MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Modification of VPDES Permit VA0068110

TO: FMC Wastewater Treatment Facility 2021 Modification File

FROM: Alison Thompson

DATE: March 11, 2022

During the 2021 Virginia legislative session, the General Assembly of Virginia passed House Bill 2129 (Attachment 1). The Enhanced Nutrient Removal Certainty Program (ENRC Program) requires that certain wastewater treatment plants upgrade their nutrient removal technology or close outdated facilities in support of the Chesapeake Bay TMDL to reduce nutrient loads to the Bay. The Department of Environmental Quality – Northern Regional Office (DEQ-NRO) was directed to modify the VPDES Permit VA0068110 for the FMC Wastewater Treatment Facility (WWTF) owned by Spotsylvania County. The modification is limited to adding a compliance schedule which requires Spotsylvania County to convey the flows from the FMC WWTF to the County's Massaponax WWTF (VA0025658) and close the FMC WWTF by January 1, 2026.

This memorandum summarizes the changes to the permit effective August 1, 2018, and serves as the modification to the original Fact Sheet (Attachment 2).

The following discussions are numbered as they appear in the original Fact Sheet. The information contained in this memorandum replaces or expands upon the information in the original Fact Sheet.

17f. Effluent Screening, Wasteload Allocation, and Effluent Limit Development –Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

This facility has coverage under 9VAC25-820 – General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020055. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – Water Quality Management Plan Regulation which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e. those with design flows of ≥ 0.5 MGD above the fall line and > 0.1 MGD below the fall line.

Once this facility conveys all flow to the Massaponax WWTF (VA0025658) and closes, the Total Nitrogen and Total Phosphorus nutrient loads will be transferred to the Massaponax WWTF.

20b. Other Permit Requirements – Schedule of Compliance

This permit already contains a Schedule of Compliance for Total Recoverable Copper (Permit Part I.C.). The Schedule of Compliance required by HB2129 will be placed into the VPDES permit as Part I.G as follows:

Schedule of Compliance for Conveying Flows to the Massaponax WWTF (VA0025658) and Closing FMC WWTF
The permittee shall convey FMC WWTF flow to the Massaponax WWTF (VA0025658) and close the FMC WWTF, in accordance with the following schedule:

a. Submit progress reports to DEQ annually, no later than February 1 of each year.
b. Convey flow to the Massaponax WWTF and close the FMC WWTF by January 1, 2026.

In accordance with the dates identified in the above schedule of compliance, the permittee shall submit to the DEQ-NRO either a report of progress, or in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement. The compliance reports due beginning February 1, 2023, shall address the requirements of the Enhanced Nutrient Removal Certainty (ENRC) Program.

During the compliance period, the permittee must (1) continue to operate the facility in a manner that will minimize or avoid degradation of the effluent from current operating levels and (2) notify DEQ prior to making any substantial process control modifications that might degrade the quality of the effluent.

23. Changes to Permit from the Previously Issued Permit

a) Special Conditions

- A Schedule of Compliance (Permit Part I.G.) was added to require the facility to convey flow from the FMC WWTF to the Massaponax WWTF (VA0025658) and close by January 1, 2026.

25. Public Notice Information

First Public Notice Date: February 3, 2022 Second Public Notice Date: February 10, 2022

Public Notice Information is required by 9VAC25-31-280. 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. (571) 866-6083, alison.thompson@deq.virginia.gov. See Attachment 3 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: This was a staff initiated modification so no modification fee was paid by Spotsylvania County.

State/Federal Agency Comments: By email dated November 17, 2021, EPA commented on the draft permit indicating that:

> *"1. The closure and conveyance compliance schedules to meet the requirements of the ENRC requirements appear to be appropriate, but the interim requirements must include enforceable actions leading to compliance with the final requirement. These interim requirements will also provide justification for the length of the compliance schedule that is afforded in the permit (i.e., that the time allowed is "as soon as possible", as required by 40 CFR 122.47(a)(1)). Progress reports may be appropriate but should not be the sole interim requirement for meeting the final requirements. Progress reports are intended to be used when the time needed for completion of interim requirements is more than 1 year and isn't readily divisible into stages for completion (see 40 CFR 122.47(a)(3)(ii)). A compliance schedule must also include enforceable actions the facility will take that will lead to compliance. EPA recommends DEQ include a justification for the length of time it has granted the facility in the compliance schedule in the permit record.*
>
> *a. 40 CFR 122.47(a)(3)(i) requires "[t]he time between interim dates shall not exceed 1 year, except that in the case of a schedule for compliance with standards for sewage sludge use and disposal". Since the first interim milestone is scheduled to be completed by February 1, 2023, depending on the date of permit issuance, the time may be greater than one year. DEQ should consider this when finalizing the permit."*

DEQ did not initially include specific requirements for this facility in the compliance schedule since the facility is closing and there are no specific actions necessary for the actual treatment works. The VPDES permit already included a special condition in Part I.F.13 for a Treatment Works Closure Plan when it was reissued in 2018. While DEQ maintains that milestones other than progress reports aren't needed for this compliance schedule, based on

EPA's comments and a discussion with the permittee, DEQ has revised the compliance schedule to include appropriate milestones for the construction of the conveyance components of the project.

Public Comments: No comments were received.

Owner Comments: By letter dated November 9, 2021, the permittee requested a revision to the Schedule of Compliance for the conveyance of the FMC WWTF flow to Massaponax to include the following footnote:

Alternatively the facility shall be in compliance with this schedule either (a) by complying with 4.0 mg/L total nitrogen and 0.3 mg/L total phosphorus annual average concentrations for compliance year 2026 or (b) as a facility subject to an aggregated waste load allocation, by exercising the option of achieving an equivalent discharged load in compliance year 2026 based on 4.0 mg/L total nitrogen and 0.3 mg/L total phosphorus annual average concentrations and actual annual flow treated without the acquisition and use of point source credits generated by permitted facilities not under common ownership.

The owner also asked that the records be updated to include a new Facility and Owner Contact:

Brian Orrock, Wastewater Treatment Manager (540) 507-7362 borrock@spotsylvania.va.us

Based on the owner's comments, the Schedule of Compliance in Part I.G. was revised and DEQ's records have been updated to include the new facility and owner contact information.

CHAPTER 363

An Act to amend and reenact §§ 10.1-1186.01, 62.1-44.19:13, and 62.1-44.19:14 of the Code of Virginia, relating to Chesapeake Bay Phase III Watershed Improvement Plan; nutrient removal; regulations.

[H 2129]

Approved March 25, 2021

Be it enacted by the General Assembly of Virginia:

1. That §§ 10.1-1186.01, 62.1-44.19:13, and 62.1-44.19:14 of the Code of Virginia are amended and reenacted as follows:

§ 10.1-1186.01. Reimbursements to localities for upgrades to treatment works.

A. *As used in this section, "Enhanced Nutrient Removal Certainty Program" or "ENRC Program" means the same as that term is defined in § 62.1-44.19:13.*

B. The General Assembly shall fund grants to finance the reasonable costs of design and installation of nutrient removal technology at the publicly owned treatment works designated as significant dischargers contained in subsection ~~E,~~ *F* or as eligible nonsignificant dischargers as defined in § 10.1-2117. ~~Notwithstanding § 10.1-2128, at such time as~~ *When* grant disbursements pursuant to this section reach ~~200 percent of the appropriations provided for in Chapter 951 of the Acts of Assembly of 2005 and Chapter 10 of the Acts of Assembly of 2006, Special Session I~~ *a sum sufficient to fund the completion of the ENRC Program at all publicly owned treatment works,* the House Committee on Agriculture, Chesapeake and Natural Resources, the House Committee on Appropriations, the Senate Committee on Agriculture, Conservation and Natural Resources, and the Senate Committee on Finance *and Appropriations* shall review *(i)* the future funding needs to meet the purposes of the Water Quality Improvement Act, *(ii) the most recent annual needs estimate required by § 10.1-2134.1,* and *(iii)* the appropriate funding mechanism for such needs.

~~B.~~ *C.* The disbursement of grants for the design and installation of nutrient removal technology at those publicly owned treatment works included in subsection ~~E~~ *F* and eligible nonsignificant dischargers shall be made monthly based on a requisition submitted by the grant recipient in the form requested by the Department. Each requisition shall include written certification that the applicable local share of the cost of nutrient removal technology for that portion of the project covered by such requisition has been incurred or expended. Except as may otherwise be approved by the Department, disbursements shall not exceed 95 percent of the total grant amount until satisfactory completion of the project. The distribution of the grants shall be effected by one of the following methods:

1. In payments to be paid by the State Treasurer out of funds appropriated to the Water Quality Improvement Fund pursuant to § 10.1-2131;

2. Over a specified time through a contractual agreement entered into by the Treasury Board and approved by the Governor, on behalf of the Commonwealth, and the locality or public service authority undertaking the design and installation of nutrient removal technology, such payments to be paid by the State Treasurer out of funds appropriated to the Treasury Board; or

3. In payments to be paid by the State Treasurer upon request of the Director ~~of Environmental Quality~~ out of proceeds from bonds issued by the Virginia Public Building Authority, in consultation with the Department ~~of Environmental Quality~~, pursuant to §§ 2.2-2261, 2.2-2263, and 2.2-2264, including the Commonwealth's share of the interest costs expended by the locality or regional authority for financing such project during the period from ~~50%~~ *50 percent* completion of construction to final completion of construction.

~~C.~~ *D.* The General Assembly ~~shall have~~ *has* the sole authority to determine whether disbursement ~~will~~ *shall* be made pursuant to subdivision ~~B~~ *C* 1, ~~B~~ 2, or ~~B~~ 3, or a combination thereof~~;~~, provided that a disbursement shall ~~only~~ be made pursuant to subdivision ~~B~~ *C* 3 *only* upon a certification by the Department ~~of Environmental Quality~~ that project grant reimbursements for the fiscal year will exceed the available funds in the Water Quality Improvement Fund.

~~D.~~ *E.* Exclusive of any deposits made pursuant to § 10.1-2128, the grants awarded pursuant to this section shall include such appropriations as provided ~~for in Chapter 951 of the Acts of Assembly of 2005; and Chapter 10 of the Acts of Assembly of 2006, Special Session I~~ *from time to time in the appropriation act or any amendments thereto.*

~~E.~~ *F.* The disbursement of grants to finance the costs of design and installation of nutrient removal technology, *including eligible design and installation costs for implementation of the ENRC Program,* at the following ~~89~~ *listed* publicly owned treatment works and other eligible nonsignificant dischargers shall be provided pursuant to the distribution methodology included in § 10.1-2131. ~~However, in~~ *The notation "WIP3-N" or "WIP3-P" indicates that a facility is subject to additional requirements for total*

nitrogen or total phosphorus, respectively, under the ENRC Program. In no case shall any publicly owned treatment works receive a grant of less than ~~35%~~ *35 percent* of the costs of the design and installation of nutrient removal technology.

FACILITY NAME	OWNER
Shenandoah - Potomac River Basin	
ACSA-Fishersville STP	Augusta County Service Authority
Luray STP	Town of Luray
ACSA-Middle River Regional STP	Augusta County Service Authority
HRRSA-North River WWTF *WIP3-P*	Harrisonburg-Rockingham Regional Sewer Authority
ACSA-Stuarts Draft STP	Augusta County Service Authority
Waynesboro STP	City of Waynesboro
ACSA-Weyers Cave STP	Augusta County Service Authority
Berryville STP	Town of Berryville
Front Royal STP	Town of Front Royal
Mount Jackson STP	Town of Mount Jackson
New Market STP	Town of New Market
Shenandoah Co.-North Fork Regional WWTP	Shenandoah County
Stoney Creek Sanitary District STP	Stoney Creek Sanitary District
Strasburg STP	Town of Strasburg
Woodstock STP	Town of Woodstock
FWSA-Opequon Water Reclamation Facility	Frederick-Winchester Service Authority
FWSA-Parkins Mill WWTF	Frederick-Winchester Service Authority
Purcellville-Basham Simms WWTF	Town of Purcellville
LCSA-Broad Run WRF	Loudoun County Service Authority
Leesburg WPCF	Town of Leesburg
Round Hill WWTP	Town of Round Hill
PWCSA-H.L. Mooney WWTF	Prince William County Service Authority
Upper Occoquan Sewage Authority WWTP	Upper Occoquan Sewage Authority
FCW&SA-Vint Hill WWTF	Fauquier County Water and Sewer Authority
Alexandria Sanitation Authority WWTP	Alexandria Sanitation Authority
Arlington Co. WPCF	Arlington County
Fairfax Co. - Noman-Cole Pollution Control Facility	Fairfax County
Stafford Co.-Aquia WWTP	Stafford County
Colonial Beach STP	Town of Colonial Beach
Dahlgren Sanitary District WWTP	King George County Service Authority
Fairview Beach STP	King George County Service Authority
Purkins Corner WWTP	King George County Service Authority
District of Columbia - Blue Plains STP (Virginia portion)	Loudoun County Service Authority and Fairfax County contract for capacity
Rappahannock River Basin	
Culpeper WWTP	Town of Culpeper
Marshall WWTP	Town of Marshall
Mountain Run WWTP	Culpeper County
Orange STP	Town of Orange
Rapidan STP	Rapidan Service Authority
FCW&SA-Remington WWTP	Fauquier County Water and Sewer Authority
Warrenton STP	Town of Warrenton
Wilderness Shores WWTP	Rapidan Service Authority
Spotsylvania Co.-FMC WWTF *WIP3-N, WIP3-P*	Spotsylvania County
Fredericksburg WWTF	City of Fredericksburg
Stafford Co.-Little Falls Run WWTF	Stafford County
Spotsylvania Co.-Massaponax WWTF *WIP3-N, WIP3-P*	Spotsylvania County
Montross-Westmoreland WWTP	Westmoreland County
Oakland Park STP	King George County Service Authority
Tappahannock WWTP	Town of Tappahannock
Urbanna WWTP	Hampton Roads Sanitation District
Warsaw STP	Town of Warsaw
Reedville Sanitary District WWTP	Reedville Sanitary District
Kilmarnock WWTP	Town of Kilmarnock
York River Basin	
Caroline Co. Regional STP	Caroline County
Gordonsville STP	Rapidan Service Authority
Ashland WWTP	Hanover County
Doswell WWTP	Hanover County
HRSD-York River STP *WIP3-N*	Hampton Roads Sanitation District
Parham Landing WWTP	New Kent County
Totopotomoy WWTP	Hanover County
HRSD-West Point STP	Hampton Roads Sanitation District

HRSD-Mathews Courthouse STP	Hampton Roads Sanitation District
Spotsylvania Co.-Thornburg STP WIP3-N, WIP3-P	*Spotsylvania County*
James River Basin	
Buena Vista STP	City of Buena Vista
~~Clifton Forge STP~~	~~Town of Clifton Forge~~
Covington STP	City of Covington
Lexington-Rockbridge Regional WQCF	Maury Service Authority
Alleghany Co.-Low Moor STP	Alleghany County
Alleghany Co.-Lower Jackson River WWTP	Alleghany County
Amherst-Rutledge Creek WWTP	Town of Amherst
Lynchburg STP	City of Lynchburg
RWSA-Moores Creek Regional STP	Rivanna Water and Sewer Authority
Crewe WWTP	Town of Crewe
Farmville WWTP	Town of Farmville
Chesterfield Co.-Falling Creek WWTP	Chesterfield County
Henrico Co. WWTP	Henrico County
Hopewell Regional WWTF	City of Hopewell
Chesterfield Co.-Proctors Creek WWTP	Chesterfield County
Richmond WWTP	City of Richmond
South Central Wastewater Authority WWTF *WIP3-N, WIP3-P*	South Central Wastewater Authority
~~Chickahominy WWTP~~	~~New Kent County~~
HRSD-Boat Harbor STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-James River STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-Williamsburg STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-Nansemond STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-Army Base STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-Virginia Initiative Plant STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
HRSD-Chesapeake/Elizabeth STP *WIP3-N, WIP3-P*	Hampton Roads Sanitation District
Eastern Shore Basin	
Cape Charles WWTP	Town of Cape Charles
Onancock WWTP	Town of Onancock
Tangier Island WWTP	Town of Tangier

~~F.~~ *G.* To the extent that any publicly owned treatment works receives less than the grant specified pursuant to § 10.1-2131, any year-end revenue surplus or unappropriated balances deposited in the Water Quality Improvement Fund, as required by § 10.1-2128, shall be prioritized in order to augment the funding of those projects for which grants have been prorated. Any additional reimbursements to these prorated projects shall not exceed the total reimbursement amount due pursuant to the formula established in subsection E of § 10.1-2131.

~~G.~~ *H.* Notwithstanding the provisions of subsection B of § 10.1-2131, the Director ~~of the Department of Environmental Quality~~ shall not be required to enter into a grant agreement with a facility designated as a significant discharger or eligible nonsignificant discharger if the Director determines that the use of nutrient credits in accordance with the Chesapeake Bay Watershed Nutrient Credit Exchange Program (§ 62.1-44.19:12 et seq.) would be significantly more cost-effective than the installation of nutrient controls for the facility in question.

§ 62.1-44.19:13. Definitions.

As used in this article, unless the context requires a different meaning:

"Annual mass load of total nitrogen" (expressed in pounds per year) means the daily total nitrogen concentration (expressed as mg/L to the nearest 0.01 mg/L) multiplied by the flow volume of effluent discharged during the 24-hour period (expressed as MGD to the nearest 0.01 MGD), multiplied by 8.34 and rounded to the nearest whole number to convert to pounds per day (lbs/day) units, then totaled for the calendar month to convert to pounds per month (lbs/mo) units, and then totaled for the calendar year to convert to pounds per year (lbs/yr) units.

"Annual mass load of total phosphorus" (expressed in pounds per year) means the daily total phosphorus concentration (expressed as mg/L to the nearest 0.01mg/L) multiplied by the flow volume of effluent discharged during the 24-hour period (expressed as MGD to the nearest 0.01 MGD) multiplied by 8.34 and rounded to the nearest whole number to convert to pounds per day (lbs/day) units, then totaled for the calendar month to convert to pounds per month (lbs/mo) units, and then totaled for the calendar year to convert to pounds per year (lbs/yr) units.

"Association" means the Virginia Nutrient Credit Exchange Association authorized by this article.

"Attenuation" means the rate at which nutrients are reduced through natural processes during transport in water.

"Best management practice," "practice," or "BMP" means a structural practice, nonstructural practice, or other management practice used to prevent or reduce nutrient loads associated with stormwater from reaching surface waters or the adverse effects thereof.

"Biological nutrient removal technology" means (i) technology that will achieve an annual average total nitrogen effluent concentration of eight milligrams per liter and an annual average total phosphorus

effluent concentration of one milligram per liter, or (ii) equivalent reductions in loads of total nitrogen and total phosphorus through the recycle or reuse of wastewater as determined by the Department.

"Delivered total nitrogen load" means the discharged mass load of total nitrogen from a point source that is adjusted by the delivery factor for that point source.

"Delivered total phosphorus load" means the discharged mass load of total phosphorus from a point source that is adjusted by the delivery factor for that point source.

"Delivery factor" means an estimate of the number of pounds of total nitrogen or total phosphorus delivered to tidal waters for every pound discharged from a permitted facility, as determined by the specific geographic location of the permitted facility, to account for attenuation that occurs during riverine transport between the permitted facility and tidal waters. Delivery factors shall be calculated using the Chesapeake Bay Program watershed model.

"Department" means the Department of Environmental Quality.

"Enhanced Nutrient Removal Certainty Program" or "ENRC Program" means the Phase III Watershed Implementation Plan Enhanced Nutrient Removal Certainty Program established pursuant to subsection G of § 62.1-44.19:14.

"Equivalent load" means 2,300 pounds per year of total nitrogen and 300 pounds per year of total phosphorus at a flow volume of 40,000 gallons per day; 5,700 pounds per year of total nitrogen and 760 pounds per year of total phosphorus at a flow volume of 100,000 gallons per day; and 28,500 pounds per year of total nitrogen and 3,800 pounds per year of total phosphorus at a flow volume of 500,000 gallons per day.

"Facility" means a point source discharging or proposing to discharge total nitrogen or total phosphorus to the Chesapeake Bay or its tributaries. This term does not include confined animal feeding operations, discharges of stormwater, return flows from irrigated agriculture, or vessels.

"General permit" means the general permit authorized by this article.

"MS4" means a municipal separate storm sewer system.

"Nutrient credit" or "credit" means a nutrient reduction that is certified pursuant to this article and expressed in pounds of phosphorus or nitrogen either (i) delivered to tidal waters when the credit is generated within the Chesapeake Bay Watershed or (ii) as otherwise specified when generated in the Southern Rivers watersheds. "Nutrient credit" does not include point source nitrogen credits or point source phosphorus credits as defined in this section.

"Nutrient credit-generating entity" means an entity that generates nonpoint source nutrient credits.

"Permitted facility" means a facility authorized by the general permit to discharge total nitrogen or total phosphorus. For the sole purpose of generating point source nitrogen credits or point source phosphorus credits, "permitted facility" shall also mean the Blue Plains wastewater treatment facility operated by the District of Columbia Water and Sewer Authority.

"Permittee" means a person authorized by the general permit to discharge total nitrogen or total phosphorus.

"Point source nitrogen credit" means the difference between (i) the waste load allocation for a permitted facility specified as an annual mass load of total nitrogen, and (ii) the monitored annual mass load of total nitrogen discharged by that facility, where clause (ii) is less than clause (i), and where the difference is adjusted by the applicable delivery factor and expressed as pounds per year of delivered total nitrogen load.

"Point source phosphorus credit" means the difference between (i) the waste load allocation for a permitted facility specified as an annual mass load of total phosphorus, and (ii) the monitored annual mass load of total phosphorus discharged by that facility, where clause (ii) is less than clause (i), and where the difference is adjusted by the applicable delivery factor and expressed as pounds per year of delivered total phosphorus load.

"State-of-the-art nutrient removal technology" means (i) technology that will achieve an annual average total nitrogen effluent concentration of three milligrams per liter and an annual average total phosphorus effluent concentration of 0.3 milligrams per liter, or (ii) equivalent load reductions in total nitrogen and total phosphorus through recycle or reuse of wastewater as determined by the Department.

"Tributaries" means those river basins listed in the Chesapeake Bay TMDL and includes the Potomac, Rappahannock, York, and James River Basins, and the Eastern Shore, which encompasses the creeks and rivers of the Eastern Shore of Virginia that are west of Route 13 and drain into the Chesapeake Bay.

"Waste load allocation" means (i) the water quality-based annual mass load of total nitrogen or annual mass load of total phosphorus allocated to individual facilities pursuant to the Water Quality Management Planning Regulation (9VAC25-720) or its successor, or permitted capacity in the case of nonsignificant dischargers; (ii) the water quality-based annual mass load of total nitrogen or annual mass load of total phosphorus acquired pursuant to § 62.1-44.19:15 for new or expanded facilities; or (iii) applicable total nitrogen or total phosphorus waste load allocations under the Chesapeake Bay total maximum daily loads (TMDLs) to restore or protect the water quality and beneficial uses of the Chesapeake Bay or its tidal tributaries.

§ 62.1-44.19:14. Watershed general permit for nutrients.

A. ~~By January 1, 2006, or as soon thereafter as possible, the~~ *The* Board shall issue a Watershed General Virginia Pollutant Discharge Elimination System Permit, hereafter referred to as the general permit, authorizing point source discharges of total nitrogen and total phosphorus to the waters of the Chesapeake Bay and its tributaries. Except as otherwise provided in this article, the general permit shall control in lieu of technology-based, water quality-based, and best professional judgment, interim or final effluent limitations for total nitrogen and total phosphorus in individual Virginia Pollutant Discharge Elimination System permits for facilities covered by the general permit where the effluent limitations for total nitrogen and total phosphorus in the individual permits are based upon standards, criteria, waste load allocations, policy, or guidance established to restore or protect the water quality and beneficial uses of the Chesapeake Bay or its tidal tributaries.

B. This section shall not be construed to limit or otherwise affect the Board's authority to establish and enforce more stringent water quality-based effluent limitations for total nitrogen or total phosphorus in individual permits where those limitations are necessary to protect local water quality. The exchange or acquisition of credits pursuant to this article shall not affect any requirement to comply with such local water quality-based limitations.

C. The general permit shall contain the following:

1. Waste load allocations for total nitrogen and total phosphorus for each permitted facility expressed as annual mass loads, *including reduced waste load allocations where applicable under the ENRC Program*. The allocations for each permitted facility shall reflect the applicable individual water quality-based total nitrogen and total phosphorus waste load allocations. An owner or operator of two or more facilities located in the same tributary may apply for and receive an aggregated waste load allocation for total nitrogen and an aggregated waste load allocation for total phosphorus for multiple facilities reflecting the total of the water quality-based total nitrogen and total phosphorus waste load allocations established for such facilities individually;

2. A schedule requiring compliance with the combined waste load allocations for each tributary as soon as possible taking into account (i) opportunities to minimize costs to the public or facility owners by phasing in the implementation of multiple projects; (ii) the availability of required services and skilled labor; (iii) the availability of funding from the Virginia Water Quality Improvement Fund as established in § 10.1-2128, the Virginia Water Facilities Revolving Fund as established in § 62.1-225, and other financing mechanisms; (iv) water quality conditions; and (v) other relevant factors. Following receipt of the compliance plans required by subdivision C 3, the Board shall reevaluate the schedule taking into account the information in the compliance plans and the factors in this subdivision, and may modify the schedule as appropriate;

3. A requirement that ~~within nine months after the initial effective date of the general permit,~~ the permittees shall either individually or through the Association submit compliance plans to the Department for approval. The compliance plans shall contain, at a minimum, any capital projects and implementation schedules needed to achieve total nitrogen and phosphorus reductions sufficient to comply with the individual and combined waste load allocations of all the permittees in the tributary. The compliance plans may rely on the exchange of point source credits in accordance with this article, but not the acquisition of credits through payments authorized by § 62.1-44.19:18, to achieve compliance with the individual and combined waste load allocations in each tributary. The compliance plans shall be updated annually and submitted to the Department no later than February 1 of each year. *The compliance plans due beginning February 1, 2023, shall address the requirements of the ENRC Program*;

4. Such monitoring and reporting requirements as the Board deems necessary to carry out the provisions of this article;

5. A procedure that requires every owner or operator of a facility authorized by a Virginia Pollutant Discharge Elimination System permit to discharge 100,000 gallons or more per day, or an equivalent load, directly into tidal waters, or 500,000 gallons or more per day, or an equivalent load, directly into nontidal waters, to secure general permit coverage by filing a registration statement with the Department within a specified period after each effective date of the general permit. The procedure shall also require any owner or operator of a facility authorized by a Virginia Pollutant Discharge Elimination System permit to discharge 40,000 gallons or more per day, or an equivalent load, directly into tidal or nontidal waters to secure general permit coverage by filing a registration statement with the Department at the time he makes application with the Department for a new discharge or expansion that is subject to an offset or technology-based requirement in § 62.1-44.19:15, and thereafter within a specified period of time after each effective date of the general permit. The procedure shall also require any owner or operator of a facility with a discharge that is subject to an offset requirement in subdivision A 5 of § 62.1-44.19:15 to secure general permit coverage by filing a registration statement with the Department prior to commencing the discharge and thereafter within a specified period of time after each effective date of the general permit. The general permit shall provide that any facility authorized by a Virginia Pollutant Discharge Elimination System permit and not required by this subdivision to file a registration statement shall be deemed to be covered under the general permit at the time it is issued, and shall file a registration statement with the Department when required by this section. Owners or operators of

facilities that are deemed to be permitted under this section shall have no other obligation under the general permit prior to filing a registration statement and securing coverage under the general permit based upon such registration statement;

6. A procedure for efficiently modifying the lists of facilities covered by the general permit where the modification does not change or otherwise alter any waste load allocation or delivery factor adopted pursuant to the Water Quality Management Planning Regulation (9VAC25-720) or its successor, or an applicable total maximum daily load. The procedure shall also provide for modifying or incorporating new waste load allocations or delivery factors, including the opportunity for public notice and comment on such modifications or incorporations; and

7. Such other conditions as the Board deems necessary to carry out the provisions of this chapter and Section 402 of the federal Clean Water Act (33 U.S.C. § 1342).

D. 1. The Board shall (i) review during the year 2020 and every 10 years thereafter the basis for allocations granted in the Water Quality Management Planning Regulation (9VAC25-720) and (ii) as a result of such decennial reviews propose for inclusion in the Water Quality Management Planning Regulation (9VAC25-720) either the reallocation of unneeded allocations to other facilities registered under the general permit or the reservation of such allocations for future use.

2. For each decennial review, the Board shall determine whether a permitted facility has:

a. Changed the use of the facility in such a way as to make discharges unnecessary, ceased the discharge of nutrients, and become unlikely to resume such discharges in the foreseeable future; or

b. Changed the production processes employed in the facility in such a way as to render impossible, or significantly to diminish the likelihood of, the resumption of previous nutrient discharges.

3. Beginning in 2030, each review also shall consider the following factors for municipal wastewater facilities:

a. Substantial changes in the size or population of a service area;

b. Significant changes in land use resulting from adopted changes to zoning ordinances or comprehensive plans within a service area;

c. Significant establishment of conservation easements or other perpetual instruments that are associated with a deed and that restrict growth or development;

d. Constructed treatment facility capacity;

e. Significant changes in the understanding of the water chemistry or biology of receiving waters that would reasonably result in unused nutrient discharge allocations over an extended period of time;

f. Significant changes in treatment technologies that would reasonably result in unused nutrient discharge allocations over an extended period of time;

g. The ability of the permitted facility to accommodate projected growth under existing nutrient waste load allocations; and

h. Other similarly significant factors that the Board determines reasonably to affect the allocations granted.

The Board shall not reduce allocations based solely on voluntary improvements in nutrient removal technology.

E. The Board shall maintain and make available to the public a current listing, by tributary, of all permittees and permitted facilities under the general permit, together with each permitted facility's total nitrogen and total phosphorus waste load allocations, and total nitrogen and total phosphorus delivery factors.

F. Except as otherwise provided in this article, in the event that there are conflicting or duplicative conditions contained in the general permit and an individual Virginia Pollutant Discharge Elimination System permit, the conditions in the general permit shall control.

G. The Board shall adopt amendments to the Water Quality Management Planning Regulation and modifications to Virginia Pollutant Discharge Elimination System permits or registration lists to establish and implement the Phase III Watershed Implementation Plan Enhanced Nutrient Removal Certainty Program (ENRC Program) as provided in this subsection. The ENRC Program shall consist of the following projects and the following waste load allocation reductions and their respective schedules for compliance.

1. Priority projects for additional nitrogen and phosphorus removal (schedule for compliance):

PROJECT NAME	*DESCRIPTION (COMPLIANCE SCHEDULE)*
HRSD-Chesapeake/Elizabeth STP	*Consolidate into regional system and close treatment facility (1/1/2023)*
HRSD-Boat Harbor WWTP	*Convey by subaqueous crossing to Nansemond River WWTP for nutrient removal (1/1/2026)*
HRSD-Nansemond River WWTP	*Upgrade and expand with nutrient removal technology of 4.0 mg/L total nitrogen (1/1/2026) and 0.30 mg/L total phosphorus (1/1/2032)*
HRSD-Nassawadox WWTP	*Convey to regional system for nutrient removal (1/1/2026)*
Spotsylvania Co.-FMC WWTF	*Convey to Massaponax WWTF and close treatment facility (1/1/2026)*

Spotsylvania Co.-Massaponax WWTF	*Expand with nutrient removal technology of 4.0 mg/L total nitrogen and 0.30 mg/L total phosphorus to consolidate and close FMC WWTF (1/1/2026)*
Spotsylvania Co.-Thornburg STP	*Upgrade with nutrient removal technology of 4.0 mg/L total nitrogen and 0.30 mg/L total phosphorus (1/1/2026)*
HRRSA-North River WWTP	*Phosphorus removal tertiary filtration upgrade (1/1/2026)*
South Central Wastewater Authority WWTF	*Upgrade with nutrient removal technology of 4.0 mg/L total nitrogen and 0.30 mg/L total phosphorus (1/1/2026)*
HRSD-Williamsburg WWTP	*Upgrade with nutrient removal technology of 4.0 mg/L total nitrogen (1/1/2026) and 0.30 mg/L total phosphorus (1/1/2032)*
HRSD-VIP WWTP	*Upgrade with nutrient removal technology of 4.0 mg/L total nitrogen (1/1/2026) and 0.30 mg/L total phosphorus (1/1/2032)*
HRSD-James River WWTP	*Upgrade with nutrient removal technology of 4.0 mg/L total nitrogen (1/1/2026) and 0.30 mg/L total phosphorus (1/1/2028)*
HRSD-Army Base WWTP	*Convey to VIP WWTP for nutrient removal (1/1/2032) or upgrade with nutrient removal technology of 4.0 mg/L total nitrogen (1/1/2026) and 0.30 mg/L total phosphorus (1/1/2032)*

Each priority project and the associated schedule of compliance shall be incorporated into the applicable Virginia Pollutant Discharge Elimination System permit or registration list. Each priority project facility shall be in compliance by complying with applicable annual average total nitrogen and total phosphorus concentrations for compliance years 2026, 2028, and 2032 or, only for a facility subject to an aggregated waste load allocation, by exercising the option of achieving an equivalent discharged load by the date set out in the schedule of compliance based on the applicable total nitrogen and total phosphorus annual average concentrations and actual annual flow treated without the acquisition and use of point source credits generated by permitted facilities not under common ownership. Noncompliance shall be enforceable in the same manner as any other condition of a Virginia Pollutant Discharge Elimination System permit.

2. Nitrogen waste load allocation reductions - HRSD-York River WWTP:

Reduce the total nitrogen waste load allocation for the HRSD-York River WWTP to 228,444 lbs/year effective January 1, 2026.

3. James River HRSD SWIFT nutrient upgrades:

Reduce total nitrogen waste load allocations for HRSD treatment works in the James River basin to the following allocations effective January 1, 2026:

FACILITY NAME	*TOTAL NITROGEN WASTELOAD ALLOCATION (lbs/year)*
HRSD-Army Base WWTP	*219,307*
HRSD-Boat Harbor STP	*304,593*
HRSD-James River STP	*243,674*
HRSD-VIP WWTP	*487,348*
HRSD-Nansemond STP	*365,511*
HRSD-Williamsburg STP	*274,133*

Reduce total phosphorus waste load allocations for HRSD treatment works in the James River basin to the following allocations effective January 1, 2026:

FACILITY NAME	*TOTAL PHOSPHORUS WASTELOAD ALLOCATION (lbs/year)*
HRSD-Army Base WWTP	*27,413*
HRSD-Boat Harbor STP	*38,074*
HRSD-James River STP	*30,459*
HRSD-VIP WWTP	*60,919*
HRSD-Nansemond STP	*45,689*
HRSD-Williamsburg STP	*34,267*

Reduce total phosphorus waste load allocations for HRSD treatment works in the James River basin to the following allocations effective January 1, 2030:

FACILITY NAME	*TOTAL PHOSPHORUS WASTELOAD ALLOCATION (lbs/year)*
HRSD-Army Base WWTP	*21,931*
HRSD-Boat Harbor STP	*30,459*
HRSD-James River STP	*24,367*
HRSD-VIP WWTP	*48,735*
HRSD-Nansemond STP	*36,551*
HRSD-Williamsburg STP	*27,413*

Reduce total phosphorus waste load allocations for HRSD treatment works in the James River basin to the following allocations effective January 1, 2032:

FACILITY NAME	*TOTAL PHOSPHORUS WASTELOAD ALLOCATION (lbs/year)*
HRSD-Army Base WWTP	*16,448*
HRSD-Boat Harbor STP	*22,844*
HRSD-James River STP	*18,276*
HRSD-VIP WWTP	*36,551*
HRSD-Nansemond STP	*27,413*
HRSD-Williamsburg STP	*20,560*

Transfer the total nitrogen (454,596 lbs/year) and total phosphorus (41,450 lbs/year) waste load allocations for the HRSD-Chesapeake/Elizabeth STP to the Nutrient Offset Fund effective January 1, 2026.

Transfer the total nitrogen (153,500 lbs/yr) and total phosphorous (17,437 lbs/yr) waste load allocations for the HRSD-J.H. Miles Facility consolidation to HRSD in accordance with the approved registration list December 21, 2015, transfer.

2. That the Enhanced Nutrient Removal Certainty Program as established in subdivisions G 1, 2, and 3 of § 62.1-44.19:14 of the Code of Virginia, as amended by this act, shall be deemed to implement through January 1, 2026, the Commonwealth's Chesapeake Bay Phase III Watershed Implementation Plan in lieu of the floating waste load allocation concept proposed in Initiative 52 of the Commonwealth's Chesapeake Bay Phase III Watershed Implementation Plan. However, nothing in this act shall be construed to limit the State Water Control Board's authority to impose (i) additional requirements or modifications to phosphorous waste load allocations necessary to achieve compliance with the numeric chlorophyll-a criteria applicable to the James River; (ii) requirements or modifications to waste load allocations necessary to comply with changes to federal law that become effective after January 1, 2021; or (iii) requirements or modifications to waste load allocations necessary to comply with a court order issued after January 1, 2021.

3. That the State Water Control Board shall modify the Virginia Pollutant Discharge Elimination System (VPDES) permits for the facilities listed in subdivision G 1 of § 62.1-44.19:14 of the Code of Virginia, as amended by this act, to include any requirements and compliance schedules established in this act.

4. That if the Secretary of Natural Resources (the Secretary) determines on or after July 1, 2026, that the Commonwealth has not achieved, or in the event of increased nutrient loads associated with climate change will not be able to maintain, its nitrogen pollution reduction commitments in the Chesapeake Bay Total Maximum Daily Load (TMDL) Phase III Watershed Implementation Plan, the Secretary may develop an additional watershed implementation plan or plans pursuant to § 2.2-218 of the Code of Virginia. Any such plan shall take into consideration the progress made by all point and nonpoint sources toward meeting applicable load and waste load allocations, the best available science and water quality modeling, and any applicable U.S. Environmental Protection Agency guidance for Chesapeake Bay TMDL implementation. In any such plan, the Secretary may include as priority projects upgrades with nutrient removal technology of 4.0 mg/L annual average total nitrogen concentration at municipal wastewater treatment facilities with a design capacity greater than 10.0 MGD discharging to James River Segment JMSTF2 so long as (i) the scheduled date for compliance is January 1, 2036; (ii) notwithstanding the wasteload allocations specified in clause (iii), compliance requires operating the nutrient removal technology to achieve an annual average total nitrogen concentration of less than or equal to 4.0 mg/L or, until such time as the facility is upgraded to achieve such concentration, the option of achieving an equivalent discharged load based on an annual average total nitrogen concentration of 4.0 mg/L and actual annual flow treated, including the use of point source nitrogen credits; and (iii) the facilities have and retain the following total nitrogen waste load allocations: Falling Creek WWTP (182,738 lbs/year), Proctors Creek WWTP (411,151 lbs/year and, in the event that Proctors Creek WWTP is expanded in accordance with 9VAC25-40-70 and Falling Creek WWTP is upgraded to achieve 4.0 mg/L, 493,391 lbs/year), and Henrico County WWTP (1,142,085 lbs/year). If the Secretary opts to include such facilities in the plan, the State Water Control Board shall include the foregoing concentrations limits, waste load allocations, and schedules for compliance in the Water Quality Management Planning Regulation, the Watershed General Virginia Pollutant Discharge Elimination System permit, and individual VPDES permits, as applicable.

This document provides pertinent information concerning reissuance of the VPDES Permit listed below. This permit is being processed as a Major, Municipal permit. The discharge results from the operation of a 4.0 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia Water Quality Standards (effective June 5, 2017) and updating permit language as appropriate. The effluent limitations and special conditions contained within this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1.	Facility Name and Mailing Address:	FMC Wastewater Treatment Facility 10900 HCC Dr. Fredericksburg, VA 22408	SIC Code: NAICS Code:	4952 WWTP 221320 Sewage Treatment Facilities
	Facility Location:	11801 Capital Lane Fredericksburg, VA 22408	County:	Spotsylvania
	Facility Contact Name: Facility Email Address:	Douglas Crooks dcrooks@spotsylvania.va.us	Telephone Number:	(540) 507-7362
2.	Permit No.: Other VPDES Permits: Other Permits: E2/E3/E4 Status:	VA0068110 VAN020055 3023165 (Petroleum Tank ID) E3	Expiration Date:	December 17, 2017
3.	Owner Name: Owner Contact / Title: Owner Email Address:	County of Spotsylvania Douglas Crooks / Wastewater Treatment Division Director dcrooks@spotsylvania.va.us	Telephone Number:	(540) 507-7362
4.	Application Complete Date: Permit Drafted By: Draft Permit Reviewed By: Draft Permit Reviewed By: Public Comment Period:	May 5, 2017 Caitlin Shipman Alison Thompson Bryant Thomas Start Date: June 25, 2018	Date Drafted: Date Reviewed: Date Reviewed: End Date:	April 19, 2018 April 27, 2018 May 2, 2018 July 25, 2018

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

Receiving Stream Name:	Rappahannock River	Stream Code:	3-RPP
Drainage Area at Outfall:	1638.26 mi^2	River Mile:	107.43
Stream Basin:	Rappahannock River	Subbasin:	None
Section:	1	Stream Class:	II
Special Standards:	a	Waterbody ID / 6^{th} Order HUC:	VAN-E20E / RA46
7Q10 Low Flow:	Tidal	7Q10 High Flow:	Tidal
1Q10 Low Flow:	Tidal	1Q10 High Flow:	Tidal
30Q10 Low Flow:	Tidal	30Q10 High Flow:	Tidal
Harmonic Mean Flow:	Tidal	30Q5 Flow:	Tidal

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
- **X** EPA Guidelines
- **X** Water Quality Standards
- ____ Other (PES, Occoquan Policy, Dulles)

7. **Licensed Operator Requirements:** Class I

8. **Reliability Class:** Class I

9. **Facility / Permit Characterization:**

- ____ Private
- ____ Federal
- ____ State
- **X** POTW
- **X** eDMR Participant
- ____ Effluent Limited
- **X** Water Quality Limited
- **X** Whole Effluent Toxicity Program
- **X** Pretreatment Program
- **X** Total Maximum Daily Load (TMDL)
- ____ Possible Interstate Effect
- **X** Compliance Schedule
- ____ Interim Limits in Permit
- ____ Interim Limits in Other Document

10. Wastewater Sources and Treatment Description:

Influent is received from the Fredericksburg WWTF and Deep Run Pump Station. The Fredericksburg WWTF (VA0025127) receives approximately 2 MGD of flow from the Hazel Run interceptor. Of that 2 MGD of flow, approximately 1 MGD is County flow, which is then sent to the FMC WWTF along with approximately 1.5 MGD of City's flows.

Preliminary treatment consists of two mechanical bar screens and two rectangular grit collection tanks. After preliminary treatment, the effluent is mixed with soda ash and alum for pH control and phosphorus removal, respectively, before reaching the aeration lagoons.

Secondary treatment takes place in three aeration lagoons. Lagoon No. 1 is divided by a floating curtain where the first third of the volume is mixed without aeration via two 10-HP mixers. The remaining two thirds of the volume is oxygenated using five floating aerators. The flow exiting the first lagoon is split between two aeration lagoons that operate in parallel. Some alum is added in preliminary treatment for phosphorus removal. However, most of the removal of nutrients is a biological process that occurs in the aeration lagoons.

Flow from the aeration lagoons is split to two clarifiers. The scum from the clarifiers is pumped to the sludge holding tanks. RAS from the clarifiers is injected in the area after the grit chambers. WAS from the clarifiers is sent to two aerobic sludge holding tanks.

The effluent from the clarifiers then enters dual sandfilters. These filters serve to remove excess solids and scum. The scum and backwash water from these filters is returned to the head of the plant via use of the RAS line. Sand media is replaced periodically.

Sodium hypochlorite is used for disinfection and sodium bisulfite is used for dechlorination. Sodium hypochlorite is added to the manhole prior to the chlorine contact tanks; sodium bisulfite is added for dechlorination after the chlorine contact tanks. Two baffled chlorine contact tanks merge into one dechlorination tank in which post aeration takes place. A defoaming agent is added at the chlorine contact tank by pumping the solution from a tube placed above the tank. Discharge is to the Rappahannock River via a submerged outfall approximately four miles upstream of the Massaponax WWTF.

The aerated basins at the FMC WWTF are designed to handle 5.4 MGD; however, this facility maintains a hydraulic design flow of 4.0 MGD. The transfer of 1.4 MGD of flow by removal of the 5.4 MGD flow tier was accomplished through an August 2, 2010 permit modification of the Massaponax WWTF VPDES Permit (VA0025658) and the 2012 permit reissuance of the FMC WWTF.

DEQ is aware of preliminary plans to either decommission FMC WWTF and send the flow to Massaponax WWTF or send the flow from the Hazel Run interceptor to Massaponax WWTF.

Previously at this facility, two stormwater outfalls were permitted under the VPDES General Permit for Stormwater Discharges Associated with Industrial Activity (VAR051423). A no-exposure certification request was received by DEQ on April 7, 2014. DEQ staff conducted a site visit on April 22, 2014 and determined that there was no reasonable potential for the industrial activity at FMC WWTF to impact storm water quality. By letter dated May 16, 2014, DEQ approved the no-exposure certificate for this facility; accordingly, the permit was terminated on June 16, 2014 (**Attachment 2**).

See **Attachment 3** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Number	Discharge Sources	Treatment	Design Flow	Latitude / Longitude
001	Domestic and Commercial Wastewater	See Section 10	4.0 MGD	38° 16' 55" / 77° 26' 42"
See **Attachment 4** for the topographic map of Fredericksburg (182C).				

11. Sludge Treatment and Disposal Methods:

Wasted sludge from the treatment process is aerobically digested using two digesters operating in parallel, gravity thickened, and then dewatered by a belt press. The Class B sludge is transported in a stabilized form via watertight trucks to the Livingston Landfill (VPA00065) located at 6241 Massey Road in Spotsylvania County, where it is combined with sludge from Massaponax WWTF (VA0025658) for composting. All composted sludge is sold in bulk as a Class A Sludge.

12. Discharges, Intakes, and Monitoring Stations Located Within 6th Order HUC RA46:

TABLE 2 DISCHARGES, INTAKES & MONITORING STATIONS			
ID / Permit Number	Facility Name	Type	Receiving Stream
VAG110093	Titan Virginia Ready Mix LLC – Stafford	Concrete Products GP	England Run, UT
VAG110095	Aggregate Industries MAR – Falmouth		Rappahannock River, UT
VAG830492	Woodfin Heating – Fredericksburg	Petroleum Discharge GP	Deep Run, UT
VAG830522	Sheetz Incorporated 346		Fall Quarry Run, UT
VAR050991	Cellofoam North America Inc – Fredericksburg	Stormwater Industrial GP	Deep Run
VAR051052	United Parcel Service – Fredericksburg		Deep Run, UT
VAR051028	McLane Mid Atlantic		England Run, UT
VAR052340	Perry R Sisson Incorporated		
VAR050897	All Foreign Used Auto Parts Incorporated		Falls Run, UT
VAR050987	BFI Fredericksburg Recyclery		Hazel Run
VAR051679	Superior Paving Corporation - Bellman Road		
VAR052341	Norfleet Quality Limited Liability Company		Hazel Run, UT
VAR051091	Anderson Oil Company - Bulk Storage Terminal		Rappahannock River, UT
VAG750251	Enterprise Rent-A-Car - 20 Plantation Dr	Vehicle Wash and Laundry GP	England Run, UT
VAG750242	Enterprise Rent A Car - 3455 Jefferson Davis Hwy		Hazel Run, UT
VA0029785	Lincoln Terminal Company	VPDES IP	Deep Run, UT
VA0025127	Fredericksburg Wastewater Treatment Facility		Rappahannock River
VA0025658	Massaponax Wastewater Treatment Facility		
VA0068110	FMC Wastewater Treatment Facility		
VA0076392	Little Falls Run Wastewater Treatment Facility		
3-RPP104.47	DEQ Monitoring Station	Ambient	Rappahannock River
3-RPP106.01		Trend / Bay	
3-RPP107.33		Fish / Sediment	

13. Material Storage:

TABLE 3 MATERIAL STORAGE		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Alum	10,000 gal	Overflow floor drain leading to headworks.
Soda Ash	40,000 lb	Stored inside building.
Sodium Hypochlorite	10,000 gal	Overflow to floor drain leading to headworks; stored inside double walled tank.
Sodium Bisulfite	5,000 gal	Overflow floor drain leading to headworks.
Polymer	1,000 gal	
Defoamer	500 gal	

14. Site Inspection:

DEQ-NRO Water Permitting staff, Caitlin Shipman and Ann Zimmerman, conducted a site visit on November 1, 2017. DEQ staff was met onsite by the plant's chief operator, Bob Fessler, who provided a tour of the facility.

DEQ-NRO Water Compliance staff, Amy Dooley, completed a technical inspection of this facility on November 9, 2017 (**Attachment 5**).

15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

This facility discharges into an upstream segment of the tidal freshwater Rappahannock River. The nearest DEQ ambient monitoring station is 3-RPP106.01, located upstream from the Fredericksburg Country Club, approximately 1.42 miles

downstream from Outfall 001. The following is the water quality summary for this segment of the Rappahannock River, as taken from the 2016 Integrated Report:

Class II, Section 1, special stds. a.

DEQ monitoring stations located in this segment of the Rappahannock River:

- *Ambient monitoring station 3-RPP104.47, two hundred yards below the Massaponax Wastewater Treatment Facility*
- *Ambient trend/Bay monitoring station 3-RPP106.01, located upstream from the Fredericksburg Country Club*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, excursions above the risk-based tissue screening value (TSV) of 270 parts per billion (ppb) for arsenic (As) in fish tissue was recorded in one species of fish (1 sample) collected in 2006 at fish tissue monitoring station 3-RPP107.33 (striped bass), noted by an observed effect.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for this portion of the Rappahannock River was approved by EPA on 05/05/2008. The wildlife use is considered fully supporting.

The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicate that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.

Note: The aquatic life use assessment described above includes assessment for Chesapeake Bay-specific criteria for the Tidal Freshwater Rappahannock segment RPPTF. In the 2016IR, the aquatic life use was delisted for a dissolved oxygen impairment based on Bay assessment of thirty-day mean dissolved oxygen values for the open-water aquatic life sub-use. Subsequent available information regarding Chesapeake Bay segment RPPTF indicates that the aquatic life use will be considered impaired in the 2018IR for the dissolved oxygen parameter for the open-water aquatic life sub-use.

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	Year First Listed as Impaired	TMDL Completed	WLA	Basis for WLA
Impairment Information in the 2014 Integrated Report:						
Rappahannock River (Tidal Freshwater)	Recreation	*E. coli*	2002	Tidal Freshwater Rappahannock River Bacteria TMDL 5/5/2008	6.95E+12 cfu/year *E. coli**	126 cfu/ 100 mL *E. coli* --- 4.0 MGD
	Fish Consumption	PCBs in Fish Tissue	2004	No	---	---
	Aquatic Life	Dissolved Oxygen	2008†	Chesapeake Bay TMDL 12/29/210	65,784 lbs/yr TN	Edge of Stream (EOS) Loads
	Open-Water Aquatic Life				4,934 lbs/yr TP 493,380.72 lbs/yr TSS	

*In the Tidal Freshwater Rappahannock Bacteria TMDL report, this facility was assigned a WLA of 9.39E+12 cfu/year based on a design flow of 5.4 MGD. In 2012, the design flow decreased to 4.0 MGD. The net 1.4 MGD change in design flow (and associated WLA of 2.44E+12 cfu/year) was transferred to Massaponax WWTP (VA0025658). If this facility is decommissioned during the current permit cycle, its WLA will be transferred to Massaponax WWTP (VA0025658) and the total WLA for that permit will be adjusted accordingly.

This facility discharges directly to the Rappahannock River; located within the Chesapeake Bay watershed. The receiving stream has been addressed in the Chesapeake Bay TMDL, completed by the Environmental Protection Agency (EPA) on December 29, 2010. The TMDL addresses dissolved oxygen (DO), chlorophyll a and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source waste load allocations (WLAs) for total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185. This facility is considered a Significant Chesapeake Bay wastewater discharge and has been assigned wasteload allocations as noted in Table 4 above.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP); approved by EPA on December 29, 2010. The approved WIP recognizes that the TMDL nutrient WLAs for Significant Chesapeake Bay wastewater dischargers are set in two regulations: 1) the Water Quality Management Planning Regulation (9VAC25-720); and 2) the *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia* (9VAC25-820). The WIP states that since TSS discharges from wastewater facilities represent an insignificant portion of the Bay's total sediment load, they may be considered aggregated and wastewater discharges with technology-based TSS limits are considered consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. DEQ has provided coverage under the VPDES Nutrient General Permit (GP) for this facility under permit VAN020055. The requirements of the Nutrient GP currently in effect for this facility are consistent with the Chesapeake Bay TMDL. This individual permit includes TSS limits that are also consistent with the Chesapeake Bay TMDL and WIP. In addition, the individual permit addresses limitations for the protection of instream dissolved oxygen concentrations as detailed in Section 19 of this Fact Sheet. The proposed effluent limits within this individual permit are consistent with the Chesapeake Bay TMDL and will not cause an impairment or observed violation of the standards for DO, chlorophyll a or SAV as required by 9VAC25-260-185.

The full planning statement is found in **Attachment 6**.

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 Rappahannock River is located within Section 1 of the Rappahannock River Basin and classified as Class II water.

Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0 – 9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented **Attachment 7**.

The Freshwater Water Quality/Wasteload Allocation Analysis located in **Attachment 8** details other water quality criteria applicable to the receiving stream.

Some Water Quality Criteria are dependent on the pH, temperature and total hardness of the receiving stream and/or final effluent. These values were utilized to determine the criterion found in **Attachment 8** for the following pollutants:

pH and Temperature for Ammonia Criteria

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

The seasonal tiers for the Rappahannock River are November through April and May through October. These tiers, established by the Virginia Institute of Marine Science (VIMS) Model, reflect the differences between winter and summer temperatures in the Rappahannock River.

During the previous permit reissuance, the 90th percentile effluent pH used to determine the ammonia criteria was the assumed value of 7.5 SU. A 10th percentile pH value was not calculated. Staff evaluated the effluent pH data from October 1, 2016 – September 30, 2017 and determined the 90th and 10th percentile were 7.1 SU and 6.7 SU, respectively (**Attachment 9**). It is staff's professional judgment that there is a significant difference in the 90th percentile pH values; the calculated pH values be used instead of the assumed values.

Effluent temperature data was not readily available, therefore, the 90th percentile annual and winter temperatures were assumed to be 25°C and 15 °C, respectively.

For the receiving stream, the 90th percentile temperature and pH used during the last reissuance were 28 ºC and 7.6 SU. These values were calculated during the 1995 permit reissuance and were derived from weekly samples collected by the City of Fredericksburg Department of Public Works staff at the Mayfield Bypass Bridge during the period of January 1991 through May 1995. This station was located upstream of the outfalls for the City of Fredericksburg WWTF (VA0025127), FMC WWTF (VA0068110), Massaponax WWTF (VA0025658), and the Little Falls Run WWTP (VA0076392).

Staff evaluated ambient monitoring data from DEQ monitoring station 3-RPP110.57, which is located upstream of all the major municipal dischargers at the Rt. 1 bridge, for the period of February 2007 – June 2017. During this time period, monitoring occurred approximately every other month. The 90th percentile annual and the 90th percentile wet season temperature values were calculated to be 28.66 °C and 19.06 °C, respectively; the 90th and 10th percentile pH values were calculated to be 8.99 SU and 6.98 SU, respectively (**Attachment 10**).

It is staff's professional judgment that the pH and temperature values calculated from the DEQ monitoring station 3-RPP110.57 are significantly different than those used in previous permit reissuance and shall be used in this permitting action.

Hardness Dependent Metals Criteria

The Water Quality Criteria for some metals are dependent on the receiving stream and/or effluent total hardness values (expressed as mg/L calcium carbonate).

There is no hardness data for this facility/receiving stream. Staff guidance suggests utilizing a default hardness value of 50 mg/L $CaCO_3$ for streams east of the Blue Ridge. The hardness dependent metals criteria in **Attachment 8** are based on this default value.

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 per 100 mL of water shall not exceed the following:

	Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]For a minimum of four weekly samples taken during any calendar month

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Rappahannock River, is located within Section 1of the Rappahannock River Basin. This section of the receiving stream has been designated with a special standard of "a".

According to 9VAC25-260-310.a, Special Standard "a" applies to all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, including those waters on which condemnation or restriction classifications are established by the Virginia Department of Health. The fecal coliform bacteria standard is as follows: the geometric mean fecal coliform value for a sampling station shall not exceed an MPN (Most probable number) or a MF (Membrane Filtration using mTEC culture media) of 14 per 100 milliliters of sample and the estimated 90th percentile shall not exceed an MPN of 43 per 100 ml for a 5-tube decimal dilution test or an MPN of 49 per 100 ml for a 3-tube decimal dilution test or MF test of 31 CFU (colony forming units) per 100 ml. The shellfish area is not to

be so contaminated by radionuclides, pesticides, herbicides, or fecal material that the consumption of shellfish might be hazardous. This same standard is also contained in 9VAC25-260-160. Fecal Coliform Bacteria; Shellfish Waters. This standard is used for the interpretation of instream monitoring data and not for setting fecal coliform effluent limitations.

e. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on September 19, 2017 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a 3 mile radius of the discharge: Red-cockaded Woodpecker (*Picoides borealis*), Dwarf Wedgemussel (*Alasmidonta heterodon*), Atlantic Sturgeon (*Acipenser oxyrinchus*), Northern Long-Eared Bat (*Myotis septentrionalis*), Little Brown Bat (*Myotis lucifugus lucifugus*), Tri-colored Bat (*Permyotis subflavus*), Loggerhead Shrike (*Lanius ludovicianus*), Bachman's Sparrow (*Peucaea aestivalis*), and Green Floater (*Lasmigona subviridis*). 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.

In addition, the Virginia Department of Conservation and Recreation; the Virginia Department of Game and Inland Fisheries; and the United States Fish and Wildlife Service were coordinated during this reissuance per the procedures as set forth in the 2007 Memorandum of Understanding (MOU) concerning Threatened and Endangered Species Screening for VPDES Permits. The purpose of this coordination is to obtain input from other agencies during the permitting process to ascertain potential adverse impacts to threatened and endangered species and/or their habitats.

A summary of any comments from these agencies is located in Section 26 of this Fact Sheet.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's 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.

Historically, there have been observations indicating water quality concerns for aquatic plants and open water aquatic life use. The Rappahannock River was listed as impaired for aquatic life in the 303(d) list of impaired waters in 2006. The Rappahannock River was delisted in 2008, relisted in 2014, delisted in 2016, and is expected to be relisted in 2018. This indicates that the dissolved oxygen criteria is being minimally met or not being met. Furthermore, heavy development has occurred in this watershed.

Given the aforementioned, it is staff's professional judgment that the water quality of the river does not exceed water quality standards; therefore, this receiving stream has been classified as a Tier 1 water. The proposed permit limits have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

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

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

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) 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. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration values is greater than the chronic WLA. 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 permit application with corresponding certificates of analysis, Discharge Monitoring Reports (DMRs) has been reviewed and determined to be suitable for evaluation. Please see **Attachment 12** for a summary of effluent data.

The following pollutants require a wasteload allocation analysis: ammonia and total residual chlorine are likely since this facility is a wastewater treatment plant and uses chlorine for disinfection, and Part D of EPA Form 2A of the application packet indicate that antimony, cadmium, copper, zinc, chloroform and dichlorobromomethane are present in quantifiable levels in the discharge.

b. Mixing Zones and Wasteload Allocations (WLAs)

1) Acute Toxicity

DEQ Guidance Memorandum 00-2011 states that for surface discharges into tidal estuaries or estuarine embayments, the acute wasteload allocations (WLAa) should be set at two times the acute standard because initial mixing in these circumstances are limited and lethality in the allocation impact zone must be prevented. The 2X factor is derived from the fact that the acute standard or criteria maximum concentration (CMC) is defined as one half of the final acute value (FAV) for a specific toxic pollutant. The FAV prevents acute toxicity 95% of the time for the genera tested. If the acute value is one half the FAV, the twice the acute standard should equal the FAV or equal an acceptable value for preventing lethality.

2) Chronic Toxicity

DEQ Guidance Memorandum 00-2011 states that for surface discharges into tidal estuaries, estuarine embayments, or the open ocean, the chronic wasteload allocation (WLAc) should be based upon site specific data on waste dispersion or dilution when available or appropriate. Where wastewater dispersion/dilution data are not available, a dilution ratio of 50:1 may be used. While staff acknowledges that some dilution is occurring in the Rappahannock River, since four major wastewater treatment plants discharge into a relatively small tidal freshwater area close to the fall line, large tidal influences may not be realized. It is staff's judgment that the agency default chronic mix ratio of 50:1 is too high while no dilution (end of pipe) is too stringent because some mixing is occurring.

The low flow 7Q10 statistic for the USGS flow gage near I-95 on the Rappahannock River (#01668000) was determined to be 29.6 MGD. Accordingly, staff has chosen to use an instream waste concentration (IWC) of 50%. The 50% IWC, or 2:1 mixing, is supported by the percent of IWC computed using the cumulative flows from the four major dischargers to the low flow 7Q10 statistic for the USGS flow gage on the Rappahannock River (**Table 5**).

TABLE 5
MUNICIPAL DISCHARGES IN THE UPPER RAPPAHANNOCK RIVER

VPDES Permit Number	Facility Name	Design Flow
VA0076392	Little Falls Run WWTF	13.0 MGD
VA0025658	Massaponax WWTF	9.4 MGD
VA0068110	FMC WWTF	4.0 MGD
VA0025127	Fredericksburg WWTP	4.5 MGD
	Total:	30.9 MGD

Until more evidence becomes available that demonstrates a more appropriate dilution ratio for toxic pollutants, these dilution ratios will be carried forward.

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, total residual chlorine may be present since chlorine is used for disinfection, and Part D of EPA Form 2A of the application packet indicate that antimony, cadmium, copper, zinc, chloroform and dichlorobromomethane are present in the discharge. As such, **Attachment 8** details the WLA derivations for these pollutants.

c. Virginia Institute of Marine Science Rappahannock Model & Future Permitting Strategy

Stafford County, Spotsylvania County, and the City of Fredericksburg sponsored a water quality model for the upper Rappahannock River estuary developed by the Virginia Institute of Marine Science (VIMS) entitled a *Modeling Study for the Water Quality of the Upper Rappahannock River* (VIMS model). This model was approved by the State Water Control Board Director on December 6, 1991 and has been used to determine effluent limitations for VPDES dischargers in the upper Rappahannock River since then.

This model has been run on the following occasions: August 1995, for the issuance of the VPDES permit for Haymount WWTF (VA0089125) and the flow expansion for the Fredericksburg WWTP (VA0025127); August 1996, for the issuance of the Hopyard WWTP permit (VA0089338); March 1997, for changes in the flow and production at White Packing Company (VA0088200); April 1999, to accommodate flow expansions at the Little Falls Run WWTF (VA0076392) and the Massaponax WWTF; April 2003, for the expansion of the then proposed Hopyard WWTP; January 2005, to accommodate an additional flow tier to Little Falls Run WWTF (VA0076392); August 2006, to model the loadings for the Fredericksburg WWTP (VA0025127), and March 2010, to accommodate the transfer of 1.4 MGD of flow from FMC WWTF (VA0068110) to Massaponax WWTF (VA0025658).

A staff memorandum, from March 2010, summarizes the numerous scenarios analyzed and predicted outcomes using the VIMS model. This memo also highlighted that the existing VIMS model would not be appropriate for future permitting decisions given the age of the model, the development that has occurred in the watershed, and the removal of the Embry Dam in 2004. Additionally, the model is not able to predict instream dissolved oxygen concentrations consistent with current designated uses and water quality criteria as contained in 9VAC25-260-185. It is only capable of predicting a 30-day average output concentration. Accordingly, any future expansions to existing WWTP design flows would require an update to the VIMS model, or another approach to ensuring protection of instream beneficial uses.

Therefore, a new permitting strategy was developed. In lieu of developing a new model for the tidal freshwater Rappahannock River, staff proposes to implement an approach that caps conventional pollutant loadings (e.g. $cBOD_5$, TSS, TKN) to the tidal freshwater Rappahannock River from wastewater treatment plants at currently authorized levels (**Attachment 11**).

While the VIMS model is not appropriate for future permitting decisions, it is staff's professional judgment that the existing limits for the FMC WWTF are protective of water quality standards.

d. Effluent Limitations, Outfall 001 – Toxic Pollutants

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

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

1) Ammonia as N/TKN

The VIMS model has previously shown that a TKN limit of 3.0 mg/L is needed during the low flow months (May – October) to protect the dissolved oxygen criterion. It is generally accepted that total Kjeldahl nitrogen (TKN) consists of approximately 60% ammonia in raw wastewater. As the waste stream is treated, the ammonia component of TKN is converted to nitrate (NO_3) and nitrite (NO_2). It is estimated that a facility achieving a TKN limit of 3.0 mg/L essentially removes ammonia from the waste stream, resulting in a 'self-sustaining' quality effluent that protects against ammonia toxicity. Therefore, the TKN limit of 3.0 mg/L remains protective against ammonia toxicity in the receiving stream during May – October.

Staff reevaluated the pH and temperature of the receiving stream and has concluded it is significantly different than what was used previously to derive ammonia criteria. As result, staff used the new data to determine new ammonia water quality criteria, new wasteload allocations (WLAs) and calculated a new ammonia limit. DEQ guidance suggests using a sole data point of 9.0 mg/L to ensure the evaluation adequately addresses the potential ammonia in a discharge containing domestic sewage. This resulted in an ammonia limit of 4.3 mg/L (**Attachment 13**).

Previously, the VIMS Model showed that neither an ammonia or TKN limit is needed during the high flow period (November through April). However, given the age of the model, ammonia critiera were not in place at the time the model was developed, and updated data characterizing the receiving stream and effluent, it is staff's professional judgment that an ammonia limit is needed during the high flow months of November – April. It is staff's professional judgment that the TKN limit of 3.0 mg/L is protective of the ammonia criteria during May – October

The Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013. It is staff's understanding that the new ammonia criteria may result in significant reductions in ammonia effluent limitations and that the incorporation of those criteria into the Virginia Water Quality Standards is forthcoming. Applying current DEQ practices and procedures for deriving ammonia effluent limitations, the draft ammonia criteria would trigger an average monthly limit of 2.0 mg/L for the current flow tier (**Attachment 14**). While current practices and procedures are being revisited, DEQ staff is providing this approximation for informational purposes.

2) Total Residual Chlorine (TRC)

Chlorine is utilized for disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance, as applicable. In accordance with current DEQ guidance, staff employed a default data point of 0.2 mg/L (200 µg/L) and the calculated WLAs to derive limits. A monthly average of 0.014 mg/L and a weekly average limit of 0.015 mg/L are proposed for this discharge (**Attachment 15**).

3) Metals/Organics

Antimony:

There is no aquatic life criteria for antimony, the calculated human health WLA is 1300 µg/L. The results of Part D of EPA Form 2A of the application showed one antimony sample was 7 µg/L, the other two samples were below the quantification level of 5 µg/L (**Attachment 16**). Using the conservative assumption that data below a quantification level is equal to the quantification level, the 97th percentile is 6.88 µg/L, which is 0.53% of the human health criteria. Therefore, it is staff's professional judgment that there is not a reasonable potential for an excursion of the antimony human health WLA; therefore, neither a limit or additional monitoring is warranted at this time.

Copper:

Sampling occurred annually for total recoverable copper during the current permit term. A 1:1 ratio between dissolved and total recoverable metals is assumed since the nature of the receiving waters (numerous inputs and tidal influences) complicates the determination of a total to dissolved metals ratio. Copper sampling also occurred as a part of the application for reissuance. The reasonable potential analysis of the total recoverable copper indicates that a limit of 14 µg/L is needed (**Attachment 17**). A compliance schedule for copper will be included in this reissuance.

Zinc:

A zinc limit of 130 µg/L was established during the 2001 permit reissuance. The monthly average and weekly average zinc limits of 130 µg/L are being carried forward with this permitting action.

Chloroform:

There is no aquatic life criteria for chloroform, the human health WLA is 22,000 µg/L. The results of Part D of EPA Form 2A of the application show the chloroform data as 39 µg/L, 61 µg/L, 57 µg/L (**Attachment 16**). The 97th percentile of this dataset is 60.76 µg/L, which is 0.3% of the human health WLA. Therefore, it is staff's professional judgment that there is not a reasonable potential for an excursion of the chloroform human health WLA; therefore, a limit is not warranted at this time.

Dichlorobromomethane:

There is no aquatic life criteria for dichlorobromomethane, the human health WLA is 340 µg/L. The results of Part D of EPA Form 2A of the application showed one sample result was 9 µg/L, the other two samples were below the quantification level of 5 µg/L (**Attachment 16**). Using the conservative assumption that data below the quantification level is equal to the quantification level, the 97th percentile is equal to 8.76 µg/L, which is 2.58% of the human health WLA. Therefore, it is staff's professional judgment that there is not a reasonable potential for an excursion of the dichlorobromomethane human health criteria, therefore, a limit is not warranted at this time.

Polychlorinated Biphenyls (PCBs):

During the previous permit term, the facility conducted low-level PCB testing utilizing EPA Method 1668 in support of the fish consumption impairment for tidal freshwater Rappahannock River. The facility provided two dry weather sample results and three wet weather sample results to DEQ. The third wet weather sample was taken in response to the spike seen in the second wet weather sample (**Table 6**). A spike was also seen in the results of the Fredericksburg WWTF (VA0025127), which sends approximately 2.0 MGD of flow per day to FMC WWTF (VA0068110).

DEQ utilized the blank correction procedures set forth in Guidance Memorandum 14-2004, "Procedures for reviewing and deriving total PCB concentrations from samples analyzed using low-level PCB method 1668 to be used in the development and implementation of TMDLs," to obtain the concentrations for the samples (**Tables 6 & 7**).

TABLE 6 BLANK CORRECTED RESULTS OF WET WEATHER PCB SAMPLING			
Sample (pg/L)	733.567	4119.271	785.981
Duplicate (pg/L)	759.579	3982.634	876.245

TABLE 7 BLANK CORRECTED RESULTS OF DRY WEATHER PCB SAMPLING		
Sample (pg/L)	680.917	562.72
Duplicate (pg/L)	662.607	576.976

The chronic aquatic life criterion for PCBs is 14,000 pg/L and the human health criterion is 640 pg/L. The results of the PCB sampling show one of the wet weather results exceeded the chronic aquatic life criterion and all of the wet weather results and one of the dry weather results exceeded the human health criterion. Therefore, is staff's professional judgment that a Pollutant Minimization Plan for PCBs should be developed.

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

No changes to dissolved oxygen (D.O), total phosphorus, pH limitations are proposed. No changes to the concentration limits for carbonaceous biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), or total Kjeldahl nitrogen (TKN) are proposed.

As stated in Section 17c, DEQ is proposing to cap the loadings of conventional pollutants discharged by major municipal facilities into the upper, tidal, freshwater Rappahannock River. Accordingly, if Spotsylvania County's flow from the Hazel Run interceptor is transferred from FMC WWTF to Massaponax WWTF, Massaponax WWTF will receive loadings for $cBOD_5$, TKN, and TSS based on the volume of flow transferred (1 MGD). Staff recommendations for transferring loadings with consolidation of wastewater treatment are detailed in the memorandum *Strategy for Future Permitting Decisions in the Tidal, Freshwater Rappahannock River* (**Attachment 11**).

Part I.A.2 has been added to this permit to account for the transfer of loadings for $cBOD_5$, TSS, and TKN to the Massapoanx WWTF (**Attachment 11, Appendix 4**). In Part I.A.2, FMC WWTF's loadings were calculated using the following formula:

Loadings (kg/day) =
Concentration Limit (mg/L) x [Design Flow (MGD) – Flow Transferred (MGD)] x Conversion Factor (3.785)

DO, $cBOD_5$, and TKN concentration limitations are based on the March 2010 VIMS Model (**Attachment 11**).

It is staff's practice to equate the total suspended solids limits with the $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH and *E. coli* limitations are in accordance with the Water Quality Standards, 9VAC25-260-50 and 9VAC25-260-170, respectively.

f. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

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

This facility has also obtained coverage under 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020055. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e. those with design flows of ≥ 0.5 MGD above the fall line and > 0.1 MGD below the fall line.

Monitoring for nitrates + nitrites, total Kjeldahl nitrogen, and total nitrogen are included in this permit. The monitoring is needed to protect the Chesapeake Bay Water Quality Standards. Monitoring frequencies are set at the frequencies as set forth in 9VAC25-820.

Monthly phosphorus limitations are based on the VIMS Model. Historically, elevated chlorophyll a levels in the upper segment of the Rappahannock River, near the City of Fredericksburg, have indicated eutrophication to be present. Chlorophyll a is measured as an indicator of algae growth; phosphorus contributes directly to algae growth. To prevent further increases in algae growth in this segment of the river, total phosphorus loadings will not be allowed to increase beyond the current limits for the Fredericksburg WWTF, the FMC WWTF, the Massaponax WWTF, and the Little Falls Run WWTP.

g. Effluent Limitations and Monitoring Summary

The effluent limitations are presented in Section 19. Limits were established for carbonaceous biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), ammonia as N, total Kjeldahl nitrogen (TKN), pH, dissolved oxygen (DO), total residual chlorine.

A copper limit is included with this reissuance; zinc and copper limits are in accordance with the Water Quality Standards (9VAC25-260-170).

The limit for total suspended solids is based on Professional Judgment.

The mass loading (kg/day) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and then a conversion factor of 3.785. All units for loadings were transferred from lb/day to kg/day.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

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

18. Antibacksliding:

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

19. Effluent Limitations/Monitoring Requirements:

a. Municipal Outfall 001:

Design Flow: 4.0 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date or the CTO authorizing the transfer of flow from the Hazel Run interceptor to Massaponax WWTF (VA0025658).

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	3,5	15 mg/L 230 kg/day	23 mg/L 350 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	15 mg/L 230 kg/day	23 mg/L 350 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
E. coli (Geometric Mean)	3	126 n/100mL	NA	NA	NA	1/D [a]	Grab
Total Residual Chlorine (after contact tank)	2,4	NA	NA	1.0 mg/L	NA	1/2 HR	Grab
Total Residual Chlorine (after dechlorination)	3	0.014 mg/L	0.015 mg/L	NA	NA	1/2 HR	Grab
Ammonia (Nov – Apr)	3	4.3 mg/L	5.3 mg/L	NA	NA	1/D	24H-C
Total Kjeldahl Nitrogen (TKN) (May – Oct)	3,5	3.0 mg/L 45 kg/day	5.0 mg/L 68 kg/day	NA	NA	1/W	24H-C
Total Kjeldahl Nitrogen (TKN) (Nov – Apr)	3, 6	NL mg/L	NA	NA	NA	1/W	24H-C
Nitrate+Nitrite, as N	3,6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen [b]	3,6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Phosphorus	3	2.0 mg/L	NA	NA	NA	1/W	24H-C
Total Hardness as $CaCO_3$	2,3	NL µg/L	NA	NA	NA	1/4M [c]	Grab
Zinc, Total Recoverable	3	130 µg/L	130 µg/L	NA	NA	1/YR	Grab
Copper, Total Recoverable	3	14 µg/L	14 µg/L	NA	NA	1/4M	Grab
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/YR	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/YR	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Strategy for Rappahannock Dischargers – **Attachment 11**
6. 9VAC25-40 (Nutrient Regulation)

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

1/2 HR = Once every two hours.
1/D = Once every day.
1/W = Once every two weeks.
1/4M = Once every four months. [d]
1/YR = Once every calendar year.

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

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

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

[c] Sampling shall be taken concurrently with total recoverable zinc and total recoverable copper sampling.

[d] Monitoring periods shall be January – April, March – August, and September – December.

b. Municipal Outfall 001:

Design Flow: 4.0 MGD.

Effective Dates: During the period beginning with the CTO for the transfer of the flow from the Hazel Run interceptor to Massaponax WWTF (VA0025658) 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	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	3,5	15 mg/L 170 kg/day	23 mg/L 260 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	15 mg/L 170 kg/day	23 mg/L 260 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
E. coli (Geometric Mean)	3	126 n/100mL	NA	NA	NA	1/D [a]	Grab
Total Residual Chlorine (after contact tank)	2,4	NA	NA	1.0 mg/L	NA	1/2 HR	Grab
Total Residual Chlorine (after dechlorination)	3	0.014 mg/L	0.015 mg/L	NA	NA	1/2 HR	Grab
Ammonia (Nov – Apr)	3	4.3 mg/L	5.3 mg/L	NA	NA	1/D	24H-C
Total Kjeldahl Nitrogen (TKN) (May – Oct)	3,5	3.0 mg/L 34 kg/day	5.0 mg/L 51 kg/day	NA	NA	1/W	24H-C
Total Kjeldahl Nitrogen (TKN) (Nov – Apr)	3, 6	NL mg/L	NA	NA	NA	1/W	24H-C
Nitrate+Nitrite, as N	3,6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen [b]	3,6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Phosphorus	3	2.0 mg/L	NA	NA	NA	1/W	24H-C
Total Hardness as $CaCO_3$	2,3	NL µg/L	NA	NA	NA	1/4M [c]	Grab
Zinc, Total Recoverable	3	130 µg/L	130 µg/L	NA	NA	1/YR	Grab
Copper, Total Recoverable	3	14 µg/L	14 µg/L	NA	NA	1/4M	Grab
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/YR	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/YR	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Strategy for Rappahannock Dischargers – **Attachment 11**
6. 9VAC25-40 (Nutrient Regulation)

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

1/2 HR = Once every two hours.
1/D = Once every day.
1/W = Once every two weeks.
1/4M = Once every four months. [d]
1/YR = Once every calendar year.

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

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

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

[c] Sampling shall be taken concurrently with total recoverable zinc and total recoverable copper sampling.

[d] Monitoring periods shall be January – April, March – August, and September – December.

c. Stormwater Outfalls 001 & 002:

Effective Dates: During the period beginning with the effective date of the permit and lasting until the expiration date.

The facility is authorized to discharge non-contaminated stormwater through Stormwater Outfalls 001 & 002.
No monitoring or effluent limitations are established for these outfalls.
There shall be no discharge of floating solids or visible foam other than in trace amounts.
There shall be no discharge of process wastewater through these outfalls.

20. Other Permit Requirements:

a. Part I.B. 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. 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 instream 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.

b. Part I.C. of the Permit Details the Requirements for a Schedule of Compliance for Total Recoverable Copper

The VPDES Permit Regulation, 9VAC25-31-250 allows use of Compliance Schedules to allow facilities sufficient time for upgrades to meet newly established effluent limits. The permit contains newly established limits for total recoverable copper. Since the facility was not designed to meet these limits, a schedule of compliance is required to provide the permittee time to determine how they will comply with this limit. The permittee shall achieve compliance with the final limits specified in Part I.A. of the VPDES permit in accordance with the following schedule as contained in Part I.C. of the permit:

SCHEDULE OF COMPLIANCE	
ACTION	DATE TO BE COMPLETED
Submit a plan and schedule for achieving compliance with the final copper limit	Within 180 days after the effective date of the permit (January 28, 2019).
Prepare an annual report of progress on attainment of final copper limits.	August 1, 2019; August 1, 2020; August 1, 2021.
Achieve compliance with final copper limit.	Within 4 years from the effective date of the permit (August 1, 2022).

c. Permit Section Part I.D. Details the Requirements for Whole Effluent Toxicity (WET) Program

Whole Effluent Toxicity (WET) refers to the aggregate toxic effect to aquatic organisms from all pollutants present within a facility's wastewater effluent. This program is one approach to comply with the Clean Water Act's prohibition of the discharge of toxic pollutants in toxic amounts. WET testing allows for the measurement of the wastewater's potential effects on specific test organism's ability to survive, grow and reproduce.

The VPDES Permit Regulation at 9VAC25-31-220.D.1.a-d. requires limitations in permits to provide for and ensure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Limitations must control all pollutants or pollutant parameters which the Board determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any Virginia water quality standard, including narrative criteria. The determination whether a discharge causes or contributes to an instream excursion above a narrative or numeric criteria shall utilize procedures which account for existing controls on sources of pollution, variability of the pollutant, species sensitivity and dilution of the effluent in the receiving stream. If it is determined that a reasonable potential exists to cause or contribute to an instream excursion of narrative criterion of the water quality standard, the permit must contain effluent limits for whole effluent toxicity. However, limits may not be necessary when it is demonstrated that chemical-specific limits are sufficient to attain and maintain applicable numeric and narrative water quality standards.

A WET Program is imposed for municipal facilities with a design rate >1.0 MGD, all facilities with an approved pretreatment program or required to develop a pretreatment program and/or those required by the Board based on effluent variability, compliance history, instream waste concentration (IWC), existing pollutant controls and/or receiving stream characteristics.

As referenced above, reasonable potential determinations must take into account the variability of the pollutant or pollutant parameter in the effluent, sensitivity of the species to toxicity testing and, as appropriate, the dilution of the effluent in the

receiving stream. This warrants a sampling regime that rotates throughout a given calendar year; a quarterly schedule in order to obtain seasonal perspectives that encompass that potential variableness listed prior. This methodology coincides with the VPDES Permit Regulation requirements that facilities submit representative data that reflects the seasonal variation in the discharge with each permit application (9VAC25-31-100.K.4.g.). Therefore, it is staff's best professional judgement that a WET testing protocol be proposed with this permit action that requires a rotating, quarterly testing regime for each annual monitoring requirement. The schedule as set forth within Part I.D. of the permit will ensure that the discharge is monitored for whole effluent toxicity and demonstrates seasonal variations.

See **Attachment 19** for a summary of the past test results. **Attachment 20** details the statistical evaluation of the previous WET results indicating that a limit is not warranted. **Attachment 21** documents the calculated compliance endpoints that will be carried forward with this reissuance.

d. Permit Section Part I.E. Details the Requirements of a Pretreatment Program

The VPDES Permit Regulation at 9VAC25-31-730 through 900., and the Federal Pretreatment Regulation at 40 CFR Part 403 requires POTWs with a design flow of > 5.0 MGD and receiving from Industrial Users (IUs) pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

The FMC WWTP is a POTW with a current design capacity of 4.0 MGD.

Spotsylvania County also owns and operates the Thornburg STP (VA0029513), which has a design flow of 0.345 MGD, as well as the Massaponax WWTF is a POTW with a current design capacity of 9.4 MGD and expansion flow tiers of 11.4 MGD, 13.4 MGD, 14.4 MGD, and 17.9 MGD.

The Pretreatment Program for Spotsylvania County was approved on October 25, 1996. The two Significant Industrial Users (SIUs) Spotsylvania County regulates through this program are Virginia Semiconductor, Inc. and Goodwill Industries. Both SIUs discharge to the FMC WWTF through Fredericksburg WWTF. There are currently no SIUs discharging to the Massaponax WWTF.

The pretreatment program conditions in the proposed permit reissuance will include: implementation of the approved pretreatment program that complies with the Clean Water Act, State Water Control Law, state regulations, and the approved program.

21. Other Special Conditions:

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

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

c. O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

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

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

f. Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.

g. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should data collected and submitted for Attachment A of the permit, indicate the need for limits to ensure protection of water quality criteria, the permit may be modified or alternately revoked and reissued to impose such water quality-based limitations.

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

k. Mixing Zone Study. The permittee may conduct a site specific mixing zone study for the receiving waters to determine wasteload allocations for toxic pollutants. The permittee may request that the permit be modified to reflect the results of the study.

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

m. Treatment Works Closure Plan. This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure treatment works are properly closed so that the risk of untreated wastewater discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section §62.1-44.21 requires every owner to furnish when requested plans, specification and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purpose of the State Water Control Law.

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

o. Total Maximum Daily Load (TMDL) Reopener. Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream.

22. Permit Section Part II.

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

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

a. Special Conditions:

- The PCB Monitoring special condition was removed.
- The PCB Pollutant Minimization Plan and the Treatment Works Closure Plan special conditions were added.

b. Monitoring and Effluent Limitations:

- An ammonia limit (Nov – April) was added.
- A total recoverable copper limit was added with a compliance schedule.
- Effluent limitations and monitoring requirements were added to account for the transfer of flow to Massaponax WWTF.

24. Variances/Alternate Limits or Conditions:

None.

25. Public Notice Information:

First Public Notice Date: June 25, 2017 Second Public Notice Date: July 2, 2017

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) 583-3859, caitlin.shipman@deq.virginia.gov. See **Attachment 22** 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: Reissuance was delayed due to the development of the Permitting Strategy for Municipal Dischargers in the Tidal Freshwater Rappahannock River (**Attachment 11**).

State/Federal Agency Comments:

VDH: There are no public water supply facilities that will be impacted by the discharge.

VDH-DSS: The project will not affect shellfish growing waters.

DCR: Recommended a study to determine if Dwarf wedgemussels are present. Recommended UV/ozone be used for disinfection instead of chlorination.

FWS: Recommended EPA's 2013 Ammonia criteria be incorporated in limit development, if adopted into the VA WQS during the permit reissuance. Recommended replacing chlorine disinfection with UV, if the facility is ever upgraded.

DGIF: Provided the facility adheres to the permit, does not anticipate an adverse impact on threatened or endangered species.

The full comment from each agency and DEQ's response is located in **Attachment 23.**

Public Comments: None.

Owner Comments: None.

FMC Wastewater Treatment Facility (VA0068110)
Fact Sheet Attachments:

Attachment 1 – Flow Frequency Determination

Attachment 2 – VAR051423 Termination Letter & Site Visit

Attachment 3 – Facility Diagram

Attachment 4 – Topographic Map

Attachment 5 – Technical Inspection Report

Attachment 6 – Planning Statement

Attachment 7 – Dissolved Oxygen Criteria for Class II Waters

Attachment 8 – Water Quality Criteria / Wasteload Allocation Analysis

Attachment 9 – Effluent pH Calculations (October 2016 – September 2017)

Attachment 10 – Ambient pH Calculations (February 2007 – June 2017)

Attachment 11 – Permitting Strategy for Municipal Dischargers in Upper Tidal Freshwater Rappahannock River

Attachment 12 – Summary of Discharge Monitoring Reports (DMRs)

Attachment 13 – Ammonia Limit Evaluation

Attachment 14 – Pending Ammonia Criteria

Attachment 15 – Total Residual Chlorine Limit Evaluation

Attachment 16 – Summary of Data from EPA Form 2A

Attachment 17 – Copper Limit Evaluation

Attachment 18 – Zinc Limit Evaluation

Attachment 19 – Summary of WET Testing

Attachment 20 – WET Limit Evaluation

Attachment 21 – WET Compliance Endpoints

Attachment 22 – Public Notice

Attachment 23 – Coordination with State & Federal Agencies

Attachment 1 – Flow Frequency Determination

Rappahannock River Flow Determination
USGS Gaging Station #01668000

Rappahannock River near Fredericksburg, VA (#01668000):

Drainage Area: 1595 mi^2

High Flow Months: November - April

Gaging Station Data Collected From: 9/19/1907 to 12/27/2017.

Low Flow		
Statistic	cfs	MGD
1Q10	38.3	24.75
7Q10	45.8	29.60
30Q5	122	78.85
30Q10	78	50.41

Attachment 2 – VAR051423 Termination Letter & Site Visit

COMMONWEALTH of VIRGINIA

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

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

May 16, 2014

Via E-mail (DCrooks@Spotsylvania.va.us)

Mr. Doug Crooks
Division Director Wastewater Treatment Facilities
Spotsylvania County
600 Hudgins Road
Spotsylvania, VA 22408

Re: Termination of Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Storm Water Discharges Associated with Industrial Activity – VAR051423

Dear Mr. Crooks:

Based on a site review conducted April 22, 2014, the Department of Environmental Quality - Northern Regional Office has approved a no-exposure certification request received on April 7, 2014, for the FMC Wastewater Treatment Facility. Pursuant to 9VAC25-151-50 C, an owner covered by the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity who is later able to file a no-exposure certification to be excluded from permitting is no longer authorized by nor required to comply with this permit. Additionally, if the owner is no longer required to have permit coverage due to a no-exposure exclusion, the owner is not required to submit a notice of termination. As such, the Department of Environmental Quality has approved the termination of the Permit referenced above. Termination of this permit does not prohibit the discharge of storm water from the FMC Wastewater Treatment Facility. Additionally, termination of this permit does not change or alter terms and conditions of the facility's individual permit nor does this termination relieve the facility from complying with the individual permit (VA0068110). Termination of this permit is effective thirty days from the date of this notification (June 16, 2014) unless you provide an objection in accordance with one of the two paragraphs below.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty days from the date you received this decision within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Virginia Department of Environmental Quality.

Alternatively, any owner under §§ 62.1-44.16, 62.1-44.17 and 62.1-44.19 of the State Water Control Law aggrieved by any action of the State Water Control Board taken without a formal hearing, or by inaction of the Board, may demand in writing a formal hearing of such owner's grievance, provided a petition requesting such hearing is filed with the Board. Said agreement must meet the requirements set forth in §1.23 (b) of the Board's Procedural Rule No. 1.

Please note that should a discharge arise in accordance with 9VAC25-31-100, Application for a Permit, FMC Wastewater Treatment Facility shall be responsible for complying with Virginia State Water Control Laws and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

Should you have any questions or need any additional information, please contact Susan Mackert at (703) 583-3853 or by email at susan.mackert@deq.virginia.gov.

Sincerely,

Bryant Thomas
Water Permits and Planning Manager

Enc: Site memorandum

cc: File – VAR051423
Rebecca Johnson – DEQ Compliance Inspector
Becky Vice – DEQ Compliance Auditor

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: FMC Wastewater Treatment Facility (VAR051423)

TO: File

FROM: Susan Mackert

DATE: May 12, 2014

COPIES: Mr. Doug Crooks – Division Director Wastewater Treatment Facilities

A site visit was performed on April 22, 2014, to assess drainage patterns, point source discharge locations, and permit applicability for the referenced facility. Additionally, the site visit was conducted to verify information provided in a no-exposure certification request received April 7, 2014.

General Site Observations

- The facility operates under SIC Code 4952 (wastewater treatment) which falls under Sector T – Treatment Works of the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Storm Water Discharges Associated with Industrial Activity (SWGP).
- The facility has a design flow of 4 Million Gallons per Day (MGD).
- The facility comprises approximately 7.2 acres with paved and grass surfaces and consists of an office building and typical wastewater treatment process units (photos 1 – 2).
- The facility has two storm water outfalls.
  - Storm water Outfall 001 is located in the southern most portion of the facility. The drainage area consists of a grassy area adjacent to the aerated lagoons (photos 3 - 4). Storm water flows through a drainage swale (photo 5) prior to discharge to the Rappahannock River (photo 6).
  - The drainage area to storm water Outfall 002 is comprised of two separate areas adjacent to the digesters and entrance road and the clarifier area. Storm water from these two areas converges in the area of the chlorine contact tank and is sampled at a manhole location in the northern most portion of the facility (photo 7). Discharge is to the Rappahannock River.
    - Storm water is collected via a series of manholes adjacent to the digesters and entrance road. This drainage area consists of primarily grassy surfaces (photo 8).
    - Storm water is also collected from areas adjacent to the clarifiers (photos 9 – 10). This drainage area consists of primarily grassy surfaces.
- Areas of potential storm water contamination include the solids handling area (photo 11) and the bar screen/dumpster area (photo 12). Both areas are undercover with any storm water returned to the headworks. As such, there is no reasonable potential for these areas to impact storm water quality.

Staff Recommendations

The requirements found within 9VAC25-151 are applicable to point source storm water discharges associated with industrial activity. Based on observations made during the site visit, it is staff's best professional judgement that there is no reasonable potential for the industrial activity at the FMC Wastewater Treatment Facility to impact storm water quality. Storm water discharges are comprised primarily of runoff from paved and grassy areas. Discharges such as this are currently exempt from coverage under the general industrial storm water permit. Any areas of potential storm water contamination are returned to the headworks thereby not impacting storm water quality.

The facility maintains coverage under the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity (VAR051423). Pursuant to 9VAC25-151-50 C, an owner covered by the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity who is later able to file a no-exposure certification to be excluded from permitting is no longer authorized by nor required to comply with this permit. Additionally, if the owner is no longer required to have permit coverage due to a no-exposure exclusion, the owner is not required to submit a notice of termination. Please note that if a discharge arises in accordance with 9VAC25-31-100, Application for a Permit, the FMC Wastewater Treatment Facility shall be responsible for complying with Virginia State Water Control Law and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

Photo 1. Facility overview.

Photo 2. Facility overview.

Photo 3. Drainage area to Outfall 001. Flow is in the direction of the arrow.

Photo 4. Drainage area to Outfall 001. Flow is in the direction of the arrow.

Photo 5. Drainage swale to Outfall 001. Flow is in the direction of the arrow.

Photo 6. Outfall 001.

Photo 7. Sampling location for storm water Outfall 002.

Photo 8. Grassy area adjacent to digesters. Flow is in the direction of the arrow to a series of manholes adjacent to the entrance road.

Photo 9. Drainage area to storm water Outfall 002.

Photo 10. Drainage area to storm water Outfall 002.

Photo 11. Solids handling area. Drains return storm water flow to the headworks.

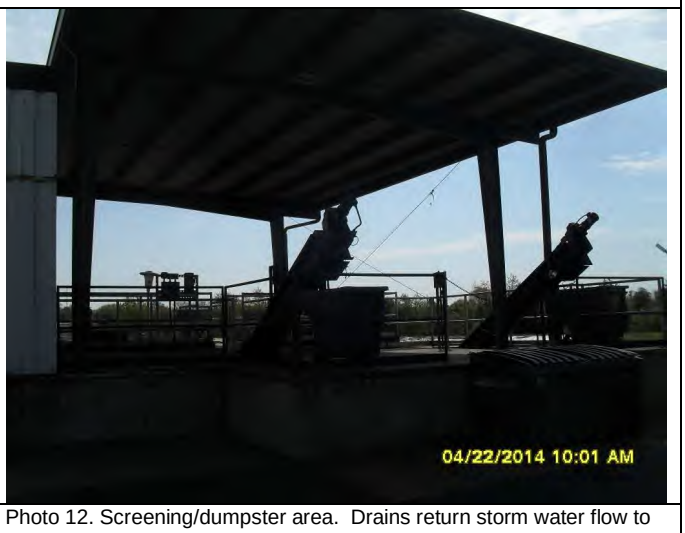


Photo 12. Screening/dumpster area. Drains return storm water flow to the headworks.

Attachment 3 – Facility Diagram

Attachment 2

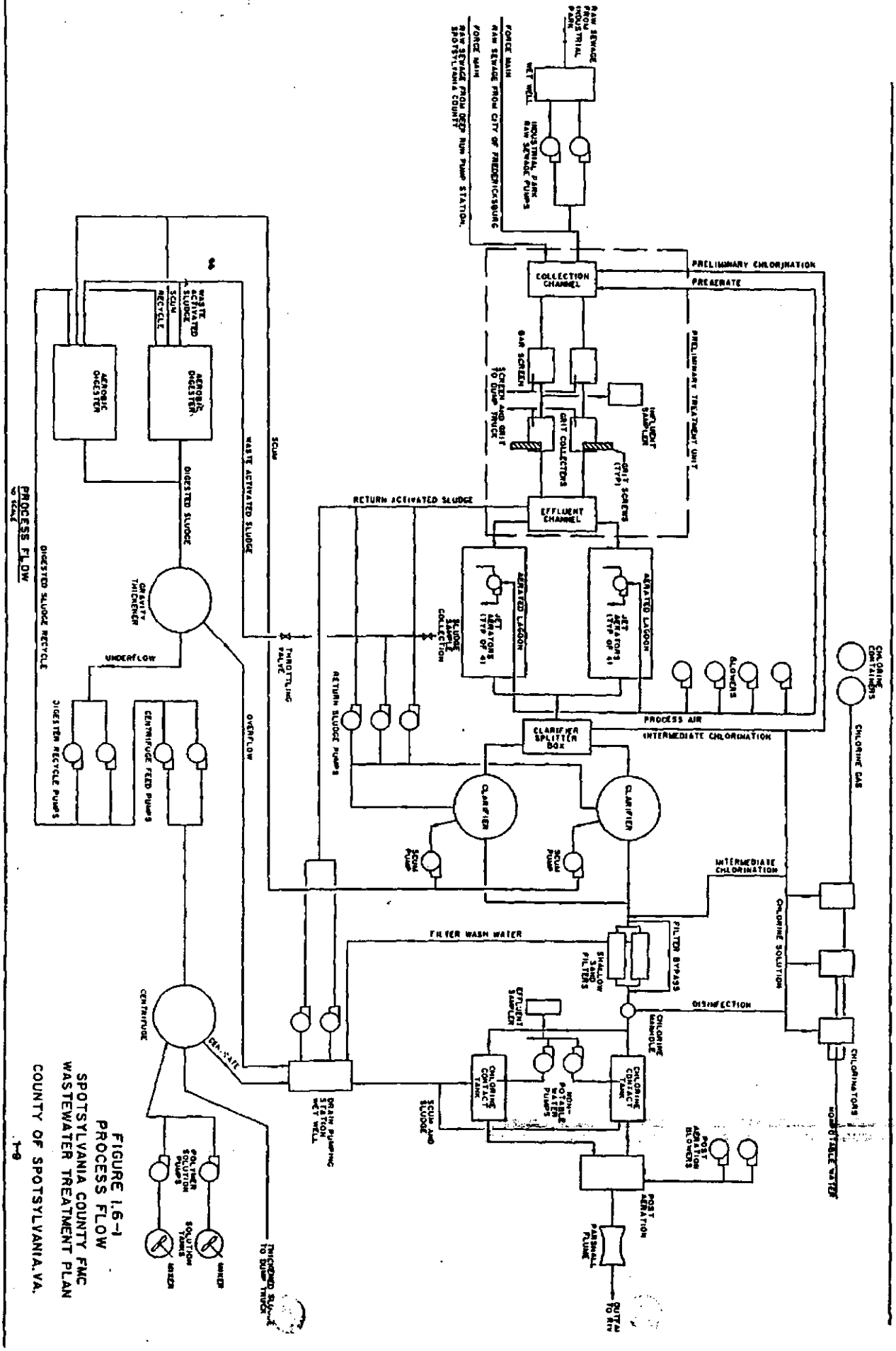
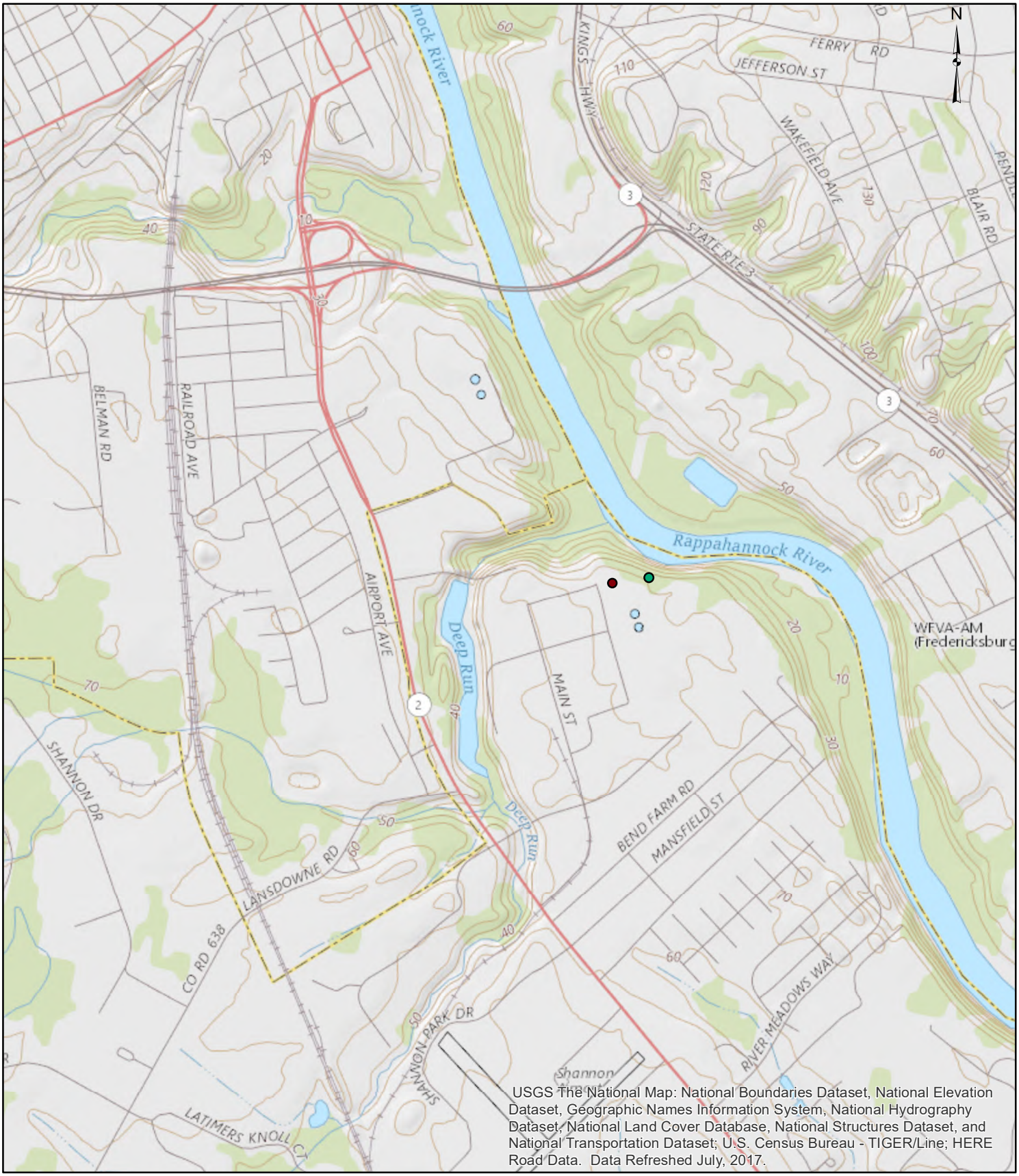


FIGURE 1.6-1
PROCESS FLOW
SPOTSYLVANIA COUNTY FMC
WASTEWATER TREATMENT PLAN
COUNTY OF SPOTSYLVANIA, VA.

Attachment 4 – Topographic Map

FMC Wastewater Treatment Plant



Legend

- VA0068110 FMC Outfall 001
- VA0068110 FMC WWTP

Attachment 5 – Technical Inspection Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

November 27, 2017

Mr. Doug Crooks
Director of Wastewater Treatment Division
Spotsylvania County
600 Hudgins Road
Fredericksburg, VA 22408

Re: FMC Wastewater Treatment Facility, Permit VA0068110

Dear Mr. Crooks:

Attached is a copy of the Inspection Report generated while conducting a Focused Technical/Laboratory inspection at the subject facility on November 9, 2017. This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 et seq. (APA).

Please review the enclosed report and submit in writing adequate documentation of all measures taken (Including all necessary supporting documentation) to address the Request for Corrective Action Section no later than December 22, 2017. Included in this response should be a plan of action and timetable for resolving this compliance issue, if it has not already been addressed. Should you choose to respond, your response may be sent either via the US Postal Service or electronically, via e-mail. DEQ recommends sending electronic responses as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm 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) 583-3905 or by e-mail at Amy.dooley@deq.virginia.gov.

Sincerely,

Amy E. Dooley
Environmental Specialist II

cc: Permits / DMR File; Compliance Manager; Compliance Auditor - DEQ

DEQ

WASTEWATER FACILITY INSPECTION REPORT

PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0068110	**December 18, 2012**		**December 17, 2017**

Facility Name	Address	Telephone Number
FMC Wastewater Treatment Facility	**11801 Capital Lane, Fredericksburg, VA 22408**	**540-507-7362**
Owner Name	Address	Telephone Number
Spotsylvania County	**600 Hudgins Road, Fredericksburg, VA 22408**	**540-507-7490**
Responsible Official	Title	Telephone Number
Doug Crooks	**Division Director Wastewater**	**540-507-7490**
Responsible Operator	Operator Cert. Class/number	Telephone Number
Robert Fessler	**Class I / 965007996**	**540-507-7362**

TYPE OF FACILITY:

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

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**4.0 MGD**
Population Served	**~25, 333**
Connections Served	**~10,133**

EFFLUENT LIMITS: (Units mg/L unless otherwise noted.)

Parameter	Min.	Monthly/Weekly Avg.	Max.	Parameter	Min.	Monthly/Weekly Avg.	Max.
pH (S.U.)	**6.0**		**9.0**	**Total Suspended Solids**		**15 / 23**	
$cBOD_5$		**15 / 23**		**Dissolved Oxygen**	**6.0**		
TKN (May – Oct)		**3.0 / 5.0**		**E. coli (n/100mL)**		**126**	
TRC (after dechlorination)		**0.016 / 0.019**		**TRC (after contact tank)**	**1.0**		
Total Recoverable Zinc (µg/ml)		**130 / 130**		**Total Phosphorus**		**2.0**	

Receiving Stream	**Rappahannock River**
Basin	**Rappahannock River**
Discharge Point (LONG)	**77° 26’ 42” W**
Discharge Point (LAT)	**38° 16’ 55” N**

Virginia Department of Environmental Quality

FOCUSED CEI TECH/LAB INSPECTION REPORT

FACILITY NAME: FMC Wastewater Treatment Facility (WWTF)		**INSPECTION DATE:**	November 9, 2017
		INSPECTOR	Amy Dooley
PERMIT No.: VA0068110		**REPORT DATE:**	November 21, 2017
TYPE OF FACILITY: ☑Municipal ☑Major; ☐ Industrial ☐Minor; ☐ Federal ☐ Small Minor; ☐ HP ☐ LP		**TIME OF INSPECTION:**	1125 Arrival; 1425 Departure
		TOTAL TIME SPENT	24hrs.
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☑ Yes ☐ No
REVIEWED BY / Date: Earl L. Stafford 11/26/17			
PRESENT DURING INSPECTION: Corey Matus			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments:	☐ Yes ☑ No ☐ NA
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments: **O&M Manual appears to be outdated. Example: Outdated staff and permit indicates a date of October 4, 2001 and October 4, 2006. See Request for Corrective Action.**	☐ Yes ☑ No ☐ NA
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments: **Class I: 4, Class II: 1, Class III: 0, Trainee: 2**	☑ Yes ☐ No ☐ NA
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments: **Plant is operated 24 hours a day/7 days a week utilizing 3 shifts per 24 hour period.**	☑ Yes ☐ No ☐ NA
5. Is there an established and adequate program for training personnel? Comments:	☑ Yes ☐ No ☐ NA
6. Are preventive maintenance task schedules being met? Comments: **Maintenance conducted by maintenance department.**	☑ Yes ☐ No ☐ NA
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No ☐ NA
8. Have there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No ☐ NA
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments: **Exercised monthly under full load.**	☑ Yes ☐ No ☐ NA
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No ☐ NA

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TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments: **Composted at Livingston Landfill to produce Class A EQ marketable product.**	☑ Yes ☐ No ☐ NA
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No ☐ NA
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No ☐ NA

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

☑ Operational logs ☑ Instrument maintenance & calibration

☐ Mechanical equipment maintenance ☑ Industrial waste contribution (Municipal facilities)

Comments: **Most of maintenance records are kept by the maintenance department.**

15. What does the operational log contain?

☑ Visual observations ☐ Flow measurement ☐ Laboratory results ☑ Process adjustments

☐ Control calculations ☑ Other (specify):

Comments: **Minor mechanical maintenance may be included in the log book. Ex: Changing hypochlorite tubes. The facility has log sheets with various process control and water compliance measurements (pH and DO).**

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☑ Manufacturer's 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: **The records are part of the facility's pretreatment program.**

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: **Most maintenance records are kept by the maintenance department.**

20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

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UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	PROBLEMS*	COMMENTS
Screening/Comminution		*Mechanical bar screens that drop rags into a bin for disposal.*
Grit Removal		*Two grit channels following the mechanical bar screens. Mechanical scrapers push grit from the bottom of the chamber into a conveyance system and into a bin for disposal.*
Ponds/Lagoons/Activated Sludge	**1**	*Two lagoons out of three were in service. Thick dark brown/black foam blanket and vegetation observed growing on anoxic zone and lagoon liner.*
Secondary Sedimentation	**1**	*Solids observed between baffle and weir and in launder.*
Filtration		*Two sand filters.*
Chlorination		*Sodium hypochlorite utilized for disinfection. Small amount of foam was evident on water surface.*
Dechlorination		*Sodium bisulfite utilized for dechlorination.*
Flow Measurements		*Flow meter was last calibrated October 26, 2017.*
Post Aeration	**1**	*Conducted in the dechlorination zone. Compliance sampling is conducted adjacent to the Parshall flume. Growth was observed in sample tubing.*
Plant Outfall		*Submerged in Rappahannock River.*

***** 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)

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

Bar Screens and Grit Chambers:
Influent flows into the plant and through one of two mechanical bar screens and grit chambers. Screenings and grit are disposed of in dumpsters, which are disposed of daily. At the time of inspection, the facility was utilizing lamps attached to the grit/screen shoots in order to impede freezing of the grit/screenings. (Photos 1 and 2)

Lagoon/Activated Sludge Process:
Post the grit chambers, the influent mixes with the return activated sludge (RAS) from the clarifiers and flows into the first of a three step activated sludge process, which is carried out through a sequential lagoon system. The first lagoon is divided into two zones, one anoxic and one aerobic. A thick foam layer with vegetation was observed on the anoxic portion of the pond. The influent flows into the anoxic zone and then into the aerobic zone of the first lagoon, then into one of the two aerobic lagoons. One of the two aerobic lagoons was down during the inspection due to maintenance (liner replacement). Vegetation was noted on lagoon liner. (Photos 3 - 5) **See Request for Corrective Action.**

Clarifiers:
Both clarifiers were online at time of inspection. Scum was evident on the water surface. Solids (floc) were observed between the baffle and weirs and within the launders of both clarifiers. The operator onsite indicated that the clarifiers are cleaned on an as needed basis. Sodium hypochlorite is added to the clarifiers in order to inhibit algae growth. A large amount of filter flies were observed around the clarifier at time of inspection. (Photos 6 and 7) **See Request for Corrective Action.**

Sand Filters:
Both sand filters were online at time of inspection. Automatic backwash is initiated due to loss of head pressure but can also be manually initiated. (Photo 8)

Chlorination/Dechlorination:
The clarifier effluent flows through a chlorine contact tank where sodium hypochlorite is added for disinfection. Treated effluent then cascades over into the dechlorination zone where sodium bisulfite is used to dechlorinate the treated effluent. (Photo 9)

Post Aeration/Outfall:
The dechlorination zone is equipped with aerators to increase the dissolved oxygen. The treated effluent flows through a Parshall flume and to the outfall discharge pipe. Water compliance sampling point is located adjacent to the flume. Growth was observed in the composite sample tubing. (Photos 10) **See Request for Corrective Action.**

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LABORATORY INSPECTION

PRESENT DURING INSPECTION: Corey Matus

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 2015, May 2016, and July 2017**	☑ 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):	☑ Yes ☐ No
7.	Are annual thermometer calibration(s) adequate?	☑ Yes ☐ No

Lab Name:	Parameters:
Spotsylvania County Laboratory Services **10900 HCC Drive** **Fredericksburg, VA 22408**	***E.coli*, TSS, $cBOD_5$, TKN, TP, Zinc, Copper**

8. Parameters evaluated during this inspection (attach checklists):
   ☑ pH
   ☐ Temperature
   ☑ Total Residual Chlorine
   ☑ Dissolved Oxygen

Comments:

VA DEQ Focused CEI Tech/Lab Inspection Report

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EFFLUENT FIELD DATA
(as taken by operator at time of inspection)

Flow	2.98 MGD	**Dissolved Oxygen**	8.84 mg/L	**TRC (Contact Tank)**	3.06 mg/L (1x dilution)
pH	7.06 S.U.	**Temperature**	16.2 ˚C	**TRC (Final Effluent)**	0.01 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: **Outfall 001 is submerged in the Rappahannock River.**

REQUEST for CORRECTIVE ACTION:

1. Permit Condition Part I.E.3. states: "The permittee shall maintain a current O&M Manual for the treatment works…The O&M Manual shall detain the practices and procedures which will be followed to ensure compliance with the requirements of this permit…." *During the inspection, it appeared that the O&M manual was outdated and did not reflect the current permit.* **Provide to DEQ by December 22, 2017, a narrative that includes a timeline on how the permittee will address/resolve this issue.**

2. Permit Condition Part II.A.2. states: "Monitoring shall be conducted according to procedures approved under Title 40 Code of Federal Regulations Part 136 or alternative methods approved by the U.S. Environmental Protection Agency, unless other procedures have been specified in this permit." *During the inspection, the Initial Demonstration of Capability (IDC) for Mr. Fessler indicated a Lomotte pH meter rather than the currently used pH meter utilized for water compliance sampling, which is an Acorn pH meter. Neither the DO IDC for Jesse Rhine nor any of the IDCs for Cody Matus indicate a meter in which the IDC was performed.* **Provide to DEQ by December 22, 2017, a narrative that includes a timeline on how the permittee will address/resolve these issues and prevent future occurrences.**

3. Permit Condition Part II.Q. states: "Proper operation and maintenance. The permittee shall at all times property operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit...to achieve compliance with the conditions of this permit." *During the inspection, it appeared that there was a thick dark brown/grey foam layer with vegetation on the anoxic zone of the first lagoon; solids accumulated between the clarifier baffle and weir and within the launder in both clarifiers; and growth in the composite sample tubing.* **Provide to DEQ by December 22, 2017, a narrative that includes a timeline on how the permittee will address/resolve these issues and prevent future occurrences.**

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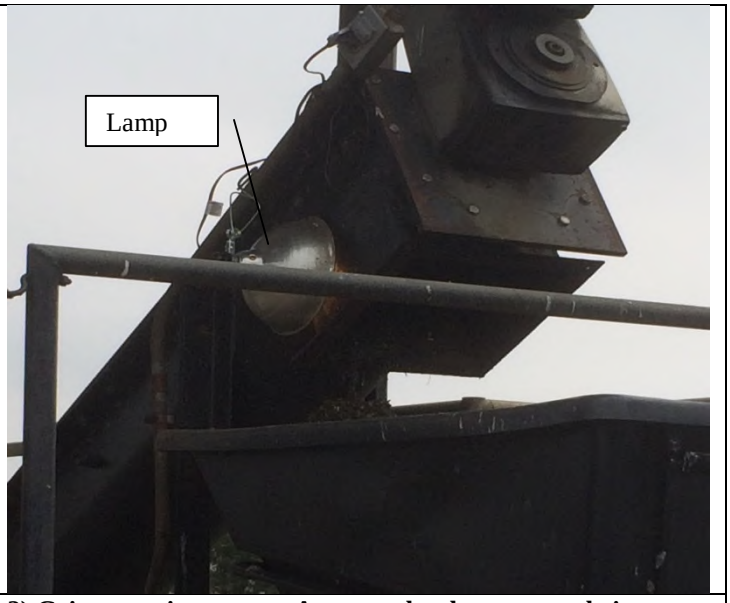
NOTES and COMMENTS:

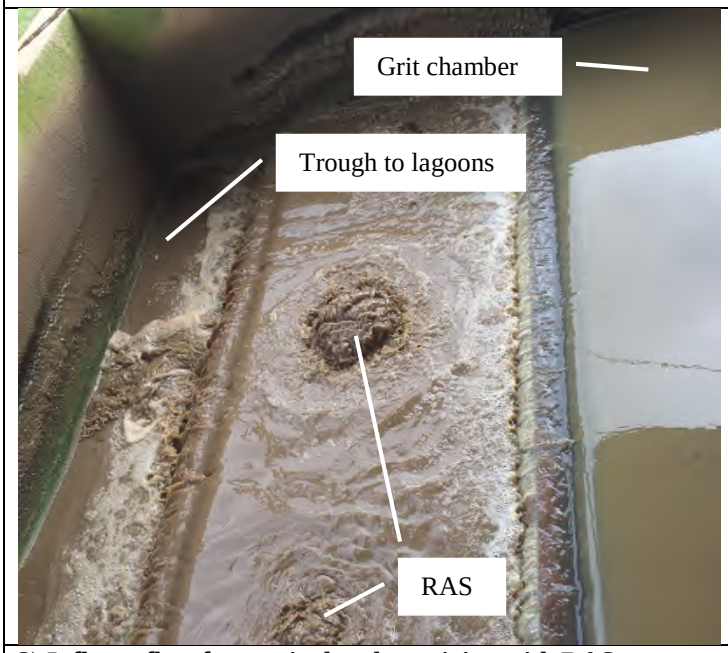
1. The lab sheet indicates a Spec√ ™ lot number/expiration date of A7139/ May 2022 but Spec√ ™ used during the inspection and that day's Spec√ ™ was Lot A6180/ June 2018. The facility may wish to update the lab sheet or utilize the annotated Spec√ ™ lot on the lab sheet.

2. Based on the review of the facility spreadsheet and Certificate of Analysis (CoA) for October 2017, it appears that some transposition of numbers may have occurred. For example, the facility spreadsheet submitted as an attachment in eDMR has a lab result of 1.08 mg/L for TKN on October 21, 2017 and the Quantity or Loading Monthly Average of 25.17 kg/D for $cBOD_5$. However, the CoA reports 1.04 mg/L for TKN and the DMR indicates 25.15 kg/D for $cBOD_5$ respectively.

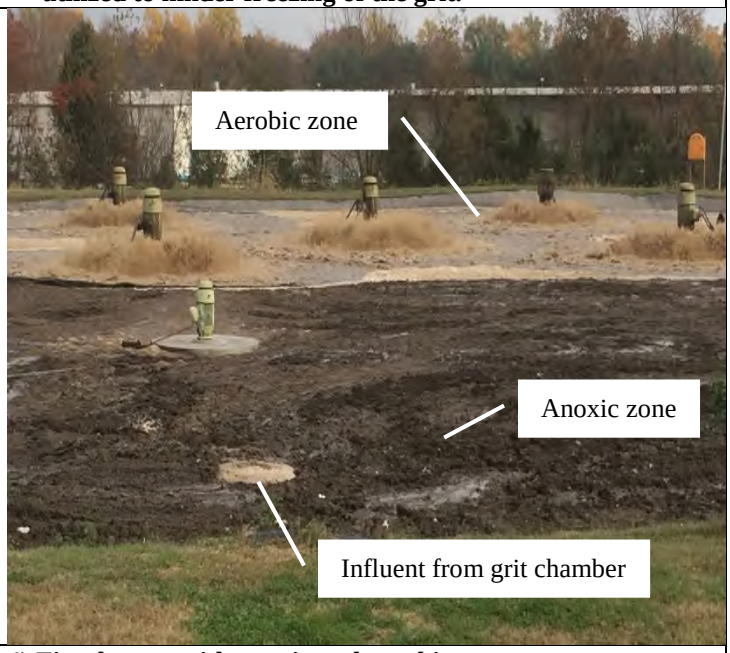
1) Mechanical bar screen.



2) Grit augur into carts. Appears that lamps were being utilized to hinder freezing of the grit.



3) Influent flow from grit chamber mixing with RAS.



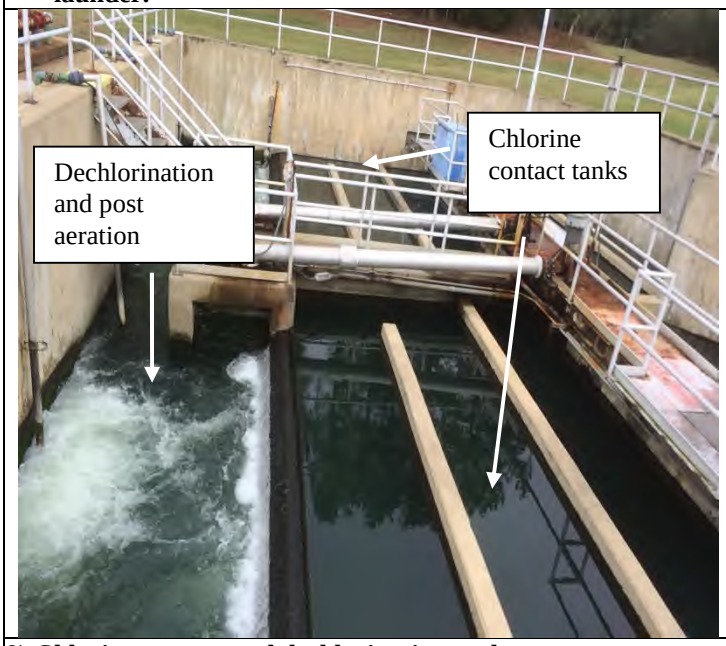
4) First lagoon with anoxic and aerobic zones.

5) Vegetation growing on lagoon liner.

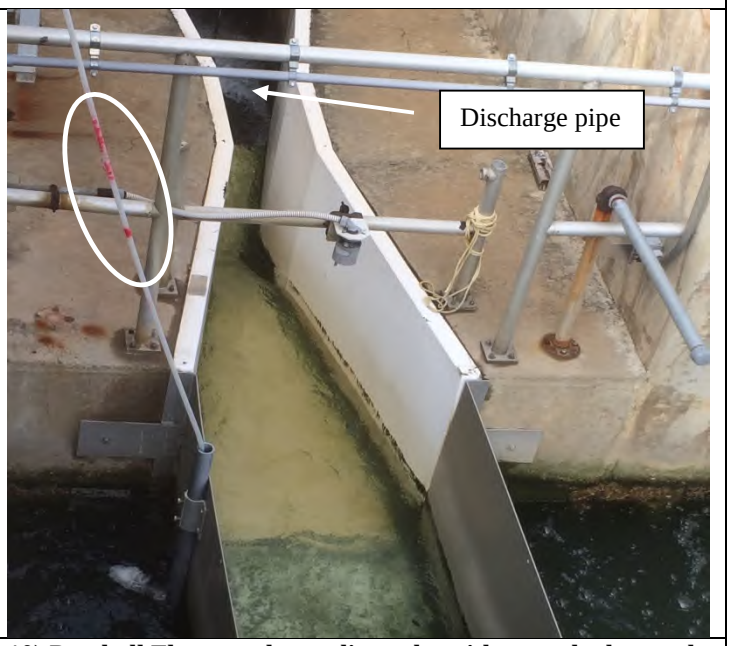
6) Solids observed between clarifier baffle and weirs.

7) Solids observed between clarifier baffle and weirs and in launder.

8) Filters.



9) Chlorine contact and dechlorination tanks.



10) Parshall Flume and sampling tube with growth observed.

ANALYST:	**Corey Matus**	VPDES NO	**VA0068110**

Meter: **Oakton Acorn pH6**

Parameter: Hydrogen Ion (pH)
Method: Electrometric
3/2015

METHOD OF ANALYSIS:

☑	21st Edition of Standard Methods (SM 21) – 4500-H^+ B-2000 (SM 21 pH)
☐	22nd Edition of Standard Methods (SM 22), or Online Editions of Standard Methods – 4500-H^+ B-2011 (SM 22 pH)

	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 this analysis? **NOTE**: Analyze 4 samples of known pH; you may use an external source of buffers or other known standards (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.2 SU of the known concentration of the sample or within "Acceptable Range" specified by the PT provider. [SM 1020 B.1] **NOTE: The same pH buffer [values] used for calibration of the instrument can be used as LCS if from a different source or different lot.**	☑	☐
2)	**IF** a replicate sample is analyzed is there a written procedure for which result will be reported on DMR (Sample or Replicate) and is this procedure being followed? [DEQ – based on EPA Good Laboratory Practices Standards]	**NA**	
3)	Is a Laboratory Control Sample (LCS) tested at least annually and are results within acceptance criteria? [SM 21 B.2 or SM 22 1020 B.3.] **NOTE:** LCS should be a purchased Proficiency Test (PT) sample or a different buffer other than ones used for calibration of the meter [with a ±0.2 SU acceptance range or within "Acceptable Range" specified by the PT provider].. **NOTE: The same pH buffer [values] used for calibration of the instrument can be used as LCS if from a different source or different lot.**	☑	☐
4)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [SM 21 pH or SM 22 pH 2.b./c. and 5.b.]	☑	☐
5)	Is electrode storage solution in accordance with manufacturer's instructions? [SM 21 pH or SM 22 pH 4.a. and Mfr.]	☑	☐
6)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [SM 21 pH or SM 22 pH 4.a.] **NOTE**: Start with Buffer 7 unless manufacturer's instructions state otherwise. [**NOTE:** If meter is not capable of 3 buffer calibration use 2 buffers bracketing the expected sample pH and then measure a 3rd buffer (the measurement value recorded must be ±0.1 SU), and then reread and record value of buffer 7 to ensure ±0.1 SU.]	☑	☐
7)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Verification measurement should be within +/- 0.1 SU. [SM 21 1020 B 10.c. or SM 22 1020 B 11.c.]	☑	☐
8)	Is calibration verification measurement repeated with every 10 samples and at the end of a series of samples? Verification measurement should be within +/- 0.1 SU. [SM 21 pH or SM 22 pH 4020 B 2.b.] **NOTE:** Not applicable if pH meter is calibrated before taking any measurement (e.g., if operator monitors daily pH at more than one facility and calibrates before each measurement).	**NA**	
9)	Do the buffer solutions appear to be free of contamination or growths? [SM 21 pH or SM 22 pH 3.a.]	☐	☑
10)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [SM 21 pH or SM 22 pH 3.a.]	☑	☐

11)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	☑	☐
12)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	☑	☐
13)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [SM 21 pH or SM 22 pH 4.a and 4.b]	☑	☐
14)	Is the sample stirred gently at a constant speed during measurement? [SM 21 pH or SM 22 pH 4.b.]	☑	☐
15)	Does the meter hold a steady reading after reaching equilibrium? [4.b.]	☑	☐

PROBLEMS/COMMENTS:

9) Floating debris was noted in storage solution and in buffers. Operator indicated that the solutions will be changed after the inspection.

12) Conducted at facility on a bench top pH meter.

ANALYST:	**Corey Matus**	VPDES NO.	**VA0068110**

Meter: **Pocket Cholorimeter II**

Parameter: Total Residual Chlorine (TRC)
Method: DPD Colorimetric
(HACH Pocket and Pocket II Colorimeter)
11/2014

METHOD OF ANALYSIS:

☑	HACH Manufacturer's Instructions (Method 8167) plus an edition of *Standard Methods*
☑	21st Edition of *Standard Methods* 4500-Cl G-2000 (SM 21 Cl)
☐	22nd Edition of *Standard Methods* 4500-Cl G-2011 (SM 22 Cl)

		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√ ™. Acceptance range is 70-130% recovery **and** 20% Relative Standard Deviation (RSD) **or** within PT specified acceptance range **and** 20% RSD. [SM 1020 B.1]	☑	☐
2)	Is calibration curve verification checked daily using a high and a low standard? **NOTE:** May use manufacturer's installed calibration and commercially available chlorine standards, or Spec√ ™, for daily calibration verifications. [SM 21 1020]	**Spec√ ™ conducted every shift.**	
3)	**IF** a replicate sample is analyzed is there a written procedure for which result will be reported on DMR (Sample or Replicate) and is this procedure being followed? [DEQ – based on EPA Good Laboratory Practices Standards]	**NA**	
4)	Is a Laboratory Control Sample (LCS) tested at least annually and are results within acceptance criteria? [SM 21 B. 2. or SM 22 1020 B 3.] **NOTE:** LCS should be a purchased Proficiency Test (PT) sample or if a known standard different from the calibration standards is used. Use the PT acceptance criteria when given or use 70-130% recovery **and** 20% Relative Standard Deviation (RSD) as the acceptance criteria.	☑	☐
5)	Are the DPD Powder Pillows stored in a cool, dry place? [Mfr.]	☑	☐
6)	Are the pillows within the manufacturer's expiration date? [Mfr.]	☑	☐
7	Are pillows appropriate for the sample size being analyzed and for Total Residual Chlorine	☑	☐
8)	Has buffering capability of DPD pillows been checked annually? (Pillows should adjust sample pH to between 6 and 7) [Mfr.]	☑	☐
9)	When pH adjustment is required, is H_2SO_4 or NaOH used? [Hach 11.3.1]	☑	☐
10)	Are cells clean and in good condition? [Mfr]	☑	☐
11)	Is the Hach colorimeter program set to measure "TRC, mg/L"? [Mfr.]	☑	☐
12)	Is the low range (0.01 mg/L resolution) used for samples containing residuals from 0.1 mg/L - 2.00 mg/L? [Mfr.]	☑	☐
13)	Is the 10-mL cell (2.5-cm diameter) used for samples from 0-2.00 mg/L? [Mfr.]	☑	☐
14)	Are samples analyzed within 15 minutes of collection? [40 CFR Part 136]	☑	☐
15)	Is meter zeroed correctly using sample for the blank analysis? [Mfr. and SM 21 1020 B.4. or SM 22 1020 B.5.]]	☑	☐

16)	Is the instrument light screen placed correctly on the meter body when the meter is zeroed and when the sample is analyzed? [Mfr.]	☑	☐
17)	Is the DPD Total Chlorine Powder Pillow mixed into the sample? [Hach 11.1]	☑	☐
18)	Is the analysis made at least three minutes but not more than six minutes after Powder Pillow addition? [Hach 11.2]	☑	☐
19)	If read-out exceeds "2.19 mg/L", is the original sample diluted correctly, and then reanalyzed within 15 minutes of the original collection time? [Hach 1.2 & 2.0]	☑	☐

PROBLEMS/COMMENTS:

None

ANALYST:	**Corey Matus**	VPDES NO	**VA0068110**

Meter: **YSI 55**

Parameter: Dissolved Oxygen
Method: Membrane Electrode
11/2014

METHOD OF ANALYSIS:

☑	21st Edition of Standard Methods (SM 21) – 4500-O G-2001 (SM 21 DO)
☐	22nd of Standard Methods, or Online Editions of Standard Methods (SM 22) – 4500-O G-2011 (SM 22 DO)

Dissolved Oxygen (D.O.) 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 this analysis? **NOTE**: Analyze 4 samples of air-saturated water. Recovery for each of the 4 samples must be +/- 4% of the calculated oxygen saturation for the altitude/barometric pressure and temperature of the samples. {Alternatively analyze 4 samples of water of known concentration (verified by iodometric titration procedure SM 21 or SM 22 4500-O C). Instrument measurements must agree within +/-0.1 mg/L of verified concentration.} [SM 21 or SM 22 1020 B.1 and 4020 B.1]	☑	☐
2)	Are calibration results (mg/L) within ± 4% of the barometric (or altitude) corrected oxygen saturated water value? [SM 21 B.2 or SM 22 1020 B.2.]	☑	☐
3)	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? [SM 21 DO or SM 22 B 3.]	**In Situ**	
4)	Are meter and electrode operable and providing consistent readings? [SM 21 DO G 2. or SM 22 DO G 2.]	☑	☐
5)	Is membrane in good condition without trapped air bubbles? **NOTE: No air bubbles ≥ 1/8 inch (total area of all bubbles).** [SM 21 DO G 3.b. or SM 22 DO G 3.b.]	☑	☐
6)	Is correct filling solution used in electrode? [Mfr.]	☑	☐
7	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	☑	☐
8)	Is meter calibrated before use or at least daily? [Mfr. & SM 21 1020 B 10.a. or SM 22 1020 B 11.a]	**Every shift, 3 shifts daily**	
9)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	☑	☐
10)	Is sample stirred during analysis (or is there sufficient flow across probe's membrane surface)? [SM 21 DO or SM 22 DO G 3.b. and Mfr.]	**In Situ**	
11)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	☑	☐
12)	Is meter stabilized before reading D.O.? [Mfr.]	☑	☐
13)	Is electrode stored according to manufacturer's instructions? [Mfr.]	☑	☐

PROBLEMS/COMMENTS:

None

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

11/2014

FACILITY NAME:	FMC Wastewater Treatment Plant	**PERMIT NO:**	VA0068110	**DATE:**	November 9, 2017

EQUIPMENT	**Preservation Range**	**In Range?**		**Inspector Reading**	**Checked & Logged Daily?**		**Correct Increment?**		**ANNUAL THERMOMETER VERIFICATION**				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?				Yes/No **Yes**
									DATE CHECKED	**MARKED**		**OFFSET VALUE[1] (Correction)**	**INSPECT TEMP**
		Yes	No	°C	Yes	No	Yes	No		Yes	No	°C	°C
SAMPLE REFRIGERATOR	1-6° C	☑	☐	**4.5**	☑	☐	☑	☐	**9-12-17**	☑	☐	**+0.2**	**3.9**
AUTO SAMPLER	1-6° C	☑	☐	**4.3**	☑	☐	☑	☐	**7-20-17**	☑	☐	**-0.3**	**4.0**
pH METER	± 1° C	☑	☐						**9-11-17**	☑	☐	**0**	**23.2**
D.O. METER	± 1° C	☑	☐						**9-11-17**	☑	☐	**0**	**23.3**

PROBLEMS/COMMENTS:
None

[1] Offset Value tolerances (reference **NIST 105-6**): Sampling Refrigerator and Auto Sampler, pH and D.O. meters must be within ±2°C (2 times tolerance value). Thermometers measuring Outfall permit compliance must be within ±1.0°C (2 times tolerance value).

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET
Revised 02/2015 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**FMC Wastewater Treatment Plant**	VPDES NO	**VA0068110**	DATE:	**November 9, 2017**

HOLDING TIMES *[Note: Collection period (for composites) and Sample Collection time (end of collection period) must be recorded on the COC.]*						**SAMPLE CONTAINER**				**PRESERVATION** *[Note: Preservation is to occur within 15 minutes of the end of the collection period.]*				
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.	☑	☐	☑	☐	☑	☐	☑	☐	Within 15 minutes				
CHLORINE	15 MIN.	☑	☐	☑	☐	☑	☐	☑	☐	Within 15 minutes				
DISSOLVED 0_2	15 MIN	**Conducted in situ**								Within 15 minutes				
BOD5 & CBOD5	48 HOURS									$\leq 6^o$ C	☑	☐	☑	☐
TSS	7 DAYS									$\leq 6^o$ C	☑	☐	☑	☐
FECAL COLIFORM / *E. coli* / *Enterococci*	8 HRS									$<10^o$ C+0.008% $Na_2S_2O_3$	☑	☐	☑	☐
TKN	28 DAYS									DECHLOR $\leq 6^o$ C+H_2S0_4 pH<2	☑	☐	☑	☐
NITRATE+NITRITE	28 DAYS									$\leq 6^o$ C+H_2S0_4 pH<2	☑	☐	☑	☐
TOTAL PHOS.	28 DAYS									$\leq 6^o$ C+H_2S0_4 pH<2	☑	☐	☑	☐

PROBLEMS: **None**

Holding Times and Preservation References (VELAP except for Field Tests)

Attachment 6 – Planning Statement

To: Caitlin Shipman
From: Rebecca Shoemaker

Date: May 3, 2018
Subject: Planning Statement for FMC WWTP
Permit Number: VA0068110

Information for Outfall 001:

Discharge Type: Municipal
Discharge Flow: 4.0 MGD
Receiving Stream: Rappahannock River
Latitude / Longitude: 38° 16' 55" / 77° 26' 42"
Rivermile: 107.43
Streamcode: 3-RPP
Waterbody: VAN-E20E
6th Order HUC: RA46
Water Quality Standards: Class II, Section 1, sp. stds. a
Drainage Area: 1638.26 mi^2

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 an upstream segment of the tidal freshwater Rappahannock River. The nearest DEQ ambient monitoring station is 3-RPP106.01, located upstream from the Fredericksburg Country Club, approximately 1.42 miles downstream from Outfall 001. The following is the water quality summary for this segment of the Rappahannock River, as taken from the 2016 Integrated Report:

Class II, Section 1, special stds. a.

DEQ monitoring stations located in this segment of the Rappahannock River:

- *ambient monitoring station 3-RPP104.47, two hundred yards below the Massaponax Wastewater Treatment Facility*
- *ambient trend/Bay monitoring station 3-RPP106.01, located upstream from the Fredericksburg Country Club*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, excursions above the risk-based tissue screening value (TSV) of 270 parts per billion (ppb) for arsenic (As) in fish tissue was recorded in one species of fish (1 sample) collected in 2006 at fish tissue monitoring station 3-RPP107.33 (striped bass), noted by an observed effect.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for this portion of the Rappahannock River was approved by EPA on 05/05/2008. The wildlife use is considered fully supporting.

The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicate that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous

dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.

Note: The aquatic life use assessment described above includes assessment for Chesapeake Bay-specific criteria for the Tidal Freshwater Rappahannock segment RPPTF. In the 2016IR, the aquatic life use was delisted for a dissolved oxygen impairment based on Bay assessment of thirty-day mean dissolved oxygen values for the open-water aquatic life sub-use. Subsequent available information regarding Chesapeake Bay segment RPPTF indicates that the aquatic life use will be considered impaired in the 2018IR for the dissolved oxygen parameter for the open-water aquatic life sub-use.

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	Year first Listed as Impaired	TMDL completed	WLA	Basis for WLA
Impairment Information in the 2016 Integrated Report						
Rappahannock River (Tidal Freshwater)	Recreation	*E. coli*	2002	Tidal Freshwater Rappahannock River Bacteria TMDL 5/5/2008	6.95E+12 cfu/year *E. coli**	126 cfu/100 ml *E. coli* --- 4.0 MGD
	Fish Consumption	PCBs in Fish Tissue	2004	No	---	---

*In the Tidal Freshwater Rappahannock Bacteria TMDL report, this facility was assigned a WLA of 9.39E+12 cfu/year based on a design flow of 5.4 MGD. In 2012, the design flow decreased to 4.0 MGD. The net 1.4 MGD change in design flow (and associated WLA of 2.44E+12 cfu/year) was transferred to Massaponax WWTP (VA0025658). If this facility is decommissioned during the current permit cycle, its WLA will be transferred to Massaponax WWTP (VA0025658) and the total WLA for that permit will be adjusted accordingly.

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

No.

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

There is a completed downstream TMDL for the Chesapeake Bay, but the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement. However, this facility is accounted for in the Chesapeake Bay TMDL (Appendix Q). It has individual WLAs based on edge of stream loads for total nitrogen (65,784 lbs/yr), total phosphorus (4,934 lbs/yr), and total suspended solids (493,380.72 lbs/yr).

The tidal Rappahannock River is listed with a fish consumption use impairment for PCBs in fish tissue; a TMDL has not been developed to address this impairment. This facility conducted PCBs monitoring during the last permit cycle, and any additional requirements related to PCBs will be outlined in the permit.

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

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

Attachment 7 – Dissolved Oxygen Criteria for Class II Waters

Dissolved Oxygen Criteria (9VAC25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1,2]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean >3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

[1]See subsection aa of 9VAC25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

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

Attachment 8 – Water Quality Criteria / Wasteload Allocation Analysis

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: FMC WWTP Permit No.: VA0068110

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

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	50	mg/L	1Q10 (Annual) =	1	MGD	Annual - 1Q10 Mix =	100	%	Mean Hardness (as CaCO3) =	50	mg/L
90% Temperature (Annual) =	28.66	deg C	7Q10 (Annual) =	1	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	25	deg C
90% Temperature (Wet season) =	19.06	deg C	30Q10 (Annual) =	1	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =	15	deg C
90% Maximum pH =	8.99	SU	1Q10 (Wet season) =	1	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	7.1	SU
10% Maximum pH =	6.98	SU	30Q10 (Wet season)	1	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =	6.7	SU
Tier Designation (1 or 2) =	1		30Q5 =	1	MGD				Discharge Flow =	1	MGD
Public Water Supply (PWS) Y/N? =	n		Harmonic Mean =	1	MGD						
Trout Present Y/N? =	n										
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+01**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+00**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	**6.0E+00**	**--**	**na**	**1.0E-03**
Ammonia-N (mg/l) (Yearly)	0	2.31E+01	2.15E+00	na	--	4.62E+01	4.30E+00	na	--	--	--	--	--	--	--	--	--	**4.62E+01**	**4.30E+00**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	2.31E+01	4.04E+00	na	--	4.62E+01	8.08E+00	na	--	--	--	--	--	--	--	--	--	**4.62E+01**	**8.08E+00**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+04**
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+03**
Arsenic	o	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	**6.8E+02**	**3.0E+02**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+03**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E-03**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E+01**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+03**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.8E+03**
Cadmium	0	1.8E+00	6.6E-01	na	--	3.6E+00	1.3E+00	na	--	--	--	--	--	--	--	--	--	**3.6E+00**	**1.3E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	**4.8E+00**	**8.6E-03**	**na**	**1.6E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	**1.7E+06**	**4.6E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	**3.8E+01**	**2.2E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	**1.7E-01**	**8.2E-02**	**na**	**--**
Chromium III	0	3.2E+02	4.2E+01	na	--	6.5E+02	8.4E+01	na	--	--	--	--	--	--	--	--	--	**6.5E+02**	**8.4E+01**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	**3.2E+01**	**2.2E+01**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-02**
Copper	0	7.0E+00	5.0E+00	na	--	1.4E+01	9.9E+00	na	--	--	--	--	--	--	--	--	--	**1.4E+01**	**9.9E+00**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	**4.4E+01**	**1.0E+01**	**na**	**3.2E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E-03**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	**2.2E+00**	**2.0E-03**	**na**	**4.4E-03**
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	**3.4E-01**	**3.4E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.8E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.6E-01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+02**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.4E+02**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+02**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	**4.8E-01**	**1.1E-01**	**na**	**1.1E-03**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.8E+04**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.0E+03**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.6E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.8E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**na**	**1.8E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**na**	**1.8E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	**4.4E-01**	**1.1E-01**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	**1.7E-01**	**7.2E-02**	**na**	**1.2E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E-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	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**na**	**1.6E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	**1.0E+00**	**7.6E-03**	**na**	**7.8E-04**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E-03**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.8E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	**1.9E+00**	**--**	**na**	**3.6E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**4.0E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	4.9E+01	5.6E+00	na	--	9.8E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**9.8E+01**	**1.1E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	2.8E+00	1.5E+00	- -	- -	--	--	--	--	--	--	--	--	**2.8E+00**	**1.5E+00**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**6.0E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	0	1.0E+02	1.1E+01	na	4.6E+03	2.0E+02	2.3E+01	na	9.2E+03	--	--	--	--	--	--	--	--	**2.0E+02**	**2.3E+01**	**na**	**9.2E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	**5.6E+01**	**1.3E+01**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	**1.3E-01**	**2.6E-02**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	**--**	**2.8E-02**	**na**	**1.3E-03**
Pentachlorophenol [C]	0	7.3E+00	5.6E+00	na	3.0E+01	1.5E+01	1.1E+01	na	6.0E+01	--	--	--	--	--	--	--	--	**1.5E+01**	**1.1E+01**	**na**	**6.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	**4.0E+01**	**1.0E+01**	**na**	**8.4E+03**
Silver	0	1.0E+00	--	na	--	2.1E+00	--	na	--	--	--	--	--	--	--	--	--	**2.1E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.4E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	**1.5E+00**	**4.0E-04**	**na**	**5.6E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	**9.2E-01**	**1.4E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+01**
Zinc	0	6.5E+01	6.6E+01	na	2.6E+04	1.3E+02	1.3E+02	na	5.2E+04	--	--	--	--	--	--	--	--	**1.3E+02**	**1.3E+02**	**na**	**5.2E+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+03
Arsenic	1.8E+02
Barium	na
Cadmium	7.9E-01
Chromium III	5.0E+01
Chromium VI	1.3E+01
Copper	5.6E+00
Iron	na
Lead	6.7E+00
Manganese	na
Mercury	9.2E-01
Nickel	1.4E+01
Selenium	6.0E+00
Silver	8.4E-01
Zinc	5.2E+01

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

Attachment 9 – Effluent pH Calculations (October 2016 – September 2017)

FMC WWTP (VA0068110) pH (SU)]

90th 7.1

10th 6.7

Sample Date	pH (SU)	Sample Date	pH (SU)	Sample Date	pH (SU)	Sample Date	pH (SU)
10/1/2016	7.1	11/24/2016	7.1	1/17/2017	7	3/12/2017	6.6
10/2/2016	6.9	11/25/2016	7	1/18/2017	6.9	3/13/2017	6.9
10/3/2016	7.1	11/26/2016	7	1/19/2017	6.9	3/14/2017	6.8
10/4/2016	7	11/27/2016	6.9	1/20/2017	6.9	3/15/2017	6.9
10/5/2016	6.9	11/28/2016	7.1	1/21/2017	6.6	3/16/2017	6.8
10/6/2016	6.8	11/29/2016	6.9	1/22/2017	6.6	3/17/2017	6.8
10/7/2016	6.8	11/30/2016	7	1/23/2017	6.8	3/18/2017	6.6
10/8/2016	7	12/1/2016	6.7	1/24/2017	6.9	3/19/2017	6.9
10/9/2016	7.1	12/2/2016	7.2	1/25/2017	6.8	3/20/2017	6.8
10/10/2016	7.1	12/3/2016	7..1	1/26/2017	6.8	3/21/2017	6.8
10/11/2016	7.1	12/4/2016	6.9	1/27/2017	6.9	3/22/2017	6.9
10/12/2016	7	12/5/2016	7	1/28/2017	6.8	3/23/2017	6.8
10/13/2016	6.9	12/6/2016	7	1/29/2017	6.7	3/24/2017	6.9
10/14/2016	6.9	12/7/2016	6.8	1/30/2017	6..7	3/25/2017	6.7
10/15/2016	6.7	12/8/2016	6.7	1/31/2017	6.9	3/26/2017	7.1
10/16/2016	6.9	12/9/2016	6.6	2/1/2017	6.7	3/27/2017	6.8
10/17/2016	7	12/10/2016	6.8	2/2/2017	6.6	3/28/2017	6.8
10/18/2016	7.1	12/11/2016	6.9	2/3/2017	6.6	3/29/2017	7
10/19/2016	7.1	12/12/2016	7	2/4/2017	7	3/30/2017	6.6
10/20/2016	7	12/13/2016	7	2/5/2017	7	3/31/2017	6.6
10/21/2016	7.1	12/14/2016	7	2/6/2017	7	4/1/2017	6.7
10/22/2016	7.1	12/15/2016	6.8	2/7/2017	6.9	4/2/2017	6.9
10/23/2016	7.2	12/16/2016	6.7	2/8/2017	7	4/3/2017	7
10/24/2016	7	12/17/2016	6.8	2/9/2017	6.7	4/4/2017	7
10/25/2016	7.3	12/18/2016	7	2/10/2017	6.6	4/5/2017	6.6
10/26/2016	7.2	12/19/2016	7	2/11/2017	7	4/6/2017	7
10/27/2016	7.1	12/20/2016	7	2/12/2017	6.9	4/7/2017	6.9
10/28/2016	7.1	12/21/2016	6.8	2/13/2017	7	4/8/2017	6.9
10/29/2016	7.1	12/22/2016	6.8	2/14/2017	6.9	4/9/2017	6.8
10/30/2016	7.3	12/23/2016	6.8	2/15/2017	6.9	4/10/2017	7
10/31/2016	7.2	12/24/2016	6.9	2/16/2017	6.6	4/11/2017	7
11/1/2016	7.2	12/25/2016	7	2/17/2017	6.6	4/12/2017	6.9
11/2/2016	7.2	12/26/2016	6.9	2/18/2017	6.9	4/13/2017	6.8
11/3/2016	7.2	12/27/2016	6.8	2/19/2017	7	4/14/2017	6.7
11/4/2016	7.2	12/28/2016	6.7	2/20/2017	6.6	4/15/2017	7
11/5/2016	7	12/29/2016	6.9	2/21/2017	6.8	4/16/2017	6.7
11/6/2016	6.9	12/30/2016	6.7	2/22/2017	6.5	4/17/2017	7
11/7/2016	7.2	12/31/2016	7	2/23/2017	6.6	4/18/2017	6.9
11/8/2016	7.1	1/1/2017	6.9	2/24/2017	6.7	4/19/2017	7
11/9/2016	6.9	1/2/2017	6.9	2/25/2017	6.8	4/20/2017	6.6
11/10/2016	6.8	1/3/2017	6.9	2/26/2017	6.8	4/21/2017	6.7
11/11/2016	6.6	1/4/2017	6.9	2/27/2017	6.8	4/22/2017	6.7
11/12/2016	7.1	1/5/2017	6.9	2/28/2017	7	4/23/2017	7
11/13/2016	6.7	1/6/2017	6.9	3/1/2017	7	4/24/2017	7.1
11/14/2016	6.9	1/7/2017	6.7	3/2/2017	6.9	4/25/2017	7
11/15/2016	7.1	1/8/2017	6.4	3/3/2017	7	4/26/2017	7
11/16/2016	6.9	1/9/2017	6.8	3/4/2017	6.7	4/27/2017	6.8
11/17/2016	7.1	1/10/2017	6.8	3/5/2017	6.6	4/28/2017	6.6
11/18/2016	7.1	1/11/2017	6.9	3/6/2017	6.9	4/29/2017	7
11/19/2016	6.9	1/12/2017	6.9	3/7/2017	7.1	4/30/2017	7
11/20/2016	6.9	1/13/2017	7	3/8/2017	7	5/1/2017	6.8
11/21/2016	7.1	1/14/2017	6.7	3/9/2017	7	5/2/2017	6.9
11/22/2016	7.1	1/15/2017	6.7	3/10/2017	6.9	5/3/2017	6.9
11/23/2016	7.1	1/16/2017	6.9	3/11/2017	6.7	5/4/2017	6.9

Sample Date	pH (SU)	Sample Date	pH (SU)	Sample Date	pH (SU)
5/5/2017	7	6/28/2017	7	8/21/2017	7.1
5/6/2017	6.9	6/29/2017	6.7	8/22/2017	7
5/7/2017	6.9	6/30/2017	6.5	8/23/2017	6.9
5/8/2017	6.9	7/1/2017	7.1	8/24/2017	6.8
5/9/2017	6.9	7/2/2017	7	8/25/2017	7
5/10/2017	6.9	7/3/2017	7	8/26/2017	6.9
5/11/2017	7	7/4/2017	6.4	8/27/2017	7.1
5/12/2017	6.8	7/5/2017	7	8/28/2017	7
5/13/2017	6.9	7/6/2017	6.8	8/29/2017	7
5/14/2017	6.9	7/7/2017	6.9	8/30/2017	7.1
5/15/2017	6.8	7/8/2017	6.8	8/31/2017	7
5/16/2017	6.8	7/9/2017	7	9/1/2017	7
5/17/2017	6.7	7/10/2017	6.9	9/2/2017	6.8
5/18/2017	6.9	7/11/2017	7	9/3/2017	6.9
5/19/2017	6.9	7/12/2017	7	9/4/2017	7
5/20/2017	6.9	7/13/2017	7	9/5/2017	6.9
5/21/2017	6.6	7/14/2017	6.6	9/6/2017	7
5/22/2017	6.9	7/15/2017	7	9/7/2017	6.9
5/23/2017	6.9	7/16/2017	7	9/8/2017	7
5/24/2017	6.9	7/17/2017	7	9/9/2017	7.1
5/25/2017	7.1	7/18/2017	7	9/10/2017	6.8
5/26/2017	6.9	7/19/2017	7	9/11/2017	6.9
5/27/2017	6.7	7/20/2017	7.1	9/12/2017	7
5/28/2017	6.6	7/21/2017	6.9	9/13/2017	6.9
5/29/2017	6.7	7/22/2017	7.2	9/14/2017	7
5/30/2017	6.8	7/23/2017	6.9	9/15/2017	6.9
5/31/2017	6.9	7/24/2017	7.1	9/16/2017	6.9
6/1/2017	6.5	7/25/2017	7.1	9/17/2017	7
6/2/2017	6.9	7/26/2017	7.1	9/18/2017	6.9
6/3/2017	6.6	7/27/2017	7	9/19/2017	7.1
6/4/2017	6.5	7/28/2017	7	9/20/2017	7
6/5/2017	6.7	7/29/2017	7.1	9/21/2017	7
6/6/2017	7.1	7/30/2017	7	9/22/2017	7.1
6/7/2017	6.8	7/31/2017	7.1	9/23/2017	6.9
6/8/2017	6.5	8/1/2017	6.9	9/24/2017	7
6/9/2017	6.6	8/2/2017	7.1	9/25/2017	7.1
6/10/2017	7	8/3/2017	7.1	9/26/2017	7.1
6/11/2017	6.5	8/4/2017	6.9	9/27/2017	7.2
6/12/2017	7	8/5/2017	7.2	9/28/2017	7.2
6/13/2017	6.6	8/6/2017	7.1	9/29/2017	7.2
6/14/2017	7	8/7/2017	7.2	9/30/2017	7.2
6/15/2017	6.9	8/8/2017	7.1		
6/16/2017	6.6	8/9/2017	7		
6/17/2017	6.6	8/10/2017	6.8		
6/18/2017	6.9	8/11/2017	7.1		
6/19/2017	6.9	8/12/2017	7		
6/20/2017	7	8/13/2017	7.1		
6/21/2017	6.9	8/14/2017	6.9		
6/22/2017	6.8	8/15/2017	7		
6/23/2017	7	8/16/2017	6.7		
6/24/2017	6.7	8/17/2017	6.8		
6/25/2017	6.8	8/18/2017	6.9		
6/26/2017	6.8	8/19/2017	7		
6/27/2017	7.2	8/20/2017	6.9		

Attachment 10 – Ambient pH Calculations (February 2007 – June 2017)

ID	Sample Date	Temp (C)	pH (SU)
3-RPP110.57	6/15/2017	28.76	9.38
3-RPP110.57	4/25/2017	15.39	7.73
3-RPP110.57	2/21/2017	11.02	8.05
3-RPP110.57	12/27/2016	6.39	7.53
3-RPP110.57	10/24/2016	16.05	8.59
3-RPP110.57	8/18/2016	29.48	7.41
3-RPP110.57	6/21/2016	26.55	7.89
3-RPP110.57	4/25/2016	19.14	9.04
3-RPP110.57	2/22/2016	7.25	6.55
3-RPP110.57	12/17/2015	10.21	7.33
3-RPP110.57	10/28/2015	14.81	6.89
3-RPP110.57	8/26/2015	25.92	7.38
3-RPP110.57	6/11/2015	27.28	
3-RPP110.57	2/25/2015	-0.01	6.66
3-RPP110.57	12/4/2014	7.76	7.08
3-RPP110.57	10/14/2014	19.81	8.26
3-RPP110.57	8/11/2014	27.34	8.73
3-RPP110.57	6/19/2014	28.52	8.16
3-RPP110.57	4/17/2014	12.12	6.98
3-RPP110.57	2/20/2014	4.02	6.86
3-RPP110.57	12/11/2013	3.59	6.97
3-RPP110.57	10/31/2013	12.78	8.29
3-RPP110.57	8/15/2013	24.54	8.9
3-RPP110.57	6/19/2013	21.84	7.28
3-RPP110.57	4/24/2013	17.04	8.28
3-RPP110.57	2/26/2013	5.26	7.19
3-RPP110.57	12/20/2012	6.44	8.16
3-RPP110.57	10/18/2012	17.25	8.7
3-RPP110.57	8/15/2012	28.13	8.82
3-RPP110.57	6/27/2012	26.3	8.9
3-RPP110.57	4/25/2012	15.91	8.79
3-RPP110.57	2/22/2012	7.48	8.56
3-RPP110.57	10/27/2011	15.5	7.9
3-RPP110.57	8/17/2011	28.7	8.4
3-RPP110.57	6/23/2011	26.3	7.8
3-RPP110.57	4/20/2011	15.8	7.2
3-RPP110.57	2/24/2011	6.6	7.8
3-RPP110.57	12/21/2010	1	7.2
3-RPP110.57	10/27/2010	20.9	8.4
3-RPP110.57	8/25/2010	25.9	9
3-RPP110.57	6/23/2010	32.7	9.2
3-RPP110.57	4/27/2010	18.3	7.9
3-RPP110.57	2/22/2010	4.3	7.1
3-RPP110.57	12/16/2009	6.4	7.4
3-RPP110.57	10/21/2009	14.6	8.4
3-RPP110.57	8/26/2009	29.7	9.1
3-RPP110.57	6/29/2009	27.2	8.9
3-RPP110.57	4/28/2009	24	8.4
3-RPP110.57	2/18/2009	4.4	7.3
3-RPP110.57	12/17/2008	7.1	7.2
3-RPP110.57	10/23/2008	13	8.5
3-RPP110.57	8/20/2008	27.7	9.1
3-RPP110.57	6/25/2008	27.3	8.7
3-RPP110.57	4/23/2008	16.6	7
3-RPP110.57	2/27/2008	5.9	7.2
3-RPP110.57	12/19/2007	3.4	7.3
3-RPP110.57	10/24/2007	20.7	7.9
3-RPP110.57	8/22/2007	23.9	8
3-RPP110.57	6/27/2007	31.2	8.7
3-RPP110.57	4/25/2007	21.3	8.3
3-RPP110.57	2/27/2007	5	7.1

	90th	10th	Nov - Apr 90th
Temp	28.66	-	19.06
pH	8.99	6.98	-

Attachment 11 – Permitting Strategy for Municipal Dischargers in Upper Tidal Freshwater Rappahannock River

COMMONWEALTH of VIRGINIA

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Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

TO:	Permit Files for all Affected Discharges to the Rappahannock River
FROM:	Caitlin Shipman, Water Permit Writer
THROUGH:	Bryant Thomas, NRO Water Permits & Planning Manager
DATE:	May 15, 2018
SUBJECT:	Strategy for Future Permitting Decisions in the Tidal, Freshwater Rappahannock River

PURPOSE

The purpose of this memo is to summarize the basis of Virginia Pollution Discharge Elimination System (VPDES) permitting decisions for sewage treatment plant discharges into the upper tidal freshwater Rappahannock River and to outline a strategy to ensure beneficial uses of the receiving water continue to be maintained, consistent with the Virginia Water Quality Standards.

BACKGROUND

For purposes of this discussion, the upper tidal freshwater Rappahannock River stretches approximately 30 rivermiles from the Route 301 Bridge crossing at approximately rivermile 80 to the Route 1 Bridge crossing at approximately rivermile 111. There are seven (7) municipal wastewater dischargers in this section of the river, four (4) of which are classified as major facilities (Table 1). The four major dischargers are: the City of Fredericksburg's wastewater treatment plant (WWTP), Spotsylvania County's FMC WWTP and Massaponax WWTF, and Stafford County's Little Falls Run WWTP. Due to the proximity of these discharges and in order to ensure water quality of the river was protected, Stafford County, Spotsylvania County, and the City of Fredericksburg funded a water quality model for the upper tidal freshwater Rappahannock River estuary. The model was developed by the Virginia Institute of Marine Science (VIMS), and entitled *A Modeling Study of the Water Quality of the Upper Rappahannock River (VIMS Model).* The State Water Control Board approved this model on December 6, 1991.

Table 1. Active DEQ Monitoring Stations and Municipal Discharges - Upper Tidal Freshwater Rappahannock River

River Mile	ID/Permit Number	Description	Type
110.57	3-RPP110.57	DEQ Monitoring Station – Route 1 Bridge Crossing	Trend
107.99	VA0025127	Discharge – City of Fredericksburg WWTF	VPDES IP - Major
107.43	VA0068110	Discharge – FMC WWTP	VPDES IP - Major
106.01	3-RPP106.01	DEQ Monitoring Station – Upstream of Fredericksburg Country Club	Chesapeake Bay
104.67	VA0025658	Discharge – Massaponax WWTP	VPDES IP - Major
104.61	VA0076392	Discharge – Little Falls Run WWTP	VPDES IP - Major
98.81	3-RPP098.81	DEQ Monitoring Station – Near Hayfield Bar	Chesapeake Bay
93.52	VA0060429	Discharge – Four Winds Campground	VPDES IP - Minor
91.55	3-RPP091.55	DEQ Monitoring Station – Near Hopyard Bar	Chesapeake Bay
91.2	VA0089338	Discharge – Hopyard Farms Wastewater Treatment Plant	VPDES IP - Minor
86.65	VA0089125	Discharge –Haymount WWTF (UT to Rappahannock)	VPDES IP - Minor
80.19	3-RPP080.19	DEQ Monitoring Station – 100 yards downstream from Rt. 301 bridge crossing at Port Royal	Chesapeake Bay

A March 2010 staff memorandum summarizes the VIMS model inputs, assumptions, and model results (Attachment 1). This memo also highlighted that the existing VIMS model would not be appropriate for future permitting decisions given the age of the model, the development that has occurred in the watershed, and the removal of the Embry Dam in 2004. Additionally, the model is not able to predict instream dissolved oxygen concentrations consistent with current designated uses and water quality criteria as contained in 9VAC25-260-185. It is only capable of predicting a 30-day average output concentration. Accordingly, any future expansions to existing WWTP design flows would require an update to the VIMS model, or another approach to ensuring protection of instream beneficial uses.

Water Quality

There are several assessment units established for this section of the river with slight variations in the assessment results. A description of the water quality assessment as taken from the 2016 Integrated Report (IR) for this section of the Rappahannock River is contained in Attachment 2. However, the overall assessment of this section of the River can be summarized as follows:

- The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicates that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.
- Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use.
- The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue.
- *E. coli* monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for this portion of the Rappahannock River was approved by EPA on 05/05/2008.

While the 2016 IR assessed the aquatic life use as fully supporting, this open water aquatic life subuse has been identified as impaired in recent assessments. Specifically, the open water aquatic life use impairment for the tidal freshwater Rappahannock River was removed, or delisted, in the 2016 IR. The 2016 IR data window extended from 2009 through 2014. However, the more recent dissolved oxygen data collected by DEQ at stations RPP080.19, 3-RPP091.55, and 3-RPP098.81 reveal periodic dips in dissolved oxygen during warm weather months (Attachment 3). It is staffs understanding that these more recent data will result in the aquatic life use being identified as impaired in the future 2018 assessment.

It is worth noting that the January 2017 report entitled *Current Status and Long-Term Trends in Water Quality and Living Resources in the Virginia Tributaries and Chesapeake Bay Mainstem from 1985 Through 2015* prepared by researchers from Old Dominion University and DEQ noted a degrading trend in bottom dissolved oxygen in the upper Rappahannock River tidal freshwater. Lastly, while information is limited, it should be noted that it is staff's understanding that the tidal freshwater Rappahannock River is a phosphorus-limited system.

PERMITTING STRATEGY

Overview

An expansion request received from Spotsylvania County for the Massaponax WWTP, as outlined below, has prompted staff to consider how permit effluent limits for sewage treatment discharges will be established with new or expanded discharges. As noted previously, the VIMS model is no longer appropriate to use as the basis for establishing effluent limits with new and/or expanding discharges into this portion of the tidal freshwater Rappahannock River. Staff proposes to implement an approach that caps conventional pollutant loadings (e.g. $cBOD_5$, TSS, TKN) to the tidal freshwater Rappahannock River from wastewater treatment plants at current authorized levels.

In addition, staff is aware that there are and will continue to be increasing demands on water resources. For example, Caroline County, a downstream locality, has tentatively identified the tidal freshwater River as a source of potable water. There is also expectation that reclamation and reuse will continue to expand into the future as water demands grow over time. In lieu of developing a new water quality model for the tidal freshwater Rappahannock River, DEQ staff is proposing to cap the loadings of current municipal dischargers at their current flow tiers to ensure beneficial uses are maintained in accordance with the Water Quality Standards and to allow the capacity of wastewater treatment to be aligned with future demands on water resources.

Summary of Permitting Strategy

Effluent Limitations for Conventional Parameters and Nutrients for all dischargers:

- It is recommended that effluent limitations for conventional parameters (BOD_5 or $cBOD_5$, TSS, TKN) for all discharges be established by capping the pollutant loadings at current levels authorized by VPDES permits. These loading caps will be maintained for all expansion flow tiers.
- If/as flows are transferred to consolidate wastewater treatment in the region, the associated pollutant loadings with the consolidated flows will also be transferred to the new receiving facility(ies)[1].
- It is recommended that DO effluent limits be maintained at current levels; all major facilities have a minimum DO requirement of 6.0 mg/L.
- Effluent limitations for total nitrogen and total phosphorus will be established consistent with the Chesapeake Bay program requirements implemented through both the individual and general VPDES permits.

Effluent Limitations for Toxics:

- Effluent limitations for all toxics, including ammonia, for major and minor sources will continue to be established in accordance with the Virginia Water Quality Standards and agency policies and practices for deriving limits that are protective of all beneficial uses;
    - Any currently established effluent limits for ammonia and/or other toxics will be evaluated on a case-by-case basis with future permit renewals to consider applicable water quality criteria and also consider whether backsliding would be an issue.

Mixing Assumptions:

- In the upper tidal freshwater area where the major dischargers are located, allowable mixing has been and is recommended to continue to be based on current DEQ practices and/or guidance, and staff's professional judgment on the available mixing with expanded flow tiers
- In the lower portion of the tidal freshwater area where the minor dischargers are located, allowable mixing is recommended to be analogous to that established with the VIMS model.

The rationale and basis for each of these elements is discussed below.

Municipal Dischargers

As noted previously, there are four major municipal dischargers within approximately 3.3 rivermiles of each other (Table 2). The City of Fredericksburg diverts a portion of the sewage flow to the FMC WWTF. The February 2013 fact sheet for the City of Fredericksburg permit indicated that approximately 1.5 MGD is diverted to the FMC WWTF.

[1] See the discussion on the computation of loadings below for details on the specific recommendations concerning the transfer of pollutant loads.

DEQ is aware that Spotsylvania County has preliminary plans to close the FMC WWTF and send the wastewater flows to the Massaponax WWTF, creating a regional wastewater treatment plant with the Massaponax WWTF. At this time, DEQ is not aware of the long term plans for the Fredericksburg WWTP. It is staff's understanding that several options exist for the Fredericksburg plant. One is decommissioning the facility and sending all wastewater flows to Spotsylvania County at the Massaponax WWTF. A second is making investment into upgrading the current facility to meet near-term requirements, including the upcoming ammonia criteria, and consider long term emerging issues such as controlling pharmaceuticals and endocrine disruptors. While the science associated with understanding these long term issues is still developing, and establishment of regulations to address these emerging contaminants is well in the future, municipal authorities need to consider these emerging issues when making investment decisions that will entail a 20-30 year operational period.

Table 2. Major municipal dischargers into the upper tidal freshwater Rappahannock River.

Facility Name (Permit Number)	Rivermile	Existing Flow	Expansion Flow Tier(s)
City of Fredericksburg WWTF (VA0025127)	107.99	4.5 MGD	-
FMC WWTF (VA0068110)	107.43	4.0 MGD	-
Massaponax WWTF (VA0025658)	104.52	9.4 MGD	11.4 MGD, 13.4 MGD, 14.4 MGD, 17.9 MGD *
Little Falls Run WWTF (VA0076392)	104.61	8.0 MGD	13.0 MGD

*Expansion flow tiers as requested by Spotsylvania County in their VPDES permit application for reissuance dated April 4, 2017 and subsequent addendums to the application.

On April 14, 2017, Spotsylvania County submitted their application for reissuance of the VPDES permit for Massaponax WWTF, VA0025658. The current design flow of this facility is 9.4 MGD. In this application and in subsequent correspondence, Spotsylvania County requested expansion flow tiers of 11.4 MGD, 13.4 MGD, 14.4 MGD, and 17.9 MGD. According to communication with Spotsylvania County, these expansion flow tiers allow for future plans to decommission FMC WWTF (VA0068110), bringing the flows from the Hazel Run interceptor to Massaponax WWTF, and also allow for the flows from the Fredericksburg WWTP (VA0025127) to be directed to the Massaponax facility. The expanded flow tiers requested by Spotsylvania County provide flexibility for all flows from the three current wastewater treatment plants to be treated at the Massaponax WWTF.

Then authorized minor municipal dischargers to this portion of the Rappahannock River include Four Winds Campground WWTP (VA0060429), Hopyard Farms WWTP (VA0089338), and Haymount WWTP (VA0089125). Note that the Haymount WWTP is not built. All of these facilities have expansion flow tiers in their current VPDES permits (Table 3).

Table 3. Minor municipal dischargers into the upper tidal freshwater Rappahannock River.

Facility Name (Permit Number)	Rivermile	Current Design Flow	Expansion Flow Tier(s)
Four Winds Campground WWTP (VA0060429)	93.52	0.0375 MGD	0.125 MGD, 0.21 MGD
Hopyard Farms WWTP (VA0089338)	91.20	0.375 MGD	0.5 MGD
Haymount WWTP (VA0089125)	86.65	0.58 MGD	0.96 MGD

Conventional Parameters

It is staff's professional judgment that pollutant loadings (lb/year) from BOD_5 or $cBOD_5$, TSS, and TKN should be capped at or below current loadings for the expansion flow tiers in current VPDES permits in order to maintain water quality and protect beneficial uses. This approach recognizes the observed dissolved oxygen levels in the tidal freshwater Rappahannock River marginally meet the established beneficial uses. The aquatic life use was identified as impaired in 2006 and 2014, and is expected to be identified as impaired again in 2018. While capping loadings from conventional parameters does not necessarily reduce pollutant loadings from current levels, it does prevent the increase of loadings beyond the currently authorized design flow for each facility. This strategy is similar, conceptually, to the approach instituted in the Chesapeake Bay TMDL whereby

nutrient loadings (TN and TP) are capped at existing levels for non-significant dischargers. This does not prevent growth or expansion of existing wastewater treatment plants, but it does maintain loadings at or near current levels. Future flow expansions will require a reduction in pollutant concentrations in order to maintain loadings. The level of treatment for conventional parameters associated with this approach is achievable, as it generally involves advanced secondary to a tertiary level of wastewater treatment.

Major Municipal Dischargers

The focus of the discussion below is on the WWTPs serving Fredericksburg and Spotsylvania County as the forthcoming permitting actions for these facilities need to evaluate the requested wastewater treatment consolidation as discussed previously. With regard to the Little Falls Run WWTP serving Stafford County, staff recommends maintaining pollutant loadings at currently authorized levels consistent with the framework of this permitting strategy.

If flows are transferred from FMC WWTF and/or Fredericksburg WWTF to Massaponax WWTF, it is recommended that the hydraulic component of the loadings from those flows be transferred as well for cBOD and TSS. Accordingly, $cBOD_5$ and TSS loadings transferred to the expanded Massaponax WWTF will be calculated based on the volume of flow transferred and the effluent concentration limitation in Massaponax's VPDES permit (Table 4, Attachment 4). The Massaponax WWTF is a newer facility providing a higher level of treatment than either the FMC or Fredericksburg facilities. The effluent concentration limitations for $cBOD_5$ and TSS are lower for the Massaponax WWTF than the other two facilities. If consolidation of one or all plants occurs, there will be a net reduction of $cBOD_5$ and TSS discharged to the Rappahannock River. Expansions beyond the combined, or aggregate, authorized flows of these plants would then require reductions in effluent limit concentrations in order to maintain pollutant loading caps.

Currently, all major dischargers have seasonal TKN limits based on the VIMS model that apply May through October (Table 4). It is staffs understanding that these TKN limitations were established to protect instream DO concentrations, rather than preventing ammonia toxicity as the ammonia standards were not in place at the time the Rappahannock model was developed. Staff proposes maintaining the current aggregate TKN loadings as established in the three VPDES permits. As consolidation occurs, TKN loadings will be transferred to Massaponax WWTF. These loadings will be based on the currently established pollutant loading limits for each facility; therefore, there will be no increase in TKN loadings to the river (Attachment 4).

Additionally, it is recommended that special condition permit language be included in each of the permits that prohibits multiple facilities from operating once flows are transferred (e.g. a sunset provision). Accordingly, with each authorized expanded flow tier at the Massaponax WWTF, there needs to be an equal flow reduction from either of the diverting facilities.

Staff recognizes that this recommended permitting approach consolidates all pollutant loadings that had occurred over roughly 3.3 miles to one discharge point. The low DO observations noted above have generally occurred significantly downstream from the discharges. With regard to TKN loadings, staff recognizes that the state-of-the-art TN concentration limitations in place at Massaponax WWTF, 4.0 mg/L (annual average), will effectively govern discharges of TKN as well. Given that there have not been localized DO concerns in the upper portion of the tidal freshwater Rappahannock River and the advanced level of treatment required to meet the annual TN concentration limit, it is staff's position that this recommended permitting approach will be protective of water quality.

Table 4. Summary of $cBOD_5$, TSS and TKN effluent limits and loadings discharged when flows are treated at levels currently permitted versus loadings discharged if FMC WWTF and Fredericksburg WWTF consolidated with Massaponax WWTF. All limits presents are monthly averages. The TKN limits present are established seasonally (May – October). TKN limits established outside of this time period are not shown. Calculations for effluent limits are presented in Attachment 4.

Limits at Currently Permitted Flow Tiers							
Facility:	Design Flow (MGD):	Concentration Limits (mg/L):		Loading Limits (kg/day):			
		$cBOD_5$ / TSS:	TKN:	$cBOD_5$ / TSS:	TKN:		
Massaponax	9.4	10	9	360	320		
FMC	4	15	3	230	45		
Fredericksburg	4.5	13	7	220	119		
			Total:	810	484		
Proposed Limits for Massaponax WWTF Expansion Flow Tiers							
	Design Flow (MGD):	Concentration Limits (mg/L):		Loading Limits (kg/day):		Net Reduction (kg/day):	
		$cBOD_5$ / TSS:	TKN:	$cBOD_5$ / TSS:	TKN:	$cBOD_5$ / TSS	TKN
	11.4	10	9	431	358	31	0
	13.4	10	9	507	366	76	0
	14.4	10	9	545	392	87	0
	17.9	10	9	678	484	126	0

As noted above, staff recommends capping pollutant loadings of conventional parameters from the Little Falls Run WWTP at currently authorized levels. Little Falls Run WWTP has a design flow rate of 8.0 MGD. The permit currently authorizes an expanded flow tier of 13.0 MGD. Staff recommends capping the pollutant loadings of cBOD, TSS and seasonal TKN to those at the 8.0 MGD flow tier to prevent any increases in pollutant loadings to the river above those currently authorized.

Minor Municipal Dischargers

Staff recommends that pollutant loadings for minor dischargers be maintained at currently authorized levels to prevent possible water quality degradation of the Rappahannock River. Accordingly, future flow expansions of minor dischargers will require a reduction in pollutant concentrations in order to maintain loadings. The level of treatment for conventional parameters associated with this approach is achievable, as it generally involves advanced secondary to a tertiary level of wastewater treatment.

Expansion flow limits for minor dischargers were calculated based on the design capacity at the current flow tier. First, the permitted design capacity was calculated for the current flow tier; then, the concentration limits for each parameter for each expansion flow tier were derived from the permitted design capacity (Table 5). See Attachment 5 for details regarding computations.

Table 5. Effluent limits for current and expanded flow tiers municipal minor dischargers in the upper tidal freshwater Rappahannock River. Effluent limits for expansion flow tiers are calculated based on the permitted design capacity at the current flow tier.

Four Winds Campground WWTP (VA0060429)		
Flow Tier	BOD_5	TSS
0.0375 MGD	30 mg/L	30 mg/L
0.125 MGD	9.0 mg/L	9.0 mg/L
0.21 MGD	5.4 mg/L	5.4 mg/L
Hopyard Farms WWTP (VA0089338)		
Flow Tier	BOD_5	TSS
0.375 MGD	30 mg/L	30 mg/L
0.5 MGD	23 mg/L	23 mg/L
Haymount WWTP (VA0089125)		
Flow Tier	$cBOD_5$	TSS
0.58 MGD	10 mg/L	10 mg/L
0.96 MGD	6.0 mg/L	6.0 mg/L

Total Nitrogen and Total Phosphorus

Staff will continue to implement the requirements of the Chesapeake Bay TMDL consistent with applicable law and regulations and agency policy and practices. These requirements are instituted through both the Watershed General Permit for Nutrient Discharges to the Chesapeake Bay and the individual VPDES permits. It is staff's professional judgement that these limits are protective of the water quality standards.

Ammonia and Other Toxic Parameters

Currently, ammonia effluent limitations are established for two of the major discharges: the Massaponax WWTF (seasonally) and Little Falls Run WWTP (year round). Ammonia effluent limits are established for all of the minor discharges, with the exception of the Haymount WWTP, which has a TKN limit of 3.0 mg/L. Based on water quality assessments and additional staff review of DEQ ambient monitoring data, there have been no observed ammonia toxicity issues in the upper tidal freshwater Rappahannock. It is staff's professional judgment that the criteria for ammonia, and other toxic pollutants, established in the Virginia Water Quality Standards and DEQ policies and procedures for deriving effluent limitations are and will continue to be protective of water quality.

With this permitting approach, effluent limitations for all toxics, including ammonia, for major and minor sources will continue to be established in accordance with the Virginia Water Quality Standards and agency policies and practices for deriving limits that are protective of all beneficial uses. Any currently established effluent limits for ammonia and/or other toxics will be evaluated on a case-by-case basis to consider applicable water quality criteria and also consider whether backsliding would be an issue.

Lastly, it should be noted that the Environmental Protection Agency (EPA) finalized new, more stringent recommended ammonia criteria in August 2013. It is staff's understanding that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming and will result in reductions in ammonia effluent limitations. Accordingly, as the ammonia criteria and Agency effluent limit derivation procedures are updated, staff will evaluate limits upon permit reissuance consistent with this strategy and agency policy.

Mixing Assumptions

Major Municipal Dischargers

In the current VPDES permits for the major discharges, a mixing ratio of 2:1 has been applied for both acute and chronic toxicity reasonable potential analyses. The acute mixing allowance applies a 2:1 ratio consistent with DEQ guidance that recognizes the basis of the acute water quality criteria. The chronic mixing recognizes that four major municipal sewage treatment plants discharge into a relatively small tidal freshwater area close to the fall line. Therefore, large tidal influences may not be realized. It has been staff's judgment that the agency default chronic mix ratio of 50:1 is too high while no dilution is too stringent (end of pipe) because some mixing is occurring. Accordingly, staff chose to use an instream waste concentration (IWC) of 50%. The 50% IWC, or 2:1 mixing, is supported by the percent of IWC computed using the cumulative flows from the four major dischargers to the low flow 7Q10 statistic for the USGS flow gage near I-95 on the Rappahannock River (#01668000). This computed IWC equates to approximately 55%. The fact sheets for each permit provide a detailed explanation of the derivation and justification for the applied mixing assumptions that have been applied to date.

With this permitting strategy, it is recommended that the 2:1 mixing assumption continue to be applied for evaluation of chronic criteria. However, the consolidation of flows to the Massaponax WWTF would result in all discharges occurring at essentially one location in the river as the Massaponax WWTF and Little Falls Run WWTP are located across from each other. Accordingly, it is recommended that acute mixing assumption be changed to not allow for any mixing should the consolidation occur.

The acute water quality criteria represent a one-hour average concentrations not to be exceeded more than once every three years. Accordingly, the consideration of available mixing needs to consider the worst-case scenario, which would be facilities operating at full design flow under drought conditions. While it is tidal freshwater at the discharge location, it is staff's judgment that a worst-case, conservative approach is not to allow mixing for the acute criteria analyses.

Minor Municipal Discharges

Ammonia limits for the minor facilities that discharge directly to the Rappahannock River were established by the VIMS model. There were no TKN limits established for these facilities, indicating that limits were established to protect against potential toxicity rather than for instream DO protection. Staff reviewed instream ammonia monitoring data from the ambient monitoring stations for this section of the Rappahannock River and did not observe any exceedances of the ammonia criteria indicating permit limits are protective. Staff has computed the equivalent levels of dilution that would generate the VIMS ammonia limits using current agency practices and procedures and the current Water Quality Standards. Using these computations, staff recommends dilution ratios of 2:1 for acute toxicity and 5:1 for chronic toxicity for these minor municipal facilities. A final determination of the appropriate mixing ratio of ammonia for each discharge will be determined by staff upon permit renewals.

New Dischargers

For all new municipal facilities treating > 1,000 gpd that begin discharging in the upper tidal freshwater Rappahannock River, staff proposes establishing effluent limitations for conventional parameters ($cBOD_5$ and TSS) at levels which, in combination with a total nitrogen and total phosphorus limit, essentially remove oxygen demanding substances ensuring instream water quality conditions are maintained and protected.

These limits are based on professional judgment and are similar to those established in the Policy for the Potomac Embayments as contained in 9VAC25-415-40. That regulation established effluent limitations for $cBOD_5$, TSS, TP, and seasonal ammonia limits for April 1 through October 31. Since their implementation in 1997, these limits established by the Policy for the Potomac Embayments have been demonstrated to be protective of water quality for the tidal freshwater tributaries to the Potomac River in Northern Virginia, where phosphorus is the limiting nutrient. Additionally, this high level of treatment establishes an appropriate foundation for future requirements which may be instituted to control emerging contaminants or possible reuses. It is staff's professional judgment that similar effluent limits should be applied to all new facilities in the upper tidal freshwater Rappahannock River (Table 6).

Table 6. Proposed effluent limitations for new municipal dischargers in the upper tidal freshwater Rappahannock River.

Parameter	Monthly Average (mg/L)
$cBOD_5$	5
Total Suspended Solids	6.0

Regarding treatment and removal of total nitrogen and total phosphorus, staff proposes continuing to implement the requirements of the Chesapeake Bay TMDL consistent with applicable law and regulations and agency policy and practices. These requirements are instituted through both the Watershed General Permit for Nutrient Discharges to the Chesapeake Bay and the individual VPDES permit. It is staff's professional judgment that these limits are protective of both the Chesapeake Bay and the receiving stream.

As is DEQ's current practice, ammonia toxicity will be evaluated against water quality criteria using current policies and guidance to ensure beneficial uses are protected and maintained.

Appendix 1 - March 2010 Staff Memorandum Summarizing the VIMS Model

March 2010
MEMORANDUM

TO: Virginia Institute of Marine Science (VIMS) Model for the Tidal Rappahannock File

FROM: Alison Thompson, Water Permitting -- NRO

SUBJECT: Virginia Institute of Marine Science Model for the Tidal Rappahannock.
Input Assumptions and Summaries through December 2009

This memo summarizes all of the VIMS model inputs, assumptions, and results made to date, documenting the use of and decisions reached with the model.

The last major update to the inputs to the model was dated January 2005. It was the model run for the expansion of the Little Falls Run STP from 8.0 MGD to 13.0 MGD. In addition, staff made changes to the VIMS point source inputs due to the regulatory initiatives regarding nutrient loadings to the Chesapeake Bay. This analysis accounted for the status of the nutrient regulations in January 2005. In August 2006, staff did a correction to the model for the Fredericksburg STP flow used for the nutrient loadings. The most recent work, and the basis for this memorandum, was done because DEQ received a modification request from Spotsylvania County to move 1.4 MGD flow from FMC to the Massaponax STP.

Background

Stafford County, Spotsylvania County, and the City of Fredericksburg funded a water quality model for the upper Rappahannock River estuary developed by the Virginia Institute of Marine Science (VIMS), entitled A Modeling Study of the Water Quality of the Upper Rappahannock River (VIMS Model). This model was approved by the State Water Control Board Director on December 6, 1991. This model is used to determine effluent limitations for new and expanded discharge requests in the upper Rappahannock River, from the fall line at Fredericksburg to the Rt. 301 Bridge in King George County. VIMS documentation of the model is contained in *A Modeling Study of the Water Quality of the Upper Rappahannock River*, October 1991. A copy of the report as well as the program and general correspondence is contained in the Department of Environmental Quality (DEQ) Northern Regional Office (NRO) Rappahannock Model File.

There are 32 river miles between the fall line and the Rt. 301 Bridge. The model divides this 32 mile segment of the river into 33 model segments (see Figure 1 for discharger locations). The following point source discharges are included in the current model run:

Segment 3:	Fredericksburg STP	VA0025127	4.5 MGD
Segment 4:	FMC WWTP	VA0068110	4.0 MGD
Segment 9:	Little Falls Run STP	VA0076392	13.0 MGD
	Massaponax STP	VA0025658	9.4 MGD
Segment 20:	Four Winds Campground	VA0060429	0.210 MGD
Segment 23:	Hopyard Farm WWTP	VA0089338	0.50 MGD
Segment 26:	Haymount STP	VA0089125	0.96 MGD

Regulations affecting the VIMS model inputs

The 2008 303(d)/305(b) Integrated Report (2008 IR) indicates that the tidal, freshwater portion of the Rappahannock River (which encompasses the entire extent of this model) is impaired for not meeting the aquatic life use due to low levels of dissolved oxygen. Specifically, an open water assessment of dissolved oxygen values during the summer season showed that the tidal, freshwater Rappahannock River (RPPTF) does not meet water quality standards. The total maximum daily load (TMDL) for this impairment is due by 2010, as part of the Chesapeake Bay wide TMDL to address excess nutrients and sediment affecting the Bay.

In addition, the 2008 IR also listed the tidal, freshwater Rappahannock River as impaired for not meeting the fish consumption use, due to elevated levels of Polychlorinated Biphenyls (PCBs) in fish tissue. The Virginia Department of Health issued a fish

consumption advisory for the Rappahannock River below the fall line that limits American eel, blue catfish, carp, channel catfish, croaker, gizzard shad, and anadromous (coastal) striped bass consumption to no more than two meals per month. The affected area extends from the I-95 bridge above Fredericksburg downstream to the mouth of the river near Stingray Point, including its tributaries Hazel Run up to the I-95 bridge crossing and Claiborne Run up to the Route 1 bridge crossing. The TMDL study for this impairment is due by 2016.

Finally, the tidal, freshwater Rappahannock River, from the Route 1 bridge in Fredericksburg, downstream to the confluence with Mill Creek (near the Route 301 bridge crossing) is listed as impaired for not supporting the recreational use due to exceedances of the *E. coli* bacteria criterion. A TMDL was developed for the bacteria impairment in 2007-2008. The TMDL was approved by EPA on 05/05/2008.

As of the drafting of this memo, the preliminary 2010 303(d)/305(b) Integrated Assessment indicates that the open-water aquatic life sub-use (assessed using dissolved oxygen data) for the tidal, freshwater Rappahannock River is fully supporting. There is insufficient information to determine if the aquatic life sub-use for migratory fish spawning and nursery is being met; thus, the overall aquatic life use is also listed as having insufficient information to make an assessment.

Virginia has committed to protecting and restoring the Bay and its tributaries. Currently the Agency has developed nutrient water quality standards for the Bay and its tributaries, amended the Nutrient Policy (9 VAC 25-40-10) to govern the inclusion of technology-based, numerical nitrogen and phosphorus limits in VPDES permits, and a parallel effort updating and amending the Water Quality Management Planning (WQMP) regulation 9 VAC 25-720. The Water Quality Standards for the Bay were adopted in March 2005. The WQMP regulation includes Total Nitrogen and Total Phosphorus Wasteload Allocations for all Chesapeake Bay Program Significant Discharge List (CBP SDL) discharges.

The total phosphorous loadings based on the Nutrient Policy and/or from the WQMP for the applicable facilities are as follows:

Fredericksburg STP (4.5 MGD; 0.3 mg/L)	4,111 lb/year
FMC WWTP (5.4 MGD; 0.3 mg/L)	4,934 lb/year
Little Falls Run STP (8.0 MGD; 0.3 mg/L)	7,309 lb/year
Massaponax STP (8.0 MGD; 0.3 mg/L)	7,309 lb/year
Four Winds Campground (0.21 MGD)	640 lb/year. Not in the WQMP, but must meet 1.0 mg/L annual average
Haymount STP (0.96 MGD; 0.3 mg/L)	877 lb/year
Hopyard Farm WWTP (0.5 MGD; 0.3 mg/L)	457 lb/year

The total nitrogen loadings based on the Nutrient Policy and from the WQMP for the applicable facilities are as follows:

Fredericksburg STP (4.5 MGD; 4.0 mg/L)	54,819 lb/year
FMC WWTP (5.4 MGD; 4.0 mg/L)	65,784 lb/year
Little Falls Run STP (8.0 MGD; 4.0 mg/L)	97,458 lb/year
Massaponax STP (8.0 MGD; 4.0 mg/L)	97,458 lb/year
Four Winds Campground (0.21 MGD)	5100 lb/year. Not in the WQMP, but must meet 8.0 mg/L annual average
Haymount STP (0.96 MGD; 4.0 mg/L)	11,695 lb/year
Hopyard Farm WWTP (0.5 MGD; 4.0 mg/L)	6091 lb/year.

In addition to the nutrient initiatives, the changes to the Water Quality Standards for the Chesapeake Bay and tidal waters included criteria for dissolved oxygen, water clarity, chlorophyll a, and Designated Uses. The dissolved oxygen standard for

migratory fish waters for the months of February through May is a 7-day mean of greater than of 6.0 mg/L. For the months of June through January, the minimum is 5.5 mg/L. These dissolved oxygen criteria apply to the upper tidal portion of the Rappahannock River.

RADCO 208 Plan

The Rappahannock Area Development Commission (RADCO) 208 Area Waste Treatment Management Plan was adopted in August 1977, was amended in September 1983, and was repealed in 2004. The loading allocations in it had to be maintained until the Plan was repealed. The loading allocations in the Plan were based on an old water quality model, AUTO$$, that was replaced in 1991 by the VIMS model.

The VIMS model has demonstrated that nutrients are the primary factor affecting water quality in the upper tidal Rappahannock River. Numerous runs of the model have demonstrated that cBOD is not as influential as the nutrients at the maximum permitted flows of each POTW. As such, cBOD loadings are permissible above the levels specified in the old RADCO Plan.

Model Timeline

To date the model has been run seven times, each being necessitated by a request for a flow increase or for a new discharge. The runs are as follows:

1. August 14, 1995 - expansion of Fredericksburg STP from 3.5 to 4.5 MGD
   - addition of 0.93 MGD Haymount STP in Caroline County
2. August 22, 1996 - addition of 0.25 MGD Hopyard Farm WWTP in King George County
3. March 17, 1997 - flow increase and production increase at White Packing
4. April 7, 1999 - expansion of Little Falls Run STP from 4.0 to 8.0 MGD
   - expansion of Massaponax STP from 6.0 to 8.0 MGD
5. December 1, 2000 - expansion of FMC WWTP from 4.0 to 5.4 MGD
6. April 29, 2003 - expansion of the proposed Hopyard Farm WWTP from 0.25 to 0.50 MGD.
7. January 26, 2005 -remove White Packing from Segment 26 since the facility is closed
   -correction of Haymount STP flow to 0.96 (previously was 0.93)
   -addition of 1.0-MGD Greenhost – Village Farms in King George County
   -expansion of Little Falls Run STP from 8.0 to 13.0 MGD
   -incorporation of the WQMP nutrient loadings for the Significant Dischargers
8. August 2006 - correct nutrient loadings for the City of Fredericksburg
9. December 2009 - shift 1.4 MGD flow from FMC to Massaponax (will now be 9.4 MGD)
   - change the distribution of the nitrogen species based on the data obtained from the Discharge Monitoring Reports.

The initial run on August 14, 1995, has been considered the background condition for the river segments. The VIMS files located at DEQ-NRO contain the supporting documentation for the original model inputs and the subsequent model runs. With each successive run of the model, all parameters had been kept constant except those affected by the request necessitating the model run. The most recent model runs affected a change to the nutrient loadings for all the dischargers. In the older model runs, staff used best professional judgment to determine the distribution of the three nitrogen species: Ammonia as Nitrogen, Total Kjeldahl Nitrogen, and Oxidized Nitrogen (Nitrate+Nitrite). The January 2010 run looked at actual performance data from the four largest facilities and found that the old assumptions were not correct. The old assumptions were Ammonia as Nitrogen (25%), Total Kjeldahl Nitrogen (25%), and Oxidized Nitrogen (50%). The actual performance data from these larger facilities is Ammonia as Nitrogen (3%), Total Kjeldahl Nitrogen (37%), and Oxidized Nitrogen (60%).

Antidegradation Analysis

With each running of the model, and/or permit action concerning this section of the Rappahannock River, an antidegradation analysis has been conducted in accordance with the water quality standards and DEQ guidance. This is a difficult task since the assessment and designation of Tier I or Tier II waters is partially subjective given the narrative criteria of the standards, water quality data are not static, and waterbody boundaries are not well defined.

Since the onset of using this model, the established model segments have been used, by default, to define river sections into individual waterbodies for the antidegradation analysis. DEQ did not suggest or contend that these model segments should be used for other water quality management purposes. It was recognized that the river from the fall line down to the Rt. 301 Bridge could have been, and perhaps should have been, considered one waterbody segment. DEQ also acknowledged that this whole segment of the Rappahannock River could have been assessed as Tier I since it is considered nutrient enriched and turbid and therefore subject to corrective plans outlined in the *1999 Tributary Strategy for the Rappahannock River and Northern Neck Coastal Basins*. However, being uncertain DEQ elected to evaluate antidegradation, as through each of the model segments were actual distinct waterbodies. This approach was conservative in terms of protecting water quality and to date did not prove to be an undo burden to any of the dischargers.

Historically, four segments were identified as Tier II through this process: segment 16, segment 20, segment 23, and segment 26. Each was identified through separate permit actions that did not initially involve the VIMS model. When a segment was analyzed as Tier II, two parameters generally were assessed, ammonia and dissolved oxygen (DO). Ammonia levels were kept below the baselines and DO was kept to no lower than 0.2 mg/L of the concentration predicted in the August 14, 1995 background model run. The VIMS memo dated April 29, 2003 contains the historical summary and table of the baselines of the Tier determinations for each of the four segments.

During the January 2005 model run analysis, the entire Rappahannock River was determined to be Tier I. The previous determination of Tier II ratings for segments 16, 20, 23, and 26 were made with adherence to guidance with little best professional judgement by staff. It has been 10 years since the initial runs of the model and staff no longer believes it appropriate to assign a tier rating for each model segment. Staff believes it is best to rate the whole segment from the fall line to the Route 301 bridge as one segment. The nutrient enrichment problems of this segment, as evident by high turbidity, warrant a Tier I rating. Staff again makes this determination for the sole purpose of assigning permit limits. And since the Tier ratings have had very little influence on the results of the model, there is no measurable consequence to this change, and there is no need to continue to assess these segments (16, 20, 23, and 26) as being different from the whole river segment.

It should be noted that the predicted concentrations of dissolved oxygen and ammonia are significantly different in this current model run than what was considered the “background” concentrations. With the new loading allocations to the significant discharges in place, the model predicts that chlorophyll concentrations will be significantly less than what prior model runs have predicted and the artificially elevated levels of dissolved oxygen (nutrients stimulate chlorophyll growth and chlorophyll photosynthesis generates dissolved oxygen) are no longer predicted. Further discussion of chlorophyll a is found in the next section.

Total Phosphorus Loading Cap (historical perspective)

All of the above facilities discharge into the tidal freshwater Rappahannock River. This section of the river was formerly designated as nutrient enriched waters. Specifically, the Tidal freshwater Rappahannock River from the fall line to Buoy 44 near Leedstown, Virginia, including all tributaries to their headwaters that enter the tidal freshwater Rappahannock River were classified as nutrient enriched waters. All dischargers into nutrient enriched waters as designated in the Water Quality Standards for Nutrient Enriched Waters that were permitted before July 1, 1988, and that discharge 1 MGD or more were subject to the Policy for Nutrient Enriched Waters. This policy required facilities to meet a monthly average Total Phosphorus limitations of 2.0 mg/L and to monitor for monthly average Total Nitrogen concentration and loading values. The application of standards to protect nutrient enriched waters within the Chesapeake Bay watershed was replaced in Virginia by the aforementioned regulatory programs governing nutrient and sediment inputs into the Bay. Thus, the nutrient enriched waters designation was removed from the Water Quality Standards.

Based on the prior VIMS model runs, the chlorophyll a levels in the upper segments of the river in the Fredericksburg area approached 100 ug/L under design conditions. It is staff’s best professional judgment that high chlorophyll a concentrations and the corresponding high alga growth mask dissolved oxygen depletion due to BOD loading. The model provides a 30-day average output and it is hypothesized that the elevating effect of the chlorophyll concentrations is more significant than the depleting effect of the BOD loadings. If the model provided daily outputs, one could see the diurnal dissolved oxygen sag and super-saturation effects in an over-enriched system. Further, the model demonstrated that chlorophyll a concentrations increased with additional phosphorus (P) loadings. If P limits for the expanding STPs were based solely on the Nutrient Policy, 2 mg/L, then chlorophyll a levels would exceed 120 ug/L in the waters around the City of Fredericksburg. To prevent

further increases in chlorophyll a concentrations in this part of the river, total phosphorus loadings (mass based, kg/day) were not allowed to increase for the Fredericksburg, FMC, Massaponax, and Little Falls Run wastewater treatment plants beyond the current limits. All future requests for flow increases at these facilities required that the P mass limits remain constant at the current loading limits. Permitted phosphorus concentration limits may remain at the same level prescribed by the Nutrient Policy, 2 mg/L, since it is the total mass loading that impacts chlorophyll levels. However, as effluent flows increase, in order to meet the mass limitations, effluent concentrations had to be below the 2 mg/L limit.

The relationship of how chlorophyll photosynthesis affects dissolved oxygen levels has been explored in this model and it was worth recognizing what historical baseline/initial levels were. These values were useful in the subsequent model runs for tracking how nutrients inflated dissolved oxygen levels (nutrients stimulate chlorophyll growth and chlorophyll photosynthesis generates dissolved oxygen).

DEQ has adopted a chlorophyll a narrative standard at 9VAC25-260-185 that states, "Concentrations of chlorophyll a in free-floating microscopic aquatic plants (algae) shall not exceed levels that result in undesirable or nuisance aquatic plant life, or render tidal waters unsuitable for the propagation and growth of a balanced, indigenous population of aquatic life or otherwise result in ecologically undesirable water quality conditions such as reduced water clarity, low dissolved oxygen, food supply imbalances, proliferation of species deemed potentially harmful to aquatic life or humans or aesthetically objectionable conditions."

Summary of Past Model Runs

In the 1995 VIMS model, the winter inputs for ammonia and organic nitrogen for all wastewater treatment plants were 14 mg/L ammonia and 14 mg/L organic nitrogen. These values represented little to no nitrification. The model indicated that there were no far field violations of the winter ammonia standards. Therefore, no winter ammonia or TKN limits were established for Fredericksburg, FMC, Massaponax, and Little Falls Run wastewater treatment plants. The acute ammonia criterion for the winter months was 12.07 mg/L. DEQ did not impose winter acute based ammonia limits on any of the treatment plants for the following reasons: the discharges are located near the fall line where tidal influences are the smallest; the net advective flow of the river dominates the tidal influence; the design flows are much smaller than the critical flows of the river; ammonia decays rather rapidly; and each of the plants were achieving varying degrees of nitrification.

During the April 7, 1999 model run, winter ammonia loading had to be lowered for Little Falls Run and Massaponax from 14 mg/L to 12 mg/L in order to meet the antidegradation baselines in segment 23 and 26. Since organic nitrogen would also decrease during the nitrification process, its input into the model was also lowered to 12 mg/L for both dischargers. During this model run, the winter ammonia loadings for FMC were also lowered to 12 mg/L to meet the antidegradation baselines of segments 16, 23, and 26. At the new flows for FMC, water quality criteria and antidegradation baselines are still protective for the summer months of May – October. Since organic nitrogen would also decrease during the nitrification process, its input into the model was also lowered to 12 mg/L for FMC. Acute based ammonia limits were imposed at the new flows for the same reasons cited above. However, since the new model inputs were lower than the acute ammonia water quality standard of 12.07 mg/L, it was certain that the acute standard was protected in the winter.

In the December 1, 2000 model run, two minor data entry problems were corrected in conjunction with the expansion of FMC to 5.4 MGD. First, in the original model documentation memorandum of August 14, 1995, the assumption was made that total effluent nitrogen levels for these types of plants would be 30 mg/L, and that it would exist in the form of organic nitrogen, ammonia, and/or inorganic nitrogen depending on the facility's ability to nitrify. This can be seen on page 1 under the section "Assumptions for nitrogen". However, the value shown for the three separate nitrogen parts add up to 32 mg/L. It was felt that this was a simple oversight at the time. Additionally, during the April 7, 1999 model run, nitrate-nitrite levels were increased to 21 mg/L and 24 mg/L for the Little Falls Run and Massaponax dischargers respectively, even though the ammonia nitrogen levels were set at 12 mg/L. Therefore, in order to maintain the original model assumptions, winter nitrate input levels were reset to 6 mg/L during this run for Little Falls Run, Massaponax, and FMC. Since the Fredericksburg inputs had not been adjusted, nor had they recently been adjusted, the original values were maintained (14 mg/L organic-N, 14 mg/L Ammonia-N, and 4 mg/L Nitrate/Nitrite). Second, the ammonia loadings for the Haymount STP were incorrectly entered as 8.61 kg/d. The correct loading was entered as 3.53 kg/d. This correction had little to no impact on the model outputs.

In the April 29, 2003, model run all numerical criteria were met and all antidegradation baselines for ammonia and DO were met except for one. In the winter run, segment 23 (Hopyard Farm) yielded a DO of 7.43 mg/L. The baseline for DO in this segment is 7.47 mg/L. In order to maintain the additional 0.04 mg/L of DO, the BOD concentrations of Hopyard Farm and the upstream dischargers would have to be significantly reduced. DEQ did not believe this reduction was warranted since the model was run based on design capacity flows for all facilities and not just for Hopyard Farm. In addition, the DO deficit for

segment 23 actually improved from 0.07 mg/L to 0.04 mg/L with the increase in Hopyard Farm's flows. Therefore, changes to the effluent limits were not necessary for such a small change in DO since the model is not that sensitive or accurate.

In January 2005, the model run was conducted to include the expansion of the Little Falls Run STP, the removal of White Packing, the correction of the Haymount STP flow, and the addition of Greenhost – Village Farms because of observed nutrient concentrations in the discharge. This model run also assumed that the Nutrient Policy and the WQMP regulation were adopted. Effluent loadings for $cBOD_5$ and Dissolved Oxygen were derived by multiplying the current concentration limits by the maximum permitted flow. For the facilities that are contained in the draft WQMP regulation, nutrient loadings were derived using the flows and loadings presented in draft regulation. For Four Winds Campground, nutrient loadings were derived using a total nitrogen concentration of 8.0 mg/L and a total phosphorus concentration of 1.0 mg/L based on the draft Nutrient Policy. For Hopyard Farm WWTP, nutrient loadings were derived using a total nitrogen concentration of 4.0 mg/L and a total phosphorus concentration of 0.3 mg/L based on what was the draft WQMP. Best professional judgement and actual effluent data were used to determine the loadings for Greenhost- Village Farms. There was a small excursion of the Migratory fish spawning an nursery dissolved oxygen concentration of $\geq$6 mg/L; the excursion was 5.6 mg/L. Staff did not change the BOD limits for the dischargers but recommended increased ambient monitoring of the upper tidal Rappahannock River.

Current Model Run Summary

The model was run for the summer (May- October) period because this is the most critical time and when potential dissolved oxygen excursions have been noted during past model analyses. Historically, no problems have been noted with chlorophyll or dissolved oxygen in the winter runs. It should be noted that before the model runs could be fully analyzed and other scenarios attempted, the computer that this model runs on began to fail. The older programming (Leahy Fortran) used for the VIMS model no longer runs on the newer computers. Therefore, additional modeling cannot be performed without updating the code of the VIMS model.

Summer continues to be the critical period for the water quality of the upper tidal freshwater Rappahannock River because stream flows are typically lower and the dischargers have a greater influence on the water quality in the river, and alga growth is higher during the warmer temperatures of the summer months.

Staff ran a baseline run for the summer with Massaponax at 8 MGD; the baseline run did have the nitrogen allocations changed to reflect actual effluent characteristics, as discussed above. Model runs were also done with Massaponax at 9.4 MGD, Massaponax at 9.4 MGD and all facilities meeting the WQMP conditions, all FMC flow moved to Massaponax, and all flow from FMC and the City of Fredericksburg moved to Massaponax.

Chlorophyll a & Nutrients

When the WQMP is fully implemented, the model predicts chlorophyll a levels to drop substantially even when all the dischargers are at full capacity. The WQMP essentially reduces and places total nitrogen and total phosphorus loading caps on the significant dischargers. By removing the WWTP nutrient food sources for the algae, alga populations fall and thus, chlorophyll a levels are reduced. As noted earlier in this memorandum, staff also reallocated the nitrogen species based on the performance of the upgraded facilities. This also changed the output predictions from former analyses. It is staff's best professional judgment that moving the 1.4 MGD flow from FMC to Massaponax will not have any negative effects on the chlorophyll a and nutrient concentrations in the River.

Dissolved Oxygen

Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use.

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1,2]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	

[1]See subsection aa of 9 VAC 25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

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

The model results show protection of the dissolved oxygen criteria except for the month of May in several segments. The current temporal application of the dissolved oxygen standards is different than the temporal application of the model, i.e., May is classified in the summer period. The migratory fish spawning and nursery Designated Use also looks at a 7-day mean, but the model only has a 30-day output. At this time, staff does not feel any changes are necessary to the cBOD limits for the dischargers because:

1) The excursion is very small; 5.6 mg/L is the predicted concentration in segment 13 when the Massaponax flow is at 9.4 and all facilities are at the WQMP loadings and concentrations.
2) The model is not that accurate to warrant substantial changes to the STPs to achieve such a small difference in dissolved oxygen. The accuracy of the model is questionable since it was developed over 20 years ago.
3) The model assumes May to be like July, August, and September, when in fact it is not, i.e., the water temperature is cooler and the background flows are higher.

VIMS Model

Due to the age of the model and the development and changes that have occurred in the localities, staff will also inform the localities that any additional changes to design flows will require an update to the VIMS model. Staff recommends that the following be considered when the model is updated:

1) The model currently provides only a 30-day average output. It would be useful to have the ability to generate hourly, daily or other shorter averaging periods. A more refined model will allow better understanding of the relationships between DO, chlorophyll a, BOD, and nutrients.
2) Consider land use and hydrologic changes that have occurred and the associated changes to water flow, quantity and quality dynamics, especially since the Embry Dam has been removed from the River.

Appendix 2 - Summary of the 2016 Integrated Report Water Quality Assessment

The water quality assessment for this section of the tidal freshwater Rappahannock River as contained in the most recent, final 2016 Integrated Report identifies several impairments. The following was taken from the 2016 Integrated Report:

- Rappahannock River from fall line at US1 downstream to the outlet of waterbody E-20E (Portion of CBP segment RPPTF)

  Class II, Section 1, special stds. a.

  The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. For the segment beginning at the fall line at Route 1 and continuing downstream until the confluence with Massaponax Creek, excursions above the risk-based tissue screening value (TSV) of 270 parts per billion (ppb) for arsenic (As) in fish tissue was recorded in one species of fish (1 sample) collected in 2006 at monitoring station 3-RPP107.33 (striped bass), noted by an observed effect. For the segment beginning at the confluence with Massaponax Creek and continuing downstream until the outlet of waterbody VAN-E20E, one excursion above the risk-based tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in one species of fish (1 sample) collected in 2006 at monitoring station 3-RPP080.19 (channel catfish), noted by an observed effect.

  E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for this portion of the Rappahannock River was approved by EPA on 05/05/2008.

  The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicates that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.

  The wildlife use is considered fully supporting.

- Rappahannock River from the confluence with Massaponax Creek downstream until the confluence with Ware Creek. (The upper reach of this segment (approx. 0.3 sq mi) extends into waterbody VAN-E20E; Portion of CBP segment RPPTF):

  Class II, Section 1, special stds. a.

  The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, one excursion above the risk-based tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in one species of fish (1 sample; channel catfish) collected in 2006 at DEQ fish tissue monitoring station 3-RPP080.19 (located in a downstream segment), noted by an observed effect.

  Coastal 2000 weight of evidence analysis, utilizing bulk chemical data, toxicity test data, and an evaluation of benthic community conditions, resulted in an assessment of fully supporting with potential chronic effects of metals and PAHs in the sediment. Apparent bacterial action responsible for decline in pH and increase in ammonia was also noted.

  The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicates that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.

  The recreation and wildlife uses are considered fully supporting. A bacteria TMDL for this portion of the Rappahannock River was approved by EPA on 05/05/2008.

- Rappahannock River from the confluence with Ware Creek downstream until the confluence with Mill Creek (Portion of CBP segment RPPTF):

    Class II, Section 1, special stds. a.

    The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, one excursion above the risk-based tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in one species of fish (1 sample; channel catfish) collected in 2006 at DEQ fish tissue monitoring station 3-RPP080.19, noted by an observed effect.

    Coastal 2000 weight of evidence analysis, utilizing bulk chemical data, toxicity test data, and an evaluation of benthic community conditions, resulted in an assessment of fully supporting with potential benthic effects from cumulative metals in the sediment.

    The aquatic life use is considered fully supporting. Assessment of the thirty day mean dissolved oxygen values indicates that the open-water aquatic life subuse is fully supporting. The seven day mean and instantaneous dissolved oxygen levels have not been assessed. The submerged aquatic vegetation data is assessed as fully supporting. Tidal freshwater Rappahannock B-IBI (benthic community) is assessed as fully supporting the aquatic life use. The Chesapeake Bay TMDL was completed in 2010.

    The wildlife and recreation uses are considered fully supporting.

Appendix 3 – Trends in Dissolved Oxygen

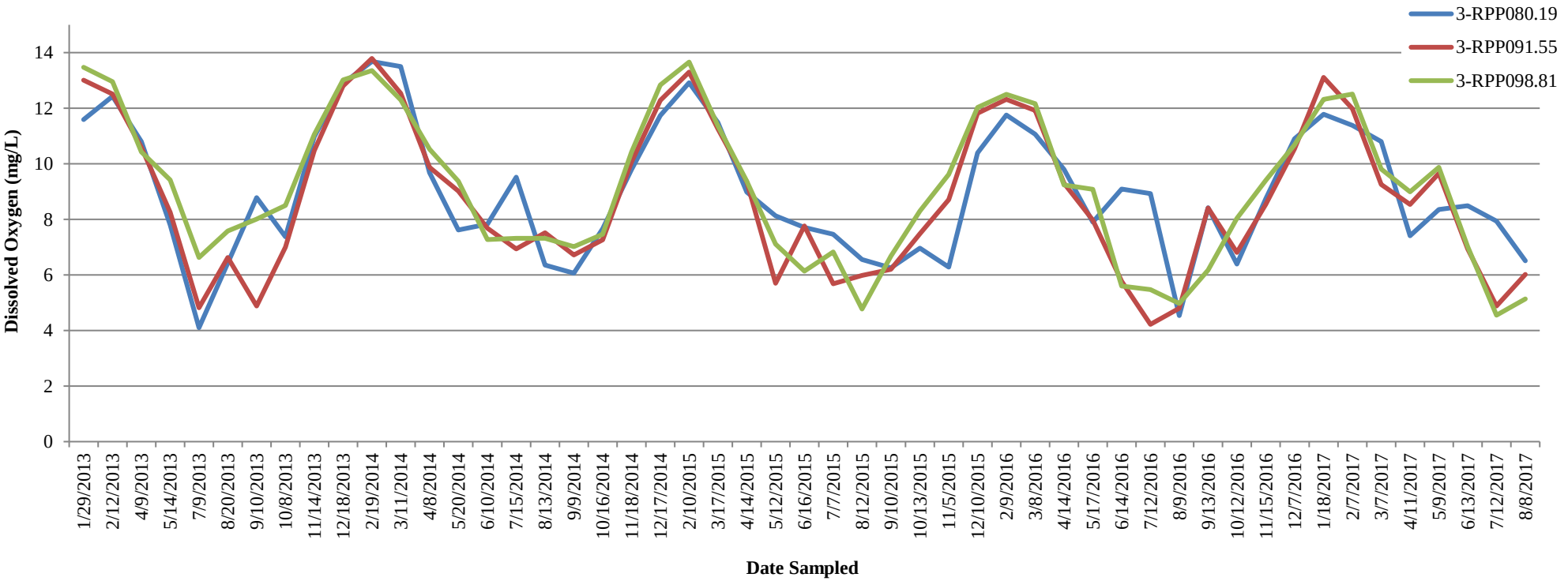

Figure 1. Trends of dissolved oxygen (mg/L) in the upper freshwater Rappahannock River at three DEQ monitoring stations between January 2013 and August 2017. Legend shows the color codes and name of each DEQ monitoring station. The rivemile sampled at correspond to the last 5 digits of the name of a monitoring station.

Appendix 4 – Effluent Limit and Net Reduction Calculations for Major Municipal Dischargers

Loading limits were calculated using the following formula:

Loadings (kg/day) = Concentration Limit (mg/L) x Flow (MGD) x Conversion Factor (3.785)

The Hazel Run Interceptor receives approximately 1 MGD of flow from Spotsylvania County and 1 MGD from the City of Fredericksburg. This flow is sent to the Fredericksburg WWTF (VA0025127), which in turn sends the 1 MGD of County flows to FMC WWTF. The design flows of Fredericksburg WWTF and FMC WWTF each account for receiving 1 MGD of flow from this interceptor. Therefore, if the Hazel Run Interceptor flows and corresponding loadings are sent to Massaponax WWTF, the loadings for FMC WWTF (VA0068110) and Fredericksburg WWTF (VA0025127) should be adjusted accordingly.

$cBOD_5$ and TSS:

Limits for loadings of $cBOD_5$ and TSS for Massaponax WWTF's expansion flow tiers were calculated from the transferred flow (MGD) and respective concentration limit (mg/L) in Massaponax's current VPDES permit. Final $cBOD_5$ and TSS limits in VPDES permit will be rounded to two significant figures.

At FMC WWTF and Fredericksburg WWTF, the loadings lost were calculated using the current concentration limits in each facility's VPDES permit. Since the concentration limits in these permits are higher than the limits in Massaponax's permit, there is a net loss of loadings being discharged to the Rappahannock River.

Massaponax WWTF (VA0025658):

9.4 MGD – Current Flow Tier

$cBOD_5$ Loading = 10 mg/L x 9.4 MGD x 3.785 = 356 kg/day
TSS Loading = 10 mg/L x 9.4 MGD x 3.785 = 356 kg/day

11.4 MGD – Current Flow Tier + Hazel Run Interceptor

$cBOD_5$ Loading = 10 mg/L x 11.4 MGD x 3.785 = 431 kg/day
TSS Loading = 10 mg/L x 11.4 MGD x 3.785 = 431 kg/day

13.4 MGD – Current Flow Tier + FMC WWTF

$cBOD_5$ Loading = 10 mg/L x 13.4 MGD x 3.785 = 507 kg/day
TSS Loading = 10 mg/L x 13.4 MGD x 3.785 = 507 kg/day

14.4 MGD – Current Flow Tier + FMC WWTF + Hazel Run Interceptor

$cBOD_5$ Loading = 10 mg/L x 14.4 MGD x 3.785 = 545 kg/day
TSS Loading = 10 mg/L x 14.4 MGD x 3.785 = 545 kg/day

17.9 MGD – Current Flow Tier + FMC WWTF + Fredericksburg WWTF

$cBOD_5$ Loading = 10 mg/l x 17.9 MGD x 3.785 = 678 kg/day
TSS Loading = 10 mg/l x 17.9 MGD x 3.785 = 678 kg/day

Loadings Remaining after Transferring Hazel Run to Massaponax WWTF (VA0025658):

FMC WWTF (VA0068110):

$cBOD_5$ Loading = 15 mg/L x 3.0 MGD x 3.785 = 170 kg/day
TSS Loading = 15 mg/L x 3.0 MGD x 3.785 = 170 kg/day

Fredericksburg WWTF (VA0025127):

$cBOD_5$ Loading = 13 mg/L x 3.5 MGD x 3.785 = 172 kg/day
TSS Loading = 13 mg/L x 3.5 MGD x 3.785 = 172 kg/day

Calculation of Net Reductions of $cBOD_5$/TSS Loadings Discharged:

$cBOD_5$ and TSS loadings are equivalent. Therefore, only one set of calculations was completed. Net loss was calculated by subtracting the total loadings discharged from the loadings discharged at currently permitted levels.

Loadings Discharged - Currently Permitted Levels:

Massaponax WWTF – 9.4 MGD = 356 kg/day
FMC WWTF – 4.0 MGD = 15 mg/L x 4.0 MGD x 3.785 = 227 kg/day
Fredericksburg WWTF – 4.5 MGD = 13 mg/L x 4.5 MGD x 3.785 = 221 kg/day

Total = 804 kg/day

Loadings Discharged – Hazel Run Transferred to Massaponax WWTF:

Massaponax WWTF – 11.4 MGD = 431 kg/day
FMC WWTF – 3.0 MGD = 170 kg/day
Fredericksburg WWTF – 3.5 MGD = 172 kg/day

Total = 773 kg/day
Net Loss = 31 kg/day

Loadings Discharged – FMC WWTF Transferred to Massaponax WWTF:

Massaponax WWTF – 13.4 MGD = 507 kg/day
Fredericksburg WWTF – 3.5 MGD = 221 kg/day

Total = 728 kg/day
Net Loss = 76 kg/day

Loadings Discharged – FMC WWTF & Hazel Run Transferred to Massaponax WWTF:

Massaponax WWTF – 14.4 MGD = 545 kg/day
Fredericksburg WWTF – 3.5 MGD = 172 kg/day

Total = 717 kg/day
Net Loss = 87 kg/day

Loadings Discharged – FMC WWTF & Fredericksburg WWTF to Massaponax WWTF:

Massaponax WWTF – 17.9 MGD = 678 kg/day

Net Loss = 126 kg/day

TKN:

Limits for loadings of TKN for Massaponax WWTF's expansion flow tiers were calculated from the transferred flow (MGD) and respective concentration limit (mg/L) in respective facility's current VPDES permit. Final TKN limits in VPDES permit will be rounded to two significant figures. Upon consolidation, there will be no net increase or decrease in loadings discharged.

Massaponax WWTF (VA0025658):

9.4 MGD – Current Flow Tier

TKN Loading = 9 mg/L x 9.4 MGD x 3.785 = 320.21 kg/day

11.4 MGD – Current Flow Tier + Hazel Run Interceptor

TKN Loading (Massaponax) = 9 mg/L x 9.4 MGD x 3.785 = 320.2 kg/day
TKN Loading (FMC) = 3 mg/L x 1.0 MGD x 3.785 = 11.36 kg/day
TKN Loading (Fredericksburg) 7 mg/L x 1.0 MGD x 3.785 = 26.5 kg/day

Total TKN Loading = 320 kg/day + 11.36 kg/day + 26.5 kg/day = 358.1 kg/day

13.4 MGD – Current Flow Tier + FMC WWTF

TKN Loading (Massaponax) = 9 mg/L x 9.4 MGD x 3.785 = 320.2 kg/day
TKN Loading (FMC) = 3 mg/L x 4 MGD x 3.785 = 45.4 kg/day

Total TKN Loading = 320.2 kg/day + 45.4 kg/day = 365.6 kg/day

14.4 MGD – Current Flow Tier + FMC WWTF + Hazel Run Interceptor

TKN Loading (Massaponax) = 9 mg/L x 9.4 MGD x 3.785 = 320.2 kg/day
TKN Loading (FMC) = 3 mg/L x 4 MGD x 3.785 = 45.4 kg/day
TKN Loading (Fredericksburg) 7 mg/L x 1.0 MGD x 3.785 = 26.5 kg/day

Total TKN Loading = 320.2 kg/day + 45.4 kg/day + 26.5 kg/day = 392.1 kg/day

17.9 MGD – Current Flow Tier + FMC WWTF + Fredericksburg WWTF

TKN Loading (Massaponax) = 9 mg/L x 9.4 MGD x 3.785 = 320.2 kg/day
TKN Loading (FMC) = 3 mg/L x 4 MGD x 3.785 = 45.4 kg/day
TKN Loading (Fredericksburg) = 7 mg/L x 4.5 MGD x 3.785 = 119.2

Total TKN Loading = 320.2 kg/day + 45.4 kg/day + 119.2 kg/day = 484.8 kg/day

Loadings Remaining after Transferring Hazel Run to Massaponax WWTF (VA0025658):

FMC WWTF (VA0068110):

TKN Loading = 3 mg/L x 3.0 MGD x 3.785 = 34.1 kg/day

Fredericksburg WWTF (VA0025127):

TKN Loading = 7 mg/L x 3.5 MGD x 3.785 = 92.7 kg/day

Appendix 5 – Permitted Design Capacity & Effluent Limit Calculations for Minor Municipal Dischargers

Limits for expansion flow tiers were calculated from the design capacity at the current flow tier. The permitted design capacity (PDC) for each facility/parameter was calculated using the following equation:

PDC (kg/year) = Existing Flow (MGD) x Pollutant Concentration (mg/L) x 365 (days per year) x 3.785 (conversion factor)

Concentration limits for each parameter for each expansion flow tier were then derived from the PDC using the following equation:

Limitation (mg/L) = PDC (kg/year) ÷ 365 (days per year) ÷ Expanded Flow (MGD) ÷ 3.785 (conversion factor)

Final limits in permits will be rounded to two significant figures.

Four Winds Campground (VA0060429)

Permitted Design Capacities:

BOD PDC = 0.0375 MGD x 30 mg/L x 365 days/year x 3.785 = 1,554.22 kg/year
TSS PDC = 0.0375 MGD x 30 mg/L x 365 days/year x 3.785 = 1,554.22 kg/year

Calculated Effluent Limits for 0.125 MGD Flow Tier:

BOD = 1,554.22 kg/year ÷ 0.125 MGD ÷ 365 days/year ÷ 3.785 = 9.0 mg/L
TSS = 1,554.22 kg/year ÷ 0.125 MGD ÷ 365 days/year ÷ 3.785 = 9.0 mg/L

Calculated Effluent Limits for 0.21 MGD Flow Tier:

BOD = 1,554.22 kg/year ÷ 0.21 MGD ÷ 365 days/year ÷ 3.785 = 5.4 mg/L
TSS = 1,554.22 kg/year ÷ 0.21 MGD ÷ 365 days/year ÷ 3.785 = 5.4 mg/L

Hopyard Farms (VA0089338)

Permitted Design Capacities:

BOD PDC = 0.375 MGD x 30 mg/L x 365 days/year x 3.785 = 15,542.16 kg/year
TSS PDC = 0.375 MGD x 30 mg/L x 365 days/year x 3.785 = 15,542.16 kg/year

Calculated Effluent Limits for 0.5 MGD Flow Tier:

BOD = 15,542.16 kg/year ÷ 0.5 MGD ÷ 365 days/year ÷ 3.785 = 22.5 mg/L
TSS = 15,542.16 kg/year ÷ 0.5 MGD ÷ 365 days/year ÷ 3.785 = 22.5 mg/L

Haymount WWTP (VA0089125)

Permitted Design Capacities:

cBOD PDC = 0.58 MGD x 10 mg/L x 365 days/year x 3.785 = 8,012.85 kg/year
TSS PDC = 0.58 MGD x 10 mg/L x 365 days/year x 3.785 = 8,012.85 kg/year
TKN PDC = 0.58 MGD x 3 mg/L x 365 days/year x 3.785 = 2,403.85 kg/year

Calculated Effluent Limitations for 0.96 MGD Flow Tier:

cBOD = 8,012.85 kg/year ÷ 0.96 MGD ÷ 365 days/year ÷ 3.785 = 6.04 mg/L
TSS = 8,012.85 kg/year ÷ 0.96 MGD ÷ 365 days/year ÷ 3.785 = 6.04 mg/L
TKN = 2,403.85 kg/year ÷ 0.96 MGD ÷ 365 days/year ÷ 3.785 = 1.81 mg/L

Attachment 12 – Summary of Discharge Monitoring Reports (DMRs)

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	1/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	2/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	3/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	4/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	5/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	6/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	7/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	8/10/2012	CBOD5	1.54	6.81		0.24	1.05
VA0068110	9/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	10/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	11/10/2012	CBOD5	<QL	<QL		<QL	<QL
VA0068110	12/10/2012	CBOD5	0.19	<QL		1.71	<QL
VA0068110	1/10/2013	CBOD5	15.48	20.28		2.25	2.77
VA0068110	2/10/2013	CBOD5	16.62	24.81		1.97	3.06
VA0068110	3/10/2013	CBOD5	20.22	23.38		2.59	3.08
VA0068110	4/10/2013	CBOD5	25	34.35		2.74	3.2
VA0068110	5/10/2013	CBOD5	13.23	20.76		2.1	3.12
VA0068110	6/10/2013	CBOD5	7.29	9.79		1.1	1.67
VA0068110	7/10/2013	CBOD5	10.21	15.47		1.08	1.69
VA0068110	8/10/2013	CBOD5	4.02	6.01		0.44	0.66
VA0068110	9/10/2013	CBOD5	1.1	2.49		0.14	0.32
VA0068110	10/10/2013	CBOD5	2.06	11.23		0.73	1.63
VA0068110	11/10/2013	CBOD5	14.45	14.84		2.15	2.28
VA0068110	12/10/2013	CBOD5	18.09	22.41		3.27	3.88
VA0068110	1/10/2014	CBOD5	24.27	26.07		3.11	3.34
VA0068110	2/10/2014	CBOD5	33.63	43.45		4.54	5.39
VA0068110	3/10/2014	CBOD5	40.25	53.39		4.85	5.17
VA0068110	4/10/2014	CBOD5	42.88	44.21		5.61	6.51
VA0068110	5/10/2014	CBOD5	29.3	38.77		3.5	4.91
VA0068110	6/10/2014	CBOD5	29.6	35.84		2.48	2.86
VA0068110	7/10/2014	CBOD5	9.76	15.55		1.19	1.96
VA0068110	8/10/2014	CBOD5	13.72	17.91		2.03	2.7
VA0068110	9/10/2014	CBOD5	6.09	10.55		0.96	1.63
VA0068110	10/10/2014	CBOD5	7.71	10.39		1.23	1.7
VA0068110	11/10/2014	CBOD5	11.06	16.58		1.71	2.39
VA0068110	12/10/2014	CBOD5	13.34	14.86		2.33	2.53
VA0068110	1/10/2015	CBOD5	18.11	22.83		2.77	3.17
VA0068110	2/10/2015	CBOD5	24.8	29.44		3.58	3.66
VA0068110	3/10/2015	CBOD5	45.87	61.3		5.57	6.88
VA0068110	4/10/2015	CBOD5	32.08	40.95		3.57	3.73
VA0068110	5/10/2015	CBOD5	25.93	29.25		3.07	3.86
VA0068110	6/10/2015	CBOD5	17.63	19.8		2.61	2.83
VA0068110	7/10/2015	CBOD5	17.68	18.84		2.51	2.71
VA0068110	8/10/2015	CBOD5	8.23	13.36		1.24	1.87
VA0068110	9/10/2015	CBOD5	8.9	10.37		1.51	1.76
VA0068110	10/10/2015	CBOD5	9.87	15.68		1.56	2.46
VA0068110	11/10/2015	CBOD5	16.98	19.82		2.21	2.88
VA0068110	12/10/2015	CBOD5	17.88	21.35		2.59	2.87
VA0068110	1/10/2016	CBOD5	24.52	28.39		3.19	3.55
VA0068110	2/10/2016	CBOD5	28.46	37.22		3.31	3.68
VA0068110	3/10/2016	CBOD5	35.7	48.17		3.31	3.8
VA0068110	4/10/2016	CBOD5	28.36	30.13		3.38	3.77

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	5/10/2016	CBOD5	26	28.77		3.09	3.4
VA0068110	6/10/2016	CBOD5	29.87	33.74		2.55	2.68
VA0068110	7/10/2016	CBOD5	22.76	24.92		2.39	2.68
VA0068110	8/10/2016	CBOD5	22	28.2		2.48	2.89
VA0068110	9/10/2016	CBOD5	12.83	17.09		1.66	2.33
VA0068110	10/10/2016	CBOD5	16.97	20.3		1.87	2.38
VA0068110	11/10/2016	CBOD5	28.47	31.8		3.02	3.29
VA0068110	12/10/2016	CBOD5	27.76	28.41		3.52	3.74
VA0068110	1/10/2017	CBOD5	28.8	35.17		3.72	4.58
VA0068110	2/10/2017	CBOD5	31.16	34.89		3.44	3.73
VA0068110	3/10/2017	CBOD5	36.2	40.3		4.5	4.9
VA0068110	4/10/2017	CBOD5	42.14	56.03		4.66	4.99
VA0068110	5/10/2017	CBOD5	35.27	48.43		3.64	4.43
VA0068110	1/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	2/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	3/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	4/10/2012	CL2, INST RES MAX				<QL	<QL
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VA0068110	6/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	7/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	8/10/2012	CL2, INST RES MAX				<QL	<QL
VA0068110	9/10/2012	CL2, INST RES MAX				<QL	<QL
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VA0068110	1/10/2013	CL2, INST RES MAX				<QL	<QL
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VA0068110	11/10/2013	CL2, INST RES MAX				<QL	<QL
VA0068110	12/10/2013	CL2, INST RES MAX				<QL	<QL
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VA0068110	2/10/2014	CL2, INST RES MAX				0.000853	<QL
VA0068110	3/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	4/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	5/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	6/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	7/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	8/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	9/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	10/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	11/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	12/10/2014	CL2, INST RES MAX				<QL	<QL
VA0068110	1/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	2/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	3/10/2015	CL2, INST RES MAX				<QL	<QL

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	4/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	5/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	6/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	7/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	8/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	9/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	10/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	11/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	12/10/2015	CL2, INST RES MAX				<QL	<QL
VA0068110	1/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	2/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	3/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	4/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	5/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	6/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	7/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	8/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	9/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	10/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	11/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	12/10/2016	CL2, INST RES MAX				<QL	<QL
VA0068110	1/10/2017	CL2, INST RES MAX				<QL	<QL
VA0068110	2/10/2017	CL2, INST RES MAX				<QL	<QL
VA0068110	3/10/2017	CL2, INST RES MAX				<QL	<QL
VA0068110	4/10/2017	CL2, INST RES MAX				<QL	<QL
VA0068110	5/10/2017	CL2, INST RES MAX				<QL	<QL
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VA0068110	2/10/2012	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	3/10/2012	CL2, INST TECH MIN LIMIT			1.02		
VA0068110	4/10/2012	CL2, INST TECH MIN LIMIT			0.82		
VA0068110	5/10/2012	CL2, INST TECH MIN LIMIT			0.79		
VA0068110	6/10/2012	CL2, INST TECH MIN LIMIT			0.84		
VA0068110	7/10/2012	CL2, INST TECH MIN LIMIT			0.72		
VA0068110	8/10/2012	CL2, INST TECH MIN LIMIT			0.8		
VA0068110	9/10/2012	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	10/10/2012	CL2, INST TECH MIN LIMIT			0.83		
VA0068110	11/10/2012	CL2, INST TECH MIN LIMIT			1.02		
VA0068110	12/10/2012	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	1/10/2013	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	2/10/2013	CL2, INST TECH MIN LIMIT			0.89		
VA0068110	3/10/2013	CL2, INST TECH MIN LIMIT			1.22		
VA0068110	4/10/2013	CL2, INST TECH MIN LIMIT			1.07		
VA0068110	5/10/2013	CL2, INST TECH MIN LIMIT			1.04		
VA0068110	6/10/2013	CL2, INST TECH MIN LIMIT			0.93		
VA0068110	7/10/2013	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	8/10/2013	CL2, INST TECH MIN LIMIT			0.87		
VA0068110	9/10/2013	CL2, INST TECH MIN LIMIT			0.77		
VA0068110	10/10/2013	CL2, INST TECH MIN LIMIT			0.53		
VA0068110	11/10/2013	CL2, INST TECH MIN LIMIT			1.06		
VA0068110	12/10/2013	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	1/10/2014	CL2, INST TECH MIN LIMIT			1.02		
VA0068110	2/10/2014	CL2, INST TECH MIN LIMIT			1.13		

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	3/10/2014	CL2, INST TECH MIN LIMIT			1		
VA0068110	4/10/2014	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	5/10/2014	CL2, INST TECH MIN LIMIT			1.02		
VA0068110	6/10/2014	CL2, INST TECH MIN LIMIT			0.86		
VA0068110	7/10/2014	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	8/10/2014	CL2, INST TECH MIN LIMIT			0.87		
VA0068110	9/10/2014	CL2, INST TECH MIN LIMIT			0.75		
VA0068110	10/10/2014	CL2, INST TECH MIN LIMIT			0.68		
VA0068110	11/10/2014	CL2, INST TECH MIN LIMIT			0.69		
VA0068110	12/10/2014	CL2, INST TECH MIN LIMIT			1.08		
VA0068110	1/10/2015	CL2, INST TECH MIN LIMIT			1.07		
VA0068110	2/10/2015	CL2, INST TECH MIN LIMIT			0.68		
VA0068110	3/10/2015	CL2, INST TECH MIN LIMIT			1.2		
VA0068110	4/10/2015	CL2, INST TECH MIN LIMIT			1.26		
VA0068110	5/10/2015	CL2, INST TECH MIN LIMIT			1.04		
VA0068110	6/10/2015	CL2, INST TECH MIN LIMIT			0.97		
VA0068110	7/10/2015	CL2, INST TECH MIN LIMIT			1.04		
VA0068110	8/10/2015	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	9/10/2015	CL2, INST TECH MIN LIMIT			0.8		
VA0068110	10/10/2015	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	11/10/2015	CL2, INST TECH MIN LIMIT			1.05		
VA0068110	12/10/2015	CL2, INST TECH MIN LIMIT			1.09		
VA0068110	1/10/2016	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	2/10/2016	CL2, INST TECH MIN LIMIT			1.03		
VA0068110	3/10/2016	CL2, INST TECH MIN LIMIT			1.16		
VA0068110	4/10/2016	CL2, INST TECH MIN LIMIT			1.04		
VA0068110	5/10/2016	CL2, INST TECH MIN LIMIT			1.01		
VA0068110	6/10/2016	CL2, INST TECH MIN LIMIT			1.19		
VA0068110	7/10/2016	CL2, INST TECH MIN LIMIT			1.04		
VA0068110	8/10/2016	CL2, INST TECH MIN LIMIT			1.11		
VA0068110	9/10/2016	CL2, INST TECH MIN LIMIT			1		
VA0068110	10/10/2016	CL2, INST TECH MIN LIMIT			0.98		
VA0068110	11/10/2016	CL2, INST TECH MIN LIMIT			0.78		
VA0068110	12/10/2016	CL2, INST TECH MIN LIMIT			1.15		
VA0068110	1/10/2017	CL2, INST TECH MIN LIMIT			1.06		
VA0068110	2/10/2017	CL2, INST TECH MIN LIMIT			1.38		
VA0068110	3/10/2017	CL2, INST TECH MIN LIMIT			1.07		
VA0068110	4/10/2017	CL2, INST TECH MIN LIMIT			1.15		
VA0068110	5/10/2017	CL2, INST TECH MIN LIMIT			1.05		
VA0068110	1/10/2012	CL2, TOTAL CONTACT			1.01		
VA0068110	2/10/2012	CL2, TOTAL CONTACT			1.01		
VA0068110	3/10/2012	CL2, TOTAL CONTACT			1.02		
VA0068110	4/10/2012	CL2, TOTAL CONTACT			0.82		
VA0068110	5/10/2012	CL2, TOTAL CONTACT			0.79		
VA0068110	6/10/2012	CL2, TOTAL CONTACT			0.84		
VA0068110	7/10/2012	CL2, TOTAL CONTACT			0.72		
VA0068110	8/10/2012	CL2, TOTAL CONTACT			0.8		
VA0068110	9/10/2012	CL2, TOTAL CONTACT			1.01		
VA0068110	10/10/2012	CL2, TOTAL CONTACT			0.83		
VA0068110	11/10/2012	CL2, TOTAL CONTACT			1.02		
VA0068110	12/10/2012	CL2, TOTAL CONTACT			1.03		
VA0068110	1/10/2013	CL2, TOTAL CONTACT			1.01		

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	2/10/2013	CL2, TOTAL CONTACT			0.89		
VA0068110	3/10/2013	CL2, TOTAL CONTACT			1.22		
VA0068110	4/10/2013	CL2, TOTAL CONTACT			1.07		
VA0068110	5/10/2013	CL2, TOTAL CONTACT			1.04		
VA0068110	6/10/2013	CL2, TOTAL CONTACT			0.93		
VA0068110	7/10/2013	CL2, TOTAL CONTACT			1.01		
VA0068110	8/10/2013	CL2, TOTAL CONTACT			0.87		
VA0068110	9/10/2013	CL2, TOTAL CONTACT			0.77		
VA0068110	10/10/2013	CL2, TOTAL CONTACT			0.53		
VA0068110	11/10/2013	CL2, TOTAL CONTACT			1.06		
VA0068110	12/10/2013	CL2, TOTAL CONTACT			1.01		
VA0068110	1/10/2014	CL2, TOTAL CONTACT			1.02		
VA0068110	2/10/2014	CL2, TOTAL CONTACT			1.13		
VA0068110	3/10/2014	CL2, TOTAL CONTACT			1		
VA0068110	4/10/2014	CL2, TOTAL CONTACT			1.03		
VA0068110	5/10/2014	CL2, TOTAL CONTACT			1.02		
VA0068110	6/10/2014	CL2, TOTAL CONTACT			0.86		
VA0068110	7/10/2014	CL2, TOTAL CONTACT			1.03		
VA0068110	8/10/2014	CL2, TOTAL CONTACT			0.87		
VA0068110	9/10/2014	CL2, TOTAL CONTACT			0.75		
VA0068110	10/10/2014	CL2, TOTAL CONTACT			0.68		
VA0068110	11/10/2014	CL2, TOTAL CONTACT			0.69		
VA0068110	12/10/2014	CL2, TOTAL CONTACT			1.08		
VA0068110	1/10/2015	CL2, TOTAL CONTACT			1.07		
VA0068110	2/10/2015	CL2, TOTAL CONTACT			0.68		
VA0068110	3/10/2015	CL2, TOTAL CONTACT			1.2		
VA0068110	4/10/2015	CL2, TOTAL CONTACT			1.26		
VA0068110	5/10/2015	CL2, TOTAL CONTACT			1.04		
VA0068110	6/10/2015	CL2, TOTAL CONTACT			0.97		
VA0068110	7/10/2015	CL2, TOTAL CONTACT			1.04		
VA0068110	8/10/2015	CL2, TOTAL CONTACT			1.03		
VA0068110	9/10/2015	CL2, TOTAL CONTACT			0.8		
VA0068110	10/10/2015	CL2, TOTAL CONTACT			1.03		
VA0068110	11/10/2015	CL2, TOTAL CONTACT			1.05		
VA0068110	12/10/2015	CL2, TOTAL CONTACT			1.09		
VA0068110	1/10/2016	CL2, TOTAL CONTACT			1.03		
VA0068110	2/10/2016	CL2, TOTAL CONTACT			1.03		
VA0068110	3/10/2016	CL2, TOTAL CONTACT			1.16		
VA0068110	4/10/2016	CL2, TOTAL CONTACT			1.04		
VA0068110	5/10/2016	CL2, TOTAL CONTACT			1.01		
VA0068110	6/10/2016	CL2, TOTAL CONTACT			1.19		
VA0068110	7/10/2016	CL2, TOTAL CONTACT			1.04		
VA0068110	8/10/2016	CL2, TOTAL CONTACT			1.11		
VA0068110	9/10/2016	CL2, TOTAL CONTACT			1		
VA0068110	10/10/2016	CL2, TOTAL CONTACT			0.98		
VA0068110	11/10/2016	CL2, TOTAL CONTACT			0.78		
VA0068110	12/10/2016	CL2, TOTAL CONTACT			1.15		
VA0068110	1/10/2017	CL2, TOTAL CONTACT			1.06		
VA0068110	2/10/2017	CL2, TOTAL CONTACT			1.38		
VA0068110	3/10/2017	CL2, TOTAL CONTACT			1.07		
VA0068110	4/10/2017	CL2, TOTAL CONTACT			1.15		
VA0068110	5/10/2017	CL2, TOTAL CONTACT			1.05		

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	1/10/2014	COPPER, TOTAL RECOVERABLE				6.1	6.1
VA0068110	1/10/2015	COPPER, TOTAL RECOVERABLE				7.72	7.72
VA0068110	1/10/2016	COPPER, TOTAL RECOVERABLE				4.53	4.53
VA0068110	1/10/2017	COPPER, TOTAL RECOVERABLE				5.43	7
VA0068110	1/10/2012	DO			7.7		
VA0068110	2/10/2012	DO			8		
VA0068110	3/10/2012	DO			7.6		
VA0068110	4/10/2012	DO			6.6		
VA0068110	5/10/2012	DO			6.1		
VA0068110	6/10/2012	DO			6.5		
VA0068110	7/10/2012	DO			7.5		
VA0068110	8/10/2012	DO			6.1		
VA0068110	9/10/2012	DO			6.5		
VA0068110	10/10/2012	DO			6.5		
VA0068110	11/10/2012	DO			7.1		
VA0068110	12/10/2012	DO			6.7		
VA0068110	1/10/2013	DO			7.3		
VA0068110	2/10/2013	DO			8.4		
VA0068110	3/10/2013	DO			8.4		
VA0068110	4/10/2013	DO			8.5		
VA0068110	5/10/2013	DO			7.9		
VA0068110	6/10/2013	DO			6.3		
VA0068110	7/10/2013	DO			6.3		
VA0068110	8/10/2013	DO			6.3		
VA0068110	9/10/2013	DO			6.6		
VA0068110	10/10/2013	DO			6.5		
VA0068110	11/10/2013	DO			7		
VA0068110	12/10/2013	DO			7.8		
VA0068110	1/10/2014	DO			7.7		
VA0068110	2/10/2014	DO			8.7		
VA0068110	3/10/2014	DO			8		
VA0068110	4/10/2014	DO			8.5		
VA0068110	5/10/2014	DO			7.5		
VA0068110	6/10/2014	DO			7.1		
VA0068110	7/10/2014	DO			6.7		
VA0068110	8/10/2014	DO			7		
VA0068110	9/10/2014	DO			7		
VA0068110	10/10/2014	DO			6.4		
VA0068110	11/10/2014	DO			6.7		
VA0068110	12/10/2014	DO			7.7		
VA0068110	1/10/2015	DO			8.8		
VA0068110	2/10/2015	DO			8.7		
VA0068110	3/10/2015	DO			8.2		
VA0068110	4/10/2015	DO			8.6		
VA0068110	5/10/2015	DO			7.1		
VA0068110	6/10/2015	DO			6.7		
VA0068110	7/10/2015	DO			6.2		
VA0068110	8/10/2015	DO			6.8		
VA0068110	9/10/2015	DO			6.7		
VA0068110	10/10/2015	DO			6.6		
VA0068110	11/10/2015	DO			6.9		
VA0068110	12/10/2015	DO			8		

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	1/10/2016	DO			7.5		
VA0068110	2/10/2016	DO			7.3		
VA0068110	3/10/2016	DO			8.1		
VA0068110	4/10/2016	DO			7.7		
VA0068110	5/10/2016	DO			7.2		
VA0068110	6/10/2016	DO			7		
VA0068110	7/10/2016	DO			6.5		
VA0068110	8/10/2016	DO			6.1		
VA0068110	9/10/2016	DO			6.3		
VA0068110	10/10/2016	DO			6.7		
VA0068110	11/10/2016	DO			7.1		
VA0068110	12/10/2016	DO			6.8		
VA0068110	1/10/2017	DO			7.3		
VA0068110	2/10/2017	DO			8.2		
VA0068110	3/10/2017	DO			7.6		
VA0068110	4/10/2017	DO			8		
VA0068110	5/10/2017	DO			6.7		
VA0068110	1/10/2012	E.COLI				1	
VA0068110	2/10/2012	E.COLI				1	
VA0068110	3/10/2012	E.COLI				1	
VA0068110	4/10/2012	E.COLI				1	
VA0068110	5/10/2012	E.COLI				1	
VA0068110	6/10/2012	E.COLI				1	
VA0068110	7/10/2012	E.COLI				1	
VA0068110	8/10/2012	E.COLI				1	
VA0068110	9/10/2012	E.COLI				1	
VA0068110	10/10/2012	E.COLI				1	
VA0068110	11/10/2012	E.COLI				1	
VA0068110	12/10/2012	E.COLI				1	
VA0068110	1/10/2013	E.COLI				1	
VA0068110	2/10/2013	E.COLI				1	
VA0068110	3/10/2013	E.COLI				1.4	
VA0068110	4/10/2013	E.COLI				1	
VA0068110	5/10/2013	E.COLI				1	
VA0068110	6/10/2013	E.COLI				2	
VA0068110	7/10/2013	E.COLI				1	
VA0068110	8/10/2013	E.COLI				1	
VA0068110	9/10/2013	E.COLI				1	
VA0068110	10/10/2013	E.COLI				2	
VA0068110	11/10/2013	E.COLI				1	
VA0068110	12/10/2013	E.COLI				1	
VA0068110	1/10/2014	E.COLI				1	
VA0068110	2/10/2014	E.COLI				1	
VA0068110	3/10/2014	E.COLI				1.05	
VA0068110	4/10/2014	E.COLI				1	
VA0068110	5/10/2014	E.COLI				1	
VA0068110	6/10/2014	E.COLI				1	
VA0068110	7/10/2014	E.COLI				1	
VA0068110	8/10/2014	E.COLI				1	
VA0068110	9/10/2014	E.COLI				1	
VA0068110	10/10/2014	E.COLI				1	
VA0068110	11/10/2014	E.COLI				1	

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	12/10/2014	E.COLI				1	
VA0068110	1/10/2015	E.COLI				1	
VA0068110	2/10/2015	E.COLI				1	
VA0068110	3/10/2015	E.COLI				1.15	
VA0068110	4/10/2015	E.COLI				1	
VA0068110	5/10/2015	E.COLI				1	
VA0068110	6/10/2015	E.COLI				1	
VA0068110	7/10/2015	E.COLI				1	
VA0068110	8/10/2015	E.COLI				1	
VA0068110	9/10/2015	E.COLI				1	
VA0068110	10/10/2015	E.COLI				1	
VA0068110	11/10/2015	E.COLI				1	
VA0068110	12/10/2015	E.COLI				1	
VA0068110	1/10/2016	E.COLI				1	
VA0068110	2/10/2016	E.COLI				2	
VA0068110	3/10/2016	E.COLI				1.48	
VA0068110	4/10/2016	E.COLI				2	
VA0068110	5/10/2016	E.COLI				1	
VA0068110	6/10/2016	E.COLI				1	
VA0068110	7/10/2016	E.COLI				1	
VA0068110	8/10/2016	E.COLI				1	
VA0068110	9/10/2016	E.COLI				1	
VA0068110	10/10/2016	E.COLI				2	
VA0068110	11/10/2016	E.COLI				1	
VA0068110	12/10/2016	E.COLI				1	
VA0068110	1/10/2017	E.COLI				1	
VA0068110	2/10/2017	E.COLI				1	
VA0068110	3/10/2017	E.COLI				1	
VA0068110	4/10/2017	E.COLI				2	
VA0068110	5/10/2017	E.COLI				1	
VA0068110	1/10/2012	FLOW	2.29	5.01			
VA0068110	2/10/2012	FLOW	2.15	3.91			
VA0068110	3/10/2012	FLOW	2.05	3.23			
VA0068110	4/10/2012	FLOW	2.14	4.36			
VA0068110	5/10/2012	FLOW	1.73	2.68			
VA0068110	6/10/2012	FLOW	1.96	3.22			
VA0068110	7/10/2012	FLOW	1.86	2.57			
VA0068110	8/10/2012	FLOW	1.74	1.92			
VA0068110	9/10/2012	FLOW	1.93	2.54			
VA0068110	10/10/2012	FLOW	1.91	2.9			
VA0068110	11/10/2012	FLOW	1.92	3.8			
VA0068110	12/10/2012	FLOW	1.81	2.42			
VA0068110	1/10/2013	FLOW	1.79	2.99			
VA0068110	2/10/2013	FLOW	2.16	3.77			
VA0068110	3/10/2013	FLOW	2.05	2.83			
VA0068110	4/10/2013	FLOW	2.4	4.02			
VA0068110	5/10/2013	FLOW	1.69	2.32			
VA0068110	6/10/2013	FLOW	1.8	3.03			
VA0068110	7/10/2013	FLOW	2.65	4.47			
VA0068110	8/10/2013	FLOW	2.21	2.78			
VA0068110	9/10/2013	FLOW	1.99	3.34			
VA0068110	10/10/2013	FLOW	1.83	2.12			

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	11/10/2013	FLOW	1.82	2.93			
VA0068110	12/10/2013	FLOW	1.46	3.64			
VA0068110	1/10/2014	FLOW	2.1	3.6			
VA0068110	2/10/2014	FLOW	1.98	3.49			
VA0068110	3/10/2014	FLOW	2.2	3.57			
VA0068110	4/10/2014	FLOW	2.06	4.05			
VA0068110	5/10/2014	FLOW	2.21	5.3			
VA0068110	6/10/2014	FLOW	3.12	4.99			
VA0068110	7/10/2014	FLOW	2.25	2.98			
VA0068110	8/10/2014	FLOW	1.85	3.24			
VA0068110	9/10/2014	FLOW	1.73	2.82			
VA0068110	10/10/2014	FLOW	1.69	2			
VA0068110	11/10/2014	FLOW	1.66	2.54			
VA0068110	12/10/2014	FLOW	1.51	2.59			
VA0068110	1/10/2015	FLOW	1.74	3.19			
VA0068110	2/10/2015	FLOW	1.83	3.7			
VA0068110	3/10/2015	FLOW	2.21	3.56			
VA0068110	4/10/2015	FLOW	2.36	3.76			
VA0068110	5/10/2015	FLOW	2.37	5			
VA0068110	6/10/2015	FLOW	1.79	2.15			
VA0068110	7/10/2015	FLOW	1.89	3.65			
VA0068110	8/10/2015	FLOW	1.77	2.79			
VA0068110	9/10/2015	FLOW	1.58	1.71			
VA0068110	10/10/2015	FLOW	1.65	2.24			
VA0068110	11/10/2015	FLOW	2.23	3.96			
VA0068110	12/10/2015	FLOW	1.82	2.64			
VA0068110	1/10/2016	FLOW	2.12	3.47			
VA0068110	2/10/2016	FLOW	2.28	3.74			
VA0068110	3/10/2016	FLOW	2.81	4.6			
VA0068110	4/10/2016	FLOW	2.23	2.72			
VA0068110	5/10/2016	FLOW	2.22	2.54			
VA0068110	6/10/2016	FLOW	3.08	4.92			
VA0068110	7/10/2016	FLOW	2.51	3.75			
VA0068110	8/10/2016	FLOW	2.33	2.92			
VA0068110	9/10/2016	FLOW	2.08	2.5			
VA0068110	10/10/2016	FLOW	2.39	4.84			
VA0068110	11/10/2016	FLOW	2.52	4.12			
VA0068110	12/10/2016	FLOW	2.09	2.37			
VA0068110	1/10/2017	FLOW	2.05	2.83			
VA0068110	2/10/2017	FLOW	2.4	4			
VA0068110	3/10/2017	FLOW	2.14	2.6			
VA0068110	4/10/2017	FLOW	2.39	4.66			
VA0068110	5/10/2017	FLOW	2.51	3.97			
VA0068110	1/10/2012	pH			6.5		6.9
VA0068110	2/10/2012	pH			6.5		6.9
VA0068110	3/10/2012	pH			6.7		7
VA0068110	4/10/2012	pH			6.5		7.1
VA0068110	5/10/2012	pH			6.7		7.1
VA0068110	6/10/2012	pH			6.5		7
VA0068110	7/10/2012	pH			6.8		7.2
VA0068110	8/10/2012	pH			6.6		7.2
VA0068110	9/10/2012	pH			6.9		7.2

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	10/10/2012	pH			6.5		7.3
VA0068110	11/10/2012	pH			6.2		7.2
VA0068110	12/10/2012	pH			6.6		7.2
VA0068110	1/10/2013	pH			6.8		7.2
VA0068110	2/10/2013	pH			6.7		7.1
VA0068110	3/10/2013	pH			6.6		7.1
VA0068110	4/10/2013	pH			6.6		7.3
VA0068110	5/10/2013	pH			6.7		7.2
VA0068110	6/10/2013	pH			6.7		7.1
VA0068110	7/10/2013	pH			6.6		7.1
VA0068110	8/10/2013	pH			6.6		7.1
VA0068110	9/10/2013	pH			6.8		7.3
VA0068110	10/10/2013	pH			6.9		7.3
VA0068110	11/10/2013	pH			6.3		7.3
VA0068110	12/10/2013	pH			6.4		7.2
VA0068110	1/10/2014	pH			6.7		7.1
VA0068110	2/10/2014	pH			6.7		7.1
VA0068110	3/10/2014	pH			6.6		7.1
VA0068110	4/10/2014	pH			6.6		7.1
VA0068110	5/10/2014	pH			6.5		7
VA0068110	6/10/2014	pH			6.6		7
VA0068110	7/10/2014	pH			6.7		7.1
VA0068110	8/10/2014	pH			6.7		7.1
VA0068110	9/10/2014	pH			6.8		7.3
VA0068110	10/10/2014	pH			6.6		7.4
VA0068110	11/10/2014	pH			6.8		7.7
VA0068110	12/10/2014	pH			6.6		7.4
VA0068110	1/10/2015	pH			6.5		7.3
VA0068110	2/10/2015	pH			6		7.1
VA0068110	3/10/2015	pH			6.3		7
VA0068110	4/10/2015	pH			6.4		6.9
VA0068110	5/10/2015	pH			6.1		7.1
VA0068110	6/10/2015	pH			6.1		7.1
VA0068110	7/10/2015	pH			6.6		7.1
VA0068110	8/10/2015	pH			6.1		7.2
VA0068110	9/10/2015	pH			6.6		7.4
VA0068110	10/10/2015	pH			6.7		7.5
VA0068110	11/10/2015	pH			6.9		7.5
VA0068110	12/10/2015	pH			6.6		7.5
VA0068110	1/10/2016	pH			6.5		7.2
VA0068110	2/10/2016	pH			6.3		7
VA0068110	3/10/2016	pH			6.6		7.2
VA0068110	4/10/2016	pH			6.6		7.2
VA0068110	5/10/2016	pH			6.8		7.1
VA0068110	6/10/2016	pH			6.7		7.2
VA0068110	7/10/2016	pH			6.7		7.1
VA0068110	8/10/2016	pH			6.6		7.2
VA0068110	9/10/2016	pH			6.7		7.3
VA0068110	10/10/2016	pH			6.9		7.3
VA0068110	11/10/2016	pH			6.7		7.3
VA0068110	12/10/2016	pH			6.6		7.2
VA0068110	1/10/2017	pH			6.6		7.2

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	2/10/2017	pH			6.4		7
VA0068110	3/10/2017	pH			6.5		7
VA0068110	4/10/2017	pH			6.6		7.1
VA0068110	5/10/2017	pH			6.6		7.1
VA0068110	1/10/2012	PHOSPHORUS, TOTAL (AS P)	3			0.17	
VA0068110	2/10/2012	PHOSPHORUS, TOTAL (AS P)	3			0.2	
VA0068110	3/10/2012	PHOSPHORUS, TOTAL (AS P)	2.25			0.14	
VA0068110	4/10/2012	PHOSPHORUS, TOTAL (AS P)	3			0.19	
VA0068110	5/10/2012	PHOSPHORUS, TOTAL (AS P)	4			0.23	
VA0068110	6/10/2012	PHOSPHORUS, TOTAL (AS P)	6			0.37	
VA0068110	7/10/2012	PHOSPHORUS, TOTAL (AS P)	6			0.4	
VA0068110	8/10/2012	PHOSPHORUS, TOTAL (AS P)	8			0.56	
VA0068110	9/10/2012	PHOSPHORUS, TOTAL (AS P)	5			0.29	
VA0068110	10/10/2012	PHOSPHORUS, TOTAL (AS P)	5			0.28	
VA0068110	11/10/2012	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	12/10/2012	PHOSPHORUS, TOTAL (AS P)	3			0.17	
VA0068110	1/10/2013	PHOSPHORUS, TOTAL (AS P)	2			0.18	
VA0068110	2/10/2013	PHOSPHORUS, TOTAL (AS P)	2			0.14	
VA0068110	3/10/2013	PHOSPHORUS, TOTAL (AS P)	3.5			0.2	
VA0068110	4/10/2013	PHOSPHORUS, TOTAL (AS P)	6			0.25	
VA0068110	5/10/2013	PHOSPHORUS, TOTAL (AS P)	3			0.21	
VA0068110	6/10/2013	PHOSPHORUS, TOTAL (AS P)	3			0.19	
VA0068110	7/10/2013	PHOSPHORUS, TOTAL (AS P)	4			0.17	
VA0068110	8/10/2013	PHOSPHORUS, TOTAL (AS P)	3			0.18	
VA0068110	9/10/2013	PHOSPHORUS, TOTAL (AS P)	3			0.19	
VA0068110	10/10/2013	PHOSPHORUS, TOTAL (AS P)	4			0.23	
VA0068110	11/10/2013	PHOSPHORUS, TOTAL (AS P)	3			0.18	
VA0068110	12/10/2013	PHOSPHORUS, TOTAL (AS P)	5			0.35	
VA0068110	1/10/2014	PHOSPHORUS, TOTAL (AS P)	4			0.21	
VA0068110	2/10/2014	PHOSPHORUS, TOTAL (AS P)	5			0.31	
VA0068110	3/10/2014	PHOSPHORUS, TOTAL (AS P)	9.5			0.53	
VA0068110	4/10/2014	PHOSPHORUS, TOTAL (AS P)	8			0.5	
VA0068110	5/10/2014	PHOSPHORUS, TOTAL (AS P)	5			0.21	
VA0068110	6/10/2014	PHOSPHORUS, TOTAL (AS P)	5			0.21	
VA0068110	7/10/2014	PHOSPHORUS, TOTAL (AS P)	3			0.17	
VA0068110	8/10/2014	PHOSPHORUS, TOTAL (AS P)	11			0.65	
VA0068110	9/10/2014	PHOSPHORUS, TOTAL (AS P)	9			0.54	
VA0068110	10/10/2014	PHOSPHORUS, TOTAL (AS P)	5			0.32	
VA0068110	11/10/2014	PHOSPHORUS, TOTAL (AS P)	2			0.14	
VA0068110	12/10/2014	PHOSPHORUS, TOTAL (AS P)	1			0.13	
VA0068110	1/10/2015	PHOSPHORUS, TOTAL (AS P)	3			0.16	
VA0068110	2/10/2015	PHOSPHORUS, TOTAL (AS P)	2			0.14	
VA0068110	3/10/2015	PHOSPHORUS, TOTAL (AS P)	3.75			0.2	
VA0068110	4/10/2015	PHOSPHORUS, TOTAL (AS P)	3			0.17	
VA0068110	5/10/2015	PHOSPHORUS, TOTAL (AS P)	4			0.17	
VA0068110	6/10/2015	PHOSPHORUS, TOTAL (AS P)	2			0.13	
VA0068110	7/10/2015	PHOSPHORUS, TOTAL (AS P)	5			0.37	
VA0068110	8/10/2015	PHOSPHORUS, TOTAL (AS P)	4			0.27	
VA0068110	9/10/2015	PHOSPHORUS, TOTAL (AS P)	4			0.3	
VA0068110	10/10/2015	PHOSPHORUS, TOTAL (AS P)	3			0.24	
VA0068110	11/10/2015	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	12/10/2015	PHOSPHORUS, TOTAL (AS P)	3			0.15	

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	1/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	2/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	3/10/2016	PHOSPHORUS, TOTAL (AS P)	4.5			0.18	
VA0068110	4/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	5/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	6/10/2016	PHOSPHORUS, TOTAL (AS P)	4			0.14	
VA0068110	7/10/2016	PHOSPHORUS, TOTAL (AS P)	4			0.18	
VA0068110	8/10/2016	PHOSPHORUS, TOTAL (AS P)	5			0.26	
VA0068110	9/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.19	
VA0068110	10/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.19	
VA0068110	11/10/2016	PHOSPHORUS, TOTAL (AS P)	5			0.22	
VA0068110	12/10/2016	PHOSPHORUS, TOTAL (AS P)	3			0.16	
VA0068110	1/10/2017	PHOSPHORUS, TOTAL (AS P)	3			0.15	
VA0068110	2/10/2017	PHOSPHORUS, TOTAL (AS P)	4			0.18	
VA0068110	3/10/2017	PHOSPHORUS, TOTAL (AS P)	3.5			0.19	
VA0068110	4/10/2017	PHOSPHORUS, TOTAL (AS P)	5			0.23	
VA0068110	5/10/2017	PHOSPHORUS, TOTAL (AS P)	4			0.18	
VA0068110	6/10/2012	TKN, MAY-OCT	17.1	20.53		1.05	1.06
VA0068110	7/10/2012	TKN, MAY-OCT	16.99	20.41		1.1	1.31
VA0068110	8/10/2012	TKN, MAY-OCT	15.81	19		1.09	1.26
VA0068110	9/10/2012	TKN, MAY-OCT	19.18	25.84		1.19	1.61
VA0068110	10/10/2012	TKN, MAY-OCT	16.1	18.85		1.02	1.23
VA0068110	11/10/2012	TKN, MAY-OCT	21.77	33.54		1.41	2.4
VA0068110	6/10/2013	TKN, MAY-OCT	12.77	14.45		0.84	0.93
VA0068110	7/10/2013	TKN, MAY-OCT	25.63	34.99		1.13	1.6
VA0068110	8/10/2013	TKN, MAY-OCT	29.71	38.42		1.58	1.86
VA0068110	9/10/2013	TKN, MAY-OCT	25.9	38.39		1.52	1.95
VA0068110	10/10/2013	TKN, MAY-OCT	22.2	25.75		1.45	1.7
VA0068110	11/10/2013	TKN, MAY-OCT	12.71	13.99		0.85	0.95
VA0068110	6/10/2014	TKN, MAY-OCT	29.51	38.24		1.11	1.35
VA0068110	7/10/2014	TKN, MAY-OCT	22.02	23.99		1.19	1.42
VA0068110	8/10/2014	TKN, MAY-OCT	22.67	25.6		1.46	1.68
VA0068110	9/10/2014	TKN, MAY-OCT	14.99	19.31		1.03	1.2
VA0068110	10/10/2014	TKN, MAY-OCT	12.15	12.99		0.86	0.99
VA0068110	11/10/2014	TKN, MAY-OCT	11.1	11.73		0.81	0.81
VA0068110	6/10/2015	TKN, MAY-OCT	14.48	16.75		0.97	1.08
VA0068110	7/10/2015	TKN, MAY-OCT	16.77	17.16		1.07	1.16
VA0068110	8/10/2015	TKN, MAY-OCT	13	14.25		0.89	0.92
VA0068110	9/10/2015	TKN, MAY-OCT	10.79	12.15		0.81	0.94
VA0068110	10/10/2015	TKN, MAY-OCT	12.01	15.35		0.88	1.21
VA0068110	11/10/2015	TKN, MAY-OCT	15.62	20.01		0.82	1
VA0068110	6/10/2016	TKN, MAY-OCT	21.7	29.97		0.83	1.14
VA0068110	7/10/2016	TKN, MAY-OCT	16.5	16.1		0.76	0.77
VA0068110	8/10/2016	TKN, MAY-OCT	21.28	25.72		1.08	1.19
VA0068110	9/10/2016	TKN, MAY-OCT	17.33	20.55		1.02	1.27
VA0068110	10/10/2016	TKN, MAY-OCT	19.42	21.86		0.98	1.16
VA0068110	11/10/2016	TKN, MAY-OCT	21.7	25.11		1.04	1.18
VA0068110	1/10/2012	TSS	30.58	58.72		3.21	4.33
VA0068110	2/10/2012	TSS	31.64	41.54		3.82	4.53
VA0068110	3/10/2012	TSS	19.38	18.16		2.49	2.37
VA0068110	4/10/2012	TSS	18.83	21.35		2.28	2.94
VA0068110	5/10/2012	TSS	20.97	31.61		3.12	4.13

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	6/10/2012	TSS	19.96	25.56		2.72	2.99
VA0068110	7/10/2012	TSS	15.65	19.17		2.13	2.6
VA0068110	8/10/2012	TSS	7.99	11.33		1.22	1.81
VA0068110	9/10/2012	TSS	20.19	39.9		2.74	5.47
VA0068110	10/10/2012	TSS	13.53	14.25		1.87	2.14
VA0068110	11/10/2012	TSS	22.58	24.97		3.03	3.56
VA0068110	12/10/2012	TSS	21.53	24.35		3.15	3.47
VA0068110	1/10/2013	TSS	17.61	24.5		2.57	2.9
VA0068110	2/10/2013	TSS	24.5	32.33		2.92	3.94
VA0068110	3/10/2013	TSS	26.45	29.19		3.41	3.86
VA0068110	4/10/2013	TSS	51.38	72.17		5.36	6.6
VA0068110	5/10/2013	TSS	18.66	20.08		3	3.03
VA0068110	6/10/2013	TSS	17.33	17.8		2.52	2.31
VA0068110	7/10/2013	TSS	32.26	69.75		2.93	5.27
VA0068110	8/10/2013	TSS	31.44	37.77		3.74	4.17
VA0068110	9/10/2013	TSS	15.49	21.71		2.04	2.63
VA0068110	10/10/2013	TSS	17.79	20.14		2.56	2.89
VA0068110	11/10/2013	TSS	17.97	22.46		2.58	2.69
VA0068110	12/10/2013	TSS	19.57	23.18		3.5	4.1
VA0068110	1/10/2014	TSS	21.8	35.85		2.6	3.54
VA0068110	2/10/2014	TSS	24.72	32.23		3.3	3.84
VA0068110	3/10/2014	TSS	44.61	71.99		4.99	6.41
VA0068110	4/10/2014	TSS	49.44	96.28		6.32	12.64
VA0068110	5/10/2014	TSS	38.05	35.45		4.28	4.26
VA0068110	6/10/2014	TSS	57.17	68.68		4.61	5.37
VA0068110	7/10/2014	TSS	30.8	47.4		3.54	4.89
VA0068110	8/10/2014	TSS	22.74	31.96		3.27	4.81
VA0068110	9/10/2014	TSS	6.34	11.94		0.98	1.93
VA0068110	10/10/2014	TSS	5.64	6.98		0.89	1.14
VA0068110	11/10/2014	TSS	6.14	10.71		0.97	1.67
VA0068110	12/10/2014	TSS	6.81	8.5		1.2	1.5
VA0068110	1/10/2015	TSS	12.05	18.59		1.78	2.4
VA0068110	2/10/2015	TSS	14.31	23.68		1.97	2.96
VA0068110	3/10/2015	TSS	34.12	38.44		4.01	4.67
VA0068110	4/10/2015	TSS	28.26	44.47		3.05	4.04
VA0068110	5/10/2015	TSS	31.59	55.58		3.32	4.23
VA0068110	6/10/2015	TSS	8.74	10.68		1.29	1.51
VA0068110	7/10/2015	TSS	11.08	15.29		1.48	1.66
VA0068110	8/10/2015	TSS	7.38	7.53		1.1	1.04
VA0068110	9/10/2015	TSS	4.07	7.35		0.67	1.2
VA0068110	10/10/2015	TSS	2.94	4.12		0.47	0.76
VA0068110	11/10/2015	TSS	13.26	26.78		1.34	2.29
VA0068110	12/10/2015	TSS	5.18	9.46		0.75	1.27
VA0068110	1/10/2016	TSS	14.29	20.02		1.73	2.16
VA0068110	2/10/2016	TSS	16.76	24.9		1.92	2.46
VA0068110	3/10/2016	TSS	23.33	27.47		2.14	2.43
VA0068110	4/10/2016	TSS	16.73	20.1		1.99	2.23
VA0068110	5/10/2016	TSS	17.57	19.5		2.08	2.29
VA0068110	6/10/2016	TSS	18.92	29.92		1.6	2.56
VA0068110	7/10/2016	TSS	4.59	5.1		0.43	0.5
VA0068110	8/10/2016	TSS	13.01	19.69		1.44	1.99
VA0068110	9/10/2016	TSS	6.35	8.16		0.81	1.11

Permit Number	Due Date	Par Description	Quantity Average	Quantity Maximum	Concentration Min	Concentration Average	Concentration Max
VA0068110	10/10/2016	TSS	11.46	13.25		1.08	1.56
VA0068110	11/10/2016	TSS	25.71	37.85		2.61	3.41
VA0068110	12/10/2016	TSS	11.4	13.26		1.44	1.63
VA0068110	1/10/2017	TSS	13.24	16.3		1.71	2.13
VA0068110	2/10/2017	TSS	22.99	29.19		2.49	3.3
VA0068110	3/10/2017	TSS	25.5	34.8		3.2	4.3
VA0068110	4/10/2017	TSS	40.82	73		4.34	6.37
VA0068110	5/10/2017	TSS	28.42	50.17		2.88	4.57
VA0068110	2/10/2012	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1
VA0068110	2/10/2013	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1
VA0068110	1/10/2014	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1
VA0068110	1/10/2015	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1
VA0068110	1/10/2016	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1.47
VA0068110	1/10/2017	TUc - CHRONIC 3-BROOD STATRE CERIODAPHNIA DUBIA					1
VA0068110	2/10/2012	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	2/10/2013	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	1/10/2014	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	1/10/2015	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	1/10/2016	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	1/10/2017	TUc - CHRONIC 7-DAY STATRE PIMEPHALES PROMELAS					1
VA0068110	3/10/2012	ZINC, TOTAL RECOVERABLE				<QL	<QL
VA0068110	6/10/2012	ZINC, TOTAL RECOVERABLE				<QL	<QL
VA0068110	9/10/2012	ZINC, TOTAL RECOVERABLE				<QL	<QL
VA0068110	12/10/2012	ZINC, TOTAL RECOVERABLE				53	53
VA0068110	1/10/2014	ZINC, TOTAL RECOVERABLE				<QL	<QL
VA0068110	1/10/2015	ZINC, TOTAL RECOVERABLE				57	57
VA0068110	1/10/2016	ZINC, TOTAL RECOVERABLE				44.4	44.4
VA0068110	1/10/2017	ZINC, TOTAL RECOVERABLE				37.43	48

Permit Number	Due Date	Par Description	Concentration	Concentration Average	Source
VA0068110	6/20/2013	COPPER, TOTAL RECOVERABLE	6.1	6.1	DMR
VA0068110	9/23/2014	COPPER, TOTAL RECOVERABLE	7.72	7.72	DMR
VA0068110	8/18/2015	COPPER, TOTAL RECOVERABLE	4.53	4.53	DMR
VA0068110	2/25/2016	COPPER, TOTAL RECOVERABLE	2.72		DMR
VA0068112	7/14/2016	COPPER, TOTAL RECOVERABLE	6	5.43	FORM 2A
VA0068113	7/14/2016	COPPER, TOTAL RECOVERABLE	6		FORM 2A
VA0068114	8/10/2016	COPPER, TOTAL RECOVERABLE	7		FORM 2A
VA0068111	5/23/2017	COPPER, TOTAL RECOVERABLE	6	6	DMR
VA0068110	6/20/2013	ZINC, TOTAL RECOVERABLE	22	22	DMR
VA0068110	9/23/2014	ZINC, TOTAL RECOVERABLE	57	57	DMR
VA0068110	8/18/2015	ZINC, TOTAL RECOVERABLE	44.4	44.4	DMR
VA0068110	2/25/2016	ZINC, TOTAL RECOVERABLE	48		DMR
VA0068111	7/14/2016	ZINC, TOTAL RECOVERABLE	32	40.5	FORM 2A
VA0068112	7/14/2016	ZINC, TOTAL RECOVERABLE	34		FORM 2A
VA0068113	8/10/2016	ZINC, TOTAL RECOVERABLE	48		FORM 2A
VA0068114	5/23/2017	ZINC, TOTAL RECOVERABLE	27	27	DMR

QL (mg/L)	
Copper	1
Zinc	10

Attachment 13 – Ammonia Limit Evaluation

5/21/2018 10:10:57 AM

Facility = FMC WWTF
Chemical = Ammonia
Chronic averaging period = 30
WLAa   = 46.2
WLAc   = 4.3
Q.L.   = .1
samples/mo. = 28
samples/wk. = 7

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 Chronic Toxicity
Maximum Daily Limit   = 8.67598140169014
Average Weekly limit = 5.29848436765873
Average Monthly LImit = 4.32578504917072

The data are:

 9

Attachment 14 – Pending Ammonia Criteria

Attachment 14a – Pending Ammonia Criteria:

Wasteload Allocation Analysis

EPA Ammonia Criteria Calculations:

Effluent:

90% Maximum pH (SU)	7.1
90% Maximum Temperature (deg C)	25
Design Flow (MGD)	1

Receiving Stream:

90% Maximum pH (SU)	8.99
90% Maximum Temperature (deg C)	28.66
1Q10	1
30Q10	1
Background Concentration (mg/L):	0

Stream/Discharge Mix:

1Q10

90% pH (SU)	7.40
90% Temp (deg C)	26.83

30Q10

90% pH (SU)	7.40
90% Temp (deg C)	26.83

Criteria:

Acute:	6.09
Chronic:	0.98

Wasteload Allocations:

Acute WLA:	12.19
Chronic WLA:	1.95

Conversion		Ratio	
pH	**[H+]**	**1Q10**	**30Q10**
7.1	7.94E-08	4.02E-08	4.02E-08
8.99	1.02E-09		

Attachment 14b – Pending Ammonia Criteria: Limit Evaluation

2/13/2018 10:41:37 AM

Facility = FMC WWTF
Chemical = Ammonia - Annual
Chronic averaging period = 30
WLAa = 12.19
WLAc = 1.95
Q.L. = .1
# samples/mo. = 28
# samples/wk. = 7

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 Chronic Toxicity
Maximum Daily Limit = 3.93445668216181
Average Weekly limit = 2.40280105044989
Average Monthly LImit = 1.96169321997277

The data are:

9

Attachment 15 – Total Residual Chlorine Limit Evaluation

4/25/2018 9:07:52 AM

Facility = FMC WWTF
Chemical = TRC
Chronic averaging period = 4
WLAa   = 38
WLAc   = 22
Q.L.   = 100
samples/mo. = 360
samples/wk. = 90

Summary of Statistics:

observations = 1
Expected Value = 200
Variance   = 14400
C.V.   = 0.6
97th percentile daily values = 486.683
97th percentile 4 day average = 332.758
97th percentile 30 day average= 241.210
< Q.L.   = 0
Model used   = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit   = 32.1766452491711
Average Weekly limit = 14.8618034598637
Average Monthly LImit = 14.0093470820118

The data are:

 200

Attachment 16 – Summary of Data from EPA Form 2A

	Sampling Results Submitted on EPA Form 2a					
	Parameter	Antimony	Copper	Zinc	Chloroform	Dichlorobromomethane
Sample Date	7/6/2016	7	6	32	39	9
	7/12/2016	5	6	34	61	5
	8/2/2016	5	7	48	57	5

Attachment 17 – Copper Limit Evaluation

10/18/2017 2:27:54 PM

Facility = FMC WWTP
Chemical = Copper
Chronic averaging period = 4
WLAa = 14
WLAc = 9.9
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = 5.75875
Variance = 11.9387
C.V. = 0.6
97th percentile daily values = 14.0134
97th percentile 4 day average = 9.58135
97th percentile 30 day average= 6.94535
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 14
Average Weekly limit = 14
Average Monthly LImit = 14

The data are:

6.1
7.72
4.53
2.72
6
6
7
6

Attachment 18 – Zinc Limit Evaluation

8/29/01 10:53:20 AM

Facility = Fredericksburg WWTF
Chemical = Zinc
Chronic averaging period = 4
WLAa = 130.08
WLAc = 117.82
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 7
Expected Value = 68.5714
Variance = 1692.73
C.V. = 0.6
97th percentile daily values = 166.862
97th percentile 4 day average = 114.088
97th percentile 30 day average= 82.7007
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 130.08
Average Weekly limit = 130.08
Average Monthly LImit = 130.08

The data are:

49
57
64
98
72
66
74

Attachment 19 – Summary of WET Testing

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Northern Regional Office
13901 Crown Court **Woodbridge VA 22193** **(703) 583-3800**

SUBJECT: TOXICS MANAGEMENT PROGRAM (TMP) DATA REVIEW
FMC Wastewater Treatment Plant (VA0068110)
REVIEWER: Douglas Frasier
DATE: 5 August 2016

PREVIOUS REVIEW: 24 February 2016

DATA REVIEWED:

This review covers the fourth (4^{th}) annual chronic toxicity tests conducted in May 2016 at Outfall 001.

DISCUSSION:

The results of these toxicity tests, along with the results of previous toxicity tests conducted on effluent samples collected from Outfall 001, are summarized in Table 1.

The chronic toxicity of the effluent samples was determined with a 3-brood static daily renewal survival and reproduction chronic test performed on *C. dubia* and a 7-day daily renewal larval survival and growth test performed on *P. promelas*.

CONCLUSION:

The toxicity tests are valid and the results are acceptable. The test results indicate that the effluent samples from Outfall 001 exhibit no chronic toxicity to the test species.

BIOMONITORING RESULTS

FMC WWTP (VA0068110)

Table 1
Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	48-H LC_{50} (%)	IC_{25} (%)	NOAEC / NOEC (%)	% SURV	TU_a	TU_c	REMARKS
03/16/95	Acute *C. dubia*	>100			100			1st annual
03/13/95	Chronic *C. dubia*			100 S 6.3 R	90			
05/31/95	Chronic *C. dubia*			100 S 25 R	100			Retest
03/14/96	Acute *C. dubia*	>100			95			2nd annual
03/12/96	Chronic *C. dubia*			100 SR	100			
03/05/97	Acute *C. dubia*	>100			100			3rd annual
03/04/97	Chronic *C. dubia*			100 SR	100			
03/11/98	Acute *C. dubia*	>100			100			4th annual
03/09/98	Chronic *C. dubia*			55.2 SR	60			
03/10/99	Acute *C. dubia*	>100			100			5th annual
03/08/99	Chronic *C. dubia*			100 SR	100			
03/15/00	Acute *C. dubia*	>100			100			6th annual
03/13/00	Chronic *C. dubia*			100 SR	100			
03/29/01	Acute *C. dubia*	>100			100			7th annual
03/26/01	Chronic *C. dubia*	>100	59	100 S 55.2 R	100			
Permit Reissued October 4, 2001								
11/28/01	Acute *C. dubia*	>100		100	95	1		1st annual
11/28/01	Acute *P. promelas*	>100		100	100	1		
11/26/01	Chronic *C. dubia*	>100	75.6	67.5 SR	0		1.48	
11/16/01	Chronic *P. promelas*	82.2	75.0	67.5 SG	0		1.48	
04/17/02	Acute *C. dubia*	>100		100	100	1		2nd annual
04/17/02	Acute *P. promelas*	>100		100	100	1		
04/15/02	Chronic *C. dubia*	>100	>100	100 SR	100		1	
04/15/02	Chronic *P. promelas*	>100	>100	100 SG	93		1	
04/14/03	Acute *C. dubia*	>100		100	100	1		3rd annual
04/14/03	Acute *P. promelas*	>100		100	100	1		
04/09/03	Chronic *C. dubia*	>100	>100	100 SR	100		1	
04/09/03	Chronic *P. promelas*	>100	>100	100 SG	88		1	
07/21/04	Acute *C. dubia*	>100		100	100	1		4th annual
07/21/04	Acute *P. promelas*	>100		100	95	1		
07/19/04	Chronic *C. dubia*	>100	>100	100 SR	100		1	
07/19/04	Chronic *P. promelas*	>100	>100	100 SG	98		1	
08/17/05	Acute *C. dubia*	>100		100	100	1		5th annual
08/17/05	Acute *P. promelas*	>100		100	100	1		
08/15/05	Chronic *C. dubia*	>100	85	100 S 67.5 R	100		1	
08/15/05	Chronic *P. promelas*	>100	>100	100 S 67.5 G	90		1	
Permit Reissued 21 August 2007								
09/24/07	Chronic *C. dubia*	>100	83.4	100 S 68 R	100		1.47	1st Annual
09/24/07	Chronic *P. promelas*	>100	>100	100 SG	98		1	

TEST DATE	TEST TYPE/ORGANISM	48-H LC_{50} (%)	IC_{25} (%)	NOAEC / NOEC (%)	% SURV	TU_a	TU_c	REMARKS
06/09/08	Chronic *C. dubia*	>100	>100	100 SR	100		1	2nd Annual
06/09/08	Chronic *P. promelas*	>100	>100	100 S 68 G	93		1.47	
09/22/09	Chronic *C. dubia*	>100	>100	100 SR	100		1	3rd Annual
09/22/09	Chronic *P. promelas*	>100	94.6	100 S 68 G	88		1.47	
08/23/10	Chronic *P. promelas*	>100	>100	100 SG	80		1	4th Annual
08/23/10	Chronic *C. dubia*	>100	>100	100 SR	98		1	
06/20/11	Chronic *P. promelas*	>100	>100	100 S 68 G	100		1.47	5th Annual
06/20/11	Chronic *C. dubia*	>100	>100	100 SR	100		1	
07/30/12	Chronic *P. promelas*	>100	>100	100 SG	100		1	
07/30/12	Chronic *C. dubia*	>100	>100	100 SR	90		1	
Permit Reissued 18 December 2012								
05/20/13	Chronic *C. dubia*	>100	>100	100 SR	100		1	1st Annual
05/20/13	Chronic *P. promelas*	>100	>100	100 SG	98		1	
05/19/14	Chronic *C. dubia*	>100	>100	100 SR	100		1	2nd Annual
05/19/14	Chronic *P. promelas*	>100	>100	100 SG	100		1	
05/04/15	Chronic *C. dubia*	>100	>100	100 S 68 R	100		1.47	3rd Annual
05/04/15	Chronic *P. promelas*	>100	>100	100 SG	95		1	
05/16/16	Chronic *C. dubia*	>100	>100	100 SR	100		1	4th Annual
05/16/16	Chronic *P. promelas*	>100	>100	100 SG	100		1	

FOOTNOTES:

A **bold** faced value for LC_{50} or NOEC indicates that the test failed the criteria.

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth
% SURV – Percent survival in 100% effluent
NOAEC – No observed adverse effect concentration for acute tests
NOEC – No observed effect concentration for chronic tests

Attachment 20 – WET Limit Evaluation

10/26/2017 9:24:44 AM

Facility = FMC
Chemical = C. dubia
Chronic averaging period = 4
WLAa = 3
WLAc = 2
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 4
Expected Value = 1.1175
Variance = .449570
C.V. = 0.6
97th percentile daily values = 2.71934
97th percentile 4 day average = 1.85928
97th percentile 30 day average= 1.34776
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1
1.47
1

10/26/2017 9:25:02 AM

Facility = FMC
Chemical = P. promelas
Chronic averaging period = 4
WLAa = 3
WLAc = 2
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

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

No Limit is required for this material

The data are:

1
1
1
1

Attachment 21 – WET Compliance Endpoints

Spreadsheet for determination of WET test endpoints or WET limits

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

Enter data in the cells with blue type:

Entry Date:	10/26/17
Facility Name:	FMC
VPDES Number:	VA0068110
Outfall Number:	1

Acute Endpoint/Permit Limit

Use as LC_{50} in Special Condition, as TUa on DMR

ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA TUa
ACUTE WLAa		0.3				

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

Chronic Endpoint/Permit Limit

Use as NOEC in Special Condition, as TUc on DMR

CHRONIC	2.92514937	TU_c	NOEC =	35	% Use as	2.85 TU_c
BOTH*	3.00000007	TU_c	NOEC =	34	% Use as	2.94 TU_c
AML	2.92514937	TU_c	NOEC =	35	% Use as	2.85 TU_c

ACUTE WLAa,c	3
CHRONIC WLAc	2

* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.20207454 a limit may result using STATS.EXE

% Flow to be used from MIX.EXE

Plant Flow:	4	MGD	
Acute 1Q10:	1	MGD	100 %
Chronic 7Q10:	1	MGD	100 %

Diffuser /modeling study?

Enter Y/N: y
Acute: 1 :1
Chronic: 2 :1

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

IWC_a	100 %	Plant flow/plant flow + 1Q10	**NOTE: If the IWCa is >33%, specify the**
IWC_c	50 %	Plant flow/plant flow + 7Q10	**NOAEC = 100% test/endpoint for use**

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

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

$LTA_{a,c}$	1.2328341	WLAa,c X's eA					
LTA_c	1.2020746	WLAc X's eB				Rounded NOEC's	%
MDL** with $LTA_{a,c}$	3.000000074	TU_c	NOEC =	33.333333	(Protects from acute/chronic toxicity)	NOEC = 34	%
MDL** with LTA_c	2.925149368	TU_c	NOEC =	34.186288	(Protects from chronic toxicity)	NOEC = 35	%
AML with lowest LTA	2.925149368	TU_c	NOEC =	34.186288	Lowest LTA X's eD	NOEC = 35	

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

							Rounded LC50's	%
MDL with $LTA_{a,c}$	0.300000007	TU_a	LC50 =	333.333325	%	Use NOAEC=100%	LC50 = NA	%
MDL with LTA_c	0.292514937	TU_a	LC50 =	341.862884	%	Use NOAEC=100%	LC50 = NA	

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

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

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA

(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB

(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC

(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD

(P. 100, step 4b of TSD)

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

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

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

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

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

Table 1. ACR using Vertebrate data

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

Table 2. ACR using Invertebrate data

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

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	83.2	1.202075		
Dilution series to use for limit			35	2.8571429
Dilution factor to recommend:	0.9120829		0.591608	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	91.2	1.10	59.2	1.69
	83.2	1.20	35.0	2.86
	75.9	1.32	20.7	4.83
	69.20	1.44	12.3	8.16
Extra dilutions if needed	63.12	1.58	7.2	13.80
	57.57	1.74	4.3	23.32

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

Table 3. ACR used: 10

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

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

enter it here: NO DATA %LC_{50}

NO DATA TUa

Attachment 22 – Public Notice

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 Spotsylvania County, Virginia.

PUBLIC COMMENT PERIOD: June 25, 2018 to July 25, 2018

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

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: County of Spotsylvania, 10900 HCC Dr., Fredericksburg, VA 22408, VA0068110

NAME AND ADDRESS OF FACILITY: FMC Wastewater Treatment Facility, 11801 Capital Lane, Fredericksburg, VA, 22408

This facility is an Environmental Enterprise participant in Virginia's Environmental Excellence Program.

PROJECT DESCRIPTION: The County of Spotsylvania has applied for a reissuance of a permit for the public FMC Wastewater Treatment Facility. The applicant proposes to release treated sewage wastewaters from residential and commercial areas at a rate of 4.0 million gallons per day into a water body. The sludge will be disposed by composting at Livingston Landfill. The facility proposes to release the treated sewage wastewaters in the Rappahannock River in Spotsylvania County in the Rappahannock 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, carbonaceous biochemical oxygen demand, total suspended solids, dissolved oxygen, *E. coli*, total residual chlorine, ammonia, total Kjeldahl nitrogen, total phosphorus, total recoverable zinc, total recoverable copper. The permit requires monitoring without limitation for the following pollutants: flow, nitrate+nitrite, total nitrogen, and total hardness.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail 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: Caitlin Shipman
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3859 E-mail: caitlin.shipman@deq.virginia.gov

Attachment 23 – Coordination with State & Federal Agencies

Attachment 23a – Coordination with State & Federal Agencies:
Virginia Department of Health

Marissa J. Levine, MD, MPH, FAAFP
State Health Commissioner

COMMONWEALTH of VIRGINIA

DEPARTMENT OF HEALTH

OFFICE OF DRINKING WATER

Culpeper Field Office

400 S. Main Street, 2nd Floor
Culpeper, VA 22701
Phone: 540-829-7340
Fax: 540-829-7337

MAY 15 2017

Subject: Water - Spotsylvania County DEQ Permits

Mr. Tom Faha, Regional Director
Northern Virginia Regional Office
Department of Environmental Quality
13901 Crown Court
Woodbridge, VA 22193-1453

Dear Mr. Faha:

Re: VPDES Permit No. VA0068110, FMC WWTF

We have reviewed the above referenced information to determine the impact on public drinking water supplies.

There are no public water supply facilities (e.g., raw water intakes downstream, groundwater sources, treatment units, distribution system components) that will be impacted by the discharge point or project activities.

If you have any questions, please let me know.

Sincerely,

Hugh J. Eggborn, P.E.
Engineering Field Director

cc: ODW – Field Services Engineer

R:\Dist 16\6177 SPOTSYLVANIA COUNTY\SPOTSY Co. UTILITIES\MOTTS RUN-wtp\General\VPDES FMC WWTF 05122017.doc

Attachment 23b – Coordination with State & Federal Agencies:
VDH Department of Shellfish Sanitation

COMMONWEALTH of VIRGINIA
Department of Health
DIVISION OF SHELLFISH SANITATION
109 Governor Street, Room 614-B
Richmond, VA 23219
Ph: 804-864-7487
Fax: 804-864-7481

MEMORANDUM

DATE: 5/18/2017

TO: Caitlin Shipman
Department of Environmental Quality

FROM: B. Keith Skiles, MPH, Director
Division of Shellfish Sanitation

SUBJECT: FMC WWTP

City / County: Spottsylvania

Waterbody: Rappahannock River

Type: ☑ VPDES ☐ VMRC ☐ VPA ☐ VWP ☐ JPA ☐ Other:

Application / Permit Number: VA0068110

☑ The project will not affect shellfish growing waters.

☐ The project is located in or adjacent to approved shellfish growing waters, however, the activity as described will not require a change in classification.

☐ The project is located in or adjacent to condemned shellfish growing waters and the activity, as described, will not cause an increase in the size or type of the existing closure.

☐ The project will affect condemned shellfish waters and will not cause an increase in the size of the total condemnation. However, a prohibited area (an area from which shellfish relay to approved waters for self-purification is not allowed) will be required within a portion of the currently condemned area. See comments.

☐ A buffer zone (including a prohibited area) has been previously established in the vicinity of this discharge, however, the closure will have to be revised. Map attached.

☐ This project will affect approved shellfish waters. If this discharge is approved, a buffer zone (including a prohibited area) will be established in the vicinity of the discharge. Map attached.

☐ Other.

ADDITIONAL COMMENTS:

Area #: n/a

bks

Attachment 23c – Coordination with State & Federal Agencies:

Virginia Department of Conservation & Recreation

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

June 7, 2017

Susan Mackert
DEQ-NRO
13901 Crown Court
Woodbridge, VA 22193

Re: VA0068110, FMC WWTF

Dear Ms. Mackert:

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

According to the information currently in our files, the Hazel Run Rt. 1 to Rt. 2 Stream Conservation Unit (SCU) is located within the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Hazel Run Rt. 1 to Rt. 2 SCU has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are:

Aquatic Natural Community (NP-Lower Rappahannock Second Order Stream)	G2?/S2?/NL/NL
Aquatic Natural Community (NC-Lower Rappahannock Second Order Stream)	G2G3/S2S3/NL/NL

The documented Aquatic Natural Communities are based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river) collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Communities are significant on multiple levels. First, these streams are a grade B, per the VCU-Center for Environmental Sciences (CES), indicating their relative regional significance, considering their aquatic community composition and the present-day conditions of other streams in the region. These stream reaches also hold a "Healthy" stream designation per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of these streams to ideal stream conditions of biology and habitat for this region. Lastly, these streams contribute to high Biological Integrity at the watershed level (6th order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Communities and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species.

Furthermore, according to a DCR zoologist, there is potential for the Dwarf wedgemussel (*Alasmidonta heterodon*, G1G2/S1/LE/LE) to occur at the project site. The Dwarf wedgemussel grows to a length of approximately 30 mm. This species inhabits creeks of varying sizes, residing in muddy sand, sand, and gravel bottoms, in areas of slow to moderate current and little silt deposition (USFWS, 1993). Currently, this species exists in widely scattered, small populations in the Chowan, James, York, Rappahannock, and Potomac River drainages. Its native host fishes include Mottled sculpin (*Cottus bairdi*), Johnny darters (*Etheostoma nigrum*), Tessellated darters (*Etheostoma olmstedi*) and Sculpins (*Cottus* sp.) (Michaelson and Neves, 1995). Please note that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

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

Due to the potential for this site to support populations of Dwarf wedgemussel, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at chris.ludwig@dcr.virginia.gov or 804-371-6206 to discuss arrangements for field work. A list of other individuals who are qualified to conduct inventories may be obtained from the USFWS.

To minimize impacts to aquatic resources, DCR also recommends the use of UV/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality.

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

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

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

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. According to the information currently in our files, Rappahannock River, which has been designated by the VDGIF as a "Threatened and Endangered Species Water" for the Green floater is within 2 miles of the project area. Therefore, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at (804) 692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

CC: Amy Ewing, VDGIF
Troy Andersen, USFWS

Literature Cited

Michaelson, D.L. and R.J. Neves. 1995. Life history and habitat of the endangered Dwarf wedgemussel *Alasmidonta heterodon* (Bivalvia:Unionidae). Journal of the North American Benthol Society 14(2): 324-340.

U.S. Fish and Wildlife Service. 1993. Dwarf Wedge Mussel (*Alasmidonta heterodon*) Recovery Plan. Hadley, Massachusetts. p. 52.

Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18: 6-9.

COMMONWEALTH of VIRGINIA

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

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

June 23, 2017

By Email: alice.baird@dcr.virginia.gov
Receipt Confirmation Requested

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison
Department of Conservation and Recreation
600 East Main Street
Richmond, Virginia 23219

Re: Response to DCR Comment on Application for Reissuance of VA0068110, FMC WWTF, Spotsylvania County

Dear Ms. Baird:

The Department of Environmental Quality (DEQ) received the Department of Conservation and Recreation's (DCR) comment on the application for reissuance of VPDES Permit No. VA0068110, FMC Wastewater Treatment Facility (WWTF) on June 7, 2017. DCR's comment identified the potential for the endangered Dwarf wedgemussel (*Alasmidonta heterodon)* to occur at the project site and recommended conducting a survey to determine the presence of Dwarf wedgemussels.

VPDES permit limits are developed so they are protective of the Virginia Water Quality Standards. These Water Quality Standards protect the designated uses of a receiving stream. Per 9VAC25-260-10, all state waters have been designated with the use of the propagation and growth of a balanced, indigenous population of aquatic life, which might reasonably be expected to inhabit them.

FMC WWTF was placed in service over 27 years ago. At this time, no expansions are scheduled for this facility. Staff does not foresee any major changes to the permit or backsliding of effluent limitations with this reissuance.

Given the aforementioned, it is staff's professional judgment that this permit is protective of aquatic life and therefore of Dwarf wedgemussels. Accordingly, staff does not believe a study is necessary at this time. However, staff will forward DCR's comments to the facility's owner for additional consideration.

Please contact me at (703) 583 – 3859 or caitlin.shipman@deq.virginia.gov if you have any questions or concerns.

Respectfully,

Caitlin Shipman
Water Permit Writer

CC:

Amy Ewing, VDGIF (rr.dgif-ESSProjects@dgif.virginia.gov)
Troy Andersen, USFWS (troy_anderson@fws.gov)
Elleanore Daub, DEQ (elleanore.daub@deq.virginia.gov)

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

June 7, 2017
Revised June 27, 2017

Susan Mackert
DEQ-NRO
13901 Crown Court
Woodbridge, VA 22193

Re: VA0068110, FMC WWTF, revised

Dear Ms. Mackert:

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

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Aquatic Natural Community (NC-Lower Rappahannock Second Order Stream)	G2G3/S2S3/NL/NL

The documented Aquatic Natural Communities are based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river) collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Communities are significant on multiple levels. First, these streams are a grade B, per the VCU-Center for Environmental Sciences (CES), indicating their relative regional significance, considering their aquatic community composition and the present-day conditions of other streams in the region. These stream reaches also hold a "Healthy" stream designation per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of these streams to ideal stream conditions of biology and habitat for this region. Lastly, these streams contribute to high Biological Integrity at the watershed level (6th order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Communities and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species.

Furthermore, according to a DCR zoologist, there is potential for the Dwarf wedgemussel (*Alasmidonta heterodon*, G1G2/S1/LE/LE) to occur at the project site. The Dwarf wedgemussel grows to a length of approximately 30 mm. This species inhabits creeks of varying sizes, residing in muddy sand, sand, and gravel bottoms, in areas of slow to moderate current and little silt deposition (USFWS, 1993). Currently, this species exists in widely scattered, small populations in the Chowan, James, York, Rappahannock, and Potomac River drainages. Its native host fishes include Mottled sculpin (*Cottus bairdi*), Johnny darters (*Etheostoma nigrum*), Tessellated darters (*Etheostoma olmstedi*) and Sculpins (*Cottus* sp.) (Michaelson and Neves, 1995). Please note that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

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

Due to the potential for this site to support populations of Dwarf wedgemussel, DCR recommends an inventory for the resource in the study area. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources, or proceed with an assumption of presence and adhere to EPA's 2013 freshwater ammonia criteria for this project.

DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at chris.ludwig@dcr.virginia.gov or 804-371-6206 to discuss arrangements for field work. A list of other individuals who are qualified to conduct inventories may be obtained from the USFWS.

To minimize impacts to aquatic resources, DCR also recommends the use of UV/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality.

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

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

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

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. According to the information currently in our files, Rappahannock River, which has been designated by the VDGIF as a "Threatened and Endangered Species Water" for the Green floater is within 2 miles of the project area. Therefore, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at (804) 692-0984. Thank you for the opportunity to comment on this project.

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

CC: Amy Ewing, VDGIF
Troy Andersen, USFWS

Literature Cited

Michaelson, D.L. and R.J. Neves. 1995. Life history and habitat of the endangered Dwarf wedgemussel *Alasmidonta heterodon* (Bivalvia:Unionidae). Journal of the North American Benthol Society 14(2): 324-340.

U.S. Fish and Wildlife Service. 1993. Dwarf Wedge Mussel (*Alasmidonta heterodon*) Recovery Plan. Hadley, Massachusetts. p. 52.

Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18: 6-9.

COMMONWEALTH of VIRGINIA

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

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

June 30, 2017

By Email: alice.baird@dcr.virginia.gov
Receipt Confirmation Requested

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison
Department of Conservation and Recreation
600 East Main Street
Richmond, Virginia 23219

Re: Response to DCR Comment on Application for Reissuance of VA0068110, FMC WWTF, Spotsylvania County

Dear Ms. Baird:

The Department of Environmental Quality (DEQ) received the Department of Conservation and Recreation's (DCR) revised comment on the application for reissuance of VPDES Permit No. VA0068110, FMC Wastewater Treatment Facility (WWTF) on June 27, 2017. DCR's comment identified the potential for the endangered Dwarf wedgemussel (*Alasmidonta heterodon)* to occur at the project site and recommended either conducting a survey to determine the presence of Dwarf wedgemussels or assuming presence and implementing EPA's 2013 ammonia criteria.

In a response letter, dated June 23, 2017, DEQ addressed DCR's recommendation for a survey to determine if Dwarf wedgemussels are present. At this time, the recommended EPA ammonia criteria from 2013 have not been incorporated into the Virginia Water Quality Standards. The rule-making in Virginia to adopt these recommendations is on-going. The new recommended criteria will be incorporated into VPDES permits once they are adopted in the Water Quality Standards as regulation.

VPDES permit limits are developed so they are protective of the Virginia Water Quality Standards. These Water Quality Standards protect the designated uses of a receiving stream. Per 9VAC25-260-10, all state waters have been designated with the use of the propagation and growth of a balanced, indigenous population of aquatic life, which might reasonably be expected to inhabit them.

FMC WWTF was placed in service over 27 years ago. At this time, no expansions are scheduled for this facility. Staff does not foresee any major changes to the permit or backsliding of effluent limitations with this reissuance.

Given the aforementioned, it is staff's professional judgment that this permit is protective of aquatic life and therefore of Dwarf wedgemussels.

Please contact me at (703) 583 – 3859 or caitlin.shipman@deq.virginia.gov if you have any questions or concerns.

Respectfully,

Caitlin Shipman
Water Permit Writer

CC:

Amy Ewing, VDGIF (rr.dgif-ESSProjects@dgif.virginia.gov)
Troy Andersen, USFWS (troy_anderson@fws.gov)
Elleanore Daub, DEQ (elleanore.daub@deq.virginia.gov)

Attachment 23d – Coordination with State & Federal Agencies:
United States Fish and Wildlife Service

Shipman, Caitlin (DEQ)

From: Ciparis, Serena <serena_ciparis@fws.gov>
Sent: Friday, June 9, 2017 12:16 PM
To: Shipman, Caitlin (DEQ)
Subject: Re: T&E Coordination for VA0068110

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Caitlin-

We have completed the review of information relative to the reissuance of the VPDES permit for the FMC, Inc. WWTP, VA0068110. Thank you for providing access to the 2012 factsheet and permit, the permit application, and the DMR and WET testing data from the current permit cycle, as requested.

The facility discharges effluent to the Rappahannock River within a reach of the river that is potential habitat for the federally listed endangered dwarf wedgemussel (*Alasmidonta heterodon*). Blueback herring (*Alosa aestivalis*) and alewife herring (*Alosa pseudoharengus*) have been recently collected in the immediate vicinity of this facility. Both species are considered federal species of concern and are under the jurisdiction of NOAA fisheries. Therefore, we suggest further consultation with NOAA fisheries regarding this discharge.

The DMR data from the current permit cycle (2012-2017) for Outfall 001 include measurements of pH, BOD, DO, TSS, residual chlorine, TKN (May-Oct), and results of chronic WET testing. Results suggest that the plant is functioning properly. Overall, we do not anticipate any adverse effects from this discharge.

Because of the proximity of this facility to potential habitat for a federally endangered mussel species, we do have two suggestions for consideration. Freshwater mussels are sensitive to ammonia toxicity. The facility has a dry season (May-Oct) TKN limit based on a water quality model developed by the Virginia Institute of Marine Science (VIMS). The DMR data indicate that TKN concentrations during the dry season are generally low. Because the TKN limit (3.0 mg/L) is less than the ammonia-N concentrations derived from toxicity-based water quality standards (4.2 mg/L avg.) we support permit limits based on TKN. However, more stringent water quality criteria for ammonia-N were published by USEPA in 2013 and may be adopted into Virginia's water quality standards during the upcoming (2017-2022) permit cycle. If these criteria are adopted prior to reissuance of this permit, we would appreciate their inclusion in updated calculations of ammonia-N limits and comparison with the current TKN limit. Given the low concentrations of TKN reported in the DMR data, the facility should be able to meet more stringent requirements without modifications to treatment processes. If the facility is ever upgraded, we would also appreciate the facility operator's consideration of adoption of UV disinfection to replace the current use of chlorination/dechlorination.

If you have any questions regarding these comments, please contact me via email (serena_ciparis@fws.gov) or telephone (540-231-1257).

Regards,

Serena

On Tue, May 9, 2017 at 11:56 AM, Shipman, Caitlin (DEQ) <Caitlin.Shipman@deq.virginia.gov> wrote:

> Ms. Ciparis,
>
> FWS has requested coordination with the reissuance of FMC WWTF (VA0068110). Please see the attached form and the limit page from the current permit. Please let me know if you have any questions or concerns.
>
> Respectfully,
>
> Caitlin Shipman
>
> Permit Writer - Water
>
> Department of Environmental Quality
>
> 13901 Crown Court, Woodbridge, VA 22193
>
> caitlin.shipman@deq.virginia.gov | 703.583.3859

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
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Molly Joseph Ward
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June 30, 2017

By Email: serena_ciparis@fws.gov
Receipt Confirmation Requested

Serena Ciparis
Threatened & Endangered Review Coordinator
United States Fish and Wildlife Services
6669 Short Lane
Gloucester, VA 23061

Re: FWS Comment on Application for Reissuance for VA0068110, FMC WWTF, Spotsylvania County

Dear Ms. Ciparis:

The Department of Environmental Quality (DEQ) received the U.S. Fish and Wildlife Services' (FWS) comment on the application for reissuance of VPDES Permit No. VA0025658, FMC Wastewater Treatment Facility (WWTF) on June 9, 2017.

FWS's comment identified the potential for habitat for the endangered dwarf wedgemussel (*Alasmidonta heterodon)* to be within reach of the facility's discharge. FWS also noted that blueback herring (*Alosa aestivalis)* and alewife herring *(Alosa pseudoharengus*) have recently been collected in the vicinity of the facility. Both species are considered federal species of concern and are under the jurisdiction of NOAA Fisheries, as such, FWS recommended further consultation with NOAA regarding this discharge. Overall, FWS does not anticipate any adverse effects from the discharge.

VPDES permit limits are developed so they are protective of the Virginia Water Quality Standards. These Water Quality Standards protect the designated uses of a receiving stream. Per 9VAC25-260-10, all state waters have been designated with the use of the propagation and growth of a balanced, indigenous population of aquatic life, which might reasonably be expected to inhabit them.

Given the aforementioned, it is staff's professional judgment that with this reissuance, the permit will remain protective of aquatic life and therefore of dwarf wedgemussels, blueback herring, and alewife herring. Accordingly, DEQ will notify NOAA of the draft permit through our mailing list, which is our current procedure.

FWS also put forth two comments for DEQ's consideration: 1) a dry season ammonia limitation based on toxicity, and 2) including the ammonia criteria developed by the U.S. EPA in 2013 in the development of ammonia limits, if it is adopted into Virginia's Water Quality Standards prior to this permit's reissuance. DEQ will consider FWS's recommendations while developing permit limitations for this permit reissuance.

Please contact me at (703) 583 – 3859 or caitlin.shipman@deq.virginia.gov if you have any questions or concerns.

Respectfully,

Caitlin Shipman
Water Permit Writer

Attachment 23e – Coordination with State & Federal Agencies:
Virginia Department of Game and Inland Fisheries

Shipman, Caitlin (DEQ)

From: ProjectReview (DGIF)
Sent: Tuesday, July 18, 2017 11:21 AM
To: Shipman, Caitlin (DEQ); David L O'Brien; 'troy_andersen@fws.gov'
Cc: ProjectReview (DGIF)
Subject: ESSLog 38117; DEQ VPDES VA0068110 for the FMC WWTF in Spotsylvania County, VA

We have reviewed the above-referenced reissuance of the VPDES permit VA0068110 for the FMC WWTF in Spotsylvania County, VA. The facility discharges to the lower Rappahannock River (tidal). The tidal Rappahannock River to the tidal confluence with the Chesapeake Bay is designated Threatened and Endangered (T&E) species waters for the federal Endangered state Endangered (FESE) Atlantic sturgeon. These waters are also designated anadromous fish use waters.

Provided the applicant adheres to the permit conditions & the following recommendations, we do not anticipate the reissuance of this permit to result in adverse impact to these designated T&E species waters or their associated species. We support the USFWS recommendation to contact NOAA-Fisheries regarding this species.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
Phone: (804) 367-2733
Email: Ernie.Aschenbach@dgif.virginia.gov

Physical Address: 7870 Villa Park Drive, Suite 400 | Henrico, VA 23228
Mailing Address: P.O. Box 90778 | Henrico, VA 23228-0778

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on three draft permits from the Department of Environmental Quality that will allow the release of treated wastewater into two water bodies in Spotsylvania County, Virginia.

PUBLIC COMMENT PERIOD: February 3, 2022 to March 7, 2022

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 NUMBERS: County of Spotsylvania, 600 Hudgins Road, Fredericksburg, VA 22408, VA0025658 – Massaponax WWTF, VA0068110 – FMC WWTF, and VA0029513 - Thornburg Community STP

NAME AND ADDRESS OF FACILITIES:
Massaponax Wastewater Treatment Facility, 10900 HCC Drive, Fredericksburg, VA 22408
FMC Wastewater Treatment Facility, 11801 Capital Lane, Fredericksburg, VA 22408
Thornburg Community Sewage Treatment Plant, 5225 Mud Tavern Road, Woodford, VA 22580

These facilities are Exemplary Environmental Enterprise participants in Virginia's Environmental Excellence Program.

PROJECT DESCRIPTION: These three public Spotsylvania County permits, Massaponax Wastewater Treatment Facility, FMC Wastewater Treatment Facility, and Thornburg Community Sewage Treatment Plant, are being modified to comply with the requirements of House Bill 2129 which was passed in the 2021 session of the Virginia General Assembly. The Enhanced Nutrient Removal Certainty Program (ENRC Program) requires that certain wastewater treatment plants upgrade their nutrient removal technology or close outdated facilities in support of the Chesapeake Bay TMDL to reduce nutrient loads to the Bay. No other permit monitoring, limitations or special conditions are affected by this modification.

The Massaponax WWTF will expand to 13.4 MGD to upgrade the nutrient removal technology and consolidate the flows from the FMC WWTF by January 1, 2026. The FMC WWTF will convey flow and the facility will close by January 1, 2026. The Massaponax WWTF proposes to release the treated sewage wastewaters in the Rappahannock River in Spotsylvania County in the Rappahannock River watershed. A watershed is the land area drained by a river and its incoming streams.

The Thornburg Community STP will upgrade to install nutrient removal technology by January 1, 2026. The facility proposes to release the treated sewage wastewaters in an unnamed tributary to the Po River River in Spotsylvania County in the York River watershed. A watershed is the land area drained by a river and its incoming streams.

These facilities are subject to the requirements of 9VAC25-820 and have registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail 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 permits and applications at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Alison Thompson
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3834 E-mail: alison.thompson@deq.virginia.gov