This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.01 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 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:	Goose Creek Industrial Park WWTP P. O. Box 4000 Ashburn, VA 20146	SIC Code :	4952 WWTP
	Facility Location:	42217 Cochran Mill Road Leesburg, VA 22175	County:	Loudoun
	Facility Contact Name:	Frank Stokes	Telephone Number:	571-291-7834
	Facility E-mail Address:	fstokes@loudounwater.org		
2.	Permit No.:	VA0080993	Expiration Date of previous permit:	December 8, 2013
	Other VPDES Permits associated with this facility:		None	
	Other Permits associated with this facility:		None	
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Loudoun County Sanitation Authority d/b/a Loudoun Water		
	Owner Contact/Title:	Dale Hammes/General Manager	Telephone Number:	571-291-7700
	Owner E-mail Address:	dhammes@loudounwater.org		
4.	Application Complete Date:	June 25, 2013		
	Permit Drafted By:	Joan C. Crowther	Date Drafted:	May 5, 2014
	Draft Permit Reviewed By:	Douglas Frasier	Date Reviewed:	5/14/14
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	5/16/14
	Public Comment Period :	Start Date:	End Date:	

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

Receiving Stream Name :	Sycolin Creek	Stream Code:	1aSYC
Drainage Area at Outfall:	17.3 sq.mi.	River Mile:	0.15
Stream Basin:	Potomac River	Subbasin:	Potomac River
Section:	8	Stream Class:	III
Special Standards:	PWS	Waterbody ID:	VAN-A08R
7Q10 Flow:	0.06 MGD	7Q10 High Flow:	0.71 MGD
1Q10 Flow:	0.05 MGD	1Q10 High Flow:	0.50 MGD
30Q10 Flow:	0.12 MGD	30Q10 High Flow:	1.3 MGD
Harmonic Mean Flow:	1.1 MGD	30Q5 Flow:	0.23 MGD

(1) Since 1993, the receiving stream flow frequency determinations have been calculated three times and have varied greatly especially for the annual flows. The effluent limitations for $cBOD_5$, BOD_5, TKN, ammonia have been determined using different stream flows frequency determination. This will be discussed in Fact Sheet Sections 17 c and d. The following table shows the receiving stream flow determinations for 1993, 1998 and 2008.

Flow	1993	1998	2008
7Q10	0.175 MGD	0.433 MGD	0.06 MGD
1Q10	0.149 MGD	0.40 MGD	0.05 MGD
30Q5	0.491 MGD	0.76 MGD	0.23 MGD
30Q10			0.12 MGD
HF 7Q10	1.23 MGD	1.29 MGD	0.71 MGD
HF 1Q10	1.62 MGD	1.098 MGD	0.5 MGD
HF 30Q10			1.3 MGD
HM	1.62 MGD	1.51 MGD	1.1 MGD

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

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

7. Licensed Operator Requirements: Class IV

8. Reliability Class: Class I

9. Permit Characterization:

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

10. Wastewater Sources and Treatment Description:

The Goose Creek Industrial Park WWTP treats domestic wastewater flows from the surrounding industrial development that includes a lumberyard, recycling facility, and numerous other enterprises. The prefabricated WWTP plant is designed to treat 10,000 GPD, but normally treats about 1,500 GPD; discharge is intermittent (weekly to monthly), and may average up to 7,500 GPD. Discharge during the winter is limited to occasional events to maintain pond level. Treatment consists of the following stages: preliminary (solids grinder), secondary (extended air activated sludge), polishing pond, tablet chlorination/dechlorination, and post aeration.

Preliminary Treatment
Influent from the collection system serving the Goose Creek Industrial Park enters the WWTP via an 8-inch gravity sewer where preliminary treatment consists of a comminutor and bar screen. The bar screen serves as the preliminary treatment backup when the comminutor is being serviced. Solids generated in the preliminary treatment process are disposed via sanitary landfill.

Secondary Treatment
The wastewater then enters the extended aeration basin, where a spiral-roll, diffused-air system operates via a timer (30 minutes off). Effluent from the aeration chamber then enters the hopper clarifier. Sludge in the secondary clarifier is returned to the aeration basin when the aerators are operating. The return rate is based on the sludge settleability, mixed liquor suspended solids and sludge volume index tests. Remaining sludge is wasted to the aerated sludge holding tank.

Polishing Pond
After treatment in the secondary clarifier, wastewater is directed to a 150,000 gallon, bentonite-clay lined pond in which settling and duckweed provide additional treatment. An HDPE baffle grid system is installed on the pond surface to keep duckweed evenly distributed. A wooden sled is used to harvest duckweed as needed. The harvested duckweed is dewatered on site and is disposed via landfill.

Chlorination/Dechlorination/Post- Aeration
After pond treatment, the wastewater is disinfected in the chlorine contact tank. Disinfection and dechlorination are achieved using tablet feeder systems that dispense calcium hypochlorite and sodium bisulfate, respectively. Post aeration with diffused air in the dechlorination chamber is turned on manually every time a discharge occurs. Sampling is conducted after the dechlorination chamber.

After all treatment, flow is measured at a 45 degree v-notch weir prior to shore-based discharge through an 8-inch diameter pipe (Outfall 001). The discharge is approximately 15 feet from the southwest fence of the treatment plant and approximately 20 feet upstream of the convergence of Sycolin Creek and Goose Creek. Discharge from the corrugated pipe flows to Sycolin Creek through a small rock covered channel.

In 2004 a groundwater monitoring plan was developed and three monitoring wells were installed around the pond. The attached site plan has been updated to show the approximate location of the wells.

Facility schematic/Diagram

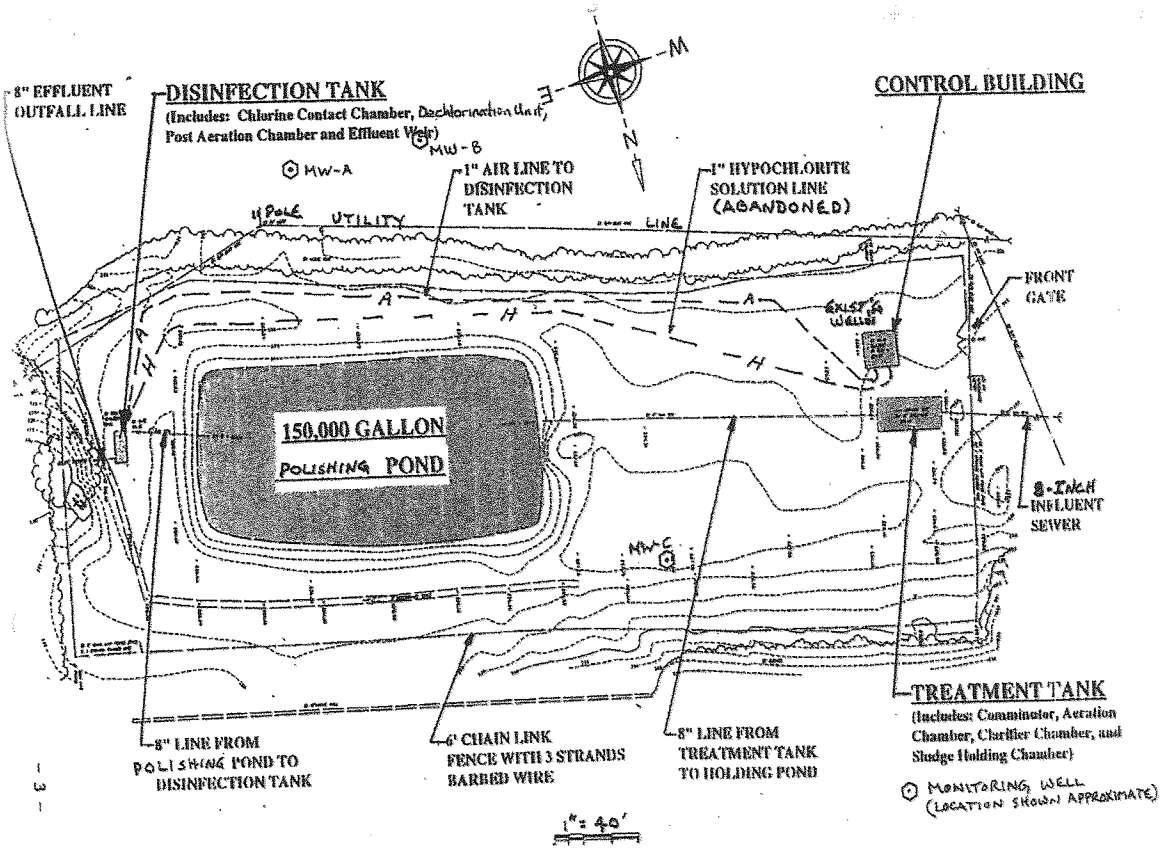
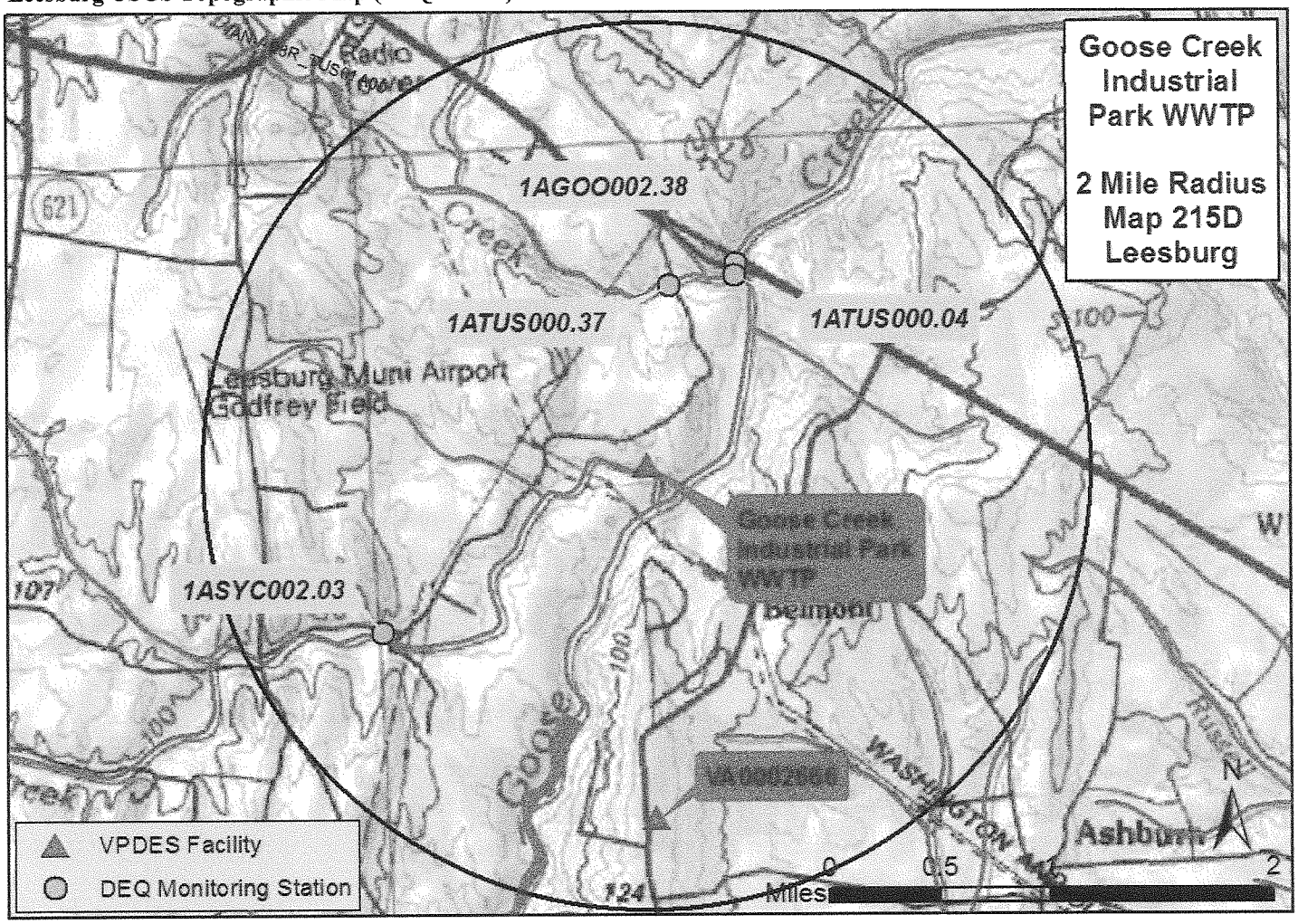


TABLE 1 – Outfall Description				
Outfall Number	**Discharge Sources**	**Treatment**	**Design Flow**	**Outfall Latitude and Longitude**
001	Domestic and/or Commercial Wastewater	See Item 10 above.	0.01 MGD	39° 4' 21" N 77° 31' 09" W

Leesburg USGS Topographic Map (DEQ #215D)



11. Sludge Treatment and Disposal Methods:

Waste activated sludge is pumped from the secondary clarifier to an aerated sludge holding tank. As needed, the digested sludge is removed by a septic waste hauler and transported to the Broad Run Water Reclamation Facility (VA0091383) for further treatment and final disposal (typically 1-2 times per year.)

12. DEQ Ambient Water Quality Monitoring Stations and VPDES Permit in Vicinity of Discharge

Table 2 – DEQ Monitoring Stations and VPDES Permit within a 2-mile radius of discharge point.

WQM Station /VPDES Permit No.	Description
1aGOO002.38	Goose Creek, Route 7 Bridge, approximately 1.5 miles downstream of discharge
1aSYC002.03	Sycolin Creek, Route 653 Bridge, approximately 1.9 miles upstream of discharge
1aTUS000.04	Tuscarora Creek, Golf Cart Bridge, upstream from its mouth, not on discharge stream
1aTUS000.37	Tuscarora Creek, Route 653 Bridge, not on discharge stream
VA0002666	Goose Creek Water Treatment Plant

13. Material Storage:

TABLE 3 - Material Storage		
Materials Description	**Volume Stored**	**Spill/Stormwater Prevention Measures**
Calcium Hypochlorite	1 – 45 lb. bucket	Stored under roof; spills contained within process building.
Sodium Bisulfate	1 – 45 lb. bucket	
DPD Total Chlorine	50 pillows	
Hydrated Lime	40 lbs.	
Pollu-Treat C316 (Polymer)	5 lbs.	

14. Site Inspection:

Site Inspection was performed by Sharon Allen on November 15, 2013 (see Attachment 2).

15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

This facility discharges into Sycolin Creek. The closest DEQ ambient monitoring station on Sycolin Creek is 1aSYC002.03, located at the Route 653 Bridge crossing, approximately 1.9 miles upstream of Outfall 001. The closest downstream ambient monitoring station is 1aGOO002.38, located on Goose Creek at the Route 7 Bridge crossing, approximately 1.5 miles downstream of Outfall 001. The following is the water quality summary for Sycolin Creek, as taken from the 2012 Integrated Report:

> *E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A fecal coliform TMDL for the Sycolin Creek watershed has been completed and approved.*
>
> *The aquatic life use is considered fully supporting. Citizen monitoring finds a low probability of adverse conditions for biota. The public water supply and wildlife uses are considered fully supporting. The fish consumption use was not assessed.*

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

Table 4. 303(d) Impairment and TMDL information for the receiving stream segment						
Waterbody Name	**Impaired Use**	**Cause**	**TMDL completed**	**WLA**	**Basis for WLA**	**TMDL Schedule**
Sycolin Creek	Recreation	*E. coli*	Goose Creek Watershed Bacteria 05/01/03	2.76E+10 cfu/year fecal coliform	200 cfu/100ml FC --- 0.010 MGD	Modified 10/27/06

The TMDL presents the WLA for this facility in terms of *E. coli* as well: 1.74E+10 cfu/year.

Table 5. Information on Downstream 303(d) Impairments and TMDLs							
Waterbody Name	**Impaired Use**	**Cause**	**Distance From Outfall**	**TMDL completed**	**WLA**	**Basis for WLA**	**TMDL Schedule**
Goose Creek	Aquatic Life	Benthic Macroinvertebrates	0.2 miles	Goose Creek Watershed Benthic 04/26/04	0.5 tons/yr	30 mg/L TSS --- 0.010 MGD	N/A
	Fish Consumption	PCBs	0.2 miles	No	---	---	2018

This facility was assigned a total WLA for 2.5 tons/year in the Benthic TMDL for the Goose Creek watershed. This total WLA was calculated based upon the permitted maximum average concentration for TSS (mg/L) and an assumption of the facility operating at 5 times the design flow. The factor of 5 for the design flow was used as a conservative measure to build in future growth in the watershed. Although the future growth for the watershed was determined by the design flow of each facility currently in the watershed, the future growth is available for both new and expanding permits in the watershed. The actual WLA for this facility without including the future growth is 0.5 tons/year.

The Planning Statement is found in Attachment 3.

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 Sycolin Creek is located within Section 8 of the Potomac River Basin, and classified as a Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0-9.0 standard units (S.U.).

The Freshwater Water Quality/Wasteload Allocation Analysis (Attachment 4) details other water quality criteria applicable to the receiving stream.

Some Water Quality Criteria are dependent on the temperature, pH, and total hardness of the stream and final effluent. The stream and final effluent values used in the Freshwater Water Quality/Wasteload Allocation Analysis are as follows:

pH and Temperature for Ammonia Criteria:
The freshwater, 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.

The stream pH and temperature values were derived by using the DEQ ambient water quality data collected in the VAN-A08R Waterbody during the period of January 1990 through February 2011. The annual pH and temperature 90th percentiles for this time period are 8.0 S.U. and 23.4°C, respectively. The wet temperature 90th percentile is 12.7°C (December – April). The pH 10th percentile is 7.0 S.U.

The effluent data for the period of January 2009 through December 2013 was reviewed to derive the 90th percentile values for pH and temperature. The pH value was 8.3 S.U. and the temperature value was 21°C. Because the discharge is intermittent in nature, seasonal pH and temperature values were not determined.

Total Hardness for Hardness-Dependent Metals Criteria:
The Water Quality Criteria for some metals are dependent on the receiving stream's and final effluent's total hardness (expressed as mg/L calcium carbonate).

The stream total hardness value of 83.6 mg/L $CaCO_3$ was derived by using the DEQ ambient water quality collected in the VAN-A08R Waterbody during the period of January 1990 through February 2011. There is no hardness data for this facility. Staff guidance suggests using a default hardness value of 50 mg/L $CaCO_3$ for streams east of the Blue Ridge. The hardness-dependent metals criteria in Attachment 4 are based on this default value and the stream hardness.

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:

> *E. coli* bacteria per 100 ml of water shall not exceed a monthly geometric mean of 126 n/100 ml for a minimum of four weekly samples taken during any calendar month.
>
> If there are insufficient data to calculate monthly geometric mean in freshwater, no more than 10% of the total samples in the assessment period shall exceed 235 E.coli CFU/100 ml.

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, Sycolin Creek, is located within Section 8 of the Potomac River Basin. This section has been designated with a special standard of PWS (Public Water Supply).

Special Standard PWS designates a public water supply intake. The Board's Water Quality Standards establish numerical standards for specific parameters calculated to protect human health from toxic effects through drinking water and fish consumption. See 9VAC25-260-140 B for applicable criteria.

e. Threatened or Endangered Species
The Virginia DGIF Fish and Wildlife Information System Database was searched on June 26, 2013 for records to determine if there are threatened or endangered species in the vicinity of the discharge. *Lasmigona sbuviridis,* Floater green, was identified within a 2 mile radius of the discharge. It is listed as a State threatened species. DGIF was coordinated with on June 26, 2013 for their comments regarding this reissuance. By email dated August 22, 2013 (Attachment 5), DGIF responded by stating:

> *We have reviewed the VPDES re-issuance for the above-referenced. The receiving stream, Sycolin Run, has a 7Q10 ranging from 0.06 Million Gallons per day during low-flow (MGD) to 0.71 MGD during high flow. Total Residual Chlorine (after dechlorination) discharge is 0.014 mg/L monthly average and 0.017 mg/L weekly average. Sycolin Run is a headwater tributary to Goose Creek.*
>
> *According to our records, Goose Creek is a designated Threatened and Endangered (T&E) species water for the state Threatened (ST) green floater (mussel).*
>
> *In order to protect aquatic resources, we generally recommend ultraviolet (UV) disinfection rather than chlorination disinfection. If chlorination becomes necessary and is used, we recommend and support continued dechlorination, prior to discharge. The ammonia limits proposed within the EPA rule are expressed on the basis of total ammonia-nitrogen (TAN). The proposed EPA ammonia limit for waters with mussels (not T&E mussels, <u>any</u> mussel species) is:*
>
> - *CMC (Criterion Maximum Concentration or acute) - 2.9 mg N/L (at pH 8 and 25C)*
> - *CCC (Criterion Continuous Concentration or chronic) - 0.26 mg N//L (at pH 8 and 25C) with a 4-day average within the 30 day average period no higher than 2.5 the CCC, which would be 0.65 mg N/L.*
>
> *The ammonia limits proposed within the EPA rule are the best information currently available regarding ammonia levels protective of mussels. Therefore, we recommend and support the EPA values being implemented in this permit for this and all future VPDES permits. Provided the project adheres to the effluent limitations and monitoring requirements specified in the permit, we do not anticipate the re-issuance of this existing permit to result in adverse impact to designated T&E species waters or their associated species. 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 T&E species 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.*

DEQ has reviewed DGIF's comments and at this time no changes to the draft permit are proposed. 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 2 based on an evaluation that (1) it has been designed with the special standard of PWS (public water supply), (2) the benthic TMDL did not include the discharge segment of Sycolin Creek, and (3) current agency guidance does not allow for a violation to the bacteria standard to be used for establishing the tier category. Therefore, it

is staff's best professional judgment that the Tier 2 protection be kept in place for this permit reissuance. No significant degradation to the existing water quality will be allowed. In accordance with current DEQ guidance, no significant lowering of water quality is to occur where permit limits are based on the following:

- The dissolved oxygen in the receiving stream is not lowered more than 0.2 mg/L from the existing levels;
- The pH of the receiving stream is maintained within the range 6.0-9.0 S.U.;
- There is compliance with all temperature criteria applicable to the receiving stream;
- No more than 25% of the unused assimilative capacity is allocated for toxic criteria established for the protection of aquatic life; and
- No more than 10% of the unused assimilative capacity is allocated for criteria for the protection of human health.

The antidegradation policy also prohibits the expansion of mixing zones to Tier 2 waters unless the requirements of 9VAC25-260-30.A.2 are met. The draft permit is not proposing an expansion of the existing mixing zone.

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 is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are then calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a. Effluent Screening:
Effluent data obtained from the facility's monthly discharge monitoring reports (DMRs) for the period of November 2008 through December 2013 have been reviewed and determined to be suitable for evaluation. The following exceedances were reported:

BOD_5 – May 2009,
TKN – November 2011 (no data was reported), and
$cBOD_5$ – July 2012.

The following pollutants require a wasteload allocation analysis: Ammonia as N; Total Residual Chlorine.

b. Mixing Zones and Wasteload Allocations (WLAs):

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{Co\,[\,Qe + (f)(Qs)\,] - [\,(Cs)(f)(Qs)\,]}{Qe}$$

Where:
WLA = Wasteload allocation
Co = In-stream water quality criteria
Qe = Design flow
f = Decimal fraction of critical flow from mixing evaluation
Qs = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
Cs = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage and total residual chlorine may be present since chlorine is used for disinfection. As such, Attachment 6 details the mixing analysis results and WLA derivations for these pollutants.

Antidegradation Wasteload Allocations (AWLAs).

Since the receiving stream has been determined to be a Tier 2 water, staff must also determine antidegradation wasteload allocations (AWLAs). The steady state complete mix equation is used substituting the antidegradation baseline (Cb) for the in-stream water quality criteria (Co):

$$AWLA = \frac{Cb\,(Qe + Qs) - (Cs)(Qs)}{Qe}$$

Where:

AWLA	=	Antidegradation-based wasteload allocation
Cb	=	In-stream antidegradation baseline concentration
Qe	=	Design flow
Qs	=	Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
Cs	=	Mean background concentration of parameter in the receiving stream.

Calculated AWLAs for the pollutants noted in 17. b. above are presented in Attachment 4.

c. <u>Effluent Limitations Toxic Pollutants, Outfall 001 –</u>

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 AWLAs 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:

Since this facility's discharge is intermittent, only the ammonia acute criterion is used to determine a need for an ammonia effluent limitation. For the past four permit reissuances (1993, 1998, 2003, and 2008) staff has determined that ammonia effluent limitations were not necessary in order to protect the instream water quality criteria. The only ammonia documentation that could be found was the 1998 calculations. The following table outlines the pH and temperature used for the two seasonal tiers (June – November and December – May). See Attachment 7 for Ammonia calculations.

Parameter	pH (SU)	Temperature (°C)	Acute Criteria (mg/L)	WLA_a (mg/L)
Ammonia (June – November)	7.5	25	11.93	490
Ammonia (December – May)	7.9	15	6.77	751

The 2003 permit reissuance stated that the 1998 ammonia calculations were carried forward. The 2008 permit reissuance determined different ammonia acute criteria for June – November and December – May, respectively 107.4 mg/L and 187.75 mg/L. Documentation for these calculations could not be found. The 2008 fact sheet stated that ammonia limitations were not necessary for December – May season and the June through November TKN limit of 5 mg/L would be carried forward.

For this reissuance, due to the recalculation of the stream flow frequency determinations in 2008, the facility's pH and temperature review for the period of January 2009 through December 2013, and the VAN-A08R Waterbody's pH and temperature for the period of January 1990 through February 2011, an ammonia effluent limitations for December – May of 11.7 mg/L would be necessary to maintain water quality standards. See Attachment 8.

However at this time, it is staff best professional judgment instead of establishing new ammonia effluent limitations for this permit reissuance, the 1998 ammonia calculations will be carried forward; therefore, no ammonia effluent limitations will be required. The reason for this is because of the EPA's adoption (August 22, 2013) of Final Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater 2013. The DEQ will be incorporating the new ammonia criteria in the State Water Quality Standards within the next five years; thereby, causing this facility to upgrade to comply with the new ammonia criteria. It is staff's best professional judgment that the permittee should only be required to upgrade once to meet the ammonia limitations. An Ammonia monthly monitoring requirement will be incorporated into this reissuance.

The 2014 December – May Ammonia effluent limitation of 11.7 mg/L was based on the following stream data and facility effluent data. The stream pH and temperature values were derived by using the DEQ ambient water quality data collected in the VAN-A08R Waterbody during the period of January 1990 through February 2011. The annual pH and temperature 90th percentiles for this period of time are 8.0 S.U. and 23.4°C, respectively. The wet temperature 90th percentile is 12.7°C (December – April). The effluent data for the period of January 2009 through December 2013 was reviewed to derive the 90th percentile values for pH and temperature. The pH value was 8.3 S.U. and the temperature value was 21°C. Seasonal pH and temperature values were not determined. DEQ guidance suggests using a sole data point of 9.0 mg/L for discharges containing domestic sewage to ensure the evaluation adequately addresses the potential for ammonia to be present in the discharge containing domestic sewage. See Attachment 9.

2) Total Residual Chlorine:

Chlorine is used for disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.014 mg/L and a weekly average limit of 0.017 mg/L are proposed for this discharge (see Attachment 10).

3) Metals/Organics:

No metals or organics data were available for review; therefore, no effluent limits are proposed.

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

No changes to biochemical oxygen demand-5 day (BOD_5) (December –May), carbonaceous biochemical oxygen demand-5 day ($cBOD_5$) (June – November), total suspended solids (TSS), Total Kjeldahl Nitrogen (TKN) (June –November), and pH limitations are proposed.

The Dissolved Oxygen effluent limitation is being increased from 5.0 mg/L to 6.8 mg/L in order to maintain antidegradation policy for Tier 2 waters.

Dissolved Oxygen, $cBOD_5$, BOD_5, and TKN limitations were based on the stream modeling conducted in July 1993 (Attachment 11) and are set to meet the water quality criteria for D.O. in the receiving stream and to ensure that the receiving stream D.O. does not decrease more than 0.2 mg/l to meet the requirements of the antidegradation policy.

Historical Stream Model Note:

> The 1993 stream model was performed to maintain antidegradation in the receiving stream. The 7Q10 stream flows used were established by the Flow Frequency Determination Goose Creek Industrial Park WWTP – VA0080993 Memorandum from Paul Herman dated March 1993. The 7Q10 flow was 0.175 MGD and the high flow 7Q10 was 1.23 MGD. A dissolved oxygen effluent limitation of 6.8 mg/L was established in this stream model.
>
> In the 1998 permit reissuance, staff re-evaluated the stream model and a revised flow frequency determination for Goose Creek Industrial Park was obtained (Memorandum Flow Frequency Determination Goose Creek Industrial Park – VA0080993 from Paul Herman dated June 1998). The 7Q10 flow was 0.433 MGD and the high flow 7Q10 was 1.29 MGD. The stream model was redone and the dissolved oxygen effluent limitation of 5.0 mg/L was established in this stream model. Antidegradation was not maintained in this stream model. The dissolved oxygen level was allowed to decrease 0.275 mg/L; thereby, not meeting the antidegradation policy.
>
> In the 2008 permit reissuance, staff revised the flow frequency determination for Goose Creek Industrial Park (Memorandum dated August 2008 from Doug Frasier). The 7Q10 flow was 0.06 MGD and the high flow 7Q10 was 0.71 MGD. The stream model was not redone at this time and the 1998 stream model effluent limitations were carried forward. The dissolved oxygen effluent limitation of 5.0 mg/L has been carried forward since the 1998 permit reissuance.
>
> However, since the stream has been designated as Tier 2 waters, antidegradation must be complied with. Therefore, for this permit reissuance the 1993 stream model will be used to determine the effluent limitations for the Goose Creek Industrial Park WWTP. The dissolved oxygen effluent limitation will be re-established at 6.8 mg/L so that the antidegradation policy will be met.
>
> The 1993 permit contained interim limitations allowing the permittee time to meet the proposed effluent limitations, specifically the interim limits provided relief for $cBOD_5$, TKN, Dissolved Oxygen and Total Residual Chlorine. The plant was upgraded and a Certificate To Operate was signed by DEQ on March 7, 1997 and VDH on March 12, 1997. Based on this information, the wastewater treatment plant was designed to meet the Dissolved Oxygen effluent limitation of 6.8 mg/L in 1997 so for this reissuance no interim Dissolved Oxygen effluent limitation or compliance schedule is needed.

Total Suspended Solids effluent limitations are based on the Federal Effluent Guidelines for Secondary Treatment Facilites (40 CFR 133.103(c)).

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170. The permit includes a maximum instead of a geometric mean for the bacteria limit because the facility has a discontinuous discharge and 4 monthly samples to calculate a geometric mean cannot be obtained. While the WQS specify a geometric mean of 126 and a maximum value of 235 for water quality assessments and beach monitoring, we think using the maximum as a permit limit is a reasonable interpretation of the WQS. The maximum was derived statistically from the geometric mean. The maximum represents a conservative approach; derived from upper percentiles of the frequency distribution around the geometric mean. With 235 cfu, we are utilizing the 75th percentile. This is the more conservative then say for example the 95th percentile in that a measurement falling above the 75th percentile value of the collected data is somewhat likely to lie beyond the distribution of values that constitute the geometric mean. Whereas a measurement that falls above the 95th percentile value is very likely to lie beyond the distribution of values that constitute the geometric mean. The maximum based on the 75th percentile is 235 and the maximum based on the 95th percentile is 576. The desired risk level will be maintained if the total cfu remain under the upper limit of the confidence interval, which is 235 cfu per 100 mL of water. It is staff's best professional judgment that this limitation is a conservative one and will also demonstrate compliance with the TMDL.

f. Effluent Limitations and Monitoring Summary:

The effluent limitations are presented in the following table. Limits were established for $cBOD_5$ (June through November), BOD_5 (December through May), Total Suspended Solids, pH, Dissolved Oxygen, TKN, *E.coli*, and Total Residual Chlorine.

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 (2014).

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD_5 and $cBOD_5$ (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 65% removal for TSS. This permit requires influent TSS monitoring on an annual basis to demonstrate 65% removal.

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

19. A Effluent Limitations/Monitoring Requirements:
Design flow is 0.01 MGD.
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/D	Estimate
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
BOD_5 (December – May)	3, 5	30 mg/L 1.1 kg/day	45 mg/L 1.7 kg/day	NA	NA	1/M	Grab
$cBOD_5$ (June – November)	3, 5	12 mg/L 0.45kg/day	18 mg/L 0.68 kg/day	NA	NA	1/M	Grab
Total Suspended Solids (TSS)	1, 2	30 mg/L 1.1 kg/day	45 mg/L 1.7 kg/day	NA	NA	1/M	Grab
Ammonia as N (mg/L)	NA	NL	NL	NA	NA	1/M	Grab
Dissolved Oxygen (DO)	3	NA	NA	6.8 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN) (June – Nov)	3, 5	5.0 mg/L 0.19 kg/day	7.5 mg/L 0.28 kg/day	NA	NA	1/M	Grab
E. coli (Single Sample Maximum)[a]	3	NA	NA	NA	235 n/100ml	1/M	Grab
Total Residual Chlorine (after contact tank)	2, 3, 4	NA	NA	1.5 mg/L	NA	1/D	Grab
Total Residual Chlorine (after dechlorination)	3	0.014 mg/L	0.017 mg/L	NA	NA	1/D	Grab

The basis for the limitations codes are:
1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Stream Model- Attachment 11

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

1/D = Once every day.
1/M = Once every month.

Estimated = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge
Grab = An individual sample collected over a period of time not to exceed 15 minutes.
a. Samples shall be collected between 10:00 a.m. and 4:00 p.m.

B. Influent Monitoring Requirements:

Design flow is 0.01 MGD.
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Influent TSS*	1	NL	NA	NA	NA	1/YR	Grab

The basis for the limitations codes are:
1. Federal Effluent Requirements

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
1/YR = Once every year.
Grab = An individual sample collected over a period of time not to exceed 15-minutes.
* = 65% Removal Efficiency Demonstration.

C. Groundwater Monitoring Requirements:

Effective Dates: During the period beginning with the permit's effective date and lasting until the permit expiration date.
For wells: MWA, MWB and MWC

Parameters	Units	Limit	Monitoring Requirements	
			Frequency	Sample Type
Static water level	Ft.	NL	1/YR	Measured
pH	S.U.	NL	1/YR	Grab
Conductivity	µmho/cm	NL	1/YR	Grab
E.coli	n/100 mL	NL	1/YR	Grab
Nitrates	mg/L	NL	1/YR	Grab

1. Sampling shall be conducted yearly and reported yearly. The yearly reporting periods shall be January through December. The DMR shall be submitted no later than January 10th of the following year.

2. The static water level shall be measured prior to bailing the well water for sampling. At least three volumes of groundwater shall be withdrawn immediately before sampling each well.

1/YR = Once per year.
Grab = An individual sample collected over a period not to exceed 15-minutes.

20. Other Permit Requirements:

a. **Part I.D. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.**

These additional chlorine requirements are necessary per the Sewage Collection and Treatment Regulations at 9VAC25-790 and by the Water Quality Standards at 9VAC25-260-170. A minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more that 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be <1.0 mg/L with any TRC <0.6 mg/L considered a system failure. *E. coli* limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used.

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.

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. **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 IV operator.

e. **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 of I. The facility is required to meet a reliability Class of I based on the public water supply of the City of Fairfax located upstream of the confluence of Sycolin Creek and Goose Creek.

f. **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.

g. **Treatment Works Closure Plan.** The State Water Control Law §62.1-44.15:1.1, makes it illegal for an owner to cease operation and fail to implement a closure plan when failure to implement the plan would result in harm to human health or the environment. This condition is used to notify the owner of the need for a closure plan where a facility is being replaced or is expected to close.

h. **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

i. **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.

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

k. **PCB Monitoring.** This special condition requires the permittee to conduct PCB dry weather and wet weather monitoring using ultra-low level PCB analysis to support the development of the PCB TMDL for the fish consumption use impairment in Goose Creek.

l. **Groundwater Monitoring.** State Water Control Law §62.1-1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. Groundwater monitoring for parameters of concern will indicate whether possible lagoon seepage is resulting in violations to State Water Control Board's Groundwater Standards. A groundwater monitoring plan was approved on October 18, 2004. Groundwater monitoring consists of three monitoring wells: MWA, MWB, and MWC (upgradient). The permittee shall continue monitoring and reporting for the parameters listed in Part I.C.

22. Permit Section Part II.

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: The PCB monitoring special condition was added to the permit due to the downstream PCB impairment in fish tissue. This monitoring is required to assist in the development of the PCB TMDL in 2018.

b. Monitoring and Effluent Limitations:
   1) Ammonia effluent monitoring requirement has been added to assist in the determination of the need for a future effluent limitation.
   2) The Dissolved Oxygen effluent limitation has been increased to 6.8 mg/L in accordance with the 1993 stream model thus adhering to the antidegradation policy.

24. Variances/Alternate Limits or Conditions:

There are no variances/alternate limits or conditions associated with the permit.

25. Public Notice Information:

First Public Notice Date: Second Public Notice Date:

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): None

Staff Comments: None

Public Comment: 1) DGIF requested to review this permit in accordance with the VPDES Memorandum of Understanding dated April 16, 2007. See Section 15.e of this fact sheet for their comments.
2) No public comments were received during the public comment period.

Attachment Number	Description of Attachment
1	1993, 1998, and 2008 Flow Frequency Determinations
2	Site Inspection dated November 15, 2011
3	Planning Statement dated July 9, 2013
4	Freshwater Water Quality/Wasteload Allocation Analysis
5	DGIF Comments dated August 22, 2013
6	2014 Mixing Analysis Results
7	1998 Ammonia as N Calculation Documentation
8	2014 Ammonia as N Calculation Documentation
9	pH and Temperature Effluent Data January 2009 through December 2013
10	Total Residual Chlorine Calculation Documentation
11	Stream Model – July 1993, August 1998
12	Public Notice

MEMORANDUM

STATE WATER CONTROL BOARD
Office of Water Quality Assessments
4900 Cox Road P. O. Box 11143 Richmond, Virginia 23230

SUBJECT: Flow Frequency Determination
Goose Creek Industrial Park WWTP - VA0080993

TO: Joan Crowther, NRO

FROM: Paul Herman, OWRM-WQAP Paul

DATE: March 29, 1993

COPIES: Ron Gregory, Charles Martin, Dale Phillips, Richard Ayers, Mark Richards, File

APR 1993
Received
NRO

The Goose Creek Industrial Park WWTP is proposing a discharge to Sycolin Creek just above its confluence with Goose Creek near Leesburg, VA. Stream flow frequencies are required at this site by the permit writer for the purpose of calculating effluent limitations for the VPDES permit.

The USGS conducted several flow measurements on the Little River near Oatlands, VA during the late 1960s and early 1980s. The measurements were made at the U.S. Route 15 bridge just upstream from Goose Creek. The measurements made by the USGS were correlated with the same day daily mean values from the continuous record gage on Goose Creek near Leesburg, VA #01644000. The measurements and daily mean value were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gage were plotted on the regression line and the associated flow frequencies at the measurement site were determined from the graph.

The Little River partial record gage #01643988 was selected to represent the flows expected in Sycolin Creek due to its proximity to the discharge receiving stream, its similar topography and geology, and its comparable watershed characteristics.

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

Goose Creek near Leesburg, VA (#01644000):

Drainage Area	=	332	mi^2
1Q10	=	1.8	cfs
7Q10	=	2.2	cfs
30Q5	=	7.9	cfs
High Flow 7Q10	=	24	cfs
HM	=	34	cfs

Little River near Oatlands, VA #01643988:

Drainage Area	=	47.7	mi^2	
1Q10	=	0.63	cfs	
7Q10	=	0.75	cfs	0.485 MGD
30Q5	=	2.1	cfs	
High Flow 7Q10	=	5.2	cfs	3.36 MGD (DEC-MAY)
HM	=	6.8	cfs	

Sycolin Creek at discharge point:

Drainage Area	=	17.3	mi^2	
1Q10	=	0.23	cfs	0.149 MGD
7Q10	=	0.27	cfs	0.175 MGD
30Q5	=	0.76	cfs	0.491 MGD
High Flow 7Q10	=	1.9	cfs	1.23 MGD
HM	=	2.5	cfs	1.62 MGD

The drainage area of Sycolin Creek at its mouth is 17.3 mi^2.

This analysis assumes there are no significant discharges, withdrawals or springs influencing the flow in Sycolin Creek.

The drainage area of Goose Creek just above its confluence with Sycolin Creek is 347.5 mi^2. The 7Q10 for this point on Goose Creek was determined to be 2.3 cfs using proportional drainage areas and the Goose Creek near Leesburg, VA gage. The 7Q10 must be adjusted to account for the withdrawal from Goose Creek Reservoir, which lies between the gage and Sycolin Creek. The maximum annual average daily withdrawal from Goose Creek Reservoir was 11.1 MGD (17.2 cfs) and occurred in 1990. This results in zero flow over the dam during low flow periods. Therefore, the 7Q10 flows in Goose Creek just above Sycolin Creek are 0.0 cfs, assuming there are no significant springs or discharges between the dam and Sycolin Creek.

If there are any questions concerning this analysis, please let me know.

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
Goose Creek Industrial Park - #VA0080993

RECEIVED
JUN 9 1998
Northern VA. Region
Dept. of Env. Quality

TO: James Engbert, NRO

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

DATE: June 8, 1998

COPIES: Ron Gregory, Charles Martin, Eugene Powell, File

This memo supercedes my March 29, 1993 memo to Joan Crowther concerning the subject VPDES permit.

The Goose Creek Industrial Park discharges to the Sycolin Creek near Leesburg, VA. Stream flow frequencies are required at this site by the permit writer for the purpose of calculating effluent limitations for the VPDES permit.

The VDEQ conducted several flow measurements on the Sycolin Creek from 1993 to 1997. The measurements were made near the mouth near Leesburg, VA. The measurements made correlated very well with the same day daily mean values from the continuous record gage on the Goose Creek near Leesburg, VA #01644000. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gage were plotted on the regression line and the associated flow frequencies at the measurement site were determined from the graph. Since the measurement site was located just above the discharge point, they are considered to be the same. The data for the reference gage and the measurement site/discharge point are presented below:

Goose Creek near Leesburg, VA (#01644000):

Drainage Area = 332 mi^2

1Q10 = 1.6 cfs	High Flow 1Q10 = 16 cfs
7Q10 = 1.9 cfs	High Flow 7Q10 = 23 cfs
30Q5 = 6.9 cfs	HM = 33 cfs

Sycolin Creek above mouth near Leesburg, VA (#01644110) and at discharge point:

Drainage Area = 17.3 mi^2

1Q10 = 0.62 cfs = 0.400706 MGD	High Flow 1Q10 = 1.70 cfs = 1.09871 MGD
7Q10 = 0.67 cfs = 0.433021 MGD	High Flow 7Q10 = 2.00 cfs = 1.2926 MGD
30Q5 = 1.18 cfs = 0.762634 MGD	HM = 2.35 cfs = 1.518805 M

The high flow months are December through May. This analysis assumes there are no significant discharges, withdrawals or springs influencing the flow in the Sycolin Creek upstream of the discharge point.

If there are any questions concerning this analysis, please let me know.

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

TO: VPDES Reissuance File VA0080993

DATE: 20 August 2008

FROM: Douglas Frasier

SUBJECT: Flow Frequency Determination of VPDES Permit No. VA0080993
Goose Creek Industrial Park Wastewater Treatment Plant

Goose Creek Industrial Park WWTP discharges to Sycolin Creek, approximately 20 feet upstream of the convergence of Sycolin Creek and Goose Creek. It was staff's best professional judgement to update the stream flow frequencies utilizing current flow frequencies for use in the development of effluent limitations for this VPDES permit.

There is a continuous recording gage on Goose Creek near Leesburg, VA (#01644000), downstream from Outfall 001. The referenced gaging station has a drainage area of 332 square miles. The drainage area at the Outfall for Goose Creek Industrial Park WWTP is 17.3 square miles.

The flow frequencies shall be determined using values from gaging station #01644000 and adjusting them by proportional drainage areas.

Gaging Station #01644000

Drainage area	=	332 sq. mi.
1Q10	=	1.4 cfs
7Q10	=	1.8 cfs
30Q5	=	6.9 cfs
30Q10	=	3.7 cfs
High flow 30Q10	=	38 cfs
High flow 1Q10	=	15 cfs
High flow 7Q10	=	21 cfs
Harmonic Mean	=	33 cfs

Sycolin Creek at Goose Creek Industrial WWTP at Outfall 001

Drainage area	=	17.3 sq. mi.	
1Q10	=	0.07 cfs	0.05 MGD*
7Q10	=	0.09 cfs	0.06 MGD*
30Q5	=	0.36 cfs	0.23 MGD*
30Q10	=	0.19 cfs	0.12 MGD*
High flow 30Q10	=	2.0 cfs	1.3 MGD*
High flow 1Q10	=	0.78 cfs	0.50 MGD*
High flow 7Q10	=	1.1 cfs	0.71 MGD*
Harmonic Mean	=	1.7 cfs	1.1 MGD*

*Conversion to MGD = (cfs flow measurement) x (0.6463)

The high flow months are December - May

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

December 11, 2012

Bruce Ringrose
Manager, Community Systems
Loudoun Water
P.O. Box 4000
Ashburn, VA 20146

Re: **Goose Creek Industrial Park WWTP, Permit # VA0080993**

Dear Mr. Ringrose:

Attached is a copy of the Inspection Report generated from the Facility Technical Inspection conducted at Goose Creek Industrial Park – Wastewater Treatment Plant (WWTP) on November 15, 2012. I would like to thank Les Morefield and David McGill for their time and assistance during this inspection.

This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 *et seq.* (APA). 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 contact me at the Northern Regional Office at (703) 583-3882 or by e-mail at Sharon.Allen@deq.virginia.gov.

Sincerely,

Sharon Allen

Sharon Allen
Environmental Specialist II

Electronic copy sent:
Permits / DMR File, Compliance Manager – DEQ
Les Morefield - Community Systems Supervisor, Loudoun Water

Attachment 2

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0080993	**December 9, 2008**		**December 9, 2013**

Facility Name	Address	Telephone Number
Goose Creek Industrial Park WWTP	**42217 Cochran Mill Rd, Leesburg, VA 20175**	**571-291-7878**
Owner Name	Address	Telephone Number
Loudoun Water	**P.O. Box 4000, Ashburn, VA 20146**	**571-291-7878**
Responsible Official	Title	Telephone Number
Les Morefield Class I; 1965005477	**Community Systems Supervisor**	**571-291-7878**
Responsible Operator	Operator Cert. Class/number	Telephone Number
David McGill	**Class IV; 1965008257**	********

TYPE OF FACILITY:

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

INFLUENT CHARACTERISTICS:		DESIGN:
	Flow	**0.01**
	Population Served	**Variable**
	Connections Served	**8**

EFFLUENT LIMITS: mg/L unless otherwise specified

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
E. Coli n/100ml			**235**	**pH s.u.**	**6.0**		**9.0**
DO	**5.0**			**TRC (after contact tank)**	**1.5**		
TRC (after dechlorination)		**.014**	**.017**	**TSS**		**30**	**45**
BOD5 (June – November)		**12**	**18**	**BOD5 (December - May)**		**30**	**45**
TKN (June – November)		**5.0**	**7.5**				

Revised: 06-2011

Receiving Stream	**Sycolin Creek**
Basin	**Potomac River**
Discharge Point (LONG)	**77° 31' 09"**
Discharge Point (LAT)	**39° 04' 21"**

Problems identified at last inspection: **Oct 30, 2006**	Corrected	Not Corrected
1. During the permit writer's site visit prior to reissuing this permit in 2003, she noted numerous muskrat burrows in the bank of the Lemna pond and as a result required the installation of groundwater monitoring wells to determine if the integrity of the pond's bentonite clay liner had been breached. While the pond condition is much improved, two burrows were noted in the berm on the north side of the pond. The burrows should be filled as they are discovered to discourage muskrat colonization.	[X]	[ ]

Comments 2006

1. **The plant has in the past experienced adverse effects of storm water runoff from the neighboring property. Storm water flow carrying sawdust and chips from the neighboring sawmill would flow downhill directly into the WWTP. LCSA has recently installed a new concrete driveway that also diverts the runoff so it flows around the plant rather than into it.**

SUMMARY November 2012

COMMENTS:

- **This permit is due to be reissued in the coming year.**
- **The flow design for this facility is 10,000 MGD; the actual flow much less. This plant has an intermittent discharge. Months with flow in 2012 were January, March, May, July, and November.**
- **Muskrat burrows were present around Lemna pond. The Water Division Maintenance Staff from Loudoun Water has been requested to evaluate the pond condition and conduct repairs. This item has been placed on their schedule; possibly in Spring 2013. Pond may be re-lined with bentonite.**
- **Groundwater monitoring currently once per year.**

REQUEST for CORRECTIVE ACTION:

- **Update DEQ when repair work is conducted and completed.**

Virginia Department of Environmental Quality

FOCUSED CEI TECH/LAB INSPECTION REPORT

FACILITY NAME: Goose Creek Industrial Park WWTP		**INSPECTION DATE:**	**November 15, 2012**
		INSPECTOR	**S. Allen**
PERMIT No.:	**VA0080993**	**REPORT DATE:**	**December 10, 2012**
TYPE OF FACILITY: ☑ Municipal ☐ Major ☐ Industrial ☑ Minor ☐ Federal ☐ Small Minor ☐ HP ☐ LP		**TIME OF INSPECTION:**	Arrival **0940** / Departure **1130**
		TOTAL TIME SPENT (including prep & travel)	**15 hours**
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☑ Yes ☐ No
REVIEWED BY / Date:			
		12/10/12	
PRESENT DURING INSPECTION:	**Doug Frasier – DEQ** **Les Morefield, David McGill – Loudoun Water**		

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments:	☐ Yes ☑ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments:	☑ Yes ☐ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator requirements being met? Comments:	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments: **Operators visit 3 times a week minimum; daily when plant is discharging.**	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments:	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments:	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No
8. Have there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments: **NA** **Per the SCAT regulations: Class I reliability - Certain Reliability Class I treatment works for which it is feasible to shut down or discontinue treatment works operation during periods of power failure without bypassing or violating effluent limitations may be exempt from the alternate feed requirement.**	☐ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments: **NA**	☐ Yes ☐ No

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TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments:	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments: **Old DMRs and plant log sheets kept on site.**	☑ Yes ☐ No
14. Which of the following records does the plant maintain? ☑ Operational logs ☑ Instrument maintenance & calibration ☑ Mechanical equipment maintenance ☐ Industrial Waste Contribution (Municipal facilities) Comments:	
15. What does the operational log contain? ☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☑ Process adjustments ☐ Control calculations ☐ Other (specify) Comments:	
16. What do the mechanical equipment records contain? ☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules ☑ Spare parts inventory ☑ Equipment/parts suppliers ☐ Other (specify) Comments:	
17. What do the industrial waste contribution records contain (Municipal only)? ☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types ☐ Other (specify) Comments: **NA**	
18. Which of the following records are kept at the plant and available to personnel? ☑ Equipment maintenance records ☑ Operational log ☐ Industrial contributor records ☑ Instrumentation records ☑ Sampling and testing records Comments:	
19. List records not normally available to plant personnel and their location: Comments: **Copies of E-DMR submittal confirmation and copies of supporting documents are kept at Broad Run WRF. Original operator log sheets kept at the Goose Creek WWTP.**	
20. Are the records maintained for the required time period (three or five years)? **Comments:**	☑ Yes ☐ No

Permit #	VA0080993

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping			
Flow Measurement (Influent)			
Screening/Comminution	Y	N	
Grit Removal			
Oil/Water Separator			
Flow Equalization			
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration	Y	N	*Aeration basin and sludge holding tank run on same blowers- 30 minutes on, 30 minutes off.*
Biological Nutrient Removal			
Sequencing Batch Reactor			
Secondary Sedimentation	Y	N	
Ponds/Lagoons	Y	6	*Pond is a 150,000 gallon unaerated Lemna pond which uses duckweed to further treat the wastewater prior to disinfection. Muskrats have been burrowing around the pond; operators fill holes in with rocks when discovered.*
Flocculation			
Tertiary Sedimentation			
Filtration			
Micro-Screening			
Activated Carbon Adsorption			
Chlorination	Y	N	
Dechlorination	Y	N	
Ozonation			
Ultraviolet Disinfection			
Post Aeration	Y	6	*There is a short in the electrical conduit somewhere. Staff has installed a temporary line to run equipment, plan to have line dug up and repaired or replaced.*
Flow Measurement (Effluent)	Y		*V-notch weir*
Land Application (Effluent)			
Plant Outfall	Y	N	
Sludge Pumping			
Flotation Thickening (DAF)			
Gravity Thickening			
Aerobic Digestion	Y	N	*Sludge Holding Tank acts as an aerobic digestor.*
Anaerobic Digestion			
Lime Stabilization			
Centrifugation			
Sludge Press			
Vacuum Filtration			
Drying Beds			
Land Application (Sludge)			

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

Permit #	VA0080993

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- Package plant with extended aeration and clarification followed by a Lemna pond for nutrient removal. There are theoretically 15 connections; however, the industrial park is not fully occupied.
- Operators visit three times per week when the plant is not discharging, daily when they are discharging. Process control monitoring includes DO, pH, MLSS in aeration basin even when plant is not discharging.
- Mr. Morefield said they need to dig up the electrical conduit that runs to the end of the Lemna pond- there is short somewhere, need to find and will replace conduit. Have bypass wire rigged up. Anticipates that they may hit the blower line when digging; if happens, they will replace the whole blower line as well.
- The neighboring sawmill has installed silt fence across their SW drainage path to prevent debris that escapes from the site from entering Sycolin creek. However, the silt fence also resulted in the drainage backing up and becoming standing water that partially floods the WWTP property (pages 5 and 6). I stopped by the sawmill and explained the problem to Ms. Jeanne Webb, who gave permission to remove the smaller section of silt fence.

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LABORATORY INSPECTION

PRESENT DURING INSPECTION:	Doug Frasier- DEQ Les Morefield, David McGill- Loudon Water

1.	Do lab records include sampling date/time, analysis date/time, sample location, test method, test results, analyst's initials, instrument calibration and maintenance, and Certificate of Analysis? ☑ Sampling Date/Time ☑ Analysis Date/Time ☑ Sample Location ☐ Test Method ☑ Test Results ☑ Analyst's Initials ☑ Instrument Calibration & Maintenance ☑ Chain of Custody ☑ Certificate of Analysis	
2.	Are Discharge Monitoring Reports complete and correct? Month(s) reviewed: January, March, May, and July 2012	☑ Yes ☐ No
3.	Are sample location(s) according to permit requirements (after all treatment unless otherwise specified)?	☑ Yes ☐ No
4.	Are sample collection, preservation, and holding times appropriate; and is sampling equipment adequate?	☑ Yes ☐ No
5.	Are grab and composite samples representative of the flow and the nature of the monitored activity?	☑ Yes ☐ No
6.	If analysis is performed at another location, are shipping procedures adequate? List parameters and name & address of contract lab(s): **E. coli, TSS and cBOD5/BOD5** Loudoun Water Central Laboratory at Broad Run 44865 Loudoun Water Way Ashburn, VA 201446 **TKN** Martel Laboratories, JDS Inc. 1025 Cromwell Bridge Rd. Baltimore, MD 21286	☑ Yes ☐ No
7.	Are annual thermometer calibration(s) adequate?	☑ Yes ☐ No
8.	Parameters evaluated during this inspection (attach checklists): ☑ pH ☐ Temperature ☑ Total Residual Chlorine ☑ Dissolved Oxygen ~~☐ Biochemical Oxygen Demand~~ ~~☐ Total Suspended Solids~~ ☐ Other (specify) ☐ Other (specify) ☐ Other (specify) Comments:	

Permit #	VA0080993

EFFLUENT FIELD DATA:

Flow	MGD	**Dissolved Oxygen**	11.96 mg/L	**TRC (Contact Tank)**	>2.2 mg/L
pH	6.94 S.U.	**Temperature**	5.4 °C	**TRC (Final Effluent)**	0.02 mg/L
Was a Sampling Inspection conducted?	☑ Yes (see Sampling Inspection Report) ☐ No				

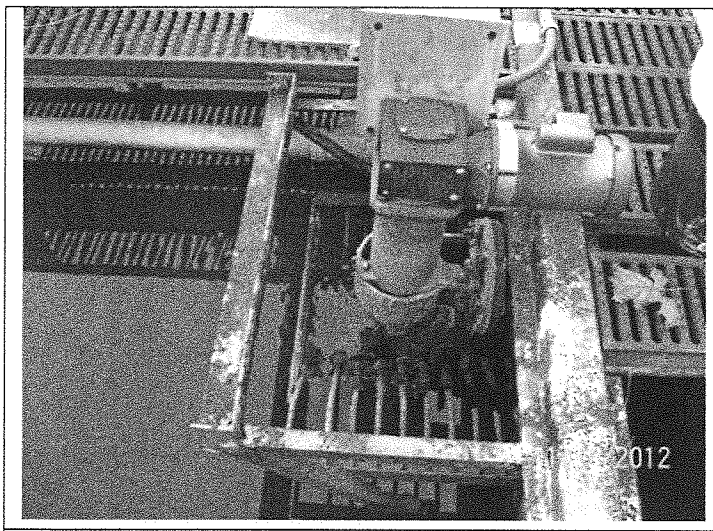
CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☑ Shore based ☐ Submerged Diffuser? ☐ Yes ☑ No
2. Are the outfall and supporting structures in good condition? ☑ Yes ☐ No
3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen
4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☑ No
5. Receiving stream: ☑ No observed problems ☑ Indication of problems (explain below)

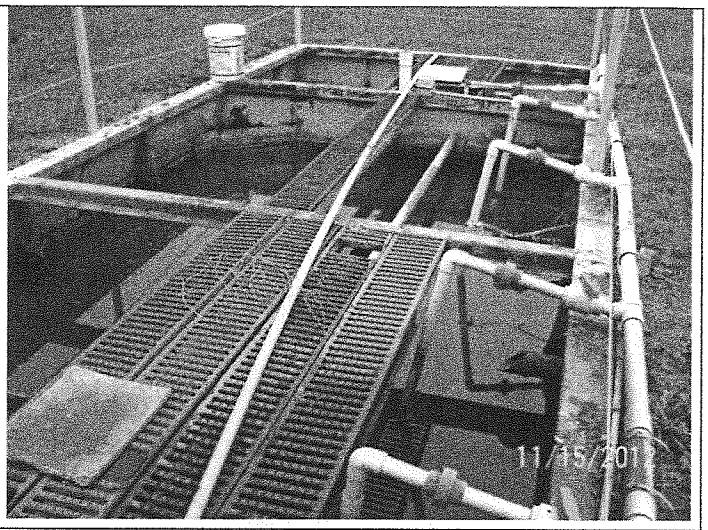
   Comments:

REQUEST for CORRETIVE ACTION:

1. **Update DEQ when repair work is conducted and completed:**
   Repair of the electric conduit;
   Repair/relining of the Lemna pond.



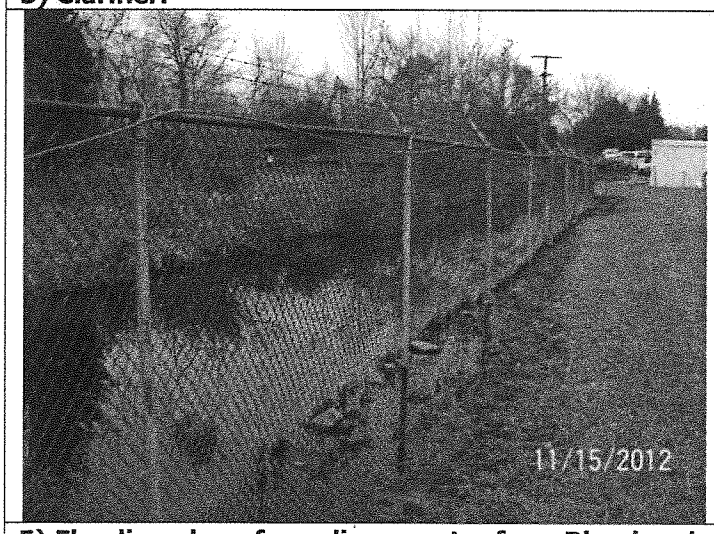
1) Headworks - comminutor and bar screen.



2) Aeration basin (air off).

3) Clarifier.

4) Clarifier weir and effluent trough.



5) Flooding along fence line – water from Riverbend Sawmill.

6) Silt fence causing flooding issue.

Facility name: Goose Creek Industrial Park WWTP
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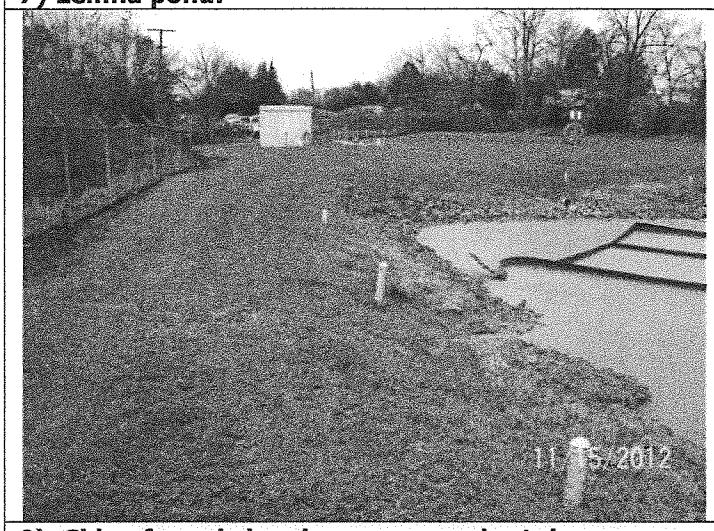
7) Lemna pond.

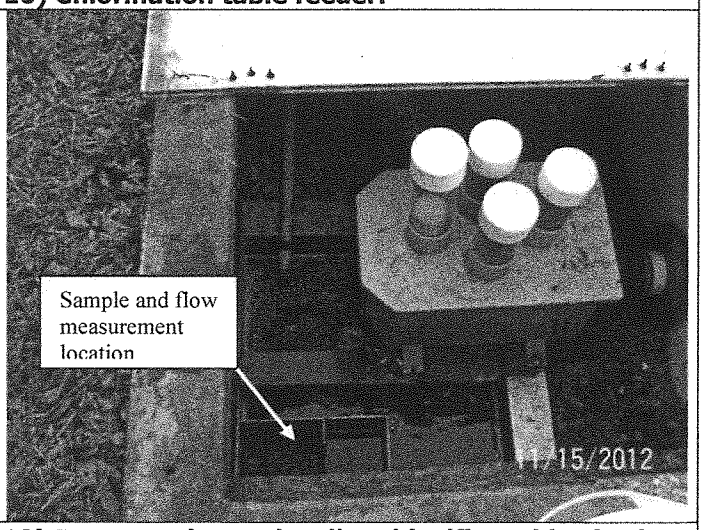
8) Rocks placed in muskrat holes.



9) Side of pond showing some muskrat damage.

10) Chlorination table feeder.

11) Chlorine contact tank.



12) Post aeration and sodium bisulfite tablet feeder.

Facility name: Goose Creek Industrial Park WWTP
Site Inspection Date: November 15, 2012

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Photos & Layout by: S. Allen
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ANALYST:	**David McGill**	VPDES NO.	**VA0080993**

Parameter: Dissolved Oxygen
Method: Electrode
01/08

Meter: **WTW Multi 340i multi-meter**

METHOD OF ANALYSIS:

X	19th 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]	**In situ**	
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.		
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]		
14)	If a duplicate sample is analyzed, is the relative percent difference (RPD) < 20? [18th ed. Table 1020 I; 21st ed. DEQ]		

COMMENTS:	**Loudoun Water has both 19th and 20th editions SM.**
PROBLEMS:	**None noted.**

ANALYST:	**David McGill**	VPDES NO	**VA0080993**

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

Meter: **WTW Multi 340i multi-meter**

METHOD OF ANALYSIS

X	19th 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]	X	
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]	**In situ**	
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]	**In situ**	
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.		
16)	Is pH of duplicate samples within 0.1 SU of the original sample? [Part 1020]		
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]		

COMMENTS:	**Loudoun Water has both 19th and 20th editions SM** **4) Calibrated with pH buffers 7 and 10, rechecked w/ pH 4 buffer.**
PROBLEMS:	**9) The multimeter had a label, but writing has washed away.**

ANALYST:	**David McGill**	VPDES NO	**VA0080993**

Parameter: Total Residual Chlorine
Method: DPD Colorimetric (HACH Pocket Colorimeter™)
01/08

Instrument: **Pocket Colorimeter II**

METHOD OF ANALYSIS:

HACH Manufacturer's Instructions (Method 8167) plus an edition of Standard Methods

X	19th Edition of Standard Methods 4500-Cl G
	21st Edition of Standard Methods 4500-Cl G (00)

		Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? NOTE: Analyze 4 samples of known TRC. Must use a lot number or source that is different from that used to prepare calibration standards. May not use Spec√ ™. [SM 1020 B.1]	X	
2)	Are the DPD PermaChem® Powder Pillows stored in a cool, dry place? [Mfr.]	X	
3)	Are the pillows within the manufacturer's expiration date? [Mfr]	X	
4)	Has buffering capability of DPD pillows been checked annually? (Pillows should adjust sample pH to between 6 and 7) [Mfr]	X	
5)	When pH adjustment is required, is H_2SO_4 or NaOH used? [11.3.1]	X	
6)	Are cells clean and in good condition? [Mfr]	X	
7)	Is the low range (0.01-mg/L resolution) used for samples containing residuals from 0-2.00 mg/L? [Mfr.]	X	
8)	Is calibration curve developed (may use manufacturer's calibration) with daily verification using a high and a low standard? NOTE: May use manufacturer's installed calibration and commercially available chlorine standards for daily calibration verifications. [18th ed 1020 B.5; 21st ed 4020 B.2.b]	X	
9)	Is the 10-mL cell (2.5-cm diameter) used for samples from 0-2.00 mg/L? [Mfr.]	X	
10)	Is the meter zeroed correctly by using sample as blank for the cell used? [Mfr.]	X	
11)	Is the instrument cap placed correctly on the meter body when the meter is zeroed and when the sample is analyzed? [Mfr.]	X	
12)	Is the DPD Total Chlorine PermaChem® Powder Pillow mixed into the sample? [HACH 11.1]	X	
13)	Is the analysis made at least three minutes but not more than six minutes after PermaChem® Powder Pillow addition? [11.2]	X	
14)	If read-out is flashing [2.20], is sample diluted correctly, then reanalyzed? [1.2 & 2.0]	X	
15)	Are samples analyzed within 15 minutes of collection? [40 CFR Part 136]	X	
16)	Is a duplicate sample analyzed after every 20 samples if citing 18th Edition [SM 1020 B.6] or daily for 21st Edition [SM 4020 B.3.c]?		
17)	If duplicate sample is analyzed, is the relative percent difference (RPD) ≤ 20? [18th ed. Table 1020 I; 21st ed. DEQ]		

COMMENTS:	**7) High range used for chlorine contact tank, low range used for final effluent.**
PROBLEMS:	**None noted.**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET
1/08

FACILITY NAME:	**Goose Creek Industrial Park WWTP**	VPDES NO:	**VA0080993**	DATE:	**November 15, 2012**

EQUIPMENT	RANGE	IN RANGE		INSPECT READING °C	CHECK & LOG DAILY		CORRECT INCREMENT		ANNUAL THERMOMETER VERIFICATION				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?				Y/N **Y**
									DATE CHECKED	MARKED		CORR FACTOR	INSPECT TEMP
		Y	N		Y	N	Y	N		Y	N	°C	°C
pH METER	± 1° C			**NA**					**6/22/12**		**X**	**0.1**	**21.9**
DO METER	± 1° C			**NA**					**6/22/12**		**X**	**0**	**21.9**

COMMENTS:	**The analyses were discussed and "walked through" with operator, but not demonstrated using final effluent.**
PROBLEMS:	**The multimeter on site had been labeled, but the ink had faded and it was illegible. A new label had been put on the meter as of December 5, 2012.**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET
Revised 7/05 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**Goose Creek Industrial Park WWTP**	VPDES NO	**VA0080993**	DATE:	**November 15, 2012**

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
pH	15 MIN.	**X**		**X**		**In Situ**				N/A				
CHLORINE	15 MIN.	**X**		**X**		**X**		**X**		N/A				
DISSOLVED 0_2	15 MIN./IN SITU	**X**		**X**		**In Situ**				N/A				
PROBLEMS: **None noted**										PROBLEMS: **NA**				

To:	Joan C. Crowther
From:	Jennifer Carlson
Date:	July 9, 2013
Subject:	Planning Statement for Goose Creek Industrial Park WWTP
Permit Number:	VA0080993

Information for Outfall 001:

Discharge Type: Municipal
Discharge Flow: 0.010 MGD
Receiving Stream: Sycolin Creek
Latitude / Longitude: 39°4'21"/77°31'09"
Rivermile: 0.15
Streamcode: 1aSYC
Waterbody: VAN-08R
Water Quality Standards: Section 8, Class III, Special Standards PWS
Drainage Area: 17.3 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.

   This facility discharges into Sycolin Creek. The closest DEQ ambient monitoring station on Sycolin Creek is 1aSYC002.03, located at the Route 653 bridge crossing, approximately 1.9 miles upstream of Outfall 001. The closest downstream ambient monitoring station is 1aGOO002.38, located on Goose Creek at the Route 7 bridge crossing, approximately 1.5 miles downstream of Outfall 001. The following is the water quality summary for Sycolin Creek, as taken from the Draft 2012 Integrated Report*:

   The following are the DEQ ambient monitoring stations located on Sycolin Creek:

   - *1aSYC002.03, at Route 653*

   E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A fecal coliform TMDL for the Sycolin Creek watershed has been completed and approved.

   The aquatic life use is considered fully supporting. Citizen monitoring finds a low probability of adverse conditions for biota. The public water supply and wildlife uses are considered fully supporting. The fish consumption use was 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*						
Sycolin Creek	Recreation	*E. coli*	Goose Creek Watershed Bacteria 05/01/03	2.76E+10 cfu/year fecal coliform	200 cfu/100ml FC --- 0.010 MGD	Modified 10/27/06

**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.*

The TMDL presents the WLA for this facility in terms of *E. coli* as well: 1.74E+10 cfu/year.

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*							
Goose Creek	Aquatic Life	Benthic Macroinvertebrates	0.2 miles	Goose Creek Watershed Benthic 04/26/04	0.5 tons/yr	30 mg/L TSS --- 0.010 MGD	N/A
	Fish Consumption	PCBs	0.2 miles	No	---	---	2018

**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.*

This facility was assigned a total WLA for 2.5 tons/year in the Benthic TMDL for the Goose Creek watershed. This total WLA was calculated based upon the permitted maximum average concentration for TSS (mg/L) and an assumption of the facility operating at 5 times the design flow. The factor of 5 for the design flow was used as a conservative measure to build in future growth in the watershed. Although the future growth for the watershed was determined by the design flow of each facility currently in the watershed, the future growth is available for both new and expanding permits in the watershed. The actual WLA for this facility without including the future growth is 0.5 tons/year.

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

Goose Creek is listed with a PCB impairment, approximately 0.2 miles downstream of this facility. In support for the PCB TMDL that is scheduled for development by 2018 for Goose Creek, this facility is a candidate for low-level PCB monitoring, based upon its designation as a minor municipal facility. DEQ staff recommends that this facility perform low-level PCB monitoring during the upcoming permit

cycle. It is recommended that this facility collect 2 samples using EPA Method 1668, which is capable of detecting low-level concentrations for all 209 PCB congeners. PCB data generated using Method 1668 revisions A, B, C are acceptable, however data generated using versions A or C is preferred.

There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

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

   The intake for the City of Fairfax is located upstream of the confluence of Sycolin Creek and Goose Creek.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Goose Creek Industrial Park WWTP Permit No.: VA0080993

Receiving Stream: Sycolin Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	83.6	mg/L
90% Temperature (Annual) =	23.4	deg C
90% Temperature (Wet season) =	12.7	deg C
90% Maximum pH =	8	SU
10% Maximum pH =	7	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0.05	MGD
7Q10 (Annual) =	0.06	MGD
30Q10 (Annual) =	0.12	MGD
1Q10 (Wet season) =	0.5	MGD
30Q10 (Wet season)	1.3	MGD
30Q5 =	0.23	MGD
Harmonic Mean =	1.1	MGD

Mixing Information

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

Effluent Information

Mean Hardness (as CaCO3) =	50	mg/L
90% Temp (Annual) =	21	deg C
90% Temp (Wet season) =		deg C
90% Maximum pH =	8.3	SU
10% Maximum pH =		SU
Discharge Flow =	0.01	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	6.7E+02	9.9E+02	--	--	1.6E+04	2.4E+04	--	--	6.7E+01	9.9E+01	--	--	1.6E+03	2.4E+03	**--**	**--**	**1.6E+03**	**2.4E+03**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	1.5E+02	2.2E+02	--	--	6.1E-01	9.3E-01	--	--	1.5E+01	2.2E+01	**--**	**--**	**1.5E+01**	**2.2E+01**
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	5.7E+01	2.8E+02	--	--	5.1E-02	2.5E-01	--	--	5.7E+00	2.8E+01	**--**	**--**	**5.7E+00**	**2.8E+01**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	1.8E+01	--	5.4E-02	5.6E-02	7.5E-01	--	4.9E-05	5.0E-05	4.5E+00	--	5.4E-03	5.6E-03	**4.5E+00**	**--**	**5.4E-03**	**5.6E-03**
Ammonia-N (mg/l) (Yearly)	0	7.83E+00	1.36E+00	--	--	4.70E+01	1.76E+01	--	--	1.96E+00	3.39E-01	--	--	1.17E+01	4.40E+00	--	--	**1.17E+01**	**4.40E+00**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	8.34E+00	2.43E+00	--	--	4.25E+02	3.18E+02	--	--	2.09E+00	6.07E-01	--	--	1.06E+02	7.95E+01	--	--	**1.06E+02**	**7.95E+01**	**--**	**--**
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	2.0E+05	9.6E+05	--	--	8.3E+02	4.0E+03	--	--	2.0E+04	9.6E+04	**--**	**--**	**2.0E+04**	**9.6E+04**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	1.3E+02	1.5E+04	--	--	5.6E-01	6.4E+01	--	--	1.3E+01	1.5E+03	**--**	**--**	**1.3E+01**	**1.5E+03**
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	2.0E+03	1.1E+03	2.4E+02	--	8.5E+01	3.8E+01	1.0E+00	--	5.1E+02	2.6E+02	2.4E+01	--	**5.1E+02**	**2.6E+02**	**2.4E+01**	**--**
Barium	0	--	--	2.0E+03	--	--	--	4.8E+04	--	--	--	2.0E+02	--	--	--	4.8E+03	--	**--**	**--**	**4.8E+03**	**--**
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	2.4E+03	5.7E+04	--	--	2.2E+00	5.1E+01	--	--	2.4E+02	5.7E+03	**--**	**--**	**2.4E+02**	**5.7E+03**
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	9.5E-02	2.2E-01	--	--	8.6E-05	2.0E-04	--	--	9.5E-03	2.2E-02	**--**	**--**	**9.5E-03**	**2.2E-02**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	3.3E+01	5.9E+02	--	--	3.0E-02	5.3E-01	--	--	3.3E+00	5.9E+01	**--**	**--**	**3.3E+00**	**5.9E+01**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	3.4E+04	1.6E+06	--	--	1.4E+02	6.5E+03	--	--	3.4E+03	1.6E+05	**--**	**--**	**3.4E+03**	**1.6E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	1.3E+03	2.4E+03	--	--	1.2E+00	2.2E+00	--	--	1.3E+02	2.4E+02	**--**	**--**	**1.3E+02**	**2.4E+02**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	4.8E+03	1.6E+05	--	--	4.3E+00	1.4E+02	--	--	4.8E+02	1.6E+04	**--**	**--**	**4.8E+02**	**1.6E+04**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	3.6E+04	4.6E+04	--	--	1.5E+02	1.9E+02	--	--	3.6E+03	4.6E+03	**--**	**--**	**3.6E+03**	**4.6E+03**
Cadmium	0	3.0E+00	9.4E-01	5.0E+00	--	1.8E+01	6.6E+00	1.2E+02	--	7.4E-01	2.4E-01	5.0E-01	--	4.4E+00	1.6E+00	1.2E+01	--	**4.4E+00**	**1.6E+00**	**1.2E+01**	**--**
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	2.6E+02	1.8E+03	--	--	2.3E-01	1.6E+00	--	--	2.6E+01	1.8E+02	**--**	**--**	**2.6E+01**	**1.8E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.4E+01	3.0E-02	8.9E-01	9.0E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	3.6E+00	7.5E-03	8.9E-02	9.0E-02	**3.6E+00**	**7.5E-03**	**8.9E-02**	**9.0E-02**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	5.2E+06	1.6E+06	6.0E+06	--	2.2E+05	5.8E+04	2.5E+04	--	1.3E+06	4.0E+05	6.0E+05	--	**1.3E+06**	**4.0E+05**	**6.0E+05**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	1.1E+02	7.7E+01	--	--	4.8E+00	2.8E+00	--	--	2.9E+01	1.9E+01	--	--	**2.9E+01**	**1.9E+01**	**--**	**--**
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	3.1E+03	3.8E+04	--	--	1.3E+01	1.6E+02	--	--	3.1E+02	3.8E+03	**--**	**--**	**3.1E+02**	**3.8E+03**

Attachment 4

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	4.4E+02	1.4E+04	--	--	4.0E-01	1.3E+01	--	--	4.4E+01	1.4E+03	**--**	**--**	**4.4E+01**	**1.4E+03**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	8.2E+03	2.6E+05	--	--	3.4E+01	1.1E+03	--	--	8.2E+02	2.6E+04	**--**	**--**	**8.2E+02**	**2.6E+04**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	2.4E+04	3.8E+04	--	--	1.0E+02	1.6E+02	--	--	2.4E+03	3.8E+03	**--**	**--**	**2.4E+03**	**3.8E+03**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	1.9E+03	3.6E+03	--	--	8.1E+00	1.5E+01	--	--	1.9E+02	3.6E+02	**--**	**--**	**1.9E+02**	**3.6E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	5.0E-01	2.9E-01	--	--	2.1E-02	1.0E-02	--	--	1.2E-01	7.2E-02	--	--	**1.2E-01**	**7.2E-02**	**--**	**--**
Chromium III	0	4.6E+02	6.1E+01	--	--	2.8E+03	4.3E+02	--	--	1.2E+02	1.5E+01	--	--	7.0E+02	1.1E+02	--	--	**7.0E+02**	**1.1E+02**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	9.6E+01	7.7E+01	--	--	4.0E+00	2.8E+00	--	--	2.4E+01	1.9E+01	--	--	**2.4E+01**	**1.9E+01**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	2.4E+03	--	--	--	1.0E+01	--	--	--	2.4E+02	--	**--**	**--**	**2.4E+02**	**--**
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	--	--	3.8E-04	1.8E-03	--	--	4.2E-02	2.0E-01	**--**	**--**	**4.2E-02**	**2.0E-01**
Copper	0	1.1E+01	7.3E+00	1.3E+03	--	6.4E+01	5.1E+01	3.1E+04	--	2.7E+00	1.8E+00	1.3E+02	--	1.6E+01	1.3E+01	3.1E+03	--	**1.6E+01**	**1.3E+01**	**3.1E+03**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.3E+02	3.6E+01	3.4E+03	3.8E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	3.3E+01	9.1E+00	3.4E+02	3.8E+04	**3.3E+01**	**9.1E+00**	**3.4E+02**	**3.8E+04**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	3.4E-01	3.4E-01	--	--	3.1E-04	3.1E-04	--	--	3.4E-02	3.4E-02	**--**	**--**	**3.4E-02**	**3.4E-02**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	2.4E-01	2.4E-01	--	--	2.2E-04	2.2E-04	--	--	2.4E-02	2.4E-02	**--**	**--**	**2.4E-02**	**2.4E-02**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	6.6E+00	7.0E-03	2.4E-01	2.4E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	1.7E+00	1.8E-03	2.4E-02	2.4E-02	**1.7E+00**	**1.8E-03**	**2.4E-02**	**2.4E-02**
Demeton	0	--	1.0E-01	--	--	--	7.0E-01	--	--	--	2.5E-02	--	--	--	1.8E-01	--	--	**--**	**1.8E-01**	**--**	**--**
Diazinon	0	1.7E-01	1.7E-01	--	--	1.0E+00	1.2E+00	--	--	4.3E-02	4.3E-02	--	--	2.6E-01	3.0E-01	--	--	**2.6E-01**	**3.0E-01**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	1.0E+04	3.1E+04	--	--	4.2E+01	1.3E+02	--	--	1.0E+03	3.1E+03	**--**	**--**	**1.0E+03**	**3.1E+03**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	7.7E+03	2.3E+04	--	--	3.2E+01	9.6E+01	--	--	7.7E+02	2.3E+03	**--**	**--**	**7.7E+02**	**2.3E+03**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	1.5E+03	4.6E+03	--	--	6.3E+00	1.9E+01	--	--	1.5E+02	4.6E+02	**--**	**--**	**1.5E+02**	**4.6E+02**
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.3E+01	3.1E+01	--	--	2.1E-02	2.8E-02	--	--	2.3E+00	3.1E+00	**--**	**--**	**2.3E+00**	**3.1E+00**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	6.1E+02	1.9E+04	--	--	5.5E-01	1.7E+01	--	--	6.1E+01	1.9E+03	**--**	**--**	**6.1E+01**	**1.9E+03**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	4.2E+02	4.1E+04	--	--	3.8E-01	3.7E+01	--	--	4.2E+01	4.1E+03	**--**	**--**	**4.2E+01**	**4.1E+03**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	7.9E+03	1.7E+05	--	--	3.3E+01	7.1E+02	--	--	7.9E+02	1.7E+04	**--**	**--**	**7.9E+02**	**1.7E+04**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	3.4E+03	2.4E+05	--	--	1.4E+01	1.0E+03	--	--	3.4E+02	2.4E+04	**--**	**--**	**3.4E+02**	**2.4E+04**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.8E+03	7.0E+03	--	--	7.7E+00	2.9E+01	--	--	1.8E+02	7.0E+02	**--**	**--**	**1.8E+02**	**7.0E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	2.4E+03	--	--	--	1.0E+01	--	--	--	2.4E+02	--	**--**	**--**	**2.4E+02**	**--**
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	5.6E+02	1.7E+04	--	--	5.0E-01	1.5E+01	--	--	5.6E+01	1.7E+03	**--**	**--**	**5.6E+01**	**1.7E+03**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	3.8E+02	2.3E+04	--	--	3.4E-01	2.1E+01	--	--	3.8E+01	2.3E+03	**--**	**--**	**3.8E+01**	**2.3E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.4E+00	3.9E-01	5.8E-02	6.0E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	3.6E-01	9.8E-02	5.8E-03	6.0E-03	**3.6E-01**	**9.8E-02**	**5.8E-03**	**6.0E-03**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	4.1E+05	1.1E+06	--	--	1.7E+03	4.4E+03	--	--	4.1E+04	1.1E+05	**--**	**--**	**4.1E+04**	**1.1E+05**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	9.1E+03	2.0E+04	--	--	3.8E+01	8.5E+01	--	--	9.1E+02	2.0E+03	**--**	**--**	**9.1E+02**	**2.0E+03**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	6.5E+06	2.6E+07	--	--	2.7E+04	1.1E+05	--	--	6.5E+05	2.6E+06	**--**	**--**	**6.5E+05**	**2.6E+06**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	4.8E+04	1.1E+05	--	--	2.0E+02	4.5E+02	--	--	4.8E+03	1.1E+04	**--**	**--**	**4.8E+03**	**1.1E+04**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	1.7E+03	1.3E+05	--	--	6.9E+00	5.3E+02	--	--	1.7E+02	1.3E+04	**--**	**--**	**1.7E+02**	**1.3E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	3.1E+02	6.7E+03	--	--	1.3E+00	2.8E+01	--	--	3.1E+01	6.7E+02	**--**	**--**	**3.1E+01**	**6.7E+02**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.2E+02	3.8E+03	--	--	1.1E-01	3.4E+00	--	--	1.2E+01	3.8E+02	**--**	**--**	**1.2E+01**	**3.8E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	1.2E-06	1.2E-06	--	--	5.0E-09	5.1E-09	--	--	1.2E-07	1.2E-07	**--**	**--**	**1.2E-07**	**1.2E-07**
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	4.0E+01	2.2E+02	--	--	3.6E-02	2.0E-01	--	--	4.0E+00	2.2E+01	**--**	**--**	**4.0E+00**	**2.2E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+00	3.9E-01	1.5E+03	2.1E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.3E-01	9.8E-02	1.5E+02	2.1E+02	**3.3E-01**	**9.8E-02**	**1.5E+02**	**2.1E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+00	3.9E-01	1.5E+03	2.1E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.3E-01	9.8E-02	1.5E+02	2.1E+02	**3.3E-01**	**9.8E-02**	**1.5E+02**	**2.1E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.3E+00	3.9E-01	--	--	5.5E-02	1.4E-02	--	--	3.3E-01	9.8E-02	--	--	**3.3E-01**	**9.8E-02**	**--**	**--**
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	1.5E+03	2.1E+03	--	--	6.2E+00	8.9E+00	--	--	1.5E+02	2.1E+02	**--**	**--**	**1.5E+02**	**2.1E+02**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	5.2E-01	2.5E-01	1.4E+00	1.4E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	1.3E-01	6.3E-02	1.4E-01	1.4E-01	**1.3E-01**	**6.3E-02**	**1.4E-01**	**1.4E-01**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	7.0E+00	7.2E+00	--	--	2.9E-02	3.0E-02	--	--	7.0E-01	7.2E-01	**--**	**--**	**7.0E-01**	**7.2E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	1.3E+04	5.0E+04	--	--	5.3E+01	2.1E+02	--	--	1.3E+03	5.0E+03	**--**	**--**	**1.3E+03**	**5.0E+03**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	3.1E+03	3.4E+03	--	--	1.3E+01	1.4E+01	--	--	3.1E+02	3.4E+02	**--**	**--**	**3.1E+02**	**3.4E+02**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	2.6E+04	1.3E+05	--	--	1.1E+02	5.3E+02	--	--	2.6E+03	1.3E+04	**--**	**--**	**2.6E+03**	**1.3E+04**
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.2E+04	--	--	--	5.0E+01	--	--	--	1.2E+03	--	**--**	**--**	**1.2E+03**	**--**
Guthion	0	--	1.0E-02	--	--	--	7.0E-02	--	--	--	2.5E-03	--	--	--	1.8E-02	--	--	**--**	**1.8E-02**	**--**	**--**
Heptachlor [c]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	3.1E+00	2.7E-02	8.8E-02	8.8E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	7.8E-01	6.7E-03	8.8E-03	8.8E-03	**7.8E-01**	**6.7E-03**	**8.8E-03**	**8.8E-03**
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	3.1E+00	2.7E-02	4.3E-02	4.3E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	7.8E-01	6.7E-03	4.3E-03	4.3E-03	**7.8E-01**	**6.7E-03**	**4.3E-03**	**4.3E-03**
Hexachlorobenzene[c]	0	--	--	2.8E-03	2.9E-03	--	--	3.1E-01	3.2E-01	--	--	2.8E-04	2.9E-04	--	--	3.1E-02	3.2E-02	**--**	**--**	**3.1E-02**	**3.2E-02**
Hexachlorobutadiene[c]	0	--	--	4.4E+00	1.8E+02	--	--	4.9E+02	2.0E+04	--	--	4.4E-01	1.8E+01	--	--	4.9E+01	2.0E+03	**--**	**--**	**4.9E+01**	**2.0E+03**
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	2.6E-02	4.9E-02	--	--	2.9E+00	5.4E+00	--	--	2.6E-03	4.9E-03	--	--	2.9E-01	5.4E-01	**--**	**--**	**2.9E-01**	**5.4E-01**
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	9.1E-02	1.7E-01	--	--	1.0E+01	1.9E+01	--	--	9.1E-03	1.7E-02	--	--	1.0E+00	1.9E+00	**--**	**--**	**1.0E+00**	**1.9E+00**
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	5.7E+00	--	1.1E+02	2.0E+02	2.4E-01	--	9.8E-02	1.8E-01	1.4E+00	--	1.1E+01	2.0E+01	**1.4E+00**	**--**	**1.1E+01**	**2.0E+01**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	9.6E+02	2.6E+04	--	--	4.0E+00	1.1E+02	--	--	9.6E+01	2.6E+03	**--**	**--**	**9.6E+01**	**2.6E+03**
Hexachloroethane[c]	0	--	--	1.4E+01	3.3E+01	--	--	1.6E+03	3.7E+03	--	--	1.4E+00	3.3E+00	--	--	1.6E+02	3.7E+02	**--**	**--**	**1.6E+02**	**3.7E+02**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	1.4E+01	--	--	--	5.0E-01	--	--	--	3.5E+00	--	--	**--**	**3.5E+00**	**--**	**--**
Indeno (1,2,3-cd) pyrene [c]	0	--	--	3.8E-02	1.8E-01	--	--	4.2E+00	2.0E+01	--	--	3.8E-03	1.8E-02	--	--	4.2E-01	2.0E+00	**--**	**--**	**4.2E-01**	**2.0E+00**
Iron	0	--	--	3.0E+02	--	--	--	7.2E+03	--	--	--	3.0E+01	--	--	--	7.2E+02	--	**--**	**--**	**7.2E+02**	**--**
Isophorone[c]	0	--	--	3.5E+02	9.6E+03	--	--	3.9E+04	1.1E+06	--	--	3.5E+01	9.6E+02	--	--	3.9E+03	1.1E+05	**--**	**--**	**3.9E+03**	**1.1E+05**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	8.7E+01	1.0E+01	1.5E+01	--	5.2E+02	7.0E+01	3.6E+02	--	2.2E+01	2.5E+00	1.5E+00	--	1.3E+02	1.7E+01	3.6E+01	--	**1.3E+02**	**1.7E+01**	**3.6E+01**	**--**
Malathion	0	--	1.0E-01	--	--	--	7.0E-01	--	--	--	2.5E-02	--	--	--	1.8E-01	--	--	**--**	**1.8E-01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	1.2E+03	--	--	--	5.0E+00	--	--	--	1.2E+02	--	**--**	**--**	**1.2E+02**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	8.4E+00	5.4E+00	- -	- -	3.5E-01	1.9E-01	- -	--	2.1E+00	1.3E+00	- -	--	**2.1E+00**	**1.3E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	1.1E+03	3.6E+04	--	--	4.7E+00	1.5E+02	--	--	1.1E+02	3.6E+03	**--**	**--**	**1.1E+02**	**3.6E+03**
Methylene Chloride [c]	0	--	--	4.6E+01	5.9E+03	--	--	5.1E+03	6.5E+05	--	--	4.6E+00	5.9E+02	--	--	5.1E+02	6.5E+04	**--**	**--**	**5.1E+02**	**6.5E+04**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	2.1E-01	2.4E+03	--	--	7.5E-03	1.0E+01	--	--	5.3E-02	2.4E+02	--	**--**	**5.3E-02**	**2.4E+02**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	**--**	**0.0E+00**	**--**	**--**
Nickel	0	1.5E+02	1.7E+01	6.1E+02	4.6E+03	8.9E+02	1.2E+02	1.5E+04	1.1E+05	3.7E+01	4.1E+00	6.1E+01	4.6E+02	2.2E+02	2.9E+01	1.5E+03	1.1E+04	**2.2E+02**	**2.9E+01**	**1.5E+03**	**1.1E+04**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	2.4E+05	--	--	--	1.0E+03	--	--	--	2.4E+04	--	**--**	**--**	**2.4E+04**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	4.1E+02	1.7E+04	--	--	1.7E+00	6.9E+01	--	--	4.1E+01	1.7E+03	**--**	**--**	**4.1E+01**	**1.7E+03**
N-Nitrosodimethylamine[c]	0	--	--	6.9E-03	3.0E+01	--	--	7.7E-01	3.3E+03	--	--	6.9E-04	3.0E+00	--	--	7.7E-02	3.3E+02	**--**	**--**	**7.7E-02**	**3.3E+02**
N-Nitrosodiphenylamine[c]	0	--	--	3.3E+01	6.0E+01	--	--	3.7E+03	6.7E+03	--	--	3.3E+00	6.0E+00	--	--	3.7E+02	6.7E+02	**--**	**--**	**3.7E+02**	**6.7E+02**
N-Nitrosodi-n-propylamine[c]	0	--	--	5.0E-02	5.1E+00	--	--	5.6E+00	5.7E+02	--	--	5.0E-03	5.1E-01	--	--	5.6E-01	5.7E+01	**--**	**--**	**5.6E-01**	**5.7E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.7E+02	4.6E+01	--	--	7.0E+00	1.7E+00	--	--	4.2E+01	1.2E+01	--	--	**4.2E+01**	**1.2E+01**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	3.9E-01	9.1E-02	--	--	1.6E-02	3.3E-03	--	--	9.8E-02	2.3E-02	--	--	**9.8E-02**	**2.3E-02**	**--**	**--**
PCB Total[c]	0	--	1.4E-02	6.4E-04	6.4E-04	--	9.8E-02	7.1E-02	7.1E-02	--	3.5E-03	6.4E-05	6.4E-05	--	2.5E-02	7.1E-03	7.1E-03	**--**	**2.5E-02**	**7.1E-03**	**7.1E-03**
Pentachlorophenol [c]	0	1.7E-02	1.4E-02	2.7E+00	3.0E+01	1.0E-01	9.6E-02	3.0E+02	3.3E+03	4.2E-03	3.4E-03	2.7E-01	3.0E+00	2.5E-02	2.4E-02	3.0E+01	3.3E+02	**2.5E-02**	**2.4E-02**	**3.0E+01**	**3.3E+02**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	2.4E+05	2.1E+07	--	--	1.0E+03	8.6E+04	--	--	2.4E+04	2.1E+06	**--**	**--**	**2.4E+04**	**2.1E+06**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	2.0E+04	9.6E+04	--	--	8.3E+01	4.0E+02	--	--	2.0E+03	9.6E+03	**--**	**--**	**2.0E+03**	**9.6E+03**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	3.6E+02	--	--	--	1.5E+00	--	--	--	3.6E+01	--	**--**	**--**	**3.6E+01**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	9.6E+01	9.6E+01	--	--	4.0E-01	4.0E-01	--	--	9.6E+00	9.6E+00	**--**	**--**	**9.6E+00**	**9.6E+00**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	1.2E+02	--	--	--	5.0E-01	--	--	--	1.2E+01	--	**--**	**--**	**1.2E+01**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	7.2E+02	--	--	--	3.0E+00	--	--	--	7.2E+01	--	**--**	**--**	**7.2E+01**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.2E+02	3.5E+01	4.1E+03	1.0E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	3.0E+01	8.8E+00	4.1E+02	1.0E+04	**3.0E+01**	**8.8E+00**	**4.1E+02**	**1.0E+04**
Silver	0	2.3E+00	--	--	--	1.4E+01	--	--	--	5.6E-01	--	--	--	3.4E+00	--	--	--	**3.4E+00**	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	6.0E+06	--	--	--	2.5E+04	--	--	--	6.0E+05	--	--	--	**6.0E+05**	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.9E+02	4.4E+03	--	--	1.7E-01	4.0E+00	--	--	1.9E+01	4.4E+02	--	--	**1.9E+01**	**4.4E+02**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	7.7E+02	3.7E+03	--	--	6.9E-01	3.3E+00	--	--	7.7E+01	3.7E+02	--	--	**7.7E+01**	**3.7E+02**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	5.8E+00	1.1E+01	--	--	2.4E-02	4.7E-02	--	--	5.8E-01	1.1E+00	--	--	**5.8E-01**	**1.1E+00**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	1.2E+04	1.4E+05	--	--	5.1E+01	6.0E+02	--	--	1.2E+03	1.4E+04	--	--	**1.2E+03**	**1.4E+04**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.2E+07	--	--	--	5.0E+04	--	--	--	1.2E+06	--	--	--	**1.2E+06**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	4.4E+00	1.4E-03	3.1E-01	3.1E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.1E+00	3.5E-04	3.1E-02	3.1E-02	**1.1E+00**	**3.5E-04**	**3.1E-02**	**3.1E-02**
Tributyltin	0	4.6E-01	7.2E-02	--	--	2.8E+00	5.0E-01	--	--	1.2E-01	1.8E-02	--	--	6.9E-01	1.3E-01	--	--	**6.9E-01**	**1.3E-01**	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	8.4E+02	1.7E+03	--	--	3.5E+00	7.0E+00	--	--	8.4E+01	1.7E+02	--	--	**8.4E+01**	**1.7E+02**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	6.5E+02	1.8E+04	--	--	5.9E-01	1.6E+01	--	--	6.5E+01	1.8E+03	--	--	**6.5E+01**	**1.8E+03**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	2.8E+03	3.3E+04	--	--	2.5E+00	3.0E+01	--	--	2.8E+02	3.3E+03	--	--	**2.8E+02**	**3.3E+03**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	1.6E+03	2.7E+03	--	--	1.4E+00	2.4E+00	--	--	1.6E+02	2.7E+02	--	--	**1.6E+02**	**2.7E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.2E+03	--	--	--	5.0E+00	--	--	--	1.2E+02	--	--	--	**1.2E+02**	--
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	2.8E+01	2.7E+03	--	--	2.5E-02	2.4E+00	--	--	2.8E+00	2.7E+02	--	--	**2.8E+00**	**2.7E+02**
Zinc	0	9.5E+01	9.7E+01	7.4E+03	2.6E+04	5.7E+02	6.8E+02	1.8E+05	6.2E+05	2.4E+01	2.4E+01	7.4E+02	2.6E+03	1.4E+02	1.7E+02	1.8E+04	6.2E+04	**1.4E+02**	**1.7E+02**	**1.8E+04**	**6.2E+04**

Notes:

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

Metal	Target Value (SSTV)
Antimony	1.3E+01
Arsenic	2.4E+01
Barium	4.8E+03
Cadmium	9.9E-01
Chromium III	6.4E+01
Chromium VI	9.6E+00
Copper	6.4E+00
Iron	7.2E+02
Lead	1.0E+01
Manganese	1.2E+02
Mercury	8.1E-01
Nickel	1.7E+01
Selenium	5.3E+00
Silver	1.4E+00
Zinc	5.7E+01

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

Crowther, Joan (DEQ)

From: Aschenbach, Ernie (DGIF)
Sent: Thursday, August 22, 2013 11:14 AM
To: Crowther, Joan (DEQ); nhreview (DCR); susan_lingenfelser@fws.gov; Daub, Elleanore (DEQ)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 33969; VPDES DEQ# VA-0080993 re-issuance for the Goose Creek Industrial Park WWTP Stream Flow in Leesburg, Loudoun County, VA

We have reviewed the VPDES re-issuance for the above-referenced. The receiving stream, Sycolin Run, has a 7Q10 ranging from 0.06 Million Gallons per day during low-flow (MGD) to 0.71 MGD during high flow. Total Residual Chlorine (after dechlorination) discharge is 0.014 mg/L monthly average and 0.017 mg/L weekly average. Sycolin Run is a headwater tributary to Goose Creek.

According to our records, Goose Creek is a designated Threatened and Endangered (T&E) species water for the state Threatened (ST) green floater (mussel).

In order to protect aquatic resources, we generally recommend ultraviolet (UV) disinfection rather than chlorination disinfection. If chlorination becomes necessary and is used, we recommend and support continued dechlorination, prior to discharge. The ammonia limits proposed within the EPA rule are expressed on the basis of total ammonia-nitrogen (TAN). The proposed EPA ammonia limit for waters with mussels (not T&E mussels, <u>any</u> mussel species) is:

- CMC (Criterion Maximum Concentration or acute) - 2.9 mg N/L (at pH 8 and 25C)
- CCC (Criterion Continuous Concentration or chronic) - 0.26 mg N//L (at pH 8 and 25C) with a 4-day average within the 30 day average period no higher than 2.5 the CCC, which would be 0.65 mg N/L.

The ammonia limits proposed within the EPA rule are the best information currently available regarding ammonia levels protective of mussels. Therefore, we recommend and support the EPA values being implemented in this permit for this and all future VPDES permits. Provided the project adheres to the effluent limitations and monitoring requirements specified in the permit, we do not anticipate the re-issuance of this existing permit to result in adverse impact to designated T&E species waters or their associated species. 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 T&E species 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
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FAX: (804) 367-2427
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2014 Mixing Analysis

Mixing Zone Predictions for Goose Creek Industrial Park WWTP

Effluent Flow = 0.01 MGD
Stream 7Q10 = 0.06 MGD
Stream 30Q10 = 0.12 MGD
Stream 1Q10 = 0.05 MGD
Stream slope = 0.00177 ft/ft
Stream width = 7 ft
Bottom scale = 5
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .1516 ft
Length = 141.83 ft
Velocity = .102 ft/sec
Residence Time = .0161 days

Recommendation:

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

Mixing Zone Predictions @ 30Q10

Depth = .2217 ft
Length = 101.97 ft
Velocity = .1297 ft/sec
Residence Time = .0091 days

Recommendation:

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

Mixing Zone Predictions @ 1Q10

Depth = .1381 ft
Length = 153.54 ft
Velocity = .096 ft/sec
Residence Time = .4441 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

1998 Ammonia Calculation Documentation

Ammonia Water Quality Criteria

The fresh water, aquatic life Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. The 90th percentile temperature and pH values are used because they best represent the critical design conditions of the receiving stream. The 7Q10 and 1Q10 of the receiving stream are 0.433021 MGD and 0.400706 MGD, respectively. Samples were collected at a location approximately 100 feet downstream of the outfall where the effluent and Sycolin Creek are assumed to be completely mixed. Downstream pH and temperature data from January, 1995, to June, 1998, was used for developing the 90th percentile values (See Addendum A). Values were tiered into a low flow period, June through November, and a high flow period, December through May.

A temperature value of 15°C and a pH value of 7.9 s.u. were used to calculate the ammonia water quality criteria for the months of December through May. The applicable ammonia water quality criteria calculations are shown in Addendum B. The ammonia water quality criteria are:

Acute: 6.77 mg/l as NH_3-N
Chronic: 1.54 mg/l as NH_3-N

A temperature value of 25°C and a pH value of 7.5 s.u. were used to calculate the ammonia water quality criteria for the months of June through November. The applicable ammonia water quality criteria calculations are shown in Addendum C. The ammonia water quality criteria are:

Acute: 11.93 mg/l as NH_3-N
Chronic: 2.05 mg/l as NH_3-N

WASTELOAD ALLOCATION EQUATION

The basic calculation for establishing a WLA is the steady state complete mix equation.

$$WLA = \frac{C_o(Q_e + Q_s) - (C_s)(Q_s)}{Q_e}$$

where: WLA = wasteload allocation
Q_s = critical receiving stream flow
Q_e = design flow (MGD)
C_o = in-stream Water Quality Criteria
C_s = mean background concentration of parameter in stream

Upstream sampling in Sycolin Creek, at station 1ASYC002.03, does not show a consistent background ammonia or chlorine concentration. Therefore, it will be assumed that $C_s = 0$ for ammonia and chlorine and the basic WLA will become:

$$WLA = \frac{C_o(Q_o + Q_e)}{Q_e}$$

MIXING ZONE CONSIDERATIONS

9 VAC 25-260-20.B. Mixing Zones. Mixing zone concepts are required in evaluating permit limits for acute and chronic standards. §B1.a-c. mixing zone requirements are general and §1.d.-e. requirements establish spacial restrictions for regulatory mixing zones. The Department of Environmental Quality uses a simplified mixing model to determine the physical mixing area of a discharge with the receiving stream. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).

- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).

- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.

- Lateral mixing (across the width) is a linear function of distance downstream.

- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).

- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.

- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation.

Acute WLA (WLA_a)

Per Criteria for Surface Waters, 9 VAC 25-260-140.A., instream water quality conditions shall not be acutely or chronically toxic except as allowed in mixing zones. Acute toxicity means an adverse effect that usually occurs shortly after exposure to a pollutant. Lethality is the usual measure of acute toxicity. Where death is not easily detected, immobilization is considered equivalent to death. Per 9 VAC 25-260-140.B. footnote 10, for Acute criteria, 1Q10 flows are used to calculate wasteload allocations. 1Q10 is the lowest flow averaged over a period of 1 day which on a statistical basis can be expected to occur once every 10 climatic years (April 1 - March 31).

The lowest flow which, on a statistical basis, would occur for a 1-day period once every 10 years (1Q10) for the receiving stream is 0.400706 MGD. In addition, the physical mixing area of the discharge with the receiving stream must be evaluated to ensure that the mixing zone provisions of the Water Quality Standards (9 VAC 25-260-20) are not violated. As long as drifting organisms are not exposed to concentration levels above the numerical standard for a period of time greater than the acute exposure averaging period, acute lethality attributable to the discharge should not be observed. In this instance, it is considered appropriate to use the full stream flow referenced in the standards application section of the Water Quality Standards. If exposure times within the physical mixing area are greater than the acute exposure averaging period (one hour), then the stream flow to be used in the wasteload allocation equation is reduced proportionately to allow drifting organism passage through the physical mixing area without lethal impacts.

Ammonia

WLA's are calculated for the two separate instream flow seasons, high flow and low flow, and are based upon pH and temperatures during these individual seasons.

For the low flow months of June through November, the length of stream required for physical mixing under 1Q10 conditions has been determined as 332 feet and 100 % of the 1Q10 flow should be used in the WLA equation (See Addendum D .

$$WLA_a = \frac{C_o\,(0.01\ MGD + 0.400706\ MGD)}{0.01\ MGD} = \frac{11.93\ mg/l\ (0.01\ MGD + 0.400706\ MGD)}{0.01\ MGD} = 490\ mg/l$$

For the high flow months of December through May, the length of stream required for physical mixing under 1Q10 conditions has been determined as 558 feet and 100 % of the 1Q10 flow should be used in the WLA equation (See Addendum D).

$$WLA_a = \frac{C_o\,(0.01\ MGD + 1.09871\ MGD)}{0.01\ MGD} = \frac{6.77\ mg/l\ (0.01\ MGD + 1.09871\ MGD)}{0.01\ MGD} = 751\ mg/l$$

Chronic WLA (WLA_c)

Chronic toxicity means an adverse effect that is irreversible or progressive or occurs because the rate of injury is greater than the rate of repair during prolonged exposure to a pollutant. This includes low level, long term effects such as reduction in growth or reproduction. Per 9 VAC 25-260-140.B. footnote 10, for Chronic criteria, 7Q10 flows are used to calculate wasteload allocations. 7Q10 is the lowest flow averaged over a period of 7 consecutive days that can be statistically expected to occur once every 10 climatic years (April 1 - March 31).

The lowest flow which, on a statistical basis, would occur for a 7-consecutive day period once every 10 years (7Q10) for the receiving stream is 0.0.433021 MGD. In addition, the physical mixing area of the discharge with the receiving stream must be evaluated to ensure that the mixing zone provisions of the Water Quality Standards (9 VAC 25-260-20) are not violated. As long as drifting organisms are not exposed to concentration levels above the numerical standard for a period of time greater than one-half the chronic exposure averaging period, chronic impacts attributable to the discharge should not be observed. In this instance, it is considered appropriate to use the full stream flow referenced in the standards application section of the Water Quality Standards. If exposure times within the physical mixing area are greater than one-half of the chronic exposure averaging period (two days), then the stream flow to be used in the wasteload allocation equation is reduced proportionately to allow drifting organisms passage through the physical mixing area without impacts to an organisms growth or reproduction.

Ammonia

WLA's are calculated for the two separate instream flow seasons, high flow and low flow, and are based upon pH and temperatures during these individual seasons.

For the low flow months of June through November, the length of stream required for physical mixing under 7Q10 conditions has been determined as 319 feet and 100 % of the 7Q10 flow should be used in the WLAc equation (See Addendum D).

$$WLAc = \frac{C_o\,(0.01\ MGD + 0.433021\ MGD)}{0.01\ MGD} = \frac{2.05\ mg/l\,(0.010\ MGD + 0.433021\ MGD)}{0.01\ MGD} = 91\ mg/l$$

For the high flow months of December through May, the length of stream required for physical mixing under 7Q10 conditions has been determined as 512 feet and 100 % of the 7Q10 flow should be used in the WLAc equation (See Addendum D).

$$WLAc = \frac{C_o\,(0.01\ MGD + 1.2926\ MGD)}{0.01\ MGD} = \frac{1.54\ mg/l\,(0.01\ MGD + 1.2926\ MGD)}{0.01\ MGD} = 201\ mg/l$$

```
Analysis of the Goose Creek Ind Park (June - Nov) effluent data for ammonia
Averaging period for standard = 30 days

The statistics for ammonia are:
   Number of values          =  1
   Quantification level      =  .2
   Number _ quantification   =  0
   Expected value            =  10
   Variance                  =  36.00001
   C.V.                      =  .6
   97th percentile           =  24.33418
   Statistics used           = Reasonable potential assumptions - Type 2 data

The WLAs for ammonia are:
   Acute WLA          =  490
   Chronic WLA        =  90.8
   Human Health WLA   = ----


NO LIMIT IS REQUIRED FOR ammonia

 The Data are
 10
```

Analysis of the Goose Creek Ind Park (Dec - May) effluent data for ammonia
Averaging period for standard = 30 days

The statistics for ammonia are:

Number of values	=	1
Quantification level	=	.2
Number _ quantification	=	0
Expected value	=	10
Variance	=	36.00001
C.V.	=	.6
97th percentile	=	24.33418
Statistics used	=	Reasonable potential assumptions - Type 2 data

The WLAs for ammonia are:

Acute WLA	=	751
Chronic WLA	=	201
Human Health WLA	=	----

NO LIMIT IS REQUIRED FOR ammonia

The Data are
10

Goose Creek Industrial Park (VA0080993) - Downstream Monitoring Data

Dec - May

Date	Temp ('C)	Point	Sample	Rank	Percent	pH (s.u.)	Point	Sample	Rank	Percent
1/17/95	7	23	17	1	100.00%	7.3	2	8	1	95.45%
2/13/95	0	11	15	2	90.91%	8	4	8	1	95.45%
3/13/95	6	16	15	2	90.91%	7.7	5	7.9	3	90.91%
4/3/95	3	17	14	4	86.36%	8	3	7.7	4	77.27%
5/3/95	12	5	12	5	81.82%	7.9	8	7.7	4	77.27%
12/13/95	5	10	11	6	72.73%	7.3	12	7.7	4	77.27%
1/5/96	0	22	11	6	72.73%	7.3	13	7.6	7	72.73%
2/12/96	2	1	7	8	63.64%	7.7	9	7.5	8	59.09%
3/13/96	3	20	7	8	63.64%	7.5	15	7.5	8	59.09%
4/5/96	11	3	6	10	59.09%	7.3	20	7.5	8	59.09%
5/3/96	15	6	5	11	40.91%	7.3	14	7.4	11	54.55%
12/9/96	1	15	5	11	40.91%	7.7	1	7.3	12	27.27%
1/15/97	0	19	5	11	40.91%	7.6	6	7.3	12	27.27%
2/3/97	4	21	5	11	40.91%	7.4	7	7.3	12	27.27%
3/26/97	5	14	4	15	36.36%	7.5	10	7.3	12	27.27%
4/7/97	15	4	3	16	22.73%	7.2	11	7.3	12	27.27%
5/5/97	14	9	3	16	22.73%	7	19	7.3	12	27.27%
12/16/97	3	18	3	16	22.73%	7.1	16	7.2	18	18.18%
1/6/98	5	8	2	19	18.18%	7.3	22	7.2	18	18.18%
2/18/98	7	12	1	20	13.64%	7.5	18	7.1	20	9.09%
3/15/98	5	2	0	21	0.00%	7	23	7.1	20	9.09%
4/6/98	11	7	0	21	0.00%	7.2	17	7	22	0.00%
5/4/98	17	13	0	21	0.00%	7.1	21	7	22	0.00%

23 Samples x .90
= 20.7 ≅ 21 Pos
Up = 3 Positio
Down
= 15°C & 7.9°

June - Nov

Date	Temp ('C)	Point	Sample	Rank	Percent	pH (s.u.)	Point	Sample	Rank	Percent
6/5/95	20	3	27	1	100.00%	7.6	1	7.6	1	94.44%
7/7/95	23	14	25	2	88.89%	7.5	19	7.6	1	94.44%
8/8/95	27	15	25	2	88.89%	7.4	2	7.5	3	83.33%
9/6/95	21	2	23	4	83.33%	7.5	4	7.5	3	83.33%
10/6/95	20	4	21	5	72.22%	7.2	3	7.4	5	66.67%
11/13/95	4	13	21	5	72.22%	7.2	8	7.4	5	66.67%
6/3/96	17	1	20	7	50.00%	7.3	10	7.4	5	66.67%
7/5/96	18	5	20	7	50.00%	7.4	7	7.3	8	55.56%
8/19/96	20	9	20	7	50.00%	7.1	17	7.3	8	55.56%
9/19/96	19	16	20	7	50.00%	7.4	5	7.2	10	38.89%
10/16/96	15	10	19	11	44.44%	7	6	7.2	10	38.89%
11/20/96	6	8	18	12	38.89%	7.2	12	7.2	10	38.89%
6/12/97	21	7	17	13	27.78%	6.9	9	7.1	13	16.67%
7/21/97	25	19	17	13	27.78%	7.1	14	7.1	13	16.67%
8/4/97	25	11	15	15	22.22%	7.1	15	7.1	13	16.67%
9/15/97	20	17	12.3	16	16.67%	7.1	16	7.1	13	16.67%
10/20/97	12.3	12	6	17	11.11%	7.3	11	7	17	5.56%
11/17/97	3	6	4	18	5.56%	7	18	7	17	5.56%
6/11/98	17	18	3	19	0.00%	7.6	13	6.9	19	0.00%

19 Samples x .90
= 17.1 ≅ 17 posi
~~Down~~ UP = 3 positio
Down
= 25°C & 7.5°

Ammonia Calculation - Acute Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	15	7.90	***Dec - May***

FT
FT=10^((.03)(20-T) = 1.4125375

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.0529822
FPH= **1.0529822**

Acute Criteria Concentration=.52/FT/FPH/2 = **0.1748044**

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Acute Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) **Fraction= 0.0212894**
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C,) **pKa = 9.5624909**
Total Acute Ammonia Criteria = Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Acute Ammonia Criteria = **0.1748044** / **0.0212893988** = Total Ammonia = **8.2108651 mg/l**

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL ACUTE N-NH3 **8.2108651 X .822** **6.7657528 MG/L** = **6.77**

Ammonia Calculation - Chronic Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	15	7.90	***Dec - May***

FT
FT=10^((.03)(20-T) = 1.4125375

FPH
FPH=1 if 8.0<=pH<=9.0 = NA
FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.0529822
FPH= **1.0529822**

Ratio
Ratio = 13.5 if 7.7<=pH<=9.0 = 13.5
Ratio = 20.25 x (10^(7.7-pH))/(1+(10^(7.4-pH)) if 6.5<=pH<7.7 = NA
Ratio = **13.5**

Chronic Criteria Concentration=.8/FT/FPH/RATIO = **0.0398415**

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Chronic Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) **Fraction= 0.0212894**
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C) **pKa = 9.5624909**
Total Chronic Ammonia Criteria=Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Chronic Ammonia Criteria = **0.0398415** / **0.0212894** = Total Ammonia = **1.87142224 mg/l**

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL CHRONIC N-NH3 **1.8714222 X .822** **1.5420519 MG/L** = **1.54**

Revised 12/03/97: (i:wdbr1\common\permits\model\newamm)

VPDES #: VA0080993

Addendum C

Ammonia Calculation - Acute Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	25	7.50	***June - Nov***

FT

FT=10^((.03)(20-T) = 0.7079458

FPH

FPH=1 if 8.0<=pH<=9.0 = NA

FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.4354626

FPH= **1.4354626**

Acute Criteria Concentration=.52/FT/FPH/2 = **0.2558477**

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Acute Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) **Fraction= 0.0176772**
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C,) **pKa = 9.2448413**
Total Acute Ammonia Criteria = Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Acute Ammonia Criteria = **0.2558477** / **0.0176771779** = Total Ammonia = **14.4733324 mg/l**

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL ACUTE N-NH3 **14.4733324 X .822** **11.9260259 MG/L** = **11.93**

Ammonia Calculation - Chronic Ammonia Criteria for Freshwater

	Temperature	pH	
DATA ENTRY:->	25	7.50	***June - Nov***

FT

FT=10^((.03)(20-T) = 0.7079458

FPH

FPH=1 if 8.0<=pH<=9.0 = NA

FPH=((1+10^(7.4-pH))/1.25 if 6.5<=pH<8.0 = 1.4354626

FPH= **1.4354626**

Ratio

Ratio = 13.5 if 7.7<=pH<=9.0 = NA

Ratio = 20.25 x (10^(7.7-pH))/(1+(10^(7.4-pH)) if 6.5<=pH<7.7 = 17.8864081

Ratio = **17.886408**

Chronic Criteria Concentration=.8/FT/FPH/RATIO = **0.0440124**

Conversion from un-ionized to Total Ammonia can be calculated by using the following formulas:
Total Chronic Ammonia Criteria = Calculated un-ionized ammonia criteria divided by fraction of un-ionized Ammonia
Where: Fraction of un-ionized ammonia = 1/(10^(pKa-pH) +1) **Fraction= 0.0176772**
where: pKa = 0.09018 + (2729.92/273.2 + temperature 'C) **pKa = 9.2448413**
Total Chronic Ammonia Criteria=Calculated un-ionized Ammonia Criteria divided by fraction of un-ionized Ammonia
Total Chronic Ammonia Criteria = **0.0440124** / **0.0176772** = Total Ammonia = **2.48978611 mg/l**

Total Ammonia is then converted to Ammonia-Nitrogen.
TOTAL CHRONIC N-NH3 **2.4897861 X .822** **2.0515838 MG/L** = **2.05**

Revised 12/03/97: (i:wdbr1\common\permits\model\newamm)

Addendum D

MIXING ANALYSIS FOR Goose Creek Ind Park (June - Nov)

Effluent flow = .01 MGD
Stream 7Q10 flow = .433021 MGD Stream 1Q10 flow = .400706 MGD
Width = 10 ft Slope (ft/ft) = .0038
Bottom scale = 3
Channel has normal irregularities

C H R O N I C R E S U L T S

7Q10 depth = 0.23 ft
7Q10 velocity = 0.30 ft/sec = 4.9 mi / day
Mixing length @ 7Q10 = 319 ft =
Residence time = 0.012 days
COMPLETE MIX MAY BE USED FOR THE CHRONIC WLA
Percent of 7Q10 to be used for WLAc = 100%

A C U T E R E S U L T S

1Q10 depth = 0.22 ft
1Q10 velocity = 0.29 ft/sec = 4.8 mi / day
Mixing length @ 1Q10 = 332 ft =
Residence time = 0.314 hours
COMPLETE MIX MAY BE USED FOR THE ACUTE WLA
Percent of 1Q10 to be used for WLAa = 100%

Use print screen for hard copy

A:@MIX¢

$$\text{SLOPE} = \frac{10\text{ft}}{2640\text{ft}} = \boxed{0.0038}$$

FROM USGS TOPO MAP

MIXING ANALYSIS FOR Goose Creek Ind Park (Dec - May)

Effluent flow = .01 MGD
Stream 7Q10 flow = 1.2926 MGD Stream 1Q10 flow = 1.09871 MGD
Width = 15 ft Slope (ft/ft) = .0038
Bottom scale = 3
Channel has normal irregularities

C H R O N I C R E S U L T S

7Q10 depth = 0.34 ft
7Q10 velocity = 0.40 ft/sec = 6.5 mi / day
Mixing length @ 7Q10 = 512 ft =
Residence time = 0.015 days
COMPLETE MIX MAY BE USED FOR THE CHRONIC WLA
Percent of 7Q10 to be used for WLAc = 100%

A C U T E R E S U L T S

1Q10 depth = 0.31 ft
1Q10 velocity = 0.37 ft/sec = 6.1 mi / day
Mixing length @ 1Q10 = 558 ft =
Residence time = 0.417 hours
COMPLETE MIX MAY BE USED FOR THE ACUTE WLA
Percent of 1Q10 to be used for WLAa = 100%

Use print screen for hard copy

A:@MIX¢

2/10/2014 2:51:34 PM

Facility = Goose Creek Industrial Park WWTP
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 11.7
WLAc =
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

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

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 11.7
Average Weekly limit = 11.7
Average Monthly LImit = 11.7

The data are:

9

Goose Creek Industrial Park pH and Temperature Data

Temperature 90th Percentile = 21°C

pH 90th Percentile = 8.3 SU

Month/ Year	Day	Temp °C	pH
Jan-09	1		
	2		
	3		
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	25		
	26		
	27		
	28		
	29		
	30		
Feb-09	1		
	2	8	3.8
	3	8	3.5
	4	8.2	3.2
	5	7.9	3
	6	8.1	3
	7		
	8		
	9	8	3.5
	10	8	4.4
	11	8	5.4
	12	8.2	8.3
	13		
	14		
	15		

Month/ Year	Day	Temp °C	pH
Feb-09	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
Mar-09	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
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	23		
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	26		
	27		
	28		
	29		
	30		
	31		
Apr-09	1		

Month/ Year	Day	Temp °C	pH
Apr-09	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13	7.6	10.4
	14	8	10.9
	15	8	11
	16	7.7	9.2
	17	7.7	10.2
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
May-09	1		
	2		
	3		
	4		
	5	7.6	12.7
	6	7.7	14.7
	7	7.8	15.7
	8	7.9	15.8
	9		
	10		
	11	7.7	15.9
	12	7.7	14.6
	13	7.8	13.8
	14	7.6	15.2
	15		
	16		

Attachment 9

Month/ Year	Day	Temp °C	pH
May-09	17		
	18	7.5	15.3
	19	7.7	13.6
	20	7.7	13.4
	21	7.8	13.7
	22	7.8	15.1
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Jun-09	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8	7.6	18.8
	9	7.7	20.7
	10	7.7	20
	11	7.6	20.7
	12	7.7	21
	13		
	14		
	15	7.3	20.6
	16	7.7	21.3
	17	7.6	19.9
	18	7.7	19.6
	19	7.6	20.1
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
Jul-09	1		
	2		

Month/ Year	Day	Temp °C	pH
Jul-09	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13	7.5	21.2
	14	7.7	19.8
	15	7.7	19.8
	16	7.6	21.5
	17	7.7	21.4
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Aug-09	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		

Month/ Year	Day	Temp °C	pH
Aug-09	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Sep-09	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8	7.8	20
	9	7.9	19.5
	10	7.7	19.6
	11	7.7	18.3
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22	7.8	20.6
	23	7.8	19.8
	24	7.7	20.7
	25		
	26		
	27		
	28		
	29		
	30		
Oct-09	1		
	2		
	3		
	4		

Month/ Year	Day	Temp °C	pH
Oct-09	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
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	21		
	22		
	23		
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	31		
Nov-09	1		
	2		
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	16		
	17		
	18		
	19		
	20		

Month/ Year	Day	Temp °C	pH
Nov-09	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
Dec-09	1		
	2		
	3		
	4		
	5		
	6		
	7	7.5	4.8
	8	7.5	4.1
	9	7.5	4
	10	7.5	4
	11	7.5	3.2
	12		
	13		
	14	7.6	4.5
	15	7.6	3.3
	16	7.6	3.6
	17	7.4	3.3
	18	7.7	2.9
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Jan-10	1		
	2		
	3		
	4	7.7	3.9
	5	7.5	2.1
	6	7.9	2.1

Month/ Year	Day	Temp °C	pH
Jan-10	7	7.7	2.1
	8	8.1	1.6
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25	7.8	5..2
	26	7.7	4.9
	27	7.7	3.8
	28	7.8	3.7
	29	8.3	2
	30		
	31		
Feb-10	1		
	2		
	3		
	4		
	5		
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	7		
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	9		
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	13		
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	17		
	18		
	19		
	20		
	21		
	22		

Month/ Year	Day	Temp °C	pH
Feb-10	23	8.3	2
	24	8.3	1.8
	25	8.2	2.2
	26	8.1	2.2
	27		
	28		
Mar-10	1	7.1	4
	2	8.6	4.9
	3	8.6	5.1
	4	8.4	5.1
	5	8.5	4.5
	6		
	7		
	8	8.6	4.9
	9	8.4	6.5
	10	8.9	6.6
	11	8.9	7.6
	12	8.9	9.8
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22	8.5	11.6
	23	8.3	10.4
	24	8.1	8.9
	25	8.2	9.9
	26	8.4	11.1
	27		
	28		
	29	7.8	9.2
	30	7.9	9.3
	31	7.8	10.6
Apr-10	1	7.8	10.1
	2	7.8	11.4
	3		
	4		
	5	7.7	11.6
	6	7.9	16.4
	7	7.9	15.4
	8	7.8	16
	9	8	15
	10		

Month/ Year	Day	Temp °C	pH
Apr-10	11		
	12	7.8	13.8
	13	7.8	11.2
	14	7.8	10.6
	15	7.6	10.1
	16		
	17		
	18		
	19	7.6	11.6
	20	7.8	10.1
	21	7.7	10.2
	22	7.8	10.4
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
May-10	1		
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Month/ Year	Day	Temp °C	pH
May-10	28		
	29		
	30		
	31		
Jun-10	1		
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	6		
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	8		
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	21		
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Jul-10	1		
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	7		
	8		
	9		
	10		
	11		
	12	7.2	22.5
	13	7.4	22.6

Month/ Year	Day	Temp °C	pH
Jul-10	14	7.4	23
	15	7.4	22.6
	16	7.5	23.4
	17		
	18		
	19		
	20	7.6	23.6
	21	7.6	23.6
	22	7.7	23.4
	23	7.4	22.7
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Aug-10	1		
	2		
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	28		
	29		

Month/ Year	Day	Temp °C	pH
Aug-10	30		
	31		
Sep-10	1		
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	3		
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	7		
	8		
	9		
	10		
	11		
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	24		
	25		
	26		
	27		
	28		
	29		
	30		
Oct-10	1		
	2		
	3		
	4	7.8	16.9
	5	7.8	14.9
	6	7.7	14.4
	7	7.6	14.1
	8	7.6	13.8
	9		
	10		
	11		
	12		
	13		
	14		
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Month/ Year	Day	Temp °C	pH
Oct-10	16		
	17		
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	31		
Nov-10	1		
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	28		
	29		
	30		
Dec-10	1		

Month/ Year	Day	Temp °C	pH
Dec-10	2		
	3		
	4		
	5		
	6	7.5	2.8
	7	7.7	1.9
	8	7.6	2.5
	9	7.3	2.9
	10	7.5	1.5
	11		
	12		
	13	6.9	3.1
	14	7.5	2.1
	15	7.5	1.2
	16	7.5	0.8
	17	7.9	0.8
	18		
	19		
	20		
	21		
	22		
	23		
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	31		
Jan-11	1		
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	15		
	16		
	17		

Month/ Year	Day	Temp °C	pH
Jan-11	18		
	19		
	20		
	21		
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	27		
	28		
	29		
	30		
	31		
Feb-11	1		
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	18		
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	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
Mar-11	1		
	2		
	3		
	4		
	5		

Month/ Year	Day	Temp °C	pH
Mar-11	6		
	7		
	8	8.5	5.6
	9	8.5	4.7
	10	8.6	6
	11	8.3	6.1
	12		
	13		
	14	7.9	6.5
	15	8.1	6.5
	16	8	7.3
	17	8	7.1
	18	8.1	9.3
	19		
	20		
	21	7.8	8
	22	7.9	11.2
	23	8	10.9
	24	8.1	9.5
	25	8.1	6.2
	26		
	27		
	28	8.1	6.1
	29	8	4.5
	30	8.5	5.7
	31	8.6	4.8
Apr-11	1		
	2		
	3		
	4		
	5		
	6		
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	18		
	19		
	20		
	21		

Month/ Year	Day	Temp °C	pH
Apr-11	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
May-11	1		
	2		
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	4		
	5		
	6		
	7		
	8		
	9	8.8	16.6
	10	8.2	16.6
	11	8.3	17.6
	12	8.1	16.4
	13	8.1	16.5
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23	7.9	19.5
	24	8	20.3
	25	7.9	20.7
	26	7.9	21.9
	27	7.5	22.4
	28		
	29		
	30		
	31		
Jun-11	1		
	2		
	3		
	4		
	5		
	6		
	7		

Month/ Year	Day	Temp °C	pH
Jun-11	8		
	9		
	10		
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	30		
Jul-11	1		
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	22		
	23		
	24		

Month/ Year	Day	Temp °C	pH
Jul-11	25		
	26		
	27		
	28		
	29		
	30		
	31		
Aug-11	1		
	2		
	3		
	4		
	5		
	6		
	7		
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	21		
	22		
	23		
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	26		
	27		
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	29		
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	31		
Sep-11	1		
	2		
	3		
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	6		
	7		
	8		
	9		

Month/ Year	Day	Temp °C	pH
Sep-11	10		
	11		
	12	7.7	18.8
	13	7.7	18.6
	14	7.9	20.2
	15	8	20.6
	16	7.9	20.2
	17		
	18		
	19		
	20	7.5	17.2
	21	7.9	10.4
	22	7.9	9.3
	23	7.9	11.4
	24		
	25		
	26	8	13.4
	27	8	13.4
	28	8	17.7
	29	7.9	16.6
	30	8.1	16.4
Oct-11	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18	7.4	16.4
	19	7.5	14.4
	20	7.8	14.7
	21	7.7	13.6
	22		
	23		
	24		
	25		
	23		

Month/ Year	Day	Temp °C	pH
Oct-11	26		
	27		
	28		
	29		
	30		
	31		
Nov-11	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8	7.6	15.4
	9	7.3	14
	10	7.2	13.7
	11		
	12		
	13		
	14	7.4	13.9
	15	7.3	16.8
	16	7.7	8
	17	7.7	8.3
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28	7.3	9
	29	7.4	7.5
	30	7.4	7.6
Dec-11	1	7.4	6.5
	2	7.4	5.6
	3		
	4		
	5	7.8	7.2
	6	7.3	6
	7	7.3	6.9
	8	7.3	6.4
	9	7.3	5.5
	10		
	11		

Month/ Year	Day	Temp °C	pH
Dec-11	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19	7.8	15.4
	20	7	17
	21	6.9	19.4
	22	7.1	15.5
	23	7.1	13.1
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
Jan-12	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17	7.2	4.7
	18	7.6	3.8
	19	7.6	3.5
	20	7.7	3.5
	21		
	22		
	23	7.4	3.7
	24	7.5	3.2
	25	7.6	3.9
	26	7.5	3.7
	27	7.7	6.1

Month/ Year	Day	Temp °C	pH
Jan-12	28		
	29		
	30		
	31		
Feb-12	1		
	2		
	3		
	4		
	5		
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	13		
	14		
	15		
	16		
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	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
Mar-12	1		
	2		
	3		
	4		
	5	7.8	5.6
	6	7.7	4.9
	7	7.8	5
	8	8	7.3
	9	8	9.1
	10		
	11		
	12	7.8	7.1
	13	8	8.9
	14	7.8	9.9

Month/ Year	Day	Temp °C	pH
Mar-12	15	7.8	10.9
	16	7.7	11.4
	17		
	18		
	19		
	20		
	21		
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	29		
	30		
	31		
Apr-12	1		
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	27		
	28		
	29		
	30		

Month/ Year	Day	Temp °C	pH
May-12	1		
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	3		
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	10		
	11		
	12		
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	30		
	31		
Jun-12	1		
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	12		
	13		
	14		
	15		
	16		

Month/ Year	Day	Temp °C	pH
Jun-12	17		
	18		
	19		
	20		
	21		
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	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
Jul-12	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9	7.3	21.9
	10	7.6	22.6
	11	7.8	23
	12	7.5	23.2
	13		
	14		
	15		
	16	8.1	24.3
	17	7.9	24.6
	18	7.4	24.8
	19	7.8	24.4
	20	7.6	24.6
	21		
	22		
	23		
	24		
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	26		
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	30		
	31		
Aug-12	1		
	2		

Month/ Year	Day	Temp °C	pH
Aug-12	3		
	4		
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	13		
	14		
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	31		
Sep-12	1		
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Month/ Year	Day	Temp °C	pH
Sep-12	19		
	20		
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Oct-12	1		
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	9	7.7	13.3
	10	7.9	13.2
	11	8	12.8
	12	8.1	12.6
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	21		
	22	7.9	12.9
	23	7.7	10.9
	24	7.7	11.8
	25	7.4	12.6
	26	7.6	13.5
	27		
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	31		
Nov-12	1		
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	4		

Month/ Year	Day	Temp °C	pH
Nov-12	5		
	6		
	7		
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	9		
	10		
	11		
	12		
	13	7.8	6.2
	14	7.7	5.8
	15	7.9	5.3
	16	7.7	5
	17		
	18		
	19		
	20		
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Dec-12	1		
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Month/ Year	Day	Temp °C	pH
Dec-12	22		
	23		
	24		
	25		
	26		
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	30		
	31		
Jan-13	1		
	2		
	3		
	4		
	5		
	6		
	7	7.8	4
	8	7.6	3.5
	9	7.6	3.4
	10	7.3	3.1
	11	7.5	4.3
	12		
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	14		
	15		
	16		
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	20		
	21		
	22		
	23		
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	30		
	31		
Feb-13	1		
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	4		
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	6		

Month/ Year	Day	Temp °C	pH
Feb-13	7		
	8		
	9		
	10		
	11		
	12	7.9	5
	13	8.1	5.1
	14	7.8	4.7
	15	8.3	4.2
	16		
	17		
	18		
	19		
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	27		
	28		
Mar-13	1		
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	3		
	4		
	5	8.4	4.3
	6	8.8	5.2
	7	8.7	3.5
	8	8.8	4.8
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	11	8.3	8.9
	12	8.1	9.4
	13	7.7	8.9
	14	8.5	5.9
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Month/ Year	Day	Temp °C	pH
Mar-13	26		
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Apr-13	1		
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May-13	1		
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Month/ Year	Day	Temp °C	pH
May-13	12		
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Jun-13	1		
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Month/ Year	Day	Temp °C	pH
Jun-13	28		
	29		
	30		
Jul-13	1		
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	29		
	30		
	31		
Aug-13	1		
	2		
	3		
	4		
	5	8	20.4
	6	8.1	21
	7	8.1	21.8
	8	7.9	23.3
	9	7.9	24.3
	10		
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	12		
	13		

Month/ Year	Day	Temp °C	pH
Aug-13	14		
	15		
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	31		
Sep-13	1		
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Month/ Year	Day	Temp °C	pH
Sep-13	30		
Oct-13	1		
	2		
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	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15	7.7	15.2
	16	7.9	15
	17	7.8	15.1
	18	7.9	14.8
	19		
	20		
	21	7.8	13
	22	7.9	11.9
	23	7.9	11.4
	24	8	10.4
	25	7.7	8.8
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	28		
	29		
	30		
	31		
Nov-13	1		
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	14		
	15		

Month/ Year	Day	Temp °C	pH
Nov-13	16		
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	27		
	28		
	29		
	30		
Dec-13	1		
	2	7.8	3.9
	3	7.9	3.6
	4	7.8	3.4
	5	7.8	5.2
	6	7.7	7.8
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16	7.8	4.3
	17	7.9	3.4
	18	7.9	3.4
	19	7.9	3.9
	20	8	4
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	31		

8/21/2008 10:29:58 AM

Facility = Goose Creek Industrial Park WWTP
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.029
WLAc = 0.019
Q.L. = .1
# samples/mo. = 28
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.77889208970114E-02
Average Weekly limit = 1.69708942596669E-02 0.017 mg/L
Average Monthly LImit = 1.38553660944296E-02 0.014 mg/L

The data are:

0.2

DATA FILE SUMMARY

****

THE NAME OF THE DATA FILE IS: GOOS.MOD

1993 Stream Model

THE STREAM NAME IS: Sycolin Creek
THE RIVER BASIN IS: Potomac River
THE SECTION NUMBER IS: 9
THE CLASSIFICATION IS: III

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

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Goose Creek Industrial Park WWTP

PROPOSED LIMITS ARE:

FLOW	=	.01	MGD
BOD5	=	30	MG/L
TKN	=	20	MG/L
D.O.	=	6.8	MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 1

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Little River

GAUGE DRAINAGE AREA	=	47.7	SQ.MI.
GAUGE 7Q10	=	.485	MGD
DRAINAGE AREA AT DISCHARGE	=	17.3	SQ.MI.

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

ALLOCATION DESIGN TEMPERATURE = 25 °C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 1.5 MI

SEGMENT WIDTH = 7 FT
SEGMENT DEPTH = .2 FT
SEGMENT VELOCITY = .5 FT/SEC

DRAINAGE AREA AT SEGMENT START = 17.3 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 364.8 SQ.MI.

ELEVATION AT UPSTREAM END = 210 FT
ELEVATION AT DOWNSTREAM END = 196 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = LARGE ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
07-26-1993 08:12:55

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE Goose Creek Industrial Park WWTP DISCHARGE

TO Sycolin Creek

THE SIMULATION STARTS AT THE Goose Creek Industrial Park WWTP DISCHARGE

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

FLOW = .01 MGD cBOD5 = 12 Mg/L TKN = 5 Mg/L D.O. = 6.8 Mg/L (JUNE-NOV) LOW FLOW SEASON

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.204 Mg/L ****

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

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

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.17590 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.448 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

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

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	1.50	0.311	5.600	1.000	0.450	0.000	203.00	25.00	8.276

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

TOTAL STREAMFLOW = 0.1859 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.413	6.345	0.466
0.100	0.100	7.363	6.190	0.460
0.200	0.200	7.321	6.038	0.454
0.300	0.300	7.288	5.891	0.448
0.400	0.400	7.263	5.747	0.442
0.500	0.500	7.243	5.606	0.437
0.600	0.600	7.230	5.469	0.431
0.700	0.700	7.221	5.335	0.425
0.800	0.800	7.216	5.205	0.420
0.900	0.900	7.215	5.077	0.414
1.000	1.000	7.217	5.000	0.409
1.100	1.100	7.336	5.000	0.404
1.200	1.200	7.440	5.000	0.398
1.300	1.300	7.448	5.000	0.393
1.400	1.400	7.448	5.000	0.388
1.500	1.500	7.448	5.000	0.383

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
07-26-1993 08:38:57

DATA FILE = GOOS.MOD

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE Goose Creek Industrial Park WWTP DISCHARGE

TO Sycolin Creek

SEASONAL LIMITS RUN - - WET SEASON PERIOD: Dec TO May

THE SIMULATION STARTS AT THE Goose Creek Industrial Park WWTP DISCHARGE

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

FLOW = .01 MGD cBOD5 = 30 Mg/L TKN = 20 Mg/L D.O. = 6.8 Mg/L

HIGH FLO SEASON (DEC-MA

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.502 Mg/L ****

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

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

THE WET SEASON 7Q10 STREAM FLOW
AT THE DISCHARGE IS 0.44610 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 8.990 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

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

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	1.50	0.550	5.600	1.000	0.450	0.000	203.00	15.00	9.989

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

All assumptions made for this run are the same as the dry season run except for the 7Q10. The wet season 7Q10 is 0.4461 MGD.

TOTAL STREAMFLOW = 0.4561 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	8.942	6.535	1.614
0.100	0.100	8.938	6.477	1.608
0.200	0.200	8.933	6.420	1.603
0.300	0.300	8.930	6.364	1.597
0.400	0.400	8.927	6.308	1.592
0.500	0.500	8.925	6.253	1.587
0.600	0.600	8.924	6.198	1.581
0.700	0.700	8.923	6.143	1.576
0.800	0.800	8.922	6.089	1.571
0.900	0.900	8.922	6.036	1.565
1.000	1.000	8.923	5.983	1.560
1.100	1.100	8.924	5.930	1.555
1.200	1.200	8.925	5.878	1.549
1.300	1.300	8.927	5.827	1.544
1.400	1.400	8.929	5.775	1.539
1.500	1.500	8.932	5.725	1.534

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
07-26-1993 08:11:51

DATA FILE = GOOS.MOD

1998 Stream model

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*******************************************************************************

                REGIONAL MODELING SYSTEM            VERSION 3.2

            DATA FILE SUMMARY

*******************************************************************************

THE NAME OF THE DATA FILE IS: SUMMGOOS.MOD


THE STREAM NAME IS:     Sycolin Creek
THE RIVER BASIN IS:     Potomac River
THE SECTION NUMBER IS: 9
THE CLASSIFICATION IS: III

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

DISCHARGE WITHIN 3 MILES (Y/N) = N


THE DISCHARGE BEING MODELED IS: Goose Creek Industrial Park

PROPOSED LIMITS ARE:
    FLOW  =  .01 MGD
    BOD5  =  12  MG/L
    TKN   =  5  MG/L
    D.O.  =  5 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED =  1

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
    THE GAUGE NAME IS: Goose Creek near Leesburg VA #01644000
    GAUGE DRAINAGE AREA        =  332  SQ.MI.
    GAUGE 7Q10                 =  1.22797  MGD
    DRAINAGE AREA AT DISCHARGE =  17.3  SQ.MI.

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

ALLOCATION DESIGN TEMPERATURE =  25   C
```

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 1.5 MI

SEGMENT WIDTH = 7 FT
SEGMENT DEPTH = .2 FT
SEGMENT VELOCITY = .5 FT/SEC

DRAINAGE AREA AT SEGMENT START = 17.3 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 364.8 SQ.MI.

ELEVATION AT UPSTREAM END = 210 FT
ELEVATION AT DOWNSTREAM END = 196 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = LARGE ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
08-31-1998 11:46:25

****

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE Goose Creek Industrial Park DISCHARGE

TO Sycolin Creek

COMMENT: June - November, 7Q10 = 0.433,no antidegradation

THE SIMULATION STARTS AT THE Goose Creek Industrial Park DISCHARGE

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

FLOW = .01 MGD cBOD5 = 12 Mg/L TKN = 5 Mg/L D.O. = 5 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.081 Mg/L ****

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

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

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.06399 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.448 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

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

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. C	DO-SAT Mg/L
1	1.50	0.311	5.600	1.000	0.450	0.000	203.00	25.00	8.276

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

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

TOTAL STREAMFLOW = 0.0740 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.117	8.379	1.171
0.100	0.100	7.046	8.174	1.155
0.200	0.200	6.987	7.974	1.140
0.300	0.300	6.941	7.779	1.126
0.400	0.400	6.904	7.589	1.111
0.500	0.500	6.876	7.403	1.097
0.600	0.600	6.856	7.222	1.083
0.700	0.700	6.842	7.046	1.069
0.800	0.800	6.835	6.873	1.055
0.900	0.900	6.832	6.705	1.041
1.000	1.000	6.834	6.541	1.028
1.100	1.100	6.839	6.381	1.014
1.200	1.200	6.848	6.225	1.001
1.300	1.300	6.859	6.073	0.988
1.400	1.400	6.873	5.925	0.976
1.500	1.500	6.888	5.780	0.963

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
08-31-1998 11:46:18

DATA FILE = SUMMGOOS.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

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THE NAME OF THE DATA FILE IS: WINTER.MOD

THE STREAM NAME IS: Sycolin Creek
THE RIVER BASIN IS: Potomac River
THE SECTION NUMBER IS: 9
THE CLASSIFICATION IS: III

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

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Goose Creek Industrial Park

PROPOSED LIMITS ARE:
FLOW = .01 MGD
BOD5 = 30 MG/L
TKN = 30 MG/L
D.O. = 5 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 1

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Goose Creek near Leesburg, #01644000
GAUGE DRAINAGE AREA = 332 SQ.MI.
GAUGE 7Q10 = 14.8649 MGD
DRAINAGE AREA AT DISCHARGE = 17.3 SQ.MI.

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

ALLOCATION DESIGN TEMPERATURE = 15 C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 1.5 MI

SEGMENT WIDTH = 9 FT
SEGMENT DEPTH = .3 FT
SEGMENT VELOCITY = .7 FT/SEC

DRAINAGE AREA AT SEGMENT START = 17.3 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 364.8 SQ.MI.

ELEVATION AT UPSTREAM END = 210 FT
ELEVATION AT DOWNSTREAM END = 196 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = LARGE ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

****

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE Goose Creek Industrial Park DISCHARGE

TO Sycolin Creek

COMMENT: Dec - May, 7Q10 = 1.293 MGD, no antidegradation

THE SIMULATION STARTS AT THE Goose Creek Industrial Park DISCHARGE

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

FLOW = .01 MGD cBOD5 = 30 Mg/L TKN = 30 Mg/L D.O. = 5 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.863 Mg/L ****

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

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

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.77459 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 8.990 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

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

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. C	DO-SAT Mg/L
1	1.50	0.429	5.600	1.000	0.450	0.000	203.00	15.00	9.989

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

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

TOTAL STREAMFLOW = 0.7846 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	8.939	5.892	1.490
0.100	0.100	8.941	5.826	1.484
0.200	0.200	8.943	5.760	1.477
0.300	0.300	8.946	5.695	1.471
0.400	0.400	8.949	5.631	1.464
0.500	0.500	8.953	5.568	1.458
0.600	0.600	8.957	5.505	1.452
0.700	0.700	8.962	5.443	1.445
0.800	0.800	8.967	5.382	1.439
0.900	0.900	8.972	5.321	1.433
1.000	1.000	8.978	5.261	1.426
1.100	1.100	8.984	5.202	1.420
1.200	1.200	8.990	5.143	1.414
1.300	1.300	8.990	5.086	1.408
1.400	1.400	8.990	5.028	1.402
1.500	1.500	8.990	5.000	1.396

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REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
08-31-1998 11:58:06

DATA FILE = WINTER.MOD

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 Loudoun, 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: Loudoun County Sanitation Authority, d/b/a Loudoun Water, P. O. Box 4000, Ashburn, VA 20146, VA0080993

PROJECT DESCRIPTION: Loudoun County Sanitation Authority, d/b/a Loudoun Water has applied for a reissuance of a permit for the public Goose Creek Industrial Park Wastewater Treatment Plant. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 0.01 million gallons per day into a water body. The sludge will be disposed by transporting the digested sludge to the Broad Run Water Reclamation Facility (VA0091383) for further treatment and disposal. The facility proposes to release treated sewage in the Sycolin Creek in Loudoun 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, $cBOD_5$, BOD_5, Total Suspended Solids, Dissolved Oxygen, Total Residual Chlorine, TKN, and *E. coli*.

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