This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Major[1], Municipal permit. The discharge results from the operation of a 1.0 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS (effective January 6, 2011) and updating permit language as appropriate. The permit also contains proposed effluent limits for a design flow of 0.97 MGD wastewater treatment plant. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1.	Facility Name and Mailing Address:	Dahlgren Wastewater Treatment Plant 9207 Kings Highway King George, VA 22485	SIC Code :	4952 WWTP
	Facility Location:	16383 Dahlgren Road King George, VA 22485	County:	King George
	Facility Contact Name:	Jeff Hockaday	Telephone Number:	540-775-2746
	Facility E-mail Address:	jhockaday@co.kinggeorge.state.va.us		
2.	Permit No.:	VA0026514	Expiration Date of previous permit:	January 11, 2014
	Other VPDES Permits associated with this facility:		VAN010060 (King George County – Potomac River Aggregate)	
	Other Permits associated with this facility:		None	
	E2/E3/E4 Status:	NA		
3.	Owner Name:	King George County Service Authority		
	Owner Contact/Title:	Christopher F. Thomas, PE/ General Manager	Telephone Number:	540-775-2746
	Owner E-mail Address:	cthomas@co.kinggeorge.state.va.us		
4.	Application Complete Date:	December 14, 2013		
	Permit Drafted By:	Joan C. Crowther	Date Drafted:	August 29, 2014
	Draft Permit Reviewed By:	Douglas Frasier	Date Reviewed:	September 4, 2014
	Technical Review By:	Alison Thompson	Date Reviewed:	September 8, 2014
	Public Comment Period :	Start Date: October 30, 2014	End Date:	December 1, 2014

5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination

Receiving Stream Name :	Williams Creek	Stream Code:	1aWLL
Drainage Area at Outfall:	4.5 sq.mi.	River Mile:	0.05
Stream Basin:	Potomac River	Subbasin:	Potomac River
Section:	2	Stream Class:	II
Special Standards:	a	Waterbody ID:	VAN-A30E
7Q10 Low Flow:	Tidal	7Q10 High Flow:	NA
1Q10 Low Flow:	NA	1Q10 High Flow:	NA
30Q10 Low Flow:	NA	30Q10 High Flow:	NA
Harmonic Mean Flow:	NA	30Q5 Flow:	NA

[1]Once the Certificate to Operate has been issued for the 0.97 MGD facility, the facility will be designated as a minor, municipal wastewater treatment plant.

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

X	State Water Control Law	X	EPA Guidelines
X	Clean Water Act	X	Water Quality Standards
X	VPDES Permit Regulation		Other
X	EPA NPDES Regulation		

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

	Private	X	Effluent Limited	X	Possible Interstate Effect
	Federal	X	Water Quality Limited		Compliance Schedule Required
	State	X	Whole Effluent Toxicity Program Required		Interim Limits in Permit
X	POTW	X	Pretreatment Program Required	X	Interim Limits in Other Document
X	TMDL	X	e-DMR Participant		

10. **Wastewater Sources and Treatment Description:**

The 1.0 MGD wastewater facility consists of flow equalization, rotating influent screen, a 4-channel oxidation ditch, flash mixer for alum addition, two secondary clarifiers operated in parallel, a rotating disk filter, ultra-violet light disinfections, an effluent pumping station and a submerged outfall near the mouth of Williams Creek and its confluence with Upper Machodoc Creek.

The wastewater treatment process is currently being upgraded. After completion of this upgrade, the capacity of this facility will decrease from the current 1.0 MGD to 0.97 MGD due to capacity loss attributed to placement of IFAS media/modules in the ditch. This upgrade is designed to enable the plant to achieve an annual average Total Nitrogen (TN) concentration of 3 mg/L. All other discharge parameters will remain unchanged. The Certificate to Construct for this upgrade was issued on August 30, 2013. The Certificate to Construct and Consent Order can be found in Attachment 2. In accordance with the Consent Order dated September 27, 2012, to King George County Service Authority, this upgrade will be completed by December 31, 2014. The following description details the Water Quality Improvement Fund's Grant No. #440-S-14-04 for the Dahlgren WWTP's upgrade dated April 25, 2014 and the Certificate to Construct dated August 30, 2013.

In 2006, an upgrade was completed to increase the plant capacity to 1.0 million gallons per day (MGD). At the time of the upgrade, the plant was operated in extended aeration activated sludge (EAAS) mode, although provisions were made to allow operation in biological nutrient removal (BNR) mode should the need arise. The 2006 upgrade did not include supplemental carbon feed, online nutrient analyzer instrumentation, or denitrifying filters that would be required for compliance with the discharge limits that are near state of the art (SOA) nutrient removal.

After the completion of the original NRT upgrade, the KGCSA obtained WQIF grant funding retroactively for certain components of the plant. This (prior) grant agreement, requires annual average effluent performance standard levels of 4.0 mg/L for total nitrogen (TN) and 0.30 mg/L of total phosphorus (TP).

The Authority was unable to consistently meet these performance standards. The KGCSA implemented several optimization measures including changing the oxidation ditch configuration from EAAS to BNR mode, changing the internal recycle by adding air lift pumps and recycle to a different location, converting the soda ash chemical feed to add molasses as a supplemental carbon source, and recent purchase of hand held ammonia and nitrate instrumentation. These corrective actions improved the nutrient removal efficiency at the facility; however the existing plant cannot consistently meet the existing VPDES TN and TP permit limits and the existing WQIF TN and TP performance standards. Therefore additional engineering investigation revealed the following deficiencies:

1. *The ratio of TKN to CBOD5 is too high for removal by bio-accumulation. In order to achieve the current performance TN standard of 4.0 mg/L and the Phase II grant agreement annual average performance standard of 3.0 mg/L, the plant must have accurate control of both the DO and supplemental carbon feed.*

2. *The operators do not have the ability to observe the process in real time and make adjustments necessary to fine tune the process.*

3. *There is no automation for process changes that occur during the 8 hours a day that the plant is unmanned.*

4. *The sludge wasting is not automated, which leads to the potential for human error.*

5. *Autotrophic microorganism (nitrifiers and denitrifiers) are far more sensitive to changes in temperature and organic loading than heterotrophic microorganisms. In order to adjust to temperature changes, appropriate adjustments need to be made to the mixed liquor suspended solids concentrations, which is currently subject to human error.*

6. *There is a lack of a control system that uses input parameters other than DO. DO systems are good for CBOD removal, but are not accurate enough for high rate of removal of nutrients.*

7. *The process cannot reliably denitrify to comply with existing VPDES TN and TP permit limits, especially as flows continue to increase.*

Based on the analysis of the plant, the following measures are part of the Phase II WWTP upgrade:

1. *Installation of 1500 gallon Bulk Supplemental Carbon (liquid molasses) Tank and variable speed solution pump. This system will be set up in the existing old filter press building and will discharge into the outer ring near the mixers. This building is heated and ventilated. "Revised based on King George County Service Authority's comments received on the draft permit: the 1,500 gallon Bulk Supplement Carbon Tank utilizes "BioCarb" not liquid molasses. The BioCarb provides more carbon per gallon than molasses."*

2. *Installation of a continuous effluent nitrate sensor and monitoring system. This system will be the indicator for the monitoring of the biological denitrification process. The monitor will provide 4-20 mA signals that will primarily control the supplemental carbon feed rate and provide secondary data for dissolved oxygen controls. The sensor will provide real time concentrations and trending patterns for adjusting to achieve optimum treatment efficiencies while accounting for any fluctuations in flows, raw characteristics, and temperatures. These continuous automatic adjustments will be made 24 hours a day. "Revised based on King George County Service Authority's comments received on the draft permit: The upgrade resulted in the installation of two*

continuous nitrate sensors. The first is installed in the anoxic ditch (outer ring) and the other is installed at the UV channel."

3. *Installation of a continuous effluent Ammonia sensor and monitoring system. This system will provide information for the primary control of the dissolved oxygen within the existing ditches and a primary indicator of the nitrification process. This will maximize the biological nitrification process. The sensor will provide real time data that will utilize 4-20 mA signals to adjust the variable speed drives of the existing disc rotors. Again, these sensors will account for any fluctuations in flows, raw characteristics, microbial activity and temperatures. These continuous automatic adjustments will be made 24 hours a day.*

4. *Installation of a continuous MLSS sensor and monitor. This sensor would provide continuous monitoring and trending of the MLSS. This data would trigger wasting operations and/or increased retention for maintaining the optimum concentration of biomass for efficient biological nitrification and denitrification.*

5. *Installation of continuous effluent Phosphorus sensor and monitor. This would allow for operator adjustments of the alum feed rate to account for any changes in the flow or raw water strength based on real time data.*

6. *Installation of ten IFAS modules in the oxidation ditch with air burst connection for cleaning.*

7. *Provide replacement 2 mm step screen at the headworks to provide improved solids removal at the plant. "Revised based on King George County Service Authority's comments received on the draft permit: The 2mm step screen replaced the headworks comminutor and auger system."*

8. *Provide two turbo blowers in the old filter press building to power air lift pumps for internal recycle. The pumps are VFD controlled which will allow the internal recycle pump flow rate to be adjusted based on incoming flow.*

9. *Update SCADA software and integrate new equipment. Provide a new raw water influent magmeter for improved equalization.*

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow(s)	Outfall Latitude and Longitude
001	Domestic and/or Commercial Wastewater	See Item 10 above.	1.0 MGD and 0.97 MGD	38° 19' 24" N 77° 03' 11" W

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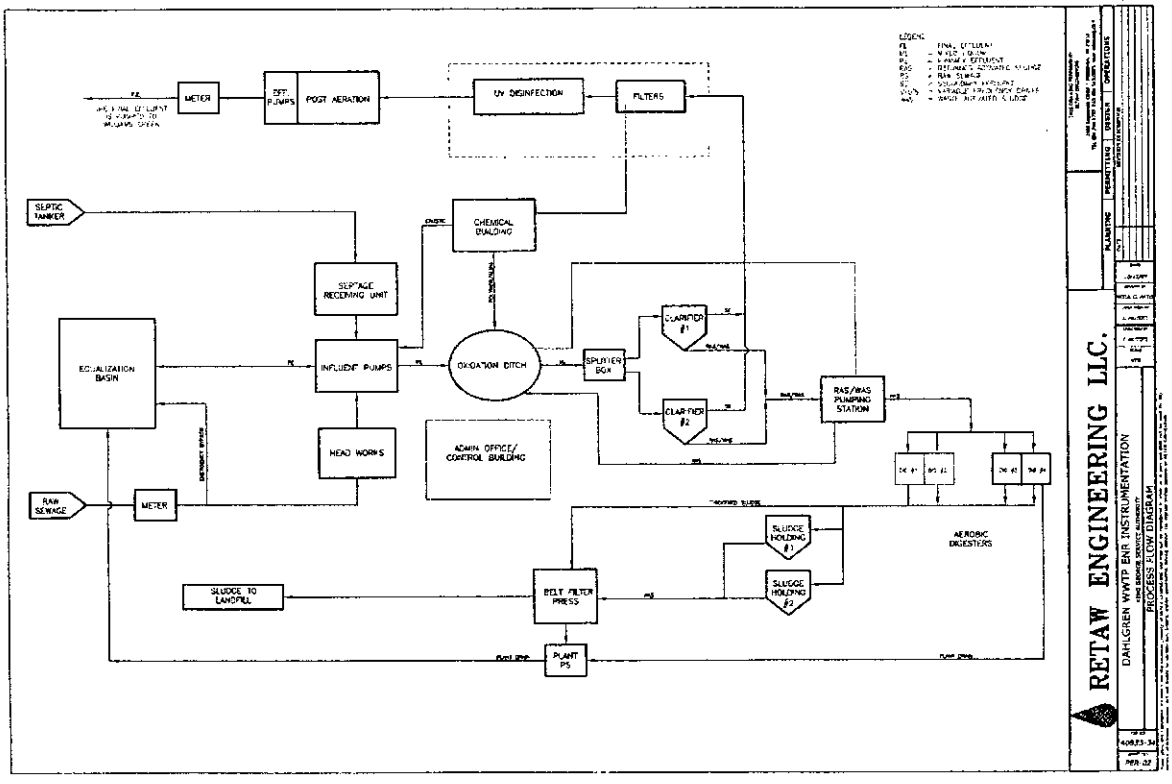
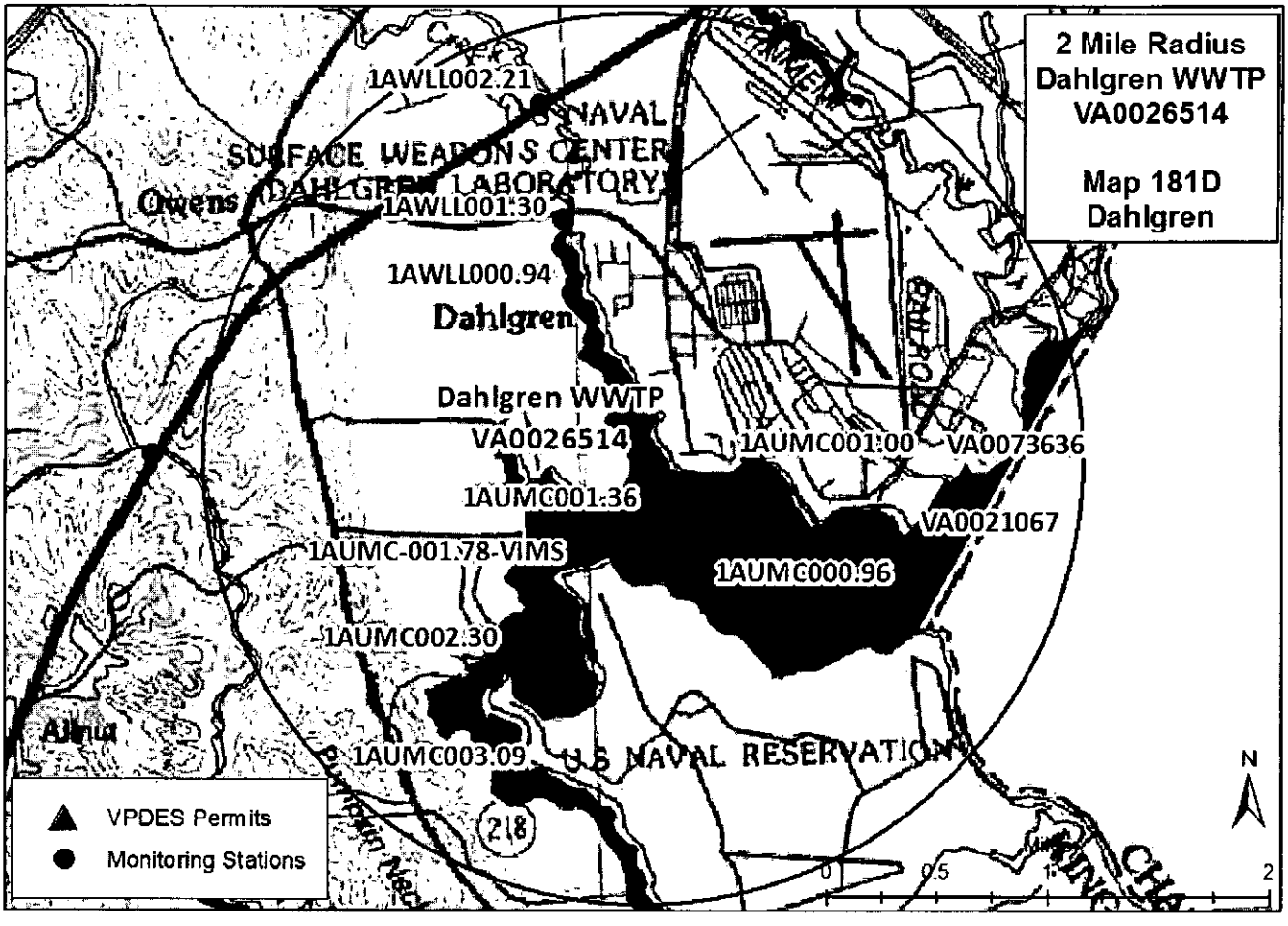
Dahlgren WWTP Schematic/Diagram





11. Sludge Treatment and Disposal Methods:

Sewage sludge from the King George County Service Authority's wastewater facilities is taken to the Dahlgren Wastewater Treatment Plant and combined in the aerobic digesters. The sludge is treated by aerobic digestion then de-watered using a belt filter press. The de-watered sludge is hauled to the King George County Landfill, which is operated by Waste Management, for final disposal.

12. DEQ Monitoring Stations and VPDES Permit Discharges Within a Two Radius of the Discharge

TABLE No. 2 - Summary of DEQ's Ambient Water Quality Monitoring Stations on Upper Machodoc Creek and Williams Creek

DEQ Station Rivermile	DEQ Ambient Water Quality Monitoring Station Description
1AUMC000.96	Upper Machodoc Creek; 0.6 miles East of Howland Point; 38° 19' 1.9"/ 77° 02' 47.7; Last Sampled July 2004
1AUMC001.00	Upper Machodoc Creek; Upper Machodoc Creek of Golf Course; 38° 19' 18.3"/ 77° 02' 36.50"; Last Sampled August 2003
1AUMC001.36	Upper Machodoc Creek; near mouth of Williams Creek; 38° 19' 15"/ 77° 03' 08"; Last Sampled June 1979
1AUMC002.30	Upper Machodoc Creek; Off Wood Island; 38° 18' 37.7"/ 77° 3' 53"; Last Sampled September 2005
1AUMC003.09	Upper Machodoc Creek; East of Pumpkin Neck; 38° 18' 9.6"/ 77° 3' 45.353"; Last Sampled September 2009
1AWLL000.94	Williams Creek; Mid Embayment; 38° 20' 3.6"/ 77° 03' 31.9"; Last Sampled September 2005
1AWLL001.30	Williams Creek; Route 206; 38° 20' 21"/ 77° 03' 34"; Last Sampled June 2014
1AWLL002.21	Williams Creek; Route 301; 38° 20' 48"/ 77° 03' 40"; Last Sampled December 2008

TABLE No. 3 – Summary of VPDES Permit Facilities that discharge in the vicinity

VPDES Permit Number	Description of VPDES Permit Facility
VA0073636	United States Naval Surface Warfare Center; Industrial Discharge; 38° 19' 18"/ 77° 01' 34"; Upper Machodoc Creek is the receiving stream.
VA0021067	United States Naval Surface Warfare Center; Municipal Discharge; 38° 19' 15"/ 77° 01' 40"; Upper Machodoc Creek is the receiving stream.

13. Material Storage:

TABLE No. 4 - Material Storage

Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Aluminum Sulfate	60-50 lb. bags	Stored in the chemical building
Bio-Carb ND 80	3,500 Gallons	Stored in the old belt press building
Soda Ash	30 - 50 lb.	Stored in the chemical building

14. Site Inspection:

Performed by Rebecca Johnson, DEQ Compliance Water Inspector on July 9, 2014. (See Attachment 3).

15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

Outfall 001 discharges to a tidal segment of Williams Creek. There are no DEQ monitoring stations located within this segment; however, there are two DEQ stations located upstream of the outfall on Williams Creek. Station 1aWLL000.94 is a special study station with limited data, located approximately 0.8 miles upstream of Outfall 001 in the tidal area. Station 1aWLL001.30 is an ambient monitoring station, located at the Route 206 Bridge crossing, approximately 1.2 miles upstream of the outfall.

DEQ does not have any ambient monitoring stations located downstream of Outfall 001 in the Upper Machodoc Creek embayment. There is a DEQ fish tissue and sediment station, 1aUMC001.36, and 2 coastal probabilistic monitoring stations, 1aUMC000.96 and 1aUMC001.00, located in the Upper Machodoc Creek embayment. The Virginia Institute of Marine Science has a monitoring station, 1aUMC-001.78- VIMS, in the western portion of the Upper Machodoc Creek embayment.

The tidal segment that receives the discharge from Outfall 001 has been designated by the Virginia Department of Health, Division of Shellfish Sanitation as an administratively prohibited area for shellfishing. The shellfishing use was removed from the segment in the 2010 Integrated Report.

The following is the water quality summary for this administratively prohibited segment of Williams Creek, as taken from the 2012 Integrated Report:

> *Assessment of the submerged aquatic vegetation (SAV) acreage indicates that the shallow-water submerged aquatic vegetation subuse is not met; therefore, the aquatic life use is considered not supporting. This impairment is addressed by the completed TMDL for the Chesapeake Bay watershed. The open water aquatic life subuse is considered insufficient, as the thirty day mean is acceptable, but the seven day mean and instantaneous levels have not been assessed. Additionally, the deep-water subuse is considered insufficient, as the thirty day mean is acceptable, but the one day mean and instantaneous dissolved oxygen levels have not been assessed.*
>
> *The wildlife, fish consumption and recreation uses were not assessed.*

b. 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)

Table No. 5 303(d) Impairment and TMDL information for the receiving stream segment

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Williams Creek	Aquatic Life	Aquatic Plants (Submerged aquatic vegetation below goal)	Chesapeake Bay TMDL 12/29/2010	9,137 lbs/yr TN	Edge of Stream (EOS) Loads	NA
	Shallow-Water Submerged Aquatic Vegetation			914 lbs/yr TP		
				91,366.8 lbs/yr TSS		

Table No. 6. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Upper Machodoc Creek	Fish Consumption	PCBs	0.11 miles	Tidal Potomac PCB 10/31/2007	0.88 grams/year PCB	0.064 ng/L --- 1.0 MGD	NA

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2012 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment. EPA issued the Bay TMDL on December 29, 2010. It was based, in part, on the Watershed Implementation Plans developed by the Bay watershed states and the District of Columbia.

The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries that are on the impaired waters list. As with all TMDLs, a maximum aggregate watershed pollutant loading necessary to achieve the Chesapeake Bay's water quality standards has been identified. This aggregate watershed loading is divided among the Bay states and their major tributary basins, as well as by major source categories [wastewater, urban storm water, onsite/septic agriculture, air deposition]. Fact Sheet Section 17.e provides additional information on specific nutrient limitations for this facility to implement the provisions of the Chesapeake Bay TMDL.

The planning statement dated August 16, 2013 is found in Attachment 4.

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260 (360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, Williams Creek, is located within Section 2 of the Potomac River Basin, and classified as a Class II water.

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC 25-260-185 and maintain a pH of 6.0 - 9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are below:

Dissolved Oxygen Criteria (9VAC25-260-185) - Dissolved Oxygen Criteria for Class II Waters

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean >3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

[1]*In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.*

The Saltwater and Transition Zones Water Quality Criteria / Wasteload Allocation Analysis (Attachment 5) details other water quality criteria applicable to the receiving stream.

During 2009 permit reissuance process, it was staff's best professional judgment to evaluate the receiving stream in accordance with the Water Quality Standard Regulation designation recognizing the Upper Machodoc and Williams Creeks are within the Mesohaline portion of the Potomac River estuary; therefore, the receiving stream criteria was evaluated and determined using the saltwater and transition zones wasteload criteria. By evaluating the receiving stream in accordance with the Water Quality Standards designation, the permit limits were being established consistently with other facilities discharging with similar receiving stream conditions.

Some Water Quality Criteria are dependent on the temperature and pH and Total Hardness of the stream and final effluent. The stream and final effluent values used as part of Saltwater and Transition Zones Water Quality/Wasteload Allocation Analysis (Attachment 5) are as follows:

pH and Temperature for Ammonia Criteria:
The saltwater and transition zones, aquatic life Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. Since the effluent may have an impact on the instream values, the temperature and pH values of the effluent must also be considered when determining the ammonia criteria for the receiving stream. The 90th percentile temperature and pH values are used because they best represent the critical conditions of the receiving stream.

During the 2009 permit reissuance, staff evaluated the receiving stream ambient monitoring data and determined the pH and temperature 90th percentile were 7.6 S.U. and 27.8 °C, respectively for the period of February 2000 to April 2008. These stream pH and temperature values were compared to the DEQ ambient water quality data collected in the VAN-A30E Waterbody during the period of January 1990 through February 2011. The annual pH and temperature 90th percentiles for this time period are 7.9 S.U. and 29°C, respectively. The wet temperature 90th percentile is 18.4°C (December – April). The pH 10th percentile is 6.5 S.U. It is staff's best professional judgment to use the stream data collected for VAN-A30E Waterbody for this reissuance process.

The 90th percentile for the effluent pH and temperature was 8.3 S.U. and 26°C, respectively for the period of January 2006 to June 2008. The effluent pH and temperature data has been reviewed for the period of December 2008 through June 2014 and finds no significant differences from the data used to establish ammonia criteria and subsequent effluent limits in the previous permit. Therefore, the previously established pH and temperature values for the final effluent shall be carried forward as part of this reissuance process. The January 2006-June 2008 pH and temperature data can be found in Attachment 6.

Total Hardness for Hardness-Dependent Metals Criteria:
The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/L calcium carbonate). The 10th percentile of the Total Hardness data of the receiving stream is 58 mg/L. The 10th percentile was calculated used for Total Hardness instead of the average Total Hardness of the receiving stream because the data that was collected at 1AWLL001.30 and 1AWLL002.21 for the period of 1990 through 1999 is erratic. By using the 10th percentile value, DEQ is using a conservation number to reflect the receiving stream's Total Hardness. See Attachment 7 for data.

The permittee started to sample and analyze the facility's effluent for Total Hardess in August 2008. The wastewater treatment plant's effluent average Total Hardness was 40 mg/L for the period of June 2013 through June 2014. This Total Hardness data can be found in Attachment 6.

Bacteria Criteria:
The Virginia Water Quality Standards at 9VAC25-260-170A state that the following criteria shall apply to protect primary recreational uses in surface waters:

> Enterococci bacteria per 100 ml of water shall not exceed a monthly geometric mean of 35 n/100 ml for a minimum of four weekly samples taken during any calendar month.

d. Receiving Stream Special Standards
The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The

receiving stream, Williams Creek, is located within Section 2 of the Potomac River Basin. This section has been designated with a special standard of "a".

The receiving stream has been designated with a special standard of "a". According to 9VAC25-260-310.a, Special Standard "a" applies to all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, including those waters on which condemnation or restriction classifications are established by the State Department of Health. The fecal coliform bacteria standard is as follows: the geometric mean fecal coliform value for a sampling station shall not exceed an MPN (Most probable number) of 14 per 100 milliliters of sample and the 90th percentile shall not exceed 43 for a 5-tube, 3-dilution or 49 for a 3-tube, 3-dilution test. The shellfish are not to be contaminated by radionuclides, pesticides, herbicides, or fecal material that the consumption of shellfish might be hazardous. This same standard is also contained in 9VAC25-260-160. Fecal Coliform Bacteria; Shellfish Waters. This standard is used for the interpretation of instream monitoring data and not for establishing fecal coliform effluent limitations. In accordance with the VPDES Permit Manual, Section MN-3.22.B.g, for wastewater discharges into shellfish waters, the permits are to continue to limit fecal coliform bacteria with the effluent limit of 200 per 100 milliliters applied as a monthly geometric mean.

e. Adjacent State's Water Quality Standards
Dahlgren Wastewater Treatment Plant discharges to Williams Creek then to Upper Machodoc Creek, which is a tributary to the Potomac River. Staff reviewed the State of Maryland's Water Quality Standards (26.08.02.03-2 – Numerical Criteria for Toxic Substances in Surface Waters) and believes that the effluent limitations established in this permit will comply with Maryland's water quality standards at the point Upper Machodoc Creek enters the Potomac River. The draft permit was sent to the State of Maryland for their review on September 18, 2014 and no adverse comments were received.

f. Threatened or Endangered Species
The Virginia DGIF Fish and Wildlife Information System Database was searched on July 30, 2013, for records to determine if there are threatened or endangered species in the vicinity of the discharge. No threatened or endangered species were identified. In accordance with the VPDES Memorandum of Understanding dated April 16, 2007, with the Virginia Department of Game and Inland Fisheries (DGIF) and other agencies, this facility's discharge information was forwarded to DGIF for their review on June 30, 2013. By email dated January 23, 2014 (Attachment 8), DGIF responded by stating:

> *We have reviewed the application for VPDES reissuance for the above-referenced facility. The receiving water is Williams Creek. According to the application (all critical flows for receiving waters) Williams Creek is tidal. The Design Flow of the facility is 1.0 MGD.*
>
> *According to our records Williams Creek is a headwater tributary to the Potomac River, a confirmed anadromous fish use river. Williams Creek is a potential anadromous fish use area. In general, when water is treated we typically recommend and support ultraviolet (UV) disinfection (rather than chlorination disinfection) and support the continued dechlorination of effluent after chlorine disinfection. Provided the applicant adheres to the effluent characteristics identified in the permit application, we do not anticipate the issuance of this permit to result in adverse impact to anadromous fish use waters or their associated species. This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend and support coordination with VDCR-DNH regarding the protection of these resources. We also recommend contacting the USFWS regarding all federally listed species.*

The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on an evaluation made during the 2003 permit reissuance process stating that the 1987 stream model was used to establish the BOD_5 and Dissolved Oxygen effluent limitations to meet water quality standards. This evaluation still remains valid. Antidegradation does not apply. Permit limits proposed have been established by determining wasteload allocations that will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

a. Effluent Screening:
Effluent data obtained from the permit application and Discharge Monitoring Reports (December 2008 through June 2014) have been reviewed and determined to be suitable for evaluation. Effluent data were reviewed, and there have been the following exceedances:

Total Nitrogen (calendar year concentration) – 2009, 2010, 2011, and 2013;
Total Phosphorus (calendar year concentration) – 2009 and 2010;
Total Suspended Solids (weekly maximum concentration) – January 2013;
TKN (monthly average concentration and weekly maximum concentration) – January 2011; and
Enterococci – December 2010 and January 2011.

The following pollutants require a wasteload allocation analysis: Ammonia as N.

b. Mixing Zones and Wasteload Allocations (WLAs):
The usual steady state complete mix equations used to establish the Wasteload allocations (WLAs) for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria cannot be applied for this facility's discharge point. The receiving stream is a large tidal estuary that experiences significant tidal fluxes. Therefore, the following will be applied to Williams Creek at the discharge point.

For tidal estuaries, WLAs should be based on site-specific data of waste dispersion or dilution. King George County's consulting engineers, Draper Aden Associates, conducted modeling of Upper Machodoc and Williams Creeks entitled "Dahlgren Wastewater Treatment Plant Interim Capacity Enhancement Alternate Discharge Analysis" dated February 15, 2002 to determine the appropriate mixing zones and dilution ratios to be applied to the outfall location site. The "Cormix" model reports results as "Near-field Mixing Zone Conditions and Far-field Mixing Zone Conditions". Near-field conditions are compared against the acute criteria with a 1-hour exposure time, while Far-field conditions are compared against the chronic criteria using a 96-hour exposure time. The model predicts that at the edge of the Near-field mixing zone there would be a 20.5:1 dilutions ratio. It did not predict any Far-field dilutions due to the stagnant ambient conditions and unsteady current circulation.

DEQ reviewed and approved the model on August 23, 2002 for use with the following recommendations: For the purpose of establishing WLAs at the outfall site, the dilution values of 20:1 for acute toxicity and 20:1 for chronic toxicity should be used to develop the WLAs. The most stringent WLAs will then be used to determine any applicable effluent limits. The model and the approval memo can be found in Attachment 10.

c. Effluent Limitations, Outfall 001- Toxic Pollutants

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff evaluated the new ambient water quality data for the receiving stream based on saltwater WLAs and concluded that no ammonia effluent limitations are required. Please see Attachment 10 for the limit evaluation.

In addition to the "Cormix" model developed by the permittee's engineers, DEQ staff during the 2003 permit reissuance conducted modeling on Upper Machodoc and Williams Creeks using the regional "Tidal Prism Model for Small Tidal Basins" dated August 28, 2002. This model was used to derive $cBOD_5$ and Dissolved Oxygen effluent limitations for the 1.0 MGD outfall location as well as to determine the need for additional Total Kjeldahl Nitrogen (TKN) limits. As can be seen from the model outputs (Attachment 11) water quality standards are protected and no stringent TKN limit is required. However, the model also indicates that the levels of "Chlorophyll a" which is used as an indicator of algae blooms in Williams Creek increased. DEQ staff used the modeling results and "Best Professional Judgment" to establish a TKN effluent month average limitation of 10 mg/L. This TKN effluent limitation was selected since it indicated only a minimum increase in the "Chlorophyll a" levels occurs with this TKN effluent limitation.

2) Total Residual Chlorine:

Chlorine is not used for disinfection at this facility or anywhere else in the treatment process; therefore, no TRC effluent limitations are required.

3) Metals/Organics:

Metals and organics effluent data received with the VPDES Permit Applications indicates that there is no reasonable potential; therefore, no limits are needed.

d. Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), carbonaceous biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), Total Kjeldahl Nitrogen (TKN), and pH limitations are proposed.

It is staff's practice to equate the Total Suspended Solids limits with the $cBOD_5$ limits. TSS limits are established to equal $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

Enterococci and Fecal Coliform bacteria limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients
VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* which requires new or expanding discharges with design flows of ≥0.04 MGD to treat for TN and TP to either BNR (Biological Nutrient Removal) levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA (State of the Art) levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

This facility has also obtained coverage under 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN010060. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of ≥0.5 MGD above the fall line and >0.1 MGD below the fall line.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820. Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit. The annual averages are based on the technology installed as part of the WQIF grant funding.

f. Effluent Limitations and Monitoring Summary:

The effluent limitations are presented in the following table. Limits were established for $cBOD_5$, Total Suspended Solids, pH, Dissolved Oxygen, TKN, Fecal Coliform bacteria. Enterococci bacteria, Total Nitrogen (calendar year concentration), Total Phosphorus (calendar year concentration) and Whole Effluent Chronic Toxicity (*Mysidopsis bahia and Cyprinodon variegatus*).

The limit for Total Suspended Solids is based on Best Professional Judgment.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual for the 1.0 MGD design flow. However, it was staff's best professional judgment that the sample type and frequency for the 1.0 MGD remain in place for the 0.97 MGD.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for $cBOD_5$ and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

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19.A. Effluent Limitations/Monitoring Requirements:

Design flow is 1.0 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date or the issuance of the CTO for the 0.97 MGD facility, whichever occurs first, the permittee is authorized to discharge from Outfall Number 001. Such discharges shall be limited and monitored by the permittee as specified below.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	1,2	25 mg/L 95 kg/day	37 mg/L 140 kg/day	NA	NA	5D/W	24HC
Total Suspended Solids (TSS)	3	25 mg/L 95 kg/day	37 mg/L 140 kg/day	NA	NA	5D/W	24HC
Total Kjeldahl Nitrogen (TKN)	1,2	10 mg/L 38 kg/day	15 mg/L 57 kg/day	NA	NA	5D/W	24HC
DO	1,2	NA	NA	6.0 mg/L	NA	1/D	Grab
Fecal Coliform (Geometric Mean)	1	200 n/100 mL	NA	NA	NA	5D/W(4)	Grab
Enterococci (Geometric Mean)	1	35 n/100 mL	NA	NA	NA	5D/W (4)	Grab
Nitrate+Nitrite, as N (mg/L)	1,5	NL	NA	NA	NA	1/W	24HC
Total Nitrogen – Monthly (mg/L)(6)	1,5	NL	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date (mg/L) (6)(7)	1,5	NL	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year (6) (7)	1,5	4.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus (mg/L)	1,5	NL	NA	NA	NA	1/W	24HC
Total Phosphorus – Year to Date (mg/L)(7)	1,5	NL	NA	NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year (7)	1,5	0.30 mg/L	NA	NA	NA	1/YR	Calculated
Total Hardness (mg/L $CaCO_2$)	NA	NA	NA	NL	NL	1/W	Grab
Chronic 7-Day Static Renewal – *Americamysis bahia* (TU_c)	1	NA	NA	NA	25	1/YR	24HC
Chronic 7 Day Static Renewal – *Cyprinodon variegatus* (TU_c)	1	NA	NA	NA	25	1/YR	24HC

The basis for the limitations codes and footnotes are:

1. Water Quality Standards
2. Stream Model- Attachment 11
3. Best Professional Judgment
4. Between 10:00 am and 4:00 pm
5. 9VAC25-40 (Nutrient Regulation)
6. Total Nitrogen = Sum of TKN plus Nitrate + Nitrite
7. See Section 20a of the Fact Sheet for the Nutrient calculations

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
1/W = Once every week.
5D/W = Five days a week.
1/M = Once every month.
1/YR = Once every year.

24HC = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥ 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

The rest of this page is intentionally left blank.

B. Effluent Limitations/Monitoring Requirements:

Design flow is 0.97 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 0.97 MGD facility and lasting until expiration date, the permittee is authorized to discharge from Outfall Number 001. Such discharges shall be limited and monitored by the permittee as specified below.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	1,2	25 mg/L 92 kg/day	37 mg/L 136 kg/day	NA	NA	5D/W	24HC
Total Suspended Solids (TSS)	3	25 mg/L 92 kg/day	37 mg/L 136 kg/day	NA	NA	5D/W	24HC
Total Kjeldahl Nitrogen (TKN)	1,2	10 mg/L 37 kg/day	15 mg/L 55 kg/day	NA	NA	5D/W	24HC
DO	1,2	NA	NA	6.0 mg/L	NA	1/D	Grab
Fecal Coliform (Geometric Mean)	1	200 n/100 mL	NA	NA	NA	5D/W(4)	Grab
Enterococci (Geometric Mean)	1	35 n/100 mL	NA	NA	NA	5D/W (4)	Grab
Nitrate+Nitrite, as N (mg/L)	1,5	NL	NA	NA	NA	1/W	24HC
Total Nitrogen – Monthly (mg/L)(6)	1,5	NL	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date (mg/L) (6)(7)	1,5	NL	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year (6) (7)	1,5	3.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus (mg/L)	1,5	NL	NA	NA	NA	1/W	24HC
Total Phosphorus – Year to Date (mg/L)(7)	1,5	NL	NA	NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year (7)	1,5	0.30 mg/L	NA	NA	NA	1/YR	Calculated
Total Hardness (mg/L $CaCO_2$)	NA	NA	NA	NL	NL	1/W	Grab
Chronic 7-Day Static Renewal – *Americamysis bahia* (TU_c)	1	NA	NA	NA	25	1/YR	24HC
Chronic 7 Day Static Renewal – *Cyprinodon variegatus* (TU_c)	1	NA	NA	NA	25	1/YR	24HC

The basis for the limitations codes and footnotes are:

1. Water Quality Standards
2. Stream Model- Attachment 11
3. Best Professional Judgment
4. Between 10:00 am and 4:00 pm
5. 9VAC25-40 (Nutrient Regulation)
6. Total Nitrogen = Sum of TKN plus Nitrate + Nitrite
7. See Section 20a of the Fact Sheet for the Nutrient calculations

MGD = Million gallons per day.
NA = Not applicable.
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24HC = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥ 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

20. Other Permit Requirements:

a. Part I.B. of the permit contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b. Permit Section Part I.C., details the requirements for Pretreatment Program Requirements

The VPDES Permit Regulation at 9VAC25-31-730 through 900., and 40 CFR Part 403 requires POTWs with a design flow of >5 MGD and receiving from Industrial Users (IUs) pollutants that pass through or interfere with the operation of the POTW, or are otherwise subject to pretreatment standards, to develop a pretreatment program.

The Dahlgren WWTP is a POTW with a current design capacity of 1.0 MGD. Since this facility discharges greater than 40,000 GPD, pretreatment program conditions in accordance with DEQ guidance are included in Part I.C of the VPDES permit to determine if a pretreatment program may be needed.

c. Permit Section Part I.D., details the requirements for Whole Effluent Toxicity Program

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, IWC, and receiving stream characteristics. This permit contains a Whole Effluent Toxicity (WET) limit. As part of the 1998 permit reissuance process, the permittee was required to conduct a Toxics Management Program and had failed several of the effluent toxicity analyses. The next step was the Toxics Reduction Evaluation (TRE) which allowed the permittee time to evaluate the source of the toxicity and either eliminate or reduce the toxicity to acceptable levels. Since the 2003 permit reissuance, the facility's effluent has passed all but one of their effluent toxicity tests. This permit will continue the WET limit established in the 2003 permit reissuance for the 1.0 MGD design flow. Once a WET limit has been established for a facility, it remains permanently as an effluent limitation. See Attachment 12 for WET calculations.

21. Other Special Conditions:

a. **95% Capacity Reopener.** The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

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

c. **O&M Manual Requirement.** Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. 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 upon request. 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. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d. **CTC, CTO Requirement.** The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e. **Licensed Operator Requirement.** The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and by the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.

f. **Reliability Class.** The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of

component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class I.

g. **Sludge Reopener.** The VPDES Permit Regulation at 9VAC25-31-220.C requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

h. **Sludge Use and Disposal.** The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

i. **Water Quality Criteria Monitoring.** State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

j. **Nutrient Offsets.** The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19:15 sets forth the requirements for new and expanded dischargers, which are captured by the requirements of the law, including the requirement that non-point load reductions acquired for the purpose of offsetting nutrient discharges be enforced through the individual VPDES permit.

k. **E3/E4.** 9VAC25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

l. **Nutrient Reopener.** 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

m. **TMDL Reopener.** This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

n. **PCB Pollutant Minimization Plan.** This special condition requires the permittee, upon notification from DEQ-NRO, to submit a Pollutant Minimization Plan (PMP) to identify known and unknown sources of low-level PCBs in the effluent. This special condition details the contents of the PMP and also requires an annual report on progress to identify sources.

22. Permit Section Part II.

Required by VPDES Regulation 9VAC25-31-190, Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a. Special Conditions:

1. The PCB Monitoring Special Condition was replaced with the PCB Pollutant Minimization Plan Special Condition.
2. A special condition describing the how a geometric mean is to be calculated has been added to the permit.

b. Monitoring and Effluent Limitations:

Effluent limitations and monitoring for a design flow of 0.97 MGD were included in the permit as requested by the permittee.

It is staff's best professional opinion that the effluent monitoring frequency and sample type remain as those for a 1.0 MGD wastewater treatment plant. Past effluent limitations exceedances reflect the need for the increased monitoring and sampling requirement to ensure that the wastewater treatment plant is being operated and maintained in accordance with its Operation and Maintenance Manual to ensure compliance with the permit effluent limitations.

24. Variances/Alternate Limits or Conditions:

There are no variances/alternate limits or conditions contained in this permit.

25. Public Notice Information:

First Public Notice Date: 10/30/14 Second Public Notice Date: 11/6/14

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3925, joan.crowther@deq.virginia.gov. See Attachment 13 for a copy of the public notice document.

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

26. Additional Comments:

Previous Board Action(s):

1) The State Water Control Board entered into a Consent Order with King George County Service Authority on September 27, 2012. This Consent Order addressed permit exceedences for TKN, Total Nitrogen (Calendar Year Concentration) and Enterococci. The Consent Order contained a civil penalty of $5320.00 (paid October 23, 2012) and contained interim effluent limitations for Total Nitrogen (Calendar Year Concentration) and Total Phosphorus (Calendar Year Concentration) which remain in effect no later than December 31, 2014.
2) On February 20, 2014, the Dahlgren Wastewater Treatment Plant was referred to Enforcement due to an exceedance of the interim Total Nitrogen (Calendar Year Concentration) contained in the 2012 Consent Order. A Consent Order dated November 7, 2014 with King George County Service Authority resulted in King George County Service Authority paying a civil penalty of $1330 for the interim Total Nitrogen Calendar Year Concentration exceedance.

Staff Comments: None

Public Comment: 1) Comments from DGIF can be found in Section 15.f. of the fact sheet.

2) Comments were received by the King George County Service Authority on November 24, 2014. A copy of their November 20, 2014 letter and our response letter dated December 9, 2014 can be found in Attachment 14. The following changes to the draft permit and fact sheet were incorporated based on their comments.

a) Fact Sheet, Page 2 of 18, Section10 – Facility description will be updated.
b) Fact Sheet, Page 3 of 18, Section 10 – The fact sheet was updated to include the King George County Service Authority's comments numbered 5, 6 and 7 of their comment letter dated November 20, 2014.
c) Fact Sheet, Page 7 of 18, Section 14 – The July 9, 2014 site inspection report will be inserted in the Fact Sheet.

d) Fact Sheet, Page 9 of 18, Section 15 – Additional Total Hardness data was incorporated into the Fact Sheet and the discussion was updated to reflect this.
e) Fact Sheet, Page 10 of 18, Section 15 – The date that the draft permit and fact sheet was sent to the State of Maryland will be added to the fact sheet.
f) Fact Sheet, page 18 of 18, Section 26 – The statement was updated to included that the November 7, 2014 Consent Order had been signed for the Dahlgren Wastewater Treatment Plant.
g) Fact Sheet Attachment No. 3 was changed to Staff Site Inspection Report dated July 9, 2014.
h) Fact Sheet Attachment No. 5 was revised to incorporate the receiving stream's Total Hardness value.
i) Fact Sheet Attachment No. 7 was updated to include the DEQ's Total Hardness data for Williams Creek for the timeframe of 1990 through 1999.
j) DEQ will incorporate the Geometric Mean language in Part 1.B.2 of the permit.

Attachment 1	Paul E. Herman, Interoffice Memorandum dated August 26, 2002, regarding Flow Frequency Determination for Dahlgren Wastewater Treatment Plant
Attachment 2	Certificate to Construct (0.97 MGD) and Consent Order dated September 27, 2012
Attachment 3	Staff Inspection Report dated July 9, 2014
Attachment 4	Planning Statement dated August 16, 2013
Attachment 5	Saltwater and Transition Zones Water Quality/Wasteload Allocations Analysis
Attachment 6	Effluent Temperature and pH data (January 2006 — June 2008) Effluent Total Hardness data (June 2013- June 2014)
Attachment 7	Ambient Water Quality Data (Hardness and Salinity) for Williams Creek at Route 206
Attachment 8	Virginia DGIF Fish and Wildlife Information System Database results dated March 10, 2008
Attachment 9	Dahlgren WWTP Cormix Modeling
Attachment 10	Acute and Chronic Ammonia Water Quality Criteria Calculations
Attachment 11	Tidal Prism Model for Small Tidal Basins' Outputs dated August 28, 2002
Attachment 12	Whole Effluent Toxicity Calculations
Attachment 13	Public Notice
Attachment 14	King George County Service Authority's Comment Letter dated November 20, 2014 and DEQ's Response Letter dated December 9, 2014

MEMORANDUM

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

SUBJECT: Flow Frequency Determination
Dahlgren District WWTP - #VA0026514

TO: Jim Olson, NRO

FROM: Paul E. Herman, P.E., WQAP

DATE: August 26, 2002

COPIES: File

The Dahlgren District WWTP discharges to the Williams Creek near Dahlgren, VA. Flow frequencies are required at this site for use by the permit writer in developing effluent limitations for the VPDES permit.

The values at the discharge point were determined by inspection of the USGS Dahlgren Quadrangle topographical map that shows the receiving stream to be tidal at the discharge point. The flow frequencies for tidal streams are not determinable. Dilution ratios are recommended if the effect the discharge has on water quality in the Wiliams Creek is to be determined. The drainage area of Williams Creek above the discharge point is 4.5 mi^2.

If you have any questions concerning this analysis, please let me know.

Attachment 1

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

August 30, 2013

Via E-mail (cthomas@co.kinggeorge.state.va.us)

King George County
Dahlgren Wastewater Treatment Plant Upgrade
VA0026514, PTL# 25932

Mr. Christopher Thomas
General Manager
King George County Service Authority
10459 Courthouse Dr, Ste 200
King George, VA 22485

Dear Mr. Thomas:

In accordance with the Code of Virginia, Title 62.1, Section 62.1-44.19, attached please find the Certificate to Construct (CTC) for this project. This CTC is being issued based on the Application for Certificate to Construct dated August 27, 2013, and received by this office on August 30, 2013.

Receipt of this CTC does not relieve any owner of the responsibility to comply with any other applicable statutes or regulations, including local ordinances and zoning requirements.

Please be advised that a Certificate to Operate (CTO) is required by the Code before placing the system in operation. Application for the CTO can be found at the DEQ website: http://www.deq.virginia.gov/Programs/Water/WastewaterAssistanceTraining/WastewaterEngineering/NonWQIFMunicipalWastewaterProject.aspx .

If you have any questions about this letter or the approval process, please contact me at (703)-583-3834 or alison.thompson@deq.virginia.gov.

Respectfully,

Alison Thompson
Water Permits Technical Reviewer

cc: VA0026514 Permit File
VDH District Office, attn: Environmental Health Manager
King George County Building Official
Michael Larson (mlarson@daa.com)

Attachment 2

1. Who must apply for a Certificate to Construct (CTC)?
   9 VAC 25-790-50 and 60 define who must apply for a CTC. In general, all new or expanded sewage treatment plant projects; major modifications of sewage treatment plants; gravity sewer projects with average day design flows over 40,000 gpd; and pump stations/force mains with average day design flows >2000 gpd must apply for a CTC.

2. How long do you have to process the CTC?
   The CTC application is to be submitted at least 30 days prior to the desired start of construction. Either an email notice of an incomplete application or the approval must be processed within that time

3. Input the CTC application into the Plans Tracking Log as 'CTC Application'. See separate guidance on the PT log. The Log will generate a tracking number. That number is added to the submitted form by hand as the PTL number.

Project Name: Dahlgren WWTP Upgrade	
Date Received: 8-19-13	PTL #: 25932

4. Verify that all Information Requested on the Form is Provided:

Item	Provided?			Notes
	Yes	No	N/A	
Project Title with Date (plans and specs)	☒	☐	☐	Specifications may be on the plans so not all projects have separate specs
Project Location	☒	☐	☐	Must have City/County
Receiving Systems Identified	☒	☐	☐	Not applicable if this project owner owns the downstream collection and treatment
Contact Information	☒	☐	☐	Must have
Project Description Attached	☒	☐	☐	Must have
Letter of Acceptance	☐	☐	☒	Must have for pump stations, collection systems, and satellite reclamation systems
Reliability Rating from VDH for Pump Stations only	☐	☐	☒	Need rating and statement of how meeting the rating
Design Sewage Flows	☒	☐	☐	Must have
Project Components checked	☒	☐	☐	Must have
VPDES/VPA Permit Referenced	☒	☐	☐	Must have for sewage treatment plants
Loan/Grant status	☐	☐	☒	WQIF projects cannot utilize this abbreviated process. Return the project.
Professional Engineer signature and seal	☒	☐	☐	Must have
Design exceptions noted?	☐	☐	☒	If yes, must have attached.

Note missing items and send email to project owner and engineer.

Log of telephone conversations and additional items received:

8/22/13 Need revised flow for design flow - Valerie
VPDES app received on 7/17/13 asks for 0.97 MGD

Revised CTC received 8/30/13

King George County, Virginia

KING GEORGE COUNTY
SERVICE AUTHORITY
"Quality on Tap"

9207 Kings Highway
King George, Virginia 22485
Telephone (540) 775-2746
Fax (540) 775-5560

August 29, 2013

Allison Thompson
Virginia Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, Virginia 22193-1453

RE: Application for Certificate to Construct- Dahlgren Wastewater Treatment Plant

Dear Ms. Thompson:

Attached please find a completed Application for Certificate to Construct for Dahlgren Wastewater Treatment Plant Upgrades.

If you have any questions, comments, or concerns regarding this matter you can contact me at (540) 775-2746.

Sincerely,

Christopher F. Thomas, P.E.
General Manager

CC: Scott Sweeney, Superintendent of Operations
Jeff Hockaday, Waste Water Manager

Virginia Department of Environmental Quality
APPLICATION for CERTIFICATE TO CONSTRUCT (CTC)
For Municipal Sewage Collection, Treatment, and/or Reclamation Systems

See Instructions. Do not submit plans and specifications. Submit 1 copy of this form with all attachments. Form will expand as you enter information.

Project Title: (as it appears on plans) Dahlgren Wastewater Treatment Plant Upgrade P.E. Seal Date on Cover: 8/2/13 Specifications Title and Date: Dahlgren Wastewater Treatment Plant Upgrade	
Location of Project: Dahlgren	County/City: King George County
Receiving Wastewater Collection System(s): Dahlgren Municipal	
Receiving Sewage Treatment Plant(s)/Reclamation System: Dahlgren WWTP	
PROJECT OWNER: King George County Service Authority	**PROJECT ENGINEER**
Owner Contact Name: Christopher Thomas, PE	Name: Michael A Larson, PE
Title: General Manager	Company Name: Draper Aden Associates
Address: 10459 Courthouse Dr, Suite 200, King George VA 22485	Address: 8090 Villa Park Dr, Richmond VA 23228
Phone: 540-775-8563	Phone: 804-264-2228
Email: cthomas@co.kinggeorge.state.va.us	Email: mlarson@daa.com
Owner Signature and date: Christopher F. Thomas 8-27-13	

For Sewage Treatment Works and Sewage Collection Systems:
Attach Project Description
Attach Letter(s) of Acceptance from Receiving Facility/Utility for sewage collection system projects
Attach Reliability Class: (1) For Pump Stations attach Reliability Class Worksheet. (2) For Sewage Treatment Plants note the Reliability Class rating from the VPDES or VPA permit and method of meeting reliability classification requirements.

For a sewage treatment plant project, provide the VPDES or VPA permit number: VA0026514
Design Sewage Flow (Sewage Plant): (a) average daily flow (MGD): 0.97 (b) peak daily flow (MGD): 2.43
Design Sewage Flow (Pump Station): (a) average daily flow (MGD): _____ (b) peak hour flow (MGD): _____

Please check the appropriate components of your project:

Gravity and/or Vacuum Sewer	☐	New Sewage Treatment Plant	☐
Pump Station(s)	☐	Modification of Existing Sewage Treatment Plant	☒
Force Main(s)	☐	Expansion of Existing Sewage Treatment Plant	☐

For Reclamation or Satellite Reclamation System, Attach Page 2: Page 2 Attached? Yes ☐ No ☒

The following statement must be signed and sealed by the Virginia licensed design engineer:
"As discussed in 9 VAC 25-790-240.C., the referenced design documents are in substantial compliance with Part III - Manual of Practice For Sewerage Systems and Treatment Works, of the Sewage Collection and Treatment Regulations (9 VAC 25-790-310 et seq.)"

COMMONWEALTH OF VIRGINIA
MICHAEL A. LARSON
8-23-13

Licensed Design Engineer's Signature and original seal (signed and dated)

☐ **Design exceptions and justifications are attached in accordance with 9 VAC 25-790-240.C.**

For DEQ use only:
In accordance with the *Code of Virginia* 1950, as amended, Title 62.1, Section 62.1-44.19, this form, signed by the appropriate DEQ representative, constitutes your Certificate to Construct. This Certificate is valid for a period of five years from the date of issuance. Other permits and authorizations may be necessary. Please contact your Regional DEQ Office if you have any questions.

Name	Signature	Date	CTC PTL Number
Alison Thompson		8/30/13	25932

Department of Environmental Quality Authorized Representative

Note: Once the project is complete, an application for a Certificate to Operate must be submitted to the appropriate DEQ Regional office.

Attachment 1: Project Description

1. Installation of 1500 gallon Bulk Supplemental Carbon (liquid molasses) Tank and variable speed solution pump. This system will be set up in the existing old filter press building and will discharge into the outer ring near the mixers. This building is heated and ventilated.
2. Installation of a continuous effluent nitrate sensor and monitoring system. This system will be the indicator for the monitoring of the biological denitrification process. The monitor will provide 4-20 mA signals that will primarily control the supplemental carbon feed rate and provide secondary data for dissolved oxygen controls. The sensor will provide real time concentrations and trending patterns for adjusting to achieve optimum treatment efficiencies while accounting for any fluctuations in flows, raw characteristics, and temperatures. These continuous automatic adjustments will be made 24 hours a day.
3. Installation of a continuous effluent Ammonia sensor and monitoring system. This system will provide information for the primary control of the dissolved oxygen within the existing ditches and a primary indicator of the nitrification process. This will maximize the biological nitrification process. The sensor will provide real time data that will utilize 4-20 mA signals to adjust the variable speed drives of the existing disc rotors. Again, these sensors will account for any fluctuations in flows, raw characteristics, microbial activity and temperatures. These continuous automatic adjustments will be made 24 hours a day.
4. Installation of a continuous MLSS sensor and monitor. This sensor would provide continuous monitoring and trending of the MLSS. This data would trigger wasting operations and/ increased retention for maintaining the optimum concentration of biomass for efficient biological nitrification and denitrification.
5. Installation of continuous effluent Phosphorus sensor and monitor. This would allow for operator adjustments of the alum feed rate to account for any changes in the flow or raw water strength based on real time data.
6. Installation of eight IFAS modules in the oxidation ditch with air burst connection for cleaning.
7. Provide replacement 2 mm step screen at the headworks to provide improved solids removal at the plant.
8. Provide two turbo blowers in the old filter press building to power air lift pumps for internal recycle. The pumps are VFD controlled which will allow the internal recycle pump flow rate to be adjusted based on incoming flow.
9. Update SCADA software and integrate new equipment. Provide a new raw water influent magmeter for improved equalization.

Attachment 2: Reliability Class Rating

This facility achieves Class 1 Reliability through the use of an Emergency Generator and SCADA system.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

STATE WATER CONTROL BOARD
ENFORCEMENT ACTION - ORDER BY CONSENT
ISSUED TO
KING GEORGE COUNTY SERVICE AUTHORITY
FOR
DAHLGREN DISTRICT WASTE WATER TREATMENT PLANT
VPDES Permit No. VA0026514

SECTION A: Purpose

This is a Consent Order issued under the authority of Va. Code § 62.1-44.15, between the State Water Control Board and the King George County Service Authority, regarding the Dahlgren District Waste Water Treatment Plant, for the purpose of resolving certain violations of the State Water Control Law and the applicable permit and regulation.

SECTION B: Definitions

Unless the context clearly indicates otherwise, the following words and terms have the meaning assigned to them below:

1. "Board" means the State Water Control Board, a permanent citizens' board of the Commonwealth of Virginia, as described in Va. Code §§ 10.1-1184 and 62.1-44.7.

2. "Department" or "DEQ" means the Department of Environmental Quality, an agency of the Commonwealth of Virginia, as described in Va. Code § 10.1-1183.

3. "Director" means the Director of the Department of Environmental Quality, as described in Va. Code § 10.1-1185.

4. "DMR" means Discharge Monitoring Report.

5. "Facility" or "Plant" means the Dahlgren District Waste Water Treatment Plant located at 16383 Dahlgren Road, King George, Virginia, a plant which treats and discharges treated

sewage and other municipal wastes, for the residents and businesses located in King George County.

6. "Authority" means the King George County Service Authority, an authority created pursuant to the Virginia Water and Waste Authorities Act, Va. Code § 15.2-5100 *et seq.* King George County Service Authority is a "person" within the meaning of Va. Code § 62.1-44.3.

7. "MLSS" means Mixed Liquor Suspended Solids.

8. "Notice of Violation" or "NOV" means a type of Notice of Alleged Violation under Va. Code § 62.1-44.15.

9. "NRO" means the Northern Regional Office of DEQ, located in Woodbridge, Virginia.

10. "O&M" means operations and maintenance.

11. "Order" means this document, also known as a "Consent Order" or "Order by Consent," a type of Special Order under the State Water Control Law.

12. "Permit" means VPDES Permit No. VA0026514, which was effective on January 12, 2009 and expires on January 11, 2014.

13. "Pollutant" means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 USC § 2011 *et seq.*)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water... 9 VAC 25-31-10.

14. "Pollution" means such alteration of the physical, chemical, or biological properties of any state waters as will or is likely to create a nuisance or render such waters (a) harmful or detrimental or injurious to the public health, safety, or welfare or to the health of animals, fish, or aquatic life; (b) unsuitable with reasonable treatment for use as present or possible future sources of public water supply; or (c) unsuitable for recreational, commercial, industrial, agricultural, or other reasonable uses, provided that (i) an alteration of the physical, chemical, or biological property of state waters or a discharge or deposit of sewage, industrial wastes or other wastes to state waters by any owner which by itself is not sufficient to cause pollution but which, in combination with such alteration of or discharge or deposit to state waters by other owners, is sufficient to cause pollution; (ii) the discharge of untreated sewage by any owner into state waters; and (iii) contributing to the contravention of standards of water quality duly established by the Board, are "pollution." Va. Code § 62.1-44.3.

15. "Regulation" means the VPDES Permit Regulation, 9 VAC 25-31-10 *et seq.*

16. "State Water Control Law" means Chapter 3.1 (§ 62.1-44.2 *et seq.*) of Title 62.1 of the Va. Code.

17. "State waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands. Va. Code § 62.1-44.3.

18. "TKN" means Total Kjeldahl Nitrogen.

19. "TSS" means Total Suspended Solids.

20. "Va. Code" means the Code of Virginia (1950), as amended.

21. "VAC" means the Virginia Administrative Code.

22. "VPDES" means Virginia Pollutant Discharge Elimination System.

23. "Warning Letter" or "WL" means a type of Notice of Alleged Violation under Va. Code § 62.1-44.15.

SECTION C: Findings of Fact and Conclusions of Law

1. The Authority owns and operates the Plant in King George County, Virginia. The Permit authorizes the Authority to discharge treated sewage and other municipal wastes from the Plant, to Williams Creek, located within the Potomac River Watershed, in strict compliance with the terms and conditions of the Permit.

2. The Plant discharges to the tidal segment of Williams Creek. This segment is listed in DEQ's 2010 305(b)/303(d) Integrated Report as impaired for aquatic life use due to low dissolved oxygen, and aquatic plants (Marcrophytes). This segment is listed as impaired for recreational use due to Enterococcus. The source of the impairment is listed variously as agriculture, municipal point sources, industrial discharges, sanitary sewer overflows, loss of habitat, and atmospheric deposition of Nitrogen.

3. In submitting its DMRs, the Authority has indicated that it exceeded discharge limitations contained in Part I, Page 1, Section A, Number 1 of the Permit, for Enterococci in December 2010 and January 2011, for Total Nitrogen for the 2010 and 2011 Calendar Years, Total Phosphorus for the 2010 Calendar Year and for TKN in the January 2011 monitoring period. The Permit exceedances reported in the DMRs are as follows:

    a. During the December 2010 monitoring period, the Authority reported exceeding the concentration average (calculated as a geometric mean) monthly limit for

Enterococci and the 2010 Calendar Year concentration average limit for Total Nitrogen and Total Phosphorus.

b. During the January 2011 monitoring period, the Authority reported exceeding the concentration average (calculated as a geometric mean) monthly limit for Enterococci and the monthly concentration average limit and weekly concentration average maximum limit for TKN.
c. During the December 2011 monitoring period, the Authority reported exceeding the 2011 Calendar Year concentration average limit for Total Nitrogen.
d. The Authority submitted a revised DMR which was rejected by DEQ based on the agency's interpretation of required analytical methods. The revised DMR was done to account for individual sample results below the laboratory Quantitative Limits, in the geometric mean calculation, and rounding. The revised DMR did not show an exceedance of the permitted Enterococci limits for the December 2010 reporting period.

4. DEQ issued a Warning Letter, WL No. W2010-12-N-1006, dated December 14, 2010, for the late submittal of the seventh quarter Toxicity Monitoring Report.

5. DEQ issued a Warning Letter, WL No. W2011-02-N-1003, dated February 11, 2011, for the permit limit exceedances reported during the December 2010 monitoring period.

6. DEQ issued a Notice of Violation, NOV No. W2011-03-N-0008, dated March 14, 2011, for the permit limit exceedances reported during the January 2011 monitoring period.

7. DEQ issued a Notice of Violation on February 28, 2012, NOV No. W2012-02-N-0004 for the permit exceedance reported during the December 2011 monitoring period.

8. The Authority responded to the March 14, 2011 NOV in a letter, dated March 22, 2011. The response stated that the Enterococci exceedances were a result of a loss of filter efficiency at the Plant, contributing to higher TSS and the resulting Enterococci exceedances. The response stated that both the monthly TKN and calendar year total Nitrogen exceedances were due to a combination of high nitrogen septic, high MLSS, and December's low temperatures. The Authority further indicated in correspondence and during conversations held with DEQ staff that its failure to comply with Total Nitrogen and Total Phosphorus limits was related to certain process and design deficiencies at the Facility.

9. On December 13, 2011 an informal proceeding, as provided in § 2.2-4019 of the Code, was held at NRO to provide a basis for a case decision, in the form of a unilateral special order, regarding the matters referenced in WL No. W2010-12-N-1006, WL No. W2011-02-N-1003 and NOV No. W2011-03-N-0008. Although the proceeding was concluded, no unilateral order was issued as a result of the proceeding and the need for the issuance of such an order has been rendered moot, as the matters which were the subject of the proceeding, as well as which are referenced in NOV No. W2012-02-N-0004 are, by agreement of the parties hereto, being settled consensually by this Order.

10. Va. Code § 62.1-44.5 states that: "[E]xcept in compliance with a certificate issued by the Board, it shall be unlawful for any person to discharge into state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances."

11. The Regulation, at 9 VAC 25-31-50, also states that except in compliance with a VPDES permit, or another permit issued by the Board, it is unlawful to discharge into state waters sewage, industrial wastes or other wastes.

12. Va. Code § 62.1-44.15(5a) states that a VPDES permit is a "certificate" under the statute.

13. Williams Creek is a surface water located wholly within the Commonwealth and is a "state water" under the State Water Control Law.

14. Based on the DMRs and other reports, the Board concludes that the Authority has violated the Permit and Va. Code § 62.1-44.5 and 9 VAC 25-31-50, by discharging treated sewage and municipal wastes from the Plant while concurrently failing to comply with the conditions of the Permit, as described in paragraph C(3) and C(4) above.

15. The Authority has submitted documentation that verifies that the TKN and Enterococci violations as described in paragraphs C(3) through C(4), above, have been corrected. The Authority has further indicated that it intends to address the Total Phosphorus and Total Nitrogen violations described above by enhancing process control through the installation of both effluent and process sensors and by enhancing treatment capabilities through the installation of both a supplemental carbon feed system and an advanced biological denitrification and enhanced phosphorus removal treatment system. The Authority subsequently corrected these exceedences. DEQ acknowledges that it currently has no knowledge of any Permit violations, other than those described in paragraphs C(3) and (4) above, for the time period addressed in this Consent Order.

16. In order for the Authority to complete its return to compliance, DEQ staff and representatives of the Authority have agreed to the Schedule of Compliance, which is incorporated as Appendix A of this Order.

SECTION D: Agreement and Order

Accordingly, by virtue of the authority granted it in Va. Code §§ 62.1-44.15, the Board orders the Authority agrees to:

1. Perform the actions described in Appendices A and B of this Order; and

2. Pay a civil charge of $5320 within 30 days of the effective date of the Order in settlement of the violations cited in this Order.

Payment shall be made by check, certified check, money order or cashier's check payable to the "Treasurer of Virginia," and delivered to:

Receipts Control
Department of Environmental Quality
Post Office Box 1104
Richmond, Virginia 23218

The Authority shall include its Federal Employer Identification Number (FEIN) with the civil charge payment and shall indicate that the payment is being made in accordance with the requirements of this Order for deposit into the Virginia Environmental Emergency Response Fund (VEERF).

SECTION E: Administrative Provisions

1. The Board may modify, rewrite, or amend this Order with the consent of the King George County Service Authority for good cause shown by the Authority, or on its own motion pursuant to the Administrative Process Act, Va. Code § 2.2-4000 *et seq.*, after notice and opportunity to be heard.

2. This Order addresses and resolves only those violations specifically identified in Section C of this Order. This Order shall not preclude the Board or the Director from taking any action authorized by law, including but not limited to: (1) taking any action authorized by law regarding any additional, subsequent, or subsequently discovered violations; (2) seeking subsequent remediation of the Facility; or (3) taking subsequent action to enforce the Order

3. For purposes of this Order and subsequent actions with respect to this Order only, the Authority admits the jurisdictional allegations, findings of fact, and conclusions of law contained herein.

4. The Authority consents to venue in the Circuit Court of the City of Richmond for any civil action taken to enforce the terms of this Order.

5. The Authority declares it has received fair and due process under the Administrative Process Act and the State Water Control Law and it waives the right to any further hearing or other administrative proceeding authorized or required by law or regulation, and to any judicial review of any issue of fact or law contained herein. Nothing herein shall be construed as a waiver of the right to any administrative proceeding for, or to judicial review of, any action taken by the Board to modify, rewrite, amend, or enforce this Order.

6. Failure by the Authority to comply with any of the terms of this Order shall constitute a violation of an order of the Board. Nothing herein shall waive the initiation of appropriate enforcement actions or the issuance of additional orders as appropriate by the Board or the Director as a result of such violations. Nothing herein shall affect appropriate enforcement actions by any other federal, state, or local regulatory authority.

7. If any provision of this Order is found to be unenforceable for any reason, the remainder of the Order shall remain in full force and effect.

8. The Authority shall be responsible for failure to comply with any of the terms and conditions of this Order unless compliance is made impossible by earthquake, flood, other acts of God, war, strike, or such other occurrence. The Authority shall show that such circumstances were beyond its control and not due to a lack of good faith or

diligence on its part. The Authority shall notify the DEQ Regional Director verbally within 24 hours and in writing within three business days when circumstances are anticipated to occur, are occurring, or have occurred that may delay compliance or cause noncompliance with any requirement of the Order. Such notice shall set forth:

a. the reasons for the delay or noncompliance;

b. the projected duration of any such delay or noncompliance;

c. the measures taken and to be taken to prevent or minimize such delay or noncompliance; and

d. the timetable by which such measures will be implemented and the date full compliance will be achieved.

Failure to so notify the Regional Director verbally within 24 hours and in writing within three business days, of learning of any condition above, which the Authority intends to assert will result in the impossibility of compliance, shall constitute a waiver of any claim to inability to comply with a requirement of this Order.

9. This Order is binding on the parties hereto, their successors in interest, designees and assigns, jointly and severally.

10. This Order shall become effective upon execution by both the Director or his designee and the King George County Service Authority. Nevertheless, the King George County Service Authority agrees to be bound by any compliance date of this Order which precedes the effective date of this Order.

11. This Order shall continue in effect until:

a. the Director or his designee terminates the Order after the Authority has completed all of the requirements of the Order;

b. the Authority petitions the Director or his designee to terminate the Order after it has completed all of the requirements of the Order and the Director or his designee approves the termination of the Order; or

c. the Director or Board terminates the Order in his or its sole discretion upon 30 days' written notice to the Authority.

Termination of this Order, or any obligation imposed in this Order, shall not operate to relieve the Authority from its obligation to comply with any statute, regulation, permit condition, other order, certificate, certification, standard, or requirement otherwise applicable.

12. Any plans, reports, schedules or specifications attached hereto or submitted by the Authority and approved by the Department pursuant to this Order are incorporated into this Order. Any non-compliance with such approved documents shall be considered a violation of this Order.

13. The undersigned representative of the Authority certifies that he or she is a responsible official authorized to enter into the terms and conditions of this Order and to execute and legally bind the Authority to this document. Any documents to be submitted pursuant to this Order shall also be submitted by a responsible official of the Authority.

14. This Order constitutes the entire agreement and understanding of the parties concerning settlement of the violations identified in Section C of this Order, and there are no representations, warranties, covenants, terms or conditions agreed upon between the parties other than those expressed in this Order.

15. By its signature below, the Authority voluntarily agrees to the issuance of this Order.

And it is so ORDERED this 27th day of September, 2012.

Thomas A. Faha, NRO Regional Director
Department of Environmental Quality

King George County Service Authority voluntarily agrees to the issuance of this Order.

Date: June 27, 2012 By: Christopher F. Thomas, General Manager
(Person) (Title)
King George County Service Authority

Commonwealth of Virginia
City/County of King George

The foregoing document was signed and acknowledged before me this 27th day of June, 2012, by Christopher F. Thomas who is General Manager of King George County Service Authority, on behalf of the Authority.

Marcella A. Feltner
Notary Public

7165166
Registration No.

My commission expires: 1/31/2016

Notary seal:

Marcella A. Feltner
Commonwealth of Virginia
Notary Public
Commission No. 7165166
My Commission Expires 1/31/2016

APPENDIX A
SCHEDULE OF COMPLIANCE

King George County Service Authority shall:

1. Within 30 days of the effective date of this Order submit to DEQ for review and approval, a plan and schedule (the "Plan") to address how King George will consistently meet its annual limits for Total Nitrogen and Total Phosphorus. Said Plan will incorporate the measures recommended in that certain Preliminary Engineering Report prepared by Draper Aden Associates for the Dahlgren Wastewater Treatment Plant and dated June 30 2012. The Plan will incorporate the installation of an additional nitrate sensor prior to the Facility's denitrification stage and the installation of an advanced treatment system designed to enhance nutrient removal. The Plan will also provide for funding of construction and/or installation of the above referenced treatment improvement measures in an expeditious fashion.
2. The Plan shall include expeditious funding applications and approvals. The completion schedule shall be based on securing the funding source. Any delay in funding may require an adjustment of the estimated completion date. The Plan will incorporate measures that allow for the installation of continuous monitoring and control sensors as detailed in the Amended Report referenced in paragraph 3below. The quantity, type, and location of the sensors shall be in accordance with recommendations of the Amended Report which are designed to ensure that the Facility will consistently meet the permitted requirements for Total Nitrogen and Total Phosphorus. The Plan will detail the recommended type of advanced treatment technology for denitrification and enhanced phosphorus removal. The Amended Report will further investigate options for precise analytical instrumentation and process control along with capital infrastructure improvements for biological treatment facilities using supplemental carbon that will reliably achieve compliance with Permit discharge limits up to the full rated capacity of the Plant. The plan will also provide for funding of construction and/or installation of the above referenced treatment improvement measures in an expeditious fashion.
3. The Authority will submit the Amended Report, a revised Preliminary Engineering Report, to DEQ, for review and approval, no later than June 30, 2012.

Unless otherwise specified in this Order, King George County Service Authority shall submit all requirements of Appendix A of this Order to:

Virginia Department of Environmental Quality
Attn: Enforcement Staff
13901 Crown Court

Woodbridge, VA 22193

APPENDIX B
INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

From the effective date of this Order until the end of the calendar year in which a Certificate to Operate the Plant upgrades described in Appendix A has been issued, but in no event later than December 31, 2014,the Authority shall monitor, limit and calculate the discharge from Outfall No 001 of the Facility in accordance with VPDES Permit Number VA0026514, except as specified below. These interim limits shall retroactively apply as of the first day of the year in which this Order becomes effective. The foregoing notwithstanding, these interim limits do not supercede the provisions of that certain Virginia Water Quality Improvement Fund Point Source Grant and Operation and Maintenance Agreement, Contract #440-S-08-04, which require that King George meet a Total Nitrogen effluent concentration limit of 4.0 mg/l and a Total Phosphorus effluent concentration limit of 0.3 mg/l, both on an annual average basis, except as provided in paragraph 5.1 and Article VIII of the Agreement.

These requirements shall be construed in light of the Regulation.

Parameter Description	**Parameter Limits**			**Monitoring Requirements**	
	Concentration Minimum	**Concentration Monthly Average**	**Concentration Maximum**	**Sample Frequency**	**Sample Type**
Total Nitrogen – Calendar Year		8.0 mg/l		1/Y	Calculated
Total Phosphorus – Calendar Year		1.0 mg/l		1/Y	Calculated

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas Faha
Regional Director

August 8, 2014

Mr. Christopher F. Thomas, P.E.
General Manager
King George County Service Authority
9207 Kings Highway
King George, VA 22485

Re: Dahlgren District - Wastewater Treatment Plant Permit VA0026514

Dear Mr. Thomas,

Enclosed is a copy of the technical and laboratory reports generated after performing a Facility Technical Inspection at the Dahlgren District - Wastewater Treatment Plant (WWTP) on July 9, 2014. The compliance staff would like to thank Mr. Jeff Hockaday and his staff for their time and assistance during the inspection. This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 et seq. (APA).

Summaries for both the technical and laboratory inspections are enclosed. The facility had Deficiencies for the technical inspection. Please note the requirements and recommendations addressed in the technical summary. Please submit in writing a progress report to this office by **September 8, 2014** for the items addressed in the summary. Your response may be sent either via the US Postal Service or electronically, via E-mail. If you choose to send your response electronically, we recommend sending it as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm that the facility is in compliance with permit requirements.

If you have any questions or comments concerning this report, please feel free to call me at the Northern Regional Office at (703) 583-3909 or by e-mail at Rebecca.Johnson@deq.virginia.gov.

Sincerely,

Rebecca J. Johnson

Rebecca Johnson
Environmental Specialist II

cc: Permits / DMR File;
cc electronic: Jeff Hockaday

Attachment 3

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0026514	**01/12/2009**		**01/12/2014**

Facility Name	Address	Telephone Number
Dahlgren District Wastewater Treatment Plant	**16383 Dahlgren Road King George, Virginia 22485**	**(540) 663-2883**
Owner Name	Address	Telephone Number
King George County Service Authority	**9207 Kings Highway King George, VA 22485**	**(540) 775-2746**
Responsible Official	Title	Telephone Number
Christopher Thomas	**General Manager**	**(540) 775-8563**
Responsible Operator	Operator Cert. Class/number	Telephone Number
Jeffrey Hockaday	**Class 1 / 1965001633**	**(540) 775-2746**

TYPE OF FACILITY:

DOMESTIC				**INDUSTRIAL**			
Federal		Major	**X**	Major		Primary	
Non-federal	**X**	Minor		Minor		Secondary	

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**1.0 MGD**
Population Served	**~2,500**
Connections Served	**1091**

EFFLUENT LIMITS: mg/L unless stated otherwise

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
Flow (MGD)	**NA**	**NA**	**NL**	**Nitrate + Nitrite**		**NL**	**NA**
pH (SU)	**6.0**		**9.0**	**TKN**		**10**	**15**
TSS		**25**	**37**	**Total Nitrogen Calendar year**		**4.0**	**NA**
$CBOD_5$		**25**	**37**	**Total Phosphorus Calendar year**		**0.30**	**NA**
DO	**6.0**			**Total Hardness**		**NA**	**NL**
Fecal Coliform (N/CML)		**200**					

Receiving Stream	**Williams Creek**
Basin	**Potomac River**
Discharge Point (LAT)	**38° 19′ 24″ N**
Discharge Point (LONG)	**77° 03′ 11″ W**

Problems identified at last inspection: December 20, 2011		**Corrected:**
1. General housekeeping at the STP needs to be improved.	**( ) Yes**	**(X) No**
2. A significant amount of debris is making its way past the screening process at the plant headworks.	**( ) Yes**	**(X) No**
3. Backflow preventer in the chemical feed room was last certified in 2006.	**(X) Yes**	**( ) No**
4. Provide the dates of the last cleaning and calibration of the inline D.O. monitoring meter.	**(X) Yes**	**( ) No**
5. The polymer drums in the sludge processing building are not kept inside a containment area.	**Did not view this area**	
6. The schedule for UV cleaning should be reviewed. The bulbs and effluent weirs showed accumulated leaves and algae caught in both.	**( ) Yes**	**(X) No**
7. The UV intensity monitoring sensors indicated a low UV dosage and the LCD panel indicated an alarm condition.	**( ) Yes**	**(X) No**
8. Update O&M manual.	**New construction taking place at the facility. KGCSA will update O&M manual once construction is complete.**	

Technical Inspection Summary

Comments/Recommendations for Action from the Current Inspection on July 9, 2014:

1. ~~**As stated in Permit Number VA0026514, Part I. Section A. 1. "8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of eight (8) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge." Mr. Hockaday said the samples are not collected in a flow proportioned manner. The same set sample volume is collected once an hour for eight hours. Either provide historical documentation showing that the flow does not vary by 10% or more during the monitored discharge or begin collecting samples based on the flow.**~~

2. **As stated in Permit Number VA0026514, Part II, Section Q. "Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes effective plant performance, adequate funding, adequate staffing, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of this permit." And;**

   As stated in the Sewage Collection and Treatment (SCAT) Regulations, Part III, Article 7, 9VAC25-790-770, D.7. "At least one UV intensity meter within each assembly of lamps shall be provided to indicate

operating conditions. The intensity reading should be indicated on the control panel for each lamp assembly".

A) The ultraviolet (UV) disinfection system intensity meters were not operational. The manufacturer's recommendation state that in order to ensure proper disinfection the UV intensity must be set to greater than 65% UV transmittance.
B) Until the meters are fully operational, increase the *E. coli* sampling frequency to daily (seven days per week).
C) Once the meters are fully operational document the intensity readings at least once per day in the operators' logbook.

3. **The auto sampling fridge indicated a temperature of 8°C and the sampling container and tubing showed signs of organic growth (Photos 26 and 27). <u>DEQ recommended that the fridge temperature and/or thermometer be corrected and the sampling container and tubing be replaced.</u>**

4. **<u>Provide a copy of the annual NIST documentation for both the pH and D.O. meters for 2012-2014.</u>**

5. **<u>Provide a copy of the IDC for "Dee" and "Greta" for the pH meter to DEQ-NRO.</u>**

6. **The clarifier weirs were covered in algae. DEQ recommended increasing the cleaning frequency especially in the summer months when algae grows at an accelerated rate.**

7. **Unorganized hoses and barrels, as well as rags, were observed on the ground at the facility. DEQ recommended the facility maintain good housekeeping.**

VPDES No. **VA0026514**

REV 5/00

DEQ
WASTEWATER FACILITY
INSPECTION REPORT
PART 1

Inspection date: **July 9, 2014**

Date form completed: **August 8, 2014**
Revised September 9, 2014

Inspection by: **Rebecca Johnson**

Inspection agency: **DEQ NRO**

Time spent: **24 hours**

Announced: **No**

Reviewed by: 8/5/14

Scheduled: **Yes**

Present at inspection: **Jeff Hockaday and Daniel Powell – KGSA, Amy Dooley - DEQ**

TYPE OF FACILITY:

	Domestic	**Industrial**	
[ ] Federal	[**X**] Major	[ ] Major	[ ] Primary
[**X**] Nonfederal	[ ] Minor	[ ] Minor	[ ] Secondary

Type of inspection:

[**X**] Routine
[ ] Compliance/Assistance/Complaint
[ ] Reinspection

Date of last Technical Inspection: **December 20, 2011**
Agency: **DEQ NRO**

Population served: **approximately 2,500**

Connections served: **1091**

Last month: (Influent) **N/A**

Last month: (Effluent) **June 2014**

Flow:	**0.27**	MGD	$CBOD_5$	**2.2**	mg/L	TSS	**3.1**	mg/L
pH:	**8**	SU	E. coli	**2**	n/100ml	TKN	**2.6**	mg/L
Total Phosphorus	**0.2**	mg/L	D.O.	**6.8**	mg/L	NO2+NO3	**2.9**	mg/L

Quarter average: (Effluent) **April – June 2014**

Flow:	**0.35**	MGD	$CBOD_5$	**1.9**	mg/L	TSS	**8.7**	mg/L
pH:	**8**	SU	E. coli	**4**	n/100ml	TKN	**2.5**	mg/L
Total Phosphorus	**0.23**	mg/L	D.O.	**6.8**	mg/L	NO2+NO3	**3.0**	mg/L

DATA VERIFIED IN PREFACE [ ] Updated [**X**] No changes

Has there been any new construction? [**X**] Yes [ ] No

If yes, were plans and specifications approved? [**X**] Yes [ ] No [ ] NA

DEQ approval date: **August 30, 2013**

The certificate to operate for the plant upgrades has not been issued as of the date of the inspection.

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: I **2** II **0** III **1** IV **3** Trainee **0**
2. Hours per day plant is manned: **16 Hours (6:00 a.m. - 10:00 p.m.)**
3. Describe adequacy of staffing. [ ] Good [**X**] Average [ ] Poor
4. Does the plant have an established program for training personnel? [**X**] Yes [ ] No
5. Describe the adequacy of the training program. [ ] Good [**X**] Average [ ] Poor
6. Are preventive maintenance tasks scheduled? [**X**] Yes [ ] No
7. Describe the adequacy of maintenance. [ ] Good [ ] Average [**X**] Poor*
8. Does the plant experience any organic/hydraulic overloading?
   If yes, identify cause and impact on plant: [ ] Yes [**X**] No
9. Any bypassing since last inspection? [ ] Yes [**X**] No
10. Is the standby electric generator operational? [**X**] Yes [ ] No* [ ] NA
11. Is the STP alarm system operational? [**X**] Yes [ ] No* [ ] NA
12. How often is the standby generator exercised? **Once/Week**
    Power Transfer Switch? **Once/Week**
    Alarm System? **Once/Week**
13. When was the cross connection control device last tested on the potable water service? **May 2014**
14. Is sludge being disposed in accordance with the approved sludge disposal plan? [**X**] Yes [ ] No [ ] NA
15. Is septage received by the facility? [**Y**] Yes [ ] No
    Is septage loading controlled? [**X**] Yes [ ] No [ ] NA
    Are records maintained? [**X**] Yes [ ] No [ ] NA
16. Overall appearance of facility: [ ] Good [**X**] Average [ ] Poor

Comments:
Septage is accepted Monday through Friday at 15,000 gallons per day. pH is analyzed on the incoming septage. Sludge is received from Fairview Beach WWTP (VA0092134), Hopyard Farm WWTF (VA0089338), Purkins Corner WWTP (VA0070106), Oakland Park STP (VA0086789), and is dumped into the aerobic digestors.

7. **General housekeeping and cleaning and preventative maintenance on units needs improvement. The wet well and oxidation ditches had a lot of accumulated floating debris. The UV unit was covered in algae. The effluent pump tank had a lot of floating solids and vegetation. The final effluent automatic sampler tubing had black and pink mold growing along the inside of it.**

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?

Operational Logs for each unit process	[**X**] Yes [ ] No	[ ] NA
Instrument maintenance and calibration	[**X**] Yes [ ] No	[ ] NA
Mechanical equipment maintenance	[**X**] Yes [ ] No	[ ] NA
Industrial waste contribution (Municipal Facilities)	[ ] Yes [**X**] No	[ ] NA

2. What does the operational log contain?

[**X**] Visual observations
[**X**] Laboratory results
[**X**] Control calculations
[**X**] Flow measurement
[**X**] Process adjustments
[ ] Other (specify)

Comments:
The facility is primarily using a preprinted itemized task list in a 3 ringed binder for log book. A bound log book was also noted onsite but had not been written in for the month of June. DEQ requested the facility utilize the bound logbook daily to annotate the facility's operational tasks.

3. What do the mechanical equipment records contain?

[**X**] As built plans and specs
[**X**] Manufacturers instructions
[**X**] Lubrication schedules
[ ] Spare parts inventory
[**X**] Equipment/parts suppliers
[ ] Other (specify)

Comments:

4. What do the industrial waste contribution records contain? **N/A**
(Municipal Only)?

[ ] Waste characteristics
[ ] Impact on plant
[ ] Locations and discharge types
[ ] Other (specify)

Comments: **No industrial contributions**

5. Which of the following records are kept at the plant and available to personnel?

[**X**] Equipment maintenance records
[ ] Industrial contributor records
[**X**] Sampling and testing records
[**X**] Operational Log
[**X**] Instrumentation records

6. Records not normally available to plant personnel and their location: **None**

7. Were the records reviewed during the inspection? [**X**] Yes [ ] No

8. Are the records adequate and the O & M Manual current? [**X**] Yes [ ] No

9. Are the records maintained for the required 3-year time period? [**X**] Yes [ ] No

Comments:

(C) SAMPLING

1. Do sampling locations appear to be capable of providing representative samples? [**X**] Yes [ ] No*
2. Do sample types correspond to those required by the VPDES permit? [**X**] Yes [ ] No*
3. Do sampling frequencies correspond to those required by the VPDES permit? [**X**] Yes [ ] No*
4. Are composite samples collected in proportion to flow? [ ] Yes [**X**] No* [ ] NA
5. Are composite samples refrigerated during collection? [**X**] Yes* [ ] No* [ ] NA
6. Does plant maintain required records of sampling? [**X**] Yes [ ] No*
7. Does plant run operational control tests? [**X**] Yes [ ] No

Comments:

4. ~~**Composite samples are not collected based on flow. A same set sample volume is collected once an hour for eight hours. See Comments/Recommendations for Action**~~
5. **The effluent sampling fridge indicated a temperature of 8°C. See Comments/Recommendations for Action**

(D) TESTING

1. Who performs the testing? [**X**] Plant [ ] Central Lab [**X**] Commercial Lab

Name: **<u>Plant</u>: DO, pH, 30 minute settling, MLSS, MLVSS**
<u>Enviro Compliance</u>: CBOD, TKN, NO2, NO3, Total Phosphorus, TSS, Fecal Coliform, and *E. coli*

If plant performs any testing, complete 2-4.

2. What method is used for chlorine analysis? **N/A**
3. Does plant appear to have sufficient equipment to perform required tests? [**X**] Yes [ ] No*
4. Does testing equipment appear to be clean and/or operable? [**X**] Yes [ ] No*

Comments:

(E) FOR INDUSTRIAL FACILITIES WITH TECHNOLOGY BASED LIMITS ONLY

1. Is the production process as described in the permit application? (If no, describe changes in comments)
   [ ] Yes [ ] No [**X**] NA
2. Do products and production rates correspond as provided in the permit application? (If no, list differences)
   [ ] Yes [ ] No [**X**] NA
3. Has the State been notified of the changes and their impact on plant effluent? Date:
   [ ] Yes [ ] No* [**X**] NA

Comments:

UNIT PROCESS: Screening/Comminution

1. Number of Units: Manual: **1** Mechanical: **1**

   Number in operation: Manual: **0** Mechanical: **1**

2. Bypass channel provided: [**X**] Yes [ ] No*
   Bypass channel in use: [ ] Yes [**X**] No

3. Area adequately ventilated: [**X**] Yes [ ] No*

4. Alarm system for equipment failure or overloads: [**X**] Yes [ ] No*

5. Proper flow distribution between units: [ ] Yes [ ] No [**X**] NA

6. How often are units checked and cleaned? **Daily**

7. Cycle of operation: **Continuously**

8. Volume of screenings removed: **On July 3, 2014, the facility installed a new step screen that uses a sensor and automatically moves when the screen is full of solids, which then are disposed of in a dumpster at a rate of approximately half a bucket per day.**

9. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **Plant upgrade construction was observed adjacent to the headworks. The pipes seen in Photo 2 send flow from the belt filter press and backwash of aqua filters to the headworks.**
- **A new step screen has been installed at the headworks prior to the grinder.**
- **An in-line grinder pump "muffin monster" is installed prior to the influent pumps.**
- **Debris observed downstream of this process unit, wet well and oxidation ditch. Mr. Hockday said operations staff have not had a chance to remove the floating debris in the wet well and oxidation ditch since the new step screen has been placed online.**
- **Photos 1-4**

UNIT PROCESS: Grit Removal

1. Number of units: **3** In operation: **1**
2. Unit adequately ventilated: [**X**] Yes [ ] No*
3. Operation of grit collection equipment: [**X**] Manual [ ] Time clock [ ] Continuous duty
4. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA
5. Daily volume of grit removed: **5 gallons per day**
6. All equipment operable: [**X**] Yes [ ] No*
7. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **Grit classifier operates manually approximately once per day for 30 minutes. (Photo 3)**

UNIT PROCESS: Flow Equalization

1. Type: [ ] In-line [X] Side-line [ ] Spill pond — Number of cells: **1**

2. What unit process does it precede? **Influent pump station**

3. Is volume adequate? [X] Yes [ ] No

4. Mixing: [ ] None [X] Diffused air [ ] Fixed mechanical [ ] Floating mechanical

5. Condition of mixing equipment: [ ] Good [X] Average [ ] Poor

6. How drawn off?
   A. Pumped from: [ ] Surface [X] Sub-surface [ ] Adjustable
   B. Weir [ ] Surface [ ] Sub-surface

7. Is containment structure in good condition? [X] Yes [ ] No

8. Are the facilities to flush solids and grease from basin walls adequate? [X] Yes [ ] No [ ] NA

9. Are there facilities for withdrawing floating material and foam? [ ] Yes [X] No

10. How are solids removed? [X] Drain down [ ] Drag line [ ] NA [ ] Other:

    Is it adequate? [X] Yes [ ] No

11. Is the emergency overflow in good condition? [ ] Yes [ ] No [X] NA

12. Are the depth gauges in good condition? [X] Yes [ ] No [ ] NA

Comments:

6. The EQ basin receives influent from plant drains and is used to hold influent during high flow periods. Influent can be diverted into the lagoon from the influent pump station and drained back when the water level reaches the predetermined level. Photo 5

UNIT PROCESS: Sewage Pumping

1. Name of station: **Influent pump station**

2. Location (if not at STP):

3. Following equipment operable:

a. all pumps	[**X**] Yes	[ ] No*
b. ventilation	[**X**] Yes	[ ] No*
c. control system	[**X**] Yes	[ ] No*
d. sump pump	[ ] Yes	[ ] No*
e. seal water system	[ ] Yes	[ ] No*

4. Reliability considerations:

a. Class	[**X**] I	[ ] II	[ ] III
b. Alarm system operable:	[**X**] Yes	[ ] No*	
c. Alarm conditions monitored:			
1. high water level	[**X**] Yes	[ ] No*	
2. high liquid level in dry well	[ ] Yes	[ ] No	[ ] NA
3. main electric power	[**X**] Yes	[ ] No	[ ] NA
4. auxiliary electric power	[**X**] Yes	[ ] No	[ ] NA
5. failure of pump motors to start	[**X**] Yes	[ ] No	[ ] NA
6. test function	[ ] Yes	[ ] No*	
7. other	[ ] Yes	[ ] No	
d. Backup for alarm system operational:	[ ] Yes	[ ] No	[**X**] NA

e. Alarm signal reported to (identify): **SCADA/operator office/control room**

f. Continuous operability provisions:

[**X**] generator [ ] two sources of power
[ ] portable pump [ ] 1 day storage [ ] other

5. Does station have bypass: [ ] Yes* [**X**] No

a. evidence of bypass use	[ ] Yes*	[ ] No
b. can bypass be disinfected	[ ] Yes	[ ] No
c. can bypass be measured	[ ] Yes	[ ] No

6. How often is station checked? **Daily**

7. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **Solids that accumulate in the wet well are removed via pump and haul about 1x/6 months.**
- **Photo 6**

UNIT PROCESS: Activated Sludge Aeration

1. Number of units: **1** In operation: **1**

2. Mode of operation: **Oxidation Ditch with BNR - 4 rings (2 aerobic and 2 anaerobic)**

3. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

4. Foam control operational: [ ] Yes [ ] No* [**X**] NA

5. Scum control operational: [ ] Yes [ ] No* [**X**] NA

6. Evidence of following problems:
   a. dead spots [ ] Yes* [**X**] No
   b. excessive foam [ ] Yes* [**X**] No
   c. poor aeration [ ] Yes* [**X**] No
   d. excessive aeration [ ] Yes* [**X**] No
   e. excessive scum [ ] Yes* [**X**] No
   f. aeration equipment malfunction [ ] Yes* [**X**] No
   g. other (identify in comments) [**X**] Yes* [ ] No

7. Mixed liquor characteristics (**July 2014**):
   MLSS: **3,000-4,000** mg/L
   Color: **Choc. Brown**
   Odor: **Earthy**
   Settleability 10 min: **450%**
   Settleability 30 min: **330%**

8. Return/waste sludge:
   a. Return Rate: **not measured**
   b. Waste Rate: **~50,000 mg/L**
   c. Frequency of Wasting: **3 days per week**

9. Aeration system control: [ ] Time Clock [ ] Manual [**X**] Continuous [ ] Other (explain)

10. Effluent control devices working properly: [**X**] Yes [ ] No* [ ] NA

11. General condition: [ ] Good [**X**] Fair [ ] Poor

Comments:

- **Mr. Hockaday indicated that nitrification filters are proposed to be installed once they are acquired by the facility as part of the plant upgrade. (Photo 7)**
- **There was a significant amount of plastics floating in the oxidation ditches (Photos 8-9)**
- **The oxidation ditches were equipped with an in-line D.O. sensor. (Photo 10)**
- **Operations staff conducts daily pH analysis as part of their process controls.**

UNIT PROCESS: Sedimentation

[ ] Primary [**X**] Secondary [ ] Tertiary

1.	Number of units:	**2**	In operation: **1**	
2.	Proper flow distribution between units:	[ ] Yes	[ ] No*	[**X**] NA
3.	Signs of short circuiting and/or overloads:	[ ] Yes	[**X**] No	
4.	Effluent weirs level: Clean:	[**X**] Yes [ ] Yes	[ ] No* [**X**] No*	
5.	Scum collection system working properly:	[**X**] Yes	[ ] No*	[ ] NA
6.	Sludge collection system working properly:	[**X**] Yes	[ ] No*	
7.	Influent, effluent baffle systems working properly:	[**X**] Yes	[ ] No*	
8.	Chemical addition: Chemicals:	[ ] Yes	[**X**] No	
9.	Effluent characteristics: **Clear**			
10.	General condition:	[ ] Good	[**X**] Fair	[ ] Poor

Comments:

- **A rodent hole and rags were observed adjacent to the offline clarifier. (Photos 11-13)**
- **Algae was observed on the weirs. Ms. Johnson recommended operations staff increase the frequency of cleaning the weirs. See Comments/Recommendations for Action (Photo 14)**

UNIT PROCESS: Sludge Pumping - RAS

1. Number of Pumps: **2** In operation: **2**
2. Type of sludge pumped: [ ] Primary [ ] Secondary [**X**] Return Activated [ ] Combination [ ] Other:
3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [ ] Centrifugal [ ] Progressing Cavity [**X**] Other: **Air-lift**
4. Mode of operation: [ ] Manual [**X**] Automatic [ ] Other(explain):
5. Sludge volume pumped: **Variable**
6. Alarm system for equipment failures or overloads operational: [ ] Yes [**X**] No [ ] NA
7. General condition: [ ] Good [**X**] Fair [ ] Poor

Comments:

- **The RAS is transferred to the oxidation ditch via the RAS/WAS pump station. These pumps operate the WAS as well.**

UNIT PROCESS: Sludge Pumping - WAS

1. Number of Pumps: **2** In operation: **2**
2. Type of sludge pumped: [ ] Primary [ ] Secondary [ ] Return Activated [ ] Combination [**X**] Other: **Waste Activated Sludge**
3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift [ ] Centrifugal [ ] Progressing Cavity [**X**] Other: **Air-lift**
4. Mode of operation: [ ] Manual [**X**] Automatic [ ] Other(explain):
5. Sludge volume pumped: **Variable**
6. Alarm system for equipment failures or overloads operational: [ ] Yes [**X**] No [ ] NA
7. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **These air lift pumps send sludge from the clarifiers to the digesters and sludge holding tanks. These pumps operate the RAS as well.**
- **Empty blue barrels were noted adjacent to the sludge holding tanks. DEQ recommended general housekeeping be improved to include disposing of the barrels and storing the hoses in the designated place. (Photos 15-17)**

UNIT PROCESS: Filtration

1. Type of filters: [**X**] Gravity [ ] Pressure [ ] Intermittent

2. Number of units: **1** In operation: **1**

3. Operation of system: [**X**] Automatic [ ] Semi-automatic [ ] Manual [ ] Other(specify)

4. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

5. Evidence of following problems:

   a. uneven flow distribution [ ] Yes* [**X**] No
   b. filter clogging (ponding) [ ] Yes* [**X**] No
   c. nozzles clogging [ ] Yes* [**X**] No
   d. icing [ ] Yes* [**X**] No
   e. filter flies [**X**] Yes* [ ] No
   f. vegetation on filter [ ] Yes* [**X**] No

6. Filter aid system provided: [ ] Yes [**X**] No
   Properly operating: [ ] Yes [ ] No [**X**] NA
   Chemical used:

7. Automatic valves properly operating: [ ] Yes* [ ] No* [**X**] NA

8. Valves sequencing correctly: [ ] Yes* [ ] No* [**X**] NA

9. Backwash system operating properly: [**X**] Yes* [ ] No* [ ] NA

10. Filter building adequately ventilated: [**X**] Yes* [ ] No* [ ] NA

11. Effluent characteristics: **not observed**

12. General condition: [ ] Good [**X**] Fair [ ] Poor

Comments:

9. This is a cloth media, Aqua Disk, filter that is backwashed every 3 hours.

- **The filters were dirty. According to Mr. Hockaday the filters are changed every 3-4 years and that he has replacement filters onsite that need to be installed and will do so once the facility had enough operators to help replace the dirty filters. Photo 18**

- **DEQ recommended changing the filter discs more often to help prevent solids from passing through to the UV system and clogging the intensity sensor.**

UNIT PROCESS: Ultraviolet (UV) Disinfection

1. Number of UV lamps/assemblies: **2 Banks with 12 modules per bank**
   In operation: **2 Banks**

2. Type of UV system and design dosage: **Infilco-Degremont Aquaray HLS Model 2X48-LH**

3. Proper flow distribution between units: [**X**] Yes [ ] No* [ ] NA

4. Method of UV intensity monitoring: **Sensors in each channel**

5. Adequate ventilation of ballast control boxes: [**X**] Yes [ ] No* [ ] NA

6. Indication of on/off status of all lamps provided: [**X**] Yes [ ] No*

7. Lamp assemblies easily removed for maintenance: [**X**] Yes [ ] No*

8. Records of lamp operating hours and replacement dates provided:
   [**X**] Yes [ ] No*
   Bank 1 – 37,800 hours
   Bank 2 – 37,734 hours

9. Routine cleaning system provided: [ ] Yes [**X**] No*
   Operate properly: [ ] Yes [**X**] No*
   Frequency of routine cleaning: **As needed/See Recommendations for Action**

10. Lamp energy control system operate properly: [ ] Yes [**X**] No*

11. Date of last system overhaul: **About 2 years ago by Filco**

    a. UV unit completely drained [ ] Yes [ ] No*
    b. all surfaces cleaned [ ] Yes [ ] No*
    c. UV transmissibility checked [ ] Yes [ ] No*
    d. output of selected lamps checked [ ] Yes [ ] No*
    e. output of tested lamps
    f. total operating hours, oldest lamp/assembly **Elapsed Time: 37,700**
    g. number of spare lamps and ballasts available: lamps: ~100 sleeves: ~100 ballasts: ~10

12. UV protective eyeglasses provided: [**X**] Yes [ ] No*

13. General condition: [ ] Good [ ] Fair [**X**] Poor

Comments:

9, 10, & 13 **The intensity meters were not operational. Banks 1 and 2 had alarms flashing and showing a UV intensity reading of 0.0%. See Comments/Recommendations for Action. Operations staff said as soon as the unit is cleaned, the sensor works properly and then within a day or two the sensor becomes covered and no longer senses the intensity, however, adequate disinfection is still occurring based on the *E.coli* results.**

13. The UV system was in need of cleaning; algae, leaves, and other debris were caught between bulbs. (Photos 21 and 22)

- **Indicator lights for both Banks 1 and 2 showed that several bulbs were not functioning. (Photos 19 and 20)**

- **DEQ staff requested that the system be cleaned and documentation provided to DEQ by July 16, 2014. Mr. Hockaday provided a photo via e-mail of the cleaned UV system. Photo 23**

UNIT PROCESS: Post Aeration

1. Number of units: **1** In operation: **1**

2. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

3. Evidence of following problems:
   a. dead spots [ ] Yes* [**X**] No
   b. excessive foam [ ] Yes* [**X**] No
   c. poor aeration [ ] Yes* [**X**] No
   d. mechanical equipment failure [ ] Yes* [ ] No [**X**] NA

4. How is the aerator controlled? [ ] Time clock [ ] Manual [**X**] Continuous [ ] Other* [ ] NA

5. What is the current operating schedule? **Continuous**

6. Step weirs level: [ ] Yes [ ] No [**X**] NA

7. Effluent D.O. level: **Not noted**

8. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **Post aeration unit located after the UV Disinfection and prior to the effluent pump. Final effluent D.O. is analyzed after UV disinfection. (Photo 24)**

UNIT PROCESS: Flow Measurement

[ ] Influent [ ] Intermediate [**X**] Effluent

1. Type measuring device: **Endress Hauser promag 53W Electromagnetic meter on a 10" line**

2. Present reading: **22 GPM**

3. Bypass channel: [ ] Yes [**X**] No
   Metered: [ ] Yes [ ] No

4. Return flows discharged upstream from meter: [ ] Yes [**X**] No
   Identify:

5. Device operating properly: [**X**] Yes [ ] No*

6. Date of last calibration: **May 2014**

7. Evidence of following problems:

   a. obstructions [ ] Yes* [**X**] No
   b. grease [ ] Yes* [**X**] No

8. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

UNIT PROCESS: Effluent/Plant Outfall

1. Type Outfall [ ] Shore based [**X**] Submerged
2. Type if shore based: [ ] Wingwall [ ] Headwall [ ] Rip Rap [**X**] N/A
3. Flapper valve: [ ] Yes [ ] No [**X**] NA
4. Erosion of bank: [ ] Yes [ ] No [**X**] NA
5. Effluent plume visible? [ ] Yes* [ ] No
6. Condition of outfall and supporting structures: [ ] Good [**X**] Fair [ ] Poor*
7. Final effluent, evidence of following problems:
   a. oil sheen [ ] Yes* [ ] No
   b. grease [ ] Yes* [ ] No
   c. sludge bar [ ] Yes* [ ] No
   d. turbid effluent [ ] Yes* [ ] No
   e. visible foam [ ] Yes* [ ] No
   f. unusual color [ ] Yes* [ ] No

Comments:

- **Effluent pump tank had vegetation and other organic matter growing within the tank. DEQ requested the tank be cleaned. (Photos 25 – 26)**
- **Did not observe final effluent discharge pipe during this inspection. Discharge point is several miles away from the plant.**

UNIT PROCESS: Pressure Filtration (Sludge)

1. Number of units: **1** In operation: **0**
2. Percent solids in influent sludge: **1-4%**
3. Percent solids in discharge cake: **18%**
4. Filter run time: **3 days/week**
5. Amount cake produced: About 3-4 loads a week with an average of 13 tons per load.
6. Conditioning chemicals used: **Clarifloc Polymer**
   Dose: **Not calculated**
7. Sludge pumping: [**X**] Manual [ ] Automatic
8. Recirculating system included on acid wash: [ ] Yes [ ] No [**X**] NA
9. Signs of overloads: [ ] Yes* [ ] No
10. General condition: [ ] Good [ ] Fair [ ] Poor

Comments:

- **DEQ staff did not observe the belt press during this inspection.**
- **The de-watered sludge is hauled to the King George Landfill, which is operated by the Waste Management Corporation, for final disposal.**

UNIT PROCESS: Aerobic Digestion

1. Number of units: **4** In operation: **4**

2. Type of sludge treated [ ] Primary [**X**] WAS [ ] Other

3. Frequency of sludge application to digestors: **Daily**

4. Supernatant return rate: **Variable**

5. pH adjustment provided: [ ] Yes [**X**] No
   Utilized: [ ] Yes [ ] No [**X**] NA

6. Tank contents well-mixed and relatively free of odors: [**X**] Yes [ ] No*

7. If diffused aeration is used, do diffusers require frequent cleaning?
   [ ] Yes [**X**] No [ ] NA

8. Location of supernatant return: [ ] Head [ ] Primary [**X**] Other

9. Process control testing:

   a. reduction of volatile solids [**X**] Yes [ ] No
   b. pH [**X**] Yes [ ] No
   c. alkalinity [ ] Yes [**X**] No
   d. dissolved oxygen [ ] Yes [**X**] No

10. Foaming problem present: [ ] Yes* [**X**] No

11. Signs of short-circuiting or overloads: [ ] Yes* [**X**] No

12. General condition: [ ] Good [**X**] Fair [ ] Poor

Comments:

- **Two sludge holding tanks receive waste sludge from the Purkins and Oakland plants for further digestion and dewatering prior to disposal in the King George Landfill.**
- **Photo 28**

1) Plant upgrade construction adjacent to headworks.	2) Plant construction observed adjacent to headworks.
3) Headworks: Step screen, grinder, and grit chambers.	4) Automatic step screen with sensor.
5) EQ Basin	6) Wet well with floating solids.
Dahlgren District Wastewater Treatment Plant	**Permit VA0026514**
Photos and layout by Amy Dooley	**July 9, 2014**
	Page 1 of 5

7) Nitrification filters for plant upgrade.	8) Plastics floating in oxidation ditch.
9) Oxidation ditch.	10) DO analyzer on oxidation ditch.
11) Rags located adjacent to online clarifier.	12) Hole adjacent to offline clarifier.
Dahlgren District Wastewater Treatment Plant	**Permit VA002651**
Photos and layout by Amy Dooley	**July 9, 201**
	Page 2 of
13) Offline clarifier	14) Algae growth along the clarifier weirs and channel.
15) Empty used blue barrels located adjacent to sludge holding tanks.	16) Unorganized hoses located adjacent to the sludge holding tanks.
17) Sludge Holding Tank	18) Clogged aqua disk filters. Photo brightened.
Dahlgren District Wastewater Treatment Plant	**Permit VA002651**
Photos and layout by Amy Dooley	**July 9, 201**
	Page 3 of
19) Ultra Violet Disinfection Unit Bank 1 with indicator lights out on numerous modules.	20) Ultra Violet Disinfection Unit Bank 2 with indicator lights out on numerous modules.
21) Algae growth between UV unit banks.	22) Debris within UV bank channels after bank 2.
23) UV Unit Clean **Photo taken by KGCSA – July 15, 2014**	24) Post Aeration.
Dahlgren District Wastewater Treatment Plant	**Permit VA002651**
Photos and layout by Amy Dooley	**July 9, 2014**
	Page 4 of
25) Effluent pump tank with vegetation and other floating debris.	26) Solids and vegetation accumulation in effluent pump tank.
27) Final effluent flow meter.	28) Aerobic Digester.
29) Pink growth in the collection tube.	30) Final effluent automatic sampler fridge and dirty container. Thermometer reading was 8°C in the fridge.
Dahlgren District Wastewater Treatment Plant	**Permit VA0026514**
Photos and layout by Amy Dooley	**July 9, 2014**
	Page 5 of 5

LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME: Dahlgren Wastewater Treatment Plant	FACILITY NO: VA0026514	INSPECTION DATE: July 9, 2014
(X) Deficiencies	( ) No Deficiencies	

LABORATORY RECORDS

The Laboratory Records section had **No Deficiencies** noted during the inspection.

GENERAL SAMPLING AND ANALYSIS

The General Sampling and Analysis section had **Deficiencies** noted during the inspection.

1. **The sample container for the final effluent automatic sampler and hose were dirty. Mr. Hockaday informed Ms. Johnson via e-mail that he replaced the sample container and tubing, dated July 18, 2014. No further action is required.**

~~**2. The samples were not collected based on flow proportion. See Comments and Recommendations for Action.**~~

LABORATORY EQUIPMENT

The Laboratory Equipment section had **No Deficiencies** noted during the inspection.

INDIVIDUAL PARAMETERS

pH

The analysis for the parameter of pH had **Deficiencies** noted during the inspection.

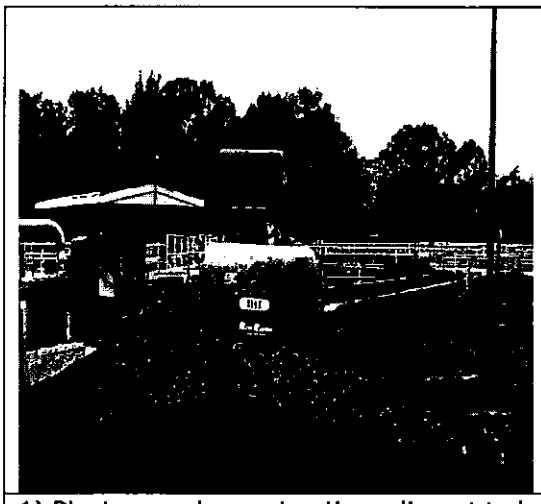
1. The initial demonstration of capabilities documentation was not available upon request.
   See Comments/Recommendations for Action

2. The Annual NIST certification documentation for the pH meter was not available.
   See Comments/Recommendations for Action

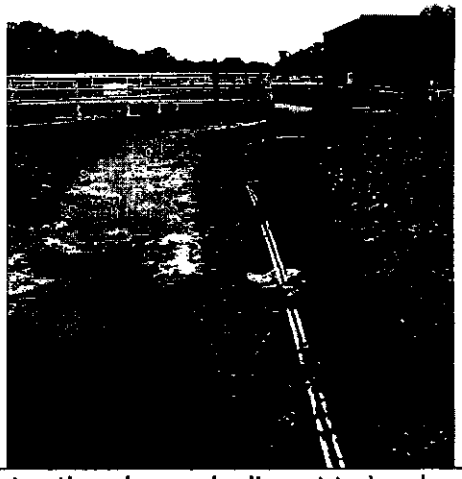
DO

The analysis for the parameter of Dissolved Oxygen (DO) had **Deficiencies** noted during the inspection.

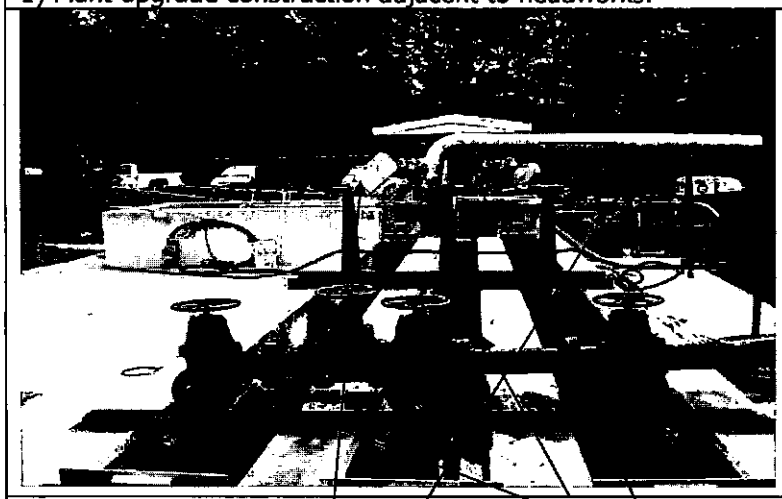
1. The Annual NIST certification documentation for the pH meter was not available.
   See Comments/Recommendations for Action



1) Plant upgrade construction adjacent to headworks.



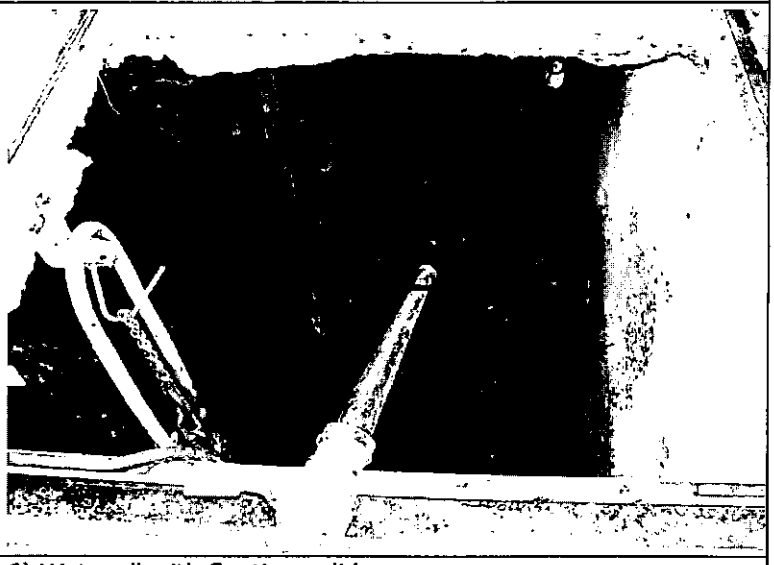
2) Plant construction observed adjacent to headworks.



3) Headworks: Step screen, grinder, and grit chambers.

4) Automatic step screen with sensor.

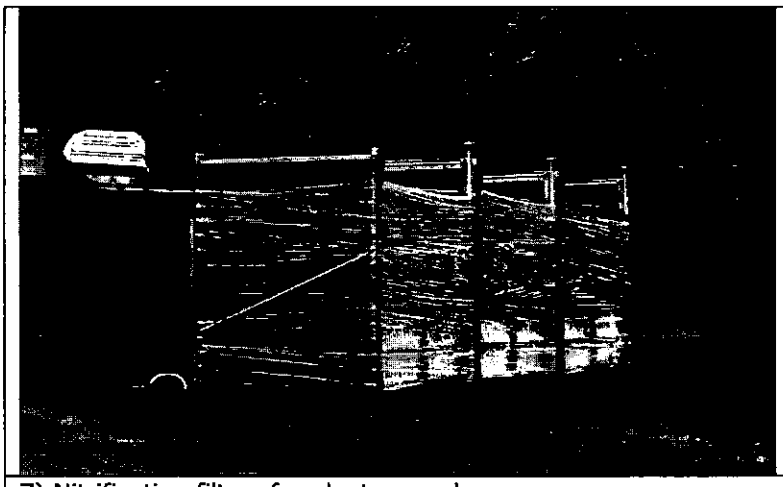
5) EQ Basin



6) Wet well with floating solids.

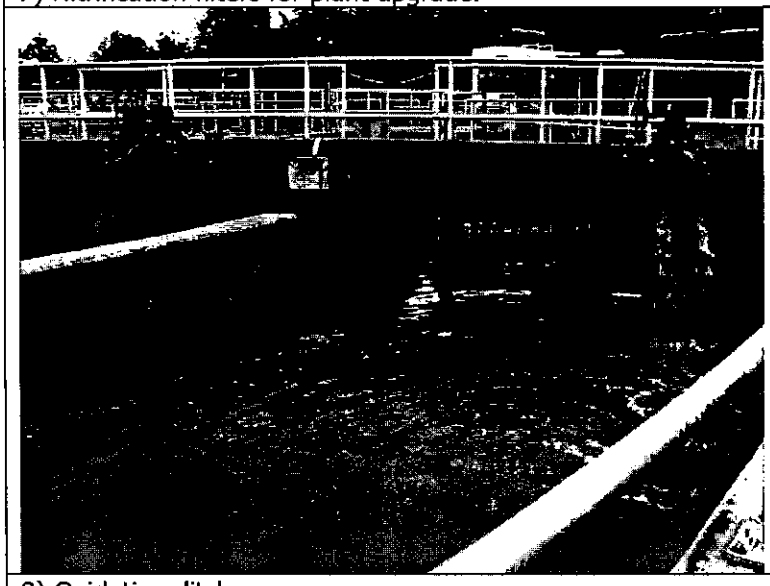
Dahlgren District Wastewater Treatment Plant | **Permit VA0026514**

Photos and layout by Amy Dooley | **July 9, 2014**

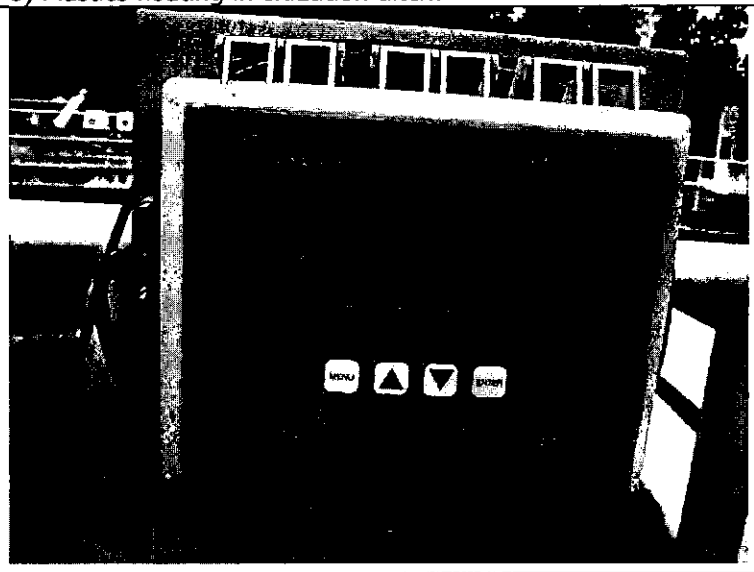


7) Nitrification filters for plant upgrade.

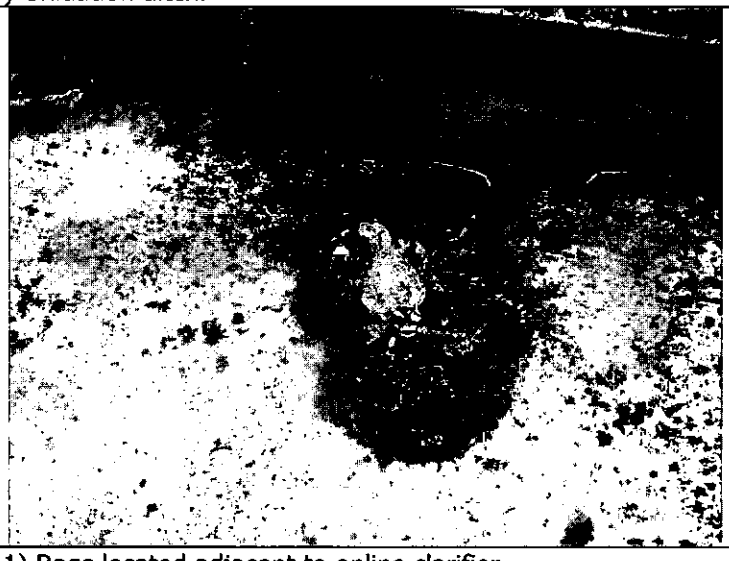
8) Plastics floating in oxidation ditch.



9) Oxidation ditch.

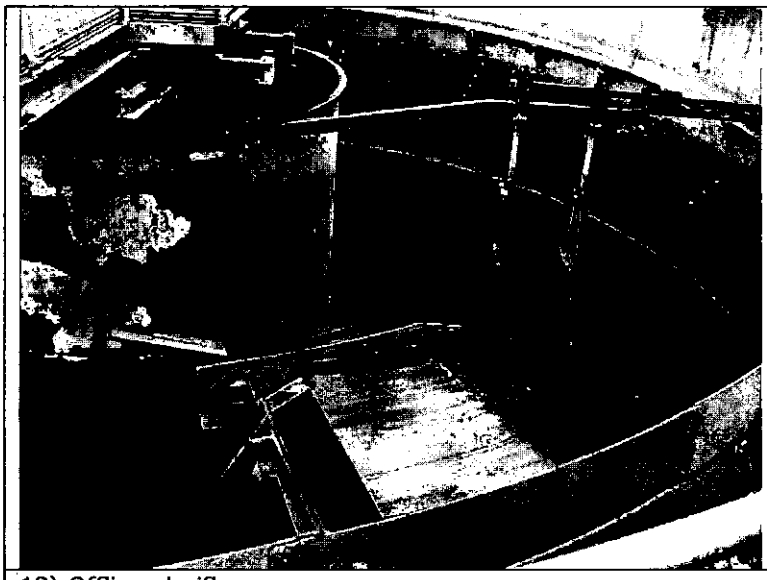


10) DO analyzer on oxidation ditch.

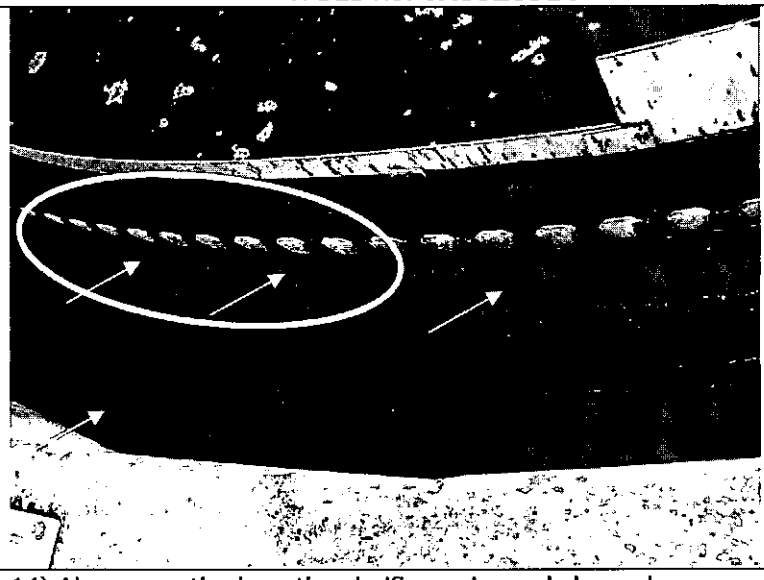


11) Rags located adjacent to online clarifier.

12) Hole adjacent to offline clarifier.

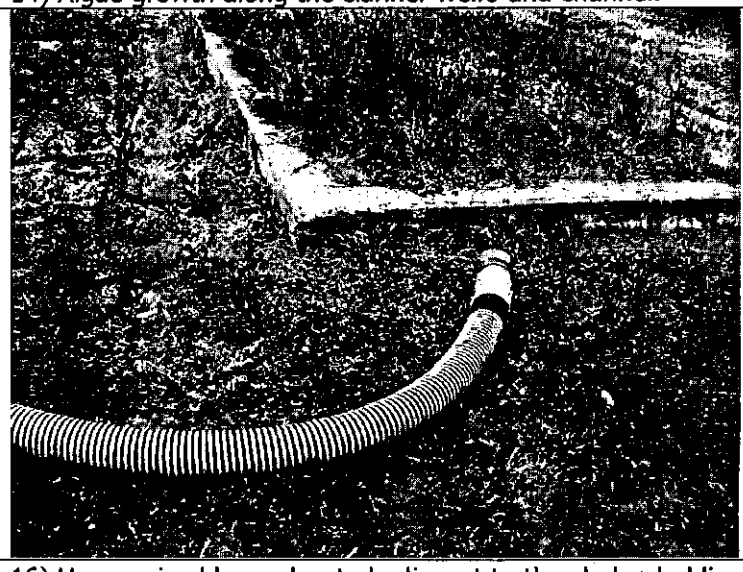


13) Offline clarifier

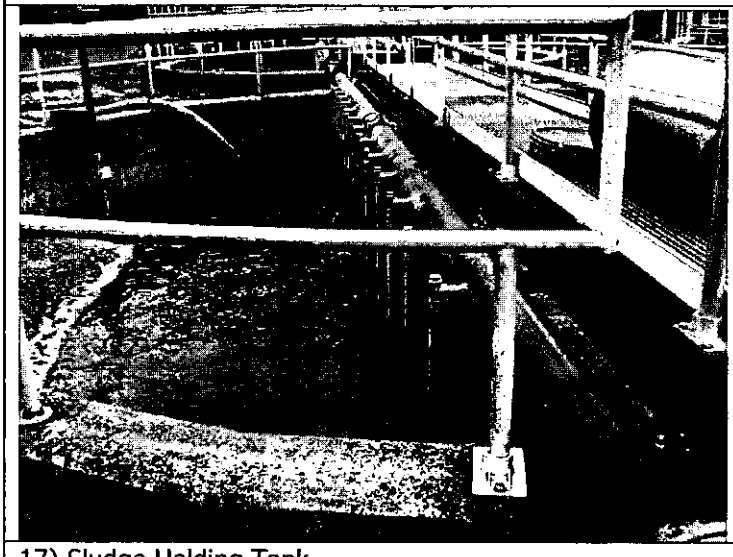


14) Algae growth along the clarifier weirs and channel.

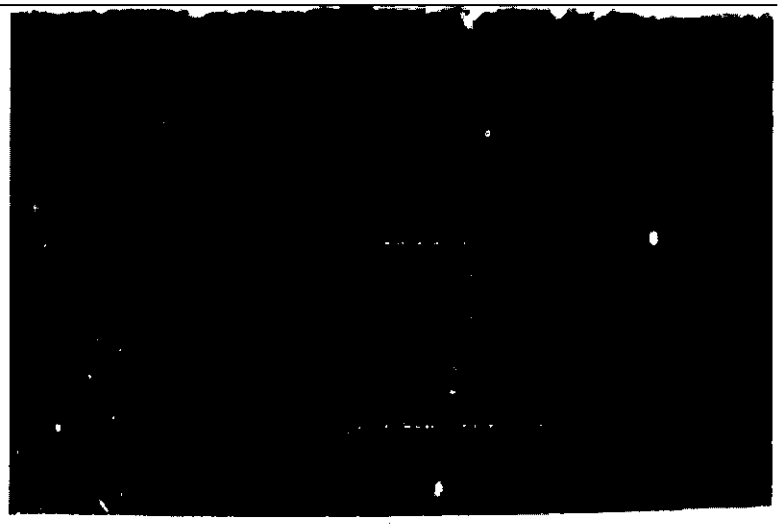
15) Empty used blue barrels located adjacent to sludge holding tanks.



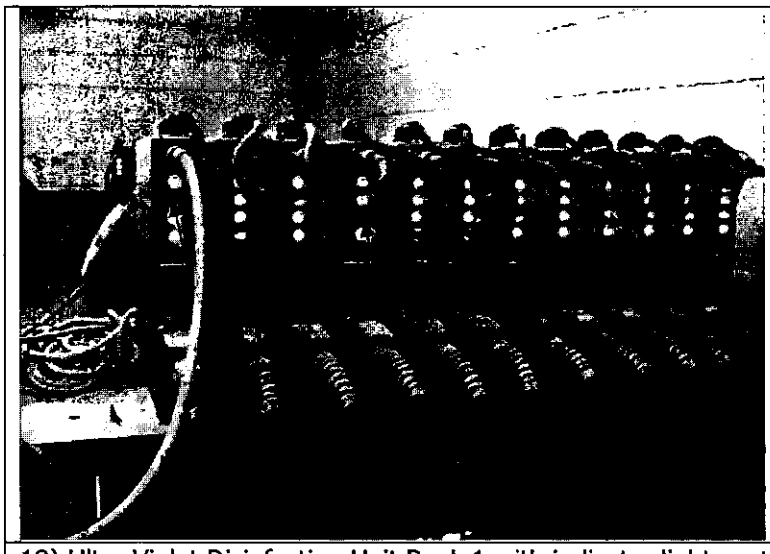
16) Unorganized hoses located adjacent to the sludge holding tanks.



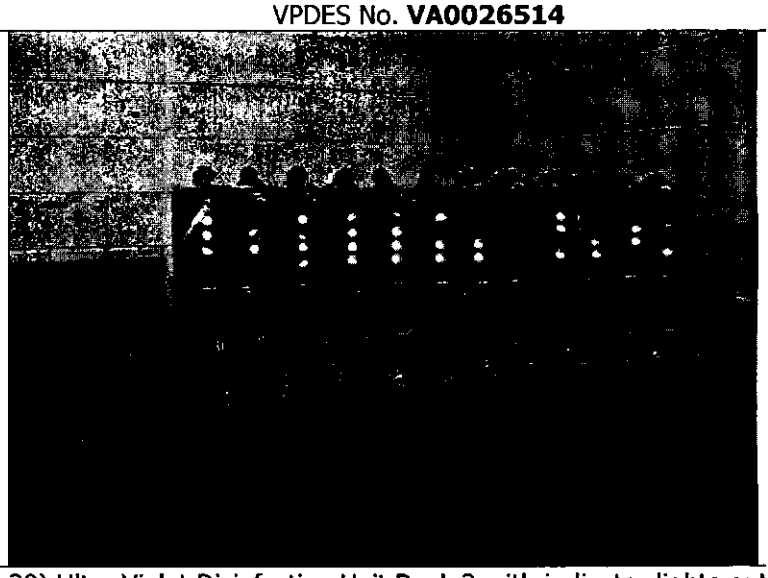
17) Sludge Holding Tank



18) Clogged aqua disk filters. Photo brightened.

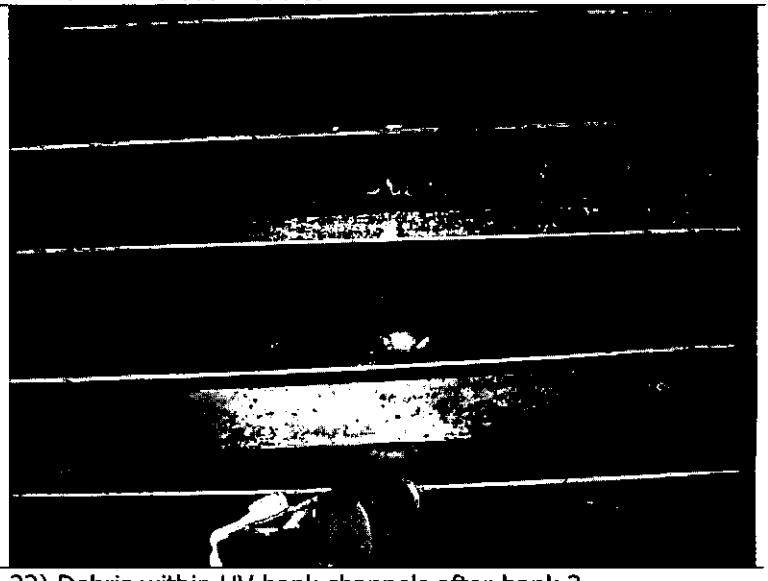


19) Ultra Violet Disinfection Unit Bank 1 with indicator lights out on numerous modules.

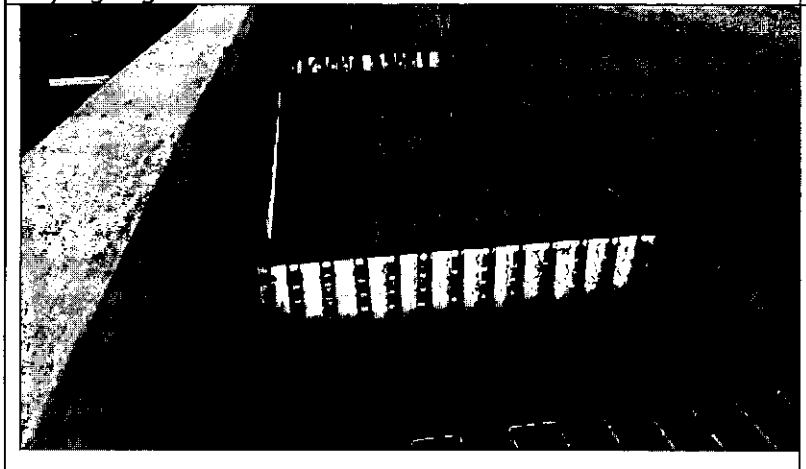


20) Ultra Violet Disinfection Unit Bank 2 with indicator lights out on numerous modules.

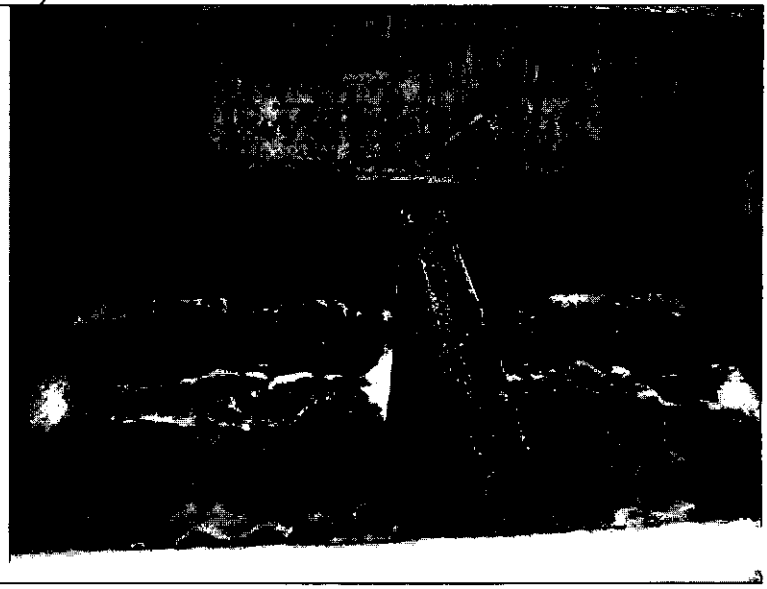
21) Algae growth between UV unit banks.



22) Debris within UV bank channels after bank 2.

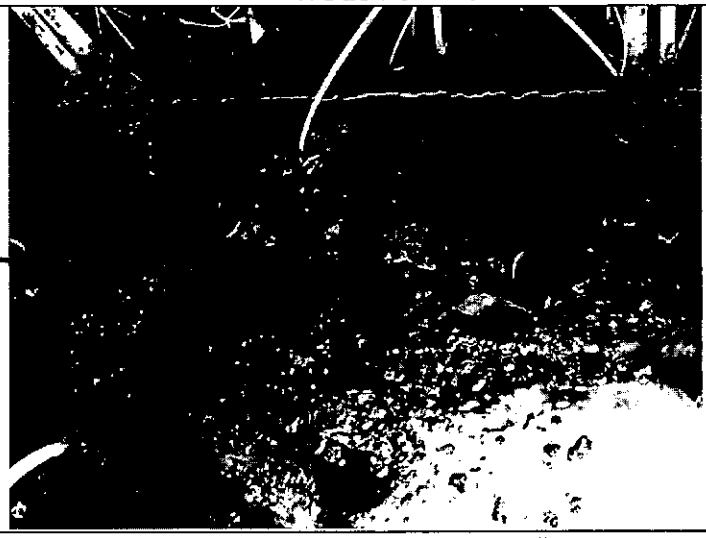


23) UV Unit Clean **Photo taken by KGCSA – July 15, 2014**

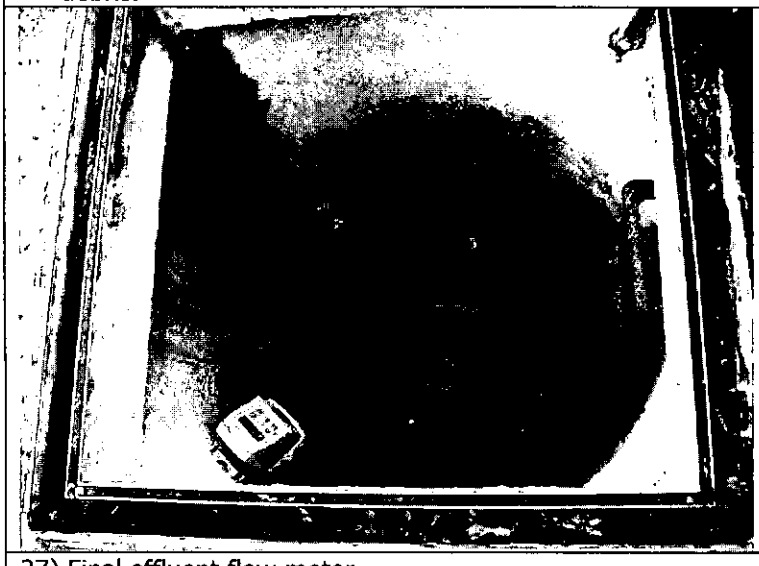


24) Post Aeration.

25) Effluent pump tank with vegetation and other floating debris.

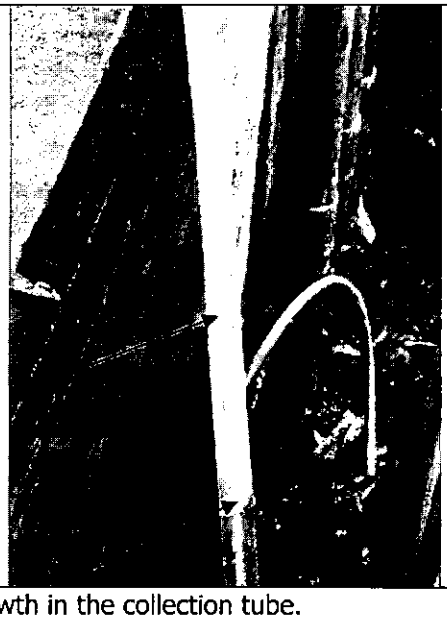


26) Solids and vegetation accumulation in effluent pump tank.

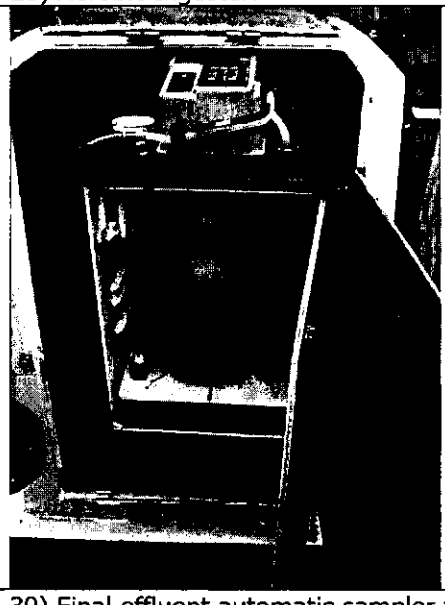


27) Final effluent flow meter.

28) Aerobic Digester.



29) Pink growth in the collection tube.



30) Final effluent automatic sampler fridge and dirty container. Thermometer reading was 8°C in the fridge.

LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME: Dahlgren Wastewater Treatment Plant	FACILITY NO: VA0026514	INSPECTION DATE: July 9, 2014
(X) Deficiencies	( ) No Deficiencies	

LABORATORY RECORDS

The Laboratory Records section had **No Deficiencies** noted during the inspection.

GENERAL SAMPLING AND ANALYSIS

The General Sampling and Analysis section had **Deficiencies** noted during the inspection.

1. **The sample container for the final effluent automatic sampler and hose were dirty. Mr. Hockaday informed Ms. Johnson via e-mail that he replaced the sample container and tubing, dated July 18, 2014. No further action is required.**

2. **The samples were not collected based on flow proportion. See Comments and Recommendations for Action.**

LABORATORY EQUIPMENT

The Laboratory Equipment section had **No Deficiencies** noted during the inspection.

INDIVIDUAL PARAMETERS

pH

The analysis for the parameter of pH had **Deficiencies** noted during the inspection.

1. The initial demonstration of capabilities documentation was not available upon request.
   See Comments/Recommendations for Action

2. The Annual NIST certification documentation for the pH meter was not available.
   See Comments/Recommendations for Action

DO

The analysis for the parameter of Dissolved Oxygen (DO) had **Deficiencies** noted during the inspection.

1. The Annual NIST certification documentation for the pH meter was not available.
   See Comments/Recommendations for Action

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
LABORATORY INSPECTION REPORT
10/01

FACILITY NO:	INSPECTION DATE:	PREVIOUS INSPECTION:	PREVIOUS EVALUATION:	TIME SPENT:
VA0026514	07/09/14	12/20/11	Deficiencies	1 hour

NAME/ADDRESS OF FACILITY:	FACILITY CLASS:	FACILITY TYPE:	UNANNOUNCED INSPECTION?
Dahlgren District Wastewater Treatment Plant 16383 Dahlgren Road King George, Virginia 22485	(X) MAJOR ( ) MINOR ( ) SMALL ( ) VPA/NDC	(X) MUNICIPAL ( ) INDUSTRIAL ( ) FEDERAL ( ) COMMERCIAL LAB	(X) YES ( ) NO **FY-SCHEDULED INSPECTION?** (X) YES ( ) NO

INSPECTOR(S):	REVIEWERS:	PRESENT AT INSPECTION:
Rebecca Johnson	Earl L. Stal	Amy Dooley - DEQ Jeff Hockaday - Chief Operator

LABORATORY EVALUATION	DEFICIENCIES? Yes	DEFICIENCIES? No
LABORATORY RECORDS		X
GENERAL SAMPLING & ANALYSIS	X	
LABORATORY EQUIPMENT		X
DISSOLVED OXYGEN ANALYSIS PROCEDURES	X	
pH ANALYSIS PROCEDURES	X	

QUALITY ASSURANCE/QUALITY CONTROL

Y/N	QUALITY ASSURANCE METHOD	PARAMETERS	FREQUENCY
N	REPLICATE SAMPLES		
N	SPIKED SAMPLES		
Y	STANDARD SAMPLES	pH	Daily with Use
N	SPLIT SAMPLES		
N	SAMPLE BLANKS		
N	OTHER		

FACILITY #: **VA0026514**

LABORATORY RECORDS SECTION

LABORATORY RECORDS INCLUDE THE FOLLOWING:

X	SAMPLING DATE	X	ANALYSIS DATE	X	CONT MONITORING CHART
X	SAMPLING TIME	X	ANALYSIS TIME	X	INSTRUMENT CALIBRATION
X	SAMPLE LOCATION	X	TEST METHOD	X	INSTRUMENT MAINTENANCE
				X	CERTIFICATE OF ANALYSIS

WRITTEN INSTRUCTIONS INCLUDE THE FOLLOWING:

X	SAMPLING SCHEDULES	X	CALCULATIONS	X	ANALYSIS PROCEDURES

	YES	NO	N/A
DO ALL ANALYSTS INITIAL THEIR WORK?	X		
DO BENCH SHEETS INCLUDE ALL INFORMATION NECESSARY TO DETERMINE RESULTS?	X		
IS THE DMR COMPLETE AND CORRECT? MONTH(S) REVIEWED: **March 2014, September 2013, and August 2012**	X		
ARE ALL MONITORING VALUES REQUIRED BY THE PERMIT REPORTED?	X		

GENERAL SAMPLING AND ANALYSIS SECTION

	YES	NO	N/A
ARE SAMPLE LOCATION(S) ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE SAMPLE COLLECTION PROCEDURES APPROPRIATE?~~**See Comments/Recommendations for Action**~~	X	~~X~~	
IS SAMPLE EQUIPMENT CONDITION ADEQUATE? **See Comments/Recommendations for Action**		X	
IS FLOW MEASUREMENT ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE COMPOSITE SAMPLES REPRESENTATIVE OF FLOW? ~~**See Comments/Recommendations for Action**~~	X	~~X~~	
ARE SAMPLE HOLDING TIMES AND PRESERVATION ADEQUATE? **See Comments/Recommendations for Action**		X	
IF ANALYSIS IS PERFORMED AT ANOTHER LOCATION, ARE SHIPPING PROCEDURES ADEQUATE? LIST PARAMETERS AND NAME & ADDRESS OF LAB: **Enviro Compliance:** **CBOD, Alkalinity, Total Nitrogen, Phosphorus, TSS, 10357 Enterococci and E.Coli** **Old Keeton Road** **Ashland, VA 23005** **VELAP ID #: 460032** **Certificate #: 2984**	X		

LABORATORY EQUIPMENT SECTION

	YES	NO	N/A
IS LABORATORY EQUIPMENT IN PROPER OPERATING RANGE?	X		
ARE ANNUAL THERMOMETER CALIBRATION(S) ADEQUATE? **See Comments/Recommendations for Action**			

ANALYST:	**Daniel Powell**	VPDES NO	**VA0026514**

Parameter: Hydrogen Ion (pH)
Method: Electrometric
01/08

Meter: **Oakton pH 700**

METHOD OF ANALYSIS

X	18th Edition of Standard Methods-4500-H-B
	21st or On-Line Edition of Standard Methods-4500-H-B (00)

	pH is a method defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing the analysis? **NOTE:** Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be ± 0.1 SU of the known concentration of the sample. [SM 1020 B.1]	**See Comments and Recommendations for Action**	
2)	Is the electrode in good condition (no chloride precipitate, etc.)? [2.b/c and 5.b]	**X**	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	**X**	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] NOTE: Follow manufacturer's instructions.	**X**	
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should by within ± 0.1 SU. [4.a]	**X**	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	**X**	
7)	Are buffer solutions within their listed shelf life or have they been prepared within the last 4 weeks? [3.a]	**X**	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	**X**	
9)	For meters with ATC that also have temperature display, was the thermometer calibrated annually? [SM2550 B.1]		**X**
10)	Is the temperature of buffer solutions and samples recorded when determining pH? [4.a]	**X**	
11)	Is sample analyzed within 15 minutes of collection? [40 CFR 136.6]	**X**	
12)	Was the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinse solution)? [4.a]	**X**	
13)	Is the sample stirred gently at a constant speed during measurement? [4.b]	**X**	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]	**X**	
15)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition [1020 B.6] or daily for 20th or 21st Edition [Part 1020] Note: Not required for *in situ* samples.	**NA**	
16)	Is pH of duplicate samples within 0.1 SU of the original sample? [Part 1020]	**NA**	
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]	**NA**	

COMMENTS:	
PROBLEMS:	**1. IDC's for Dee and Greta, Operations Staff not available upon request.** **9. The annual NIST certification was not available upon request for the pH meter.**

ANALYST:	**Daniel Powell**	VPDES NO.	**VA0026514**

Parameter: Dissolved Oxygen
Method: Electrode
Facility Elevation – 100.0 ft
01/08

Meter: **YSI 550A Field Meter**

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods-4500-O G
	21st or Online Editions of Standard Methods-4500-O G (01)

	DO is a method defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [B.3]	**X**	
2)	Are meter and electrode operable and providing consistent readings? [3]	**X**	
3)	Is membrane in good condition without trapped air bubbles? [3.b]	**X**	
4)	Is correct filling solution used in electrode? [Mfr.]	**X**	
5)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	**X**	
6)	Is meter calibrated before use or at least daily? [Mfr.]	**X**	
7)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
8)	Is sample stirred during analysis? [Mfr.]	**In Situ**	
9)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
10)	Is meter stabilized before reading D.O.? [Mfr.]	**X**	
11)	Is electrode stored according to manufacturer's instructions? [Mfr.]	**X**	
12)	~~Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition [1020 B.6] or daily if citing 20th or 21st Edition [Part 1020] Note: Not required for *in situ* samples.~~	**N/A**	
13)	~~If a duplicate sample is analyzed, is the reported value for that sampling event, the average concentration of the sample and the duplicate? [DEQ]~~	**N/A**	
14)	~~If a duplicate sample is analyzed, is the relative percent difference (RPD) < 20? [18th ed. Table 1020 I; 21st ed. DEQ]~~	**N/A**	

COMMENTS:	
PROBLEMS:	**The annual NIST certification was not available upon request for the D.O. meter.**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER CALIBRATION CHECK SHEET
06/05

FACILITY NAME:	**Dahlgren District Wastewater Treatment Plant**	VPDES NO:	**VA0026514**	DATE:	**July 9, 2014**

EQUIPMENT	RANGE	IN RANGE		INSPECTION READING °C		CHECK & LOG DAILY		CORRECT INCREMENT		ANNUAL THERMOMETER CALIBRATION				
										Is the NIST/NIST Traceable Reference Thermometer within Manufacturer's expiration date or recertified yearly?				Yes ( ) No (**X**)
										Date Checked	Marked		Correct. Factor	Inspection Temp., °C
		Y	**N**	**DEQ**	**Site**	**Y**	**N**	**Y**	**N**		**Y**	**N**		
SAMPLE REFRIGER.	1-6° C	**See Comments/Recommendations for Action**												
AUTO SAMPLER	1-4° C	**See Comments/Recommendations for Action**												
pH METER	± 1° C									**See Comments/Recommendations for Actions**				
DO METER	± 1° C													

COMMENTS:	
PROBLEMS:	**Auto sampler fridge thermometer was reading 8°C and the sampling fridge thermometer had an expired NIST sticker (May 2014).**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET
Revised 07/05 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**Dahlgren District Wastewater Treatment Plant**	VPDES NO	**VA0026514**	DATE:	**July 9, 2014**

HOLDING TIMES						SAMPLE CONTAINER				PRESERVATION				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
BOD5 & CBOD5	48 HOURS	X		X		X		X		ANALYZE 2 HRS or ≤ 6° C	X		X	
TSS	7 DAYS	X		X		X		X		≤ 6° C	X		X	
FECAL COLIFORM/E. Coli/ Enterococci	6 HRS & 2 HRS TO PROCESS	X		X		X		X		<10° C (1 HOUR) +0.008% $Na_2S_2O_3$	X		X	
pH	15 MIN.	X		X		X		X		N/A				
CHLORINE	15 MIN.									N/A				
DISSOLVED O_2	15 MIN./IN SITU	X		X		X		X		N/A				
TEMPERATURE	IMMERSION STAB.									N/A				
TKN	28 DAYS	X		X		X		X		≤ 6° C +H_2SO_4 pH<2 DECHLOR	X		X	
NITRATE	48 HOURS	X		X		X		X		≤ 6° C	X		X	
NITRATE+NITRITE	28 DAYS									≤ 6° C +H_2SO_4 pH<2				
NITRITE	48 HOURS	X		X		X		X		≤ 6° C	X		X	
TOTAL PHOS.	28 DAYS	X		X		X		X		≤ 6° C +H_2SO_4 pH<2	X		X	
METALS	6 MONTHS									HNO_3 pH<2				

COMMENTS:	**All analysis except pH and DO are sent to Enviro Compliance.**
PROBLEMS:	

To: Joan C. Crowther
From: Jennifer Carlson

Date: August 16, 2013
Subject: Planning Statement for Dahlgren WWTP
Permit Number: VA0026514

Information for Outfall 001:

Discharge Type: Municipal
Discharge Flow: 1.0 MGD, with this reissuance the permittee is requesting to add another tier 0.97 MGD
Receiving Stream: Williams Creek
Latitude / Longitude: 38° 19' 24"/77° 03' 11"
Rivermile: 0.05
Streamcode: 1aWLL
Waterbody: VAN-A30E
Water Quality Standards: Section 2, Stream Class II, Special Standards a
Drainage Area: 4.5 sq.mi.

1. Please provide water quality monitoring information for the receiving stream segment. If there is not monitoring information for the receiving stream segment, please provide information on the nearest downstream monitoring station, including how far downstream the monitoring station is from the outfall.

   Outfall 001 discharges to a tidal segment of Williams Creek. There are no DEQ monitoring stations located within this segment, however there are two DEQ stations located upstream of the outfall on Williams Creek. Station 1aWLL000.94 is a special study station with limited data, located approximately 0.8 miles upstream of Outfall 001 in the tidal area. Station 1aWLL001.30 is an ambient monitoring station, located at the Route 206 bridge crossing, approximately 1.2 miles upstream of the outfall.

   DEQ does not have any ambient monitoring stations located downstream of Outfall 001 in the Upper Machodoc Creek embayment. There is a DEQ fish tissue and sediment station, 1aUMC001.36, and 2 coastal probabilistic monitoring stations, 1aUMC000.96 and 1aUMC001.00, located in the Upper Machodoc Creek embayment. The Virginia Institute of Marine Science has a monitoring station, 1aUMC-001.78- VIMS, in the western portion of the Upper Machodoc Creek embayment.

   The tidal segment that receives the discharge from Outfall 001 has been designated by the Virginia Department of Health, Division of Shellfish Sanitation as an administratively prohibited area for shellfishing. The shellfishing use was removed from the segment in the 2010 Integrated Report.

   The following is the water quality summary for this administratively prohibited segment of Williams Creek, as taken from the Draft 2012 Integrated Report*:

Class II, Section 2, special stds. a.

Assessment of the submerged aquatic vegetation (SAV) acreage indicates that the shallow-water submerged aquatic vegetation subuse is not met, therefore the aquatic life use is considered not supporting. This impairment is addressed by the completed TMDL for the Chesapeake Bay watershed. The open water aquatic life subuse is considered insufficient, as the thirty day mean is acceptable, but the seven day mean and instantaneous levels have not been assessed. Additionally, the deep-water subuse is considered insufficient, as the thirty day mean is acceptable, but the one day mean and instantaneous dissolved oxygen levels have not been assessed.

The wildlife, fish consumption and recreation uses were not assessed.

**Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently awaiting final approval.*

2. Does this facility discharge to a stream segment on the 303(d) list? If yes, please fill out Table A.

Yes.

Table A. 303(d) Impairment and TMDL information for the receiving stream segment

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the Draft 2012 Integrated Report*						
Williams Creek	Aquatic Life	Aquatic Plants (Submerged aquatic vegetation below goal)	Chesapeake Bay TMDL 12/29/2010	9,137 lbs/yr TN	Edge of Stream (EOS) Loads	N/A
	Shallow-Water Submerged Aquatic Vegetation			914 lbs/yr TP 91,366.8 lbs/yr TSS		

**Virginia's Draft 2012 Integrated Report (IR) has been through the public comment period and reviewed by EPA. The 2012 IR is currently awaiting final approval.*

3. Are there any downstream 303(d) listed impairments that are relevant to this discharge? If yes, please fill out Table B.

Yes.

Table B. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the Draft 2012 Integrated Report*							
Upper Machodoc Creek	Fish Consumption	PCBs	0.11 miles	Tidal Potomac PCB 10/31/2007	0.88 grams/year PCB	0.064 ng/L --- 1.0 MGD	N/A

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

   The tidal Potomac River is listed with a PCB impairment and a TMDL has been developed to address this impairment. This facility has been included in the Tidal Potomac River PCB TMDL and has received a WLA. This facility conducted PCB monitoring during the last permit cycle in support of the PCB TMDL. The PCB monitoring data will be evaluated, and source reductions through pollution minimization plans may be needed.

5. Fact Sheet Requirements – Please provide information regarding any drinking water intakes located within a 5 mile radius of the discharge point.

   There are no public water supply intakes located within 5 miles of this discharge.

SALTWATER AND TRANSITION ZONES
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Dahlgren Wastewater Treatment Plant Permit No.: VA0026514 Version: OWP Guidance Memo 00-2011 (8/24/00)
Receiving Stream: Williams Creek

Attachment 5

Stream Information

Mean Hardness (as CaCO3) =	204	mg/l
90th % Temperature (Annual) =	29	(° C)
90th % Temperature (Winter) =	18.4	(° C)
90th % Maximum pH =	7.6	
10th % Maximum pH =	6.5	
Tier Designation (1 or 2) =	1	
Early Life Stages Present Y/N =	Y	
Tidal Zone =	1	(1 = saltwater, 2 = transition zone)
Mean Salinity =	6.48	(g/kg)

Mixing Information

Design Flow (MGD)	1
Acute WLA multiplier	20
Chronic WLA multiplier	20
Human health WLA multiplier	

Effluent Information

Mean Hardness (as CaCO3) =	40	mg/L
90 % Temperature (Annual) =	26	(° C)
90 % Temperature (Winter) =		(° C)
90 % Maximum pH =	8.3	SU
10 % Maximum pH =		SU
Discharge Flow =	1	MGD

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Acenapthene	0	--	--	9.9E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Acrolein		--	--	9.3E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Acrylonitrile[C]		--	--	2.5E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Aldrin [C]	0	1.3E+00	--	5.0E-04	2.6E+01	--	0.0E+00	--	--	--	--	--	--	**2.6E+01**	--	**0.0E+00**
Ammonia-N (mg/l) - Annual	0	6.53E+00	9.80E-01	--	1.31E+02	1.96E+01	--	--	--	--	--	--	--	**1.31E+02**	**1.96E+01**	--
Ammonia-N (mg/l) - Winter	0	1.50E+01	2.25E+00	--	3.00E+02	4.50E+01	--	--	--	--	--	--	--	**3.00E+02**	**4.50E+01**	--
Anthracene	0	--	--	4.0E+04	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Antimony	0	--	--	6.4E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Arsenic	0	6.9E+01	3.6E+01	--	1.4E+03	7.2E+02	--	--	--	--	--	--	--	**1.4E+03**	**7.2E+02**	--
Benzene [C]	0	--	--	5.1E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Benzidine[C]		--	--	2.0E-03	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Benzo (a) anthracene [C]	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Benzo (b) fluoranthene [C]	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Benzo (k) fluoranthene [C]	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Benzo (a) pyrene [C]	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Bis2-Chloroethyl Ether[C]	0	--	--	5.3E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Bis2-Chloroisopropyl Ether	0	--	--	6.5E+04	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Bis2-Ethylhexyl Phthalate[C]	0	--	--	2.2E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Bromoform [C]	0	--	--	1.4E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Butylbenzylphthalate	0	--	--	1.9E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Cadmium	0	4.0E+01	8.8E+00	--	8.0E+02	1.8E+02	--	--	--	--	--	--	--	**8.0E+02**	**1.8E+02**	--
Carbon Tetrachloride [C]	0	--	--	1.6E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Chlordane [C]	0	9.0E-02	4.0E-03	8.1E-03	1.8E+00	8.0E-02	0.0E+00	--	--	--	--	--	--	**1.8E+00**	**8.0E-02**	**0.0E+00**

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
TRC	0			--			--	--	--	--	--	--	--	--	--	--
Chlorine Prod. Oxidant	0	1.3E+01	7.5E+00	--	2.6E+02	1.5E+02	--	--	--	--	--	--	--	2.6E+02	1.5E+02	--
Chlorobenzene		--	--	1.6E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Chlorodibromomethane[C]	0	--	--	1.3E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Chloroform	0	--	--	1.1E+04	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2-Chloronaphthalene	0	--	--	1.6E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2-Chlorophenol	0	--	--	1.5E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Chlorpyrifos	0	1.1E-02	5.6E-03	--	2.2E-01	1.1E-01	--	--	--	--	--	--	--	2.2E-01	1.1E-01	--
Chromium III	0			--			--	--	--	--	--	--	--	--	--	--
Chromium VI	0	1.1E+03	5.0E+01	--	2.2E+04	1.0E+03	--	--	--	--	--	--	--	2.2E+04	1.0E+03	--
Chrysene [C]	0	--	--	1.8E-02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Copper	0	9.3E+00	6.0E+00	--	1.9E+02	1.2E+02	--	--	--	--	--	--	--	1.9E+02	1.2E+02	--
Cyanide, Free	0	1.0E+00	1.0E+00	1.6E+04	2.0E+01	2.0E+01	0.0E+00	--	--	--	--	--	--	2.0E+01	2.0E+01	0.0E+00
DDD [C]	0	--	--	3.1E-03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
DDE [C]	0	--	--	2.2E-03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
DDT [C]	0	1.3E-01	1.0E-03	2.2E-03	2.6E+00	2.0E-02	0.0E+00	--	--	--	--	--	--	2.6E+00	2.0E-02	0.0E+00
Demeton	0	--	1.0E-01	--	--	2.0E+00	--	--	--	--	--	--	--	--	2.0E+00	--
Diazinon	0	8.2E-01	8.2E-01	--	1.6E+01	1.6E+01	--	--	--	--	--	--	--	1.6E+01	1.6E+01	--
Dibenz(a,h)anthracene [C]	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,2-Dichlorobenzene	0	--	--	1.3E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,3-Dichlorobenzene	0	--	--	9.6E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,4-Dichlorobenzene	0	--	--	1.9E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
3,3-Dichlorobenzidine[C]	0	--	--	2.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Dichlorobromomethane [C]	0	--	--	1.7E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,2-Dichloroethane [C]	0	--	--	3.7E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,1-Dichloroethylene	0	--	--	7.1E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,2-trans-dichloroethylene	0	--	--	1.0E+04	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2,4-Dichlorophenol	0	--	--	2.9E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,2-Dichloropropane[C]	0	--	--	1.5E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,3-Dichloropropene[C]	0	--	--	2.1E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Dieldrin [C]	0	7.1E-01	1.9E-03	5.4E-04	1.4E+01	3.8E-02	0.0E+00	--	--	--	--	--	--	1.4E+01	3.8E-02	0.0E+00
Diethyl Phthalate	0	--	--	4.4E+04	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2,4-Dimethylphenol	0	--	--	8.5E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Dimethyl Phthalate	0	--	--	1.1E+06	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Di-n-Butyl Phthalate	0	--	--	4.5E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2,4 Dinitrophenol	0	--	--	5.3E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2-Methyl-4,6-Dinitrophenol	0	--	--	2.8E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
2,4-Dinitrotoluene [C]	0	--	--	3.4E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.1E-08	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
1,2-Diphenylhydrazine[C]	0	--	--	2.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Alpha-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	6.8E-01	1.7E-01	0.0E+00	--	--	--	--	--	--	6.8E-01	1.7E-01	0.0E+00

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Beta-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	6.8E-01	1.7E-01	0.0E+00	--	--	--	--	--	--	6.8E-01	1.7E-01	0.0E+00
Alpha + Beta Endosulfan	0	3.4E-02	8.7E-03	--	6.8E-01	1.7E-01	--	--	--	--	--	--	--	6.8E-01	1.7E-01	--
Endosulfan Sulfate	0	--	--	8.9E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Endrin	0	3.7E-02	2.3E-03	6.0E-02	7.4E-01	4.6E-02	0.0E+00	--	--	--	--	--	--	7.4E-01	4.6E-02	0.0E+00
Endrin Aldehyde	0	--	--	3.0E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Ethylbenzene	0	--	--	2.1E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Fluoranthene	0	--	--	1.4E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Fluorene	0	--	--	5.3E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Guthion	0	--	1.0E-02	--	--	2.0E-01	--	--	--	--	--	--	--	--	2.0E-01	--
Heptachlor [C]	0	5.3E-02	3.6E-03	7.9E-04	1.1E+00	7.2E-02	0.0E+00	--	--	--	--	--	--	1.1E+00	7.2E-02	0.0E+00
Heptachlor Epoxide[C]	0	5.3E-02	3.6E-03	3.9E-04	1.1E+00	7.2E-02	0.0E+00	--	--	--	--	--	--	1.1E+00	7.2E-02	0.0E+00
Hexachlorobenzene[C]	0	--	--	2.9E-03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hexachlorobutadiene[C]	0	--	--	1.8E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	4.9E-02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	1.7E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	1.6E-01	--	1.8E+00	3.2E+00	--	0.0E+00	--	--	--	--	--	--	3.2E+00	--	0.0E+00
Hexachlorocyclopentadiene	0	--	--	1.1E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hexachloroethane[C]	0	--	--	3.3E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Hydrogen Sulfide	0	--	2.0E+00	--	--	4.0E+01	--	--	--	--	--	--	--	--	4.0E+01	--
Indeno (1,2,3-cd) pyrene C	0	--	--	1.8E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Isophorone[C]	0	--	--	9.6E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Kepone	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00	--
Lead	0	2.4E+02	9.3E+00	--	4.8E+03	1.9E+02	--	--	--	--	--	--	--	4.8E+03	1.9E+02	--
Malathion	0	--	1.0E-01	--	--	2.0E+00	--	--	--	--	--	--	--	--	2.0E+00	--
Mercury	0	1.8E+00	9.4E-01	--	3.6E+01	1.9E+01	--	--	--	--	--	--	--	3.6E+01	1.9E+01	--
Methyl Bromide	0	--	--	1.5E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Methylene Chloride [C]	0	--	--	5.9E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Methoxychlor	0	--	3.0E-02	--	--	6.0E-01	--	--	--	--	--	--	--	--	6.0E-01	--
Mirex	0	--	0.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00	--
Nickel	0	7.4E+01	8.2E+00	4.6E+03	1.5E+03	1.6E+02	0.0E+00	--	--	--	--	--	--	1.5E+03	1.6E+02	0.0E+00
Nitrobenzene	0	--	--	6.9E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
N-Nitrosodimethylamine[C]	0	--	--	3.0E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
N-Nitrosodiphenylamine[C]	0	--	--	6.0E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
N-Nitrosodi-n-propylamine[C]	0	--	--	5.1E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	0.0E+00
Nonylphenol	0	7.0E+00	1.7E+00	--	1.4E+02	3.4E+01	--	--	--	--	--	--	--	1.4E+02	3.4E+01	--
Parathion	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB Total[C]	0	--	3.0E-02	6.4E-04	--	6.0E-01	0.0E+00	--	--	--	--	--	--	--	6.0E-01	0.0E+00
Pentachlorophenol [C]	0	1.3E+01	7.9E+00	3.0E+01	2.6E+02	1.6E+02	0.0E+00	--	--	--	--	--	--	2.6E+02	1.6E+02	0.0E+00

Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			**Most Limiting Allocations**		
(ug/l unless noted)	Conc.	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	**Acute**	**Chronic**	**HH**
Phenol	0	--	--	8.6E+05	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Phosphorus (Elemental)	0	--	1.0E-01	--	--	2.0E+00	--	--	--	--	--	--	--	--	**2.0E+00**	--
Pyrene	0	--	--	4.0E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Selenium	0	2.9E+02	7.1E+01	4.2E+03	5.8E+03	1.4E+03	0.0E+00	--	--	--	--	--	--	**5.8E+03**	**1.4E+03**	**0.0E+00**
Silver	0	1.9E+00	--	--	3.8E+01	--	--	--	--	--	--	--	--	**3.8E+01**	--	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	4.0E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Tetrachloroethylene[C]	0	--	--	3.3E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Thallium	0	--	--	4.7E-01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Toluene	0	--	--	6.0E+03	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Toxaphene [C]	0	2.1E-01	2.0E-04	2.8E-03	4.2E+00	4.0E-03	0.0E+00	--	--	--	--	--	--	**4.2E+00**	**4.0E-03**	**0.0E+00**
Tributyltin	0	4.2E-01	7.4E-03	--	8.4E+00	1.5E-01	--	--	--	--	--	--	--	**8.4E+00**	**1.5E-01**	--
1,2,4-Trichlorobenzene	0	--	--	7.0E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
1,1,2-Trichloroethane[C]		--	--	1.6E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Trichloroethylene [C]	0	--	--	3.0E+02	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
2,4,6-Trichlorophenol [C]	0	--	--	2.4E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Vinyl Chloride[C]	0	--	--	2.4E+01	--	--	0.0E+00	--	--	--	--	--	--	--	--	**0.0E+00**
Zinc	0	9.0E+01	8.1E+01	2.6E+04	1.8E+03	1.6E+03	0.0E+00	--	--	--	--	--	--	**1.8E+03**	**1.6E+03**	**0.0E+00**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
6. Regular WLA = (WQC x WLA multiplier) - (WLA multiplier - 1)(background conc.)
7. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
8. Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Metal	Site Specific Target Value (SSTV)
Antimony	0.0E+00
Arsenic III	4.3E+02
Cadmium	1.1E+02
Chromium III	#VALUE!
Chromium VI	6.0E+02
Copper	7.2E+01
Lead	1.1E+02
Mercury	1.1E+01
Nickel	0.0E+00
Selenium	0.0E+00
Silver	1.5E+01
Zinc	0.0E+00

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

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Jan-06	pH	Temp C
1	7.3	11.0
2	7.4	10.0
3	7.2	11.0
4	7.2	11.0
5	7.1	11.0
6	7.2	11.0
7	7.2	11.0
8	1.0	11.0
9	7.4	11.0
10	7.5	11.0
11	7.4	11.0
12	7.5	11.0
13	7.4	11.0
14	7.5	11.0
15	7.3	11.0
16	7.4	9.0
17	7.5	10.0
18	7.3	11.0
19	7.5	11.0
20	7.4	10.0
21	7.4	11.0
22	7.4	10.0
23	7.3	11.0
24	7.4	10.0
25	7.5	11.0
26	7.0	10.0
27	7.5	9.0
28	7.5	10.0
29	7.7	14.0
30	7.3	11.0
31	7.5	11.0
Feb-06		
1	6.9	11.0
2	7.2	11.0
3	7.1	12.0
4	7.7	13.0
5	7.5	12.0
6	7.6	11.0
7	7.6	10.0
8	7.7	10.0
9	7.3	10.0
10	7.7	9.0
11	7.4	10.0
12	7.3	9.0
13	8.0	8.0
14	7.7	9.0
15	7.7	9.0

Feb-06	pH	Temp C
16	7.7	10.0
17	7.6	11.0
18	7.6	11.0
19	7.7	9.0
20	7.0	9.0
21	7.7	11.7
22	7.8	10.0
23	7.5	10.0
24	7.5	9.0
25	7.5	9.0
26	7.7	9.0
27	7.7	9.0
28	7.7	9.0
Mar-06		
1	7.6	8.0
2	7.8	9.0
3	7.9	9.0
4	7.4	11.0
5	7.7	10.0
6	7.9	10.0
7	7.8	9.0
8	7.9	9.0
9	7.8	10.0
10	7.8	12.0
11	7.7	13.0
12	7.8	14.0
13	7.8	14.0
14	7.6	15.0
15	7.9	14.0
16	8.1	13.0
17	7.7	13.0
18	7.8	13.0
19	7.9	13.0
20	7.8	11.0
21	7.8	11.0
22	7.9	10.0
23	7.6	11.0
24	7.8	11.0
25	7.8	11.0
26	7.9	10.0
27	7.5	12.0
28	7.9	12.0
29	7.9	12.0
30	7.9	13.0
31	7.9	13.0
Apr-06		
1	7.8	15.0
2	8.1	16.0

Apr-06	pH	Temp C
3	7.9	16.0
4	7.9	16.0
5	7.9	15.0
6	7.8	15.0
7	7.8	15.0
8	7.9	16.0
9	7.9	15.0
10	7.9	14.0
11	8.0	15.0
12	8.0	14.8
13	7.9	16.0
14	7.7	16.0
15	7.7	18.0
16	8.3	18.0
17	7.9	17.0
18	7.9	16.0
19	7.9	16.0
20	7.9	17.0
21	8.0	17.0
22	7.9	16.0
23	8.0	17.0
24	8.1	17.0
25	7.9	18.0
26	7.9	18.0
27	7.8	17.0
28	7.7	17.0
29	7.6	16.0
30	7.8	17.0
May-06		
1	8.3	16.0
2	7.8	15.0
3	7.5	16.0
4	7.6	17.0
5	8.0	18.0
6	7.7	18.0
7	7.5	19.0
8	7.6	17.0
9	8.0	17.0
10	8.0	17.0
11	7.8	17.0
12	8.0	18.0
13	8.0	19.0
14	8.0	19.0
15	7.7	17.0
16	8.0	19.0
17	8.0	19.0
18	8.0	19.0
19	8.0	19.0

Attachment 6

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

May-06	pH	Temp C
20	7.9	19.0
21	8.2	19.0
22	8.1	19.0
23	7.8	19.0
24	7.7	18.0
25	8.0	19.0
26	7.9	19.0
27	8.0	20.0
28	8.1	21.0
29	8.0	22.0
30	8.1	22.0
31	8.1	23.0
Jun-06		
1	8.1	24.0
2	7.5	25.0
3	7.6	24.0
4	8.3	21.0
5	8.1	22.0
6	8.1	22.0
7	8.1	22.0
8	8.0	22.0
9	7.8	21.0
10	7.7	22.0
11	8.1	20.0
12	7.7	21.0
13	8.1	20.0
14	8.2	21.0
15	7.8	19.0
16	8.0	21.0
17	8.2	22.0
18	7.8	22.0
19	7.8	22.0
20	8.1	24.0
21	8.2	24.0
22	8.2	24.0
23	7.7	25.0
24	8.2	25.0
25 *	8.3	26.0
26 *	8.3	25.0
27	8.0	25.0
28	7.8	25.0
29	7.3	25.0
30	7.9	25.0
Jul-06		
1	8.0	24.0
2	8.3	23.0
3	7.6	26.0
4	7.8	26.0

Jul-06	pH	Temp C
5	7.9	26.0
6	7.9	26.0
7	7.3	25.0
8	7.4	24.0
9	7.5	24.0
10	8.0	24.0
11	7.9	25.0
12	7.6	26.0
13	7.9	26.0
14	7.9	26.0
15	7.7	27.0
16	8.0	27.0
17	8.0	25.0
18	8.1	27.0
19	8.1	27.0
20	7.6	28.0
21	7.6	28.0
22	7.6	27.0
23	7.6	27.0
24	7.6	25.0
25	8.1	26.0
26	8.0	26.0
27	8.0	27.0
28	8.0	27.0
29	8.0	28.0
30	8.1	28.0
31	8.1	28.0
Aug-06		
1	8.3	27.0
2	7.8	27.0
3	7.7	29.0
4	8.2	29.0
5	8.3	29.0
6	8.2	28.0
7	8.2	27.0
8	8.0	28.0
9	7.9	28.0
10	8.0	27.0
11	8.1	26.0
12	7.8	26.0
13	8.0	25.0
14	8.2	25.0
15	7.9	24.0
16	7.9	24.0
17	8.1	24.0
18	8.0	24.0
19	8.0	24.0
20	8.4	27.0

Aug-06	pH	Temp C
21	7.9	26.0
22	8.2	26.0
23	8.1	26.0
24	7.9	24.0
25	8.0	26.0
26	7.7	26.0
27	8.0	25.0
28	8.3	25.0
29	7.9	27.0
30	8.2	27.0
31	7.8	26.0
Sep-06		
1	8.2	24.0
2	7.5	23.0
3	7.6	23.0
4	7.8	24.0
5	7.5	23.0
6	7.6	23.0
7	7.0	23.0
8	7.0	23.0
9	7.7	24.0
10	7.8	24.0
11	7.3	24.0
12	7.5	23.0
13	7.4	23.0
14	7.8	22.0
15	7.8	23.0
16	7.4	23.0
17	7.2	23.0
18	7.1	23.0
19	7.3	24.0
20	7.3	23.0
21	8.1	22.0
22	8.0	21.0
23	7.9	21.0
24	7.9	21.0
25	8.0	22.0
26	7.7	22.0
27	8.0	22.0
28	7.9	22.0
29	8.0	22.0
30	7.6	21.0
Oct-06		
1	7.6	21.0
2	8.0	21.0
3	7.6	21.0
4	8.0	22.0
5	8.1	22.0

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Oct-06	pH	Temp C
6	7.7	21.0
7	7.8	19.0
8	7.7	19.0
9	7.4	19.0
10	7.9	20.0
11	7.8	20.0
12	8.0	21.0
13	7.6	20.0
14	7.4	19.0
15	7.4	18.0
16	7.9	17.0
17	7.5	18.0
18	7.2	19.0
19	7.7	19.0
20	7.7	20.0
21	7.7	20.0
22	7.7	20.0
23	7.4	18.0
24	7.4	16.0
25	7.5	16.0
26	7.9	15.0
27	7.9	16.0
28	7.7	16.0
29	7.7	17.0
30	7.4	16.0
31	7.9	16.0
Nov-06		
1	7.9	16.0
2	7.9	17.0
3	7.2	15.0
4	7.0	13.0
5	7.2	13.0
6	7.3	13.0
7	7.6	13.0
8	7.5	14.0
9	7.8	16.0
10	7.5	16,0
11	7.5	17.0
12	7.2	17.0
13	7.3	15.0
14	7.4	16.0
15	7.5	16.0
16	7.5	16.0
17	6.8	17.0
18	6.9	16.0
19	7.0	15.0
20	7.6	14.0
21	7.5	14.0

Nov-06	pH	Temp C
22	7.6	14.0
23	7.1	13.0
24	7.4	13.0
25	7.6	13.0
26	7.5	13.0
27	7.1	14.0
28	7.6	13.0
29	7.7	14.0
30	7.6	15.0
Dec-06		
1	7.7	16.0
2	7.9	16.0
3	7.9	14.0
4	7.8	13.0
5	7.9	12.0
6	7.6	12.0
7	7.4	11.0
8	7.6	11.0
9	7.4	10.0
10	7.7	9.0
11	7.7	10.0
12	7.7	10.0
13	7.7	11.0
14	7.7	12.0
15	7.7	12.0
16	7.6	12.0
17	7.8	12.0
18	7.8	12.0
19	7.9	12.0
20	8.2	12.0
21	8.1	12.0
22	8.0	12.0
23	7.5	13.0
24	7.6	13.0
25	7.8	13.0
26	7.4	12.0
27	7.3	13.0
28	7.9	11.0
29	7.8	12.0
30	7.8	11.0
31	7.7	11.0
Jan-07		
1	7.2	12.0
2	7.3	12.0
3	7.3	11.0
4	7.2	11.0
5	7.4	12.0
6	7.4	14.0

Jan-07	pH	Temp C
7	7.5	14.0
8	6.9	14.0
9	7.0	13.0
10	7.4	11.0
11	7.3	10.0
12	7.0	11.0
13	7.0	11.0
14	7.1	12.0
15	7.1	14.0
16	7.6	14.0
17	7.5	12.0
18	7.5	11.0
19	7.5	10.0
20	7.5	10.0
21	7.7	9.0
22	7.3	10.0
23	7.4	9.0
24	7.4	9.0
25	7.5	9.0
26	7.8	8.0
27	7,2	8.0
28	7.3	9.0
29	7.6	8.0
30	7.6	7.0
31	7.7	8.0
Feb-07		
1	7.9	8.0
2	7.6	8.0
3	7.6	8.0
4	7.6	8.0
5	7.2	8.0
6	7.6	6.0
7	7.8	6.0
8	8.4	6.0
9	7.8	6.0
10	7.8	6.0
11	7.3	5.0
12	7.9	7.0
13	8.0	8.0
14	8.2	7.0
15	7.8	6.0
16	7.4	7.0
17	7.7	6.0
18	7.7	6.0
19	7.7	8.0
20	7.7	7.0
21	7.6	8.0
22	7.5	9.0

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Feb-07	pH	Temp C
23	7.6	9.0
24	7.2	8.0
25	7.6	8.0
26	7.6	8.0
27	7.7	8.0
28	7.4	8.0
Mar-07		
1	7.2	9.0
2	7.2	11.0
3	7.1	11.0
4	7.2	10.0
5	7.6	9.0
6	7.6	9.0
7	7.6	9.0
8	7.5	8.0
9	7.5	8.0
10	7.6	8.0
11	7.8	10.0
12	7.7	10.0
13	7.6	11.0
14	7.6	12.0
15	7.9	14.0
16	7.7	13.0
17	7.1	10.0
18	7.1	10.0
19	7.4	12.0
20	7.5	11.0
21	7.5	11.0
22	7.5	11.0
23	7.5	13.0
24	7.8	14.0
25	7.8	14.0
26	7.6	14.0
27	7.8	14.0
28	7.6	16.0
29	7.9	14.0
30	7.9	14.0
31	7.4	14.0
Apr-07		
1	7.3	15.0
2	7.9	15.0
3	7.8	16.0
4	7.8	16.0
5	7.9	14.0
6	7.9	14.0
7	7.6	14.0
8	8.2	11.0
9	7.8	12.0

Apr-07	pH	Temp C
10	7.6	12.0
11	7.8	13.0
12	7.6	13.0
13	7.9	13.0
14	8.1	14.0
15	7.8	14.0
16	7.7	13.0
17	7.5	12.0
18	7.5	12.0
19	7.5	13.0
20	7.3	13.0
21	7.7	14.0
22	7.6	15.0
23	7.7	16.0
24	8.1	17.0
25	7.7	18.0
26	7.5	18.0
27	7.5	17.0
28	7.9	18.0
29	8.0	17.0
30	7.8	18.0
May-07		
1	7.9	19.0
2	7.8	19.0
3	7.9	19.0
4	7.6	18.0
5	8.6	18.0
6	8.1	17.0
7	7.8	16.0
8	7.9	16.0
9	7.9	17.0
10	7.8	19.0
11	7.8	21.0
12	8.1	21.0
13	8.3	21.0
14	7.7	19.0
15	7.8	19.0
16	7.8	20.0
17	8.2	21.0
18	8.1	20.0
19	7.9	19.0
20	8.0	19.0
21	7.9	19.0
22	8.0	19.0
23	8.1	20.0
24	7.8	20.0
25	7.9	21.0
26	8.2	22.0

May-07	pH	Temp C
27	7.8	23.0
28	8.1	23.0
29	7.9	23.0
30	7.1	23.0
31	7.8	23.0
Jun-07		
1	7.9	23.0
2	8.1	24.0
3	8.0	24.0
4	8.1	23.0
5	8.2	24.0
6	8.1	24.0
7	8.0	22.0
8	8.3	24.0
9	8.0	25.0
10	8.2	24.0
11	8.1	24.0
12	8.1	24.0
13	8.1	24.0
14	7.9	23.0
15	8.2	22.0
16	8.2	22.0
17	8.3	22.0
18	8.1	23.0
19	8.0	26.0
20	8.3	26.0
21	8.2	24.0
22	8.2	24.0
23	8.2	23.0
24	8.2	23.0
25	8.2	23.0
26	8.0	24.0
27	8.2	25.0
28	8.2	26.0
29	8.1	25.0
30	8.3	26.0
Jul-07		
1	8.3	25.0
2	8.2	25.0
3	8.2	24.0
4	8.2	24.0
5	8.3	24.0
6	8.1	24.0
7	8.2	25.0
8	8.3	25.0
9	8.3	26.0
10	8.3	26.0
11	8.1	26.0

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Jul-07	pH	Temp C
12	8.3	26.0
13	8.1	26.0
14	8.2	26.0
15	8.4	26.0
16	8.3	26.0
17	8.3	26.0
18	8.2	26.0
19	8.3	26.0
20	8.4	27.0
21	8.5	25.0
22	8.5	25.0
23	8.2	24.0
24	8.2	24.0
25	8.3	25.0
26	8.2	25.0
27	8.3	25.0
28	8.3	26.0
29	8.3	26.0
30	8.2	26.0
31	8.3	26.0
Aug-07		
1	8.3	26.0
2	8.3	26.0
3	8.2	26.0
4	8.2	27.0
5	8.3	27.0
6	8.3	28.0
7	8.4	28.0
8	8.3	29.0
9	8.2	28.0
10	8.3	29.0
11	8.2	27.0
12	8.2	26.0
13	8.4	26.0
14	8.4	26.0
15	8.3	26.0
16	8.2	26.0
17	8.4	26.0
18	8.2	26.0
19	8.2	26.0
20	8.2	25.0
21	8.1	24.0
22	8.0	25.0
23	8.2	24.0
24	8.2	25.0
25	8.4	26.0
26	8.5	27.0
27	8.1	26.0

Aug-07	pH	Temp C
28	8.2	26.0
29	8.3	27.0
30	8.6	26.0
31	8.1	26.0
Sep-07		
1	8.4	26.0
2	8.3	25.0
3	8.5	25.0
4	8.3	25.0
5	8.3	25.0
6	8.4	26.0
7	8.4	26.0
8	8.4	25.0
9	8.6	26.0
10	8.4	27.0
11	8.5	27.0
12	8.3	26.0
13	8.4	25.0
14	8.3	25.0
15	8.3	24.0
16	8.5	23.0
17	8.6	23.0
18	8.2	22.0
19	8.3	22.0
20	8.3	22.0
21	8.3	23.0
22	8.3	22.0
23	8.3	23.0
24	8.3	24.0
25	8.2	24.0
26	8.2	24.0
27	8.4	24.0
28	8.3	25.0
29	8.4	24.0
30	8.6	23.0
Oct-07		
1	8.97	22.0
2	8.3	23.0
3	8.3	23.0
4	8.4	24.0
5	8.4	25.0
6	8.4	24.0
7	8.3	24.0
8	8.2	25.0
9	8.1	25.0
10	8.2	25.0
11	8.3	24.0
12	8.3	22.0

Oct-07	pH	Temp C
13	8.4	21.0
14	8.3	20.0
15	8.2	20.0
16	8.2	20.0
17	8.1	21.0
18	8.1	22.0
19	8.1	23.0
20	8.2	22.0
21	8.2	21.0
22	7.9	21.0
23	8.1	22.0
24	8.1	23.0
25	8.1	20.0
26	8.0	20.0
27	7.9	21.0
28	7.9	20.0
29	8.0	19.0
30	8.0	18.0
31	8.0	18.0
Nov-07		
1	8.0	19.0
2	8.1	18.0
3	8.4	17.0
4	8.3	17.0
5	8.0	17.0
6	8.2	17.0
7	7.9	16.0
8	8.1	15.0
9	8.1	15.0
10	8.2	15.0
11	8.0	14.0
12	8.0	15.0
13	7.9	15.0
14	8.0	15.0
15	8.1	17.0
16	8.0	16.0
17	8.1	15.0
18	8.2	15.0
19	8.0	15.0
20	8.1	15.0
21	8.1	16.0
22	8.2	16.0
23	8.2	15.0
24	8.2	14.0
25	8.1	14.0
26	7.9	14.0
27	8.0	16.0
28	8.2	15.0

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Nov-07	pH	Temp C
29	7.9	14.0
30	7.9	13.0
Dec-07		
1	7.9	15.0
2	7.8	14.0
3	8.0	13.0
4	8.1	12.0
5	8.2	12.0
6	7.9	11.0
7	8.1	11.0
8	8.3	11.0
9	8.2	12.0
10	8.0	12.0
11	8.1	13.0
12	8.0	13.0
13	8.2	13.0
14	8.3	14.0
15	8.0	12.0
16	8.0	12.0
17	7.9	11.0
18	8.0	10.0
19	8.0	10.0
20	8.0	10.0
21	7.8	10.0
22	8.1	11.0
23	8.1	11.0
24	8.0	11.0
25	8.3	11.0
26	8.2	11.0
27	8.0	11.0
28	7.8	11.0
29	8.0	12.0
30	7.9	12.0
31	8.3	11.0
Jan-08		
1	8.1	12.0
2	8.2	11.0
3	7.9	9.0
4	7.9	10.0
5	7.9	10.0
6	7.8	11.0
7	8.0	11.0
8	8.0	12.0
9	7.9	13.0
10	8.0	13.0
11	8.0	13.0
12	8.1	12.0
13	8.2	12.0

Jan-08	pH	Temp C
14	7.8	12.0
15	8.1	11.0
16	7.9	10.0
17	8.1	11.0
18	7.9	9.0
19	8.0	10.0
20	8.1	9.0
21	8.0	8.0
22	7.7	8.0
23	8.0	8.0
24	7.8	8.0
25	7.8	8.0
26	8.1	7.0
27	8.2	8.0
28	8.0	9.0
29	7.9	9.0
30	7.9	10.0
31	8.1	9.0
Feb-08		
1	7.6	9.0
2	7.9	9.0
3	7.9	9.0
4	7.8	10.0
5	7.8	11.0
6	7.8	12.0
7	7.8	13.0
8	8.1	12.0
9	8.2	12.0
10	8.4	12.0
11	7.9	10.0
12	8.0	9.0
13	7.8	10.0
14	7.9	9.0
15	7.8	9.0
16	8.0	10.0
17	7.9	10.0
18	7.8	11.0
19	7.9	10.0
20	7.6	11.0
21	8.0	10.0
22	7.8	9.0
23	7.9	9.0
24	8.1	9.0
25	7.7	10.0
26	8.1	10.0
27	8.0	11.0
28	8.0	10.0
29	8.1	8.0

	pH	Temp C
Mar-08		
1	8.1	9.0
2	8.2	10.0
3	7.3	10.0
4	7.9	13.0
5	7.8	14.0
6	7.7	13.0
7	7.9	12.0
8	7.8	13.0
9	7.8	11.0
10	7.9	11.0
11	7.9	12.0
12	7.7	12.0
13	7.9	12.0
14	7.8	13.0
15	7.8	14.0
16	7.8	14.0
17	7.9	13.0
18	7.9	13.0
19	7.9	14.0
20	8.0	14.0
21	7.9	13.0
22	7.9	14.0
23	7.8	14.0
24	8.1	13.0
25	7.8	12.0
26	7.7	13.0
27	8.0	13.0
28	8.0	14.0
29	8.2	14.0
30	8.2	13.0
31	8.2	13.0
Apr-08		
1	7.6	14.0
2	8.1	15.0
3	8.1	14.0
4	7.9	14.0
5	7.9	15.0
6	7.8	15.0
7	7.9	14.0
8	7.9	14.0
9	7.9	14.0
10	8.1	15.0
11	8.0	16.0
12	8.0	18.0
13	8.1	17.0
14	8.2	16.0
15	8.1	15.0

Dahlgren WWTP pH and Temperature Data (January 2006-June 2008)

Apr-08	pH	Temp C
16	8.0	15.0
17	7.9	15.0
18	7.8	16.0
19	7.7	17.0
20	7.9	17.0
21	7.8	18.0
22	7.9	17.0
23	7.9	19.0
24	7.9	19.0
25	8.0	19.0
26	7.8	19.0
27	7.8	19.0
28	8.1	19.0
29	8.0	19.0
30	7.9	17.0
May-08		
1	8.2	18.0
2	7.9	18.0
3	8.0	19.0
4	8.1	20.0
5	8.0	19.0
6	8.1	20.0
7	8.1	20.0
8	8.1	20.0
9	7.9	21.0
10	8.0	20.0
11	8.0	19.0
12	7.4	18.0
13	7.3	16.0
14	7.7	17.0
15	7.8	18.0
16	7.6	19.0
17	7.6	19.0
18	7.8	19.0
19	7.8	19.0
20	7.8	19.0
21	7.6	19.0
22	7.9	18.0
23	7.9	19.0
24	8.0	20.0
25	7.9	20.0
26	8.1	20.0
27	7.8	21.0
28	7.8	21.0
29	8.0	20.0
30	8.3	21.0
31	7.9	21.0

Jun-08	pH	Temp C
1	7.8	21.0
2	8.1	22.0
3	7.9	22.0
4	8.2	23.0
5	8.0	23.0
6	7.9	23.0
7	8.0	23.0
8	7.8	24.0
9	7.9	25.0
10	8.0	26.0
11	7.9	26.0
12	8.2	25.0
13	8.0	26.0
14	8.1	25.0
15	8.2	25.0
16	8.1	25.0
17	7.8	24.0
18	8.1	24.0
19	8.0	23.0
20	8.1	23.0
21	8.1	24.0
22	8.0	24.0
23	7.9	25.0
24	7.7	24.0
25	8.0	24.0
26	7.8	25.0
27	8.0	26.0
28	8.0	26.0
29	8.1	27.0
30	8.0	26.0

pH 90th Percentile = 8.3 SU
Temperature 90th Percentile = 26°C

Dahlgren Wastewater Treatment Plant Total Hardness Data
June 2013 -June 2014

Date	Total Hardness
6/6/2013	24
6/13/2013	46
6/20/2013	70
6/27/2013	32
7/4/2013	34
7/11/2013	53
7/18/2013	38
7/25/2013	27
8/6/2013	34
8/15/2013	21
8/29/2013	27
9/5/2013	38
9/12/2013	28
9/19/2013	38
9/26/2013	34
10/3/2013	40
10/10/2013	40
10/24/2013	48
10/31/2013	50
11/7/2013	38
11/14/2013	57
11/21/2013	34
11/28/2013	39
12/5/2013	37
12/12/2013	30
12/19/2013	32
12/26/2013	33
1/2/2014	36
1/9/2014	36
1/16/2014	41
1/23/2014	36
1/30/2014	38
2/6/2014	54
2/13/2014	40
2/20/2014	60
2/27/2014	44
3/6/2014	50
3/13/2014	50
3/20/2014	68
3/27/2014	64
4/3/2014	36

Date	Total Hardness
4/10/2014	60
4/17/2014	40
4/24/2014	40
5/1/2014	30
5/8/2014	42
5/15/2014	36
5/22/2014	40
5/29/2014	30
6/5/2014	36
6/12/2014	32
6/19/2014	32
6/26/2014	30

Total Hardness Average - 40 mg/L

Williams Creek Salinity

Williams Creek at Route 206	
Collection Date	Salinity
5/3/2007	1.59
9/25/2007	9.9
11/29/2007	9.97
1/30/2008	9.06
4/24/2008	1.88
Average Salinity	6.48

Total Hardness Data for Williams Creek (1990 through 1999)

Station ID 1AWLL001.30	HARDNESS, TOTAL (MG/L AS CACO3)
Collection Date & Time	
02/22/1990 10:50	480
03/22/1990 12:15	860
05/23/1990 11:05	560
06/20/1990 10:55	570
07/25/1990 10:45	1240
08/30/1990 11:30	1120
09/04/1990 13:45	1350
10/01/1990 10:35	1390
11/01/1990 10:35	920
12/03/1990 11:05	1200
01/14/1991 14:00	460
02/05/1991 13:45	242
03/05/1991 09:30	308
04/02/1991 10:30	120
05/08/1991 10:30	604
06/05/1991 13:30	900
07/01/1991 09:45	1600
10/03/1991 12:00	2100
11/06/1991 10:45	2200
12/04/1991 10:30	750
01/29/1992 09:33	2050
03/12/1992 09:47	400
04/06/1992 10:30	660
05/05/1992 09:58	1030
06/04/1992 10:00	970
07/01/1992 11:00	1220
09/03/1992 10:15	1680
10/06/1992 11:00	1470
11/02/1992 11:00	1680
12/15/1992 10:30	1500
01/14/1993 10:30	650
02/18/1993 10:20	400
03/17/1993 10:13	34
04/15/1993 09:50	86
05/13/1993 10:30	172
06/01/1993 09:50	185
07/01/1993 10:33	820
08/04/1993 14:30	1420
09/02/1993 10:08	1660
10/12/1993 10:33	1750
11/02/1993 10:29	1340
12/09/1993 10:29	710
01/06/1994 12:15	590
03/10/1994 10:04	48
04/07/1994 10:27	57
06/21/1994 11:25	561
07/28/1994 10:51	500
08/25/1994 10:16	702

Station ID 1AWLL001.30	HARDNESS, TOTAL (MG/L AS CACO3)
Collection Date & Time	
09/28/1994 10:00	880
02/27/1995 10:55	1260
05/18/1995 11:20	900
08/31/1995 11:11	1800
11/15/1995 11:27	370
02/01/1996 11:33	170
05/02/1996 10:26	260
08/15/1996 10:44	86
12/05/1996 10:18	376
03/13/1997 11:45	135
06/19/1997 11:33	674
09/23/1997 11:00	724
12/01/1997 10:44	806
03/12/1998 11:40	34.5
06/03/1998 11:25	385
09/01/1998 10:30	1050
01/07/1999 09:51	1850
03/17/1999 10:10	152
05/25/1999 10:50	1140
08/25/1999 09:00	2396
10/05/1999 10:00	837
12/02/1999 09:10	22.4
Station ID 1AWLL002.21	
10/02/1990 11:55	1600
02/06/1991 10:20	300
08/15/1991 11:45	1550
11/13/1991 11:20	40
01/30/1992 11:20	1850
03/17/1992 11:15	440
05/14/1992 11:15	930
08/17/1992 11:03	228
11/09/1992 11:07	580
02/17/1993 10:37	50
05/18/1993 10:50	110
08/11/1993 11:15	1220
12/02/1993 10:16	660
02/17/1994 10:55	31
05/31/1994 11:00	331
09/15/1994 11:17	1020
11/07/1994 10:53	1300
02/27/1995 10:37	361
05/18/1995 10:55	685
08/31/1995 11:30	1875
11/15/1995 11:46	39
02/01/1996 11:50	84
05/02/1996 10:50	81
08/15/1996 11:05	39
12/05/1996 10:40	227

Station ID 1AWLL002.21	HARDNESS, TOTAL (MG/L AS CACO3)
Collection Date & Time	
03/13/1997 12:00	58.5
06/19/1997 12:40	545
09/23/1997 11:20	1890
12/01/1997 11:00	389
03/12/1998 12:00	83.5
06/03/1998 12:33	287
09/01/1998 10:00	993
01/07/1999 10:05	1071
03/17/1999 10:25	80
05/25/1999 11:11	1100
08/25/1999 09:22	2280
10/05/1999 10:11	493
12/02/1999 10:20	23.1

10th Percentile Value = 58 mg/L

VaFWIS - Department of Game and Inland Fisheries

38,19,24.0 -77,03,11.0 **is the Search Point**

Submit | Cancel

Search Point

- [x] **Change** to "clicked" map point
- [ ] **Fixed** at 38,19,24.0 - 77,03,11.0

Show Position Rings

[x] Yes [ ] No

1 mile and 1/4 mile at the **Search Point**

Show Search Area

[x] Yes [ ] No

2 Search distance miles radius

Search Point is at map center

Base Map Choices

Topography

Map Overlay Choices

Current List: Position, Search

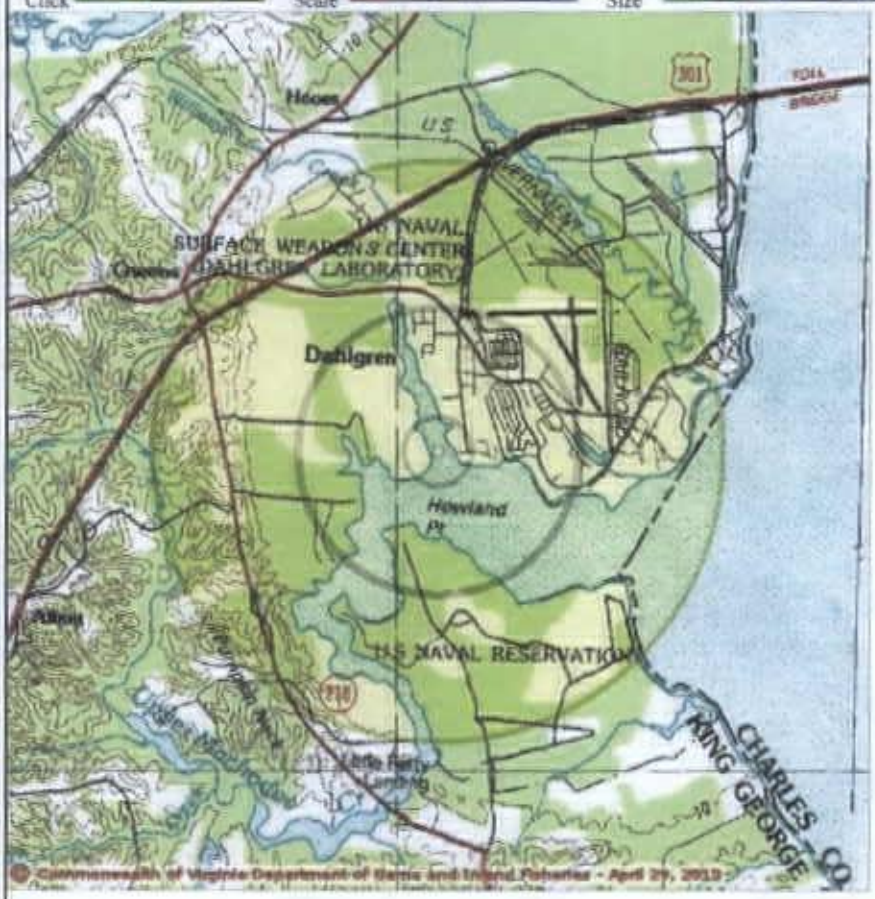
Map Overlay Legend

Position Rings 1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Refresh Browser Page

Map Click | Map Scale In Zoom Out | Screen Size Small Size Big | Help



Point of Search 38,19,24.0 -77,03,11.0

Map Location 38,19,24.0 -77,03,11.0

Select **Coordinate System:**

- [x] Degrees,Minutes,Seconds Latitude - Longitude
- [ ] Decimal Degrees Latitude - Longitude
- [ ] Meters UTM NAD83 East North Zone
- [ ] Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft.terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 315735 and top 4248485. Pixel size is 16 meters. Coordinates displayed are Degrees, Minutes, Seconds North and West.Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

Topographic maps and Black and white aerial photography for year 1990+.

Attachment 8

are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic
http://www.national.geographic.com/topo
All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2013-04-29 13:21:40 (qa/qc December 5, 2012 8:04 - tm=457495 dist=3218 I)
$poi=38.3233333 -77.0530555

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VaFWIS Search Report Compiled on 4/29/2013, 1:32:12 PM **Help**

within taxa **Fish, Aquatic Molluscs, Other Aquatic Invertebrate Taxa**

Known or likely to occur within a **2 mile radius around point 38,19,24.0 77,03,11.0** in **099 King George County, VA**

View Map of Site Location

43 Known or Likely Species ordered by Status Concern for Conservation (displaying first 20) (1 species with Status* or Tier I**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
010032	FESE	II	Sturgeon, Atlantic	Acipenser oxyrinchus		BOVA
010038		IV	Alewife	Alosa pseudoharengus		BOVA
010131		IV	Eel, American	Anguilla rostrata		BOVA,HU6
010001		IV	Lamprey, least brook	Lampetra aepyptera		HU6
010040		IV	Shad, American	Alosa sapidissima		BOVA
010173		IV	Sunfish, mud	Acantharchus pomotis		BOVA
010188			Bass, largemouth	Micropterus salmoides	Yes	BOVA,SppObs
010168			Bass, striped	Morone saxatilis		BOVA
010183			Bluegill	Lepomis macrochirus	Yes	BOVA,SppObs
010123			Bullhead, brown	Ameiurus nebulosus		BOVA
010125			Catfish, channel	Ictalurus punctatus	Yes	BOVA,SppObs
010120			Catfish, white	Ameiurus catus		BOVA
010103			Chub, creek	Semotilus atromaculatus		BOVA
010106			Chubsucker, creek	Erimyzon oblongus		BOVA
010190			Crappie, black	Pomoxis nigromaculatus	Yes	BOVA,SppObs
010101			Dace, blacknose	Rhinichthys atratulus		BOVA
010366			Dace, rosyside	Clinostomus funduloides		BOVA
010397			Darter, tessellated	Etheostoma olmstedi		BOVA
010104			Fallfish	Semotilus corporalis		BOVA
010045			Herring, blueback	Alosa aestivalis		BOVA

To view **All 43 species** View 43

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed;

FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

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

Threatened and Endangered Waters

N/A

Compiled on 4/29/2013, 1:32:12 PM 1457496.0 report=Options searchType= R dist= 3218 poi= 38,19,24.0 77,03,11.0 siteDD= null

PixelSize=64; Anadromous=0.043493; Buffer=0.214441; County=0.109963; HU6=0.252827; Impediments=0.024754; Init=0.255647; PublicLands=0.047836; Quad=0.060821; SppObs=1.625197; TEWaters=0.0371089999999999; TierReaches=0.052404; Total=2.634337; Trout=0.045601; huva=0.077647

Crowther, Joan (DEQ)

From: Aschenbach, Ernie (DGIF)
Sent: Thursday, January 23, 2014 1:48 PM
To: Crowther, Joan (DEQ); nhreview (DCR); Hillman, Brett; David O'Brien - NOAA Federal
Cc: Cason, Gladys (DGIF); ProjectReview (DGIF)
Subject: RE: ESSLog 34356; VPDES reissuance VA0026514 Dahlgren WWTP in King George County, VA

Correction in red below. This edition supersedes and should replace the original.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: ProjectReview (DGIF)
Sent: Thursday, January 23, 2014 1:31 PM
To: Crowther, Joan (DEQ); nhreview (DCR); Hillman, Brett; David O'Brien - NOAA Federal
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 34356; VPDES reissuance VA0026514 Dahlgren WWTP in King George County, VA

We have reviewed the application for VPDES reissuance for the above-referenced facility. The receiving water is Williams Creek. According to the application (all critical flows for receiving waters) Williams Creek is tidal. The Design Flow of the facility is (no limit) 1.0 MGD.

According to our records Williams Creek is a headwater tributary to the Potomac River, a confirmed anadromous fish use river. Williams Creek is a potential anadromous fish use area. In general, when water is treated we typically recommend and support ultraviolet (UV) disinfection (rather than chlorination disinfection) and support the continued dechlorination of effluent after chlorine disinfection. Provided the applicant adheres to the effluent characteristics identified in the permit application, we do not anticipate the issuance of this permit to result in adverse impact to anadromous fish use waters or their associated species.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend and support coordination with VDCR-DNH regarding the protection of these resources. We also recommend contacting the USFWS regarding all federally listed species.

Thank you for the opportunity to provide comments. Please call me if you have any questions.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

COMMONWEALTH OF VIRGIN.
Department of Environmental Quality
Office of Water Permit Programs

Subject: **Dahlgren WWTP CORMIX Modeling – VA0026514**

To: **Jim Olson - NVRO**

From: **Allan Brockenbrough - OWPP** ABB

Date: **August 13, 2002**

RECEIVED
AUG 16 2002
Northern VA. Region
Dept. of Env. Quality

I have reviewed the report entitled *Dahlgren Wastewater Treatment Plant Interim Capacity Enhancement Alternate Discharge Analysis* prepared by Draper Aden Associates and dated February 15, 2002. The report was submitted by letter dated July 23, 2002. Corrected modeling results were submitted on August 12, 2002. The model results are suitable for establishing acute and chronic wasteloads for the Dahlgren WWTP discharge. A dilution factor of 20.5 (19.5 parts river to 1 part effluent) should be used for both the acute and chronic wasteload calculations. Note that this dilution factor is based upon the proposed effluent pumping rate and can be used for any WWTP design flow up to 1.0 MGD. The relocated outfall should be at least 100 feet from shore near the mouth of Williams Creek. It should include a 6" port and a pumping rate of approximately 1041 gpm (or some other configuration which gives a minimum discharge velocity of 3.7 m/s).

Please give me a call if we need to discuss further.

AB/

Attachment 9

Brockenbrough,Allan

From: MLarson@daa.com
Sent: Monday, August 12, 2002 5:02 PM
To: Brockenbrough,Allan
Subject: Dahlgren Modeling Report

Copper zero velocity 1.5 mgd.s... Copper zero velocity 1.5 mgd.p...

Allan,

Attached is the modeling simulations that you requested for 1.5 mgd, 0.15 m discharge port, and sigma = 270 degrees. The files were correct on the computer, we must have had a mix up with old report print outs. I have only sent the files for the copper simulation, since the dilution will be the same for the other constituents.

These files can be opened with Wordpad. Please let me know if you require additional information.

(See attached file: Copper zero velocity 1.5 mgd.ses)(See attached file: Copper zero velocity 1.5 mgd.prd)

Michael A. Larson, P.E.
Project Engineer
DRAPER ADEN ASSOCIATES
8090 Villa Park Drive
Richmond, VA 23228
1-804-264-2228
Fax: 1-804-264-8773

```
CORMIX SESSION REPORT:
XXXX
```

```
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                          = yes
  CMC concentration                 CMC    = 0.0048 mg/l
  CCC concentration                 CCC    = 0.0036 mg/l
  Water quality standard specified         = given by CCC value
  Regulatory mixing zone                   = no
  Region of interest                       = 7600 m downstream
*************************************************************************
*****
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = H5-90 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full
water
  depth at the discharge site.
  Applicable layer depth = water depth = 0.5 m
*************************************************************************
*****
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------
-----
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    30 m from the left bank/shore.
  Number of display steps NSTEP = 100 per module.
-------------------------------------------------------------------------
-----
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no
regulatory
  implication.  However, this information may be useful for the
discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 0.0003 mg/l
  Dilution at edge of NFR                = 20.5
  NFR Location:                        x = 0.00 m
    (centerline coordinates)           y = -50.76 m
                                       z = 0.5 m
  NFR plume dimensions:        half-width = 5.46 m
                                 thickness = 0.5 m
-------------------------------------------------------------------------
-----
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise
towards
  the surface.
-------------------------------------------------------------------------
-----
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical
mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------
-----
FAR-FIELD MIXING SUMMARY:
```

```
  Because of the specified STAGNANT ambient conditions, there exists
  no steady-state far-field for this discharge.
  Unsteady circulations and pollutant buid-up may result in the far-
field.
-----------------------------------------------------------------------
-----
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************* TOXIC DILUTION ZONE SUMMARY
************************
Recall: The TDZ corresponds to the three (3) criteria issued in the
USEPA
  Technical Support Document (TSD) for Water Quality-based Toxics
Control,
  1991 (EPA/505/2-90-001).
  Criterion maximum concentration (CMC)  = 0.0048  mg/l
Corresponding dilution                   = 1.458333
The CMC was encountered at the following plume position:
  Plume location:                      x = 0 m
    (centerline coordinates)           y = -1.00 m
                                       z = 0 m
  Plume dimension:             half-width = 0.06 m
                                 thickness = 0.06 m
 CRITERION 1: This location is within 50 times the discharge length
scale of
              Lq = 0.13 m.
 +++++ The discharge length scale TEST for the TDZ has been SATISFIED.
++++++

 CRITERION 2: This location is within 5 times the ambient water depth of
              HD = 0.5 m.
 ++++++++++ The ambient depth TEST for the TDZ has been
SATISFIED.+++++++++++

 CRITERION 3: No RMZ has been defined.  Therefore, the Regulatory Mixing
zone
              test for the TDZ cannot be applied.
 The diffuser discharge velocity is equal to 3.73 m/s.
   This exceeds the value of 3.0 m/s recommended in the TSD.

 *** All three CMC criteria for the TDZ are SATISFIED for this
discharge. ***
********************** REGULATORY MIXING ZONE SUMMARY
************************
No RMZ has been specified.
However:
The CCC was encountered at the following plume position:
The CCC for the toxic pollutant was encountered at the following
  plume position:
  CCC                                    = 0.0036  mg/l
Corresponding dilution                   = 1.9
  Plume location:                      x = 0 m
    (centerline coordinates)           y = -1.56 m
                                       z = 0 m
  Plume dimensions:            half-width = 0.10 m
                                 thickness = 0.10 m
********************* FINAL DESIGN ADVICE AND COMMENTS
**********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any
known
  technique is NOT AN EXACT SCIENCE.
```

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111
11111
                        CORNELL MIXING ZONE EXPERT SYSTEM
              Subsystem CORMIX1:  Submerged Single Port Discharges
 CORMIX-GI Version 4.1G
-----------------------------------------------------------------------
-----
-----------------------------------------------------------------------
-----
CASE DESCRIPTION
 Site name/label:   Dahlgren
 Design case:       Copper Dillution  Zero Velocity
 FILE NAME:         P:\...0-01\work\Cormix\Copper zero velocity 1.5
mgd.prd
 Time stamp:        Thu Feb 14 11:40:26 2002

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =    300.00  AS     =    150.00  QA     =      0.00  ICHREG= 1
 HA     =      0.50  HD     =      0.50
 UA     =     0.000  F      =     0.062 USTAR =0.0000E+00
 UW     =     1.000 UWSTAR=0.1071E-02
 Uniform density environment
 STRCND=  U         RHOAM = 1006.0000

DISCHARGE PARAMETERS (metric units)
 BANK   =  LEFT      DISTB =     30.00
 D0     =     0.150 A0     =     0.018 H0     =      0.10
 THETA  =      5.00  SIGMA =    270.00
 U0     =     3.735 Q0     =     0.066        =0.6600E-01
 RHO0   =  998.2051  DRHO0 =0.7795E+01  GP0    =0.7599E-01
 C0     = 0.7000E-02 CUNITS=  mg/l
 IPOLL  =  1         KS    =0.0000E+00  KD     =0.0000E+00

FLUX VARIABLES (metric units)
 Q0     =0.6600E-01  M0    =0.2465E+00  J0     =0.5015E-02  SIGNJ0=
1.0
 Associated length scales (meters)
 LQ     =     0.13  LM     =     4.94  Lm     =  99999.00  Lb     =
99999.00
                                        Lmp    =  99999.00  Lbp    =
99999.00

NON-DIMENSIONAL PARAMETERS
 FR0    =    34.98  R      =  99999.00

FLOW CLASSIFICATION
 111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H5-90  1
 1  Applicable layer depth HS =     0.50  1
 111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0     = 0.7000E-02 CUNITS=  mg/l
 NTOX   =  1         CMC   =0.4800E-02  CCC    =  CSTD
 NSTD   =  1         CSTD  =0.3600E-02
 REGMZ  =  0
 XINT   =   7600.00  XMAX  =   7600.00

X-Y-Z COORDINATE SYSTEM:
```

ORIGIN is located at the bottom and below the center of the port:
30.00 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =100 display intervals per module

BEGIN MOD101: DISCHARGE MODULE

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
0.00	0.00	0.00	1.0	0.700E-02	0.11

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
0.00	0.00	0.00	1.0	0.700E-02	0.08
0.00	-0.04	0.00	1.0	0.700E-02	0.08
0.00	-0.07	0.00	1.0	0.700E-02	0.08
0.00	-0.11	0.00	1.0	0.700E-02	0.09
0.00	-0.15	0.00	1.0	0.700E-02	0.09
0.00	-0.19	0.00	1.0	0.700E-02	0.10
0.00	-0.23	0.00	1.0	0.700E-02	0.10
0.00	-0.27	0.00	1.0	0.700E-02	0.11
0.00	-0.30	0.00	1.0	0.700E-02	0.11
0.00	-0.34	0.00	1.0	0.700E-02	0.11
0.00	-0.38	0.00	1.0	0.700E-02	0.12
0.00	-0.42	0.00	1.0	0.700E-02	0.12
0.00	-0.46	0.00	1.0	0.700E-02	0.13
0.00	-0.50	0.00	1.0	0.681E-02	0.13
0.00	-0.54	0.00	1.1	0.659E-02	0.13
0.00	-0.57	0.00	1.1	0.641E-02	0.14
0.00	-0.61	0.00	1.1	0.621E-02	0.14
0.00	-0.65	0.00	1.2	0.603E-02	0.15
0.00	-0.69	0.00	1.2	0.585E-02	0.15
0.00	-0.73	0.00	1.2	0.571E-02	0.16
0.00	-0.77	0.00	1.3	0.555E-02	0.16
0.00	-0.81	0.00	1.3	0.540E-02	0.16
0.00	-0.85	0.00	1.3	0.526E-02	0.17
0.00	-0.88	0.00	1.4	0.515E-02	0.17
0.00	-0.92	0.00	1.4	0.502E-02	0.18
0.00	-0.96	0.00	1.4	0.490E-02	0.18

** CMC HAS BEEN FOUND **
The pollutant concentration in the plume falls below CMC value of 0.480E-02

in the current prediction interval.
This is the extent of the TOXIC DILUTION ZONE.

0.00	-1.00	0.00	1.5	0.479E-02	0.19
0.00	-1.04	0.00	1.5	0.468E-02	0.19
0.00	-1.08	0.00	1.5	0.458E-02	0.19
0.00	-1.12	0.00	1.6	0.448E-02	0.20
0.00	-1.15	0.00	1.6	0.439E-02	0.20
0.00	-1.19	0.00	1.6	0.430E-02	0.21
0.00	-1.23	0.00	1.7	0.421E-02	0.21
0.00	-1.27	0.00	1.7	0.412E-02	0.22
0.00	-1.31	0.00	1.7	0.405E-02	0.22
0.00	-1.35	0.00	1.8	0.397E-02	0.22
0.00	-1.39	0.00	1.8	0.389E-02	0.23
0.00	-1.42	0.00	1.8	0.383E-02	0.23
0.00	-1.46	0.00	1.9	0.376E-02	0.24
0.00	-1.50	0.00	1.9	0.369E-02	0.24
0.00	-1.54	0.00	1.9	0.362E-02	0.25

** WATER QUALITY STANDARD OR CCC HAS BEEN FOUND **
The pollutant concentration in the plume falls below water quality standard
or CCC value of 0.360E-02 in the current prediction interval.
This is the spatial extent of concentrations exceeding the water quality
standard or CCC value.

0.00	-1.58	0.00	2.0	0.357E-02	0.25
0.00	-1.62	0.00	2.0	0.351E-02	0.25
0.00	-1.66	0.00	2.0	0.345E-02	0.26
0.00	-1.70	0.00	2.1	0.339E-02	0.26
0.00	-1.73	0.00	2.1	0.334E-02	0.27
0.00	-1.77	0.00	2.1	0.329E-02	0.27
0.00	-1.81	0.00	2.2	0.323E-02	0.28
0.00	-1.85	0.00	2.2	0.319E-02	0.28
0.00	-1.89	0.00	2.2	0.314E-02	0.28
0.00	-1.93	0.00	2.3	0.309E-02	0.29
0.00	-1.97	0.00	2.3	0.304E-02	0.29
0.00	-2.00	0.00	2.3	0.300E-02	0.30
0.00	-2.04	0.00	2.4	0.296E-02	0.30
0.00	-2.08	0.00	2.4	0.292E-02	0.30
0.00	-2.12	0.00	2.4	0.288E-02	0.31
0.00	-2.16	0.00	2.5	0.284E-02	0.31
0.00	-2.20	0.00	2.5	0.280E-02	0.32
0.00	-2.24	0.00	2.5	0.276E-02	0.32
0.00	-2.27	0.00	2.6	0.273E-02	0.33
0.00	-2.31	0.00	2.6	0.269E-02	0.33
0.00	-2.35	0.00	2.6	0.266E-02	0.33
0.00	-2.39	0.00	2.7	0.262E-02	0.34
0.00	-2.43	0.00	2.7	0.259E-02	0.34
0.00	-2.47	0.00	2.7	0.256E-02	0.35
0.00	-2.51	0.00	2.8	0.253E-02	0.35
0.00	-2.55	0.00	2.8	0.250E-02	0.36
0.00	-2.58	0.00	2.8	0.247E-02	0.36
0.00	-2.62	0.00	2.9	0.244E-02	0.36
0.00	-2.66	0.00	2.9	0.241E-02	0.37
0.00	-2.70	0.00	2.9	0.239E-02	0.37
0.00	-2.74	0.00	3.0	0.236E-02	0.38
0.00	-2.78	0.00	3.0	0.233E-02	0.38
0.00	-2.82	0.00	3.0	0.231E-02	0.39
0.00	-2.85	0.00	3.1	0.228E-02	0.39
0.00	-2.89	0.00	3.1	0.226E-02	0.39
0.00	-2.93	0.00	3.1	0.223E-02	0.40
0.00	-2.97	0.00	3.2	0.221E-02	0.40

0.00	-3.01	0.00	3.2	0.219E-02	0.41
0.00	-3.05	0.00	3.2	0.216E-02	0.41
0.00	-3.09	0.00	3.3	0.214E-02	0.42
0.00	-3.12	0.00	3.3	0.212E-02	0.42
0.00	-3.16	0.00	3.3	0.210E-02	0.42
0.00	-3.20	0.00	3.4	0.208E-02	0.43
0.00	-3.24	0.00	3.4	0.206E-02	0.43
0.00	-3.28	0.00	3.4	0.204E-02	0.44
0.00	-3.32	0.00	3.5	0.202E-02	0.44
0.00	-3.36	0.00	3.5	0.200E-02	0.45
0.00	-3.40	0.00	3.5	0.198E-02	0.45
0.00	-3.43	0.00	3.6	0.196E-02	0.45
0.00	-3.47	0.00	3.6	0.194E-02	0.46
0.00	-3.51	0.00	3.6	0.192E-02	0.46
0.00	-3.55	0.00	3.7	0.191E-02	0.47
0.00	-3.59	0.00	3.7	0.189E-02	0.47
0.00	-3.63	0.00	3.7	0.187E-02	0.47
0.00	-3.67	0.00	3.8	0.186E-02	0.48
0.00	-3.70	0.00	3.8	0.184E-02	0.48
0.00	-3.74	0.00	3.8	0.182E-02	0.49
0.00	-3.78	0.00	3.9	0.181E-02	0.49
0.00	-3.82	0.00	3.9	0.179E-02	0.50
0.00	-3.86	0.00	3.9	0.178E-02	0.50

Cumulative travel time = 2. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

X	Y	Z	S	C	B
0.00	-3.86	0.00	3.9	0.178E-02	0.50

Profile definitions:
- BV = layer depth (vertically mixed)
- BH = top-hat half-width, in horizontal plane normal to trajectory
- ZU = upper plume boundary (Z-coordinate)
- ZL = lower plume boundary (Z-coordinate)
- S = hydrodynamic average (bulk) dilution
- C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-0.50	-4.36	0.50	3.9	0.178E-02	0.00	0.00	0.50	0.50
-0.45	-4.36	0.50	3.9	0.178E-02	0.50	0.14	0.50	0.00
-0.40	-4.36	0.50	3.9	0.178E-02	0.50	0.20	0.50	0.00
-0.35	-4.36	0.50	3.9	0.178E-02	0.50	0.24	0.50	0.00
-0.30	-4.36	0.50	3.9	0.178E-02	0.50	0.28	0.50	0.00
-0.25	-4.36	0.50	3.9	0.178E-02	0.50	0.31	0.50	0.00
-0.20	-4.36	0.50	3.9	0.178E-02	0.50	0.34	0.50	0.00
-0.15	-4.36	0.50	3.9	0.178E-02	0.50	0.37	0.50	

0.00								
	-0.10	-4.36	0.50	3.9	0.178E-02	0.50	0.40	0.50
0.00								
	-0.05	-4.36	0.50	3.9	0.178E-02	0.50	0.42	0.50
0.00								
	0.00	-4.36	0.50	5.5	0.127E-02	0.50	0.44	0.50
0.00								

Cumulative travel time = 3. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.

Profile definitions:

BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
0.00	-4.36	0.50	5.5	0.127E-02	0.50	0.39	0.50	0.00
0.00	-4.82	0.50	5.9	0.120E-02	0.50	0.44	0.50	0.00
0.00	-5.29	0.50	6.2	0.113E-02	0.50	0.49	0.50	0.00
0.00	-5.75	0.50	6.5	0.108E-02	0.50	0.54	0.50	0.00
0.00	-6.22	0.50	6.8	0.103E-02	0.50	0.60	0.50	0.00
0.00	-6.68	0.50	7.1	0.991E-03	0.50	0.65	0.50	0.00
0.00	-7.14	0.50	7.3	0.954E-03	0.50	0.70	0.50	0.00
0.00	-7.61	0.50	7.6	0.921E-03	0.50	0.75	0.50	0.00
0.00	-8.07	0.50	7.9	0.891E-03	0.50	0.80	0.50	0.00
0.00	-8.54	0.50	8.1	0.864E-03	0.50	0.85	0.50	0.00
0.00	-9.00	0.50	8.3	0.840E-03	0.50	0.90	0.50	0.00
0.00	-9.46	0.50	8.6	0.817E-03	0.50	0.95	0.50	0.00
0.00	-9.93	0.50	8.8	0.796E-03	0.50	1.00	0.50	0.00
0.00	-10.39	0.50	9.0	0.777E-03	0.50	1.05	0.50	0.00
0.00	-10.86	0.50	9.2	0.759E-03	0.50	1.10	0.50	0.00

0.00	0.00	-11.32	0.50	9.4	0.742E-03	0.50	1.15	0.50
0.00	0.00	-11.78	0.50	9.6	0.726E-03	0.50	1.20	0.50
0.00	0.00	-12.25	0.50	9.8	0.711E-03	0.50	1.25	0.50
0.00	0.00	-12.71	0.50	10.0	0.697E-03	0.50	1.31	0.50
0.00	0.00	-13.18	0.50	10.2	0.684E-03	0.50	1.36	0.50
0.00	0.00	-13.64	0.50	10.4	0.672E-03	0.50	1.41	0.50
0.00	0.00	-14.10	0.50	10.6	0.660E-03	0.50	1.46	0.50
0.00	0.00	-14.57	0.50	10.8	0.649E-03	0.50	1.51	0.50
0.00	0.00	-15.03	0.50	11.0	0.638E-03	0.50	1.56	0.50
0.00	0.00	-15.50	0.50	11.2	0.628E-03	0.50	1.61	0.50
0.00	0.00	-15.96	0.50	11.3	0.618E-03	0.50	1.66	0.50
0.00	0.00	-16.43	0.50	11.5	0.609E-03	0.50	1.71	0.50
0.00	0.00	-16.89	0.50	11.7	0.600E-03	0.50	1.76	0.50
0.00	0.00	-17.35	0.50	11.8	0.592E-03	0.50	1.81	0.50
0.00	0.00	-17.82	0.50	12.0	0.584E-03	0.50	1.86	0.50
0.00	0.00	-18.28	0.50	12.2	0.576E-03	0.50	1.91	0.50
0.00	0.00	-18.75	0.50	12.3	0.568E-03	0.50	1.96	0.50
0.00	0.00	-19.21	0.50	12.5	0.561E-03	0.50	2.01	0.50
0.00	0.00	-19.67	0.50	12.6	0.554E-03	0.50	2.07	0.50
0.00	0.00	-20.14	0.50	12.8	0.547E-03	0.50	2.12	0.50
0.00	0.00	-20.60	0.50	12.9	0.541E-03	0.50	2.17	0.50
0.00	0.00	-21.07	0.50	13.1	0.535E-03	0.50	2.22	0.50
0.00	0.00	-21.53	0.50	13.2	0.529E-03	0.50	2.27	0.50
0.00	0.00	-21.99	0.50	13.4	0.523E-03	0.50	2.32	0.50
0.00	0.00	-22.46	0.50	13.5	0.517E-03	0.50	2.37	0.50
0.00	0.00	-22.92	0.50	13.7	0.512E-03	0.50	2.42	0.50
0.00	0.00	-23.39	0.50	13.8	0.507E-03	0.50	2.47	0.50
0.00	0.00	-23.85	0.50	14.0	0.502E-03	0.50	2.52	0.50
0.00	0.00	-24.31	0.50	14.1	0.497E-03	0.50	2.57	0.50
0.00	0.00	-24.78	0.50	14.2	0.492E-03	0.50	2.62	0.50
0.00	0.00	-25.24	0.50	14.4	0.487E-03	0.50	2.67	0.50

0.00								
	0.00	-25.71	0.50	14.5	0.482E-03	0.50	2.72	0.50
0.00								
	0.00	-26.17	0.50	14.6	0.478E-03	0.50	2.77	0.50
0.00								
	0.00	-26.63	0.50	14.8	0.474E-03	0.50	2.83	0.50
0.00								
	0.00	-27.10	0.50	14.9	0.470E-03	0.50	2.88	0.50
0.00								
	0.00	-27.56	0.50	15.0	0.465E-03	0.50	2.93	0.50
0.00								
	0.00	-28.03	0.50	15.2	0.462E-03	0.50	2.98	0.50
0.00								
	0.00	-28.49	0.50	15.3	0.458E-03	0.50	3.03	0.50
0.00								
	0.00	-28.95	0.50	15.4	0.454E-03	0.50	3.08	0.50
0.00								
	0.00	-29.42	0.50	15.6	0.450E-03	0.50	3.13	0.50
0.00								
	0.00	-29.88	0.50	15.7	0.447E-03	0.50	3.18	0.50
0.00								
	0.00	-30.35	0.50	15.8	0.443E-03	0.50	3.23	0.50
0.00								
	0.00	-30.81	0.50	15.9	0.440E-03	0.50	3.28	0.50
0.00								
	0.00	-31.27	0.50	16.0	0.436E-03	0.50	3.33	0.50
0.00								
	0.00	-31.74	0.50	16.2	0.433E-03	0.50	3.38	0.50
0.00								
	0.00	-32.20	0.50	16.3	0.430E-03	0.50	3.43	0.50
0.00								
	0.00	-32.67	0.50	16.4	0.427E-03	0.50	3.48	0.50
0.00								
	0.00	-33.13	0.50	16.5	0.424E-03	0.50	3.54	0.50
0.00								
	0.00	-33.60	0.50	16.6	0.421E-03	0.50	3.59	0.50
0.00								
	0.00	-34.06	0.50	16.8	0.418E-03	0.50	3.64	0.50
0.00								
	0.00	-34.52	0.50	16.9	0.415E-03	0.50	3.69	0.50
0.00								
	0.00	-34.99	0.50	17.0	0.412E-03	0.50	3.74	0.50
0.00								
	0.00	-35.45	0.50	17.1	0.409E-03	0.50	3.79	0.50
0.00								
	0.00	-35.92	0.50	17.2	0.406E-03	0.50	3.84	0.50
0.00								
	0.00	-36.38	0.50	17.3	0.404E-03	0.50	3.89	0.50
0.00								
	0.00	-36.84	0.50	17.4	0.401E-03	0.50	3.94	0.50
0.00								
	0.00	-37.31	0.50	17.6	0.399E-03	0.50	3.99	0.50
0.00								
	0.00	-37.77	0.50	17.7	0.396E-03	0.50	4.04	0.50
0.00								
	0.00	-38.24	0.50	17.8	0.394E-03	0.50	4.09	0.50
0.00								
	0.00	-38.70	0.50	17.9	0.391E-03	0.50	4.14	0.50
0.00								
	0.00	-39.16	0.50	18.0	0.389E-03	0.50	4.19	0.50
0.00								

```
      0.00    -39.63     0.50     18.1 0.387E-03    0.50      4.24     0.50
0.00
      0.00    -40.09     0.50     18.2 0.384E-03    0.50      4.30     0.50
0.00
      0.00    -40.56     0.50     18.3 0.382E-03    0.50      4.35     0.50
0.00
      0.00    -41.02     0.50     18.4 0.380E-03    0.50      4.40     0.50
0.00
      0.00    -41.48     0.50     18.5 0.378E-03    0.50      4.45     0.50
0.00
      0.00    -41.95     0.50     18.6 0.375E-03    0.50      4.50     0.50
0.00
      0.00    -42.41     0.50     18.7 0.373E-03    0.50      4.55     0.50
0.00
      0.00    -42.88     0.50     18.9 0.371E-03    0.50      4.60     0.50
0.00
      0.00    -43.34     0.50     19.0 0.369E-03    0.50      4.65     0.50
0.00
      0.00    -43.80     0.50     19.1 0.367E-03    0.50      4.70     0.50
0.00
      0.00    -44.27     0.50     19.2 0.365E-03    0.50      4.75     0.50
0.00
      0.00    -44.73     0.50     19.3 0.363E-03    0.50      4.80     0.50
0.00
      0.00    -45.20     0.50     19.4 0.361E-03    0.50      4.85     0.50
0.00
      0.00    -45.66     0.50     19.5 0.360E-03    0.50      4.90     0.50
0.00
      0.00    -46.12     0.50     19.6 0.358E-03    0.50      4.95     0.50
0.00
      0.00    -46.59     0.50     19.7 0.356E-03    0.50      5.01     0.50
0.00
      0.00    -47.05     0.50     19.8 0.354E-03    0.50      5.06     0.50
0.00
      0.00    -47.52     0.50     19.9 0.352E-03    0.50      5.11     0.50
0.00
      0.00    -47.98     0.50     20.0 0.351E-03    0.50      5.16     0.50
0.00
      0.00    -48.44     0.50     20.1 0.349E-03    0.50      5.21     0.50
0.00
      0.00    -48.91     0.50     20.2 0.347E-03    0.50      5.26     0.50
0.00
      0.00    -49.37     0.50     20.3 0.346E-03    0.50      5.31     0.50
0.00
      0.00    -49.84     0.50     20.3 0.344E-03    0.50      5.36     0.50
0.00
      0.00    -50.30     0.50     20.4 0.342E-03    0.50      5.41     0.50
0.00
      0.00    -50.76     0.50     20.5 0.341E-03    0.50      5.46     0.50
0.00
 Cumulative travel time =          596. sec

 Entire region is occupied by Phase 1.
   Plume does not re-stratify in this flow region.

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW
-----------------------------------------------------------------------
-----
** End of NEAR-FIELD REGION (NFR) **

 SIMULATION STOPS because of STAGNANT AMBIENT conditions.
```

All far-field processes will be UNSTEADY.

CORMIX1: Submerged Single Port Discharges End of Prediction File

11111111111111111111111111111111111111111111111111111111111111111111111111111

8/27/2014 1:19:59 PM

Facility = Dahlgren Wastewater Treatment Plant
Chemical = Ammonia (Annual)
Chronic averaging period = 30
WLAa = 131 Values are expressed as mg/L.
WLAc = 19.6
Q.L. = .2
# samples/mo. = 12
# samples/wk. = 3

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

Attachment 10

Untitled

Model Using VIMS TPWQM
Date: Wed,August 28,2002

Receiving stream : Upper Machodoc 2
Facility Name : Dahlgren WWTP
Permit Number : VA0026514

Effluent Quality Characteristics

Discharge : 1.00 MGD
TP : 2.00 mg/l
TKN : 10.00 mg/l
CBOD5 : 25.00 mg/l
DO : 6.00 mg/l
FCB : 200.00 mg/l

Model Predictions

Spatially MINIMUM daily mean DO : 5.72 mg/l
Spatially MINIMUM daily minimum DO : 5.64 mg/l
Spatially MAXIMUM daily mean chlorophyll : 8.36 µg/l
Spatially MAXIMUM daily mean BOD5 : 2.01 mg/l
Spatially MAXIMUM daily mean TKN : 0.39 mg/l

Water Quality Standard is MET !!!

Attachment 1

Untitled

Model Using VIMS TPWQM
Date: Wed,August 28,2002

Receiving stream : Upper Machodoc 2
Facility Name : Dahlgren WWTP
Permit Number : VA0026514

Effluent Quality Characteristics

Discharge : 1.00 MGD
tP : 2.00 mg/l
TKN : 15.00 mg/l
CBOD5 : 25.00 mg/l
dO : 6.00 mg/l
FCB : 200.00 mg/l

Model Predictions

Spatially MINIMUM daily mean DO : 5.70 mg/l
Spatially MINIMUM daily minimum DO : 5.62 mg/l
spatially MAXIMUM daily mean chlorophyll : 9.28 µg/l
spatially MAXIMUM daily mean BOD5 : 2.03 mg/l
Spatially MAXIMUM daily mean TKN : 0.39 mg/l

Water Quality Standard is MET !!!

Model Using VIMS TPWQM
Date: Wed,August 28,2002

Receiving stream : Upper Machodoc 2
Facility Name : Dahlgren WWTP
Permit Number : VA0026514

Effluent Quality Characteristics

Discharge : 1.00 MGD
tP : 2.00 mg/l
TKN : 20.00 mg/l
CBOD5 : 25.00 mg/l
dO : 6.00 mg/l
FCB : 200.00 mg/l

Model Predictions

Spatially MINIMUM daily mean DO : 5.69 mg/l
Spatially MINIMUM daily minimum DO : 5.61 mg/l
spatially MAXIMUM daily mean chlorophyll : 10.21 µg/l
Spatially MAXIMUM daily mean BOD5 : 2.05 mg/l
Spatially MAXIMUM daily mean TKN : 0.41 mg/l

Water Quality Standard is MET !!!

BIOMONITORING RESULTS
Dahlgren District Wastewater Treatment Plant (VA0026514)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	48-hr LC_{50} (%)	IC_{25} (%)	NOEC (%)	% SURV	TU_c	LAB	REMARKS
8/6/07	Chronic *P. promelas*	>100	>100	100 SG	100	1	JR	Composite sample temperature > 6° C test invalid
2/4/08	Chronic *P. promelas*	>100	>100	100 SG	92.5	1	JR	
8/4/08	Chronic *P. promelas*	>100	>100	100 SG	97.5	1	JR	Composite sample temperature > 6° C test invalid
Permit Reissued 12 January 2009								
02/24/09	Chronic *A. bahia*	>100	>100	100 S 100 G	90	2.17	JR	1st quarter
02/24/09	Chronic *C. variegatus*	>100	>100	100 SG	100	1.0		
06/22/09	Chronic *A. bahia*	>100	>13.7	10 S 4 G	27.5	25	JR	2nd quarter
06/22/09	Chronic *C. variegatus*	>100	>100	100 SG	100	1.0		
09/21/09	Chronic *A. bahia*	>100	>13.7	100 SG	90	1.0	JR	3rd quarter
09/21/09	Chronic *C. variegatus*	>100	>100	100 SG	100	1.0		
11/30/09	Chronic *A. bahia*	>100	61.3	46 SG	97.5	2.17	JR	4th quarter
11/30/09	Chronic *C. variegatus*	>100	>100	100 S 21G	92.5	4.76		
03/09/10	Chronic *A. bahia*	>100	84	100 S 46 G	92.5	2.17	JR	5th quarter
03/09/10	Chronic *C. variegatus*	>100	>100	100 SG	100	1		
06/22/10	Chronic *A. bahia*	>100	75.4	46 S 21 G	72.5	4.76	JR	6th quarter
06/22/10	Chronic *C. variegatus*	>100	>100	100 SG	100	1		
09/28/10	Chronic *A. bahia*	>100	77.9	46 S 46 G	55	2.17	JR	7th quarter
09/28/10	Chronic *C. variegatus*	>100	>100	100 SG	100	1		
11/16/10	Chronic *A. bahia*	>100	63.1	46 S 46 G	50	2.17	JR	8th quarter
11/16/10	Chronic *C. variegatus*	>100	>100	100 SG	100	1		
04/19/11	Chronic *A. bahia*	>100	>100	100 S 46 G	95	2.17	JR	1st annual
04/19/11	Chronic *C. variegatus*	>100	>100	100 SG	100	1		
05/15/12	Chronic *A. bahia*	>100	52.1	46 S 4 G	55	25	JR	2nd annual
05/16/12	Chronic *C. variegatus*	>100	>100	100 SG	100	1		

FOOTNOTES:

A **bold** faced value for LC_{50} or NOEC indicates that the test failed the criteria.
LC50 based on observation at the end of 48 hours.

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth
INV – Invalid test
% SURV – Percent survival in 100% effluent
JR – James Reed & Associates

Attachment 12

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR					
	Revision Date: 12/13/13											
	File: WETLIM10.xls			ACUTE	2.92514937	TUa	LC_{50} =	35	% Use as	2.86	TUa	
	(MIX.EXE required also)											
				ACUTE WLAa		6	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	29.2514937	TU_c	NOEC =	4	% Use as	25.00	TU_c	
				BOTH*	60.0000015	TU_c	NOEC =	2	% Use as	50.00	TU_c	
	Enter data in the cells with blue type:			AML	29.2514937	TU_c	NOEC =	4	% Use as	25.00	TU_c	
	Entry Date:	07/24/14		ACUTE WLAa,c		60		Note: Inform the permittee that if the mean				
	Facility Name:	Dahlgren District		CHRONIC WLAc		20		of the data exceeds this TUc:			12.0207464	
	VPDES Number:	VA0026514		* Both means acute expressed as chronic				a limit may result using STATS.EXE				
	Outfall Number:	1										
				% Flow to be used from MIX.EXE				Diffuser /modeling study?				
	Plant Flow:	1	MGD					Enter Y/N	Y			
	Acute 1Q10:	0	MGD	100	%			Acute	20	:1		
	Chronic 7Q10:	0	MGD	100	%			Chronic	20	: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	5	%	Plant flow/plant flow + 1Q10			NOTE: If the IWCa is >33%, epecify the					
	IWC_c	5	%	Plant flow/plant flow + 7Q10			NOAEC = 100% test/endpoint for use					
	Dilution, acute	20		100/IWCa								
	Dilution, chronic	20		100/IWCc								
	WLA_a	6	Instream criterion (0.3 TUa) X's Dilution, acute									
	WLA_c	20	Instream criterion (1.0 TUc) X's Dilution, chronic									
	$WLA_{a,c}$	60	ACR X's WLA_c - 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.					
	$LTA_{a,c}$	24.656682	WLAa,c X's eA									
	LTA_c	12.020746	WLAc X's eB							Rounded NOEC's		%
	MDL** with $LTA_{a,c}$	60.00000147	TU_c	NOEC =	1.666667	(Protects from acute/chronic toxicity)				NOEC =	2	%
	MDL** with LTA_c	29.25149368	TU_c	NOEC =	3.418629	(Protects from chronic toxicity)				NOEC =	4	%
	AML with lowest LTA	29.25149368	TU_c	NOEC =	3.418629	Lowest LTA X's eD				NOEC =	4	
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a											
										Rounded LC50's		%
	MDL with $LTA_{a,c}$	6.000000147	TU_a	LC50 =	16.666666	%				LC50 =	17	%
	MDL with LTA_c	2.925149368	TU_a	LC50 =	34.186288	%				LC50 =	35	

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 = -0.889296666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

ACR used: 10

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

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

NO DATA	$\%LC_{50}$	
NO DATA	TUa	

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	8.3	12.02075		
Dilution series to use for limit			4	25
Dilution factor to recommend:	0.2884259		0.2	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	28.8	3.47	20.0	5.00
	8.3	12.02	4.0	25.00
	2.4	41.68	0.8	125.00
	0.69	144.50	0.2	625.00
Extra dilutions if needed	0.20	500.99	0.0	3125.00
	0.06	1736.98	0.0	15625.00

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

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

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

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

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

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

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

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

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

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

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

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

7/24/2014 8:30:46 AM

Facility = Dahlgren District WWTP
Chemical = Chronic Toxicity - C. variegatus
Chronic averaging period = 4
WLAa = 61.5
WLAc = 20.5
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 1.32014
Variance = .480358
C.V. = 0.525001
97th percentile daily values = 2.95677
97th percentile 4 day average = 2.07505
97th percentile 30 day average= 1.55816
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

1
1
1
4.76
1
1
1
1
1
1

7/24/2014 8:29:52 AM

Facility = Dahlgren District WWTP
Chemical = Chronic Toxicity - A. bahia
Chronic averaging period = 4
WLAa = 61.5
WLAc = 20.5
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 6.44100
Variance = 95.7168
C.V. = 1.518940
97th percentile daily values = 27.7105
97th percentile 4 day average = 18.2531
97th percentile 30 day average= 9.80087
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

2.17
25
1
2.17
2.17
4.76
2.17
2.17
2.17
25

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in King George County, Virginia.

PUBLIC COMMENT PERIOD: XXX, 2014 to XXX, 2014

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: King George County Service Authority, 9207 Kings Highway, King George, VA 22485, VA0026514

NAME AND ADDRESS OF FACILITY: Dahlgren Wastewater Treatment Plant; 16383 Dahlgren Road, King George, VA 22485

PROJECT DESCRIPTION: King George County Service Authority has applied for a reissuance of a permit for the public Dahlgren Wastewater Treatment Plant. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 1.0 million gallons per day into a water body. The sludge will be disposed by aerobic digestion, de-watering, and hauled to the King George County Landfill for final disposal. The facility proposes to release the treated sewage in the Williams Creek in King George County in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, $cBOD_5$, Total Suspended Solids, Total Kjeldahl Nitrogen, Dissolved Oxygen, Fecal Coliform, Enterococci, Total Nitrogen, Total Phosphorus, Chronic 7-day Static Renewal – *Mysidopsis bahia*, and Chronic 7-day Static Renewal *Cyprinodon variegatus*.

This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.
Name: Joan C. Crowther
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3925 E-mail: joan.crowther@deq.virginia.gov Fax: (703) 583-3821

King George County, Virginia

KING GEORGE COUNTY
SERVICE AUTHORITY
"Quality on Tap"

9207 Kings Highway
King George, Virginia 22485
Telephone (540) 775-2746
Fax (540) 775-5560

VA DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN
DEC 02 2014
REGIONAL OFFICE
WOODBRIDGE, VA

November 20, 2014

Ms. Joan C. Crowther
Virginia Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, Virginia 22193-1453

RE: VPDES Permit No. VA002614, Dahlgren Wastewater Treatment Plant , VPDES Draft Permit and Fact Sheet, King George County-KGCSA Permit Review Comments (DEQ Letter dated October 14, 2014)

Dear Ms. Crowther:

The King George County Service Authority (KGCSA) would like to acknowledge receipt of the referenced Draft Permit for Reissuance of the Dahlgren WWTP VPDES Permit. KGCSA has reviewed the Draft documents and provide the following comments:

1. **Permit Fact Sheet Cover Page, Paragraph 1:** KGCSA does not understand the need to reissue or process this Permit as a Major Permit or to include a tiered discharge structure. As you know, the Dahlgren WWTP is currently under construction for an upgrade to address Nutrient violations resulting from a 2012 Consent Order. The upgrade is nearing completion and the Certificate to Operate is anticipated by December 31, 2014. The upgrade will result in improved nutrient removal via denitrification by IFAS technology. The installation of the IFAS units resulted in a loss of treatment volume and overall capacity which reduces the plant to a Minor facility. Therefore, the proposed Permit should be reissued as a Minor facility with a treatment capacity of 0.97 MGD.
2. **Permit Fact Sheet Cover Page, Section 2:** Other Permits associated with facility should include the respective General Permit.
3. **Permit Fact Sheet Cover Page, Footnote 1:** As explained in Comment 1, above, there is no need to include this footnote.
4. **Permit Fact Sheet, Page 2 of 18, Section 10:** The 1.0 MGD facility consists of two secondary clarifiers, not three, operated in parallel and a rotating disk filter, not sand filtration. These units will remain in use with the upgraded facility.

Attachment 14

5. **Permit Fact Sheet, Page 3 of 18, Section 10:** The 1,500 gallon Bulk Supplemental Carbon Tank utilizes "BioCarb" not liquid molasses. The BioCarb provides more carbon per gallon than molasses.
6. **Permit Fact Sheet, Page 3 of 18, Section 10:** The upgrade resulted in the installation of two continuous nitrate sensors. The first is installed in the anoxic ditch (outer ring) and the other is installed at the UV channel.
7. **Permit Fact Sheet, Page 4 of 18, Section 10, Item 7:** The 2mm step screen replaced the headworks comminutor and auger system.
8. **Permit Fact Sheet, Page 4 of 18, Section 10, Table 1-Outfall Description:** Delete 1.0 MGD as per KGCSA Comment 1, above.
9. **Permit Fact Sheet, Page 7 of 18, Section 14, Site Inspection:** A more recent site inspection report is available. The site inspection was done by Rebecca Johnson during the summer of 2014. All items in the December 20, 2011 inspection were previously addressed by KGCSA. The most recent inspection report should be referenced.
10. **Permit Fact Sheet, Page 7 of 18, Section 15, Water Quality Standards**: The 2012 Integrated Report states that the open water aquatic life subuse is considered insufficient, yet the thirty day mean is acceptable. Additionally, the seven day mean and instantaneous levels have not been assessed. How does this mean it is considered insufficient? The same comment applies to the deep-water subuse. Lastly, why were the wildlife fish consumption and recreation uses not assessed?
11. **Permit Fact Sheet, Page 7 of 18, Section 15, Table No. 6:** The Basis for WLA column refers to 1.0 MGD. Upon issuance of the Certificate to Operate, the Plant capacity will be 0.97 MGD. Does the TMDL apply for Minor Municipals?
12. **Permit Fact Sheet, Page 8 of 18, Section 15, Dissolved Oxygen Criteria:** Why doesn't the proposed Permit limits for dissolved oxygen reflect both the "Migratory fish spawning and nursery" and "Open Water" Criteria? The proposed limit is 6.0 mg/L minimum.
13. **Permit Fact Sheet, Page 9 of 18, Section 15, Total Hardness for Hardness-Dependent Metals Criteria:** The referenced Attachment 7 established the average hardness of the receiving stream at 204 mg/L in 1977. According to the attachment, this average was calculated from a single sampling event, May 13, 1977, at three (3) different sampling stations along the channel. Is there any more recent sampling data for this segment? **KGCSA does not see the need for additional hardness sampling, at the proposed frequency, since it has been previously determined to exclude any permit limits for hardness-dependent metals.**
14. **Permit Fact Sheet, Page 10 of 18, Section 15, Adjacent State's Water Quality Standards:** Please, include a date that the draft permit was sent to the State of Maryland.
15. **Permit Fact Sheet, Page 12 of 18, Section 17, Effluent Screening, Wasteload Allocation, and Effluent Limitation Development, Subsection (1), Ammonia as N/TKN:** This Section states that a wasteload allocation analysis was done utilizing the "Tidal Prism Model for Small Tidal Basins". The model outputs

referenced, as Attachment 11, indicate that the Water Quality Standards are met for TKN values up to a value of 20 mg/L. It appears that the "Best Professional Judgment" was exercised to minimize the increase in the "Chlorophyll a" levels. KGCSA has noticed the referenced model Effluent Quality Characteristics used in the model included a Total Phosphorus concentration of 2.00 mg/L. Why was this Phosphorus concentration value used and how does this affect the model predictions for chlorophyll a?

16. **Permit Fact Sheet, Pages 13, 14, and 15 of 18, Section 19A & 19B, Effluent Limitations and Monitoring Summary:** KGCSA believes that the Permit Limits and Sampling frequencies should be based on the plant capacity of 0.97 MGD. As mentioned previously, the Certificate to Operate the upgraded plant is anticipated by December 31, 2014. Therefore, there is no need to include limits and monitoring requirements for the 1.0 MGD facility. The SCAT Regulations provides monitoring frequencies for design flows of 0.101 MGD to 0.999 MGD that differ from the frequencies proposed in the referenced limit tables. The SCAT Regulations provide for 8-hour composite samples, 3 days per week for cBOD, TSS, and TKN. The SCAT Regulations also provide a frequency of 3 days per week for Fecal Coliform and Enterococci. KGCSA requests that the monitoring frequency and composite sample durations for this Permit to be consistent with the SCAT Regulations.
17. **Permit Fact Sheet, Page 16 of 18, Section 20(c), Other Permit Requirements, Whole Effluent Toxicity Program:** KGCSA would like to point out that the design capacity of the upgraded facility is 0.97 MGD and therefore falls below the 1.0 MGD for a TMP. Additionally, the WET Calculations referenced in Attachment 12 indicate that no limits are required for either toxicity species listed on the proposed Effluent Limits Table 19B of the Fact Sheet. Therefore, KGCSA requests that this requirement be eliminated or the frequency significantly reduced.
18. **Permit Fact Sheet, Page 17 of 18, Section 21(g), Sludge Reopener:** The last sentence of this paragraph does not make sense. The facility is a sewage treatment works. However, the facility includes a sludge treatment works.
19. **Permit Fact Sheet, Page 17 of 18, Section 21(n), PCB Pollutant Minimization Plan:** How can unknown sources of low-level PCB be identified. KGCSA suggests the language be modified to "identify any sources of low-level PCB's".
20. **Permit Fact Sheet, Page 18 of 18, Section 23, Changes to the Permit from the Previous:** KGCSA does not agree with DEQ staff "best professional opinion" stated in the first paragraph of this page. The SCAT Regulations, as referenced in our Comment 16, above, provide for lower monitoring frequencies and sample types. KGCSA requests that the SCAT Regulations govern the monitoring requirements for this Permit. The past effluent limitation exceedances and plant history have resulted in the current Consent Order and Plant Upgrade. This upgrade will address these issues and provide for real time monitoring, automatic control, and more efficient operation of the plant.
21. **Permit Fact Sheet, Page 18 of 18, Section 26, Additional Comments:** Item number 2 for previous Board actions incorrectly states that DEQ staff is

currently negotiating "another" Consent Order for Total Nitrogen. This order has been executed and will be addressed as part of the September 27, 2012 Consent Order corrective action and compliance plan. These measures are under construction with the current upgrade project. The Certificate to Operate is anticipated by December 31, 2014. DEQ may want to include this Order as an Attachment.

Draft Permit Comments: KGCSA provides the following comments on the Draft Permit. The comments listed above are also applicable to the actual Draft Permit document:

22. **Part I, Page 1 of 12:** KGCSA requests that this Effluent Limitations and Monitoring Requirement be removed from the Permit for the reasons listed above.
23. **Part I, Page 2 of 12:** KGCSA requests that the Monitoring Frequency and Sample Types are as recommended in the SCAT Regulations and as explained in Comment 16, above.
24. **Part I, Page 2 of 12:** KGCSA does not see the merits of continuing to sample for Total Hardness at the frequency proposed or at all.
25. **Part I, Page 2 of 12:** KGCSA requests removal or a reduction in frequency and sample type for the Chronic Toxicity parameters as detailed in Comment 17, above.
26. **Part I, Page 3 of 12, Quantification Levels and Compliance Reporting Section B1a:** There is no QL provided for Nitrates/Nitrites, Phosphorus, Fecal Coliform, and Enterococci. Please, provide QL or guidance on how to address values below QL's where QL's are not provided.
27. **Part I, Page 3 of 12, Quantification Levels and Compliance Reporting Section B2:** There is no methodology provided for calculating the Geometric Mean or how to address results below QL's. There is also no methodology for rounding Geometric Mean results.
28. **Part I, Page 4 of 12, Quantification Levels and Compliance Reporting Section B3d:** There appears to be a discrepancy between how TKN values are treated when they are below QL's. The result is treated as a zero for calculating averages for TKN as a conventional parameter, as explained in Section 2B(2a) & 2B(2b). However, this paragraph, Section B3d, provides several ways to address values below the QL's for TKN as a nutrient parameter. Why are these situations treated differently?
29. **Part I, Page 7 of 12, Whole Effluent Toxicity Program Requirements, Section D:** KGCSA requests removal of this requirement based on the reasons provided in Comment 17, above.
30. **Part I, Page 1 of 8, Section A3, Monitoring:** Please, explain why operational or process control samples or measurements shall not be taken at the designated permit sampling or measurement locations.

Please, do not hesitate to contact me if you have any questions or comments concerning this matter. KGCSA looks forward to receiving the Permit Reissue documents and the Final Permit.

Sincerely,

Christopher F. Thomas, P.E.
General Manager

CC: Travis Quesenberry, P.E., County Administrator
Eric Gregory, County Attorney
Ignatius Mutoti, P.E., Retaw Engineering
Scott Sweeney, Superintendent of Operations
Jeff Hockaday, Waste Water Manager

COMMONWEALTH of VIRGINIA

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December 11, 2014

By Email (*cthomas@co.kinggeorge.state.va.us*)

Mr. Christopher F. Thomas, P.E.
General Manager
King George County Service Authority
9207 Kings Highway
King George, VA 22485

Re: VPDES Permit No. VA0026514, Dahlgren Wastewater Treatment Plant, Response to King George Service Authority's Comments on the VPDES Draft Permit and Fact Sheet Received November 24, 2014, King George County

Dear Mr. Thomas:

DEQ received King George Service Authority's comments to the draft permit and fact sheet on November 24, 2014. Our response to your comments is as follows:

1. **Permit Fact Sheet Cover Page, Paragraph 1:** KGCSA does not understand the need to reissue or process this Permit as a Major Permit or to include a tiered discharge structure. As you know, the Dahlgren WWTP is currently under construction for an upgrade to address Nutrient violations resulting from a 2012 Consent Order. The upgrade is nearing completion and the Certificate to Operate is anticipated by December 31, 2014. The upgrade will result in improved nutrient removal via denitrification by IFAS technology. The installation of the IFAS units resulted in a loss of treatment volume and overall capacity which reduces the plant to a Minor facility. Therefore, the proposed Permit should be reissued as a Minor facility with a treatment capacity of 0.97 MGD.

   The permitted design flow is currently 1.0 MGD and will remain so until the CTO has been issued for the design flow of 0.97 MGD. If the wastewater treatment plant's design flow is 1.0 MGD or greater, the facility is considered a Major facility; therefore, the Dahlgren Wastewater Treatment Plant VPDES Permit will be reissued as Major facility. No change to the fact sheet is necessary.

2. **Permit Fact Sheet Cover Page, Section 2:** Other Permits associated with facility should include the respective General Permit.

   This portion of the Fact Sheet deals with other permits associated with the facility other than VPDES Permits. In Accordance with EPA Form 1 Application Item10, no other permits were listed that were associated with this facility. The VPDES General Permit is currently listed in the appropriate section under Item 2. No change to the fact sheet is necessary.

3. **Permit Fact Sheet Cover Page, Footnote 1:** As explained in Comment 1, above, there is no need to include this footnote.

   See DEQ comment in No.1. No change to the fact sheet is necessary.

4. **Permit Fact Sheet, Page 2 of 18, Section 10:** The 1.0 MGD facility consists of two secondary clarifiers, not three, operated in parallel and a rotating disk filter, not sand filtration. These units will remain in use with the upgraded facility.

   The fact sheet will be revised accordingly.

5. **Permit Fact Sheet, Page 3 of 18, Section 10:** The 1,500 gallon Bulk Supplemental Carbon Tank utilizes "BioCarb" not liquid molasses. The BioCarb provides more carbon per gallon than molasses.

   This excerpt was taken directly from the Water Quality Improvement Fund's Grant No. 440-S-14-04 for the Dahlgren WWTP's upgrade dated April 25, 2014 and the Certificate to Construct dated August 30, 2013. The excerpt was updated with this additional information.

6. **Permit Fact Sheet, Page 3 of 18, Section 10:** The upgrade resulted in the installation of two continuous nitrate sensors. The first is installed in the anoxic ditch (outer ring) and the other is installed at the UV channel.

   This excerpt was taken directly from the Water Quality Improvement Fund's Grant No. 440-S-14-04 for the Dahlgren WWTP's upgrade dated April 25, 2014 and the Certificate to Construct dated August 30, 2013. The excerpt was updated with this additional information.

7. **Permit Fact Sheet, Page 4 of 18, Section 10, Item 7:** The 2mm step screen replaced the headworks comminutor and auger system.

   This excerpt was taken directly from the Water Quality Improvement Fund's Grant No. 440-S-14-04 for the Dahlgren WWTP's upgrade dated April 25, 2014 and the Certificate to Construct dated August 30, 2013. The excerpt was updated with this additional information.

8. **Permit Fact Sheet, Page 4 of 18, Section 10, Table 1-Outfall Description:** Delete 1.0 MGD as per KGCSA Comment 1, above.

   See DEQ comment in No.1. No change to the fact sheet is necessary.

9. **Permit Fact Sheet, Page 7 of 18, Section 14, Site Inspection:** A more recent site inspection report is available. The site inspection was done by Rebecca Johnson during the summer of 2014. All items in the December 20, 2011 inspection were previously addressed by KGCSA. The most recent inspection report should be referenced.

   At the time that the fact sheet and permit were being drafted, the site inspection conducted on July 9, 2014 at the Dahlgren Wastewater Treatment Plant was not completed nor available to be inserted in the fact sheet. The July 9, 2014 site inspection report will be inserted in the fact sheet as Attachment 3.

10. **Permit Fact Sheet, Page 7 of 18, Section 15, Water Quality Standards:** The 2012 Integrated Report states that the open water aquatic life subuse is considered insufficient, yet the thirty day mean is acceptable. Additionally, the seven day mean and instantaneous levels have not been assessed. How does this mean it is considered insufficient? The same comment applies to the deep-water subuse. Lastly, why were the wildlife fish consumption and recreation uses not assessed?

    Each of the aquatic life subuses have at least one or more criteria for dissolved oxygen. For the open water subuse, the following dissolved oxygen criteria apply: 30 day mean, 7 day mean, and instantaneous minimum. The deep water subuse also has 3 dissolved oxygen criteria: 30 day mean, 1 day mean and instantaneous minimum. In general, if one of the dissolved oxygen criterion for a subuse is found acceptable, then the subuse can be assessed as supporting. However, this generalization does not apply to Williams Creek because it is a Consent Decree water. Williams Creek was included in Attachment B of the 1999 Consent Decree (Plaintiff's list of waters) and Attachment C (Plaintiff's list of waters that were added to the 303(d) list in 2002) for dissolved oxygen. As a Consent Decree water, all of the dissolved oxygen criteria in Williams Creek need to be assessed (as acceptable) before a subuse can be considered supporting. There are methods in place to assess the 30 day mean, but not the 7 day mean, 1 day mean or the instantaneous minimum at this time. For the Williams Creek open water subuse, the 30 day mean was acceptable, however since we were not able to assess for the 7 day mean and the instantaneous minimum, it was considered as insufficient in the 2012 Integrated Report. Likewise, the

deep water subuse was considered as insufficient because only the 30 day mean was assessed as acceptable. The 1 day mean and the instantaneous minimum were not assessed for this subuse.

The Dahlgren WWTP facility discharges into Williams Creek. The segment that receives the discharge is defined in the 2012 Integrated Report as the boundaries of the condemned (prohibited) area described in VDH Notice and Description of Shellfish Area Condemnation Number 001A-36, Upper Machodoc Creek, Section F, effective April 14, 2010. DEQ did not have data in this segment of Williams Creek to assess the wildlife, fish consumption and recreation uses for the 2012 Integrated Report. The 2012 Integrated Report consisted of data that was collected from January 1, 2005 through December 31, 2010.

11. **Permit Fact Sheet, Page 7 of 18, Section 15, Table No, 6:** The Basis for WLA column refers to 1.0 MGD. Upon issuance of the Certificate to Operate, the Plant capacity will be 0.97 MGD. Does the TMDL apply for Minor Municipals?

    Yes, it does not matter if a wastewater treatment plant is classified as a major or minor; the discharge is part of this TMDL. No change to the fact sheet is necessary.

12. **Permit Fact Sheet, Page 8 of 18, Section 15, Dissolved Oxygen Criteria:** Why doesn't the proposed Permit limits for dissolved oxygen reflect both the "Migratory fish spawning and nursery" and "Open Water" Criteria? The proposed limit is 6.0 mg/L minimum.

    The existing and proposed dissolved oxygen effluent limitation is based on the VIMS TPWQM stream model dated August 28, 2002 (Attachment 11 of the fact sheet). The model used effluent quality characteristics for dissolved oxygen as 6.0 mg/L. The model outputs indicated that water quality standards were met.

    The dissolved oxygen criteria (9VAC25-260-185) for Migratory fish spawning and nursery and Open-water are not as stringent as the dissolved oxygen requirement necessary to meet water quality standards as determined by the VIMS TPWQM stream model. In order to ensure that water quality standards are maintained in the receiving stream, the more stringent dissolve oxygen limitation is used. No change to the fact sheet is necessary.

13. **Permit Fact Sheet, Page 9 of 18, Section 15, Total Hardness for Hardness-Dependent Metals Criteria:** The referenced Attachment 7 established the average hardness of the receiving stream at 204 mg/L in 1977. According to the attachment, this average was calculated from a single sampling event, May 13, 1977, at three (3) different sampling stations along the channel. Is there any more recent sampling data for this segment? **KGCSA does not see the need for additional hardness sampling, at the proposed frequency, since it has been previously determined to exclude any permit limits for hardness-dependent metals.**

    There is additional Total Hardness data for DEQ's ambient monitoring stations located at 1AWLL001.30 and 1AWLL002.21. This Total Hardness data was collected in 1990 through 1999. Because this data is erratic, DEQ decided to use the 10th percentile of the data instead of the average. This would be a conservative number reflective of the receiving stream. The 10th percentile is 58 mg/L. This information was incorporated into the fact sheet. The Total Hardness attachment was updated. No other changes to the fact sheet were necessary based on this change.

14. **Permit Fact Sheet, Page 10 of 18, Section 15, Adjacent State's Water Quality Standards:** Please, include a date that the draft permit was sent to the State of Maryland.

    The draft permit and fact sheet was emailed to the State of Maryland on September 18, 2014. No comments were received. This will be updated in the fact sheet.

15. **Permit Fact Sheet, Page 12 of 18, Section 17, Effluent Screening, Wasteload Allocation, and Effluent Limitation Development, Subsection (1), Ammonia as N/TKN:** This Section states that a wasteload allocation analysis was done utilizing the "Tidal Prism Model for Small Tidal Basins". The model outputs referenced, as Attachment 11, indicate that the Water Quality Standards are met for TKN values up to a value of 20 mg/L. It appears that the "Best Professional Judgment" was exercised to minimize the increase in the "Chlorophyll a" levels. KGCSA has noticed the referenced model Effluent Quality Characteristics used in the model included a Total Phosphorus concentration of 2.00 mg/L. Why was this Phosphorus concentration value used and how does this affect the model predictions for chlorophyll a?

The Total Phosphorus concentration was based the receiving stream being designated as "nutrient enriched waters". If a wastewater treatment plant discharged into nutrient enriched waters, then a Total Phosphorus monthly average effluent limitation of 2.0 mg/L was incorporated into the permit. Upper Machodoc Creek had been designated as "nutrient enriched waters"; therefore, the Total Phosphorus concentration of 2.0 mg/L was used as an effluent quality characteristic in the VIMS TPWQM Model.

16. **Permit Fact Sheet, Pages 13, 14, and 15 of 18, Section 19A & 19B, Effluent Limitations and Monitoring Summary:** KGCSA believes that the Permit Limits and Sampling frequencies should be based on the plant capacity of 0.97 MGD. As mentioned previously, the Certificate to Operate the upgraded plant is anticipated by December 31, 2014. Therefore, there is no need to include limits and monitoring requirements for the 1.0 MGD facility. The SCAT Regulations provides monitoring frequencies for design flows of 0.101 MGD to 0.999 MGD that differ from the frequencies proposed in the referenced limit tables. The SCAT Regulations provide for 8-hour composite samples, 3 days per week for cBOD, TSS, and TKN. The SCAT Regulations also provide a frequency of 3 days per week for Fecal Coliform and Enterococci. KGCSA requests that the monitoring frequency and composite sample durations for this Permit to be consistent with the SCAT Regulations.

    The design flow tier of 1.0 MGD will remain in the draft permit as reasons stated in Item 1. Because of recent past effluent violations at the wastewater treatment plant, staff has determined that the sampling frequencies should remain as currently proposed in the draft permit. The sampling frequency will help evaluate the wastewater treatment plant upgrade and its ability to consistently and reliably meet effluent limits. The effluent sampling frequencies will not be reduced at this time for the 0.97 MGD. The sampling frequencies found in the SCATS Regulations and the VPDES Permit Manual (March 27, 2014) are suggested sampling frequencies and can be increased or decreased for any design flow as determined by DEQ staff. No change to the fact sheet is necessary.

17. **Permit Fact Sheet, Page 16 of 18, Section 20(c), Other Permit Requirements, Whole Effluent Toxicity Program:** KGCSA would like to point out that the design capacity of the upgraded facility is 0.97 MGD and therefore falls below the 1.0 MGD for a TMP. Additionally, the WET Calculations referenced in Attachment 12 indicate that no limits are required for either toxicity species listed on the proposed Effluent Limits Table 19B of the Fact Sheet. Therefore, KGCSA requests that this requirement be eliminated or the frequency significantly reduced.

    As stated in the fact sheet, once a WET limit has been established for a facility, it remains permanently as an effluent limitation. The sample frequency is once year and will not be reduced. No change to the fact sheet is necessary.

18. **Permit Fact Sheet, Page 17 of 18, Section 21(g), Sludge Reopener:** The last sentence of this paragraph does not make sense. The facility is a sewage treatment works. However, the facility includes a sludge treatment works.

    The first sentence of this special condition explains that according to this section of the VPDES Permit Regulation 9VAC25-310220.C that all wastewater treatment plants treating domestic waste shall include a reopener clause allowing the incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the Clean Water Act. This is a statement saying that this is a facility which includes a wastewater treatment plant; therefore, this special condition applies. No change to the fact sheet is necessary.

19. **Permit Fact Sheet, Page 17 of 18, Section 21(n), PCB Pollutant Minimization Plan:** How can unknown sources of low-level PCB be identified. KGCSA suggests the language be modified to "identify any sources of low-level PCB's".

    The purpose of the PCB Pollutant Minimization Plan is to identify known and unknown sources of low-level PCBs. This comment is merely a writing style comment; therefore, no change to the fact sheet is necessary. The intent of the statement is understood.

20. **Permit Fact Sheet, Page 18 of 18, Section 23, Changes to the Permit from the Previous:** KGCSA does not agree with DEQ staff "best professional opinion" stated in the first paragraph of this page. The SCAT Regulations, as referenced in our Comment 16, above, provide for lower monitoring frequencies and sample types. KGCSA requests that the SCAT Regulations govern the monitoring requirements for this Permit. The past effluent limitation exceedances and plant history have resulted in the current Consent Order and Plant Upgrade. This upgrade will address these issues and provide for real time monitoring, automatic control, and more efficient operation of the plant.

King George County Service Authority has received Grant funding twice for this wastewater treatment plant to meet the nutrient effluent limitations. The facility was unable to consistently meet the nitrogen effluent limitation after the first upgrade was complete which resulted in the Consent Order dated September 27, 2012. On April 25, 2014, King George County Service Authority entered into a grant contract for achieving the current performance TN standard of 4.0 mg/L and the Phase II grant agreement annual average performance standard of 3.0 mg/L. Because King George County Service Authority failed to meet the interim Total Nitrogen annual average concentration effluent limitation of 8.0 mg/L that was established in the September 2012 Consent Order for the year of 2013, a Consent Order was issued on November 7, 2014 to the King George County Service Authority resulting in a payment of a civil penalty of $1,330. Until such time that King George County Service Authority can consistently illustrate that it can operate and maintain the Dahlgren Wastewater Treatment Plant in a matter that no effluent limitation exceendances occur, DEQ is not willing to reduce the effluent parameter sampling frequencies. No change to the fact sheet is necessary.

21. **Permit Fact Sheet, Page 18 of 18, Section 26, Additional Comments:** Item number 2 for previous Board actions incorrectly states that DEQ staff is currently negotiating "another" Consent Order for Total Nitrogen. This order has been executed and will be addressed as part of the September 27, 2012 Consent Order corrective action and compliance plan. These measures are under construction with the current upgrade project. The Certificate to Operate is anticipated by December 31, 2014. DEQ may want to include this Order as an Attachment.

    This statement contained in the fact sheet is correct. Because King George County Service Authority failed to meet the interim Total Nitrogen annual average concentration effluent limitation of 8.0 mg/L that was established in the September 2012 Consent Order for the year of 2013, a Consent Order was issued on November 7, 2014 to the King George County Service Authority resulting in a payment of a civil penalty of $1,330. The fact sheet was updated to state that the November 7, 2014 was signed.

Draft Permit Comments: KGCSA provides the following comments on the Draft Permit. The comments listed above are also applicable to the actual Draft Permit alocument [sic]:

22. **Part I, Page 1 of 12:** KGCSA requests that this Effluent Limitations and Monitoring Requirement be removed from the Permit for the reasons listed above.

    Part I.A. Effluent Limitations and Monitoring Requirements for the 1.0 MGD design flow will remain in the permit. No change to the permit is necessary.

23. **Part I, Page 2 of 12:** KGCSA requests that the Monitoring Frequency and Sample Types are as recommended in the SCAT Regulations and as explained in Comment 16, above.

    See responses to Items 16 and 20. No change to the permit is necessary.

24. **Part I, Page 2 of 12:** KGCSA does not see the merits of continuing to sample for Total Hardness at the frequency proposed or at all.

    DEQ will keep the Total Hardness sampling and frequency of analysis at once per week in the permit due to the current upgrade underway to ensure that future Total Hardness values are reflective of the effluent characteristics. No change in the permit is necessary.

25. **Part I, Page 2 of 12:** KGCSA requests removal or a reduction in frequency and sample type for the Chronic Toxicity parameters as detailed in Comment 17, above.

    See DEQ response to Item 17. No change to the permit is necessary.

26. **Part I, Page 3 of 12, Quantification Levels and Compliance Reporting Section Bla:** There is no QL provided for Nitrates/Nitrites, Phosphorus, Fecal Coliform, and Enterococci. Please, provide QL or guidance on how to address values below QL's where QL's are not provided.

    No QLs for Fecal Coliform and Enterococci are necessary; therefore, they are not listed in the permit. The QLs for these nutrients are at the discretion of the permittee, keeping in mind that they will use ½ of the QL is used to to calculate

nutrient loadings. This is consistent with the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit For Total Nitrogen And Total Phosphorus Discharges And Nutrient Trading In The Chesapeake Bay Watershed 9VAC25-820 (VAN00). No change to the permit is necessary.

27. **Part I, Page 3 of 12, Quantification Levels and Compliance Reporting Section B2:** There is no methodology provided for calculating the Geometric Mean or how to address results below QL's. There is also no methodology for rounding Geometric Mean results.

    DEQ will incorporate the following language Geometric Mean into the permit for your use.

    > *"Geometric Mean – Compliance with the monthly geometric mean shall be determined as follows: All bacteria data below the Limit of Quantitation (LOQ) or Practical Quantification Limit (PQL) of the measurement method shall be treated as the LOQ or the PQL. All concentration data equal to or above the LOQ or the PQL shall be treated as it is reported. A geometric mean shall be calculated using all reported data for the month. If all data are below the LOQ or the PQL, then the geometric mean shall be reported as "< LOQ value" or "< PQL value"."*

    The permit will be updated.

28. **Part I, Page 4 of 12, Quantification Levels and Compliance Reporting Section B3d:** There appears to be a discrepancy between how TKN values are treated when they are below QL's. The result is treated as a zero for calculating averages for TKN as a conventional parameter, as explained in Section 2B(2a) & 2B(2b). However, this paragraph, Section B3d, provides several ways to address values below the QL's for TKN as a nutrient parameter. Why are these situations treated differently?

    As you know, Total Nitrogen is the sum of TKN and nitrates/nitrites. Part I.B.3.d explains how to calculate the Total Nitrogen should the parameter results are both below the QLs, below and above the QLs, or all above the QLs. No change to the permit is necessary.

29. **Part I, Page 7 of 12, Whole Effluent Toxicity Program Requirements, Section D:** KGCSA requests removal of this requirement based on the reasons provided in Comment 17, above.

    See DEQ response to Item 17. No change to the permit is necessary.

30. **Part I, [sic]Page 1 of 8, Section A3, Monitoring:** Please, explain why operational or process control samples or measurements shall not be taken at the designated permit sampling or measurement locations.

    Permit-designated sample locations are considered <u>'point of compliance locations'</u> so any sampling/analysis of such samples, where the pollutant/parameter is identified anywhere in the permit, MUST be properly analyzed (i.e., 40CFR136 and VELAP lab) and the data must be reported when submitting the DMR. By moving operational/process control sampling UPSTREAM of the 'point of compliance' the permittee is free to use any analytical method and is not restricted to use of a VELAP lab (i.e., can use simple test kits and can do in-house analysis).

In summary, the fact sheet will be revised to include the following:

1) Fact Sheet, Page 2 of 18, Section10 – Facility description will be updated.
2) Fact Sheet, Page 3 of 18, Section 10 – The fact sheet was updated to include the King George County Service Authority's comments numbered 5, 6 and 7 of their comment letter dated November 20, 2014.
3) Fact Sheet, Page 7 of 18, Section 14 – The July 9, 2014 site inspection report will be inserted in the Fact Sheet.
4) Fact Sheet, Page 9 of 18, Section 15 – Additional Total Hardness data was incorporated into the Fact Sheet and the discussion was updated to reflect this.
5) Fact Sheet, Page 10 of 18, Section 15 – The date that the draft permit and fact sheet was sent to the State of Maryland will be added to the fact sheet.
6) Fact Sheet, page 18 of 18, Section 26 – The statement was updated to included that the November 7, 2014 Consent Order had been signed for the Dahlgren Wastewater Treatment Plant.
7) Fact Sheet Attachment No. 3 was changed to Staff Site Inspection Report dated July 9, 2014.
8) Fact Sheet Attachment No. 5 was revised to incorporate the receiving stream's Total Hardness value.

9) Fact Sheet Attachment No. 7 was updated to include the DEQ's Total Hardness data for Williams Creek for the timeframe of 1990 through 1999.

The permit will be revised to include the following:

1) DEQ will incorporate the Geometric Mean language in Part 1.B.2 of the permit.

As always, DEQ appreciates receiving any comments from the permittee regarding their draft permit and fact sheet during the reissuance process. We want the permittee to fully understand the permit conditions so that there are no questions in the future regarding the intent or requirements of the permit.

Sincerely,

Joan C. Crowther
VPDES Permit Writer

cc: Ignatius Mutoti, Rewater Engineering (Ignatius.mutoti@retaweng.com)
Jeff Hockaday, King George County Service Authority (jhockaday@co.kinggeorge.state.va.us)