VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the Virginia Pollutant Discharge Elimination System (VPDES) permit listed below. This permit is being processed as a Major, Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260. The discharge results from the treatment of production and sanitary wastewater at a pharmaceutical manufacturing facility (SIC Code: 2833 – Medicinal Chemicals and Botanical Products and 2834 – Pharmaceutical Preparations). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
   Merck Sharp & Dohme Corp. – Elkton Plant
   2778 South Eastside Highway
   Elkton, VA 22827
   Location: 2778 South Eastside Highway, Elkton

2. Permit No. VA0002178; Expiration Date: December 31, 2016

3. Owner: Merck Sharp & Dohme Corporation
   Contact Name: John A. McCloskey
   Title: Environmental Manager
   Telephone No: 540.298.4122
   Email: john.mccloskey@merck.com

4. Application Complete Date: August 3, 2016

   Permit Writer: Dawn Jeffries Date: August 23, 2016
   Reviewed By: Bev Carver Date: August 30, 2016

   Public Comment Period: November 28, 2016 to December 28, 2016

5. Receiving Stream Name: South Fork Shenandoah River (Outfall 001)
   River Mile: Outfall 001- 88.09
   Use Impairment: Yes (see items 11 and 12 below)
   Special Standards: pH
   Tidal Waters: No
   Watershed Name: VAV-B35R South Fork Shenandoah River/Elk Run/Boone Run
   Basin: Potomac; Subbasin: Shenandoah
   Section: 3; Class: IV

6. Operator License Requirements per 9VAC25-31-200.C: II

7. Reliability Class per 9VAC25-790: N/A

8. Permit Characterization:
   ☑ Private ☐ Federal ☐ State ☐ POTW ☐ PVOTW
   ☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

9. Description of Wastewaters and Treatment Facilities: **Appendix A**

   Total Number of Outfalls = 2 external, 2 internal

10. Discharge Location Description and Receiving Waters Information: **Appendix B**

11. Antidegradation (AD) Review & Comments per 9VAC25-260-30:
Tier Designation: Tier 1

The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD 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 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The South Fork Shenandoah River in the vicinity of the Merck Sharp & Dohme Corp. – Elkton Plant discharge(s) has been determined to be a Tier 1 water. This finding is based on the fact that the stream is listed as impaired for aquatic life (benthics). Antidegradation baselines are not calculated for Tier 1 waters.

12. Impaired Use Status Evaluation per 9VAC25-31-220.D: The South Fork Shenandoah River in the immediate vicinity of the discharge(s) is listed as impaired for aquatic life (benthics) and "Fish Consumption" due to mercury contamination. This facility was not assigned a wasteload allocation (WLA) in the mercury TMDL because the facility is not known or expected to be a source of mercury contamination. The facility has been assigned an E. coli WLA of 2.09×10^{12} cfu/yr in the bacteria TMDL for the South Fork Shenandoah River (based on a design flow of 1.2 MGD and a concentration of 126 cfu/100mL). A TMDL for the aquatic life impairment has not been prepared. The permit contains a reopener condition that may allow the permit limits to be modified, in compliance with section 303(d)(4) of the Act once a TMDL is approved. Chesapeake Bay TMDL WLAs for this facility for Total Nitrogen (TN), Total Phosphorus (TP), and Total Suspended Solids (TSS) are discussed in Appendix C.

13. Site Inspection: Performed by Dawn Jeffries on June 23, 2016

14. NPDES Permit Rating Worksheet: **Appendix A**
The worksheet updated using current information regarding the facility.
☑ Major ☐ Minor Score = 125

15. Effluent Screening and Effluent Limitations: **Appendix C**

16. Effluent Toxicity Testing Requirements included per 9VAC25-31-220.D: ☑ Yes ☐ No **Appendix C**

17. Management of Sludge: Sludge from the industrial wastewater treatment plant is dewatered using a belt press, dried with a steam-heated dryer, bagged, and hauled to Rockingham County Landfill for disposal. Sludge from the sewage treatment plant is pumped and hauled by a licensed hauler to North River WWTF for additional treatment and disposal. The VPDES Permit application serves as the Sludge Management Plan to be approved with the reissuance of the permit.

18. Permit Changes and Bases for Special Conditions: **Appendix D**

19. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

20. Antibacksliding Review per 9VAC25-31-220.L: This permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

21. Regulation of Users per 9VAC25-31-280.B.9: N/A – There are no industrial users associated with this facility other than the owner.

22. Stormwater Management per 9VAC25-31-120: Application Required? ☑ Yes ☐ No
Applicable stormwater management requirements have been included in this permit.

23. Compliance Schedule per 9VAC25-31-250: None required by this permit.

24. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.H, and 100.M: None

25. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility does not serve private residences.

26. Virginia Environmental Excellence Program (VEEP) Evaluation per §10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☑ No

27. Nutrient Trading Regulation per 9VAC25-820: See Appendix B
General Permit Required: ☑ Yes ☐ No
This facility is required to maintain coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen (TN) and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia ("WGP"; 9VAC25-820) because it is listed with a WLA in the Registration List in 9VAC25-820-70.

28. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☑ No
This facility is a Significant Discharger as defined in the WGP and is actively monitoring and reporting under the WGP. This permit does not include any outfalls that discharge solely stormwater exposed to industrial activity.

29. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows, T&E screening is not automatically required. However, in accordance with the VPDES Memorandum of Understanding, T&E screening was coordinated on July 7, 2016 through DCR at their request. Comments were received from DCR on August 2, 2016 and are included in the permit processing file. Comments were considered in the drafting of the permit and were also forwarded to the permittee.

30. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Dawn Jeffries at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7898, dawn.jeffries@deq.virginia.gov.

    Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and 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 if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. 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.

31. Historical Record:
    - Date discharge first commenced: Unknown; the production facility was built at the site in 1941.

    - Date permit first issued: January 31, 1975. Design flow at issuance: Unknown. A June 6, 1975 letter included a DMR that listed the monthly average discharge flow at Outfall 001 for the month of May 1975 as 7.7 MGD and the average flow for the "last four months" was listed as 9.5 MGD.

APPENDIX A

DESCRIPTION OF WASTEWATERS AND TREATMENT FACILITIES

Sanitary wastewater is treated, including disinfection, in a 0.15 MGD above ground package activated sludge plant before discharging via Outfall 102 and comingling with the industrial process wastewater at the head of the 1.2 MGD industrial treatment plant for further treatment before final discharge. Flow from the industrial treatment plant comingles via Outfall 101 with dechlorinated non-contact cooling water and stormwater prior to discharging through Outfall 001. Wastewater treatment units and details on treatment for wastewater are shown in the schematics included in the permit reissuance application.

STP Design Average Flow = 0.15 MGD
Industrial WW Treatment Facility Average Design Flow = 1.2 MGD
Industrial WW Treatment Facility Maximum Design Flow = 2.1 MGD
Industrial Facility Long Term Average (LTA) Flow = 0.992 MGD
Outfall 001 Maximum Daily Flow = 10.86 MGD (Form 2C)
Outfall 001 Maximum 30-day Flow = 7.54 MGD (Form 2C)
Outfall 001 Long Term Average Flow = 5.5 MGD (Form 2C)

Outfall 002
Stormwater runoff not exposed to industrial activity discharges from this outfall.

VPDES Permit Rating Work Sheet

Facilities identified under SIC Codes 2833 and 2834 have the following characteristics as defined in Appendix A to the NPDES Permit Rating Work Sheet found in the VPDES Permit Manual.

1987 SIC Code	1987 SIC Code Title	40 CFR 439 Sub-Part	Sub-part Title	Human Health Toxicity Number	Total Toxicity Number	Industrial Sub-category Number
2833	MEDICINAL CHEMICALS & BOTANICAL PRODUCTS	A	FERMENTATION PRODUCTS	6	8	3
2833	MEDICINAL CHEMICALS & BOTANICAL PRODUCTS	B	EXTRACTION PRODUCTS	6	8	2
2833	MEDICINAL CHEMICALS & BOTANICAL PRODUCTS	C	CHEMICAL SYNTHESIS PRODUCTS	6	8	1
2833	MEDICINAL CHEMICALS & BOTANICAL PRODUCTS	NR	NON-CONTACT COOLING WATER ONLY	1	1	99
2834	PHARMACEUTICAL PREPARATIONS	D	MIXING/COMPOUNDING-FORMULATION	6	8	0
2834	PHARMACEUTICAL PREPARATIONS	NR	NON-CONTACT COOLING WATER ONLY	1	1	99

Factor 1 – The facility has activities that fall under 40 CFR 439, Subcategories A, C, and D. The highest applicable total toxicity number is selected from the list above. This is unchanged from the previous rating.

Factor 2 – Section A, Type II is selected because the discharge contains process wastewater and non-contact cooling water in the final discharge, and the average flow is between 5 MGD and 10 MGD. This is changed from the previous rating.

Factor 3.A – The permit contains limits for COD and BOD_5. The limits have decreased. This results in a code change and a score change.

Factor 3.B – The permit contains limits for TSS. The limits have decreased, but do not result in a code change or a score change.

Factor 3.C – The permit has limits for Ammonia-N. This is unchanged from the previous rating.

Factor 4 – A worst case assumption is made for proximity to public water supplies. The highest Human Health Toxicity Number from the applicable subcategories is obtained from the table above. This is unchanged from the previous rating.

Factor 5.A – The facility is assigned WLAs for BOD_5 and NH_3 in the Water Quality Management Plan (WQMP) for the Shenandoah River. This is unchanged from the previous rating.

Factor 5.B – The receiving water is in compliance with applicable WQS for pollutants that are water quality limited in the permit. This is unchanged from the previous rating.

Factor 5.C – The facility currently performs WET monitoring and does not exhibit reasonable potential for exceeding WQS. This is unchanged from the previous rating.

Factor 6 – Proximity to Near Coastal Waters: Headquarters Priority Permit Indicator (HPRI) Code #4 – This discharge occurs in a non-coastal county. This is unchanged from the previous rating.

NPDES PERMIT RATING WORK SHEET

☐ Regular Addition
☐ DiscretionaryAddition
X Score change, but no status change
☐ Deletion

NPDES NO. **VA0002178**

Facility Name: **Merck Sharp & Dohme Corp. – Elkton Plant**

City: **Elkton, VA**

Receiving Water: **South Fork Shenandoah River**

Reach Number: _____

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
☐ YES; score is 600 (stop here) ☑ NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
☑ NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: 2833 Other SIC Codes: 2834
Industrial Subcategory Code: 003 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
[ ] No process waste streams			[ ] 3.	3	15	[ ] 7.	7	35
[ ] 1.	1	5	[ ] 4.	4	20	[X] 8.	8	40
[ ] 2.	2	10	[ ] 5.	5	25	[ ] 9.	9	45
			[ ] 6.	6	30	[ ] 10.	10	50

Code Number Checked : 8

Total Points Factor 1: 40

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A X Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☐	21	10
Flow 1 to 5 MGD	☐	22	20
Flow > 5 to 10 MGD	X	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ☐ Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	< 10 %	☐	51	0
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 23

Total Points Factor 2: 30

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) X BOD ☐ COD ☐ Other:_____

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	X	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: 3

Points Scored: 15

B. Total Suspended Solids (TSS)

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	X	> 1000 to 5000 lbs/day	3	15
	☐	> 5000 lbs/day	4	20

Code Checked: 3

Points Scored: 15

C. Nitrogen Pollutant: (check one) X Ammonia ☐ Other: _____

		Nitrogen Equivalent	*Code*	*Points*
Permit Limits: (check one)	☐	< 300 lbs/day	1	0
	X	300 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: 2

Points Scored: 5

Total Points Factor 3: 35

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

X YES (If yes, check toxicity potential number below)

☐ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ☐ check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			X 6.	6	10	☐ 10.	10	30

Code Number Checked: 6

Total Points Factor 4: 10

FACTOR 5: Water Quality Factors

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
X	Yes	1	10
☐	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
X	Yes	1	0
☐	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
☐	Yes	1	10
X	No	2	0

Code Number Checked: A 1 B 1 C 2

Points Factor 5: A 10 + B 0 + C 0 = 10 TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): _24__ *Enter the multiplication factor that corresponds to the flow code:* _1.0__

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☐	3	3	30
X	4	4	0
☐	5	5	20

HPRI code checked: 4

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 0 X (Multiplication Factor) 1.0 = 0 (TOTAL POINTS)

B. Additional Points ☐ NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

N/A

	Code	Points
☐ Yes	1	10
☐ No	2	0

C. Additional Points ☐ Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

N/A

	Code	Points
☐ Yes	1	10
☐ No	2	0

Code Number Checked: A 4 B N/A C N/A -

Points Factor 6: A 0 + B 0 + C 0 = 0 TOTAL

SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	40
2	Flows/Streamflow Volume	30
3	Conventional Pollutants	35
4	Public Health Impacts	10
5	Water Quality Factors	10
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	125

S1. Is the total score equal to or greater than 80? X Yes (Facility is a major) ☐ No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

☐ No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 125

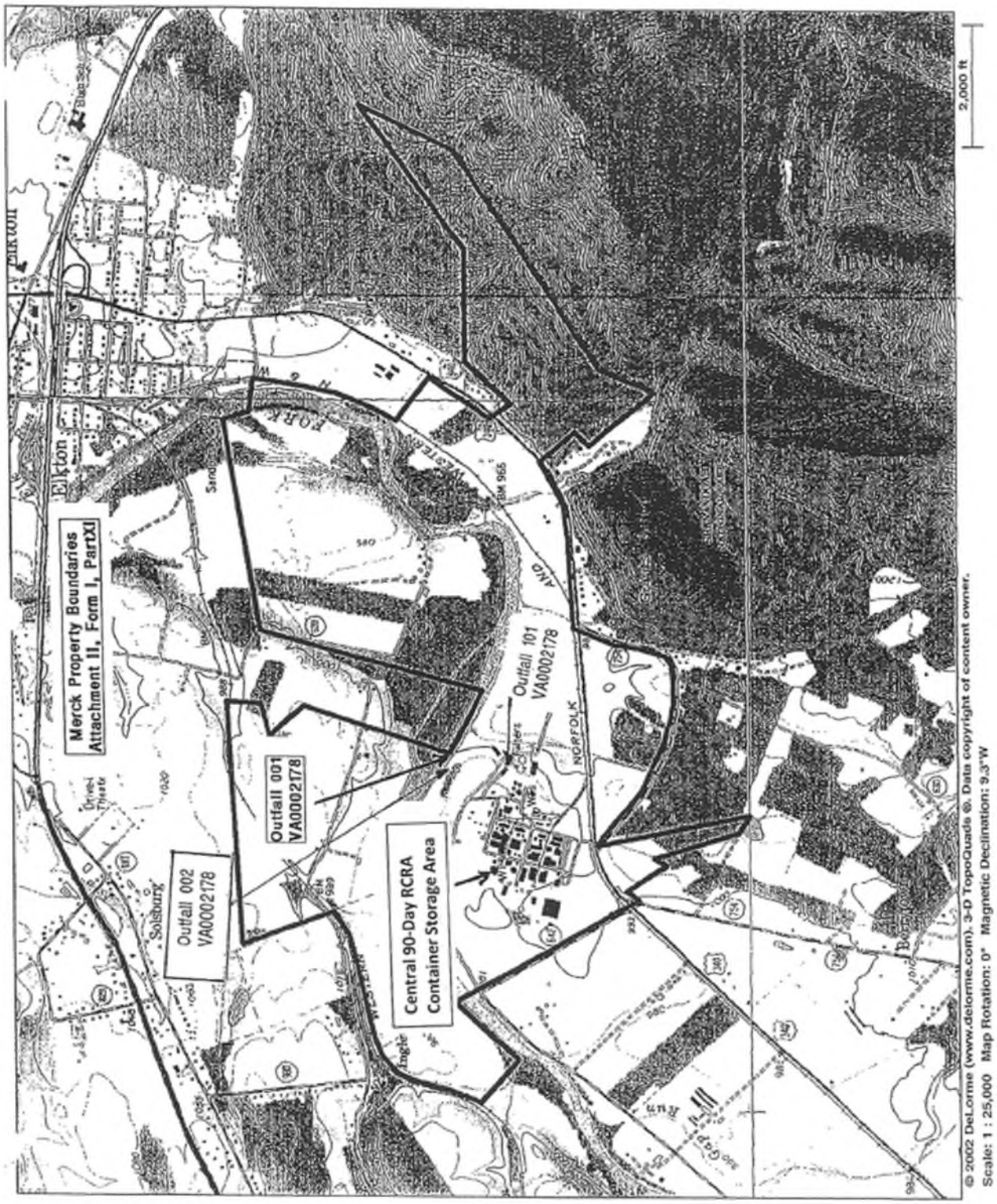
OLD SCORE: 150

Dawn Jeffries
Permit Writer's Name
540-574-7898
Phone Number
August 15, 2016
Date

APPENDIX B

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

This facility discharges to the South Fork Shenandoah River in Rockingham County. The locations of the facility and Outfall 001 are shown on the topographic map below.



PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessments Review table below.

WATER QUALITY ASSESSMENTS REVIEW
POTOMAC-SHENANDOAH RIVER BASIN
7/6/2016

IMPAIRED SEGMENTS

SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER
B32R-02-HG	South River/NF Shen./SF Shen. Rivers	162.51	8.21	154.3	Mercury in Fish Tissue
B33R-01-BEN	South Fork Shenandoah River	101.19	43.02	58.17	Benthic
B35R-01-BAC	Boone Run	13.82	0.00	13.82	Fecal Coliform/E-coli
B35R-02-BAC	Quail Run	6.6	0.00	6.6	E-coli, Fecal Coliform
B35R-02-BEN	Quail Run	5.14	0.00	5.14	Benthic
B35R-04-PH	Two Mile Run	5.06	0.00	5.06	pH

PERMITS

PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0002178	Merck Sharp & Dehome Corp. - Stonew	S.F. Shenandoah River	88.09	382316	0783841	VAV-B35R
VA0026433	Elkton STP	S.F. Shenandoah River	85.07	382437	0783807	VAV-B35R
VA0073245	MillerCoors Brewing Co. - Shenandoah	S.F. Shenandoah River	90.99	382120	0784143	VAV-B35R
VA0073245	MillerCoors Brewing Co. - Shenandoah	Gap Run X-Trib	0.56	382106	0784026	VAV-B35R

MONITORING STATIONS

STREAM	NAME	RIVER MILE	RECORD	LAT	LONG
Boone Run	1BBON000.60	0.6	7/1/91	382601	0783809
Boone Run	1BBON001.46	1.46	7/1/03	382515	0783821
Elk Run	1BELK01.00	1	1/25/11	382427	0783708
S.F. Shenandoah River	1BSSF092.46	92.46	7/1/99	382117	0784146
S.F. Shenandoah River	1BSSF082.15	82.15	9/25/07	382623	0783749
S.F. Shenandoah River	1BSSF085.08	85.08	9/23/99	382433	0783807
S.F. Shenandoah River	1BSSF088.20	88.2	3/19/02	382318	0783847
S.F. Shenandoah River	1BSSF092.69	92.69	9/23/99	382112	0784159
Quail Run	1BQAL004.30	4.30	7/1/97	382418	0784200
S.F. Shenandoah River	1BSSF086.12	86.12	5/4/06	382355	0783736
Hawksbill Creek	1BHKL002.23	2.23	5/1/96	382221	0783623

PUBLIC WATER SUPPLY INTAKES

OWNER	STREAM	RIVER MILE
None		

WATER QUALITY MANAGEMENT PLANNING REGULATION

Is this discharge addressed in the WQMP regulation? **Yes**

If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?

PARAMETER	ALLOCATION
BOD_5	1570 kg/d
NH_3	645.9 kg/d

Nutrients under the Watershed General Permit

WATERSHED NAME

VAV-B35R South Fork Shenandoah River/Elk Run/Boone Run

FLOW FREQUENCY DETERMINATION

The VDEQ has operated a continuous record gage on the South Fork Shenandoah River near Lynwood, VA (#01628500) since 1930. The gage is located approximately 10 miles upstream of the discharge point in Rockingham County, VA. The flow frequencies for the gage and the discharge point are presented below. The values at the discharge point were determined by drainage area comparisons. There are no known withdrawals located between the gage and the discharge point. Effluent from Miller Coors (VA0073245) enters the South Fork Shenandoah River below the gage but upstream of the Merck Sharp & Dohme Corp. – Elkton Plant discharge point. The average monthly flows of the permitted discharger over the previous 5 years were added to the calculated stream flows.

South Fork Shenandoah River near Lynnwood, VA (#01628500):

Drainage Area = 1079 mi^2

1Q30 =	120 cfs	High Flow 1Q10 =	235 cfs
1Q10 =	144 cfs	High Flow 7Q10 =	257 cfs
7Q10 =	153 cfs	High Flow 30Q10 =	304 cfs
30Q10 =	168 cfs	HM =	489 cfs
30Q5 =	191 cfs		

South Fork Shenandoah River at discharge point:

Drainage Area = 1161.41 mi^2

1Q30 =	129 cfs	(83.5 MGD)	High Flow 1Q10 =	253 cfs	(163 MGD)
1Q10 =	155 cfs	(100 MGD)	High Flow 7Q10 =	277 cfs	(179 MGD)
7Q10 =	165 cfs	(106 MGD)	High Flow 30Q10 =	327 cfs	(211 MGD)
30Q10 =	181 cfs	(117 MGD)	HM =	526 cfs	(340 MGD)
30Q5 =	206 cfs	(133 MGD)			

Upstream Discharges:

Miller Coors, Outfall 001 = 1.31 MGD
Miller Coors, Outfall 002 = 0.32 MGD

South Fork Shenandoah River at discharge point, including discharges:

Drainage Area = 1161.41 mi^2

1Q30 = 83.5 + 1.31 + 0.32 = 85.1 MGD	HF 1Q10 = 163 + 1.39 + 0.32 = 165 MGD
1Q10 = 100 + 1.31 + 0.32 = 102 MGD	HF 7Q10 = 179 + 1.39 + 0.32 = 180 MGD
7Q10 = 106+ 1.31 + 0.32 = 108 MGD	HF 30Q10 = 211 + 1.39 + 0.32 = 213 MGD
30Q10 = 117 + 1.31 + 0.32 = 118 MGD	HM = 526 + 1.39 + 0.32 = 342 MGD
30Q5 = 133 + 1.31 + 0.32 = 134 MGD	

The high flow months are January through May for this analysis.

REVIEWER: Bev Carver
DATE: March 17, 2016

EFFLUENT STREAM MIXING EVALUATION

The diffuser at Outfall 001 was designed to provide complete mixing within 600 feet downstream of the outfall; therefore, 100 percent mix applies when the discharge is through the diffuser. In addition, a mixing zone evaluation was done with the Virginia DEQ Mixing Zone Analysis Version 2.1 program for analysis of the discharge from a concrete channel on the river bank near the diffuser as shown on page B-5. This was done to verify that occasional, short-term discharge of effluent through the concrete channel rather than the diffuser is also protective of WQS. The results are based on the discharge and receiving stream characteristics, and are presented below.

Effluent Flow = 7.54 MGD
Stream 7Q10 = 108 MGD
Stream 30Q10 = 118 MGD
Stream 1Q10 = 102 MGD
Stream slope = 0.00126 ft/ft
Stream width = 100 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.2383 ft
Length = 4738.57 ft
Velocity = .7991 ft/sec
Residence Time = .0686 days

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

Mixing Zone Predictions @ 30Q10

Depth = 2.3547 ft
Length = 4535.91 ft
Velocity = .8253 ft/sec
Residence Time = .0636 days

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

Mixing Zone Predictions @ 1Q10

Depth = 2.1666 ft
Length = 4873.31 ft
Velocity = .7826 ft/sec
Residence Time = 1.7297 hours

Recommendation: A complete mix assumption is appropriate for this situation providing no more than 57.81% of the 1Q10 is used.

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE

4411 Early Road – P.O. Box 3000 Harrisonburg, VA 22801

SUBJECT: Site Visit for Reissuance of VPDES Permit No. VA0002178, Merck Sharp & Dohme Corp. – Elkton Plant, Rockingham County

TO: Permit Processing File

FROM: Dawn Jeffries

DATE: June 27, 2016

On June 23, 2016 the writer performed a site visit at the subject facility. Photos of the river near the submerged Outfall 001 diffuser and Outfall 002 are shown below as well as the concrete channel to which flow is diverted during the cleaning of the bar screen.

River near Outfall 001 diffuser

Outfall 002

Concrete channel at river

APPENDIX C

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001 **Final Limits** **Max. 30-day Flow: 7.54 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	Continuous	TIRE
BOD_5	4	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		1570 (kg/d)	3100 (kg/d)		
TSS	5	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		2700 (kg/d)	5400 (kg/d)		
COD	1	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		NL (kg/d)	NL (kg/d)		
Ammonia-N	4	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		645.9 (kg/d)	1300 (kg/d)		
Total Kjeldahl Nitrogen (as N)	3	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		1291 (kg/d)	2600 (kg/d)		
Effluent Chlorine (TRC)(mg/L)*	2	0.084	0.17	1/Day	Grab
---	---	Minimum	Maximum	---	---
pH (S.U.)	2,6	6.5	9.0	Continuous	Recorded
Temperature (°C)	2,3	NA	37	Continuous	Recorded
Dissolved Oxygen (mg/L)	2,3	4.5	NA	1/Day	Grab

Refer to permit for definitions of monitoring frequencies and sample types

Bases for Effluent Limitations

1. *Professional Judgment (PJ)*
2. *Water Quality Standards (9VAC25-260)*
3. *2011 ECS, LLC, Stream Modeling Report*
4. *Water Quality Management Plan Regulation (9VAC25-720)*
5. *2010 EPA Chesapeake Bay TMDL TSS WLA*
6. *Federal Effluent Limitation Guidelines (ELGs) for the Pharmaceutical Manufacturing Category, 40 CFR Parts 136 and 439*

Outfall No. 101 (Internal Outfall) **Final Limits** **Design Flow: 1.2 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	2	NL	NL	Continuous	TIRE
BOD_5	1	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		730 kg/d	1500 kg/d		
TSS	1	NL (mg/L)	NL (mg/L)	1/Week	24 HC
		1200 kg/d	2500 kg/d		
COD	1	570 mg/L	1100 mg/L	1/Week	24 HC
		2600 kg/d	5200 kg/d		
Ammonia-N	1	29.4 mg/L	84.1 mg/L	1/Week	24 HC
		130 kg/d	380 kg/d		
Acetone	1	0.2 mg/L	0.5 mg/L	1/3 Months	24 HC
		0.91 kg/d	2.3 kg/d		
Acetonitrile	1	10.2 mg/L	25 mg/L	1/3 Months	24 HC
		46 kg/d	110 kg/d		
n-Amyl Acetate	1	0.5 mg/L	1.3 mg/L	0	24 HC
		2.3 kg/d	5.9 kg/d		
Amy Alcohol	1	4.1 mg/L	10 mg/L	0	24 HC
		19 kg/d	45 kg/d		
Benzene	1	0.02 mg/L	0.05 mg/L	0	24 HC
		0.091 kg/d	0.23 kg/d		
n-Butyl Acetate	1	0.5 mg/L	1.3 mg/L	0	24 HC
		2.3 kg/d	5.9 kg/d		
Chlorobenzene	1	0.06 mg/L	0.15 mg/L	0	24 HC
		0.27 kg/d	0.68 kg/d		
Chloroform	1	0.013 mg/L	0.02 mg/L	1/3 Months	24 HC
		0.059 kg/d	0.091 kg/d		
Total Cyanide	3	0.50 mg/L	1.2 mg/L	0	Grab
		2.3 kg/d	5.4 kg/d		
o-Dichlorobenzene	1	0.06 mg/L	0.15 mg/L	0	24 HC
		0.27 kg/d	0.68 kg/d		
1,2-Dichloroethane	1	0.1 mg/L	0.4 mg/L	0	24 HC
		0.45 kg/d	1.8 kg/d		
Diethylamine	1	102 mg/L	250 mg/L	0	24 HC
		460 kg/d	1100 kg/d		
Dimethyl Sulfoxide	1	37.5 mg/L	91.5 mg/L	0	24 HC
		170 kg/d	420 kg/d		
Ethanol	1	4.1 mg/L	10 mg/L	1/3 Months	24 HC
		19 kg/d	45 kg/d		

Ethyl Acetate	1	0.5 mg/L	1.3 mg/L	1/3 Months	24 HC
		2.3 kg/d	5.9 kg/d		
n-Heptane	1	0.02 mg/L	0.05 mg/L	0	24 HC
		0.091 kg/d	0.23 kg/d		
n-Hexane	1	0.02 mg/L	0.03 mg/L	0	24 HC
		0.091 kg/d	0.14 kg/d		
Isobutyraldehyde	1	0.5 mg/L	1.2 mg/L	0	24 HC
		2.3 kg/d	5.4 kg/d		
Isopropanol	1	1.6 mg/L	3.9 mg/L	1/3 Months	24 HC
		7.3 kg/d	18 kg/d		
Isopropyl Acetate	1	0.5 mg/L	1.3 mg/L	0	24 HC
		2.3 kg/d	5.9 kg/d		
Isopropyl Ether	1	2.6 mg/L	8.4 mg/L	0	24 HC
		12 kg/d	38 kg/d		
Methanol	1	4.1 mg/L	10 mg/L	1/3 Months	24 HC
		19 kg/d	45 kg/d		
Methyl Cellosolve	1	40.6 mg/L	100 mg/L	0	24 HC
		180 kg/d	450 kg/d		
Methylene Chloride	1	0.3 mg/L	0.9 mg/L	0	24 HC
		1.4 kg/d	4.1 kg/d		
Methyl Formate	1	0.5 mg/L	1.3 mg/L	0	24 HC
		2.3 kg/d	5.9 kg/d		
4-Methyl-2-pentanone (MIBK)	1	0.2 mg/L	0.5 mg/L	0	24 HC
		0.91 kg/d	2.3 kg/d		
Phenol	1	0.02 mg/L	0.05 mg/L	1/3 Months	24 HC
		0.091 kg/d	0.23 kg/d		
Tetrahydrofuran	1	2.6 mg	8.4 mg/L	1/3 Months	24 HC
		12 kg/d	38 kg/d		
Toluene	1	0.02 mg/L	0.06 mg/L	0	24 HC
		0.091 kg/d	0.27 kg/d		
Triethylamine	1	102 mg/L	250 mg/L	0	24 HC
		460 kg/d	1100 kg/d		
Xylenes	1	0.01 mg/L	0.03 mg/L	0	24 HC
		0.045 kg/d	0.14 kg/d		

Refer to permit for definitions of monitoring frequencies and sample types

Bases for Effluent Limitations

1. *Federal ELGs for the Pharmaceutical Manufacturing Category, 40 CFR Part 439*
2. *Professional Judgment (PJ)*
3. *Water Quality Standards (9VAC25-260)*

Outfall No. 102 (Internal Outfall) **Final Limits** **Design Flow = 0.150 MGD**

PARAMETER	BASIS FOR LIMITS	EFFUENT LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Flow (MGD)	1	NL	NL	Continuous	TIRE
E. coli (N/100 mL) (geometric mean)	2	126	NA	4/Month 10 a.m. to 4 p.m.	Grab
---	---	Minimum	Maximum	---	---
Contact Chlorine (TRC) (mg/L)	1	1.0	NA	3/Day at 4-hr intervals	Grab

Refer to permit for definitions of monitoring frequencies and sample types

Bases for Effluent Limitations

1. *Professional Judgment (PJ)*
2. *Water Quality Standards (9VAC25-260)*

LIMITING FACTORS – OVERVIEW:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9VAC25-720)	
A. TMDL limits	E. coli
B. Non-TMDL WLAs	BOD_5, Ammonia-N
C. CBP (TN & TP) WLAs	TN and TP via GP VAN010007, TSS
Federal Effluent Limitation Guidelines	TSS, pH, BOD_5, COD, Ammonia-N, Cyanide, plus 30 other VOCs/SVOCs from 40 CFR Part 439
PJ/Agency Guidance limits	TKN, TRC (contact), Temperature
Water Quality-based Limits - numeric	DO, TRC (effluent), E. coli, pH, Ammonia-N, Cyanide, plus 30 other VOCs/SVOCs from 40 CFR Part 439
Water Quality-based Limits - narrative	None
Technology-based Limits (9VAC25-40-70)	None
Whole Effluent Toxicity (WET)	Monitoring without limits, Appendix C pages 22-25
Stormwater Limits	Industry general SW special conditions required

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS

This discharge was previously modeled by ECS LLC Mid-Atlantic in 2011. The most recent model addendum is dated November 3, 2011. Model results indicate that the limits applied in this permit remain protective of instream water quality downstream of the discharge. The modeling information is maintained in the DEQ-VRO receiving stream DO model files.

Process wastewater, discharged through Outfall 001 via Outfall 101, is subject to three categories of the EPA Effluent Limitation Guidelines (ELGs) as found in 40 CFR Part 439 for the Pharmaceutical Manufacturing Point Source Category: Subpart A (Fermentation Products), Subpart C (Chemical Synthesis Products), and Subpart D (Mixing/Compounding and Formulation). These three subparts prescribe BPT/BCT/BAT limits for BOD_5, TSS, COD, Cyanide, and pH as shown in Table 1 and BAT limits for additional parameters as shown in Table 2. These technology-based limits apply to Outfall 101, while water-quality based limits are applicable at Outfall 001.

Table 1 – Summary of BPT/BCT/BAT, Most Restrictive ELGs for BOD_5, TSS, COD, Cyanide, and pH*

Subpart	BOD_5 (kg/d) Monthly Average	TSS (kg/d) Monthly Average	COD (mg/L) Daily Maximum	COD Monthly Average	Cyanide (mg/L) Daily Maximum	Cyanide (mg/L) Monthly Average
A-40 CFR 439.12	90% Reduction of Influent LTA load x 3 (variability factor)	1.7 x BOD_5 limitation	1675	The lower of 856 mg/L or the concentration showing a 74% reduction of Influent LTA load x 2.2 (var. factor)	33.5	9.4
C-40 CFR 439.32	90% Reduction of Influent LTA load x 3 (variability factor)	1.7 x BOD_5 limitation	1675	The lower of 856 mg/L or the concentration showing a 74% reduction of Influent LTA load x 2.2 (var. factor)	33.5	9.4
D-40 CFR 439.42	90% Reduction of Influent LTA load x 3 but not less than 45 mg/L	1.7 x BOD_5 limitation	228	The lower of 86 mg/L or the concentration showing a 74% reduction of Influent LTA load x 2.2 (var. factor)	NA	NA

*pH requirement for all subparts is within the range of 6.0 SU – 9.0 SU at all times

Table 2 – Summary of Additional BAT ELGs *

Regulated Parameter	Monthly Average (mg/L)	Daily Maximum (mg/L)
Ammonia (as N)	29.4	84.1
Acetone	0.2	0.5
Acetonitrile	10.2	25.0
n-Amyl acetate	0.5	1.3
Amyl alcohol	4.1	10.0
Benzene	0.02	0.05
n-Butyl acetate	0.5	1.3
Chlorobenzene	0.06	0.15
Chloroform	0.013	0.02
o-Dichlorobenzene	0.03	0.15
1,2-Dichloroethane	0.1	0.4
Diethylamine	102.0	250.0
Dimethyl Sulfoxide	37.5	91.5
Ethanol	4.1	10.0
Ethyl acetate	0.5	1.3
n-Heptane	0.02	0.05
n-Hexane	0.02	0.03
Isobutyraldehyde	0.5	1.2
Isopropanol	1.6	3.9
Isopropyl acetate	0.5	1.3
Isopropyl ether	8.4	2.6
Methanol	4.1	10.0
Methyl Cellosolve	40.6	100.0
Methylene chloride	0.9	0.3
Methyl formate	0.5	1.3
4-Methyl-2-pentanone (MIBK)	0.2	0.5
Phenol	0.02	0.05
Tetrahydrofuran	2.6	8.4
Toluene	0.02	0.06
Triethylamine	102.0	250.0
Xylenes	0.01	0.03

*Apply only to Subpart A and C wastewater

Table 3 – Distribution of facility flows by Subparts

Description	Average GPD	Flow Ratios
Subpart A	338,300	39% of process WW
Subpart C	441,200	51% of process WW
Subpart D	83,000	10% of process WW
Total process wastewater	862,500	87% of outfall flow
Total non-process wastewater	130,010	13% of outfall flow
Total effluent flow (LTA)	992,510	NA

Table 4 – Average Daily Influent Loads

Year	BOD_5 (kg/d)	COD (kg/d)
2012-2015	2,438	4,511

BOD_5:

ELGs: Using the equation in Table 1 above; (2,438 kg/d) (0.10) (3) = 731.4 kg/d for the monthly average limit (MAL). Guidelines do not establish a corresponding daily maximum limit (DML), and that value has historically been set at twice the MAL per PJ. Following that procedure; (2) (731.4 kg/d) = 1462.8 kg/d for the DML.

WQMP: The WQMP specifies a year-round BOD_5 WLA for this facility of 1570 kg/d.

Stream Modeling Report: The model for this facility uses a $CBOD_5$ concentration which was based on the facility's WQMP WLA for BOD_5.

Previous Permit: Limits of 990 kg/d (MAL) and 2700 kg/d (DML) were included. Limits are given at Outfall 101.

2016 Permit: More stringent limits of 730 kg/d (MAL) and 1500 kg/d (DML) have been included at Outfall 101 based upon PJ and FELGs, respectively. A limit of 1570 kg/d (MAL) based upon the WQMP WLA and a limit of 3100 kg/d (DML) based on 2 x the MAL have been included at Outfall 001. Monitoring is required 1/Week at Outfall 101 and at Outfall 001. Agency guidelines on using two significant digits were observed.

TSS:

ELGs: The calculation (1.7) (731.4 kg/d) = 1243.38 kg/L for the MAL. Guidelines do not establish a corresponding DML; however, that value has historically been set at 2 x the MAL per PJ. Following that procedure; (2) (1243.38 kg/d) = 2486.76 kg/d for the DML.

WQMP: None

Chesapeake Bay TMDL: The 2010 EPA Chesapeake Bay TMDL TSS WLA for this facility is 2,168,100 lb/yr, equivalent to 5940 lb/d or 2700 kg/d.

Previous Permit: Limits of 1700 kg/d (MAL) and 3400 kg/d (DML) were included. Limits are given at Outfall 101.

2016 Permit: More stringent limits of 1200 kg/d (MAL) and 2500 kg/d (DML) and have been included at Outfall 101 based upon PJ and FELs, respectively. Agency guidelines on using two significant digits were also observed. A limit of 2700 kg/d (MAL) based upon the Chesapeake Bay TMDL and a limit of 5400 kg/d (DML) based on 2 x the MAL have been included at Outfall 001. Agency guidelines on using two significant digits were observed. Monitoring is required 1/Week at Outfall 101 and at Outfall 001.

COD:
ELGs: For MALs, COD must be limited at the most restrictive value based on a comparison of the concentration showing a 74% reduction of the influent load times a variability factor of 2.2 and the given allowable concentrations per subpart.

MAL 74% reduction loadings: Using the equation in Table 1 above: (4,511 kg/d) (0.26) (2.2) = 2580.292 kg/d for the MAL. This corresponds to a concentration of 568.096 mg/L for a 1.2 MGD flow. Guidelines do not establish a corresponding DML; however, the DML has historically been set at 2 x the MAL per PJ. Following that procedure; (2) (568.096 mg/l) = 1136.192 mg/L. The concentrations must be compared to those maximums allowed by regulation, shown in Table 1 above. Subparts A and C make up 90% of the process wastewater and Subpart D makes up 10%. Therefore the concentration from a 74% reduction must be compared to the following concentrations:

MAL concentrations: (0.90) (856 mg/L) + (0.10) (86 mg/L) = 779 mg/L
DML concentrations: (0.90) (1675 mg/L) + (0.10) (228 mg/L) = 1530.3 mg/L

WQMP: None

Previous Permit: Limits of 3400 kg/d (MAL) and 6600 kg/d (DML) were included. Limits are given at Outfall 101.

2016 Permit: The concentrations calculated from a 74% reduction of influent loadings are more stringent than the concentrations from Table 1 and have been used to calculate limits.

(568.096 mg/L) (1.2 MGD) (3.785) = 2580.29 kg/d
(1136.192 mg/L) (1.2 MGD) (3.785) = 5160.584 kg/d

More stringent limits of 2600 kg/d and 570 mg/L (MAL) and 5200 kg/d and 1100 mg/L (DML) and have been included at Outfall 101. Concentration limits have been included since DAF rather than the LTA flow of Outfall 101 was used for calculating the mass limits based on permittee request and justification. Agency guidelines on using two significant digits were observed. Monitoring is required 1/Week at Outfall 101 and at Outfall 001.

TKN:
ELGs: None

WQMP: None

Stream Modeling Report: The model for this facility includes a TKN concentration which was based on a load of 1291 kg/d.

Previous Permit: Limits of 1291 kg/d (MAL) and 2600 kg/d (DML) and were included at Outfall 001.

2016 Permit: Limits of 1291 kg/d (MAL) and 2600 kg/d (DML) and have been carried forward at Outfall 001 based on the Stream Modeling Report. Monitoring is required 1/Week.

Ammonia-N:
ELGs: ELGs limit this parameter at the concentrations shown in Table 2 above. These concentrations applied to a flow of 1.2 MGD result in loads of 381.9822 kg/d (DML) and 133.348 kg/d (MAL).

WQMP: The WQMP specifies a year-round Ammonia-N WLA for this facility of 645.9 kg/d.

Previous Permit: Limits of 380 kg/d (DML) and 130 kg/d (MAL) were included. Limits are given at Outfall 101.

2016 Permit: Limits of 380 kg/d (DML) and 130 kg/d (MAL) have been included at Outfall 101 based on ELGs. Agency guidelines on using two significant digits were also observed (except for the WQMP WLA limit). These limits are more stringent than those required by the evaluation of toxic parameters (see page C-17). For consistency with ELGs, mass limits are applied. Had the toxicity analysis indicated a reasonable potential to exceed WQS, concentration limits would have been included as well. A limit of 645.9 kg/d (MAL) based upon the WQMP WLA and a limit of 1300 kg/d (DML) based on 2 x the MAL have been included at Outfall 001. Monitoring is required 1/Week at Outfall 101 and at Outfall 001.

Dissolved Oxygen:
ELGs: None

WQMP: None

Stream Modeling Report: The model for this facility includes a dissolved oxygen concentration of 4.5 mg/L.

Previous Permit: A minimum limit of 4.5 mg/L was included at Outfall 001.

2016 Permit: A minimum limit of 4.5 mg/L has been carried forward with daily monitoring at Outfall 001.

Temperature:
ELGs: None

WQMP: None

Stream Modeling Report: The model for this facility includes a temperature of 37°C.

Previous Permit: A maximum limit of 37°C was included with continuous monitoring at Outfall 001. A special condition allowing for excursion times was also included.

2016 Permit: A maximum limit of 37°C has been carried forward with continuous monitoring at Outfall 001. The special condition allowing for excursion times was also carried forward. The special condition was first included prior to 1998. It is recognized that except for pH, the daily maximum limits in permits are not instantaneous maximums, but maximums based on the average of all data gathered in a day. Based on this and the continuous monitoring for this parameter, this condition is carried forward as a reasonable way to define compliance given continuous monitoring.

pH:
ELGs: ELGs require a final effluent pH in the range 6.0-9.0 S.U.

WQMP: None

Previous Permit: The permit required pH at Outfall 001 to be within the range of 6.5-9.0 S.U. based upon ELGs and the WQS of the receiving stream with continuous monitoring. Pursuant to 40 CFR 401.17(b), excursion times were allowed for continuous pH monitoring.

2016 Permit: The previous pH limits, monitoring requirements, and allowance for excursion times have been continued in the reissued permit.

Cyanide:
Background: Since 1994, cyanide limits in this permit have been based on maintaining the same cyanide concentrations in the receiving stream as was determined were protective of WQS in the 1993 model and applied in the 1994 permit. Limits have historically been applied at Outfall 001 since cyanide was detectable at that outfall in spite of dilution and because the facility incinerated sludge until the 1990s so there was a potential for cyanide in scrubber water to enter the waste stream after the Outfall 101 sampling point. Technology-based limits for this facility have historically been less stringent than those needed to protect WQS and therefore, limits have been water quality based rather than technology based.

ELGs: The technology-based limits for cyanide are shown in Table 1 above. Federal regulations and agency guidance allow monitoring to be waived for regulated parameters that are not used or generated at the facility provided the permittee provides sufficient evidence that the pollutant is not present in the effluent.

WQMP: None

Previous Permit: The permit required weekly cyanide monitoring at Outfall 001 with a MAL of 2.8 kg/d and a DML of 0.26 mg/L based on WQS.

2016 Permit: The permittee has certified by letter dated April 29, 2016 that cyanide is no longer used at the facility and that all equipment and facilities in which cyanide was handled have been thoroughly cleaned. Weekly cyanide sampling results at Outfall 001 since the use of cyanide ceased and the cleanup was completed in January 2016 have all been BQL (Below Quantitation Level of 10 µg/L). Effluent samples from Outfall 101 in August 2016 were also analyzed for cyanide and the results were also BQL. The permittee has requested that monitoring and limits for cyanide be removed from the permit. Based upon the justification provided and Guidance Memo 14-2003, a waiver for monitoring has been granted and the special condition regarding the waiver has been included. Also, limits have been moved from Outfall 001 to Outfall 101 for conformance with federal regulations requiring cyanide sampling before co-mingling with other waste streams unless cyanide is detectable at the end-of-pipe sampling point. Limits have been calculated using the same method as for all ELG parameters as shown on page B-26.

GROUNDWATER ACTIONS AND EVALUATION OF NON-CONTACT COOLING WATER
Merck Sharp & Dohme Corp. is implementing a facility-wide groundwater corrective action and monitoring program at the Elkton Plant. The groundwater monitoring program is required as part of a Resource Conservation and Recovery Act (RCRA) corrective action conducted under a Hazardous and Solid Waste Permit issued by DEQ on June 10, 2013. The corrective action remedy for the bedrock groundwater aquifer consists of the operation of groundwater extraction and bio-venting systems. Data from the monitoring program are used to verify that the three production wells (M-02, M-03, and M-04) located within the interior of the Elkton Plant are maintaining hydraulic control over the contaminated groundwater plume, and track the progress of corrective measures being implemented site-wide at the facility. No constituents of concern (COC) were detected above groundwater clean-up levels (GCL) in the three production wells. Production wells were not scheduled to be sampled in 2015. The next site-wide monitoring event will be performed in 2016.

Semiannual surface water samples were collected at six locations along the South Fork of the Shenandoah River. Samples were analyzed for VOCs and screened against the Virginia Water Quality Health-Based Drinking Water Protection Standard. No constituents of concern were detected in surface water samples collected from the Shenandoah River in 2015.

Effluent discharged from Outfall 001 consists primarily of noncontact cooling water, the source of which is groundwater from onsite wells (Well #2 through Well #12); therefore, the noncontact cooling water may contain VOCs and SVOCs. The chart below shows the COCs. Also shown are the GCLs for these constituents under the RCRA actions, the surface WQS for each parameter, and whether effluent data were submitted for each COC with the permit application. Effluent data were reviewed and no COCs were detectable.

COC	CAS No.	GCL (µg/L)	Non-PWS WQS (µg/L)	001 Sample Data (µg/l)
VOCs				
Acetone	67-64-1	700	-	
Benzene	71-43-2	5	510	<5
Carbon Tetrachloride	56-23-5	5	16	<5
Chlorobenzene	108-90-7	100	1,000	<5
Chloromethane	74-87-3	0.5	-	<5
1,2-Dibromo-3-chloropropane	96-12-8	0.2	-	
Trans-1,4-Dichloro-2-butene	110-57-6	NC	-	
1,2-Dichloroethane	107-06-2	5	370	<5
cis-1,2-Dichloroethene	156-59-2	70	-	
trans-1,2-Dichloroethene	156-60-5	100	10,000	<5
cis-1,3-Dichloropropene	10061-01-5	0.07	-	
Diethylbenzene	25340-17-4	84	84	
Ethyl Ether	60-29-7	1,400	-	
Ethylbenzene	100-41-4	700	2,100	<5
Methacrylonitrile	126-98-7	0.7	-	
4-Methyl-2-Pentanone	108-10-1	560	-	
Methylene Chloride	75-09-2	5	5,900	<5
N-Pentane	109-66-0	63,700	-	
1,1,2,2-Tetrachloroethane	79-34-5	0.035	40	<5
Tetrachloroethene	127-18-4	5	33	<5
Toluene	108-88-3	1,000	6,000	<5
1,1,2-Trichloroethane	79-00-5	5	160	<5
Trichloroethene	79-01-6	5	300	<5
Trihalomethanes*	NA	80	-	<5
Vinyl Chloride	75-01-4	2	24	<5
Xylene	1330-20-7	10,000	-	
SVOCs				
Acetophenone	98-86-2	700	-	
Aniline	62-53-3	1.23	-	
4-Chloroaniline	106-47-8	28	-	
1,4-Dichlorobenzene	106-46-7	75	190	<5
3,3-Dichlorobenzidine	91-94-1	0.02	0.28	<5
2,4-Dimethylphenol	105-67-9	140	850	<5
Bis(2-ethylhexly)phthalate	117-81-7	6	22	<5
3-Methylphenol (m-cresol)	108-39-4	350	-	
4-Methylphenol (p-cresol)	106-44-5	35	-	
Naphthalene	91-20-3	280	-	<5
2-Nitroaniline	88-74-4	0.42	-	
4-Nitroaniline	100-01-6	21	-	
Nitrobenzene	98-95-3	1.25	690	<5
N-Nitrosodiphenylamine	86-30-6	1.43	16,060	<5
Phenol	108-95-2	4,200	860,000	<5
1,4-Phenylenediamine	106-50-3	1,330	-	
2-Picoline	109-06-8	49	-	
Pyridine	110-86-1	7	-	
o-Toluidine	95-53-3	0.029	-	
1,2,4-Trichlorobenzene	120-82-1	70	70	<5
* Chloroform, Bromoform, Bromodichloromethane, and Dibromochloromethane				

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with §62.1-44.19:14.C.5 of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the WGP. The WLA for TN is 45,835 pounds per calendar year and for TP is 4,384 pounds per calendar year with an added requirement that the permittee must acquire credits for nutrients discharged in excess of 14,619 lbs/yr and 1,096 lbs/yr for TN and TP respectively.

The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed (9 VAC 25-40-70) stipulates the inclusion of technology-based effluent concentration limits in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade. Concentration limits have not been included in the draft permit since no technology has been installed to comply with site-specific nutrient limits. Prior to a facility expansion, the permittee must demonstrate that sufficient WLAs have been acquired to offset any increase in the delivered TN and delivered TP loads. The CER requirement and the permit reopener condition ensure that the facility will receive appropriate concentration limits when necessary for expanded or upgraded facilities based on the treatment technology proposed.

EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1BSSF100.10 on the South Fork Shenandoah River at the Rte 708 Bridge.

Stream Information			
90% Annual Temp (°C) =	24.4	90% pH (SU) =	8.50
Mean Hardness (mg/L) =	138	10% pH (SU) =	7.77

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH and temperature data were obtained from data submitted by the permittee with DMRs and hardness data were obtained from annual WET tests.

Effluent Information			
90% Annual Temp (°C) =	23.0	90% pH (SU) =	8.12
Mean Hardness (mg/L) =	142	10% pH (SU) =	7.24

The permittee has requested that the permit be written so that the effluent normally discharged though the diffuser at Outfall 001 could be temporarily diverted to the adjacent concrete stormwater channel to allow for maintenance and repairs to the distribution box; therefore, in the evaluation of toxic parameters, the discharge from this outfall has been evaluated both as discharging through the diffuser and as discharging for limited periods from the concrete channel. WLAs for each scenario were calculated and the more stringent acute and chronic WLAs for each parameter were used in the reasonable potential analysis as a conservative approach to protect against toxicity in either discharge scenario. Additionally, a special condition limiting the time that a discharge through the channel may occur has been added to the permit to reflect the request and intent of the permittee in the use of the channel. WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommend the evaluation of toxic pollutant limits for TRC be based on default effluent concentrations of 20 mg/L if it is potentially present. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- TRC: Monthly average and daily maximum limits are required for this discharge. These limits are slightly more stringent than the previous limits due to the slight decrease in stream flows. Effluent data from the previous permit term indicates that the lower monthly average limit can be met. The daily maximum limit is decreasing from 0.18 mg/L to 0.17 mg/L and in the previous permit term this limit has been slightly exceeded five times. However, it is expected based upon the facility's dechlorination system that the daily maximum limit can also be met consistently; therefore, a compliance schedule has not been included. Effluent TRC limits are specified in the permit at Outfall 001 regardless of the disinfection method chosen due to other sources of chlorine in the treatment process; therefore, no TRC effluent limits are included at Outfall 102.

- Ammonia-N: Limits at Outfall 101 identical to those in the previous permit are required based on ELGs, and the ELG limits are more stringent than those indicated by WQS. The required limits are applied at Outfall 101. Also, the WQMP WLA has been added at Outfall 001 as a MAL and a DML has been set at 2 x the MAL per PJ.

- Cyanide: A statistical analysis of effluent data shows no reasonable potential for exceeding WQS; however, limits are required because cyanide is listed in the ELGs for this facility. Limits were determined based on WQS and ELGs and the more stringent limits are applied at Outfall 101.

- Organics: No toxicity-based limits for any of the organic constituents regulated for this facility's SIC code were determined to be necessary. The monitoring frequency for these pollutants was increased to 1/3 Months for more accurate characterization of the effluent. During development of the permit, the permittee certified that all of the toxic FELG parameters except for acetone, acetonitrile, ethanol, ethyl acetate, isopropanol, methanol, phenol, and tetrahydrofuran are no longer used at the facility and requested a waiver for monitoring of those parameters, except for chloroform which is formed as a by-product. Monitoring results for these pollutants during the term of the

previous permit indicate that they have not been detected. Based upon the justification provided, Guidance Memo 14-2003, and 40 CFR 122.44(2), a waiver for monitoring has been granted and the special condition regarding the waiver has been included. Limits have been calculated and included in the permit as required as shown on page C-22.

EVALUATION OF STORMWATER

General Stormwater Special Conditions are placed in every individual permit that covers stormwater from one of the 29 regulated industrial sectors. The landfill at the facility operated from 1941-1999, and was capped in 2000 prior to the RCRA permit (VAD001705110) issuance Phase II of the original RCRA permit issued on March 5, 2002 included ground water monitoring of the landfill per Virginia Solid Waste Management Regulations (VSWMR) permit #183. On December 7, 2012 post closure care of the landfill was terminated and VSWMR permit #183 revoked by the department with the stipulation that remaining ground water impacts be addressed under site wide corrective action and that existing institutional controls be maintained in perpetuity with local recording authority. Stormwater from the area of the closed landfill discharges via Outfall 002. No effluent limits or monitoring requirements apply.

WQC-WLA SPREADSHEET INPUT – (Outfall 001 with Diffuser)

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Merck Sharp & Dohme
Receiving Stream: South Fork Shenandoah River
Permit No.: VA0002178
Date: 7/11/2016
Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	138	mg/L	1Q10 (Annual) =	102	MGD	Annual	- 1Q10 Flow =	100 %	Mean Hardness (as CaCO3) =	142	mg/L
90% Temperature (Annual) =	24.4	deg C	7Q10 (Annual) =	108	MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	23	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	118	MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =		deg C
90% Maximum pH =	8.50	SU	1Q10 (Wet season) =		MGD	Wet Season	- 1Q10 Flow =	%	90% Maximum pH =	8.12	SU
10% Maximum pH =	7.77	SU	30Q10 (Wet season) =		MGD		- 30Q10 Flow =	%	10% Maximum pH =	7.24	SU
Tier Designation =	1		30Q5 =	134	MGD				Current Discharge Flow =	7.54	MGD
Public Water Supply (PWS) Y/N? =	N		Harmonic Mean =	342	MGD				Discharge Flow for Limit Analysis =	7.54	MGD
V(alley) or P(iedmont)? =	V										
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Footnotes:

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

WQC-WLA SPREADSHEET OUTPUT – (Outfall 001 with Diffuser)

Facility Name: Merck Sharp & Dohme
Permit No.: VA0002178
Receiving Stream: South Fork Shenandoah River
Date: 8/30/2016

WATER QUALITY CRITERIA
7.540 MGD Discharge Flow - Mix per "Mixer"

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS
7.540 MGD Discharge - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health
Ammonia-N (Annual)	N	3.5E+00 mg/L	6.1E-01 mg/L	None	None	5.0E+01 mg/L	1.0E+01 mg/L	N/A
Antimony	N	None	None	5.6E+00	6.4E+02	N/A	N/A	1.2E+04
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	4.9E+03	2.3E+03	N/A
Benzene	Y	None	None	2.2E+01	5.1E+02	N/A	N/A	2.4E+04
Cadmium	N	5.7E+00	1.5E+00	5.0E+00	None	8.2E+01	2.2E+01	N/A
Chlordane	Y	2.4E+00	4.3E-03	8.0E-03	8.1E-03	3.5E+01	6.6E-02	3.8E-01
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.8E-01 mg/L	1.7E-01 mg/L	N/A
Chlorobenzene	N	None	None	1.3E+02	1.6E+03	N/A	N/A	3.0E+04
Chloroform	N	None	None	3.4E+02	1.1E+04	N/A	N/A	2.1E+05
Copper	N	1.8E+01	1.2E+01	1.3E+03	None	2.6E+02	1.8E+02	N/A
Cyanide, Free	N	2.2E+01	5.2E+00	1.4E+02	1.6E+04	3.2E+02	8.0E+01	3.0E+05
Diazinon	N	1.7E-01	1.7E-01	None	None	2.5E+00	2.6E+00	N/A
1,2-Dichlorobenzene	N	None	None	4.2E+02	1.3E+03	N/A	N/A	2.4E+04
1,2-Dichloroethane	Y	None	None	3.8E+00	3.7E+02	N/A	N/A	1.7E+04
Hexachlorocyclohexane Alpha-BHC	Y	None	None	2.6E-02	4.9E-02	N/A	N/A	2.3E+00
Hexachlorocyclohexane Beta-BHC	Y	None	None	9.1E-02	1.7E-01	N/A	N/A	7.9E+00
Lead	N	1.8E+02	2.0E+01	1.5E+01	None	2.6E+03	3.1E+02	N/A
Methylene Chloride	Y	None	None	4.6E+01	5.9E+03	N/A	N/A	2.7E+05
Nickel	N	2.4E+02	2.7E+01	6.1E+02	4.6E+03	3.5E+03	4.1E+02	8.6E+04
Nonylphenol	N	2.8E+01	6.6E+00	None	None	4.1E+02	1.0E+02	N/A
Phenol	N	None	None	1.0E+04	8.6E+05	N/A	N/A	1.6E+07
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.9E+02	7.7E+01	7.9E+04
Silver	N	6.0E+00	None	None	None	8.8E+01	N/A	N/A
Toluene	N	None	None	5.1E+02	6.0E+03	N/A	N/A	1.1E+05
Zinc	N	1.5E+02	1.6E+02	7.4E+03	2.6E+04	2.2E+03	2.4E+03	4.9E+05

WQC-WLA SPREADSHEET INPUT – (Outfall 001 via concrete channel)

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Merck Sharp & Dohme
Receiving Stream: South Fork Shenandoah River
Permit No.: VA0002178
Date: 8/3/2016
Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	138	mg/L	1Q10 (Annual) =	102	MGD	Annual	- 1Q10 Flow =	57.81 %	Mean Hardness (as CaCO3) =	142	mg/L
90% Temperature (Annual) =	24.4	deg C	7Q10 (Annual) =	108	MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	23	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	118	MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =		deg C
90% Maximum pH =	8.50	SU	1Q10 (Wet season) =		MGD	Wet Season	- 1Q10 Flow =	%	90% Maximum pH =	8.12	SU
10% Maximum pH =	7.77	SU	30Q10 (Wet season) =		MGD		- 30Q10 Flow =	%	10% Maximum pH =	7.24	SU
Tier Designation =	1		30Q5 =	134	MGD				Current Discharge Flow =	7.54	MGD
Public Water Supply (PWS) Y/N? =	N		Harmonic Mean =	342	MGD				Discharge Flow for Limit Analysis =	7.54	MGD
V(alley) or P(iedmont)? =	V										
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Footnotes:

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

WQC-WLA SPREADSHEET OUTPUT – (Outfall 001 via concrete channel)

Facility Name: Merck Sharp & Dohme
Permit No.: VA0002178
Receiving Stream: South Fork Shenandoah River
Date: 8/30/2016

WATER QUALITY CRITERIA
7.540 MGD Discharge Flow - Mix per "Mixer"

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS
7.540 MGD Discharge - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters	NAD WLA Aquatic Protection Acute	NAD WLA Aquatic Protection Chronic	NAD WLA Human Health
Ammonia-N (Annual)	N	3.6E+00 mg/L	6.1E-01 mg/L	None	None	3.2E+01 mg/L	1.0E+01 mg/L	N/A
Antimony	N	None	None	5.6E+00	6.4E+02	N/A	N/A	1.2E+04
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	3.0E+03	2.3E+03	N/A
Benzene	Y	None	None	2.2E+01	5.1E+02	N/A	N/A	2.4E+04
Cadmium	N	5.7E+00	1.5E+00	5.0E+00	None	5.0E+01	2.2E+01	N/A
Chlordane	Y	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.1E+01	6.6E-02	3.8E-01
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	1.7E-01 mg/L	1.7E-01 mg/L	N/A
Chlorobenzene	N	None	None	1.3E+02	1.6E+03	N/A	N/A	3.0E+04
Chloroform	N	None	None	3.4E+02	1.1E+04	N/A	N/A	2.1E+05
Copper	N	1.8E+01	1.2E+01	1.3E+03	None	1.6E+02	1.8E+02	N/A
Cyanide, Free	N	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.9E+02	8.0E+01	3.0E+05
Diazinon	N	1.7E-01	1.7E-01	None	None	1.5E+00	2.6E+00	N/A
1,2-Dichlorobenzene	N	None	None	4.2E+02	1.3E+03	N/A	N/A	2.4E+04
1,2-Dichloroethane	Y	None	None	3.8E+00	3.7E+02	N/A	N/A	1.7E+04
Hexachlorocyclohexane Alpha-BHC	Y	None	None	2.6E-02	4.9E-02	N/A	N/A	2.3E+00
Hexachlorocyclohexane Beta-BHC	Y	None	None	9.1E-02	1.7E-01	N/A	N/A	7.9E+00
Lead	N	1.8E+02	2.0E+01	1.5E+01	None	1.6E+03	3.1E+02	N/A
Methylene Chloride	Y	None	None	4.6E+01	5.9E+03	N/A	N/A	2.7E+05
Nickel	N	2.4E+02	2.7E+01	6.1E+02	4.6E+03	2.1E+03	4.1E+02	8.6E+04
Nonylphenol	N	2.8E+01	6.6E+00	None	None	2.5E+02	1.0E+02	N/A
Phenol	N	None	None	1.0E+04	8.6E+05	N/A	N/A	1.6E+07
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.8E+02	7.7E+01	7.9E+04
Silver	N	6.0E+00	None	None	None	5.3E+01	N/A	N/A
Toluene	N	None	None	5.1E+02	6.0E+03	N/A	N/A	1.1E+05
Zinc	N	1.5E+02	1.6E+02	7.4E+03	2.6E+04	1.4E+03	2.4E+03	4.9E+05

PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit. Since there are no data available for any toxic pollutants immediately upstream of this discharge, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the Quantification Level (QL) and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.

B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

B.3 If the evaluation indicates that limits are needed but the parameter was previously evaluated at the required QL and no limits were determined to be needed, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.

C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.

C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

TOXLARGE – OUTFALL 001

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Antimony, dissolved	7440-36-0	0.2	<20	b	B.1
Arsenic, dissolved	7440-38-2	1.0	<20	b	B.1
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	<5	b	B.1
Chromium III, dissolved	16065-83-1	0.5	Previously evaluated, no further monitoring required.	---	---
Chromium VI, dissolved	18540-29-9	0.5	Previously evaluated, no further monitoring required.	---	---
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	7	b	C.1
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	<15	b	B.1
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	<0.2	b	A
Nickel, dissolved	7440-02-0	0.5	<10	b	B.1
Selenium, total recoverable	7782-49-2	2.0	<20	b	B.1
Silver, dissolved	7440-22-4	0.2	<5	b	B.1
Thallium, dissolved	7440-28-0	---	<30	b	A
Zinc, dissolved	7440-66-6	2.0	<20	b	B.1
PESTICIDES/PCBS					
Aldrin [C]	309-00-2	0.05	0.018	b	A
Chlordane [C]	57-74-9	0.2	<0.5	b	B.3
Chlorpyrifos	2921-88-2	---	Previously evaluated, no further monitoring required.	---	---
DDD [C]	72-54-8	0.1	<0.02	b	A
DDE [C]	72-55-9	0.1	<0.02	b	A
DDT [C]	50-29-3	0.1	<0.02	b	A
Demeton	8065-48-3	---	Previously evaluated, no further monitoring required.	---	---
Diazinon	333-41-5	---	<12	b	A
Dieldrin [C]	60-57-1	0.1	<0.02	b	A
Alpha-Endosulfan	959-98-8	0.1	<0.01	b	A
Beta-Endosulfan	33213-65-9	0.1	<0.02	b	A
Alpha-Endosulfan + Beta-Endosulfan		---	<0.03	b	A
Endosulfan Sulfate	1031-07-8	0.1	<0.02	b	A
Endrin	72-20-8	0.1	<0.02	b	A
Endrin Aldehyde	7421-93-4	---	<0.1	b	A
Guthion	86-50-0	---	Previously evaluated, no further monitoring required.	---	---
Heptachlor [C]	76-44-8	0.05	<0.01	b	A
Heptachlor Epoxide [C]	1024-57-3	---	<0.01	b	A
Hexachlorocyclohexane Alpha-BHC [C]	319-84-6	---	0.049	b	C.1
Hexachlorocyclohexane Beta-BHC [C]	319-85-7	---	0.081	b	C.1
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	<0.01	b	A
Kepone	143-50-0	---	Previously evaluated, no further monitoring required.	---	---
Malathion	121-75-5	---	Previously evaluated, no further monitoring required.	---	---
Methoxychlor	72-43-5	---	Previously evaluated, no further monitoring required.	---	---

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Mirex	2385-85-5	---	Previously evaluated, no further monitoring required.	---	---
Parathion	56-38-2	---	Previously evaluated, no further monitoring required.	---	---
PCB Total [C]	1336-36-3	7.0	<3.5	b	A
Toxaphene [C]	8001-35-2	5.0	<3	b	A
BASE NEUTRAL EXTRACTABLES					
Acenaphthene	83-32-9	10.0	<5	b	A
Anthracene	120-12-7	10.0	<5	b	A
Benzidine [C]	92-87-5	---	<60	b	A
Benzo (a) anthracene [C]	56-55-3	10.0	<5	b	A
Benzo (b) fluoranthene [C]	205-99-2	10.0	<5	b	A
Benzo (k) fluoranthene [C]	207-08-9	10.0	<5	b	A
Benzo (a) pyrene [C]	50-32-8	10.0	<5	b	A
Bis 2-Chloroethyl Ether [C]	111-44-4	---	<5	b	A
Bis 2-Chloroisopropyl Ether	108-60-1	---	<5	b	A
Bis-2-Ethylhexyl Phthalate [C]	117-81-7	10.0	<5	b	A
Butyl benzyl phthalate	85-68-7	10.0	<5	b	A
2-Chloronaphthalene	91-58-7	---	<5	b	A
Chrysene [C]	218-01-9	10.0	<5	b	A
Dibenz(a,h)anthracene [C]	53-70-3	20.0	<5	b	A
1,2-Dichlorobenzene	95-50-1	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
1,3-Dichlorobenzene	541-73-1	10.0	<5	b	A
1,4-Dichlorobenzene	106-46-7	10.0	<5	b	A
3,3-Dichlorobenzidine [C]	91-94-1	---	<5	b	A
Diethyl phthalate	84-66-2	10.0	<5	b	A
Dimethyl phthalate	131-11-3	---	<5	b	A
Di-n-Butyl Phthalate	84-74-2	10.0	<5	b	A
2,4-Dinitrotoluene	121-14-2	10.0	<5	b	A
1,2-Diphenylhydrazine [C]	122-66-7	---	<5	b	A
Fluoranthene	206-44-0	10.0	<5	b	A
Fluorene	86-73-7	10.0	<5	b	A
Hexachlorobenzene [C]	118-74-1	---	<5	b	A
Hexachlorobutadiene [C]	87-68-3	---	<5	b	A
Hexachlorocyclopentadiene	77-47-4	---	<15	b	A
Hexachloroethane [C]	67-72-1	---	<5	b	A
Indeno(1,2,3-cd)pyrene [C]	193-39-5	20.0	<5	b	A
Isophorone [C]	78-59-1	10.0	<5	b	A
Nitrobenzene	98-95-3	10.0	<5	b	A
N-Nitrosodimethylamine [C]	62-75-9	---	<5	b	A
N-Nitrosodi-n-propylamine [C]	621-64-7	---	<5	b	A
N-Nitrosodiphenylamine [C]	86-30-6	---	<5	b	A
Pyrene	129-00-0	10.0	<5	b	A
1,2,4-Trichlorobenzene	120-82-1	10.0	<5	b	A
VOLATILES					
Acrolein	107-02-8	---	<50	b	A

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Acrylonitrile [C]	107-13-1	---	<50	b	A
Benzene [C]	71-43-2	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
Bromoform [C]	75-25-2	10.0	<5	b	A
Carbon Tetrachloride [C]	56-23-5	10.0	<5	b	A
Chlorobenzene	108-90-7	50.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
Chlorodibromomethane [C]	124-48-1	10.0	<5	b	A
Chloroform	67-66-3	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
Dichlorobromomethane [C]	75-27-4	10.0	<5	b	A
1,2-Dichloroethane [C]	107-06-2	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
1,1-Dichloroethylene	75-35-4	10.0	<5	b	A
1,2-trans-dichloroethylene	156-60-5	---	<5	b	A
1,2-Dichloropropane [C]	78-87-5	---	<5	b	A
1,3-Dichloropropene [C]	542-75-6	---	<5	b	A
Ethylbenzene	100-41-4	10.0	<5	b	A
Methyl Bromide	74-83-9	---	<5	b	A
Methylene Chloride [C]	75-09-2	20.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
1,1,2,2-Tetrachloroethane [C]	79-34-5	---	<5	b	A
Tetrachloroethylene	127-18-4	10.0	<5	b	A
Toluene	10-88-3	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
1,1,2-Trichloroethane [C]	79-00-5	---	<5	b	A
Trichloroethylene [C]	79-01-6	10.0	<5	b	A
Vinyl Chloride [C]	75-01-4	10.0	<5	b	A
RADIONUCLIDES					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
ACID EXTRACTABLES					
2-Chlorophenol	95-57-8	10.0	<5	b	A
2,4-Dichlorophenol	120-83-2	10.0	<5	b	A
2,4-Dimethylphenol	105-67-9	10.0	<5	b	A
2,4-Dinitrophenol	51-28-5	---	<30	b	A
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<15	b	A
Nonylphenol	104-40-51	---	<2.5	b	A
Pentachlorophenol [C]	87-86-5	50.0	<15	b	A
Phenol	108-95-2	10.0	<5 - No RP; limits applied at Outfall 101 due to ELGs	b	A
2,4,6-Trichlorophenol [C]	88-06-2	10.0	<5	b	A
MISCELLANEOUS					
Ammonia-N (mg/L)	766-41-7	0.2 mg/L	1.88 - No RP; limits applied at Outfall 101 per ELGs	d	C.2
Chloride (mg/L)	16887-00-6	---	Previously evaluated, no further monitoring required.	---	---
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	a	C.2
Cyanide, Free	57-12-5	10.0	<10 - No RP; limits applied at Outfall 101 per ELGs	d	C.2
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)(ppq)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Sulfide, dissolved	18496-25-8	100	Previously evaluated, no further monitoring required.	---	---
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	Previously evaluated, no further monitoring required.	---	---
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Hardness (mg/L as $CaCO_3$)	471-34-1	---	136, 144, 128, 136, 146, 186, 136, 124, 114, 136, 144, 170	c	---

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5}.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

"Source of Data" codes:
a = default effluent concentration
b = data from permittee monitoring, submitted as part of application
c = data from annual WET sampling
d = Outfall 001 highest DMR data point from permit term

"Data Evaluation" codes:
See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

STAT.EXE RESULTS:

Ammonia-N Chronic averaging period = 30 WLAa = 32 WLAc = 10 Q.L. = 0.2 # samples/mo. = 4 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 1.88 Variance = 1.27238 C.V. = 0.6 97th percentile daily values = 4.57482 97th percentile 4 day average = 3.12792 97th percentile 30 day average= 2.26738 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 1.88	**Arsenic** Chronic averaging period = 4 WLAa = 3000 WLAc = 2300 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 20	**Cadmium** Chronic averaging period = 4 WLAa = 50 WLAc = 22 Q.L. = 0.3 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 5
Chlordane Chronic averaging period = 4 WLAa = 21 WLAc = 0.066 Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = .5 Variance = .09 C.V. = 0.6 97th percentile daily values = 1.21670 97th percentile 4 day average = .831895 97th percentile 30 day average= .603026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 9.65299357475133E-02 Average Weekly Limit = 9.65299357475133E-02 Average Monthly Limit = 9.65299357475133E-02 The data are: 0.5	**Copper** Chronic averaging period = 4 WLAa = 160 WLAc = 180 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 7 Variance = 17.64 C.V. = 0.6 97th percentile daily values = 17.0339 97th percentile 4 day average = 11.6465 97th percentile 30 day average= 8.44237 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 7	**Cyanide** Chronic averaging period = 4 WLAa = 190 WLAc = 80 Q.L. = 10 # samples/mo. = 4 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 10 Variance = 36 C.V. = 0.6 97th percentile daily values = 24.3341 97th percentile 4 day average = 16.6379 97th percentile 30 day average= 12.0605 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 10

Lead Chronic averaging period = 4 WLAa = 1600 WLAc = 310 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 15 Variance = 81 C.V. = 0.6 97th percentile daily values = 36.5012 97th percentile 4 day average = 24.9568 97th percentile 30 day average= 18.0907 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 15	**Nickel** Chronic averaging period = 4 WLAa = 2100 WLAc = 410 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 10 Variance = 36 C.V. = 0.6 97th percentile daily values = 24.3341 97th percentile 4 day average = 16.6379 97th percentile 30 day average= 12.0605 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 10	**Selenium** Chronic averaging period = 4 WLAa = 180 WLAc = 77 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 20
Silver Chronic averaging period = 4 WLAa = 53 WLAc = Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 5	**TRC** Chronic averaging period = 4 WLAa = 0.17 WLAc = 0.17 Q.L. = 0.1 # samples/mo. = 30 # samples/wk. = 7 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Acute Toxicity Maximum Daily Limit = 0.17 Average Weekly limit = 0.103820225147845 Average Monthly Limit = 8.42555978575054E-02 The data are: 20	**Zinc** Chronic averaging period = 4 WLAa = 1400 WLAc = 2400 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 20

COMPARISON OF TECHNOLOGY AND WATER QUALITY-BASED LIMITS – Outfall 101

For parameters with effluent guideline limitations, the following table was used to compare the calculated technology-based limits and the water quality-based limits, and the most stringent limit was applied to the permit. The method of comparison was as follows:

1) WQS were applied at Outfall 001 to determine chronic and acute WLAs at the point the final effluent enters the river. For parameters with only human health WLAs, the WLA_{HH} was considered as a chronic limit.
2) As applicable, water quality-based concentration limits for internal Outfall 101 were back-calculated from Outfall 001 limits based on the maximum 30-day flow at Outfall 001 (7.54 MGD) and the Design Average Flow (DAF) at Outfall 101 (1.2 MGD).
3) These calculated Outfall 101 concentrations were compared to those required by ELGs, and the more stringent concentration for each parameter was used for calculating mass limits.
4) Mass limits were calculated as follows: The concentration was multiplied by the DAF for Outfall 101 (1.2 MGD) and the conversion factor of 3.785. Limits have been applied in the permit at Outfall 101. DAF rather than the LTA flow of Outfall 101 was used based on permittee request and justification. Therefore, concentration limits have also been included to ensure compliance with ELGs. Concentration limits based on water quality and all mass limits were applied to two significant digits. Concentration limits based on ELGs were applied as expressed in the ELGs without regard for significant digits.
5) Acute limits were applied as daily maximums and chronic limits were applied as monthly averages.
6) Federal regulations do not regulate the parameters below for Subcategory D. Based on the July 1998 Pharmaceutical Development Document, EPA 821-R-98-005, page 11-5, Subcategory D flow was considered in the following calculations with the same concentrations contained in the Subcategory A and C BAT regulations.
7) Monitoring frequency was increased to 1/3 Months for ELG parameters used in manufacturing or identified as being inherent to the site's waste profile and a monitoring waiver was granted for parameters not used in manufacturing or identified as being inherent to the site's waste profile.

Max Mo Avg flow (MGD) at 001:	7.54	MGD										
Design flow (MGD) at 101:	1.2	MGD										
PARAMETER	**101 acute limit** based on ELGs (mg/l)	**101 chronic limit** based on ELGs (mg/l)	**001 acute limit** based on WQS (mg/l)	**001 chronic limit** based on WQS (mg/l)	**001 HH WLA** based on WQS (mg/l)	**101 acute limit** based on 001 WLA (mg/l)	**101 chronic limit** based on 001 WLA (mg/l)	**101 HH limit** based on 001 WLA (mg/l)	**Most Restrictive Acute Limit** Daily Max (mg/l)	**Most Restrictive Chronic Limit** Monthly Avg (mg/l)	**101 Mass Limit** Daily Max (kg/d)	**101 Mass Limit** Mo Avg (kg/d)
Ammonia as N	84.1	29.4	32	10	NA	201.1	62.8	NA	84.1	29.4	382	134
Acetone	0.5	0.2	NA	NA	NA	NA	NA	NA	0.5	0.2	2.3	0.91
Acetonitrile	25	10.2	NA	NA	NA	NA	NA	NA	25	10.2	114	46
n-Amyl Acetate	1.3	0.5	NA	NA	NA	NA	NA	NA	1.3	0.5	5.9	2.3
Amyl Alcohol	10	4.1	NA	NA	NA	NA	NA	NA	10	4.1	45	19
Benzene	0.05	0.02	NA	NA	24	NA	NA	150.8	0.05	0.02	0.23	0.091
n-Butyl Acetate	1.3	0.5	NA	NA	NA	NA	NA	NA	1.3	0.5	5.9	2.3
Chlorobenzene	0.15	0.06	NA	NA	30	NA	NA	188.5	0.15	0.06	0.68	0.27
Chloroform	0.02	0.013	NA	NA	210	NA	NA	1319.5	0.02	0.013	0.091	0.059
Cyanide*	33.5	9.4	0.19	0.080	300	1.19	0.503	1885.0	1.19	0.503	5.422	2.283
o-Dichlorobenzene	0.15	0.06	NA	NA	24	NA	NA	150.8	0.15	0.06	0.68	0.27
1,2 Dichloroethane	0.4	0.1	NA	NA	17	NA	NA	106.8	0.4	0.1	1.8	0.45
Diethylamine	250	102	NA	NA	NA	NA	NA	NA	250	102	1136	463
Dimethyl Sulfoxide	91.5	37.5	NA	NA	NA	NA	NA	NA	91.5	37.5	416	170
Ethanol	10	4.1	NA	NA	NA	NA	NA	NA	10	4.1	45	19
Ethyl Acetate	1.3	0.5	NA	NA	NA	NA	NA	NA	1.3	0.5	5.9	2.3
n-Heptane	0.05	0.02	NA	NA	NA	NA	NA	NA	0.05	0.02	0.23	0.091
n-Hexane	0.03	0.02	NA	NA	NA	NA	NA	NA	0.03	0.02	0.14	0.091
Isobutyraldehyde	1.2	0.5	NA	NA	NA	NA	NA	NA	1.2	0.5	5.45	2.3
Isopropanol	3.9	1.6	NA	NA	NA	NA	NA	NA	3.9	1.6	18	7.3
Isopropyl Acetate	1.3	0.5	NA	NA	NA	NA	NA	NA	1.3	0.5	5.9	2.3
Isopropyl Ether	8.4	2.6	NA	NA	NA	NA	NA	NA	8.4	2.6	38	12
Methanol	10	4.1	NA	NA	NA	NA	NA	NA	10	4.1	45	19
Methyl Cellosolve	100	40.6	NA	NA	NA	NA	NA	NA	100	40.6	454	184
Methylene Chloride	0.9	0.3	NA	NA	270	NA	NA	1696.5	0.9	0.3	4.1	1.4
Methyl Formate	1.3	0.5	NA	NA	NA	NA	NA	NA	1.3	0.5	5.9	2.3
MIBK	0.5	0.2	NA	NA	NA	NA	NA	NA	0.5	0.2	2.3	0.91
Phenol	0.05	0.02	NA	NA	16,000	NA	NA	100533	0.05	0.02	0.23	0.091
Tetrahydrofuran	8.4	2.6	NA	NA	NA	NA	NA	NA	8.4	2.6	38	12
Toluene	0.06	0.02	NA	NA	110	NA	NA	691.2	0.06	0.02	0.27	0.091
Triethylamine	250	102	NA	NA	NA	NA	NA	NA	250	102	1136	463
Xylenes	0.03	0.01	NA	NA	NA	NA	NA	NA	0.03	0.01	0.14	0.045
* Limits based on WQS.												

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Applicability of WET Requirements:
The applicability criteria for a facility to perform toxicity testing is contained in the Departments Guidance Memo No. 00-2012, Toxics Management Program Implementation Guidance, 08/24/00, Part IV. The Standard Industrial Codes (SIC) for Merck & Co., Inc. are 2833 and 2834, which are included in Appendix A of the TMP Guidance. (GM 00-2012, Sections IV.1.A).

Summary of Toxicity Testing:
The previous permit required annual acute and chronic testing using *Ceriodaphnia dubia*. Tables 1 and 2 contain a summary of the toxicity testing results during the term of the permit. These data were evaluated using the procedures outlined in the TMP guidance.

Rationale for Most Sensitive Species:
The more-sensitive species was determined to be *Ceriodaphnia dubia* at the 2007 permit reissuance. This has been carried forward in this reissuance.

Sample Type:
A sample type of 24-hour composite is representative of the discharge.

Evaluation of Acute Instream Waste Concentration (IWCa):
The Acute IWC is ≤ 33% (see Table 3); therefore, the acute toxicity criterion is LC_{50}.

Calculation of WLAs: Acute and chronic WLAs were generated from the WETLimit10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows.

Dilution Series:
The recommended dilution series for acute tests, should they apply, is the 0.5 series starting at 100%. For chronic tests, the recommended dilution series is shown in Table 3. The chronic test midpoint is derived from the highest anticipated dilution expressed as TUc that will not trigger a limit when evaluated.

Stat.exe Limit Evaluation:
The WLAs are used in the Department's Stat.exe program in order to perform a statistical evaluation of the acute and chronic test results expressed as Toxicity Units (TUs). The toxicity data are analyzed separately by species and test type (acute or chronic).

Chronic Stat.exe Limit Evaluation:
The summary of the chronic toxicity testing data are shown in Table 2. The results of the Stat.exe evaluation are shown in Table 4. Based on the evaluation of the chronic toxicity data, a WET limit is not required at this time; therefore, monitoring shall be continued on an annual basis.

Acute Stat.exe Limit Evaluation:
The summary of the acute toxicity testing data are shown in Table 1. The results of the Stat.exe evaluation are shown in Table 4. Based on the evaluation of the acute toxicity data, no acute limit is necessary and acute monitoring will no longer be required. The permit includes language that requires quarterly acute WET testing to commence if chronic WET monitoring results in a 48-hour $LC_{50} \leq 100\%$.

Midpoint Check Stat.exe Evaluation:
The midpoint of the chronic test dilution series of 11% is equivalent to a TUc of 9.1 (Table 3). This TUc was evaluated using Stat.exe to determine if limits would be inappropriately triggered (Table 4). Since no limit was triggered, the recommended dilution series can be used without the need for adjustment.

Peer Reviewer: Bev Carver
Date: 7.12.16

Table 1
Summary of Acute Toxicity Testing (LC_{50})

Monitoring Period	Test Start Date	48-Hr. Static Acute *Ceriodaphnia dubia* (TUa)	48-Hr. Static Acute *Ceriodaphnia dubia* (% Survival in 100% Effluent)
1st Annual	8/8/12	<1.0	100
2nd Annual	8/7/13	<1.0	100
3rd Annual	8/6/14	<1.0	100
4th Annual	8/12/15	<1.0	100
5th Annual	8/3/16	<1.0	100

Table 2
Summary of Chronic Toxicity Testing

Monitoring Period	Test Start Date	Chronic 3-Brood Static Renewal Survival and Reproduction *Ceriodaphnia dubia*		48-hr LC_{50}	% Survival in 100% Effluent
		Survival (TUc)	Reproduction (TUc)		
1st Annual	8/7/12	1.0	1.0	>100	100
2nd Annual	8/6/13	1.0	1.0	>100	100
3rd Annual	8/5/14	1.0	1.0	>100	100
4th Annual	8/11/15	1.0	1.0	>100	100
5th Annual	8/2/16	1.0	1.0	>100	100

Table 3
WETLim10.xls Spreadsheet

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR					
	Revision Date: 12/13/13											
	File: WETLIM10.xls			ACUTE	2.24119203	TUa	LC_{50} =	45	% Use as	2.22	TUa	
	(MIX.EXE required also)											
				ACUTE WLAa		4.3583554	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	22.4119203	TU_c	NOEC =	5	% Use as	20.00	TU_c	
				BOTH*	43.5835554	TU_c	NOEC =	3	% Use as	33.33	TU_c	
	Enter data in the cells with blue type:			AML	22.4119203	TU_c	NOEC =	5	% Use as	20.00	TU_c	
	Entry Date:	07/11/16		ACUTE WLAa,c		43.583554		Note: Inform the permittee that if the mean				
	Facility Name:	Merck & Co., Inc.		CHRONIC WLAc		15.323607		of the data exceeds this TUc:		9.2100592		
	VPDES Number:	VA0002178		* Both means acute expressed as chronic				a limit may result using STATS.EXE				
	Outfall Number:	1										
				% Flow to be used from MIX.EXE				Diffuser /modeling study?				
	Plant Flow:	7.54	MGD					Enter Y/N	n			
	Acute 1Q10:	102	MGD	100	%			Acute	1	:1		
	Chronic 7Q10:	108	MGD	100	%			Chronic	1	:1		
	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)					Go to Page 2		
	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3		
	IWC_a	6.88333029	%	Plant flow/plant flow + 1Q10			NOTE: If the IWCa is >33%, specify the					
	IWC_c	6.525878484	%	Plant flow/plant flow + 7Q10			NOAEC = 100% test/endpoint for use					
	Dilution, acute	14.52785146		100/IWCa								
	Dilution, chronic	15.32360743		100/IWCc								
	WLA_a	4.358355438	Instream criterion (0.3 TUa) X's Dilution, acute									
	WLA_c	15.32360743	Instream criterion (1.0 TUc) X's Dilution, chronic									
	$WLA_{a,c}$	43.58355438	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 variatio	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.					
	$LTA_{a,c}$	17.91043068	WLAa,c X's eA									
	LTA_c	9.210059634	WLAc X's eB							Rounded NOEC's		%
	MDL** with $LTA_{a,c}$	43.58355544	TU_c	NOEC =	2.294443	(Protects from acute/chronic toxicity)				NOEC =	3	%
	MDL** with LTA_c	22.41192029	TU_c	NOEC =	4.461911	(Protects from chronic toxicity)				NOEC =	5	%
	AML with lowest LTA	22.41192029	TU_c	NOEC =	4.461911	Lowest LTA X's eD				NOEC =	5	
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a											
										Rounded LC50's		%
	MDL with $LTA_{a,c}$	4.358355544	TU_a	LC50 =	22.944434	%				LC50 =	23	%
	MDL with LTA_c	2.241192029	TU_a	LC50 =	44.619113	%				LC50 =	45	

CHRONIC DILUTION SERIES TO RECOMMEND		
	Monitoring	
	% Effluent	TUc
Dilution series based on data mean	11	9.210059
Dilution series to use for limit		
Dilution factor to recommend:	0.331662479	
Dilution series to recommend:	100.0	1.0
	33.2	3.0
	11.0	9.1
	3.6	27.4
	1.2	82.6
Extra dilutions if needed	0.40	249.18
	0.13	751.31

Table 4

Stat.exe Results

Chemical = WET - Chronic - C. dubia
Chronic averaging period = 4
WLAa,c = 43.583554
WLAc = 15.323607
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
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: 1,1,1,1,1

Chemical = WET - Acute - C. dubia
Chronic averaging period = 4
WLAa = 4.3583554
WLAc = NA
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
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: 1,1,1,1,1

Chemical = TUc - Midpoint Check
Chronic averaging period = 4
WLAa,c = 43.583554
WLAc = 15.323607
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9.1
Variance = 29.8116
C.V. = 0.6
97th percentile daily values = 22.1440
97th percentile 4 day average = 15.1404
97th percentile 30 day average= 10.9750
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are: 9.1

APPENDIX D

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page

- Content and format as prescribed by the VPDES Permit Manual.
- The facility name was changed.

Part I.A.1

Outfall 001 Effluent Limitations and Monitoring Requirements: Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.

Updates Part I.A.1 of the previous permit with the following:

- Slight changes were made to the format and introductory language.
- Limits for TSS, Ammonia-N, and $CBOD_5$ were included and the monitoring frequency was increased from 1/Month to 1/Week.
- Total Cyanide requirements were removed from this outfall.
- Footnotes were updated.

Part I.A.2

Outfall 101 Effluent Limitations and Monitoring Requirements: Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.

Updates Part I.A.2 of the previous permit with the following:

- Slight changes were made to the format and introductory language.
- More stringent limits for TSS, COD, and $CBOD_5$ were included.
- The monitoring frequency for VOCs/SVOCs ELG parameters was increased from 1/6 Months to 1/3 Months for some pollutants and monitoring was waived for some pollutants.
- Total Cyanide limits and an associated footnote were added to this outfall.
- The footnote for significant digits was removed.

Part I.A.3

Outfall 102 Effluent Limitations and Monitoring Requirements: Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.

Updates Part I.A.3 of the previous permit with the following:

- Slight changes were made to the format, introductory language, and footnotes.

Part I.A.4

Outfall 002 Effluent Limitations and Monitoring Requirements: Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet.

Updates Part I.A.4 of the previous permit with the following:

- Slight changes were made to the format and language.

Part I.B

Additional Total Residual Chlorine (TRC) Effluent Limitations and Monitoring Requirements: *Updates Part I.B of the previous permit with minor wording changes and removes bacteria monitoring requirements that apply if the facility switches to UV disinfection. Since the STP does not have secondary limits, a change to UV disinfection would require a permit modification.* Required by Sewage Collection and Treatment (SCAT) Regulations, 9VAC25-790 and Water Quality Standards, 9VAC25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

Part I.C **Effluent Limitations and Monitoring Requirements – Additional Instructions***:* *Updates Part I.C of the previous permit with minor wording changes. The QL for BOD_5 was changed from 5 mg/L to 2 mg/L.* Authorized by VPDES Permit Regulation 9 VAC25-31-190 J.4 and 220.I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Part I.D **Whole Effluent Toxicity (WET) Requirements:** *Updates Part I.D of the previous permit with minor wording changes and a requirement to perform quarterly acute tests if acute toxicity is detected in the chronic tests.* VPDES Permit Regulation 9VAC25-31-210 and 220.I, requires monitoring in the permit to assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Monitoring requirements are prescribed by Guidance Memo No. 00-2012.

Part I.E.1 **95% Capacity Reopener:** *Updates Part I.E.1 of the previous permit with minor wording changes and specifies the applicable outfalls.* Required by VPDES Permit Regulation 9VAC25-31-200.B.4 for certain permits. Included for this facility to ensure that adequate treatment capacity will continue to be provided as influent flows and/or loadings increase.

Part I.E.2 **Materials Handling/Storage:** *Updates Part I.E.2 of the previous permit with minor wording changes*. 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

Part I.E.3 **O&M Manual Requirement:** *Updates Part I.E.3 of the previous permit with changes to what is required to be included in the O&M Manual.* Code of Virginia §62.1-44.16, VPDES Permit Regulation 9VAC25-31-190 E, and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an O&M manual ensures this.

Part I.E.4 **Concept Engineering Report (CER) Requirement**: *Updates Part I.E.4 of the previous permit with wording changes.* Code of Virginia §62.1-44.16 requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

Part I.E.5 **SMP Requirement:** *Updates Part I.E.5 of the previous permit with minor wording changes.* VPDES Permit Regulation 9VAC25-31-100.P, 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9VAC25-32-10 *et seq.*) Applied to this industrial permit per BPJ.

Part I.E.6 **Licensed Operator Requirement:** *Updates Part I.E.6 of the previous permit with minor wording changes.* The VPDES Permit Regulation 9VAC25-31-200 C, the Code of Virginia §54.1-2300 et seq., and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18 VAC 160-20-10 et seq.), requires licensure of operators. The licensed operator requirements apply to wastewater treatment works based on the maximum 30-day average flow and treatment type.

Part I.E.7 **Treatment Works Closure Plan:** *New Requirement.* 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 industrial sites and treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Code of Virginia §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 purposes of the State Water Control Law.

Part I.E.8 **Reopeners:**

a. *Identical to Part I.E.8.a of the previous permit:* 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. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

b. *Identical to Part I.E.8.b of the previous permit:* 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.

c. *Updates Part I.E.8.c of the previous permit with minor wording changes:* 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

d. *Identical to Part I.E.8.d of the previous permit:* Sludge Reopener. Required by the VPDES Permit Regulation 9VAC25-31-220.C, for all permits issued to treatment works treating domestic sewage.

Part I.E.9 **Notification Levels:** *Identical to Part I.E.9 of the previous permit.* Required by the VPDES Permit Regulation 9VAC25-31-200.A for all manufacturing, commercial, mining, and silvicultural dischargers.

Part I.E.10 **Additional Instructions for pH:** *Identical to Part I.E.10 of the previous permit.* Pursuant to 40 CFR 401.17(b), excursion times can be allowed for continuous pH monitoring.

Part I.E.11 **Additional Instructions for Temperature:** *Identical to Part I.E.11 of the previous permit.* Condition first included prior to 1998; original rationale for this requirement is not available in the DEQ VRO but it is carried forward based on professional judgment. It is recognized that except for pH, the daily maximum limits in permits are not instantaneous maximums, but maximums based on the average of all data gathered in a day. Based on this and the continuous monitoring for this parameter, this condition is carried forward as a reasonable way to define compliance given continuous monitoring.

Part I.E.12 **Cooling Water and Boiler Additives:** *Updates Part I.E.12 of the previous permit.* Based on 9 VAC 25-196-70 for discharge of Noncontact Cooling Water when chemical additives are proposed for which the need for limits have not been evaluated.

Part I.E.13 **Limitation Monitoring Waiver:** *New Requirement.* Monitoring for one or more technology-based effluent limitations may be waived if the permittee provides the demonstration required by 9VAC25-31-220.A.2.

Part I.E.14	**Diversion from Diffuser:** *New Requirement.* An intermittent discharge from the concrete channel has been permitted. The special condition stipulates the intermittent nature of the discharge based upon the permittee's request and professional judgment.
Part I.F.1	**General Stormwater Special Conditions**: *Updates Part I.F.1 of the previous permit.* VPDES Permit Regulation 9VAC25-31-10 defines discharges of stormwater from industrial activity in 29 industrial categories. 9VAC25-31-120 requires a permit for these discharges. The Stormwater Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of stormwater associated with industrial activity, 9VAC25-151-10 et seq. VPDES Permit Regulation 9VAC25-31-220.K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.
Part I.F.2	**Stormwater Pollution Prevention Plan**: *Updates Part I.F.2 of the previous permit*. See rationale listed above for the General Stormwater Special Conditions.
Part I.F.3	**Sector-Specific Stormwater Pollution Prevention Plan Requirements**: *New Requirement*. See rationale listed above for the General Stormwater Special Conditions.
Part II	**Conditions applicable to all VPDES Permits:** *Updates Part II of the previous permit.* VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

Deletions:

Part I.E.7	Water Quality Criteria Monitoring requirements have been met and removed from the permit.