

The data are:

9

8/14/2015 4:53:26 PM

Facility = Christiansburg WWTP 001 @ 6.0MGD
Chemical = Cyanide
Chronic averaging period = 4
WLAa = 430
WLAc = 130
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

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

No Limit is required for this material

The data are:

20

8/14/2015 4:58:12 PM

Facility = Christiansburg WWTP 001 @ 8 MGD
Chemical = Cyanide
Chronic averaging period = 4
WLAa = 330
WLAc = 95
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

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

No Limit is required for this material

The data are:

20

8/14/2015 4:50:38 PM

Facility = Christiansburg WWTP 001 @ 6.0MGD
Chemical = Zinc
Chronic averaging period = 4
WLAa = 1800
WLAc = 2200
Q.L. = 2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 80
Variance = 2304
C.V. = 0.6
97th percentile daily values = 194.673
97th percentile 4 day average = 133.103
97th percentile 30 day average= 96.4842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

80

8/14/2015 5:00:36 PM

Facility = Christiansburg WWTP 001 @ 8 MGD
Chemical = Zinc
Chronic averaging period = 4
WLAa = 1300
WLAc = 1600
Q.L. = 2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 80
Variance = 2304
C.V. = 0.6
97th percentile daily values = 194.673
97th percentile 4 day average = 133.103
97th percentile 30 day average= 96.4842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

80

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office – Lynchburg
WATER DIVISION

7705 Timberlake Road Lynchburg, VA 24502

SUBJECT: CHRISTIANSBURG WWTP, VPDES PERMIT # VA0061751, TOXICS MANAGEMENT PROGRAM DATA REVIEW

TO: Kip Foster, Water Permits Manager - BRRO

FROM: Kirk Batsel, Water Permit Writer – BRRO

DATE: August 11, 2015

COPIES: Permit file

General Background

The subject facility's VPDES permit is currently being reissued. As part of the reissuance, toxicity data generated during the current permit term has been evaluated. The facility, a municipal major, significantly changed operations for improved plant performance in February 2012, by increasing Mixed Liquor Suspended Solids (MLSS) from an operational low of <1,800 mg/l to >2,200 mg/l. The current (2015) application documents this change in operation and requests that toxicity data review be limited to those tests conducted after (post) operational change. In accordance with guidance provided during a preliminary reissuance meeting with DEQ, the facility generated a total of 10 sets of tests to characterize the "new operational" effluent discharged from the WWTP. Based on this documented operational change at the facility, it is agreed that toxicity assessment should be limited to those toxicity tests generated post operational change (February 2012 – present).

The facility's permit includes conditions for both the existing design capacity of 6 MGD and a proposed expansion to 8 MGD. The current permit required quarterly chronic toxicity tests using both an invertebrate (*Ceriodaphnia dubia*) and vertebrate (*Pimephales promelas*) indicator organism followed by annual tests. However, as noted above, the facility elected to conduct additional quarterly chronic toxicity tests to have a total of ten sets of tests available for assessment upon permit reissuance. Please refer to Table 1 for results of tests generated during the current permit term.

Table 1. Chronic Toxicity Test Results for Christiansburg WWTP; VA0061751, Outfall 001

Date of test	Invertebrate NOEC % / TUc	Vertebrate NOEC %/TUc	Survival in 100% effluent	Testing Laboratory
3/13-19/12	100/1.0	100/1.0	100% C.d. 98% P.p.	CBI
5/30-6/6/12	100/1.0	100/1.0	100% C.d. 98% P.p.	CBI
8/28-9/4/12	100/1.0	100/1.0	100% C.d. 100% P.p.	CBI
10/31-11/7/12	**53/1.89(reproduction)**	100/1.0	90% C.d. 100% P.p.	CBI
3/12-19/13	100/1.0	**30/3.33(biomass)**	90% C.d. 98% P.p.	CBI
9/4-11/13	100/1.0	100/1.0	90% C.d. 90% P.p.	CBI
5/28-6/2/14	100/1.0	**53/1.88(Survival & biomass)**	100% C.d. 65% P.p.	CBI
8/25-28/14	100/1.0	100/1.0	90% C.d. 97.5% P.p.	CBI
11/17-20/14	**3/33.33(reproduction)**	100/1.0	100% C.d. 100% P.p.	CBI
2/23-26/14	100/1.0	100/1.0	100% C.d. 100% P.p.	CBI

Note: All above tests were reviewed in this technical review.

Discussion

The facility completed a total of ten sets of chronic toxicity tests since a significant change in plant operations was initiated in February 2012. All of tests were evaluated during this technical review. The chronic toxicity test endpoints were reconfirmed using the attached WETLIM spreadsheet. The endpoint remains a NOEC of 6% effluent for both the 6 MGD and 8MGD flow tiers. The test endpoints presented above were evaluated for the need for a WET limitation using STATS.exe per agency procedure. STATS results for both species are attached. The assessment did not indicate a need for a WET limitation at this time.

Recommendations

1) Based on the above, it is recommended that annual compliance chronic toxicity tests, utilizing both an vertebrate and an invertebrate indicator organism, continue with the reissued permit at the 6 MGD tier.

2) Should the CTO for the expanded 8.0 MGD facility be issued during the next permit term, the new expanded effluent should be re-characterized using quarterly chronic toxicity tests until a total of 10 sets of tests have been completed.

3) The chronic tests should utilize a dilution series predictive of toxicity at a 6% effluent concentration. Suggested monitoring series may be found in the Attached WETLIM spreadsheets (Table 4) for both 6 and 8 MGD.

4) A TMP special condition, in accordance with the above is attached for inclusion in the subject reissued permit.

(?). TOXICS MANAGEMENT PROGRAM

1. Biological Monitoring:

a. In accordance with the schedule in 2. below, the permittee shall conduct annual chronic toxicity tests using 24-hour flow-proportioned composite samples of final effluent from outfall 001.

The chronic tests to use are:

Chronic 7-Day Static Renewal Survival and Growth Test using *Pimephales promelas.*
Chronic 3-Brood Static Renewal Survival and Reproduction Test using *Ceriodaphnia dubia.*

These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction or growth. Results which cannot be determined (i.e., a "less than" NOEC value) are not acceptable, and a retest will have to be performed. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. Report the LC_{50} at 48 hours and the IC_{25} with the NOEC's in the test report.

b. The permittee may provide additional chronic tests to address data variability during the period of data generation. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

c. The test dilutions should be able to determine compliance with the following endpoints:

(1) Chronic NOEC of 6% effluent which is equivalent to a TU_c of 16.66.

d. The test data will be evaluated by STATS.EXE for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests of 1.a. may be discontinued.

e. In the event that the CTO for the expanded 8.0 MGD facility is issued, the permittee shall conduct quarterly chronic toxicity tests, as in 1.a. above, until there are a minimum of 10 sets of valid tests completed. Quarterly chronic toxicity tests for the expanded facility shall begin with six months of CTO issuance. These tests will be evaluated as in 1.d. above.

2. Reporting Schedule:

The permittee shall supply a copy of the toxicity test reports specified in this Toxics Management Program in accordance with the following schedule:

Period	Compliance Periods	DMR/Report Submission
Annual 1	Permit Effective Date to 12/31/15	2/10/16
Annual 2	1/1/16 to 12/31/16	2/10/17
Annual 3	1/1/17 to 12/31/17	2/10/18
Annual 4	1/1/18 to 12/31/18	1/10/19
Annual 5	1/1/19 to 12/31/19	1/10/20

8/10/2015 12:28:21 AM

Facility = Christiansburg WWTP
Chemical = WET Cd
Chronic averaging period = 4
WLAa =
WLAc = 16.67
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 1.30639
Variance = .311582
C.V. = 0.427280
97th percentile daily values = 2.59527
97th percentile 4 day average = 1.90091
97th percentile 30 day average= 1.49808
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

1
1
1
1
3.33
1
1.88
1
1
1

8/10/2015 12:25:47 AM

Facility = Christiansburg WWTP
Chemical = WET - Pp
Chronic averaging period = 4
WLAa =
WLAc = 16.67
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 2.78577
Variance = 18.5375
C.V. = 1.545540
97th percentile daily values = 12.0892
97th percentile 4 day average = 7.98475
97th percentile 30 day average= 4.26438
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

1
1
1
1.89
1
1
1
1
33.33
1

Spreadsheet for determination of WET test endpoints or WET limits

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

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

ACUTE 1.980000049 TUa — LC_{50} = 51 % Use as 1.96 TUa

ACUTE WLAa 1.98

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

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

CHRONIC	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c
BOTH*	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c
AML	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c

ACUTE WLAa,c 19.8
CHRONIC WLAc 22.2
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 8.13670468 a limit may result using STATS.EXE

Enter data in the cells with blue type:

Entry Date: 08/11/15
Facility Name: New River
VPDES Number: VA0061751
Outfall Number: 1

% Flow to be used from MIX.EXE

Diffuser /modeling study? Enter Y/N Y

Plant Flow:	6 MGD			
Acute 1Q10:	467 MGD	100 %	Acute	6.6 :1
Chronic 7Q10:	577 MGD	100 %	Chronic	22.2 :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	15.15151515 %	Plant flow/plant flow + 1Q10	NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use
IWC_c	4.504504505 %	Plant flow/plant flow + 7Q10	
Dilution, acute	6.6	100/IWCa	
Dilution, chronic	22.2	100/IWCc	

WLA_a 1.98 Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c 22.2 Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$ 19.8 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.

$LTA_{a,c}$ 8.13670506 WLAa,c X's eA
LTA_c 13.34302806 WLAc X's eB

							Rounded NOEC's	%
MDL** with $LTA_{a,c}$	19.80000049	TU_c	NOEC =	5.050505	(Protects from acute/chronic toxicity)		NOEC =	6 %
MDL** with LTA_c	32.46915798	TU_c	NOEC =	3.079846	(Protects from chronic toxicity)		NOEC =	4 %
AML with lowest LTA	19.80000049	TU_c	NOEC =	5.050505	Lowest LTA X's eD		NOEC =	6

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

						Rounded LC50's	%
MDL with $LTA_{a,c}$	1.980000049	TU_a	LC50 =	50.505049 %		LC50 =	51 %
MDL with LTA_c	3.246915798	TU_a	LC50 =	30.798458 %		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.

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.889296658

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.509098225

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

Table 1. ACR using Vertebrate data

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

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

Table 2. ACR using Invertebrate data

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

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

Table 3. ACR used: 10

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

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

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	12.3	8.1367047		
Dilution series to use for limit			6	16.666667
Dilution factor to recommend:	0.3505708		0.244949	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	35.1	2.85	24.5	4.08
	12.3	8.14	6.0	16.67
	4.3	23.21	1.5	68.04
	1.51	66.21	0.4	277.78
Extra dilutions if needed	0.53	188.85	0.1	1134.02
	0.19	538.70	0.0	4629.63

Cell: I8
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Spreadsheet for determination of WET test endpoints or WET limits

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

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

ACUTE 1.980000049 TUa — LC_{50} = 51 % Use as 1.96 TUa

ACUTE WLAa 1.98 — Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using STATS.EXE

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

CHRONIC	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c
BOTH*	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c
AML	19.80000049	TU_c	NOEC =	6 %	Use as 16.66	TU_c

ACUTE WLAa,c 19.8
CHRONIC WLAc 22.2
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 8.13670468 a limit may result using STATS.EXE

Enter data in the cells with blue type:

Entry Date: 08/11/15
Facility Name: New River
VPDES Number: VA0061751
Outfall Number: 1

		% Flow to be used from MIX.EXE	Diffuser /modeling study? Enter Y/N Y
Plant Flow:	8 MGD		
Acute 1Q10:	467 MGD	100 %	Acute 6.6 :1
Chronic 7Q10:	577 MGD	100 %	Chronic 22.2 :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	15.15151515 %	Plant flow/plant flow + 1Q10	NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use
IWC_c	4.504504505 %	Plant flow/plant flow + 7Q10	
Dilution, acute	6.6	100/IWCa	
Dilution, chronic	22.2	100/IWCc	

WLA_a 1.98 Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c 22.2 Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$ 19.8 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 samples 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.

$LTA_{a,c}$	8.13670506	WLAa,c X's eA					Rounded NOEC's	%
LTA_c	13.34302806	WLAc X's eB						
MDL** with $LTA_{a,c}$	19.80000049	TU_c	NOEC =	5.050505	(Protects from acute/chronic toxicity)		NOEC =	6 %
MDL** with LTA_c	32.46915798	TU_c	NOEC =	3.079846	(Protects from chronic toxicity)		NOEC =	4 %
AML with lowest LTA	19.80000049	TU_c	NOEC =	5.050505	Lowest LTA X's eD		NOEC =	6

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

							Rounded LC50's	%
MDL with $LTA_{a,c}$	1.980000049	TU_a	LC50 =	50.505049	%		LC50 =	51 %
MDL with LTA_c	3.246915798	TU_a	LC50 =	30.798458	%		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 = -0.889296658

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_x^2 = 0.086177696

δ_x = 0.293560379

B = -0.509098225

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

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

δ_h^2 = 0.3074847

δ_h = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED 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 % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	12.3	8.1367047		
Dilution series to use for limit			6	16.666667
Dilution factor to recommend:	0.3505708		0.244949	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	35.1	2.85	24.5	4.08
	12.3	8.14	6.0	16.67
	4.3	23.21	1.5	68.04
	1.51	66.21	0.4	277.78
Extra dilutions if needed	0.53	188.85	0.1	1134.02
	0.19	538.70	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

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:
Christiansburg Wastewater Treatment Facility
Receiving Stream:
New River

Permit No.: VA0061751
Date: 6/9/2010

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

Stream Information		Stream Flows		Mixing Information			Effluent Information	
Mean Hardness (as CaCO3) =	76 mg/L	1Q10 (Annual) =	467 MGD	Annual	- 1Q10 Flow =	100 %	Mean Hardness (as CaCO3) =	176 mg/L
90% Temperature (Annual) =	23 deg C	7Q10 (Annual) =	577 MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	21 deg C
90% Temperature (Wet season) =	14 deg C	30Q10 (Annual) =	663 MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =	17 deg C
90% Maximum pH =	8.2 SU	1Q10 (Wet season) =	546 MGD	Wet Season	- 1Q10 Flow =	100 %	90% Maximum pH =	7.4 SU
10% Maximum pH =	7.3 SU	30Q10 (Wet season) =	1079 MGD		- 30Q10 Flow =	100 %	10% Maximum pH =	6.8 SU
Tier Designation =	2	30Q5 =	741 MGD				1992 Discharge Flow =	0.000 MGD
Public Water Supply (PWS) Y/N? =	Y	Harmonic Mean =	1527 MGD				Discharge Flow for Limit Analysis =	6.000 MGD
V(alley) or P(iedmont)? =	V							
Trout Present Y/N? =	N							
Early Life Stages Present Y/N? =	Y							

Footnotes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

Antidegradation Baselines as established in 2010 FACT SHEET

Facility Name:	Permit No.:																	
Chesapeake Wastewater Treatment Facility	VA0081751								PRE - DISCHARGE WATER QUALITY CRITERIA									
Receiving Stream:	Date:								0.000 MGD Discharge Flow - 100% Stream Mix									
New River	6/8/2010	97th Percentiles of Effluent Concentrations				Current Downstream Mix Concentrations			Aquatic Protection		Human Health		INSTREAM BASELINES					
											Public Water	Other Surface						
Toxic Parameter and Form	Carcinogen?	Daily	4-Day	30-Day	Expected Value of Upstream Data	Acute	Chronic	H-Health	Acute	Chronic	Supplies	Waters	Acute	Chronic	H-Health
Acenaphthene	N	0	0	0	0	0	0	0	None	None	6.7E+02	9.9E+02	None	None	6.7E+01
Acrolein	N	0	0	0	0	0	0	0	None	None	6.1E+00	9.3E+00	None	None	6.1E-01
Acrylonitrile	Y	0	0	0	0	0	0	0	None	None	5.1E-01	2.5E+00	None	None	5.1E-02
Aldrin	Y	0	0	0	0	0	0	0	3.0E+00	None	4.9E-04	5.0E-04	7.5E-01	None	4.9E-05
Ammonia-N (Annual)	N	0.39046	0.267	0.19352	0.046155	0	0	0	5.7E+00 mg/L	1.0E+00 mg/L	None	None	1.5E+00 mg/L	2.9E-01 mg/L	None
Ammonia-N (Wet Season)	N	0.39046	0.267	0.19352	0.030967	0	0	0	5.7E+00 mg/L	1.8E+00 mg/L	None	None	1.5E+00 mg/L	4.7E-01 mg/L	None
Anthracene	N	0	0	0	0	0	0	0	None	None	8.3E+03	4.0E+04	None	None	8.3E+02
Antimony	N	0	0	0	0	0	0	0	None	None	5.6E+00	6.4E+02	None	None	5.6E-01
Arsenic	N	0	0	0	0	0	0	0	3.4E+02	1.5E+02	1.0E+01	None	8.5E+01	3.8E+01	1.0E+00
Barium	N	0	0	0	0	0	0	0	None	None	2.0E+03	None	None	None	2.0E+02
Benzene	Y	0	0	0	0	0	0	0	None	None	2.2E+01	5.1E+02	None	None	2.2E+00
Benzidine	Y	0	0	0	0	0	0	0	None	None	8.6E-04	2.0E-03	None	None	8.6E-05
Benzo(a)anthracene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(a)pyrene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(b)fluoranthene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(k)fluoranthene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Bis2-Chloroethyl Ether	Y	0	0	0	0	0	0	0	None	None	3.0E-01	5.3E+00	None	None	3.0E-02
Bis2-Chloroisopropyl Ether	N	0	0	0	0	0	0	0	None	None	1.4E+03	6.5E+04	None	None	1.4E+02
Bis2-Ethylhexyl Phthalate	Y	0	0	0	0	0	0	0	None	None	1.2E+01	2.2E+01	None	None	1.2E+00
Bromoform	Y	0	0	0	0	0	0	0	None	None	4.3E+01	1.4E+03	None	None	4.3E+00
Butyl Benzyl Phthalate	N	0	0	0	0	0	0	0	None	None	1.5E+03	1.9E+03	None	None	1.5E+02
Cadmium	N	0	0	0	0	0	0	0	2.9E+00	9.1E-01	5.0E+00	None	7.2E-01	2.3E-01	5.0E-01
Carbon Tetrachloride	Y	0	0	0	0	0	0	0	None	None	2.3E+00	1.6E+01	None	None	2.3E-01
Chlordane	Y	0	0	0	0	0	0	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	6.0E-01	1.1E-03	8.0E-04
Chloride	N	0	0	0	0	0	0	0	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	2.2E+02 mg/L	5.8E+01 mg/L	2.5E+01
Chlorine, Total Residual	N	0	0	0	0	0	0	0	1.9E-02 mg/L	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/L	None
Chlorobenzene	N	0	0	0	0	0	0	0	None	None	1.3E+02	1.6E+03	None	None	1.3E+01
Chlorodibromomethane	Y	0	0	0	0	0	0	0	None	None	4.0E+00	1.3E+02	None	None	4.0E-01
Chloroform	N	0	0	0	0	0	0	0	None	None	3.4E+02	1.1E+04	None	None	3.4E+01
2-Chloronaphthalene	N	0	0	0	0	0	0	0	None	None	1.0E+03	1.6E+03	None	None	1.0E+02
2-Chlorophenol	N	0	0	0	0	0	0	0	None	None	8.1E+01	1.5E+02	None	None	8.1E+00
Chlorpyrifos	N	0	0	0	0	0	0	0	8.3E-02	4.1E-02	None	None	2.1E-02	1.0E-02	None
Chromium (+3)	N	0	0	0	0	0	0	0	4.6E+02	5.8E+01	None	None	1.1E+02	1.5E+01	None
Chromium (+6)	N	0	0	0	0	0	0	0	1.6E+01	1.1E+01	None	None	4.0E+00	2.8E+00	None
Total Chromium	N	0	0	0	0	0	0	0	None	None	1.0E+02	None	None	None	1.0E+01
Chrysene	Y	0	0	0	0	0	0	0	None	None	3.8E-03	1.8E-02	None	None	3.8E-04
Copper	N	19.4673	13.31	9.64842	0.645	0.645	0.645	#REF!	1.0E+01	7.1E+00	1.3E+03	None	3.1E+00	2.3E+00	#REF!
Cyanide, Free	N	0	0	0	0	0	0	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	5.5E+00	1.3E+00	1.4E+01
DDD	Y	0	0	0	0	0	0	0	None	None	3.1E-03	3.1E-03	None	None	3.1E-04
DDE	Y	0	0	0	0	0	0	0	None	None	2.2E-03	2.2E-03	None	None	2.2E-04
DDT	Y	0	0	0	0	0	0	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.8E-01	2.5E-04	2.2E-04
Demeton	N	0	0	0	0	0	0	0	None	1.0E-01	None	None	None	2.8E-02	None
Diazinon	N	0	0	0	0	0	0	0	1.7E-01	1.7E-01	None	None	4.3E-02	4.3E-02	None
Dibenz(a,h)anthracene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
1,2-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	4.2E+02	1.3E+03	None	None	4.2E+01
1,3-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	3.2E+02	9.6E+02	None	None	3.2E+01
1,4-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	6.3E+01	1.9E+02	None	None	6.3E+00
3,3-Dichlorobenzidine	Y	0	0	0	0	0	0	0	None	None	2.1E-01	2.8E-01	None	None	2.1E-02
Dichlorobromomethane	Y	0	0	0	0	0	0	0	None	None	5.5E+00	1.7E+02	None	None	5.5E-01
1,2-Dichloroethane	Y	0	0	0	0	0	0	0	None	None	3.8E+00	3.7E+02	None	None	3.8E-01
1,1-Dichloroethylene	N	0	0	0	0	0	0	0	None	None	3.3E+02	7.1E+03	None	None	3.3E+01
1,2-trans-dichloroethylene	N	0	0	0	0	0	0	0	None	None	1.4E+02	1.0E+04	None	None	1.4E+01
2,4-Dichlorophenol	N	0	0	0	0	0	0	0	None	None	7.7E+01	2.9E+02	None	None	7.7E+00
2,4-Dichlorophenoxy Acetic Acid	N	0	0	0	0	0	0	0	None	None	1.0E+02	None	None	None	1.0E+01
1,2-Dichloropropane	Y	0	0	0	0	0	0	0	None	None	5.0E+00	1.5E+02	None	None	5.0E-01
1,3-Dichloropropene	Y	0	0	0	0	0	0	0	None	None	3.4E+00	2.1E+02	None	None	3.4E-01
Dieldrin	Y	0	0	0	0	0	0	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	6.0E-02	1.4E-02	5.2E-05
Diethyl Phthalate	N	0	0	0	0	0	0	0	None	None	1.7E+04	4.4E+04	None	None	1.7E+03
2,4 Dimethylphenol	N	0	0	0	0	0	0	0	None	None	3.8E+02	8.5E+02	None	None	3.8E+01
Dimethyl Phthalate	N	0	0	0	0	0	0	0	None	None	2.7E+05	1.1E+06	None	None	2.7E+04
Di-n-Butyl Phthalate	N	0	0	0	0	0	0	0	None	None	2.0E+03	4.5E+03	None	None	2.0E+02
2,4 Dinitrophenol	N	0	0	0	0	0	0	0	None	None	6.9E+01	5.3E+03	None	None	6.9E+00
2-Methyl-4,6-Dinitrophenol	N	0	0	0	0	0	0	0	None	None	1.3E+01	2.8E+02	None	None	1.3E+00
2,4-Dinitrotoluene	Y	0	0	0	0	0	0	0	None	None	1.1E+00	3.4E+01	None	None	1.1E-01
Dioxin +	N	0	0	0	0	0	0	0	None	None	5.0E-08	5.1E-08	None	None	5.0E-09
1,2-Diphenylhydrazine	Y	0	0	0	0	0	0	0	None	None	3.8E-01	2.0E+00	None	None	3.8E-02
Alpha-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	6.2E+00
Beta-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	6.2E+00
Alpha+Beta-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	None	None	5.5E-02	1.4E-02	None
Endosulfan Sulfate	N	0	0	0	0	0	0	0	None	None	6.2E+01	8.9E+01	None	None	6.2E+00

Facility Name:	Permit No.:
Chilhowie Wastewater Treatment Facility	VA0061761
Receiving Stream:	Date:
New River	6/9/2010

PRE - DISCHARGE WATER QUALITY CRITERIA
0.000 MGD Discharge Flow - 100% Stream Mix

Toxic Parameter and Form	Carcinogen?	97th Percentiles of Effluent Concentrations: Daily	4-Day	30-Day	Expected Value of Upstream Data	Current Downstream Mix Concentrations: Acute	Chronic	H-Health	Aquatic Protection: Acute	Chronic	Human Health: Public Water Supplies	Other Surface Waters	INSTREAM BASELINES: Acute	Chronic	H-Health
Endrin	N	0	0	0	0	0	0	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	2.2E-02	9.0E-03	5.9E-05
Endrin Aldehyde	N	0	0	0	0	0	0	0	None	None	2.9E-01	3.0E-01	None	None	2.9E-02
Ethylbenzene	N	0	0	0	0	0	0	0	None	None	5.3E+02	2.1E+03	None	None	5.3E+01
Fluoranthene	N	0	0	0	0	0	0	0	None	None	1.3E+02	1.4E+02	None	None	1.3E+01
Fluorene	N	0	0	0	0	0	0	0	None	None	1.1E+03	5.3E+03	None	None	1.1E+02
Foaming Agents (MBAS)	N	0	0	0	0	0	0	0	None	None	5.0E+02	None	None	None	5.0E+01
Guthion	N	0	0	0	0	0	0	0	None	1.0E-02	None	None	None	2.6E-03	None
Heptachlor	Y	0	0	0	0	0	0	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.3E-01	9.5E-04	7.9E-05
Heptachlor Epoxide	Y	0	0	0	0	0	0	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.3E-01	9.5E-04	3.9E-05
Hexachlorobenzene	Y	0	0	0	0	0	0	0	None	None	2.8E-03	2.9E-03	None	None	2.8E-04
Hexachlorobutadiene	Y	0	0	0	0	0	0	0	None	None	4.4E+00	1.8E+02	None	None	4.4E-01
Hexachlorocyclohexane Alpha-BHC	Y	0	0	0	0	0	0	0	None	None	2.6E-02	4.9E-02	None	None	2.6E-03
Hexachlorocyclohexane Beta-BHC	Y	0	0	0	0	0	0	0	None	None	9.1E-02	1.7E-01	None	None	9.1E-03
Hexachlorocyclohexane Gamma-BHC (Lindane)	Y	0	0	0	0	0	0	0	9.5E-01	None	9.8E-01	1.8E+00	2.4E-01	None	9.8E-02
Hexachlorocyclopentadiene	N	0	0	0	0	0	0	0	None	None	4.0E+01	1.1E+03	None	None	4.0E+00
Hexachloroethane	Y	0	0	0	0	0	0	0	None	None	1.4E+01	3.3E+01	None	None	1.4E+00
Hydrogen Sulfide	N	0	0	0	0	0	0	0	None	2.0E+00	None	None	None	5.0E-01	None
Indeno(1,2,3-cd)pyrene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Iron	N	0	0	0	0	0	0	0	None	None	3.0E+02	None	None	None	3.0E+01
Isophorone	Y	0	0	0	0	0	0	0	None	None	3.5E+02	9.6E+03	None	None	3.5E+01
Kepone	N	0	0	0	0	0	0	0	None	Zero	None	None	None	Zero	None
Lead	N	0	0	0	0	0	0	0	6.4E+01	9.5E+00	1.5E+01	None	2.1E+01	2.4E+00	1.5E+00
Malathion	N	0	0	0	0	0	0	0	None	1.0E-01	None	None	None	2.5E-02	None
Manganese	N	0	0	0	0	0	0	0	None	None	5.0E+01	None	None	None	5.0E+00
Mercury	N	0	0	0	0	0	0	0	1.4E+00	7.7E-01	None	None	3.5E-01	1.9E-01	None
Methyl Bromide	N	0	0	0	0	0	0	0	None	None	4.7E+01	1.5E+03	None	None	4.7E+00
Methylene Chloride	Y	0	0	0	0	0	0	0	None	None	4.6E+01	5.9E+03	None	None	4.6E+00
Methoxychlor	N	0	0	0	0	0	0	0	None	3.0E-02	1.0E+02	None	None	7.5E-03	1.0E+01
Mirex	N	0	0	0	0	0	0	0	None	Zero	None	None	None	Zero	None
Nickel	N	0	0	0	0	0	0	0	1.4E+02	1.6E+01	6.1E+02	4.6E+03	3.6E+01	4.0E+00	6.1E+01
Nitrate (as N)	N	0	0	0	0	0	0	0	None	None	1.0E+01 mg/L	None	None	None	1.0E+00
Nitrobenzene	N	0	0	0	0	0	0	0	None	None	1.7E+01	6.9E+02	None	None	1.7E+00
N-Nitrosodimethylamine	Y	0	0	0	0	0	0	0	None	None	6.9E-03	3.0E+01	None	None	6.9E-04
N-Nitrosodiphenylamine	Y	0	0	0	0	0	0	0	None	None	3.3E+01	6.0E+01	None	None	3.3E+00
N-Nitrosodi-n-propylamine	Y	0	0	0	0	0	0	0	None	None	5.0E-02	5.1E+00	None	None	5.0E-03
Nonylphenol	N	0	0	0	0	0	0	0	2.8E+01	6.6E+00	None	None	7.0E+00	1.7E+00	None
Parathion	N	0	0	0	0	0	0	0	6.5E-02	1.3E-02	None	None	1.6E-02	3.3E-03	None
PCB Total	Y	0	0	0	0	0	0	0	None	1.4E-02	6.4E-04	6.4E-04	None	3.5E-03	6.4E-05
Pentachlorophenol	Y	0	0	0	0	0	0	0	1.2E+01	9.0E+00	2.7E+00	3.0E+01	2.9E+00	2.3E+00	2.7E-01
Phenol	N	0	0	0	0	0	0	0	None	None	1.0E+04	8.6E+05	None	None	1.0E+03
Pyrene	N	0	0	0	0	0	0	0	None	None	8.3E+02	4.0E+03	None	None	8.3E+01
RadNuc - Beta Part & Photon Act	N	0	0	0	0	0	0	0	None	None	4.0E+00 mrem	None	None	None	4.0E-01
RadNuc - Gross Alpha Part Act	N	0	0	0	0	0	0	0	None	None	1.5E+01 pCi/L	None	None	None	1.5E+00
RadNuc - Radium 226 + 228	N	0	0	0	0	0	0	0	None	None	5.0E+00 pCi/L	None	None	None	5.0E-01
RadNuc - Uranium	N	0	0	0	0	0	0	0	None	None	3.0E+01	None	None	None	3.0E+00
Selenium, Total Recoverable	N	0	0	0	0	0	0	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	5.0E+00	1.3E+00	1.7E+01
Silver	N	0	0	0	0	0	0	0	2.2E+00	None	None	None	5.4E-01	None	None
Sulfate	N	0	0	0	0	0	0	0	None	None	2.5E+02 mg/L	None	None	None	2.5E+01
1,1,2,2-Tetrachloroethane	Y	0	0	0	0	0	0	0	None	None	1.7E+00	4.0E+01	None	None	1.7E-01
Tetrachloroethylene	Y	0	0	0	0	0	0	0	None	None	6.9E+00	3.3E+01	None	None	6.9E-01
Thallium	N	0	0	0	0	0	0	0	None	None	2.4E-01	4.7E-01	None	None	2.4E-02
Toluene	N	0	0	0	0	0	0	0	None	None	5.1E+02	6.0E+03	None	None	5.1E+01
Total Dissolved Solids	N	0	0	0	0	0	0	0	None	None	5.0E+05	None	None	None	5.0E+04
Toxaphene	Y	0	0	0	0	0	0	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.8E-01	5.0E-05	2.8E-04
Tributyltin	N	0	0	0	0	0	0	0	4.6E-01	7.2E-02	None	None	1.2E-01	1.8E-02	None
1,2,4-Trichlorobenzene	N	0	0	0	0	0	0	0	None	None	3.5E+01	7.0E+01	None	None	3.5E+00
1,1,2-Trichloroethane	Y	0	0	0	0	0	0	0	None	None	5.9E+00	1.6E+02	None	None	5.9E-01
Trichloroethylene	Y	0	0	0	0	0	0	0	None	None	2.5E+01	3.0E+02	None	None	2.5E+00
2,4,6-Trichlorophenol	Y	0	0	0	0	0	0	0	None	None	1.4E+01	2.4E+01	None	None	1.4E+00
2-(2,4,5-Trichlorophenoxy propionic acid (Silvex)	N	0	0	0	0	0	0	0	None	None	5.0E+01	None	None	None	5.0E+00
Vinyl Chloride	Y	0	0	0	0	0	0	0	None	None	2.5E-01	2.4E+01	None	None	2.5E-02
Zinc	N	139.515	95.391	89.147	3.675	3.675	3.675	3.675	9.3E+01	8.4E+01	7.4E+03	2.6E+04	2.6E+01	2.6E+01	7.4E+02

Facility Name:
Chickasaw Wastewater Treatment Facility

Receiving Stream:
New River

Toxic Parameter and Form	ANTIDEGRADATION WASTE LOAD ALLOCATIONS (6.000 MGD Discharge - 100% Stream Mix)			POST - DISCHARGE WATER QUALITY CRITERIA (6.000 MGD Discharge Flow - Mix per "Mixer")				NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS (6.000 MGD Discharge - Mix per "Mixer")			MOST RESTRICTIVE WASTE LOAD ALLOCATIONS (6.000 MGD Discharge Flow)			Target Level
	Aquatic Protection		Human	Aquatic Protection		Human Health		Aquatic Protection		Human	Aquatic Protection		Human	
	Acute	Chronic	Health	Acute	Chronic	Public Water Supplies	Other Surface Waters	Acute	Chronic	Health	Acute	Chronic	Health	
Acenaphthene	N/A	N/A	8.3E+03	None	None	6.7E+02	9.9E+02	N/A	N/A	8.3E+04	N/A	N/A	8.3E+03	N/A
Acrolein	N/A	N/A	7.6E+01	None	None	6.1E+00	9.3E+00	N/A	N/A	7.6E+02	N/A	N/A	7.6E+01	N/A
Acrylonitrile	N/A	N/A	1.3E+01	None	None	5.1E-01	2.5E+00	N/A	N/A	1.3E+02	N/A	N/A	1.3E+01	N/A
Aldrin	5.9E+01	N/A	1.3E-02	3.0E+00	None	4.9E-04	5.0E-04	2.4E+02	N/A	1.3E-01	5.9E+01	N/A	1.3E-02	N/A
Ammonia-N (Annual)	1.1E+02 mg/L	2.8E+01 mg/L	N/A	6.1E+00 mg/L	1.1E+00 mg/L	None	None	4.7E+02 mg/L	1.1E+02 mg/L	N/A	1.1E+02 mg/L	2.8E+01 mg/L	N/A	N/A
Ammonia-N (Wet Season)	1.3E+02 mg/L	8.0E+01 mg/L	N/A	6.0E+00 mg/L	1.8E+00 mg/L	None	None	5.5E+02 mg/L	3.3E+02 mg/L	N/A	1.3E+02 mg/L	8.0E+01 mg/L	N/A	N/A
Anthracene	N/A	N/A	1.0E+05	None	None	8.3E+03	4.0E+04	N/A	N/A	1.0E+06	N/A	N/A	1.0E+05	N/A
Antimony	N/A	N/A	7.0E+01	None	None	5.6E+00	6.4E+02	N/A	N/A	7.0E+02	N/A	N/A	7.0E+01	7.0E+01
Arsenic	6.7E+03	3.6E+03	1.2E+02	3.4E+02	1.5E+02	1.0E+01	None	2.7E+04	1.5E+04	1.2E+03	6.7E+03	3.6E+03	1.2E+02	1.2E+02
Barium	N/A	N/A	2.5E+04	None	None	2.0E+03	None	N/A	N/A	2.5E+05	N/A	N/A	2.5E+04	2.5E+04
Benzene	N/A	N/A	5.6E+02	None	None	2.2E+01	5.1E+02	N/A	N/A	5.6E+03	N/A	N/A	5.6E+02	N/A
Benzidine	N/A	N/A	2.2E-02	None	None	6.6E-04	2.0E-03	N/A	N/A	2.2E-01	N/A	N/A	2.2E-02	N/A
Benzo(a)anthracene	N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
Benzo(a)pyrene	N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
Benzo(b)fluoranthene	N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
Benzo(k)fluoranthene	N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
Bis2-Chloroethyl Ether	N/A	N/A	7.7E+00	None	None	3.0E-01	9.3E+00	N/A	N/A	7.7E+01	N/A	N/A	7.7E+00	N/A
Bis2-Chloroisopropyl Ether	N/A	N/A	1.7E+04	None	None	1.4E+03	6.5E+04	N/A	N/A	1.7E+05	N/A	N/A	1.7E+04	N/A
Bis2-Ethylehexyl Phthalate	N/A	N/A	3.1E+02	None	None	1.2E+01	2.2E+01	N/A	N/A	3.1E+03	N/A	N/A	3.1E+02	N/A
Bromoform	N/A	N/A	1.1E+03	None	None	4.3E+01	1.4E+03	N/A	N/A	1.1E+04	N/A	N/A	1.1E+03	N/A
Butyl Benzyl Phthalate	N/A	N/A	1.9E+04	None	None	1.5E+03	1.9E+03	N/A	N/A	1.9E+05	N/A	N/A	1.9E+04	N/A
Cadmium	5.7E+01	2.2E+01	6.2E+01	2.9E+00	9.2E-01	5.0E+00	None	2.3E+02	9.0E+01	6.2E+02	5.7E+01	2.2E+01	6.2E+01	1.3E+01
Carbon Tetrachloride	N/A	N/A	5.9E+01	None	None	2.3E+00	1.6E+01	N/A	N/A	5.9E+02	N/A	N/A	5.9E+01	N/A
Chlordane	4.7E+01	1.0E-01	2.0E-01	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.9E+02	4.2E-01	2.0E+00	4.7E+01	1.0E-01	2.0E-01	N/A
Chloride mg/L	1.7E+04 mg/L	5.6E+03 mg/L	3.1E+03 mg/L	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	6.8E+04 mg/L	2.2E+04 mg/L	3.1E+04 mg/L	1.7E+04 mg/L	5.6E+03 mg/L	3.1E+03 mg/L	N/A
Chlorine, Total Residual	3.7E-01 mg/L	2.7E-01 mg/L	N/A	1.9E-02 mg/L	1.1E-02 mg/L	None	None	1.5E+00 mg/L	1.1E+00 mg/L	N/A	3.7E-01 mg/L	2.7E-01 mg/L	N/A	N/A
Chlorobenzene	N/A	N/A	1.6E+03	None	None	1.3E+02	1.6E+03	N/A	N/A	1.6E+04	N/A	N/A	1.6E+03	N/A
Chlorodibromomethane	N/A	N/A	1.0E+02	None	None	4.0E+00	1.3E+02	N/A	N/A	1.0E+03	N/A	N/A	1.0E+02	N/A
Chloroform	N/A	N/A	4.2E+03	None	None	3.4E+02	1.1E+04	N/A	N/A	4.2E+04	N/A	N/A	4.2E+03	N/A
2-Chloronaphthalene	N/A	N/A	1.2E+04	None	None	1.0E+03	1.6E+03	N/A	N/A	1.2E+05	N/A	N/A	1.2E+04	N/A
2-Chlorophenol	N/A	N/A	1.0E+03	None	None	8.1E+01	1.5E+02	N/A	N/A	1.0E+04	N/A	N/A	1.0E+03	N/A
Chlorpyrifos	1.6E+00	1.0E+00	N/A	8.3E-02	4.1E-02	None	None	6.5E+00	4.0E+00	N/A	1.6E+00	1.0E+00	N/A	N/A
Chromium (+3)	9.0E+03	1.4E+03	N/A	4.6E+02	6.0E+01	None	None	3.6E+04	5.8E+03	N/A	9.0E+03	1.4E+03	N/A	8.6E+02
Chromium (+6)	3.2E+02	2.7E+02	N/A	1.6E+01	1.1E+01	None	None	1.3E+03	1.1E+03	N/A	3.2E+02	2.7E+02	N/A	1.3E+02
Total Chromium	N/A	N/A	1.2E+03	None	None	1.0E+02	None	N/A	N/A	1.2E+04	N/A	N/A	1.2E+03	1.2E+03
Chrysene	N/A	N/A	9.7E-02	None	None	4.4E-02	4.8E-01	N/A	N/A	1.1E+01	N/A	N/A	9.7E-02	N/A
Copper	1.9E+02	1.6E+02	#REF!	1.1E+01	7.2E+00	1.3E+03	None	7.6E+02	6.3E+02	1.6E+05	1.9E+02	1.6E+02	#REF!	#REF!
Cyanide, Free	4.3E+02	1.3E+02	1.7E+03	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.7E+03	5.1E+02	1.7E+04	4.3E+02	1.3E+02	1.7E+03	N/A
DDD	N/A	N/A	7.9E-02	None	None	3.1E-03	3.1E-03	N/A	N/A	7.9E-01	N/A	N/A	7.9E-02	N/A
DDE	N/A	N/A	5.6E-02	None	None	2.2E-03	2.2E-03	N/A	N/A	5.6E-01	N/A	N/A	5.6E-02	N/A
DDT	2.2E+01	2.4E-02	5.6E-02	1.1E+00	1.0E-03	2.2E-03	2.2E-03	8.7E+01	9.7E-02	5.6E-01	2.2E+01	2.4E-02	5.6E-02	N/A
Demeton	N/A	2.4E+00	N/A	None	1.0E-01	None	None	N/A	9.7E+00	N/A	N/A	2.4E+00	N/A	N/A
Diazinon	3.4E+00	4.1E+00	N/A	1.7E-01	1.7E-01	None	None	1.3E+01	1.7E+01	N/A	3.4E+00	4.1E+00	N/A	N/A
Dibenz(a,h)anthracene	N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
1,2-Dichlorobenzene	N/A	N/A	5.2E+03	None	None	4.2E+02	1.3E+03	N/A	N/A	5.2E+04	N/A	N/A	5.2E+03	N/A
1,3-Dichlorobenzene	N/A	N/A	4.0E+03	None	None	3.2E+02	9.6E+02	N/A	N/A	4.0E+04	N/A	N/A	4.0E+03	N/A
1,4-Dichlorobenzene	N/A	N/A	7.8E+02	None	None	8.3E+01	1.9E+02	N/A	N/A	7.8E+03	N/A	N/A	7.8E+02	N/A
3,3-Dichlorobenzidine	N/A	N/A	5.4E+00	None	None	2.1E-01	2.8E-01	N/A	N/A	5.4E+01	N/A	N/A	5.4E+00	N/A
Dichlorobromomethane	N/A	N/A	1.4E+02	None	None	5.5E+00	1.7E+02	N/A	N/A	1.4E+03	N/A	N/A	1.4E+02	N/A
1,2-Dichloroethane	N/A	N/A	9.7E+01	None	None	3.8E+00	3.7E+02	N/A	N/A	9.7E+02	N/A	N/A	9.7E+01	N/A
1,1-Dichloroethylene	N/A	N/A	4.1E+03	None	None	3.3E+02	7.1E+03	N/A	N/A	4.1E+04	N/A	N/A	4.1E+03	N/A
1,2-trans-dichloroethylene	N/A	N/A	1.7E+03	None	None	1.4E+02	1.0E+04	N/A	N/A	1.7E+04	N/A	N/A	1.7E+03	N/A
2,4-Dichlorophenol	N/A	N/A	9.6E+02	None	None	7.7E+01	2.9E+02	N/A	N/A	9.6E+03	N/A	N/A	9.6E+02	N/A
2,4-Dichlorophenoxy Acetic Acid	N/A	N/A	1.2E+03	None	None	1.0E+02	None	N/A	N/A	1.2E+04	N/A	N/A	1.2E+03	N/A
1,2-Dichloropropane	N/A	N/A	1.3E+02	None	None	5.0E+00	1.5E+02	N/A	N/A	1.3E+03	N/A	N/A	1.3E+02	N/A
1,3-Dichloropropene	N/A	N/A	8.7E+01	None	None	3.4E+00	2.1E+02	N/A	N/A	8.7E+02	N/A	N/A	8.7E+01	N/A
Dieldrin	4.7E+00	1.4E+00	1.3E-02	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.9E+01	5.4E+00	1.3E-01	4.7E+00	1.4E+00	1.3E-02	N/A
Diethyl Phthalate	N/A	N/A	2.1E+05	None	None	1.7E+04	4.4E+04	N/A	N/A	2.1E+06	N/A	N/A	2.1E+05	N/A
2,4 Dimethylphenol	N/A	N/A	4.7E+03	None	None	3.8E+02	8.5E+02	N/A	N/A	4.7E+04	N/A	N/A	4.7E+03	N/A
Dimethyl Phthalate	N/A	N/A	3.4E+06	None	None	2.7E+05	1.1E+06	N/A	N/A	3.4E+07	N/A	N/A	3.4E+06	N/A
Di-n-Butyl Phthalate	N/A	N/A	2.5E+04	None	None	2.0E+03	4.5E+03	N/A	N/A	2.5E+05	N/A	N/A	2.5E+04	N/A
2,4 Dinitrophenol	N/A	N/A	8.6E+02	None	None	6.9E+01	5.3E+03	N/A	N/A	8.6E+03	N/A	N/A	8.6E+02	N/A
2-Methyl-4,6-Dinitrophenol	N/A	N/A	1.6E+02	None	None	1.3E+01	2.8E+02	N/A	N/A	1.6E+03	N/A	N/A	1.6E+02	N/A
2,4-Dinitrotoluene	N/A	N/A	2.8E+01	None	None	1.1E+00	3.4E+01	N/A	N/A	2.8E+02	N/A	N/A	2.8E+01	N/A
Dioxin +	N/A	N/A	6.2E-07	None	None	5.0E-08	5.1E-08	N/A	N/A	6.2E-06	N/A	N/A	6.2E-07	N/A
1,2-Diphenylhydrazine	N/A	N/A	9.2E+00	None	None	3.6E-01	2.0E+00	N/A	N/A	9.2E+01	N/A	N/A	9.2E+00	N/A
Alpha-Endosulfan	4.3E+00	1.4E+00	7.7E+02	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.7E+01	5.4E+00	7.7E+03	4.3E+00	1.4E+00	7.7E+02	N/A
Beta-Endosulfan	4.3E+00	1.4E+00	7.7E+02	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.7E+01	5.4E+00	7.7E+03	4.3E+00	1.4E+00	7.7E+02	N/A
Alpha+Beta-Endosulfan	4.3E+00	1.4E+00	N/A	2.2E-01	5.6E-02	None	None	1.7E+01	5.4E+00	N/A	4.3E+00	1.4E+00	N/A	N/A
Endosulfan Sulfate	N/A	N/A	7.7E+02	None	None	6.2E+01	8.9E+01	N/A	N/A	7.7E+03	N/A	N/A	7.7E+02	N/A

Facility Name:
Cliffstreetway Wastewater Treatment Facility
Receiving Stream:
New River

Toxic Parameter and Form		ANTIDEGRADATION WASTE LOAD ALLOCATIONS (6.000 MGD Discharge - 100% Stream Mix) Aquatic Protection Acute	Aquatic Protection Chronic	Human Health	POST - DISCHARGE WATER QUALITY CRITERIA (6.000 MGD Discharge Flow - Mix per "Mixer") Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters	NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS (6.000 MGD Discharge - Mix per "Mixer") Aquatic Protection Acute	Aquatic Protection Chronic	Human Health	MOST RESTRICTIVE WASTE LOAD ALLOCATIONS (6.000 MGD Discharge Flow) Aquatic Protection Acute	Aquatic Protection Chronic	Human Health	Target Level
Endrin		1.7E+00	8.7E-01	7.3E-01	8.8E-02	3.6E-02	5.9E-02	6.0E-02	6.8E+00	3.5E+00	7.3E+00	1.7E+00	8.7E-01	7.3E-01	N/A
Endrin Aldehyde		N/A	N/A	3.6E+00	None	None	2.9E-01	3.0E-01	N/A	N/A	3.8E+01	N/A	N/A	3.6E+00	N/A
Ethylbenzene		N/A	N/A	6.6E+03	None	None	5.3E+02	2.1E+03	N/A	N/A	6.6E+04	N/A	N/A	6.6E+03	N/A
Fluoranthene		N/A	N/A	1.6E+03	None	None	1.3E+02	1.4E+02	N/A	N/A	1.6E+04	N/A	N/A	1.6E+03	N/A
Fluorene		N/A	N/A	1.4E+04	None	None	1.1E+03	5.3E+03	N/A	N/A	1.4E+05	N/A	N/A	1.4E+04	N/A
Foaming Agents (MBAS)		N/A	N/A	6.2E+03	None	None	5.0E+02	None	N/A	N/A	6.2E+04	N/A	N/A	6.2E+03	N/A
Guthion		N/A	2.4E-01	N/A	None	1.0E-02	None	None	N/A	9.7E-01	N/A	N/A	2.4E-01	N/A	N/A
Heptachlor		1.0E+01	9.2E-02	2.0E-02	5.2E-01	3.8E-03	7.9E-04	7.9E-04	4.1E+01	3.7E-01	2.0E-01	1.0E+01	9.2E-02	2.0E-02	N/A
Heptachlor Epoxide		1.0E+01	9.2E-02	1.0E-02	5.2E-01	3.8E-03	3.9E-04	3.9E-04	4.1E+01	3.7E-01	1.0E-01	1.0E+01	9.2E-02	1.0E-02	N/A
Hexachlorobenzene		N/A	N/A	7.2E-02	None	None	2.8E-03	2.9E-03	N/A	N/A	7.2E-01	N/A	N/A	7.2E-02	N/A
Hexachlorobutadiene		N/A	N/A	1.1E+02	None	None	4.4E+00	1.8E+02	N/A	N/A	1.1E+03	N/A	N/A	1.1E+02	N/A
Hexachlorocyclohexane Alpha-BHC		N/A	N/A	6.6E-01	None	None	2.6E-02	4.9E-02	N/A	N/A	6.6E+00	N/A	N/A	6.6E-01	N/A
Hexachlorocyclohexane Beta-BHC		N/A	N/A	2.3E+00	None	None	9.1E-02	1.7E-01	N/A	N/A	2.3E+01	N/A	N/A	2.3E+00	N/A
Hexachlorocyclohexane Gamma-BHC (Lindane)		1.9E+01	N/A	2.5E+01	9.5E-01	None	9.8E-01	1.8E+00	7.5E+01	N/A	2.5E+02	1.9E+01	N/A	2.5E+01	N/A
Hexachlorocyclopentadiene		N/A	N/A	5.0E+02	None	None	4.0E+01	1.1E+03	N/A	N/A	5.0E+03	N/A	N/A	5.0E+02	N/A
Hexachloroethane		N/A	N/A	3.6E+02	None	None	1.4E+01	3.3E+01	N/A	N/A	3.6E+03	N/A	N/A	3.6E+02	N/A
Hydrogen Sulfide		N/A	4.9E+01	N/A	None	2.0E+00	None	None	N/A	1.9E+02	N/A	N/A	4.9E+01	N/A	N/A
Indeno(1,2,3-cd)pyrene		N/A	N/A	9.7E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	9.7E+00	N/A	N/A	9.7E-01	N/A
Iron		N/A	N/A	3.7E+03	None	None	3.0E+02	None	N/A	N/A	3.7E+04	N/A	N/A	3.7E+03	3.7E+03
Isophorone		N/A	N/A	8.9E+03	None	None	3.5E+02	9.6E+03	N/A	N/A	8.9E+04	N/A	N/A	8.9E+03	N/A
Kepone		N/A	Zero	N/A	None	Zero	None	None	N/A	Zero	N/A	N/A	Zero	N/A	N/A
Lead		1.7E+03	2.3E+02	1.9E+02	8.6E+01	9.7E+00	1.5E+01	None	8.6E+03	9.4E+02	1.9E+03	1.7E+03	2.3E+02	1.9E+02	1.4E+02
Malathion		N/A	2.4E+00	N/A	None	1.0E-01	None	None	N/A	9.7E+00	N/A	N/A	2.4E+00	N/A	N/A
Manganese		N/A	N/A	6.2E+02	None	None	5.0E+01	None	N/A	N/A	6.2E+03	N/A	N/A	6.2E+02	6.2E+02
Mercury		2.8E+01	1.9E+01	N/A	1.4E+00	7.7E-01	None	None	1.1E+02	7.5E+01	N/A	2.8E+01	1.9E+01	N/A	1.1E+01
Methyl Bromide		N/A	N/A	5.9E+02	None	None	4.7E+01	1.5E+03	N/A	N/A	5.9E+03	N/A	N/A	5.9E+02	N/A
Methylene Chloride		N/A	N/A	1.2E+03	None	None	4.6E+01	5.9E+03	N/A	N/A	1.2E+04	N/A	N/A	1.2E+03	N/A
Methoxychlor		N/A	7.3E-01	1.2E+03	None	3.0E-02	1.0E+02	None	N/A	2.9E+00	1.2E+04	N/A	7.3E-01	1.2E+03	N/A
Mirex		N/A	Zero	N/A	None	Zero	None	None	N/A	Zero	N/A	N/A	Zero	N/A	N/A
Nickel		2.6E+03	3.9E+02	7.6E+03	1.5E+02	1.6E+01	6.1E+02	4.6E+03	1.2E+04	1.6E+03	7.6E+04	2.6E+03	3.9E+02	7.6E+03	2.3E+02
Nitrate (as N)	mg/L	N/A	N/A	1.2E+02 mg/L	None	None	1.0E+01 mg/L	None	N/A	N/A	1.2E+03 mg/L	N/A	N/A	1.2E+02 mg/L	N/A
Nitrobenzene		N/A	N/A	2.1E+02	None	None	1.7E+01	6.9E+02	N/A	N/A	2.1E+03	N/A	N/A	2.1E+02	N/A
N-Nitrosodimethylamine		N/A	N/A	1.6E-01	None	None	6.9E-03	3.0E+01	N/A	N/A	1.6E+00	N/A	N/A	1.6E-01	N/A
N-Nitrosodiphenylamine		N/A	N/A	8.4E+02	None	None	3.3E+01	9.0E+01	N/A	N/A	8.4E+03	N/A	N/A	8.4E+02	N/A
N-Nitrosodi-n-propylamine		N/A	N/A	1.3E+00	None	None	5.0E-02	5.1E+00	N/A	N/A	1.3E+01	N/A	N/A	1.3E+00	N/A
Nonylphenol		5.5E+02	1.6E+02	N/A	2.8E+01	6.6E+00	None	None	2.2E+03	6.4E+02	N/A	5.5E+02	1.6E+02	N/A	N/A
Parathion		1.3E+00	3.2E-01	N/A	6.5E-02	1.3E-02	None	None	5.1E+00	1.3E+00	N/A	1.3E+00	3.2E-01	N/A	N/A
PCB Total		N/A	3.4E-01	1.6E-02	None	1.4E-02	6.4E-04	6.4E-04	N/A	1.4E+00	1.6E-01	N/A	3.4E-01	1.6E-02	N/A
Pentachlorophenol		2.3E+02	2.2E+02	6.9E+01	1.2E+01	9.0E+00	2.7E+00	3.0E+01	9.2E+02	8.7E+02	6.9E+02	2.3E+02	2.2E+02	6.9E+01	N/A
Phenol		N/A	N/A	1.2E+05	None	None	1.0E+04	8.6E+05	N/A	N/A	1.2E+06	N/A	N/A	1.2E+05	N/A
Pyrene		N/A	N/A	1.0E+04	None	None	8.3E+02	4.0E+03	N/A	N/A	1.0E+05	N/A	N/A	1.0E+04	N/A
RadNuc - Beta Part & Photon Act	mrem	N/A	N/A	5.0E+01 mrem	None	None	4.0E+00 mrem	4.0E+00 mrem	N/A	N/A	5.0E+02 mrem	N/A	N/A	5.0E+01 mrem	N/A
RadNuc - Gross Alpha Part Act	pCi/L	N/A	N/A	1.9E+02 pCi/L	None	None	1.5E+01 pCi/L	None	N/A	N/A	1.9E+03 pCi/L	N/A	N/A	1.9E+02 pCi/L	N/A
RadNuc - Radium 226 + 228	pCi/L	N/A	N/A	6.2E+01 pCi/L	None	None	5.0E+00 pCi/L	None	N/A	N/A	6.2E+02 pCi/L	N/A	N/A	6.2E+01 pCi/L	N/A
RadNuc - Uranium		N/A	N/A	3.7E+02	None	None	3.0E+01	None	N/A	N/A	3.7E+03	N/A	N/A	3.7E+02	N/A
Selenium, Total Recoverable		3.9E+02	1.2E+02	2.1E+03	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.6E+03	4.9E+02	2.1E+04	3.9E+02	1.2E+02	2.1E+03	7.3E+01
Silver		4.2E+01	N/A	N/A	2.2E+00	None	None	None	1.7E+02	N/A	N/A	4.2E+01	N/A	N/A	1.7E+01
Sulfate	mg/L	N/A	N/A	3.1E+03 mg/L	None	None	2.5E+02 mg/L	None	N/A	N/A	3.1E+04 mg/L	N/A	N/A	3.1E+03 mg/L	N/A
1,1,2,2-Tetrachloroethane		N/A	N/A	4.3E+01	None	None	1.7E+00	4.0E+01	N/A	N/A	4.3E+02	N/A	N/A	4.3E+01	N/A
Tetrachloroethylene		N/A	N/A	1.8E+02		None	6.9E+00	3.3E+01	0.0E+00	N/A	1.8E+03	N/A	N/A	1.8E+02	N/A
Thallium		N/A	N/A	3.0E+00	None	None	2.4E-01	4.7E-01	N/A	N/A	3.0E+01	N/A	N/A	3.0E+00	N/A
Toluene		N/A	N/A	6.3E+03	None	None	5.1E+02	6.0E+03	N/A	N/A	6.3E+04	N/A	N/A	6.3E+03	N/A
Total Dissolved Solids		N/A	N/A	6.2E+06	None	None	5.0E+05	None	N/A	N/A	6.2E+07	N/A	N/A	6.2E+06	N/A
Toxaphene		1.4E+01	4.9E-03	7.2E-02	7.3E-01	2.0E-04	2.8E-03	2.8E-03	5.8E+01	1.9E-02	7.2E-01	1.4E+01	4.9E-03	7.2E-02	N/A
Tributyltin		9.1E+00	1.7E+00	N/A	4.8E-01	7.2E-02	None	None	3.8E+01	7.0E+00	N/A	9.1E+00	1.7E+00	N/A	N/A
1,2,4-Trichlorobenzene		N/A	N/A	4.4E+02	None	None	3.6E+01	7.0E+01	N/A	N/A	4.4E+03	N/A	N/A	4.4E+02	N/A
1,1,2-Trichloroethane		N/A	N/A	1.6E+02	None	None	5.9E+00	1.8E+02	N/A	N/A	1.6E+03	N/A	N/A	1.6E+02	N/A
Trichloroethylene		N/A	N/A	6.4E+02	None	None	2.5E+01	3.0E+02	N/A	N/A	6.4E+03	N/A	N/A	6.4E+02	N/A
2,4,6-Trichlorophenol		N/A	N/A	3.6E+02	None	None	1.4E+01	2.4E+01	N/A	N/A	3.6E+03	N/A	N/A	3.6E+02	N/A
2-(2,4,5-Trichlorophenoxy propionic acid (Silvex)		N/A	N/A	6.2E+02	None	None	5.0E+01	None	N/A	N/A	6.2E+03	N/A	N/A	6.2E+02	N/A
Vinyl Chloride		N/A	N/A	6.4E+00	None	None	2.6E-01	2.4E+01	N/A	N/A	6.4E+01	N/A	N/A	6.4E+00	N/A
Zinc		1.8E+03	2.2E+03	9.2E+04	9.4E+01	9.5E+01	7.4E+03	2.6E+04	7.1E+03	8.8E+03	9.2E+05	1.8E+03	2.2E+03	9.2E+04	7.0E+02

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:
Christiansburg Wastewater Treatment Facility
Receiving Stream:
New River

Permit No.: VA0061751
Date: 6/9/2010

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

Stream Information		Stream Flows		Mixing Information			Effluent Information	
Mean Hardness (as CaCO3) =	76 mg/L	1Q10 (Annual) =	467 MGD	Annual	- 1Q10 Flow =	100 %	Mean Hardness (as CaCO3) =	176 mg/L
90% Temperature (Annual) =	23 deg C	7Q10 (Annual) =	577 MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	21 deg C
90% Temperature (Wet season) =	14 deg C	30Q10 (Annual) =	663 MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =	17 deg C
90% Maximum pH =	8.2 SU	1Q10 (Wet season) =	546 MGD	Wet Season	- 1Q10 Flow =	100 %	90% Maximum pH =	7.4 SU
10% Maximum pH =	7.3 SU	30Q10 (Wet season) =	1079 MGD		- 30Q10 Flow =	100 %	10% Maximum pH =	6.8 SU
Tier Designation =	2	30Q5 =	741 MGD				1992 Discharge Flow =	0.000 MGD
Public Water Supply (PWS) Y/N? =	Y	Harmonic Mean =	1527 MGD				Discharge Flow for Limit Analysis =	8.000 MGD
V(alley) or P(iedmont)? =	V							
Trout Present Y/N? =	N							
Early Life Stages Present Y/N? =	Y							

Footnotes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from seperate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

Facility Name: Christiansburg Wastewater Treatment Facility	Permit No.: VA0061751																
Receiving Stream: New River	Date: 6/9/2010	97th Percentiles of Effluent Concentrations			Expected Value of Upstream Data	Current Downstream Mix Concentrations			PRE - DISCHARGE WATER QUALITY CRITERIA 0.000 MGD Discharge Flow - 100% Stream Mix				INSTREAM BASELINES		
									Aquatic Protection		Human Health				
Toxic Parameter and Form	Carcinogen?	Daily	4-Day	30-Day		Acute	Chronic	H-Health	Acute	Chronic	Public Water Supplies	Other Surface Waters	Acute	Chronic	H-Health
Acenaphthene	N	0	0	0	0	0	0	0	None	None	6.7E+02	9.9E+02	None	None	6.7E+01
Acrolein	N	0	0	0	0	0	0	0	None	None	6.1E+00	9.3E+00	None	None	6.1E-01
Acrylonitrile	Y	0	0	0	0	0	0	0	None	None	5.1E-01	2.5E+00	None	None	5.1E-02
Aldrin	Y	0	0	0	0	0	0	0	3.0E+00	None	4.9E-04	5.0E-04	7.5E-01	None	4.9E-05
Ammonia-N (Annual)	N	0.39046	0.267	0.19352	0.048155	0	0	0	5.7E+00 mg/L	1.0E+00 mg/L	None	None	1.5E+00 mg/L	2.9E-01 mg/L	None
Ammonia-N (Wet Season)	N	0.39046	0.267	0.19352	0.030987	0	0	0	5.7E+00 mg/L	1.8E+00 mg/L	None	None	1.5E+00 mg/L	4.7E-01 mg/L	None
Anthracene	N	0	0	0	0	0	0	0	None	None	8.3E+03	4.0E+04	None	None	8.3E+02
Antimony	N	0	0	0	0	0	0	0	None	None	5.6E+00	6.4E+02	None	None	5.6E-01
Arsenic	N	0	0	0	0	0	0	0	3.4E+02	1.5E+02	1.0E+01	None	8.5E+01	3.6E+01	1.0E+00
Barium	N	0	0	0	0	0	0	0	None	None	2.0E+03	None	None	None	2.0E+02
Benzene	Y	0	0	0	0	0	0	0	None	None	2.2E+01	5.1E+02	None	None	2.2E+00
Benzidine	Y	0	0	0	0	0	0	0	None	None	8.6E-04	2.0E-03	None	None	8.6E-05
Benzo(a)anthracene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(a)pyrene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(b)fluoranthene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Benzo(k)fluoranthene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Bis2-Chloroethyl Ether	Y	0	0	0	0	0	0	0	None	None	3.0E-01	5.3E+00	None	None	3.0E-02
Bis2-Chloroisopropyl Ether	N	0	0	0	0	0	0	0	None	None	1.4E+03	6.5E+04	None	None	1.4E+02
Bis2-Ethylehexyl Phthalate	Y	0	0	0	0	0	0	0	None	None	1.2E+01	2.2E+01	None	None	1.2E+00
Bromoform	Y	0	0	0	0	0	0	0	None	None	4.3E+01	1.4E+03	None	None	4.3E+00
Butyl Benzyl Phthalate	N	0	0	0	0	0	0	0	None	None	1.5E+03	1.9E+03	None	None	1.5E+02
Cadmium	N	0	0	0	0	0	0	0	2.9E+00	9.1E-01	5.0E+00	None	7.2E-01	2.3E-01	5.0E-01
Carbon Tetrachloride	Y	0	0	0	0	0	0	0	None	None	2.3E+00	1.6E+01	None	None	2.3E-01
Chlordane	Y	0	0	0	0	0	0	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	8.0E-01	1.1E-03	8.0E-04
Chloride	N	0	0	0	0	0	0	0	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	2.2E+02 mg/L	5.8E+01 mg/L	2.5E+01
Chlorine, Total Residual	N	0	0	0	0	0	0	0	1.9E-02 mg/L	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/L	None
Chlorobenzene	N	0	0	0	0	0	0	0	None	None	1.3E+02	1.6E+03	None	None	1.3E+01
Chlorodibromomethane	Y	0	0	0	0	0	0	0	None	None	4.0E+00	1.3E+02	None	None	4.0E-01
Chloroform	N	0	0	0	0	0	0	0	None	None	3.4E+02	1.1E+04	None	None	3.4E+01
2-Chloronaphthalene	N	0	0	0	0	0	0	0	None	None	1.0E+03	1.6E+03	None	None	1.0E+02
2-Chlorophenol	N	0	0	0	0	0	0	0	None	None	8.1E+01	1.5E+02	None	None	8.1E+00
Chlorpyrifos	N	0	0	0	0	0	0	0	8.3E-02	4.1E-02	None	None	2.1E-02	1.0E-02	None
Chromium (+3)	N	0	0	0	0	0	0	0	4.6E+02	5.9E+01	None	None	1.1E+02	1.5E+01	None
Chromium (+6)	N	0	0	0	0	0	0	0	1.6E+01	1.1E+01	None	None	4.0E+00	2.8E+00	None
Total Chromium	N	0	0	0	0	0	0	0	None	None	1.0E+02	None	None	None	1.0E+01
Chrysene	Y	0	0	0	0	0	0	0	None	None	3.8E-03	1.8E-02	None	None	3.8E-04
Copper	N	19.4673	13.31	9.64842	0.645	0.645	0.645	#REF!	1.0E+01	7.1E+00	1.3E+03	None	3.1E+00	2.3E+00	#REF!
Cyanide, Free	N	0	0	0	0	0	0	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	5.5E+00	1.3E+00	1.4E+01
DDD	Y	0	0	0	0	0	0	0	None	None	3.1E-03	3.1E-03	None	None	3.1E-04
DDE	Y	0	0	0	0	0	0	0	None	None	2.2E-03	2.2E-03	None	None	2.2E-04
DDT	Y	0	0	0	0	0	0	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.8E-01	2.5E-04	2.2E-04
Demeton	N	0	0	0	0	0	0	0	None	1.0E-01	None	None	None	2.5E-02	None
Diazinon	N	0	0	0	0	0	0	0	1.7E-01	1.7E-01	None	None	4.3E-02	4.3E-02	None
Dibenz(a,h)anthracene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
1,2-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	4.2E+02	1.3E+03	None	None	4.2E+01
1,3-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	3.2E+02	9.6E+02	None	None	3.2E+01
1,4-Dichlorobenzene	N	0	0	0	0	0	0	0	None	None	6.3E+01	1.9E+02	None	None	6.3E+00
3,3-Dichlorobenzidine	Y	0	0	0	0	0	0	0	None	None	2.1E-01	2.8E-01	None	None	2.1E-02
Dichlorobromomethane	Y	0	0	0	0	0	0	0	None	None	5.5E+00	1.7E+02	None	None	5.5E-01
1,2-Dichloroethane	Y	0	0	0	0	0	0	0	None	None	3.8E+00	3.7E+02	None	None	3.8E-01
1,1-Dichloroethylene	N	0	0	0	0	0	0	0	None	None	3.3E+02	7.1E+03	None	None	3.3E+01
1,2-trans-dichloroethylene	N	0	0	0	0	0	0	0	None	None	1.4E+02	1.0E+04	None	None	1.4E+01
2,4-Dichlorophenol	N	0	0	0	0	0	0	0	None	None	7.7E+01	2.9E+02	None	None	7.7E+00
2,4-Dichlorophenoxy Acetic Acid	N	0	0	0	0	0	0	0	None	None	1.0E+02	None	None	None	1.0E+01
1,2-Dichloropropane	Y	0	0	0	0	0	0	0	None	None	5.0E+00	1.5E+02	None	None	5.0E-01
1,3-Dichloropropene	Y	0	0	0	0	0	0	0	None	None	3.4E+00	2.1E+02	None	None	3.4E-01
Dieldrin	Y	0	0	0	0	0	0	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	6.0E-02	1.4E-02	5.2E-05
Diethyl Phthalate	N	0	0	0	0	0	0	0	None	None	1.7E+04	4.4E+04	None	None	1.7E+03
2,4 Dimethylphenol	N	0	0	0	0	0	0	0	None	None	3.8E+02	8.5E+02	None	None	3.8E+01
Dimethyl Phthalate	N	0	0	0	0	0	0	0	None	None	2.7E+05	1.1E+06	None	None	2.7E+04
Di-n-Butyl Phthalate	N	0	0	0	0	0	0	0	None	None	2.0E+03	4.5E+03	None	None	2.0E+02
2,4 Dinitrophenol	N	0	0	0	0	0	0	0	None	None	6.9E+01	5.3E+03	None	None	6.9E+00
2-Methyl-4,6-Dinitrophenol	N	0	0	0	0	0	0	0	None	None	1.3E+01	2.8E+02	None	None	1.3E+00
2,4-Dinitrotoluene	Y	0	0	0	0	0	0	0	None	None	1.1E+00	3.4E+01	None	None	1.1E-01
Dioxin +	N	0	0	0	0	0	0	0	None	None	5.0E-08	5.1E-08	None	None	5.0E-09
1,2-Diphenylhydrazine	Y	0	0	0	0	0	0	0	None	None	3.6E-01	2.0E+00	None	None	3.6E-02
Alpha-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	6.2E+00
Beta-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	6.2E+00
Alpha+Beta-Endosulfan	N	0	0	0	0	0	0	0	2.2E-01	5.6E-02	None	None	5.5E-02	1.4E-02	None
Endosulfan Sulfate	N	0	0	0	0	0	0	0	None	None	6.2E+01	8.9E+01	None	None	6.2E+00

Facility Name: Christiansburg Wastewater Treatment Facility	Permit No.: VA0061751															
Receiving Stream: New River	Date: 6/9/2010	97th Percentiles of Effluent Concentrations			Expected Value of Upstream Data	Current Downstream Mix Concentrations			PRE - DISCHARGE WATER QUALITY CRITERIA 0.000 MGD Discharge Flow - 100% Stream Mix				INSTREAM BASELINES		
									Aquatic Protection		Human Health				
											Public Water	Other Surface			
Toxic Parameter and Form	Carcinogen?	Daily	4-Day	30-Day		Acute	Chronic	H-Health	Acute	Chronic	Supplies	Waters	Acute	Chronic	H-Health
Endrin	N	0	0	0	0	0	0	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	2.2E-02	9.0E-03	5.9E-03
Endrin Aldehyde	N	0	0	0	0	0	0	0	None	None	2.9E-01	3.0E-01	None	None	2.9E-02
Ethylbenzene	N	0	0	0	0	0	0	0	None	None	5.3E+02	2.1E+03	None	None	5.3E+01
Fluoranthene	N	0	0	0	0	0	0	0	None	None	1.3E+02	1.4E+02	None	None	1.3E+01
Fluorene	N	0	0	0	0	0	0	0	None	None	1.1E+03	5.3E+03	None	None	1.1E+02
Foaming Agents (MBAS)	N	0	0	0	0	0	0	0	None	None	5.0E+02	None	None	None	5.0E+01
Guthion	N	0	0	0	0	0	0	0	None	1.0E-02	None	None	None	2.5E-03	None
Heptachlor	Y	0	0	0	0	0	0	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.3E-01	9.5E-04	7.9E-05
Heptachlor Epoxide	Y	0	0	0	0	0	0	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.3E-01	9.5E-04	3.9E-05
Hexachlorobenzene	Y	0	0	0	0	0	0	0	None	None	2.8E-03	2.9E-03	None	None	2.8E-04
Hexachlorobutadiene	Y	0	0	0	0	0	0	0	None	None	4.4E+00	1.8E+02	None	None	4.4E-01
Hexachlorocyclohexane Alpha-BHC	Y	0	0	0	0	0	0	0	None	None	2.6E-02	4.9E-02	None	None	2.6E-03
Hexachlorocyclohexane Beta-BHC	Y	0	0	0	0	0	0	0	None	None	9.1E-02	1.7E-01	None	None	9.1E-03
Hexachlorocyclohexane Gamma-BHC (Lindane)	Y	0	0	0	0	0	0	0	9.5E-01	None	9.8E-01	1.8E+00	2.4E-01	None	9.8E-02
Hexachlorocyclopentadiene	N	0	0	0	0	0	0	0	None	None	4.0E+01	1.1E+03	None	None	4.0E+00
Hexachloroethane	Y	0	0	0	0	0	0	0	None	None	1.4E+01	3.3E+01	None	None	1.4E+00
Hydrogen Sulfide	N	0	0	0	0	0	0	0	None	2.0E+00	None	None	None	5.0E-01	None
Indeno(1,2,3-cd)pyrene	Y	0	0	0	0	0	0	0	None	None	3.8E-02	1.8E-01	None	None	3.8E-03
Iron	N	0	0	0	0	0	0	0	None	None	3.0E+02	None	None	None	3.0E+01
Isophorone	Y	0	0	0	0	0	0	0	None	None	3.5E+02	9.6E+03	None	None	3.5E+01
Kepone	N	0	0	0	0	0	0	0	None	Zero	None	None	None	Zero	None
Lead	N	0	0	0	0	0	0	0	8.4E+01	9.5E+00	1.5E+01	None	2.1E+01	2.4E+00	1.5E+00
Malathion	N	0	0	0	0	0	0	0	None	1.0E-01	None	None	None	2.5E-02	None
Manganese	N	0	0	0	0	0	0	0	None	None	5.0E+01	None	None	None	5.0E+00
Mercury	N	0	0	0	0	0	0	0	1.4E+00	7.7E-01	None	None	3.5E-01	1.9E-01	None
Methyl Bromide	N	0	0	0	0	0	0	0	None	None	4.7E+01	1.5E+03	None	None	4.7E+00
Methylene Chloride	Y	0	0	0	0	0	0	0	None	None	4.6E+01	5.9E+03	None	None	4.6E+00
Methoxychlor	N	0	0	0	0	0	0	0	None	3.0E-02	1.0E+02	None	None	7.5E-03	1.0E+01
Mirex	N	0	0	0	0	0	0	0	None	Zero	None	None	None	Zero	None
Nickel	N	0	0	0	0	0	0	0	1.4E+02	1.6E+01	6.1E+02	4.6E+03	3.6E+01	4.0E+00	6.1E+01
Nitrate (as N)	N	0	0	0	0	0	0	0	None	None	1.0E+01 mg/L	None	None	None	1.0E+00
Nitrobenzene	N	0	0	0	0	0	0	0	None	None	1.7E+01	6.9E+02	None	None	1.7E+00
N-Nitrosodimethylamine	Y	0	0	0	0	0	0	0	None	None	6.9E-03	3.0E+01	None	None	6.9E-04
N-Nitrosodiphenylamine	Y	0	0	0	0	0	0	0	None	None	3.3E+01	6.0E+01	None	None	3.3E+00
N-Nitrosodi-n-propylamine	Y	0	0	0	0	0	0	0	None	None	5.0E-02	5.1E+00	None	None	5.0E-03
Nonylphenol	N	0	0	0	0	0	0	0	2.8E+01	6.6E+00	None	None	7.0E+00	1.7E+00	None
Parathion	N	0	0	0	0	0	0	0	6.5E-02	1.3E-02	None	None	1.6E-02	3.3E-03	None
PCB Total	Y	0	0	0	0	0	0	0	None	1.4E-02	6.4E-04	6.4E-04	None	3.5E-03	6.4E-05
Pentachlorophenol	Y	0	0	0	0	0	0	0	1.2E+01	9.0E+00	2.7E+00	3.0E+01	2.9E+00	2.3E+00	2.7E-01
Phenol	N	0	0	0	0	0	0	0	None	None	1.0E+04	8.6E+05	None	None	1.0E+03
Pyrene	N	0	0	0	0	0	0	0	None	None	8.3E+02	4.0E+03	None	None	8.3E+01
RadNuc - Beta Part & Photon Act	N	0	0	0	0	0	0	0	None	None	4.0E+00 mrem	None	None	None	4.0E-01
RadNuc - Gross Alpha Part Act	N	0	0	0	0	0	0	0	None	None	1.5E+01 pCi/L	None	None	None	1.5E+00
RadNuc - Radium 226 + 228	N	0	0	0	0	0	0	0	None	None	5.0E+00 pCi/L	None	None	None	5.0E-01
RadNuc - Uranium	N	0	0	0	0	0	0	0	None	None	3.0E+01	None	None	None	3.0E+00
Selenium, Total Recoverable	N	0	0	0	0	0	0	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	5.0E+00	1.3E+00	1.7E+01
Silver	N	0	0	0	0	0	0	0	2.2E+00	None	None	None	5.4E-01	None	None
Sulfate	N	0	0	0	0	0	0	0	None	None	2.5E+02 mg/L	None	None	None	2.5E+01
1,1,2,2-Tetrachloroethane	Y	0	0	0	0	0	0	0	None	None	1.7E+00	4.0E+01	None	None	1.7E-01
Tetrachloroethylene	Y	0	0	0	0	0	0	0	None	None	6.9E+00	3.3E+01	None	None	6.9E-01
Thallium	N	0	0	0	0	0	0	0	None	None	2.4E-01	4.7E-01	None	None	2.4E-02
Toluene	N	0	0	0	0	0	0	0	None	None	5.1E+02	6.0E+03	None	None	5.1E+01
Total Dissolved Solids	N	0	0	0	0	0	0	0	None	None	5.0E+05	None	None	None	5.0E+04
Toxaphene	Y	0	0	0	0	0	0	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.8E-01	5.0E-05	2.8E-04
Tributyltin	N	0	0	0	0	0	0	0	4.6E-01	7.2E-02	None	None	1.2E-01	1.8E-02	None
1,2,4-Trichlorobenzene	N	0	0	0	0	0	0	0	None	None	3.5E+01	7.0E+01	None	None	3.5E+00
1,1,2-Trichloroethane	Y	0	0	0	0	0	0	0	None	None	6.9E+00	1.6E+02	None	None	6.9E-01
Trichloroethylene	Y	0	0	0	0	0	0	0	None	None	2.5E+01	3.0E+02	None	None	2.5E+00
2,4,6-Trichlorophenol	Y	0	0	0	0	0	0	0	None	None	1.4E+01	2.4E+01	None	None	1.4E+00
2-(2,4,5-Trichlorophenoxy propionic acid (Silvex)	N	0	0	0	0	0	0	0	None	None	5.0E+01	None	None	None	5.0E+00
Vinyl Chloride	Y	0	0	0	0	0	0	0	None	None	2.5E-01	2.4E+01	None	None	2.5E-02
Zinc	N	139.515	95.391	69.147	3.675	3.675	3.675	3.675	9.3E+01	9.4E+01	7.4E+03	2.6E+04	2.6E+01	2.6E+01	7.4E+02

Facility Name:
Cedarbrook Wastewater Treatment Facility
Receiving Stream:
New River

Toxic Parameter and Form	ANTIDEGRADATION WASTE LOAD ALLOCATIONS (8.000 MGD Discharge - 100% Stream Mix)			POST - DISCHARGE WATER QUALITY CRITERIA (8.000 MGD Discharge Flow - Mix per "Mixer")				NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS (8.000 MGD Discharge - Mix per "Mixer")			MOST RESTRICTIVE WASTE LOAD ALLOCATIONS (8.000 MGD Discharge Flow)			Target
	Aquatic Protection		Human	Aquatic Protection		Human Health		Aquatic Protection		Human	Aquatic Protection		Human	
	Acute	Chronic	Health	Acute	Chronic	Public Water Supplies	Other Surface Waters	Acute	Chronic	Health	Acute	Chronic	Health	Level
Acenaphthene	N/A	N/A	6.3E+03	None	None	6.7E+02	9.9E+02	N/A	N/A	6.3E+04	N/A	N/A	6.3E+03	N/A
Acrolein	N/A	N/A	5.7E+01	None	None	6.1E+00	9.3E+00	N/A	N/A	5.7E+02	N/A	N/A	5.7E+01	N/A
Acrylonitrile	N/A	N/A	9.8E+00	None	None	5.1E-01	2.5E+00	N/A	N/A	9.8E+01	N/A	N/A	9.8E+00	N/A
Aldrin	4.5E+01	N/A	9.4E-03	3.0E+00	None	4.9E-04	5.0E-04	1.9E+02	N/A	9.4E-02	4.5E+01	N/A	9.4E-03	N/A
Ammonia-N (Annual)	8.4E+01 mg/L	2.1E+01 mg/L	N/A	6.2E+00 mg/L	1.1E+00 mg/L	None	None	3.6E+02 mg/L	8.7E+01 mg/L	N/A	8.4E+01 mg/L	2.1E+01 mg/L	N/A	N/A
Ammonia-N (Wet Season)	9.9E+01 mg/L	6.0E+01 mg/L	N/A	6.1E+00 mg/L	1.6E+00 mg/L	None	None	4.2E+02 mg/L	2.5E+02 mg/L	N/A	9.9E+01 mg/L	6.0E+01 mg/L	N/A	N/A
Anthracene	N/A	N/A	7.8E+04	None	None	8.3E+03	4.0E+04	N/A	N/A	7.8E+05	N/A	N/A	7.8E+04	N/A
Antimony	N/A	N/A	5.2E+01	None	None	5.6E+00	6.4E+02	N/A	N/A	5.2E+02	N/A	N/A	5.2E+01	5.2E+01
Arsenic	5.0E+03	2.7E+03	9.4E+01	3.4E+02	1.5E+02	1.0E+01	None	2.0E+04	1.1E+04	9.4E+02	5.0E+03	2.7E+03	9.4E+01	9.4E+01
Barium	N/A	N/A	1.9E+04	None	None	2.0E+03	None	N/A	N/A	1.9E+05	N/A	N/A	1.9E+04	1.9E+04
Benzene	N/A	N/A	4.2E+02	None	None	2.2E+01	5.1E+02	N/A	N/A	4.2E+03	N/A	N/A	4.2E+02	N/A
Benzidine	N/A	N/A	1.7E-02	None	None	6.6E-04	2.0E-03	N/A	N/A	1.7E-01	N/A	N/A	1.7E-02	N/A
Benzo(a)anthracene	N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
Benzo(a)pyrene	N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
Benzo(b)fluoranthene	N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
Benzo(k)fluoranthene	N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
Bis2-Chloroethyl Ether	N/A	N/A	5.8E+00	None	None	3.0E-01	5.3E+00	N/A	N/A	5.8E+01	N/A	N/A	5.8E+00	N/A
Bis2-Chloroisopropyl Ether	N/A	N/A	1.3E+04	None	None	1.4E+03	6.5E+04	N/A	N/A	1.3E+05	N/A	N/A	1.3E+04	N/A
Bis2-Ethylhexyl Phthalate	N/A	N/A	2.3E+02	None	None	1.2E+01	2.2E+01	N/A	N/A	2.3E+03	N/A	N/A	2.3E+02	N/A
Bromoform	N/A	N/A	8.3E+02	None	None	4.3E+01	1.4E+03	N/A	N/A	8.3E+03	N/A	N/A	8.3E+02	N/A
Butyl Benzyl Phthalate	N/A	N/A	1.4E+04	None	None	1.5E+03	1.9E+03	N/A	N/A	1.4E+05	N/A	N/A	1.4E+04	N/A
Cadmium	4.3E+01	1.7E+01	4.7E+01	2.9E+00	9.3E-01	5.0E+00	None	1.8E+02	6.6E+01	4.7E+02	4.3E+01	1.7E+01	4.7E+01	1.0E+01
Carbon Tetrachloride	N/A	N/A	4.4E+01	None	None	2.3E+00	1.6E+01	N/A	N/A	4.4E+02	N/A	N/A	4.4E+01	N/A
Chlordane	3.6E+01	7.9E-02	1.5E-01	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.4E+02	3.1E-01	1.5E+00	3.6E+01	7.9E-02	1.5E-01	N/A
Chloride mg/L	1.3E+04 mg/L	4.2E+03 mg/L	2.3E+03 mg/L	6.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	5.1E+04 mg/L	1.7E+04 mg/L	2.3E+04 mg/L	1.3E+04 mg/L	4.2E+03 mg/L	2.3E+03 mg/L	N/A
Chlorine, Total Residual	2.8E-01 mg/L	2.0E-01 mg/L	N/A	1.9E-02 mg/L	1.1E-02 mg/L	None	None	1.1E+00 mg/L	8.0E-01 mg/L	N/A	2.8E-01 mg/L	2.0E-01 mg/L	N/A	N/A
Chlorobenzene	N/A	N/A	1.2E+03	None	None	1.3E+02	1.6E+03	N/A	N/A	1.2E+04	N/A	N/A	1.2E+03	N/A
Chlorodibromomethane	N/A	N/A	7.7E+01	None	None	4.0E+00	1.3E+02	N/A	N/A	7.7E+02	N/A	N/A	7.7E+01	N/A
Chloroform	N/A	N/A	3.2E+03	None	None	3.4E+02	1.1E+04	N/A	N/A	3.2E+04	N/A	N/A	3.2E+03	N/A
2-Chloronaphthalene	N/A	N/A	9.4E+03	None	None	1.0E+03	1.6E+03	N/A	N/A	9.4E+04	N/A	N/A	9.4E+03	N/A
2-Chlorophenol	N/A	N/A	7.6E+02	None	None	8.1E+01	1.5E+02	N/A	N/A	7.6E+03	N/A	N/A	7.6E+02	N/A
Chlorpyrifos	1.2E+00	7.5E-01	N/A	8.3E-02	4.1E-02	None	None	4.9E+00	3.0E+00	N/A	1.2E+00	7.5E-01	N/A	N/A
Chromium (+3)	6.8E+03	1.1E+03	N/A	4.6E+02	6.0E+01	None	None	2.6E+04	4.4E+03	N/A	6.8E+03	1.1E+03	N/A	6.5E+02
Chromium (+6)	2.4E+02	2.0E+02	N/A	1.6E+01	1.1E+01	None	None	9.5E+02	8.0E+02	N/A	2.4E+02	2.0E+02	N/A	9.5E+01
Total Chromium	N/A	N/A	9.4E+02	None	None	1.0E+02	None	N/A	N/A	9.4E+03	N/A	N/A	9.4E+02	9.4E+02
Chrysene	N/A	N/A	7.3E-02	None	None	4.4E-02	4.9E-01	N/A	N/A	8.4E+00	N/A	N/A	7.3E-02	N/A
Copper	1.5E+02	1.2E+02	#REF!	1.1E+01	7.2E+00	1.3E+03	None	5.9E+02	4.8E+02	1.2E+05	1.5E+02	1.2E+02	#REF!	#REF!
Cyanide, Free	3.3E+02	9.5E+01	1.3E+03	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.3E+03	3.8E+02	1.3E+04	3.3E+02	9.5E+01	1.3E+03	N/A
DDD	N/A	N/A	5.9E-02	None	None	3.1E-03	3.1E-03	N/A	N/A	5.9E-01	N/A	N/A	5.9E-02	N/A
DDE	N/A	N/A	4.2E-02	None	None	2.2E-03	2.2E-03	N/A	N/A	4.2E-01	N/A	N/A	4.2E-02	N/A
DDT	1.6E+01	1.8E-02	4.2E-02	1.1E+00	1.0E-03	2.2E-03	2.2E-03	6.5E+01	7.3E-02	4.2E-01	1.6E+01	1.8E-02	4.2E-02	N/A
Demeton	N/A	1.8E+00	N/A	None	1.0E-01	None	None	N/A	7.3E+00	N/A	N/A	1.8E+00	N/A	N/A
Diazinon	2.5E+00	3.1E+00	N/A	1.7E-01	1.7E-01	None	None	1.0E+01	1.2E+01	N/A	2.5E+00	3.1E+00	N/A	N/A
Dibenz(a,h)anthracene	N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
1,2-Dichlorobenzene	N/A	N/A	3.9E+03	None	None	4.2E+02	1.3E+03	N/A	N/A	3.9E+04	N/A	N/A	3.9E+03	N/A
1,3-Dichlorobenzene	N/A	N/A	3.0E+03	None	None	3.2E+02	9.6E+02	N/A	N/A	3.0E+04	N/A	N/A	3.0E+03	N/A
1,4-Dichlorobenzene	N/A	N/A	5.9E+02	None	None	6.3E+01	1.9E+02	N/A	N/A	5.9E+03	N/A	N/A	5.9E+02	N/A
3,3-Dichlorobenzidine	N/A	N/A	4.0E+00	None	None	2.1E-01	2.8E-01	N/A	N/A	4.0E+01	N/A	N/A	4.0E+00	N/A
Dichlorobromomethane	N/A	N/A	1.1E+02	None	None	5.6E+00	1.7E+02	N/A	N/A	1.1E+03	N/A	N/A	1.1E+02	N/A
1,2-Dichloroethane	N/A	N/A	7.3E+01	None	None	3.8E+00	3.7E+02	N/A	N/A	7.3E+02	N/A	N/A	7.3E+01	N/A
1,1-Dichloroethylene	N/A	N/A	3.1E+03	None	None	3.3E+02	7.1E+03	N/A	N/A	3.1E+04	N/A	N/A	3.1E+03	N/A
1,2-trans-dichloroethylene	N/A	N/A	1.3E+03	None	None	1.4E+02	1.0E+04	N/A	N/A	1.3E+04	N/A	N/A	1.3E+03	N/A
2,4-Dichlorophenol	N/A	N/A	7.2E+02	None	None	7.7E+01	2.8E+02	N/A	N/A	7.2E+03	N/A	N/A	7.2E+02	N/A
2,4-Dichlorophenoxy Acetic Acid	N/A	N/A	9.4E+02	None	None	1.0E+02	None	N/A	N/A	9.4E+03	N/A	N/A	9.4E+02	N/A
1,2-Dichloropropane	N/A	N/A	9.6E+01	None	None	5.0E+00	1.5E+02	N/A	N/A	9.6E+02	N/A	N/A	9.6E+01	N/A
1,3-Dichloropropene	N/A	N/A	8.5E+01	None	None	3.4E+00	2.1E+02	N/A	N/A	8.5E+02	N/A	N/A	8.5E+01	N/A
Dieldrin	3.6E+00	1.0E+00	1.0E-02	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.4E+01	4.1E+00	1.0E-01	3.6E+00	1.0E+00	1.0E-02	N/A
Diethyl Phthalate	N/A	N/A	1.6E+05	None	None	1.7E+04	4.4E+04	N/A	N/A	1.6E+06	N/A	N/A	1.6E+05	N/A
2,4 Dimethylphenol	N/A	N/A	3.6E+03	None	None	3.8E+02	8.5E+02	N/A	N/A	3.6E+04	N/A	N/A	3.6E+03	N/A
Dimethyl Phthalate	N/A	N/A	2.5E+06	None	None	2.7E+05	1.1E+06	N/A	N/A	2.5E+07	N/A	N/A	2.5E+06	N/A
Di-n-Butyl Phthalate	N/A	N/A	1.9E+04	None	None	2.0E+03	4.5E+03	N/A	N/A	1.9E+05	N/A	N/A	1.9E+04	N/A
2,4 Dinitrophenol	N/A	N/A	6.5E+02	None	None	6.9E+01	6.3E+03	N/A	N/A	6.5E+03	N/A	N/A	6.5E+02	N/A
2-Methyl-4,6-Dinitrophenol	N/A	N/A	1.2E+02	None	None	1.3E+01	2.8E+02	N/A	N/A	1.2E+03	N/A	N/A	1.2E+02	N/A
2,4-Dinitrotoluene	N/A	N/A	2.1E+01	None	None	1.1E+00	3.4E+01	N/A	N/A	2.1E+02	N/A	N/A	2.1E+01	N/A
Dioxin +	N/A	N/A	4.7E-07	None	None	5.0E-08	5.1E-08	N/A	N/A	4.7E-06	N/A	N/A	4.7E-07	N/A
1,2-Diphenylhydrazine	N/A	N/A	6.9E+00	None	None	3.6E-01	2.0E+00	N/A	N/A	6.9E+01	N/A	N/A	6.9E+00	N/A
Alpha-Endosulfan	3.3E+00	1.0E+00	5.8E+02	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+01	4.1E+00	5.8E+03	3.3E+00	1.0E+00	5.8E+02	N/A
Beta-Endosulfan	3.3E+00	1.0E+00	5.8E+02	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+01	4.1E+00	5.8E+03	3.3E+00	1.0E+00	5.8E+02	N/A
Alpha+Beta-Endosulfan	3.3E+00	1.0E+00	N/A	2.2E-01	5.6E-02	None	None	1.3E+01	4.1E+00	N/A	3.3E+00	1.0E+00	N/A	N/A
Endosulfan Sulfate	N/A	N/A	5.8E+02	None	None	6.2E+01	8.9E+01	N/A	N/A	5.8E+03	N/A	N/A	5.8E+02	N/A

Facility Name:
Christiansburg Wastewater Treatment Facility
Receiving Stream:
New River

Toxic Parameter and Form		ANTIDEGRADATION WASTE LOAD ALLOCATIONS (8.000 MGD Discharge - 100% Stream Mix)			POST - DISCHARGE WATER QUALITY CRITERIA (8.000 MGD Discharge Flow - Mix per "Mixer")				NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS (8.000 MGD Discharge - Mix per "Mixer")			MOST RESTRICTIVE WASTE LOAD ALLOCATIONS (8.000 MGD Discharge Flow)			Target Level
		Aquatic Protection		Human Health	Aquatic Protection		Human Health		Aquatic Protection		Human Health	Aquatic Protection		Human Health	
		Acute	Chronic		Acute	Chronic	Public Water Supplies	Other Surface Waters	Acute	Chronic		Acute	Chronic		
Endrin		1.3E+00	6.6E-01	5.6E-01	6.6E-02	3.6E-02	5.9E-02	6.0E-02	5.1E+00	2.6E+00	5.5E+00	1.3E+00	6.6E-01	5.5E-01	N/A
Endrin Aldehyde		N/A	N/A	2.7E+00	None	None	2.8E-01	3.0E-01	N/A	N/A	2.7E+01	N/A	N/A	2.7E+00	N/A
Ethylbenzene		N/A	N/A	5.0E+03	None	None	5.3E+02	2.1E+03	N/A	N/A	5.0E+04	N/A	N/A	5.0E+03	N/A
Fluoranthene		N/A	N/A	1.2E+03	None	None	1.3E+02	1.4E+02	N/A	N/A	1.2E+04	N/A	N/A	1.2E+03	N/A
Fluorene		N/A	N/A	1.0E+04	None	None	1.1E+03	5.3E+03	N/A	N/A	1.0E+05	N/A	N/A	1.0E+04	N/A
Foaming Agents (MBAS)		N/A	N/A	4.7E+03	None	None	5.0E+02	None	N/A	N/A	4.7E+04	N/A	N/A	4.7E+03	N/A
Guthion		N/A	1.8E-01	N/A	None	1.0E-02	None	None	N/A	7.3E-01	N/A	N/A	1.8E-01	N/A	N/A
Heptachlor		7.7E+00	6.9E-02	1.5E-02	5.2E-01	3.8E-03	7.9E-04	7.9E-04	3.1E+01	2.8E-01	1.5E-01	7.7E+00	6.9E-02	1.5E-02	N/A
Heptachlor Epoxide		7.7E+00	6.9E-02	7.5E-03	5.2E-01	3.8E-03	3.9E-04	3.9E-04	3.1E+01	2.8E-01	7.5E-02	7.7E+00	6.9E-02	7.5E-03	N/A
Hexachlorobenzene		N/A	N/A	5.4E-02	None	None	2.8E-03	2.9E-03	N/A	N/A	5.4E-01	N/A	N/A	5.4E-02	N/A
Hexachlorobutadiene		N/A	N/A	6.4E+01	None	None	4.4E+00	1.8E+02	N/A	N/A	6.4E+02	N/A	N/A	6.4E+01	N/A
Hexachlorocyclohexane Alpha-BHC		N/A	N/A	5.0E-01	None	None	2.8E-02	4.9E-02	N/A	N/A	5.0E+00	N/A	N/A	5.0E-01	N/A
Hexachlorocyclohexane Beta-BHC		N/A	N/A	1.7E+00	None	None	9.1E-02	1.7E-01	N/A	N/A	1.7E+01	N/A	N/A	1.7E+00	N/A
Hexachlorocyclohexane Gamma-BHC (Lindane)		1.4E+01	N/A	1.9E+01	9.5E-01	None	9.8E-01	1.8E+00	5.6E+01	N/A	1.9E+02	1.4E+01	N/A	1.9E+01	N/A
Hexachlorocyclopentadiene		N/A	N/A	3.7E+02	None	None	4.0E+01	1.1E+03	N/A	N/A	3.7E+03	N/A	N/A	3.7E+02	N/A
Hexachloroethane		N/A	N/A	2.7E+02	None	None	1.4E+01	3.3E+01	N/A	N/A	2.7E+03	N/A	N/A	2.7E+02	N/A
Hydrogen Sulfide		N/A	3.7E+01	N/A	None	2.0E+00	None	None	N/A	1.5E+02	N/A	N/A	3.7E+01	N/A	N/A
Indeno(1,2,3-cd)pyrene		N/A	N/A	7.3E-01	None	None	3.8E-02	1.8E-01	N/A	N/A	7.3E+00	N/A	N/A	7.3E-01	N/A
Iron		N/A	N/A	2.8E+03	None	None	3.0E+02	None	N/A	N/A	2.8E+04	N/A	N/A	2.8E+03	2.8E+03
Isophorone		N/A	N/A	6.7E+03	None	None	3.5E+02	9.6E+03	N/A	N/A	6.7E+04	N/A	N/A	6.7E+03	N/A
Kepone		N/A	Zero	N/A	None	Zero	None	None	N/A	Zero	N/A	N/A	Zero	N/A	N/A
Lead		1.2E+03	1.7E+02	1.4E+02	6.6E+01	9.7E+00	1.5E+01	None	5.1E+03	7.1E+02	1.4E+03	1.2E+03	1.7E+02	1.4E+02	1.0E+02
Malathion		N/A	1.8E+00	N/A	None	1.0E-01	None	None	N/A	7.3E+00	N/A	N/A	1.8E+00	N/A	N/A
Manganese		N/A	N/A	4.7E+02	None	None	5.0E+01	None	N/A	N/A	4.7E+03	N/A	N/A	4.7E+02	4.7E+02
Mercury		2.1E+01	1.4E+01	N/A	1.4E+00	7.7E-01	None	None	8.3E+01	5.6E+01	N/A	2.1E+01	1.4E+01	N/A	8.3E+00
Methyl Bromide		N/A	N/A	4.4E+02	None	None	4.7E+01	1.5E+03	N/A	N/A	4.4E+03	N/A	N/A	4.4E+02	N/A
Methylene Chloride		N/A	N/A	8.8E+02	None	None	4.6E+01	5.9E+03	N/A	N/A	8.8E+03	N/A	N/A	8.8E+02	N/A
Methoxychlor		N/A	5.5E-01	9.4E+02	None	3.0E-02	1.0E+02	None	N/A	2.2E+00	9.4E+03	N/A	5.5E-01	9.4E+02	N/A
Mirex		N/A	Zero	N/A	None	Zero	None	None	N/A	Zero	N/A	N/A	Zero	N/A	N/A
Nickel		2.1E+03	2.9E+02	5.7E+03	1.5E+02	1.6E+01	6.1E+02	4.6E+03	8.7E+03	1.2E+03	5.7E+04	2.1E+03	2.9E+02	5.7E+03	1.6E+02
Nitrate (as N)	mg/L	N/A	N/A	9.4E+01 mg/L	None	None	1.0E+01 mg/L	None	N/A	N/A	9.4E+02 mg/L	N/A	N/A	9.4E+01 mg/L	N/A
Nitrobenzene		N/A	N/A	1.6E+02	None	None	1.7E+01	6.9E+02	N/A	N/A	1.6E+03	N/A	N/A	1.6E+02	N/A
N-Nitrosodimethylamine		N/A	N/A	1.3E-01	None	None	6.9E-03	3.0E+01	N/A	N/A	1.3E+00	N/A	N/A	1.3E-01	N/A
N-Nitrosodiphenylamine		N/A	N/A	6.3E+02	None	None	3.3E+01	6.0E+01	N/A	N/A	6.3E+03	N/A	N/A	6.3E+02	N/A
N-Nitrosodi-n-propylamine		N/A	N/A	9.6E-01	None	None	5.0E-02	5.1E+00	N/A	N/A	9.6E+00	N/A	N/A	9.6E-01	N/A
Nonylphenol		4.2E+02	1.2E+02	N/A	2.8E+01	6.6E+00	None	None	1.7E+03	4.8E+02	N/A	4.2E+02	1.2E+02	N/A	N/A
Parathion		9.8E-01	2.4E-01	N/A	6.5E-02	1.3E-02	None	None	3.9E+00	9.5E-01	N/A	9.8E-01	2.4E-01	N/A	N/A
PCB Total		N/A	2.6E-01	1.2E-02	None	1.4E-02	6.4E-04	6.4E-04	N/A	1.0E+00	1.2E-01	N/A	2.6E-01	1.2E-02	N/A
Pentachlorophenol		1.8E+02	1.7E+02	8.2E+01	1.2E+01	8.9E+00	2.7E+00	3.0E+01	6.9E+02	6.5E+02	5.2E+02	1.8E+02	1.7E+02	5.2E+01	N/A
Phenol		N/A	N/A	9.4E+04	None	None	1.0E+04	8.6E+05	N/A	N/A	9.4E+05	N/A	N/A	9.4E+04	N/A
Pyrene		N/A	N/A	7.8E+03	None	None	8.3E+02	4.0E+03	N/A	N/A	7.8E+04	N/A	N/A	7.8E+03	N/A
RadNuc - Beta Part & Photon Act	mrem	N/A	N/A	3.7E+01 mrem	None	None	4.0E+00 mrem	4.0E+00 mrem	N/A	N/A	3.7E+02 mrem	N/A	N/A	3.7E+01 mrem	N/A
RadNuc - Gross Alpha Part Act	pCi/L	N/A	N/A	1.4E+02 pCi/L	None	None	1.5E+01 pCi/L	None	N/A	N/A	1.4E+03 pCi/L	N/A	N/A	1.4E+02 pCi/L	N/A
RadNuc - Radium 226 + 228	pCi/L	N/A	N/A	4.7E+01 pCi/L	None	None	5.0E+00 pCi/L	None	N/A	N/A	4.7E+02 pCi/L	N/A	N/A	4.7E+01 pCi/L	N/A
RadNuc - Uranium		N/A	N/A	2.8E+02	None	None	3.0E+01	None	N/A	N/A	2.8E+03	N/A	N/A	2.8E+02	N/A
Selenium, Total Recoverable		3.0E+02	9.1E+01	1.6E+03	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.2E+03	3.7E+02	1.6E+04	3.0E+02	9.1E+01	1.6E+03	5.5E+01
Silver		3.2E+01	N/A	N/A	2.2E+00	None	None	None	1.3E+02	N/A	N/A	3.2E+01	N/A	N/A	1.3E+01
Sulfate	mg/L	N/A	N/A	2.3E+03 mg/L	None	None	2.5E+02 mg/L	None	N/A	N/A	2.3E+04 mg/L	N/A	N/A	2.3E+03 mg/L	N/A
1,1,2,2-Tetrachloroethane		N/A	N/A	3.3E+01	None	None	1.7E+00	4.0E+01	N/A	N/A	3.3E+02	N/A	N/A	3.3E+01	N/A
Tetrachloroethylene		N/A	N/A	1.3E+02		None	6.9E+00	3.3E+01	0.0E+00	N/A	1.3E+03	N/A	N/A	1.3E+02	N/A
Thallium		N/A	N/A	2.2E+00	None	None	2.4E-01	4.7E-01	N/A	N/A	2.2E+01	N/A	N/A	2.2E+00	N/A
Toluene		N/A	N/A	4.8E+03	None	None	5.1E+02	6.0E+03	N/A	N/A	4.8E+04	N/A	N/A	4.8E+03	N/A
Total Dissolved Solids		N/A	N/A	4.7E+06	None	None	5.0E+05	None	N/A	N/A	4.7E+07	N/A	N/A	4.7E+06	N/A
Toxaphene		1.1E+01	3.7E-03	5.4E-02	7.3E-01	2.0E-04	2.8E-03	2.8E-03	4.3E+01	1.5E-02	5.4E-01	1.1E+01	3.7E-03	5.4E-02	N/A
Tributyltin		6.8E+00	1.3E+00	N/A	4.6E-01	7.2E-02	None	None	2.7E+01	5.3E+00	N/A	6.8E+00	1.3E+00	N/A	N/A
1,2,4-Trichlorobenzene		N/A	N/A	3.3E+02	None	None	3.5E+01	7.0E+01	N/A	N/A	3.3E+03	N/A	N/A	3.3E+02	N/A
1,1,2-Trichloroethane		N/A	N/A	1.1E+02	None	None	5.9E+00	1.6E+02	N/A	N/A	1.1E+03	N/A	N/A	1.1E+02	N/A
Trichloroethylene		N/A	N/A	4.8E+02	None	None	2.6E+01	9.0E+02	N/A	N/A	4.8E+03	N/A	N/A	4.8E+02	N/A
2,4,6-Trichlorophenol		N/A	N/A	2.7E+02	None	None	1.4E+01	2.4E+01	N/A	N/A	2.7E+03	N/A	N/A	2.7E+02	N/A
2-(2,4,5-Trichlorophenoxy propionic acid (Silvex)		N/A	N/A	4.7E+02	None	None	5.0E+01	None	N/A	N/A	4.7E+03	N/A	N/A	4.7E+02	N/A
Vinyl Chloride		N/A	N/A	4.8E+00	None	None	2.5E-01	2.4E+01	N/A	N/A	4.8E+01	N/A	N/A	4.8E+00	N/A
Zinc		1.3E+03	1.6E+03	6.9E+04	9.5E+01	9.5E+01	7.4E+03	2.6E+04	5.4E+03	6.7E+03	6.9E+05	1.3E+03	1.6E+03	6.9E+04	6.3E+02

ATTACHMENT 8

SPECIAL CONDITIONS RATIONALE

VPDES PERMIT PROGRAM
LIST OF SPECIAL CONDITIONS RATIONALE

B. OTHER REQUIREMENTS OR SPECIAL CONDITIONS

1. Permit Reopeners

a. Sludge Reopener

Rationale: Required by the VPDES Permit Regulation, 9 VAC 25-31-220 C., and 40 CFR 122.44(c)(4), which note that all permits for domestic sewage treatment plants (including sludge-only facilities) include any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the Clean Water Act.

b. Total Maximum Daily Load (TMDL)] Reopener

Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired in order that they achieve the applicable water quality standards. This condition allows for the permit to be either modified or, alternatively, revoked and reissued to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(l) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan or other waste load allocation prepared under section 303 of the Act.

2. Licensed Wastewater Operator Requirement

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 D., requires the permittee to employ or contract at least one wastewater works operator who holds a current wastewater license for the permitted facility. The Code of Virginia 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators. In addition, the Sewerage Collection and Treatment Regulations (12 VAC 5-581-10 et seq.), recommends a manning and classification schedule for domestic wastewater treatment plant operators, based on plant capacity and specific treatment types.

3. Reliability Class

Rationale: The Sewerage Collection and Treatment Regulations (12 VAC 5-581-10 et seq.) specify reliability classes for all domestic sewage facilities.

4. Certificate to Construct (CTC) and Certificate to Operate (CTO) Requirements

Rationale: The Sewerage Collection and Treatment Regulations (12 VAC 5-581-10 et seq.) specify the requirement for the review and approval of plans and specifications (CTC) and the subsequent issuance of a CTO prior to operating any domestic sewage facilities.

5. Operations & Maintenance (O&M) Manual Requirements

Rationale: Required by the State Water Control Law, Section 62.1-44.19 and the VPDES Permit Regulation, 9 VAC 25-31-190 E. The State Water Control Law, Section 62.1-44.21, allows requests for any information necessary to determine the effect of the discharge on state waters. Section 401 of the Clean Water Act requires the permittee to provide opportunity for the state to review the proposed operations of the facility. In addition, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) in order to achieve compliance with the permit (includes laboratory controls and QA/QC).

6. 95% Design Capacity Notification

Rationale: Required by the VPDES Permit Regulation, 9 VAC 25-31-200 B.2., for all POTWs and PVOTWs in order to insure continued compliance with the terms of the permit.

7. Compliance Reporting Under Part I.A.

Rationale: Authorized by the VPDES Permit Regulation, 9 VAC 25-31-190 J.4. and 220 I. This condition is necessary when toxic 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.

8. Materials Handling and Storage

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-50 A., prohibits the discharge of any wastes into State waters unless authorized by permit. The State Water Control Law, Sec. 62.1-44.16 and 17 authorizes the Board to regulate the discharge of industrial or other wastes. Section 301 of the Clean Water Act prohibits the discharge of any pollutant unless it complies with specific sections of the Act.

9. Effluent Monitoring Frequencies

Rationale: The permittee is granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations that result in enforcement actions. If the permittee fails to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated. The incentive for reduced monitoring is an effort to reduce the cost of environmental compliance and to provide incentives to facilities which demonstrate outstanding performance and consistent compliance with their permits. Facilities which cannot comply with specific effluent parameters or have other related violations will not be eligible for this benefit. This is in conformance with Guidance Memorandum No. 98-2005 - Reduced Monitoring and EPA's proposed "Interim Guidance For Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (EPA 833-B-96-001) published in April 1996.

10. Indirect Dischargers

Rationale: Required by the VPDES Permit Regulation, 9 VAC 25-31-200 B.1 and 40 CFR 122.42(b), for POTWs and PVOTWs which receive waste from someone other than the owner of the treatment works. DEQ must be notified of the introduction of new pollutants to the treatment system, from an indirect discharger, whether as increased volume or a change in the character of the pollutants.

11. Minimum Freeboard

Rationale: Minimize the discharge of untreated wastewater to the groundwater or surface waters.

12. Facility Closure Plan

Rationale: This condition is required in the event that some or all of the operations at the facility cease. The system (or part of the system) must be properly closed out in accordance with regulatory requirements.

13. Permit Application Requirement

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-100 D. and 40 CFR 122.21 (d)(1) require a new application at least 180 days prior to expiration of the existing permit. In addition, the VPDES Permit Regulation, 9 VAC 25-31-100 E.1. and 40 CFR 122.21 (e)(1) note that a permit shall not be issued before receiving a complete application.

C. PRETREATMENT

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-10 et seq., Part VII, and 40 CFR Part 403 establish the legal requirements for State, local government and industry to implement National Pretreatment Standards. The Pretreatment Standards are implemented to prevent POTW plant pass through, interference, violation of water quality standards or contamination of sewage sludge. The regulation requires POTWs with a total design flow greater than 5 MGD with significant or categorical industrial input to establish a Pretreatment Program. The regulation also may apply to POTWs with design flows less than 5 MGD if circumstances warrant control of industrial discharges.

D. TOXICS MANAGEMENT PROGRAM (TMP)

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I., and 40 CFR 122.44(d) require monitoring in the permit to provide for and assure compliance with all applicable requirements of the Clean Water Act and the State Water Control Law. See additional justification included in this attachment.

Part II CONDITIONS APPLICABLE TO ALL VPDES PERMITS

The VPDES Permit Regulation, 9 VAC 25-31-190, and 40 CFR 122, require all VPDES permits to contain or specifically cite the conditions listed.

Part III – BIOSOLIDS

Tabulated below are the special condition sections of the permit, with the bases for each of the permit special conditions.

Special Condition	Description and Basis for Special Condition
Part III.B.1	**Monthly Reporting:** 9VAC25-31-590.B and the Fee Regulation 9VAC25-20-147.B requires submittal of a report by the 15th of the month following the month in which land application occurred.
Part III.B.1a-b	**Biosolids Monitoring Data:** 9VAC25-31-220-I.3 Reporting of monitoring to assure compliance with the permit limits shall be no less frequent than as required by the regulation. 9VAC25-31-190.L.4 Monitoring results shall be reported at the intervals specified in the permit on a Discharge Monitoring Report (DMR) or forms provided or specified by the department for reporting results of monitoring of sludge use or disposal practices. 9VAC25-31-220.I.4.a. states monitoring requirements may include mass (or other measurements specified in the permit) for each pollutant limited in the permit.
Part III.B.1.c	**Monthly Activity Report:** 9VAC25-31-590.B and Fee Regulation 9VAC25-20-147.B requires submittal of a report by the 15th of the month following the month in which land application occurred. Specific information to be provided is identified in 9VAC25-20-147.A. and B. 9VAC25-31-590.C refers to maintaining a report and adequate records on biosolids application rates, and methods of application for each site.
Part III.B.1.d	**Electronic Submittal Attestation Statement:** § 59.1-479 – 498, the Uniform Electronic Transactions Act provides for submission of paperwork electronically and the use of electronic signatures. No laws or regulations require hard copy submittal of original signatures in the biosolids program. 9VAC25-31-590.B. requires electronic or postmarked submittals.
Part III.B.2	**Biosolids Land Application Fee:** § 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 Class B biosolids land 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. 9VAC 20-60.D. establishes the due date.

Part III.B.3.	**Annual Report:** 9VAC25-31-590.A requires the submittal of an annual report postmarked by February 19 for the previous year. 9VAC25-31-220.I.3. provides for the VPDES permit to require monitoring the volume of biosolids and other measurements as appropriate. 9VAC25-31-590.C requires reports be maintained verifying that sludge treatment for pathogen and vector attraction reduction be maintained by the generator and owner (of the permit). 9VAC25-31-190.H. requires the permittee to submit information requested by the board, within a reasonable time, to determine compliance with the permit. Other specific information and maintenance requirements are identified in 9VAC25-20-147.A.
Part III.C.1.	**Records Retention:** VPDES Permit Regulation 9VAC25-31-580 requires permittees who prepare sewage sludge to develop records as well as retain those records for a minimum of five (5) years.
Part III.C.2.	**Class B/PC Biosolids Record Keeping:** VPDES Permit regulation 9VAC25-31-580 outlines record keeping requirements for Class B/PC biosolids.
Part III.C.3.	**Class B/CPLR Biosolids Record Keeping:** VPDES Permit regulation 9VAC25-31-580.A.5 outlines record keeping requirements for Class B/CPLR biosolids.
Part III.D.1	**Biosolids Management Plan (BSMP):** VPDES Permit Regulation 9VAC25-31-485.G requires the permit holder to maintain and implement a BSMP and specifies its components. In addition to all materials submitted with permit application, which includes an Odor Control Plan (OCP), a Nutrient Management Plan (NMP) and Operation and Maintenance (O&M) Manual are required.
Part III.D.2.	**Nutrient Management Plan (NMP) Requirement:** § 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. 9VAC25-31-505.A.1.e states that if conditions at the site change so that it meets one or more special conditions, the NMP will be approved prior to application at the site. 9VAC25-31-505.A.3., with which all biosolids operations must comply, requires that the NMP be submitted to the farmer/operator of the site, the Department of Conservation and Recreation, and the local government, unless requested in writing to not receive the NMP. 9VAC25-31-505.A.4, Table 1 requires the NMP to be approved by DCR prior to application based on soil phosphorus levels (Mehlich I).
Part III.D.3	**Operation and Maintenance (O&M) Manual Requirement:** 9VAC25-31-485.G.3, 9VAC25-790-140 and 9VAC25-790-260 – 300 identify minimum requirements to be included in an O&M Manual. Additional requirements are included in the BSMP 9VAC25-31-100.Q.12.
Part III.D.4	**Odor Control Plan (OCP) Requirement:** 9VAC25-31-100.Q.6. requires Generator's OCP and minimum content. .
Part III.D.5.	**Permittee Source List - Biosolids:** 9VAC25-31-440.D states *no person shall land apply, market, or distribute biosolids in Virginia unless the biosolids source has been approved by the board.* 9VAC25-31-100.Q.8.b. requires identification of sources that the permittee proposes to land apply in the permit application, which becomes part of the BSMP. Water Control Law and the VPDES Permit Regulation do not require a permit modification to add a new source; therefore a source that is approved may be added to the Permittee Source List with administrative authorization. A source not previously or currently approved, must obtain approval before it can be land applied under a VPDES permit.

Under the VPDES Permit Regulation these special conditions are applicable "to any person who prepares sewage sludge or biosolids, or applies biosolids to the land". However the DOC also has an agreement with a third party contractor who holds a VPA permit authorizing land application on the DOC property, as well as other sites. Therefore, the special conditions included in Parts III.D.–I. are not the responsibility of the DOC when land application activities are conducted by the contractor under the authority of a separate VPA permit, with the

exception of Parts III.D.7 - 8.	
Part III.E.1.	**100 Day Notification:** 9VAC25-31-485.D.1. requires written notification to the chief executive officer (CEO) or designee for the locality 100 days prior to the initial land application at a specific site and clarifies that the notice may be satisfied by DEQ's notice of the permit application, if necessary site information was provided in that notification.
Part III.E.2.	**14 Day Notification:** § 62.1-44.19.3.L. and 9VAC25-31-485.D.2. requires written notification to the department and the CEO or designee for the locality at least 14 days prior to land application at a specific site.
Part III.E.3.	**Signage Requirements:** 9VAC25-31-485.F.1. requires a sign be posted at a land application site at least 5 business days prior to delivery of biosolids at the site and maintained on site until 5 business days after application is complete; the sign will not be removed until 30 days after land application is complete. 9VAC25-31-485.F.1.a. – b. addresses placement of the signs. 9VAC25-31-485.F.3.– 4. specifies construction, content, and maintenance of the sign.
Part III.E.4.	**Notification of Sign Posting:** 9VAC25-31-485.F.2. requires written notification to DEQ and the CEO or designee for the locality within 24 hours of posting, identifying where the signs have been posted, and identifies information required in the notice.
Part III.E.5.	**24 Hour Notification:** 9VAC25-31-485.D.3. requires written notice to DEQ and the CEO or designee for the locality no more than 24 hours prior to commencing activity at a site, including delivery. Include the source of material and only sites where land application activities or staging will commence within 24 hours.
Part III.E.6.	**Site Operator Notification and Information:** VPDES Permit Regulation 9VAC25-31-530.H. states *The person who applies bulk biosolids to the land shall provide the owner or lease holder of the land on which the bulk biosolids is applied notice and necessary information to comply with the requirements in this article.*
Part III.E.7.	**Handling of Complaints:** VPDES Permit Regulation 9VAC25-31-485.H requires the permittee to respond within 24 hours of receiving a complaint related to the land application of biosolids, and provide notification of the complaint to DEQ, the local government where the complaint is based and the generator(s) of the biosolids involved.
Part III.E.8.	**Generator NANI:** : 9VAC25-31-530.F requires the generator of biosolids who provides biosolids to a land applier, to give notice and necessary information to the land applier. 9VAC25-31-480 states that the preparer of biosolids shall ensure that the applicable requirements in 9VAC25-31 Part VI are met when biosolids are land applied.
Most of the following **Special Conditions** have their basis in the VPA regulation. 9VAC25-31-505.C of the VPDES Permit Regulation states *Bulk biosolids meeting Class B pathogen reduction standards shall be land applied in accordance with the Virginia Pollution Abatement Permit Regulation, Article 3, Biosolids Use Standards and Practices, set forth in 9VAC25-32-490 through 9VAC25-32-580.*	
Part III.F.1. – 5.	**TRANSPORT requirements:** 9VAC25-32-540.A. – E. identifies requirements for transport routes, vehicles, prevention of drag-out and track-out, clean-up of such drag-out and track-out and clean-up and reporting of spills.
Part III.G.1. – 11.	**STAGING:** 9VAC25-32-545.A. – B. Defines staging and provides procedural requirements for staging up to 7 days and daily inspections by certified land applier; procedural and notification requirements to be implemented if biosolids cannot be applied by the end of the 7th day; and prohibits overnight staging in areas of Karst, areas identified by U.S. Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) as frequently flooded, and sites with on-site storage.

Part III.H.1. - 2.	**ON-SITE STORAGE Requirements:** 9VAC25-32-550.D.1., 3. - 10. Describes on-site storage and provides procedural requirements for staging up to 45 days, routine inspections by certified land applier; procedural and notification requirements; 9VAC25-32-550.D specifies on-site storage shall take place on a constructed surface at a location preapproved by DEQ and that biosolids stored on the site shall be land applied only at sites under control of the owner/operator of the site where the on-site storage is located; 9VAC25-32-550.C and D.2., 6. specifies permeability requirements for the pad and requires existing storage facilities to come into compliance with the amended regulation by 9/1/2014.
Part III.I.1.	**Infrequent Application:** 9VAC25-32-560.B.3.c. establishes infrequent application based on total crop needs for nitrogen.
Part III.I.2.	**Depth to Bedrock or Restrictive Layers:** 9VAC25-32-560.B.2.a. states depth to bedrock or restrictive layers shall be a minimum of 18 inches.
Part III.I.3.	**Depth to Groundwater:** 9VAC25-32-560.B.2.b. prohibits land application when seasonal high water table is within 18" of ground surface and requires use of USDA-NRCS soil survey maps and soil borings to verify groundwater depth.
Part III.I.4.	**pH Management:** 9VAC25-32-560.B.2.c. requires the biosolids soil mixture have a pH of 6>0 S.U. or higher where cadmium in the biosolids is >= 21 mg/kg. 9VAC25-32-560.B.2.c.d. requires the addition of lime or use of lime amended biosolids if soil pH is < 5.5 S.U..
Part III.I.5.	**Soil Potassium < 38 ppm:** 9VAC25-32-560.B.2.e. requires addition of potash prior to or concurrently with the biosolids if the soil potassium (Mehlich I) is < 38 ppm.
Part III.I.6.	**Equipment Calibration:** 9VAC25-32-560.B.3.d.(1) requires routine measurement of the field application rate of application equipment.
Part III.I.7.	**Liquid Biosolids:** 9VAC25-32-560.B.3.d.(1) limits application of liquid biosolids to 14,000 gallons per acre, per application with drying time between applications.
Part III.I.8.	**Grass Height:** 9VAC25-32-560.B.3.d.(1) requires hay and pasture to be grazed or clipped to approximately 6 inches prior to biosolids application.
Part III.I.9.	**Uniform Application:** 9VAC25-32-560.B.3.d.(1) requires a uniform application of biosolids on a field. If application is not uniform additional operational methods are required followed by clipping.
Part III.I.10.	**Odor Control by Incorporation:** 9VAC25-32-560.B.3.d.(2) allows DEQ or the local monitor to require incorporation, when practical or compatible with a soil conservation plan, to mitigate malodor.
Part III.I.11.	**Slope Restrictions:** 9VAC25-32-560.B.3.d.(3) prohibits application on slopes >15%, but allows the restriction to be waived by DEQ for the establishment and maintenance of perennial vegetation or based on BMPs.
Part III.I.12.	**Snow Covered Ground:** 9VAC25-32-560.B.3.d.(5) allows land application of biosolids on snow cover that is 1 inch or less in depth and the snow and biosolids are incorporated within 24 hours. If the snow melts with application, incorporation is not required.
Part III.I.13.	**Setbacks:** 9VAC25-32-560.B.3.e.(1) – (4) establishes setback distances and procedures for extending or waiving residential and property line setbacks.
Part III.I.14.	**Site Access Restrictions:** 9VAC25-32-675.B.5. establishes access restrictions for sites where Class B biosolids have been land applied.

Part III.I.15.	**Forestland (Silviculture):** 9VAC25-32-560.C. establishes requirements for land application on silvicultural sites.
Part III.I.16.	**CPLR Biosolids:** VPDES Permit Regulation 9VAC25-31-530 establishes criteria for determining the need to track the metals loadings on individual sites where metals subject to the cumulative pollutant loading rates have been applied.
Part III.J.1.	**Biosolids Sources**: 9VAC25-31-440.D. states that no person shall land apply, market or distribute biosolids in Virginia unless the biosolids source has been approved by the board.
Part III.J.2.	**Land Application Sites**: 9VAC25-31-440.C. states that no person shall land apply Class B biosolids on any land in Virginia unless that land has been identified in an application to issue, reissue or modify a permit and approved by the board.
Part III.J.3	**Pollution Liability and General Liability Requirement:** 9VAC25-31-485.E requires the permit holder to provide evidence of financial responsibility in accordance with 9VAC25-32-770 et seq. 9VAC25-32-780 establishes liability requirements. 9VAC25-32-790 – 850 provides specific requirements for each type of liability demonstration.
Part III.J.4.	**Alteration of Biosolids Composition:** 9VAC25-31-505.B.2. prohibits the alteration of the biosolids composition at the land application site.
Part III.J.5.	**Site Specific Application Rates**: 9VAC25-32-560 states site specific application rates shall not exceed the rates established in the nutrient management plan nor result in exceedance of the cumulative trace element loading rates specified in 9VAC25-32-356 Table 3.
Part III.J.6.	**Land Owner Consent Requirement**: 9VAC25-31-100.F.6. requires the submission of landowner consent forms with the permit application 9VAC25-31-485.B.2.requires the written agreement between the permittee and the landowner, specifies required information and use of the most current form approved by the board. 9VAC25-31-485.C. requires the permittee to maintain the agreement. 9VAC25-31-485.B.4. Requires the permittee to notify landowners with landowner agreements on old forms to notify the landowner of the need to sign and submit new landowner agreements on the current form.
Part III.J.7	**Threatened and Endangered Species Protection:** 9VAC25-31-550.B states no one shall apply bulk biosolids to the land if it is likely to adversely affect a threatened or endangered species listed in 9VAC25-260-320 or § 4 of the Endangered Species Act (16 USC § 1533) or if the land application is likely to adversely affect its designated critical habitat.
Part III.J.8.	**Certified Land Applicator Requirement**: § 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. 9VAC25-31-485.A. prohibits land application of Class B biosolids unless a person certified as a Land Applicator in accordance with VPA Permit Regulation 9VAC25-32-690 - 760 is on site at all times during the land application. 9VAC25-32-690 requires the land applier to maintain a field log and identifies minimum requirements and sign monthly reports, attesting that they were onsite at all times reported.
Part III.J.9.	**Reopener:** 9VAC25-31-220.C requires inclusion of a reopener clause in the permit to authorize immediate modification of the permit to address changes to standards or requirements for the use or disposal of biosolids, industrial wastewater sludge, or septage.
Part III.J.10.	**Storm Water Discharge Exception:** 9VAC25-32-30.A States that all pollutant management activities covered under a VPA permit shall maintain no point source discharge of pollutants to surface waters except in the case of a storm event greater than the 25-year, 24-hour storm. : 9VAC25-32-30.B states that except in compliance with the VPA or another permit issued by the board that it is unlawful to discharge into, or adjacent to, state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances.

ATTACHMENT 9

RECEIVING WATERS INFO./
TIER DETERMINATION/STORET DATA

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Blue Ridge Regional Office
3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequencies Determination
Town of Christiansburg Wastewater Treatment Plant – VA0061751

FROM: Bob Tate, water permit writer RST

DATE: March 8, 2010

This memo is an update of the previous flow frequency determination memo from Jason Winningham dated January 27, 2005, which updated the memo from Paul Herman dated August 12, 1996. The purpose is to determine flow frequencies for developing effluent limitations in reissuance of VPDES Permit VA0061751. The Town of Christiansburg WWTP discharges to the New River downstream of Radford, VA. Discharge is through a multiport diffuser in the New River, approximately 500 feet upstream the mouth of Crab Creek. Crab Creek flow into the New River is complicated because flow is divided between the New River and a parallel channel that combines with the river approximately 2000 feet downstream of the creek's mouth. For mixing purposes, a conservative approach was chosen for flow frequency analyses. The approach assumes that no Crab Creek flow is available for mixing. Thus this revised flow frequency memo considers only New River flows.

The flow frequencies for the New River were determined using the continuous record gage on the New River at Radford, VA (#03171000), which has been operated by the USGS since 1939.

New River at Radford, VA (#03171000):
Drainage Area = 2,748 mi^2

1Q30 = 678 CFS	
1Q10 = 719 CFS	High Flow 1Q10 = 840 CFS
7Q10 = 887 CFS	High Flow 7Q10 = 1,210 CFS
30Q10 = 1,020 CFS	High Flow 30Q10 = 1,660 CFS
30Q5 = 1,140 CFS	Harmonic Mean = 2,350 CFS

New River flows at the discharge location were determined using drainage area proportions and do not address any discharges or springs located between the gage and the outfall. There are no withdrawals identified in the State Water Use Data System database that are located between the gage and the discharge point.

New River at discharge:
Drainage Area = 2,765 mi^2

1Q30 = 682 CFS = 441 MGD	
1Q10 = 723 CFS = 467 MGD	High Flow 1Q10 = 845 CFS = 546 MGD
7Q10 = 892 CFS = 577 MGD	High Flow 7Q10 = 1,217 CFS = 786 MGD
30Q10 = 1,026 CFS = 663 MGD	High Flow 30Q10 = 1,670 CFS = 1,079 MGD
30Q5 = 1,147 CFS = 741 MGD	Harmonic Mean = 2,365 CFS = 1,527 MGD

Notes: The high flow months are January through May.
Stream measurements are through 2003.
Flow statistics were compiled in 2005.

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
West Central Regional Office
3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Town of Christiansburg STP – VA0061751

FROM: Jason Winningham, WCRO

DATE: January 27, 2005

This memo is an update of the previous flow frequency determination memo from Paul Herman dated August 12, 1996, concerning the subject VPDES permit.

The Town of Christiansburg STP discharges to the New River near Radford, VA. The discharge point is just upstream of the mouth of Crab Creek. Stream flow frequencies are required at this site and for Crab Creek at its mouth for the purpose of developing effluent limitations for the VPDES permit.

The DEQ conducted several flow measurements on Crab Creek from 1995 to 2003. The measurements were taken just above the STP near Christiansburg, VA (#03171170). The measurements made by the DEQ correlated very well with the same day daily mean values from the continuous record gage on the S. F. Roanoke River near Shawsville, VA (#02053800). The measurements and the daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The flow frequency data from the reference gage was entered into the regression line's slope-intercept equation to determine the associated flow frequencies at the measurement site. The attached spreadsheets and graph are attached.

The flow frequencies at the mouth of Crab Creek were determined by using the values at the measurement site and adjusting them by proportional drainage areas. The data for the reference gage, the measurement site, and the discharge point are presented below:

S. F. Roanoke River near Shawsville, VA (#02053800):

Drainage Area = 110 mi^2

1Q10 =	13 CFS	High Flow 1Q10 =	24 CFS
7Q10 =	14 CFS	High Flow 7Q10 =	28 CFS
30Q5 =	21 CFS	HM =	55 CFS
30Q10 =	18 CFS	High Flow 30Q10 =	40 CFS

Crab Creek at the STP near Christiansburg, VA (#03171170):

Drainage Area = 13.79 mi^2

1Q10 =	3.2 CFS	High Flow 1Q10 =	4.6 CFS
7Q10 =	3.4 CFS	High Flow 7Q10 =	5.1 CFS
30Q5 =	4.3 CFS	HM =	7.5 CFS
30Q10 =	3.9 CFS	High Flow 30Q10 =	6.2 CFS

Crab Creek at its mouth:

Drainage Area = 19.72 mi^2

1Q10 = 4.6 CFS	High Flow 1Q10 = 6.6 CFS
7Q10 = 4.8 CFS	High Flow 7Q10 = 7.2 CFS
30Q5 = 6.1 CFS	HM = 10.7 CFS
30Q10 = 5.6 CFS	High Flow 30Q10 = 8.9 CFS

The flow frequencies for the New River at the discharge point were determined using the continuos record gage on the New River at Radford, VA (#03171000), which has been operated by the USGS since 1939. Flows at this site were determined using drainage area proportions and do not address any discharges or springs located between the gage and the outfall. There are no withdrawals identified in the State Water Use Data System database that are located between the gage and the discharge point. The flow frequencies for the gage and the discharge point are listed below.

New River at Radford, VA (#03171000):

Drainage Area = 2,748 mi^2

1Q10 = 720 CFS	High Flow 1Q10 = 851 CFS
7Q10 = 912 CFS	High Flow 7Q10 = 1,243 CFS
30Q5 = 1,168 CFS	HM = 2,368 CFS
30Q10 = 1,063 CFS	High Flow 30Q10 = 1,722 CFS

New River above Crab Creek:

Drainage Area = 2,765 mi^2

1Q10 = 724 CFS	High Flow 1Q10 = 856 CFS
7Q10 = 918 CFS	High Flow 7Q10 = 1,251 CFS
30Q5 = 1,175 CFS	HM = 2,383 CFS
30Q10 = 1,070 CFS	High Flow 30Q10 = 1,733 CFS

New River below Crab Creek:

Drainage Area = 2,765 mi^2

1Q10 = 729 CFS	High Flow 1Q10 = 863 CFS
7Q10 = 922 CFS	High Flow 7Q10 = 1,258 CFS
30Q5 = 1,181 CFS	HM = 2,393 CFS
30Q10 = 1,075 CFS	High Flow 30Q10 = 1,742 CFS
1Q10 = 471 MGD	High Flow 1Q10 = 557 MGD
7Q10 = 596 MGD	High Flow 7Q10 = 813 MGD
30Q5 = 763 MGD	HM = 1,546 MGD
30Q10 = 695 MGD	High Flow 30Q10 = 1,125 MGD

The high flow months are January through May.

S. F. Roanoke River near Shawsville, Va. (Reference gage #02053800)
vs Crab Creek at STP, near Christiansburg, Va. (measurement site #03171170)

	Historic Flow Data (cfs)		Reference sites not used		
Date	S.F. Roanoke R.	Crab Creek	Little River	Walker Creek	Wolf Creek
8/7/1995	34	5.63	163	54	47
10/28/1998	84	9.11	243	90	107
6/30/1997	53	7.34	261	91	97
9/22/1997	23	4.15	106	31	24
8/3/1998	36	6.13	137	56	60
10/5/1998	22	4.97	130	44	38
6/8/1999	24	5.54	121	77	61
9/2/1999	16	3.96	52	32	12
6/27/2000	27	3.77	128	48	41
4/24/2002	45	4.07	160	213	219
6/20/2002	16	4.1	80	64	58
8/7/2002	8.8	2.8	41	45	47
10/9/2002	14	3.34	70	38	29
11/7/2002	56	7.2	231	402	678
3/26/2003	165	14	487	449	317
6/4/2003	150	18.8	433	270	305
	(Reference)	(Meas. Site)			

Flow Frequencies (cfs)		
S.F. Roanoke R.		Crab Creek
13	1Q10	3.2
14	7Q10	3.4
21	30Q5	4.3
24	HF1Q10	4.6
28	HF7Q10	5.1
55	HM	7.5
18	30Q10	3.9
40	HF30Q10	6.2
110	DA sqmi	13.79
reference (x)		measument (y)

Slope-Intercept Equation

$y = 0.7266*x^{0.682}$

DA at Crab Creek Mouth (sqmi)

19.72

Correlation data analysis

S.F. Roanoke River vs. Crab Creek

Regression Statistics	
Multiple R	0.948375402
R Square	0.899415904
Adjusted R Square	0.892231326
Standard Error	1.404133231
Observations	16

Little River vs. Crab Creek

Regression Statistics	
Multiple R	0.935208149
R Square	0.874614282
Adjusted R Square	0.865658159
Standard Error	1.567717099
Observations	16

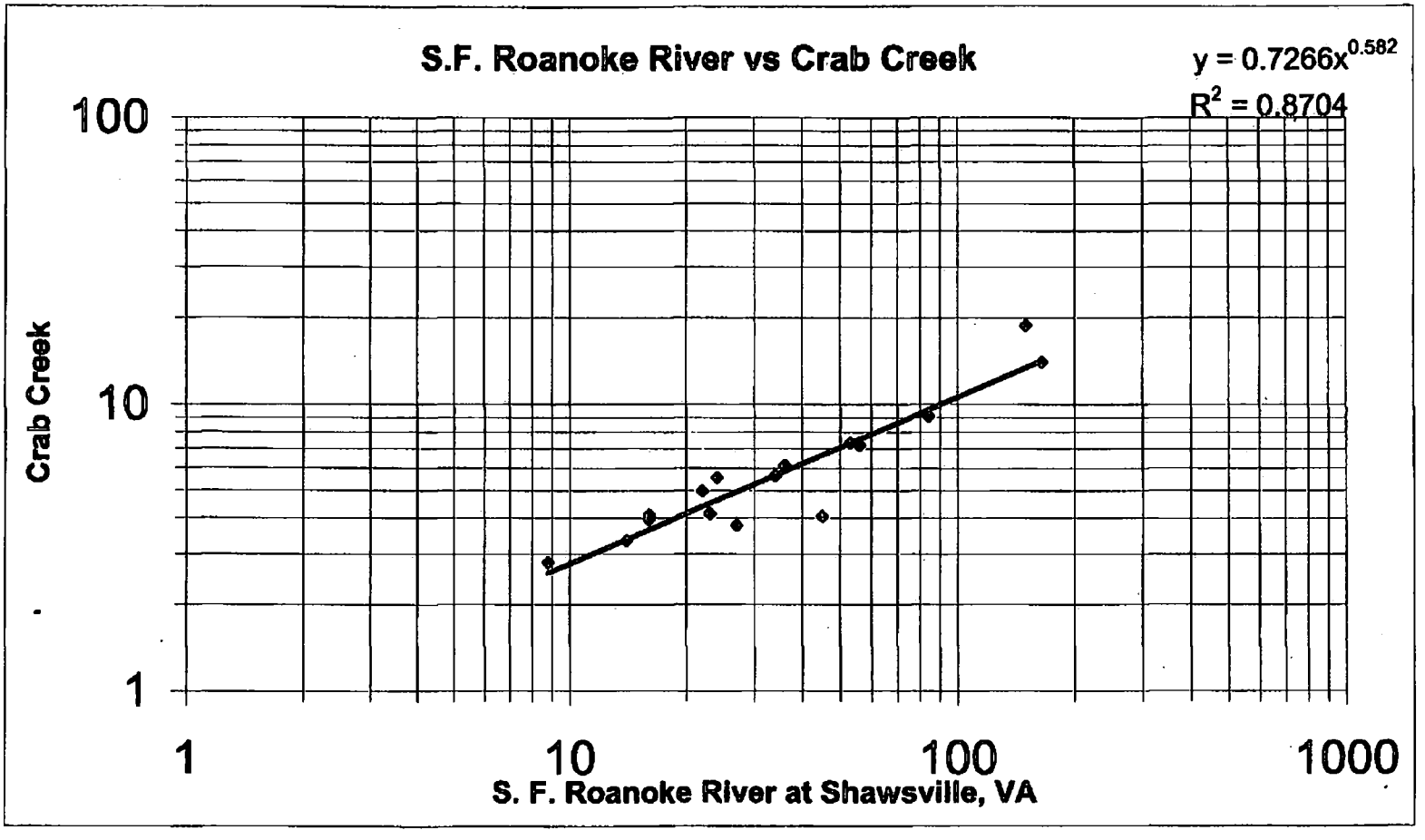
Walker Creek vs. Crab Creek

Regression Statistics	
Multiple R	0.660776797
R Square	0.436625975
Adjusted R Square	0.396384973
Standard Error	3.323089737
Observations	16

Wolf Creek vs. Crab Creek

Regression Statistics	
Multiple R	0.494320935
R Square	0.244353187
Adjusted R Square	0.190378415
Standard Error	3.848602759
Observations	16

	Meas Site cfs	Meas Site mgd	mouth cfs	New R above Crab cfs	New R below Crab cfs	New R below Crab mgd
1q10	3.2	2.1	4.6	724	729	471
7q10	3.4	2.2	4.8	918	922	596
30q5	4.3	2.8	6.1	1175	1181	763
HF 1q10	4.6	3.0	6.6	856	863	557
HF 7q10	5.1	3.3	7.2	1251	1258	813
HM	7.5	4.8	10.7	2383	2393	1546
30Q10	3.9	2.5	5.6	1070	1075	695
HF30Q10	6.2	4.0	8.9	1733	1742	1125
HF Months	Jan-May					


S.F. Roanoke River vs Crab Creek
y = 0.7266x^0.582
R^2 = 0.8704
100
10
1
Crab Creek
1
10
100
1000
S. F. Roanoke River at Shawsville, VA

WQC/WLA Spreadsheet Statistics
TOTAL HARDNESS as $CaCO_3$ in mg/L

Collection_Date_Time	Value
6/12/03 9:00	103
4/10/03 9:30	178
3/10/03 12:30	91.4
2/11/03 8:55	73.4
1/22/03 14:15	93.8
12/12/02 14:15	69.1
11/20/02 12:30	106
10/31/02 9:20	68.7
9/19/02 9:45	101
8/20/02 9:30	62.1
7/30/02 10:50	74.5
6/25/02 8:30	79.2
5/30/02 9:15	89.3
4/30/02 10:30	81.2
3/18/02 13:00	109
2/25/02 14:00	47
1/23/02 10:05	67.8
12/18/01 13:30	44.5
11/27/01 12:00	68.5
10/25/01 13:50	40.1
9/11/01 9:30	57.6
8/15/01 12:50	68.9
7/17/01 10:30	52.1
6/25/01 8:30	114
5/17/01 9:00	112
4/10/01 10:15	73.4
3/8/01 10:00	28.1
2/6/01 11:00	155
1/17/01 11:30	75.3
12/27/00 13:00	65.4
11/29/00 10:30	63.3
10/18/00 10:00	83.4
9/19/00 9:00	75.9
8/16/00 13:35	72.4
7/26/00 9:40	72.6
6/26/00 9:35	62
5/24/00 9:05	92
4/6/00 9:15	59
3/29/00 12:00	61
2/14/00 9:00	60.9
1/26/00 9:15	65.1
12/14/99 9:30	54.2
11/16/99 9:10	69.6
10/13/99 8:31	75.2
9/21/99 9:25	59.3
8/17/99 9:25	69.6
7/26/99 9:30	77
6/22/99 8:40	78
5/10/99 8:20	62
4/26/99 8:50	126
3/30/99 9:05	60
2/10/99 8:10	78
1/28/99 8:15	154
12/8/98 9:30	62
11/17/98 9:15	65
10/20/98 9:30	92
9/1/98 9:35	59.5
8/12/98 11:00	83.3
7/28/98 9:30	68.7
6/4/98 8:10	78.2
5/11/98 10:00	128
4/15/98 8:50	81
3/19/98 8:15	102
2/12/98 9:00	91
1/22/98 8:30	62.4
12/2/97 9:00	74

11/4/97 12:15	57.3
10/20/97 10:10	67.8
9/25/97 8:45	50.4
8/25/97 9:20	64.1
7/9/97 10:10	59.3
6/11/97 9:00	64.2
5/28/97 8:25	48.2
4/16/97 9:55	86.8
3/25/97 8:40	84.6
2/12/97 9:45	77.2
1/22/97 8:30	57.7
12/18/96 9:10	74
11/13/96 12:00	50
10/15/96 9:05	85
9/19/96 9:30	90
8/19/96 9:35	86
7/16/96 10:10	84
6/12/96 10:00	36
5/14/96 11:00	38
4/15/96 8:05	86
3/14/96 9:45	82
2/22/96 8:05	86
1/4/96 9:00	50
12/4/95 9:10	45
11/13/95 9:30	54
10/11/95 8:25	62
9/13/95 9:25	66
8/9/95 8:50	61
7/13/95 8:45	88
6/21/95 9:35	96
5/24/95 8:20	73
4/20/95 8:25	88
3/28/95 10:35	84
2/27/95 9:55	65
1/24/95 9:30	45
12/21/94 10:30	40
12/7/94 10:05	46
11/3/94 9:50	46
10/11/94 10:00	57
9/28/94 10:30	62
8/4/94 9:35	70
7/7/94 10:00	70
6/7/94 10:00	97
5/3/94 9:15	93
4/7/94 9:20	101
3/28/94 9:10	176
2/3/94 9:15	118
1/26/94 10:10	82
12/2/93 13:15	72
11/1/93 9:20	74
10/12/93 9:20	90
9/1/93 9:35	72
8/2/93 9:45	76
7/7/93 9:15	78
mean hardness	76

Station_ID	9-NEW081.72
Station_Description	Rt. 11 Bridge at Radford
Latitude	37-8-19
Longitude	80-34-30
Stream_Name	New River
Watershed_Code	VAW-N18R

WQC/WLA Spreadsheet Statistics

Temperature in ^{o}C

temp	Collection_Date_Time	temp
5.9	5/5/08 11:00	5.9
5.6	4/23/08 10:30	5.6
9.7	11/29/07 10:30	
22.2	9/27/07 10:00	
23.1	7/17/07 12:15	
14.8	5/9/07 12:25	14.8
8.8	3/20/07 9:15	8.8
7.1	1/17/07 12:15	7.1
6.2	12/14/06 9:30	
18.9	10/5/06 9:30	
23.2	8/14/06 10:45	
17.6	6/8/06 9:50	
9.2	4/6/06 9:00	9.2
5.1	2/21/06 10:00	5.1
5.4	12/19/05 10:45	
13.1	10/27/05 9:40	
24	8/10/05 10:00	
17.7	6/7/05 10:00	
12.08	4/19/05 9:10	12.08
4.63	2/17/05 9:30	4.63
11.11	12/1/04 10:30	
14.3	10/27/04 9:45	
23.3	8/25/04 12:30	
20.9	6/22/04 9:30	
13.73	4/21/04 15:55	13.73
5.14	2/18/04 10:15	5.14
8.2	12/22/03 10:30	
14.41	10/27/03 13:00	
17.26	6/12/03 9:00	
10.56	4/10/03 9:30	10.56
8.27	2/10/03 12:30	8.27
3.1	2/11/03 8:55	3.1
4.93	1/22/03 14:15	4.93
7.02	12/12/02 14:15	
10.55	11/20/02 12:30	
13.2	10/31/02 9:20	
21.75	9/19/02 9:45	
22.9	8/20/02 9:30	
23.08	7/30/02 10:50	
19.79	6/25/02 8:30	
16.98	5/30/02 9:15	16.98
13.59	4/30/02 10:30	13.59
8.5	3/14/02 13:00	8.5
8.1	2/25/02 14:00	8.1
6	1/23/02 10:06	6
10.6	12/18/01 13:30	
17.5	10/25/01 13:50	
21.4	9/11/01 9:30	
22.1	8/15/01 12:50	

21.8	7/17/01 10:30	
17.3	6/25/01 8:30	
13.5	5/17/01 9:00	13.5
13.1	4/10/01 10:15	13.1
6.1	3/8/01 10:00	6.1
8.2	2/6/01 11:00	8.2
3.3	1/17/01 11:30	3.3
6.5	12/27/00 13:00	
8.5	11/29/00 10:30	
16.2	10/18/00 10:00	
19.1	9/19/00 9:00	
23.7	8/16/00 13:35	
20.6	7/26/00 9:40	
20.9	6/26/00 9:35	
16.3	5/24/00 9:05	16.3
10.6	4/6/00 9:15	10.6
11.4	3/29/00 12:00	11.4
4.3	2/14/00 9:00	4.3
1.9	1/26/00 9:15	1.9
9	11/16/99 9:10	
16.9	10/13/99 8:31	
19.1	9/21/99 9:25	
23	8/17/99 9:25	
22.5	7/26/99 9:30	
18.5	6/22/99 8:40	
13.8	5/10/99 8:20	13.8
12.5	4/26/99 8:50	12.5
8.1	3/30/99 9:05	8.1
6.3	2/10/99 8:40	6.3
6.4	1/28/99 8:15	6.4
12.4	12/8/98 9:30	
12.8	11/17/98 9:15	
17.1	10/20/98 9:30	
23.3	9/1/98 9:35	
23.4	8/12/98 11:00	
23.4	7/28/98 9:30	
19	6/4/98 8:10	
14.1	5/11/98 10:00	14.1
12.4	4/15/98 8:50	12.4
23.0		**13.9**
90% annual temperature		**90% wet season temperature**

wet season: January-May

Station_ID: 9-NEW081.72
Station_Description: Rt. 11 Bridge at Radford
Latitude: 37-8-19
Longitude: 80-34-30
Stream_Name: New River
Watershed_Code: VAW-N18R

WQC/WLA Spreadsheet Statistics
pH in SU

Collection_Date_Time	
3/5/08 11:00	8.1
1/23/08 10:30	8
11/29/07 10:30	8.1
9/27/07 10:00	8.2
7/17/07 12:15	7.7
5/9/07 12:25	8.3
3/20/07 9:15	8.2
1/17/07 12:15	8
12/14/06 9:30	8.2
10/5/06 9:30	7.2
8/14/06 10:45	7.6
6/8/06 9:50	7
4/6/06 9:00	6.8
2/21/06 10:00	7.8
12/19/05 10:45	7.5
10/27/05 9:40	7.8
8/10/05 10:00	7.2
6/7/05 10:00	7.8
4/19/05 9:10	8.11
2/17/05 9:30	8.06
12/1/04 10:30	7.45
10/27/04 9:45	7.1
8/25/04 12:30	7.63
6/22/04 9:30	7.47
4/21/04 15:55	7.59
2/18/04 10:15	7.75
12/22/03 10:30	7.6
10/27/03 13:00	7.72
6/12/03 9:00	7.79
4/10/03 9:30	8.12
3/10/03 12:30	7.93
2/11/03 8:55	8.23
1/22/03 14:15	8.05
12/12/02 14:15	7.64
11/20/02 12:30	7.6
10/31/02 9:20	7.13
9/19/02 9:45	7.61
8/20/02 9:30	7.23
7/30/02 10:50	7.23
6/25/02 8:30	7.28
5/30/02 9:15	7.58
4/30/02 10:30	7.72
3/18/02 13:00	8.09
2/25/02 14:00	8.24
1/23/02 10:05	8.01
12/18/01 13:30	8.48
10/25/01 13:50	8.33
9/11/01 9:30	7.72
8/15/01 12:50	7.61

7/17/01 10:30	8.1
6/25/01 8:30	7.27
5/17/01 9:00	8.09
4/10/01 10:15	7.89
3/8/01 10:00	8.49
2/6/01 11:00	8.4
1/17/01 11:30	8.21
12/27/00 13:00	8.3
11/29/00 10:30	8.01
10/18/00 10:00	7.71
9/19/00 9:00	7.49
8/16/00 13:35	7.63
7/26/00 9:40	7.55
6/26/00 9:35	7.68
5/24/00 9:05	7.9
4/6/00 9:15	7.99
3/29/00 12:00	7.94
2/14/00 9:00	7.61
1/26/00 9:15	7.52
11/16/99 9:10	7.51
10/13/99 8:31	7.84
9/21/99 9:25	7.9
8/17/99 9:25	7.71
7/26/99 9:30	7.9
6/22/99 8:40	7.92
5/10/99 8:20	8.2
4/26/99 8:50	8.18
3/30/99 9:05	8.51
2/10/99 8:10	8.16
1/28/99 8:15	7.89
12/8/98 9:30	7.38
11/17/98 9:15	7.78
10/20/98 9:30	7.98
9/1/98 9:35	7.73
8/12/98 11:00	7.79
7/28/98 9:30	7.78
6/4/98 8:10	7.84
5/11/98 10:00	8.04
4/15/98 8:50	7.71
90% maximum pH	**8.2**
10% maximum pH	**7.3**
minimum pH	**6.8**
maximum pH	**8.5**

Station_ID 9-NEW081.72
Station_Description Rt. 11 Bridge at Radford
Latitude 37-8-19
Longitude 80-34-30
Stream_Name New River
Watershed_Code VAW-N18R

OLVER INCORPORATED

Consulting Engineers and Planners

July 21, 2005

RECEIVED

JUL 22 2005

DEQ-WCRO

Mr. Jason Winningham
Environmental Engineer Senior
West Central Regional Office
Virginia Department of Environmental Quality
3019 Peters Creek Road
Roanoke VA 24019

Re: CORMIX Modeling Information Revision-VPDES Permit Reissuance Application,
Town of Christiansburg Wastewater Treatment Facility,
VPDES Permit No. VA0061715;
Olver Project Number: 11880.29

Dear Jason:

In response to the June 27, 2005 comments e-mailed to me, I have revisited the CORMIX modeling information that was originally submitted on June 6, 2005. The information that was submitted was an update to the CORMIX evaluation that was performed in 1996 as part of the diffuser feasibility study as part of the permitting process for the relocation of the Wastewater Treatment Plant discharge from Crab Creek to the New River. Upon review of the information available from the 1996 study, it was discovered that the diffuser design conditions modeled in 1996 were slightly different than the final diffuser design and as-built configurations. These differences were not expected to significantly influence the mixing projected using the preliminary design configurations described in the PER, nor were they expected to reduce the beneficial mixing provided by the submerged diffuser relative to the Crab Creek discharge used prior to the outfall relocation.

In order to update the 1996 CORMIX modeling information, the same model approach and input information was used, with the exception of updating the diffuser configurations; the results of the modeling using this approach were submitted on June 6, 2005. As for the 1996 evaluation, the modeling approach was to determine the distance downstream of the discharge diffuser that the effluent was diluted to below the Criterion Maximum Concentration (CMC), or the distance required for the concentration to reach ten percent of the original concentration. This distance was reported as the distance required to complete mixing. The modeled area was from the diffuser to a point 5,000 meters downstream.

The comments made by Allan Brockenbrough, II, P.E., in the VDEQ Office of Water Programs recommended that the CORMIX modeling approach be changed by examining the Regulatory Mixing Zone (RMZ-an area of the effluent plume that is characterized by an area that is less than ½ the stream's width, ½ the cross-sectional area of the channel, and a distance downstream equal to 5-times the stream width), rather than the distance required to reach the CMC. To that end, we modeled the dilution that will occur within the RMZ at 1Q10 and 7Q10 stream flows. The input parameters for the RMZ boundaries used in this evaluation are:

Blacksburg, Virginia
1116 South Main Street, Suite 100 (540) 552-5548
Blacksburg, Virginia 24060 (540) 552-5577 FAX

Charlotte, North Carolina
4957 Albemarle Road (704) 535-1100
Charlotte, North Carolina 28205 (704) 535-1148 FAX

1. 5X Stream Width Downstream = 1,076 meters
2. 1/3 Cross Sectional Area = Input 33.3% of average depth (1.37 m) x stream width (213.4 m)
3. ½ Stream Width = Input 50% of stream width (213.4 m)

In this evaluation, the modeled area was increased from 5,000 meters to 15,000 meters to extend the study area. It should be noted, however, that approximately 6,000 meters downstream from the diffuser discharge is a low-water dam. Any dilution modeled past the low-water dam by CORMIX may be different from the actual in-stream dilution, because CORMIX cannot take into account the effects of the dam. The input parameters for each of the modeled conditions are depicted in the table included in the attached report.

The model outputs from the RMZ evaluation are included in Attachments 1, 2, and 3 for the effluent flows of 4.0 MGD, 6.0 MGD, and 8.0 MGD, respectively. Each of the defining characteristics of the RMZ was examined separately. Table 1 summarizes the concentration of effluent (as percent) and the corresponding dilution factor at the edge of the RMZ. As depicted, the distance downstream equal to 5-times the stream width (approximately 1,076 meters downstream of the discharge) was the most limiting of the three RMZ endpoints for all of the three discharge flows except the 8.0 MGD at 1Q10 where the cross sectional area was the limiting factor. In most cases, the effluent plume did not extend to ½ of the stream width within the 15,000 meter study area; in the one situation that it did, the results should be used with caution as this distance is downstream of the low water dam.

Table 1: RMZ Evaluation Summary

	4.0 MGD			6.0 MGD			8.0 MGD		
	5X Width Down-stream	½ Stream Width	1/3 – Cross Sectional Area	5X Width Down-stream	½ Stream Width	1/3 – Cross Sectional Area	5X Width Down-stream	½ Stream Width	1/3 – Cross Sectional Area
1Q10 Flow* Concentration	**3.76%**	RMZ Not Encountered	2.57%	**4.57%**	RMZ Not Encountered	3.87%	3.96%	3.40%[§]	**4.00%**
1Q10 Flow* Dilution Factor	**26.6**	RMZ Not Encountered	39.0	**21.9**	RMZ Not Encountered	25.8	25.3	29.4	**25.0**
7Q10 Flow* Concentration	**3.05%**	RMZ Not Encountered	1.98%	**4.17%**	RMZ Not Encountered	2.99%	**4.52%**	RMZ Not Encountered	3.95%
7Q10 Flow* Dilution Factor	**32.8**	RMZ Not Encountered	50.1	**24.0**	RMZ Not Encountered	33.4	**22.1**	RMZ Not Encountered	25.3

Notes: Values in bold represent most limiting RMZ criteria.

*The 1Q10 Flow and 7Q10 Flow used in this evaluation were 463.5 MGD and 601.5 MGD respectively and were obtained from the Water Quality Standards Worksheet created as part of the 2002 Permit Amendment. These flows are similar to those calculated as part of the 2005 permit reissuance; as such, the most limiting RMZ criteria are expected to be the same for the new and old flow values. The difference in the new and old flows on the projected dilution factors can be determined by comparing the 7Q10 dilution factors in Table 1 and Table 3.

§The projected edge of the effluent plume extends to ½ of the stream width at 14,133 meters downstream of the discharge, which is downstream from the low-water dam. The dam would likely change the shape of the effluent plume, and cannot be modeled using CORMIX.

Allan Brockenbrough, II, P.E., also suggested that the acute mixing ratio should be determined from the most limiting of the EPA's TSD Criteria (50X discharge length scale, 5X the local water depth, or 10% of the Regulatory Mixing Zone). The distances from the discharge point to the portions of the plume to evaluate the TSD Criteria are:

1. 4.5 meters (50X discharge length scale of 0.09-meters);
2. 7.35 meters (5X the local water depth of 1.47-meters); and,
3. 108 meters (10% of the RMZ of 1,076-meters).

The 50X discharge length scale is the most limiting factor in the case of the Christiansburg diffuser. Table 2 depicts the mixing ratios determined at 4.5 meters from the diffuser using CORMIX 1 and the 1Q10 flow. CORMIX 1 models the discharge from a single diffuser port. The model outputs from the CORMIX 1 models are provided in Attachment 4.

Table 2: Mixing Ratios at 50X Discharge Length Scale at 1Q10 Flow

	4.0 MGD	6.0 MGD	8.0 MGD
1Q10 Flow* Dilution Factor	6.5	6.6	6.6

*The 1Q10 Flow of 471 MGD used in this evaluation was obtained by personal communication on June 8, 2005 with Jason Winningham.

The final comment requested that the chronic mixing ratio be determined by the dilution factor at the edge of the regulatory mixing zone. Because Olver Incorporated used the updated 7Q10 flow obtained from personal communication with Jason Winningham on June 8, 2005, the values for the chronic mixing ratio are slightly different than those obtained as part of the RMZ evaluation. The results of the model outputs from the chronic mixing ratio investigation are included in Attachment 5.

Table 3: Dilution Factors at the Edge of the RMZ with 7Q10 Flow

	4.0 MGD	6.0 MGD	8.0 MGD
7Q10 Flow* Dilution Factor	32.5	23.8	22.2

*The 7Q10 Flow used in this evaluation was 596 MGD and was obtained by personal communication on June 8, 2005 with Jason Winningham.

I believe this addresses all of the comments provided. Please do not hesitate to contact me at (540) 552-5548 or Barry Helms, Assistant Town Manager, at (540) 382-6128 should you have any questions or require any additional information.

Sincerely,

OLVER INCORPORATED

Lawrence

R. Lawrence Hoffman
Director of Environmental Services

RLH/mfs

Enclosures

Cc: Allan Brockenbrough, II, P.E., Office of Water Programs, VDEQ (w/encl.)
Lance Terpenny, Town Manager, Town of Christiansburg
Barry Helms, P.E., Assistant Town Manager, Town of Christiansburg (w/encl.)
John Olver, Ph.D., P.E., Consultant, Olver Incorporated

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Blue Ridge Regional Office
3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Dissolved Oxygen Modeling
Town of Christiansburg Wastewater Treatment Plant – VA0061751

FROM: Bob Tate, water permit writer

DATE: May 25, 2010

This memo describes dissolved oxygen (DO) modeling to predict compliance with DO water quality standards (WQS). DO water quality criteria (WQC) for Class IV (mountain zones waters) are 4.0 mg/L (minimum) and 5.0 mg/L (daily average). Antidegradation applies to the discharge.

The modeling tool allows for one of two methods to determine flow: comparison of drainage areas or direct comparison of measured flows. The flow comparison method was used. 7Q10 flow data for STORET Station 9-NEW081.72 near the Route 11 Bridge in Radford provided a base flow. 7Q10 flow at the discharge point had been previously calculated for flow frequency determinations. Flow from Crab Creek was not included in the models. Crab Creek's mouth is approximately 500 feet downstream of the instream diffuser that discharges treated effluent. A channel parallel to the New River prohibits all of Crab Creek entering the New River until approximately 2000 feet downstream of the mouth. For modeling purposes, ignoring Crab Creek flow simplifies flow considerations and results in a more conservative analysis. Consequently the models contain a single short stream segment 2500' (0.47 miles) long. Stream width was estimated at 500 feet from available aerial imagery.

Background (Receiving Stream) Data
7Q10 flow came from flow frequency determinations. The model supplied default cBOD and TKN values. DO and temperature data came from the Federal Energy Regulatory Commission (FERC) relicensing study report for American Electric Power's Claytor Project. DO and temperature data were collected at New River mile 78.97 (near Plum Creek) from June though October of 2007. Data were collected for nineteen consecutive weeks from June 19 through October 24. Three to eight tests were made one day a week. Daily tests were averaged to represent a weekly average. The nineteen weekly averages were averaged and used as input data for the models. The data are assumed representative of conservative conditions. June – October is part of the low flow period (June – December) when water temperatures are highest and consequent DO values are lowest. (DO and temperature data summaries are attached.)

Discharge Data
Models were developed for 6 MGD and 8 MGD flow tiers (attached). The monthly average secondary treatment standard (30 mg/L) was used for cBOD. TKN was determined by adding 3 mg/L to the 9 mg/L assumed for municipal wastewater treatment facilities. DO was the current permit limit: 6.0 mg/L. Discharge temperature was the 90% annual effluent temperature value calculated for the waste load allocation spreadsheet. Data to determine discharge temperature came from daily operational logs for 2009.

Modeling Segmentation

The single segment in the models represents the New River from the outfall (instream diffuser) to approximately 2500 feet downstream. At the downstream point all Crab Creek flow has entered the river. USGS topographic map (Radford - North) indicates the river surface drops 20 feet over approximately 38,000 feet of run. The calculated slope was used to project elevations at the start and end of the segment using the 1700 foot contour near the Route 114 Bridge as a reference.

Channel Information

The following stream observations were made on March 31, 2010. .

cross section shape: rectangular
character: mostly straight
pools: 60% with 3 feet average depth
riffles: 40% with 1 foot average depth
bottom: gravel, small rock, large rock, boulders
sludge: none
plants: no rooted plants
algae on bottom
no green color in water

The above data were input into the modeling tool with two modifications. "Large rock" was selected to represent bottom type; the modeling tool allows for only one descriptor. The modeling tool indicated that calculated depth was inconsistent with pool and riffle input data, so pool and riffle data were revised to: pools: 75% with 4 feet average depth;
riffles: 25% with 1 foot average depth.

Modeling Outcomes and Conclusions

Both 6 MGD and 8 MGD models predict:

DO WQC are met.
DO increases from the discharge point to the end of the segment.

Consequently there are no DO antidegradation violations (no DO drop > 0.2 mg/L).
A 6 mg/L minimum DO limit and BOD secondary treatment standards limits (30 mg/L monthly average and 45 mg/L maximum weekly average) will satisfy DO WQS.
(Separate reasonable potential analyses for ammonia indicate nitrogen limits are not needed.)

Attachments: Modeling documentation for 6 MGD and 8 MGD discharges
DO and temperature data summaries from FERC relicensing report

"Model Run For I:\rstate\Christiansburg\DO Modeling\Christiansburg WWTF - 6 MGD.mod
On 5/25/2010 2:08:37 PM"

"Model is for NEW RIVER."
"Model starts at the CHRISTIANSBURG WWTF discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
577,	2,	0,	6.4,	22

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6,	30,	12,	,6,	21

"Hydraulic Information for Segment 1"

"Length"	"Width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.47,	500.001,	3.49,	.517

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
583,	6.396,	5.72,	.401,	8.249,	21.98971

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

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
.3,	.329,	1.66,	1.74,	.15,	.175,	0,	0

"Output for Segment 1"
"Segment starts at CHRISTIANSBURG WWTF"

"Total"	"Segm."			
"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	6.396,	5.72,	.401
.1,	.1,	6.411,	5.698,	.4
.2,	.2,	6.426,	5.676,	.399
.3,	.3,	6.441,	5.654,	.398
.4,	.4,	6.455,	5.632,	.397
.47,	.47,	6.465,	5.617,	.396

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

File Information

File Name:	I:\rstate\Christiansburg\DO Modeling\Christiansburg WWTF - 6 MGD.mo
Date Modified:	May 24, 2010

Water Quality Standards Information

Stream Name:	NEW RIVER
River Basin:	New River Basin
Section:	2a
Class:	IV - Mountainous Zones Waters
Special Standards:	PWS, v

Background Flow Information

Gauge Used:	STORET 9-NEW081.72 Route 11 Bridge @ Radford
Gauge Drainage Area:	2748 Sq.Mi.
Gauge 7Q10 Flow:	573 MGD
Headwater Drainage Area:	2785 Sq.Mi.
Headwater 7Q10 Flow:	577 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.2085153 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	22 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	6.4 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	1705.8 ft above MSL
Model End Elevation:	1704.5 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	CHRISTIANSBURG WWTF
VPDES Permit No.:	VA0061751

Discharger Flow Information

Flow:	6 MGD
cBOD5:	30 mg/l
TKN:	12 mg/l
D.O.:	6 mg/l
Temperature:	21 Degrees C

Geographic Information

Segment Length:	0.47 miles
Upstream Drainage Area:	2785 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	1705.8 Ft.
Downstream Elevation:	1704.5 Ft.

Hydraulic Information

Segment Width:	500.001 Ft.
Segment Depth:	3.49 Ft.
Segment Velocity:	0.517 Ft./Sec.
Segment Flow:	583 MGD
Incremental Flow:	-580.715 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	Yes
Percent Pools:	75
Percent Riffles:	25
Pool Depth:	4 Ft.
Riffle Depth:	1 Ft.
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	On Entire Bottom

"Model Run For I:\rstate\Christiansburg\DO Modeling\Christiansburg WWTF - 8 MGD.mod
On 5/25/2010 2:09:09 PM"

"Model is for NEW RIVER."
"Model starts at the CHRISTIANSBURG WWTF discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
577,	2,	0,	6.4,	22

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
8,	30,	12,	,6,	21

"Hydraulic Information for Segment 1"

"Length"	"Width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.47,	500,	3.497,	.518

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
585,	6.395,	5.957,	.533,	8.249,	21.98632

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

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
.3,	.329,	1.66,	1.74,	.15,	.175,	0,	0

"Output for Segment 1"
"Segment starts at CHRISTIANSBURG WWTF"

"Total"	"Segm."			
"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	6.395,	5.957,	.533
.1,	.1,	6.409,	5.934,	.532
.2,	.2,	6.423,	5.911,	.531
.3,	.3,	6.436,	5.888,	.53
.4,	.4,	6.449,	5.865,	.529
.47,	.47,	6.458,	5.849,	.528

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

File Information

File Name:	I:\rstate\Christiansburg\DO Modeling\Christiansburg WWTF - 8 MGD.mo
Date Modified:	May 24, 2010

Water Quality Standards Information

Stream Name:	NEW RIVER
River Basin:	New River Basin
Section:	2a
Class:	IV - Mountainous Zones Waters
Special Standards:	PWS, v

Background Flow Information

Gauge Used:	STORET 9-NEW081.72 Route 11 Bridge @ Radford
Gauge Drainage Area:	2748 Sq.Mi.
Gauge 7Q10 Flow:	573 MGD
Headwater Drainage Area:	2785 Sq.Mi.
Headwater 7Q10 Flow:	577 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.2085153 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	22 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	6.4 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	1705.8 ft above MSL
Model End Elevation:	1704.5 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	CHRISTIANSBURG WWTF
VPDES Permit No.:	VA0061751

Discharger Flow Information

Flow:	8 MGD
cBOD5:	30 mg/l
TKN:	12 mg/l
D.O.:	6 mg/l
Temperature:	21 Degrees C

Geographic Information

Segment Length:	0.47 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	1 Sq.Mi.
Upstream Elevation:	1705.8 Ft.
Downstream Elevation:	1704.5 Ft.

Hydraulic Information

Segment Width:	500 Ft.
Segment Depth:	3.497 Ft.
Segment Velocity:	0.518 Ft./Sec.
Segment Flow:	585 MGD
Incremental Flow:	-580.715 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	Yes
Percent Pools:	75
Percent Riffles:	25
Pool Depth:	4 Ft.
Riffle Depth:	1 Ft.
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	On Entire Bottom

2007 Claytor Lake Water Quality Data

Date	Time	Station	River Mile	Depth	Dissolved Oxygen (mg/L)		
6/20/2007	6:17	19	78.97	0	6.42	weekly average	6.26
6/20/2007	6:17	19	78.97	1	6.33		
6/20/2007	6:17	19	78.97	2	6.28		
6/20/2007	6:24	20	78.97	0	6.45		
6/20/2007	6:24	20	78.97	1	6.22		
6/20/2007	6:30	21	78.97	0	6.08		
6/20/2007	6:30	21	78.97	1	6.06		
6/27/2007	6:05	19	78.97	0	6.14	weekly average	6.05
6/27/2007	6:05	19	78.97	1	5.93		
6/27/2007	6:05	19	78.97	2	5.85		
6/27/2007	6:09	20	78.97	0	6.16		
6/27/2007	6:09	20	78.97	1	5.86		
6/27/2007	6:11	21	78.97	0	6.5		
6/27/2007	6:11	21	78.97	1	5.93		
7/3/2007	6:09	19	78.97	0	6.05	weekly average	5.94
7/3/2007	6:09	19	78.97	1	5.99		
7/3/2007	6:09	19	78.97	2	5.97		
7/3/2007	6:14	20	78.97	0	5.97		
7/3/2007	6:14	20	78.97	1	5.89		
7/3/2007	6:17	21	78.97	0	5.87		
7/3/2007	6:17	21	78.97	1	5.85		
7/11/2007	6:19	19	78.97	0	6.17	weekly average	6.16
7/11/2007	6:19	19	78.97	1	6.14		
7/11/2007	6:19	19	78.97	2	6.1		
7/11/2007	6:22	20	78.97	0	6.2		
7/11/2007	6:22	20	78.97	1	6.47		
7/11/2007	6:24	21	78.97	0	6.1		
7/11/2007	6:24	21	78.97	1	5.95		
7/18/2007	6:23	19	78.97	0	5.98	weekly average	5.85
7/18/2007	6:23	19	78.97	1	5.92		
7/18/2007	6:23	19	78.97	2	5.91		
7/18/2007	6:26	20	78.97	0	5.84		
7/18/2007	6:26	20	78.97	1	5.82		
7/18/2007	6:30	21	78.97	0	5.73		
7/18/2007	6:30	21	78.97	1	5.72		
7/25/2007	6:42	19	78.97	0	6.29	weekly average	6.17
7/25/2007	6:42	19	78.97	1	6.23		
7/25/2007	6:42	19	78.97	2	6.2		
7/25/2007	6:42	19	78.97	3	6.23		
7/25/2007	6:46	20	78.97	0	6.15		
7/25/2007	6:46	20	78.97	1	6.13		
7/25/2007	6:48	21	78.97	0	6.1		
7/25/2007	6:48	21	78.97	1	6.06		
7/31/2007	6:35	19	78.97	0	4.9	weekly average	4.92
7/31/2007	6:35	19	78.97	1	4.95		
7/31/2007	6:35	19	78.97	2	4.9		
7/31/2007	6:40	20	78.97	0	4.79		
7/31/2007	6:40	20	78.97	1	4.77		

7/31/2007	6:42	21	78.97	0	5.05	.	.
7/31/2007	6:42	21	78.97	1	5.08	.	.
8/8/2007	6:46	19	78.97	0	5.6	**weekly average**	**5.56**
8/8/2007	6:46	19	78.97	1	5.58	.	.
8/8/2007	6:46	19	78.97	2	5.57	.	.
8/8/2007	6:48	20	78.97	0	5.56	.	.
8/8/2007	6:48	20	78.97	1	5.53	.	.
8/8/2007	6:50	21	78.97	0	5.54	.	.
8/8/2007	6:50	21	78.97	1	5.53	.	.
8/15/2007	6:36	19	78.97	0	6.5	**weekly average**	**6.46**
8/15/2007	6:33	20	78.97	0	6.45	.	.
8/15/2007	6:30	21	78.97	0	6.44	.	.
8/21/2007	6:37	19	78.97	0	6.85	**weekly average**	**6.83**
8/21/2007	6:34	20	78.97	0	6.84	.	.
8/21/2007	6:30	21	78.97	0	6.8	.	.
8/28/2007	6:51	19	78.97	0	7.9	**weekly average**	**8.07**
8/28/2007	6:49	20	78.97	0	8.16	.	.
8/28/2007	6:45	21	78.97	0	8.14	.	.
9/4/2007	6:55	19	78.97	0	5.05	**weekly average**	**5.02**
9/4/2007	6:54	20	78.97	0	4.86	.	.
9/4/2007	6:51	21	78.97	0	5.14	.	.
9/13/2007	7:09	19	78.97	0	6.04	**weekly average**	**6.17**
9/13/2007	7:06	20	78.97	0	6.16	.	.
9/13/2007	7:02	21	78.97	0	6.32	.	.
9/19/2007	7:24	19	78.97	0	6.63	**weekly average**	**6.55**
9/19/2007	7:24	19	78.97	1	6.56	.	.
9/19/2007	7:24	19	78.97	2	6.58	.	.
9/19/2007	7:29	20	78.97	0	6.52	.	.
9/19/2007	7:29	20	78.97	1	6.5	.	.
9/19/2007	7:31	21	78.97	0	6.52	.	.
9/19/2007	7:31	21	78.97	1	6.51	.	.
9/26/2007	7:14	19	78.97	0	6.37	**weekly average**	**6.52**
9/26/2007	7:12	20	78.97	0	6.62	.	.
9/26/2007	7:09	21	78.97	0	6.56	.	.
10/3/2007	7:17	19	78.97	0	6.33	**weekly average**	**6.46**
10/3/2007	7:14	20	78.97	0	6.53	.	.
10/3/2007	7:10	21	78.97	0	6.53	.	.
10/10/2007	7:24	19	78.97	0	7.25	**weekly average**	**7.47**
10/10/2007	7:21	20	78.97	0	7.57	.	.
10/10/2007	7:17	21	78.97	0	7.6	.	.
10/16/2007	7:28	19	78.97	0	7.63	**weekly average**	**7.94**
10/16/2007	7:24	20	78.97	0	8.08	.	.
10/16/2007	7:19	21	78.97	0	8.11	.	.
10/24/2007	7:35	19	78.97	0	6.91	**weekly average**	**6.88**
10/24/2007	7:32	20	78.97	0	6.94	.	.
10/24/2007	7:28	21	78.97	0	6.8	.	.
						average of weekly averages	6.38

2007 Claytor Lake Water Quality Data

Date	Time	Station	River Mile	Depth	Water Temperature (° C)		
6/20/2007	6:17	19	78.97	0	20.42	weekly average	20.46
6/20/2007	6:17	19	78.97	1	20.43		
6/20/2007	6:17	19	78.97	2	20.43		
6/20/2007	6:24	20	78.97	0	20.39		
6/20/2007	6:24	20	78.97	1	20.39		
6/20/2007	6:30	21	78.97	0	20.59		
6/20/2007	6:30	21	78.97	1	20.57		
6/27/2007	6:05	19	78.97	0	20.52	weekly average	20.54
6/27/2007	6:05	19	78.97	1	20.53		
6/27/2007	6:05	19	78.97	2	20.53		
6/27/2007	6:09	20	78.97	0	20.52		
6/27/2007	6:09	20	78.97	1	20.52		
6/27/2007	6:11	21	78.97	0	20.58		
6/27/2007	6:11	21	78.97	1	20.58		
7/3/2007	6:09	19	78.97	0	21.72	weekly average	21.69
7/3/2007	6:09	19	78.97	1	21.73		
7/3/2007	6:09	19	78.97	2	21.73		
7/3/2007	6:14	20	78.97	0	21.69		
7/3/2007	6:14	20	78.97	1	21.69		
7/3/2007	6:17	21	78.97	0	21.63		
7/3/2007	6:17	21	78.97	1	21.63		
7/11/2007	6:19	19	78.97	0	23.15	weekly average	23.16
7/11/2007	6:19	19	78.97	1	23.18		
7/11/2007	6:19	19	78.97	2	23.18		
7/11/2007	6:22	20	78.97	0	23.17		
7/11/2007	6:22	20	78.97	1	23.18		
7/11/2007	6:24	21	78.97	0	23.14		
7/11/2007	6:24	21	78.97	1	23.14		
7/18/2007	6:23	19	78.97	0	22.79	weekly average	22.75
7/18/2007	6:23	19	78.97	1	22.8		
7/18/2007	6:23	19	78.97	2	22.8		
7/18/2007	6:26	20	78.97	0	22.77		
7/18/2007	6:26	20	78.97	1	22.78		
7/18/2007	6:30	21	78.97	0	22.64		
7/18/2007	6:30	21	78.97	1	22.65		
7/25/2007	6:42	19	78.97	0	21.63	weekly average	21.62
7/25/2007	6:42	19	78.97	1	21.71		
7/25/2007	6:42	19	78.97	2	21.7		
7/25/2007	6:42	19	78.97	3	21.71		
7/25/2007	6:46	20	78.97	0	21.68		
7/25/2007	6:46	20	78.97	1	21.68		
7/25/2007	6:48	21	78.97	0	21.43		
7/25/2007	6:48	21	78.97	1	21.45		
7/31/2007	6:35	19	78.97	0	22.45	weekly average	22.43
7/31/2007	6:35	19	78.97	1	22.45		
7/31/2007	6:35	19	78.97	2	22.45		
7/31/2007	6:40	20	78.97	0	22.41		
7/31/2007	6:40	20	78.97	1	22.41		

7/31/2007	6:42	21	78.97	0	22.42	.	.
7/31/2007	6:42	21	78.97	1	22.42	.	.
8/8/2007	6:46	19	78.97	0	24.64	**weekly average**	**24.61**
8/8/2007	6:46	19	78.97	1	24.64	.	.
8/8/2007	6:46	19	78.97	2	24.64	.	.
8/8/2007	6:48	20	78.97	0	24.62	.	.
8/8/2007	6:48	20	78.97	1	24.62	.	.
8/8/2007	6:50	21	78.97	0	24.54	.	.
8/8/2007	6:50	21	78.97	1	24.55	.	.
8/15/2007	6:36	19	78.97	0	23.19	**weekly average**	**22.97**
8/15/2007	6:33	20	78.97	0	22.98	.	.
8/15/2007	6:30	21	78.97	0	22.75	.	.
8/21/2007	6:37	19	78.97	0	24.82	**weekly average**	**24.60**
8/21/2007	6:34	20	78.97	0	24.48	.	.
8/21/2007	6:30	21	78.97	0	24.51	.	.
8/28/2007	6:51	19	78.97	0	24.05	**weekly average**	**23.98**
8/28/2007	6:49	20	78.97	0	23.96	.	.
8/28/2007	6:45	21	78.97	0	23.93	.	.
9/4/2007	6:55	19	78.97	0	23.12	**weekly average**	**22.97**
9/4/2007	6:54	20	78.97	0	23.03	.	.
9/4/2007	6:51	21	78.97	0	22.75	.	.
9/13/2007	7:09	19	78.97	0	22.96	**weekly average**	**22.73**
9/13/2007	7:06	20	78.97	0	22.7	.	.
9/13/2007	7:02	21	78.97	0	22.53	.	.
9/19/2007	7:24	19	78.97	0	20.95	**weekly average**	**20.89**
9/19/2007	7:24	19	78.97	1	20.96	.	.
9/19/2007	7:24	19	78.97	2	20.96	.	.
9/19/2007	7:29	20	78.97	0	20.93	.	.
9/19/2007	7:29	20	78.97	1	20.93	.	.
9/19/2007	7:31	21	78.97	0	20.76	.	.
9/19/2007	7:31	21	78.97	1	20.72	.	.
9/26/2007	7:14	19	78.97	0	22.68	**weekly average**	**22.55**
9/26/2007	7:12	20	78.97	0	22.51	.	.
9/26/2007	7:09	21	78.97	0	22.46	.	.
10/3/2007	7:17	19	78.97	0	21.28	**weekly average**	**21.05**
10/3/2007	7:14	20	78.97	0	20.94	.	.
10/3/2007	7:10	21	78.97	0	20.92	.	.
10/10/2007	7:24	19	78.97	0	21.36	**weekly average**	**21.11**
10/10/2007	7:21	20	78.97	0	21.02	.	.
10/10/2007	7:17	21	78.97	0	20.94	.	.
10/16/2007	7:28	19	78.97	0	19.11	**weekly average**	**18.55**
10/16/2007	7:24	20	78.97	0	18.11	.	.
10/16/2007	7:19	21	78.97	0	18.44	.	.
10/24/2007	7:35	19	78.97	0	19.54	**weekly average**	**19.50**
10/24/2007	7:32	20	78.97	0	19.51	.	.
10/24/2007	7:28	21	78.97	0	19.44	.	.
						average of weekly averages	22.06

Model Run For C:\Documents and Settings\jkwinningham\My Documents\cburgDO6.mod On 4/6/2005 2:11:42 PM

Model is for NEW RIVER.
Model starts at the TOWN OF CHRISTIANSBURG STP discharge.

Background Data

7Q10 (mgd)	cBOD5 (mg/l)	TKN (mg/l)	DO (mg/l)	Temp deg C
596	2	0	7.293	23

Discharge/Tributary Input Data for Segment 1

Flow (mgd)	cBOD5 (mg/l)	TKN (mg/l)	DO (mg/l)	Temp deg C
6	45	40	0	23

Hydraulic Information for Segment 1

Length (mi)	Width (ft)	Depth (ft)	Velocity (ft/sec)
3.5	500	2.372	0.785

Initial Mix Values for Segment 1

Flow (mgd)	DO (mg/l)	cBOD (mg/l)	nBOD (mg/l)	DOSat (mg/l)	Temp deg C
602	7.22	6.071	1.597	8.106	23

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

k1	k1@T	k2	k2@T	kn	kn@T	BD	BD@T
0.3	0.344	3.429	3.681	0.1	0.126	0	0

Output for Segment 1
Segment starts at TOWN OF CHRISTIANSBURG STP

Total Dist. (mi)	Segm. Dist. (mi)	DO (mg/l)	cBOD (mg/l)	nBOD (mg/l)
0	0	7.22	6.071	1.597
0.1	0.1	7.227	6.055	1.595
0.2	0.2	7.234	6.039	1.593
0.3	0.3	7.241	6.023	1.591
0.4	0.4	7.248	6.007	1.589
0.5	0.5	7.255	5.991	1.587
0.6	0.6	7.262	5.975	1.585
0.7	0.7	7.269	5.959	1.583
0.8	0.8	7.275	5.943	1.581
0.9	0.9	7.281	5.927	1.579
1	1	7.287	5.911	1.577
1.1	1.1	7.293	5.895	1.575
1.2	1.2	7.295	5.879	1.573
1.3	1.3	7.295	5.863	1.571
1.4	1.4	7.295	5.847	1.569
1.5	1.5	7.295	5.831	1.567
1.6	1.6	7.295	5.815	1.565
1.7	1.7	7.295	5.799	1.563
1.8	1.8	7.295	5.783	1.561
1.9	1.9	7.295	5.768	1.559
2	2	7.295	5.753	1.557
2.1	2.1	7.295	5.738	1.555
2.2	2.2	7.295	5.723	1.553
2.3	2.3	7.295	5.708	1.551
2.4	2.4	7.295	5.693	1.549
2.5	2.5	7.295	5.678	1.547
2.6	2.6	7.295	5.663	1.545
2.7	2.7	7.295	5.648	1.543
2.8	2.8	7.295	5.633	1.541
2.9	2.9	7.295	5.618	1.539
3	3	7.295	5.603	1.537
3.1	3.1	7.295	5.588	1.535
3.2	3.2	7.295	5.573	1.533
3.3	3.3	7.295	5.558	1.531
3.4	3.4	7.295	5.543	1.529
3.5	3.5	7.295	5.528	1.528

END OF FILE

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

File Information

File Name:	I:\jkwinningham\Christiansburg\2005 Permit\DO model\cburgDO6.mod
Date Modified:	April 06, 2005

Water Quality Standards Information

Stream Name:	NEW RIVER
River Basin:	New River Basin
Section:	2a
Class:	IV - Mountainous Zones Waters
Special Standards:	PWS, v

Background Flow Information

Gauge Used:	New River at Radford
Gauge Drainage Area:	2748 Sq.Mi.
Gauge 7Q10 Flow:	589 MGD
Headwater Drainage Area:	0 Sq.Mi.
Headwater 7Q10 Flow:	596 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.2143377 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	23 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.292689 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	1710 ft above MSL
Model End Elevation:	1690 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to NEW RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	TOWN OF CHRISTIANSBURG STP
VPDES Permit No.:	VA0061751

Discharger Flow Information

Flow:	6 MGD
cBOD5:	45 mg/l
TKN:	40 mg/l
D.O.:	0 mg/l
Temperature:	23 Degrees C

Geographic Information

Segment Length:	3.5 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	1710 Ft.
Downstream Elevation:	1690 Ft.

Hydraulic Information

Segment Width:	500 Ft.
Segment Depth:	2.372 Ft.
Segment Velocity:	0.785 Ft./Sec.
Segment Flow:	602 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	Yes
Percent Pools:	95
Percent Riffles:	5
Pool Depth:	2.5 Ft.
Riffle Depth:	0.5 Ft.
Bottom Type:	Gravel
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 3.2

8 mGD
BOD = 45 mg/L
TKN = 40 mg/L
D.O. = 0 mg/L

MODEL SIMULATION FOR THE Christiansburg DISCHARGE

TO New River

COMMENT: Christiansburg at 8 MGD max BOD limit (45 mg/L)

THE SIMULATION STARTS AT THE Christiansburg DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = 8 MGD cBOD5 = 45 Mg/L TKN = 40 Mg/L D.O. = 0 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.836 Mg/L ****

THE SECTION BEING MODELED IS 1 SEGMENT LONG
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 600.00000 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.701 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. - Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. ºC	DO-SAT Mg/L
1	3.30	0.604	2.927	0.300	0.150	0.000	1694.75	20.00	8.557

(The K Rates shown are at 20ºC ... the model corrects them for temperature.)

********** RESPONSE FOR SEGMENT 1 **********

TOTAL STREAMFLOW = 608.0000 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.600	6.415	2.108
0.100	0.100	7.606	6.395	2.105
0.200	0.200	7.611	6.376	2.102
0.300	0.300	7.616	6.356	2.098
0.400	0.400	7.622	6.337	2.095
0.500	0.500	7.627	6.318	2.092
0.600	0.600	7.632	6.299	2.089
0.700	0.700	7.637	6.280	2.086
0.800	0.800	7.642	6.261	2.082
0.900	0.900	7.647	6.242	2.079
1.000	1.000	7.652	6.223	2.076
1.100	1.100	7.657	6.204	2.073
1.200	1.200	7.661	6.185	2.070
1.300	1.300	7.666	6.166	2.067
1.400	1.400	7.670	6.148	2.064
1.500	1.500	7.675	6.129	2.060
1.600	1.600	7.679	6.110	2.057
1.700	1.700	7.683	6.092	2.054
1.800	1.800	7.688	6.073	2.051
1.900	1.900	7.692	6.055	2.048
2.000	2.000	7.696	6.037	2.045
2.100	2.100	7.700	6.018	2.042
2.200	2.200	7.701	6.000	2.039
2.300	2.300	7.701	5.982	2.036
2.400	2.400	7.701	5.964	2.033
2.500	2.500	7.701	5.946	2.030
2.600	2.600	7.701	5.928	2.026
2.700	2.700	7.701	5.910	2.023
2.800	2.800	7.701	5.892	2.020
2.900	2.900	7.701	5.874	2.017
3.000	3.000	7.701	5.856	2.014
3.100	3.100	7.701	5.838	2.011
3.200	3.200	7.701	5.821	2.008
3.300	3.300	7.701	5.803	2.005

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
03-08-1996 12:29:51

DATA FILE = CBURG3.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

****

THE NAME OF THE DATA FILE IS: CBURG3.MOD

THE STREAM NAME IS: New River
THE RIVER BASIN IS: New River
THE SECTION NUMBER IS: 1
THE CLASSIFICATION IS: pw

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Christiansburg

PROPOSED LIMITS ARE:
FLOW = 8 MGD
BOD5 = 45 MG/L
TKN = 40 MG/L
D.O. = 0 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 1

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: New River
GAUGE DRAINAGE AREA = 2752.9 SQ.MI.
GAUGE 7Q10 = 600 MGD
DRAINAGE AREA AT DISCHARGE = 2752.9 SQ.MI.

STREAM A DRY DITCH AT DISCHARGE (Y/N) = N
ANTIDEGRADATION APPLIES (Y/N) = Y

ALLOCATION DESIGN TEMPERATURE = 20 ½C

SEGMENT INFORMATION

SEGMENT # 1

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 3.3 MI

SEGMENT WIDTH = 356 FT
SEGMENT DEPTH = 2.96 FT
SEGMENT VELOCITY = .66 FT/SEC

DRAINAGE AREA AT SEGMENT START = 2752.9 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 2784.8 SQ.MI.

ELEVATION AT UPSTREAM END = 1702.8 FT
ELEVATION AT DOWNSTREAM END = 1686.7 FT

THE CROSS SECTION IS: WIDE SHALLOW ARC
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = Y
THE SEGMENT LENGTH IS 60 % POOLS
POOL DEPTH = 4 FT
THE SEGMENT LENGTH IS 40 % RIFFLES
RIFFLE DEPTH = 1.4 FT

BOTTOM TYPE = LARGE ROCK
EDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = VISIBLE ONLY ON EDGES
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
03-08-1996 12:29:56

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

August 24, 2015

Kirk Batsel
DEQ – Blue Ridge Regional Office
7705 Timberlake Road
Lynchburg, VA 24502

Re: VA0061751, Christiansburg WWTP

Dear Mr. Batsel:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Hellbender (*Cryptobranchus alleganiensis*, G3G4/S2S3/NL/NL) and the Green floater (*Lasmigona subviridis*, G3/S2/NL/LT) have been historically documented in the New River. The Hellbender is a large, completely aquatic salamander that prefers larger, clear, and fast-flowing streams of the Mississippi drainage (Martof, et. al, 1980). In Virginia, it is documented from the Holston, Clinch, Powell and New River drainages (Pague, 1991). The Hellbender depends on cool, flowing, well-oxygenated water, and it needs a coarse (rocky) substrate (NatureServe, 2009).

Threats to this species include habitat alteration from impoundments or channelization, and water pollution (Pague, 1991). In agricultural areas, siltation may bury the rocky substrates it requires (NatureServe, 2009). In addition, Hellbenders do not tolerate human recreational use of their habitat (NatureServe, 2009).

The Green floater is a rare freshwater mussel, ranging from New York to North Carolina in the Atlantic Slope drainages, as well as the New and Kanawha River systems in Virginia and West Virginia (NatureServe, 2009). In Virginia, there are records from the New, Roanoke, Chowan, James, York, Rappahannock, and Potomac River drainages. Throughout its range, the Green floater appears to prefer the pools and eddies with gravel and sand bottoms of smaller rivers and creeks, smaller channels of large rivers (Ortman, 1919) or small to medium-sized streams (Riddick, 1973). Please note that this species has been listed as state threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

Due to the legal status of the Green floater, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570). To minimize impacts to aquatic resources, DCR also recommends the use of uv/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality. Finally, due to the presence of freshwater mussels, DCR recommends adoption of the EPA ammonia limits to be protective of the historically documented Green floater.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov.

Should you have any questions or concerns, feel free to contact René Hypes at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. René Hypes
Project Review Coordinator

CC: Ernie Aschenbach, VDGIF

Literature Cited

Martof, B.S., W.M. Palmer, J.R. Bailey, and J.R. Harrison III. 1980. Amphibians and reptiles of the Carolinas and Virginia. University of North Carolina Press. Chapel Hill, North Carolina.

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ATTACHMENT 10

303(d) LISTED SEGMENTS

Draft 2014 Impaired Waters

Category 4 & 5 by Basin and Stream Name*

New River Basin

Cause Group Code: N29R-01-PCB - New River, Claytor Lake, Peak Creek, Reed Creek and Stony Creek

Location:	The impairment begins at the I-77 bridge crossing the New River and extends downstream to the VA/WVA State Line and includes the tributaries Peak Creek and Reed Creek as described below.
City/County	Giles Co., Montgomery Co., Pulaski Co., Radford City, Wythe Co.
Use(s):	Fish Consumption
Cause(s) / VA Category:	PCB in Fish Tissue / 5A

The Virginia Department of Health (VDH) issued a fish consumption advisory on August 6, 2001 for polychlorinated biphenyls (PCBs) for the lower portion of the New River (Rt. 114 Bridge downstream to the VA / WVA State Line - 52.0 miles) based on fish tissue collections from Carp. An Advisory extension to Claytor dam was issued 8/06/2003 (11.47 miles) recommends that no carp be consumed in these waters and no more than two meals per month of flathead and channel catfish. The VDH PCB Fish Consumption Advisory was further extended upstream on the New River (13 miles) to the I-77 Bridge to include the lower portions of Peak Creek (4.02 miles), Reed Creek (16.35 miles) and Claytor Lake (4,287 acres) on 12/02/2004. The VDH advises consumption should not exceed two meals per month for carp and smallmouth bass. Stony Creek is a 2010 Integrated Report (IR) addition to the original 2002 303(d) Listing. The VDH level of concern is 50 parts per billion (ppb) in fish tissue.

Water column data from 2010 thru 2012 are listed below where excursions of the WQS water column criterion of 640 pg/L are contravened causing 303(d) Listing for 'PCBs in Water Column'. Water column data collection is in support of TMDL development for PCBs in the New River drainage. Sample collections are made in both wet weather (WW) and dry weather (DW) conditions.

2012 Fish tissue and water column data follow reporting exceedances of the WQS based 20 ppb fish tissue value (TV) (VDH Lower Level of Concern 50 ppb). And excursions of the WQS water column criterion of 640 pg/L. Fish tissue data are in addition to previous years collections. Fish tissue data are reviewed by the VDH in making an advisory determination. A complete listing of fish tissue collection sites and associated fish tissue data are available at http://www.deq.virginia.gov. A more detailed presentation of the data can also be found using an interactive mapping application at http://www.deq.virginia.gov. The VDH Advisory information is also available via the web at http://www.vdh.virginia.gov/Epidemiology/PublicHealthToxicology/Advisories/.

9-RDC009.00 (Near Rt. 619 at Grahams Forge) 2012 two species analyzed - Carp exceeds WQS TV of 20 ppb (5 fish composite [62.6 - 69.4 cm] at 68.24 ppb. Remaining species analyzed Smallmouth Bass (5 fish composite [21.8 - 26.6 cm] at3.04 ppb.

9-NEW098.32 (Rt. 672 Bridge, Lighthouse) 2012 four species analyzed - Channel Catfish exceeds WQS TV of 20 ppb; (2 fish composite (70.5 - 71.5 cm) at 85.15 ppb. Remaining species analyzed Largemouth Bass (5 fish composite [34.5 - 43.1]) at 7.76 ppb; Spotted Bass (5 fish composite [34.2 - 38.2 cm]) at 11.00 ppb; and Carp (3 fish composite [45.8 - 56.5]) at 6.04 ppb.

9-PKC007.82 (Route 99 Bridge) 2012 three species analyzed - Stoneroller exceeds WQS criterion of 20 ppb (15 fish comp. [14.3 - 16.0 cm] at 33.18 ppb. Remaining species analyzed Rock Bass (5 fish comp. [16.7 - 18.6 cm]); at 10.49 ppb) and Redbreast Sunfish (5 fish comp. [14.3 - 18.1 cm]; at 3.01 ppb).

9-PKC004.65 (Rt. 100 Bridge) 2012 five species analyzed. Channel catfish exceeds WQS criterion of 20 ppb (2 fish composite [63.1 - 69.0 cm] at 33.15 ppb. Remaining species analyzed Largemouth Bass (5 fish composite [33.4 - 40.8 cm]; @2.68 ppb). Carp 2 sizes (4 fish composite [54.6 - 62.0 cm]; @2.32 ppb) and (4 fish composite [54.6 - 62.0 cm]; @9.16 ppb) and Smallmouth Bass (3 fish composite [35.3 - 42.6 cm]; @6.90 ppb).

9-NEW088.86 (New River Claytor Lake at Dam) 2012 six species analyzed - Flathead Catfish exceeds WQS criterion of 20 ppb (2 fish composite [83.0 - 87.5 cm]) at 88.67 ppb. Remaining species analyzed Carp (4 fish composite [58.5 - 67.0 cm] at 2.05 ppb; Channel Catfish (1 fish [58.8 cm]) at 7.43 ppb; Largemouth Bass (5 fish composite [32.5 - 34.5 cm] at 0.36 ppb; Smallmouth Bass (4 fish composite [27.0 - 32.2 cm] at 0.88 ppb and Spotted Bass (3 fish composite [28.8 - 36.8 cm] at 0.00 ppb.

9-NEW085.94 (New River downstream of Claytor Dam) 2012 two species analyzed - Flathead Catfish exceeds WQS criterion of 20 ppb (5 fish composite [57.5 - 70.3 cm]) at 33.74 ppb. Remaining species analyzed Carp (5 fish composite [62.6 - 81.0 cm] at 11.27 ppb.

9-NEW079.19 (New River below Radford University) 2012 one species two exceeding composites analyzed - Carp exceeds WQS criterion of 20 ppb (2 fish composite [67.5 - 76.5 cm] at 53.28 ppb and Carp exceeding (2 fish composite [76.8 - 83.6 cm]

ATTACHMENT 11

TABLE A AND TABLE B - CHANGE SHEETS

TABLE A

VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List any changes FROM PREVIOUS PERMIT and give a brief rationale for the changes).

OUTFALL NUMBER	PARAMETER	MONITORING CHANGED FROM / TO	EFFLUENT LIMITS CHANGED FROM / TO	RATIONALE	DATE & INITIAL
001	TSS	1/Day to 1/Week		Based on an analysis of effluent data, the facility is eligible for reduced monitoring per the VPDES permit manual.	KAB 8/17/15
001	BOD5	1/Day to 1/Week		Based on an analysis of effluent data, the facility is eligible for reduced monitoring per the VPDES permit manual.	KAB 8/17/15

OTHER CHANGES FROM:	CHANGED TO:	DATE & INITIAL
Prior Biosolids Special Conditions	Part III – Biosolids conditions updated to current requirements	KAB 8/18/15

TABLE B

VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List any changes MADE DURING PERMIT PROCESS and give a brief rationale for the changes).

OTHER CHANGES FROM:	CHANGED TO:	DATE & INITIAL
Minimum Freeboard Condition	Removed per owner comment	KAB 8/25/15
TMP Report Dates	Revised to reflect 2/10 reporting dates.	KAB 8/25/15
Part II reporting	Revised to allow reporting to Roanoke Office	KAB 8/25/15
Biosolids Conditions	Updated to allow all possible options to exist in the permit and to be consistent with current treatment provided. Also added requested headings.	KAB 8/25/15

ATTACHMENT 12

EPA/VIRGINIA DRAFT PERMIT SUBMISSION CHECKLIST

Part I. Virginia 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:	Town of Christiansburg WWTP
NPDES Permit Number:	VA0061751
Permit Writer Name:	Kirk A. Batsel
Date:	August 17, 2015

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 facilities?			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		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
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		
8.a. Has a TMDL been developed and approved by EPA for the impaired water?		X	
8.b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?	X		
8.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. Does the permit include appropriate Pretreatment Program requirements?	X		
18. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
19. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
20. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
21. Has 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 record 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) consistent with 40 CFR Part 133?	X		
2.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?			
3. Are technology-based permit limits expressed in 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	
5.a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			

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		
4.a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
4.b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
4.c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
4.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		
4.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 performed 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		
1.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 his waiver?			X
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		

II.F. Special Conditions – cont.	Yes	No	N/A
2. Does the permit include appropriate storm water program requirements?			X
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 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	
5.a. Does the permit require implementation of the "Nine Minimum Controls"?		X	
5.b. Does the permit require development and implementation of a "Long Term Control Plan"?		X	
5.c. Does the permit require monitoring and reporting for CSO events?		X	
6. 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 reporting • Signatory requirement • Reporting requirements Planned change Anticipated non-compliance Transfers Monitoring Reports Compliance schedules 24-hour reporting Other non-compliance • Bypass • Upset			
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	Kirk A. Batsel
Title	Water Permit Writer
Signature	
Date	August 17, 2015