National Pollutant Discharge Elimination System (NPDES)/ State Disposal System (SDS) Permit Program Fact Sheet

Permit Reissuance

MN0001449

Permittee:	3M Chemical Operations LLC 10746 Innovation Rd. Bldg 116 Cottage Grove, MN 55016-4600
Facility name:	3M Cottage Grove Center 10746 Innovation Rd. Cottage Grove, MN 55016-4600
Current permit expiration date:	January 31, 2008
Public comment period begins:	July 1, 2024
Public comment period ends:	August 30, 2024
Receiving water:	Unnamed Creek to the Mississippi River, both Class 2Bg, 3, 4A, 4B, 5, 6 waters
Permitting contact:	Emily Schnick 520 Lafayette Road North St. Paul, MN 55155-4194 Phone: 651-757-2699 Email: emily.schnick@state.mn.us

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Purpose and participation

Applicable statutes

This fact sheet has been prepared according to the 40 Code of Federal Regulations (CFR) § 124.8 and 124.56 and Minn R. 7001.0100, subp. 3 in regards to a draft National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit to construct and/or operate wastewater treatment facilities and to discharge into waters of the State of Minnesota.

Purpose

This fact sheet outlines the principal issues related to the preparation of this draft permit and documents the decisions that were made in the determination of the effluent limitations and conditions of this permit.

Public participation

You may submit written comments on the terms of the draft permit or on the Commissioner's preliminary determination. Your written comments must include the following:

1. A statement of your interest in the permit application or the draft permit.
2. A statement of the action you wish the Minnesota Pollution Control Agency (MPCA) to take, including specific references to sections of the draft permit that you believe should be changed.
3. The reasons supporting your position, stated with sufficient specificity as to allow the Commissioner to investigate the merits of your position.

You may also request that the MPCA Commissioner hold a public informational meeting. A public informational meeting is an informal meeting which the MPCA may hold to help clarify and resolve issues.

In accordance with Minn. R. 7000.0650 and Minn. R. 7001.0110, your petition requesting a public informational meeting must identify the matter of concern and must include the following: items one through three identified above; a statement of the reasons the MPCA should hold the meeting; and the issues you would like the MPCA to address at the meeting.

In addition, you may submit a petition for a contested case hearing. A contested case hearing is a formal hearing before an administrative law judge. Your petition requesting a contested case hearing must include a statement of reasons or proposed findings supporting the MPCA decision to hold a contested case hearing pursuant to the criteria identified in Minn. R. 7000.1900, subp. 1 and a statement of the issues proposed to be addressed by a contested case hearing and the specific relief requested. To the extent known, your petition should include a proposed list of witnesses to be presented at the hearing, a proposed list of publications, references, or studies to be introduced at the hearing, and an estimate of time required for you to present the matter at hearing.

You must submit all comments, requests, and petitions during the public comment period identified on page one of this notice. All written comments, requests, and petitions received during the public comment period will be considered in the final decisions regarding the permit. If the MPCA does not receive any written comments, requests, or petitions during the public comment period, the Commissioner or other MPCA staff as authorized by the Commissioner will make the final decision concerning the draft permit.

Comments, petitions, and/or requests must be submitted by the last day of the public comment period to:

Emily Schnick
Minnesota Pollution Control Agency
520 Lafayette Rd N
St. Paul, MN 55155-4194
Phone: 651-757-2699
Email: emily.schnick@state.mn.us

The permit will be reissued if the MPCA determines that the proposed Permittee or Permittees will, with respect to the facility or activity to be permitted, comply or undertake a schedule to achieve compliance with all applicable state and federal pollution control statutes and rules administered by the MPCA and the conditions of the permit and that all applicable requirements of Minn. Stat. ch. 116D and the rules promulgated thereunder have been fulfilled.

More detail on all requirements placed on the facility may be found in the Permit document.

General information

The permit is based on an NPDES/SDS permit application dated August 3, 2007, a more recent application dated April 15, 2021, and additional documents found in the administrative record. The primary reason for reissuing the permit is due to permit expiration.

Description of permitted facility

The facility manufactures a number of diverse products including, but not limited to, organic chemicals and polymers, adhesives, thermoplastic resins, thermosetting resins, phenolic resins, fine chemicals, polyester resins, epoxy resins, urethanes, curative organic compounds, ceramic solutions, fluorochemicals, abrasives, glass beads, pressure sensitive tapes, polymeric films and extrusions, paper coating, traffic control materials, and automotive products. The facility also conducts "pilot" or research operations for development of new products. In 2022, the facility announced it would cease the manufacturing and processing of fluorochemicals by the end of 2025. After 2025, the facility will continue to treat its per- and polyfluoroalkyl substances (PFAS)-contaminated source/groundwater, stormwater, and wastewater for PFAS contaminants.

The 3M corporate hazardous waste incinerator is located at the facility and previously received and incinerated hazardous wastes from other 3M plants across North America. The incinerator was shut down on December 31, 2021, and is currently undergoing closure activities under the oversight of MPCA's Land Permits and Remediation programs.

Process wastewater generated from production facilities, pilot production wastewaters, and sanitary wastewater are all treated at the facility wastewater treatment plant (WWTP). The WWTP consists of three separate treatment trains designated as Phase 1, Phase 2, and Phase 3. Phase 3 was primarily used to treat wastewater from the now closed incinerator. A separate treatment system is used for non-contact cooling waters (NCCW). The Phase 1 treatment train treats primarily inorganic process wastewaters and consists of a bar screen, two screw pumps, grit chamber, pH adjustment/neutralization, flash mixing tanks, and four parallel flocculating solids contact clarifiers. Phase 1 effluent is discharged to Pond C for flow equalization prior to its conveyance to Building 185 GAC treatment and then to the Phase 1 and 2 wastewater PFAS treatment system (System B) upon completion of commissioning. Note - Phase 1 effluent flow is equalized within Pond C and then sent to Building 185 GAC treatment to achieve compliance with Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF), Alkyl Phenol Ethoxylates (APEs) and Toxic Unit acute (TUa).

The Phase 2 treatment train system treats primarily organic process wastewaters and sanitary wastewater from the facility and LSP Cottage Grove LP (a non-3M electrical generation station formerly known as Cogentrix). The Phase 2 treatment train system consists of a bar screen and screw pumps for solids removal, a two-cell flow equalization tank with pH adjustment, an activated sludge system (with an anoxic basin preceding an aeration basin), and final clarification for biological solids removal. Effluent from Phase 2 is discharged to the four parallel flocculating solids contact clarifiers in the Phase 1 treatment train.

The Phase 3 treatment train previously treated scrubber wastewater (inorganic soot, ash and acids scrubbed from the combustion process) from the 3M hazardous waste incinerator and currently treats drainage from drying beds, incinerator decommissioning waters, and select stormwater collected at the facility. The Phase 3 treatment train consists of pH adjustment/neutralization tanks/system, bar screen and lift pumps, polymer addition/mixing, and particulate precipitation/clarification. A limited amount of wastewater from other facilities may also be treated at the WWTP.

Pretreated landfill leachate from the 3M designated cell at the SKB Industrial Waste Facility (SKB) in Rosemount is also discharged to the headworks of the Phase 1 treatment train after pretreatment via granular activated carbon (GAC) at a rate not to exceed 55,000 gallons per day (gpd). The leachate originates from a containment cell specifically built to receive waste soils from 3M sites in Washington County, which require disposal under various remediation activities. The pretreatment system, prior to leachate discharge to the facility Phase 1 WWTP, consists of two 10-foot diameter by 14-foot side wall carbon vessels. Each vessel has approximately 20,000 pounds of regenerated GAC. Overall height, including associated piping is approximately 22 feet. Carbon adsorber depth is eight feet (each) and filter surface area is approximately 78 sq. ft. (each). The pretreatment system also includes two 300 gallon per minute (gpm), 25.7 total dynamic head (TDH) feed pumps, associated piping & valves, electrical, mechanical and appurtenances. Discharges of liquids associated with remediation construction activities and other PFAS containing discharges may also be discharged to the SKB pretreatment system (prior to discharge to the Phase 1 system headworks) at a total combined rate of 55,000 gpd, or less.

For the SKB influents, flow rates shall not exceed an average flow of 10,000 gpd, a maximum flow of 55,000 gpd and a peak instantaneous flow of 3.0 gallons per minute (gpm)/ft^2. Flow rates to the SKB leachate vessels shall be as low as possible to increase the empty bed contact time (EBCT) for optimal performance. Maximum target mass concentrations are monitored and consistent with the monitoring plan contained with the February 5, 2010, version of the 3M Cottage Grove Wastewater Treatment Operations Management Procedure for SKB Leachate. Carbon exhaustion is monitored to determine when it’s necessary to replace the carbon. Carbon media is tested for performance at a frequency no less than 1x/250,000 gallons of treated liquid and that carbon changeout occurs no less frequently than 1x/1 million gallons of treated liquid.

Sludges produced from the WWTP are discharged to two gravity sludge thickening tanks followed by belt filter presses. Sludges generated from the Phase 3 treatment train are disposed of at a hazardous waste landfill. Phase 1 and 2 sludges are disposed of at a non-hazardous waste landfill.

NCCW used within the facility were previously discharged to an unlined NCCW retention pond prior to discharge. That pond also received industrial stormwater (ISW) runoff from certain plant areas on site. This NCCW/ISW basin also received NCCW from the LSP Cottage Grove LP co-generation facility located adjacent to the 3M facility. A portion of the NCCW (prior to the NCCW/ISW basin) is pumped back to LSP Cottage Grove LP for NCCW makeup (e.g. evaporative losses). The aforementioned unlined pond is undergoing an expansion and lining improvement effort during 2024-2025 and will be referred to as Pond 2 which will discharge to the ISW/groundwater/NCCW PFAS treatment system (System A) upon completion of commissioning.

Phase 1 (which includes Phase 2 effluent), and Phase 3 treatment train effluents discharge to a tertiary GAC treatment system in Building 185, which initiated operation in 2004. The Phase 1 and 2 GAC system was designed to remove acute toxicity and alkyl phenol ethoxylates, which may have contributed to acute toxicity in process wastewater effluent prior to 2004. In addition, this system was designed to remove specific organic compounds to meet the OCPSF discharge limitations listed in U.S. Environmental Protection Agency (USEPA) industrial regulations 40 CFR pt. 414. The Phase 3 GAC system in Building 185 was designed for removal of mercury from incinerator scrubber wastewater. Although the GAC systems in Building 185 were installed to treat pollutants other than PFAS, it was acknowledged around the time of the 2003 permit issuance that PFAS would be treated/removed in addition to toxicity and/or alkyl phenol ethoxylates by the Building 185 GAC systems.

As noted above, Phase 1 and 2 effluent undergo flow equalization in Pond C prior to GAC filtration in Building 185. Pond C is 13 feet deep with 3:1 side slopes and a 10-foot maximum and 8.3-foot mean working depth with a 100-millimeter-thick HDPE liner. Pond C is 1.5 acres at the 8.3 foot mean working depth and provides 14-20 hours of detention time at the facility design flow. Pond C is a lined pond divided into north and south sections by an earthen dike. Pond elevation is controlled by a culvert.

Effluent from the Phase 1 clarifiers (five rectangular clarifiers were replaced with conventional round clarifiers) is discharged to the north section of Pond C. Overflow from the north section to the south section is discharged through the culvert, with the inlet elevation of the culvert set to maintain 10 feet of water in the north section. A concrete sump receives effluent from the south section and Pond C effluent is discharged to the Phase 1 and 2 Building 185 GAC system for tertiary treatment.

Phase 3 effluent is discharged directly to tertiary GAC treatment within Building 185 without flow equalization. Phase 1 and 2 Building 185 effluent supplies the backwash water and water required during carbon replacement for both tertiary GAC treatment systems (Phase 1, 2, and 3). Phase 1 and 2 Building 185 effluents are pH adjusted, as needed, receive ultraviolet (UV) disinfection; and combine with pH adjusted Phase 3 GAC effluents prior to discharge from outfall SD 001. NCCW and ISW (outfall SD 002) do not currently see tertiary treatment prior to combining with SD 001 for ultimate discharge from SD 003.

Prior to July 1, 2025, Phase 3 tertiary GAC effluent combines with Phase 1 and 2 tertiary GAC effluents downstream of UV disinfection, upstream of SD 001. Upon completion of the Advanced Wastewater Treatment System, Phase 1 and 2 tertiary GAC effluent will be discharged to the Phase 1 and 2 wastewater PFAS treatment system (System B), followed by disinfection. By July 1, 2025, Phase 3 GAC effluent will receive comparable PFAS treatment to the Phase 1 and 2 wastewater or the authorization to discharge Phase 3 GAC effluent will be revoked.

The Phase 1 and 2 GAC tertiary treatment system consists of nine dual columns (18 individual vessels). The Phase 3 GAC tertiary treatment system, in Building 185, consists of four dual columns (eight individual vessels). The GAC tertiary treatment system design criteria is as follows:

	Phase 1 & 2	**Phase 3**
Peak design flow (mgd)	2.6	1.0
COD (mg/L)	160	
TSS (mg/L)	16	7.5
BOD (mg/L)	24	<6
TOC (mg/L)	50	<50
Vessel diameter (ft)	10	10
Vessel side wall height (ft)	12	12
Mass of carbon (#)*	20,000	20,000
Overall system height (ft)**	22	22
Configuration***	“lead/lag”	“lead/lag”
Max. column loading rate (gpm/s.f.)****	3	3
Empty Bed Contact Time (min)****	44.3	43.2

***** each vessel
****** to top of associated piping - including backwash system
*** for each dual column system
**** with one vessel in backwash mode

Existing Groundwater Treatment System (Building 92)
Building 92 consists of GAC filtration vessels and a water distribution system for the 3M site. The facility is designed, constructed, and operated to treat PFAS contaminated groundwater (GW) from below the 3M Cottage Grove facility, as well as PFAS contaminated GW from the Woodbury disposal site wells. Treated GW is used throughout the facility for cooling water, process water, and other building/site water requirements.

The GW system in Building 92 includes non-potable and potable GAC tertiary filtration treatment systems. The non-potable GAC tertiary filtration treatment system consists of six dual columns (12 individual vessels). The potable GAC tertiary filtration treatment system consists of three dual columns (six individual vessels). The GAC tertiary filtration treatment systems' design criteria is as follows:

	Non-potable	**Potable**
Carbon type	DSR-C	F-600
Adsorber flow rate (gpm)	627	604
Carbon A.D. (g/cc)	0.60	0.63
Carbon A.D. (g/cc) (backwashed)	0.51	0.53
Vessel diameter (ft)	10	10
Mass of carbon (pounds)*	20,000	20,000
Vessel x-sectional area (ft^2)	78.5	78.5
Vessel side wall height (ft)	12	12
Overall system height (ft)**	~22	~22
Configuration***	"lead/lag"	"lead/lag"
Max. column loading rate (gpm/s.f.)	8.0	7.7
Empty Bed Contact Time (min)	~15	~15
Peak design flow (mgd)****	4.5	1.7

***** each vessel
****** to top of associated piping - including backwash system
*** for each dual column system
**** with one vessel in backwash mode

In addition to Buildings 185 and 92, GAC treatment is/will also be included in:

- Building 149 (Operational on August 2, 2021)
- Building 150 (Operational in 2024)

Advanced PFAS Wastewater Treatment System

Effluent from the existing treatment systems described above (Phase 1 and 2 wastewaters {WW}) will be discharged to a new tertiary treatment system (System B) for removal of PFAS. An additional PFAS treatment system (System A) is also under construction and will treat stormwater/groundwater/noncontact cooling water (ISW/GW/NCCW) through a parallel treatment train. Both new systems will include membrane and media filtration equipment, buildings, tanks, storage ponds, collection infrastructure, and solids handling. Both treatment trains are currently under construction in two new buildings called Building 150 and Building 151. System C is a solids concentrating treatment system for System A solids management. Collectively, these three separate systems are referred to as the "advanced wastewater treatment system."

In order to capture and store ISW, for subsequent treatment in the new ISW/GW/NCCW PFAS tertiary treatment system (System A), three existing ISW ponds are being upgraded with new pond liners, pumping stations, and force mains. Pond 1 has an estimated storage volume of approximately 28.9 ac-ft and its lift station is designed to pump 1,000 gpm. Pond 2 has an estimated storage volume of approximately 10.67 ac-ft and its lift station is designed to pump 1,500 gpm (with 1 pump). Pond 3 has an estimated storage volume of approximately 8.37 ac-ft and it's lift station is designed to pump 1,000 gpm. All three ponds will pump ISW/GW/NCCW to the new treatment system (System A).
Filtration/treatment processes in Building 150 (for both WW and ISW/GW/NCCW PFAS removal) includes ultrafiltration (UF), reverse osmosis (RO), and GAC (Liquid Phase GAC, or LGAC) filtration. Chemical storage, pumping, piping, control systems, and associated appurtenances are also included. System C consists of UF to further concentrate solid streams from System A.

Treatment processes in Building 151 includes anion exchange (AIX) filtration and an AIX regeneration process.

Design criteria from the *PFAS Treatability Study, 3M Cottage Grove Minnesota Facility dated December 22, 2021,* includes, but are not limited to, the following:

	ISW/GW/NCCW	**WW**
Reverse Osmosis System		
Feed temp	ambient	ambient
Recovery (% to permeate)	85% (target)	85% (target)
Active area	400 s.f.	400 s.f.
Stages/Banking Arrangement	3 stages, 24/12/6	3 stages, 9/6/3
Elements per housing	6	6
Total elements per skid	252	108
Total active area per skid	100,800 s.f.	43,200 s.f.
Design Flux	14 GFD (Treatability Study)	11.6 GFD (specified)
Design flow/skid	1150 gpm (1.65 mgd)	410 gpm (0.59 mgd)
Design flow w/5 skids	5750 gpm (8.28 mgd)	2050 gpm (2.95 mgd)
Granular Activated Carbon System		
Treatment trains	4	2
Vessels per train	2	2
Vessel diameter	10 ft.	10 ft.
Mass of Carbon/vessel	20,000#	20,000#
Density (backwashed/drained)	~26 #/c.f.	~26 #/c.f.
EBCT across 2 vessels	60 min. (Treatability Study)	60 min. (Treatability Study)
Design flow/train	192 gpm (0.27 mgd)	192 gpm (0.27 mgd)
Design flow w/3 trains	576 gpm (0.83mgd)	-
Surface loading rate	2.4 gpm/s.f.	2.4 gpm/s.f.
Anion Exchange System		
Treatment trains	7	3
Vessels per train	3	3
Vessel diameter	6 ft.	6 ft.
Volume of AIX/vessel	360 c.f.	360 c.f.
EBCT across 3 vessels	60 min. (Treatability Study)	60 min. (Treatability Study)
Design flow/train	135 gpm (0.19 mgd)	135 gpm (0.19 mgd)
Design flow w/2 trains	-	270 gpm (0.39 mgd)
Design flow w/5 trains	675 gpm (0.97 mgd)	-
Surface loading rate	4.8 gpm/s.f.	4.8 gpm/s.f.

Industrial Stormwater (ISW)
This permit covers the following three types of ISW stations at the facility:

1. Direct runoff from individual ISW locations;
2. Runoff from combined ISW locations that collects and infiltrates into the ground; and

3. Runoff from combined ISW locations that is collected and transferred to the WWTP.

The facility manages captured ISW with unlined and lined basins, concrete sumps/basins, and three ponds (Ponds 1-3). Both vacuum trucks and pump stations move collected ISW from onsite sumps and containment basins to Ponds 1-3 at the headworks of the WWTP. Each truck has a maximum capacity of 5,000 gallons.

Under General Industrial Stormwater Permit coverage in effect from 2020-2025 (nullified upon this permit reissuance) uniquely identified as MNR0539X3, the facility discharges ISW through approximately 29 outfalls represented by monitoring five locations (BML 01-05).

Individual Subsurface Treatment Systems (ISTS)
There are six ISTS systems located at the facility. The Permittee estimates that the combined flow to all ISTS systems is less than 600 gpd. The facility has used these systems for decades with no known issues related to hydraulic acceptance rates, groundwater mounding above a subsurface restrictive soil layer, or daylighting of sewage; however, compliance inspections in 2023 raised concerns at some of the systems. The facility is in the process of evaluating connection to the existing Phase 1 and 2 treatment systems or alternate options for these systems.

Facility location

The facility is located at SE ¼ of Section 27, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota. The address for the facility is 10746 Innovation Road, Cottage Grove, MN 55016-4600.

Outfall locations
Outfall SD 001 (process and sanitary effluent) is located in the NW ¼ of Section 35, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota. Latitude and Longitude of outfall SD 001 is *44° 47' 12.1" and 92° 54" 5.9.*

Outfall SD 002 (non-contact cooling water, Woodbury Disposal Site water, wastewater from LSP Cottage Grove LP (formerly Cogentrix), and site stormwater runoff) is located in the NW ¼ of Section 35, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota. Latitude and Longitude of outfall SD 002 is *44° 47' 12.1" and 92° 54" 5.9.*

Outfall SD 003 (combined discharge from SD 001 and SD 002) is located in the NW ¼ of Section 35, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota. Latitude and Longitude of outfall SD 003 is *44° 47' 13.2" and 92° 54" 4.5.*

All 3 outfalls have continuous discharges to an unnamed creek (07010206-517) that flows into Pool 2 of the Mississippi River (07010206-814). The unnamed creek and the Mississippi River are Class 2Bg, 3, 4A, 4B, 5, 6 waters.

Overflow/Bypass locations
1: Woodbury groundwater emergency bypass - located in the SE ¼ of Section 27, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota.

2: Stormwater emergency bypass - located in the NW ¼ of Section 35, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota.

3: Direct discharge of LSP Cottage Grove LP wastewater during periods of high flow or when 3M uses the NCCW stormwater pond for containment - located in the NE ¼ of Section 34, Township 27 North, Range 21 West, Cottage Grove, Washington County, Minnesota.

All 3 overflow/bypass locations have intermittent discharges to an unnamed creek (07010206-517) that flows into Pool 2 of the Mississippi River (07010206-814). The unnamed creek and the Mississippi River are Class 2Bg, 3, 4A, 4B, 5, 6 waters.

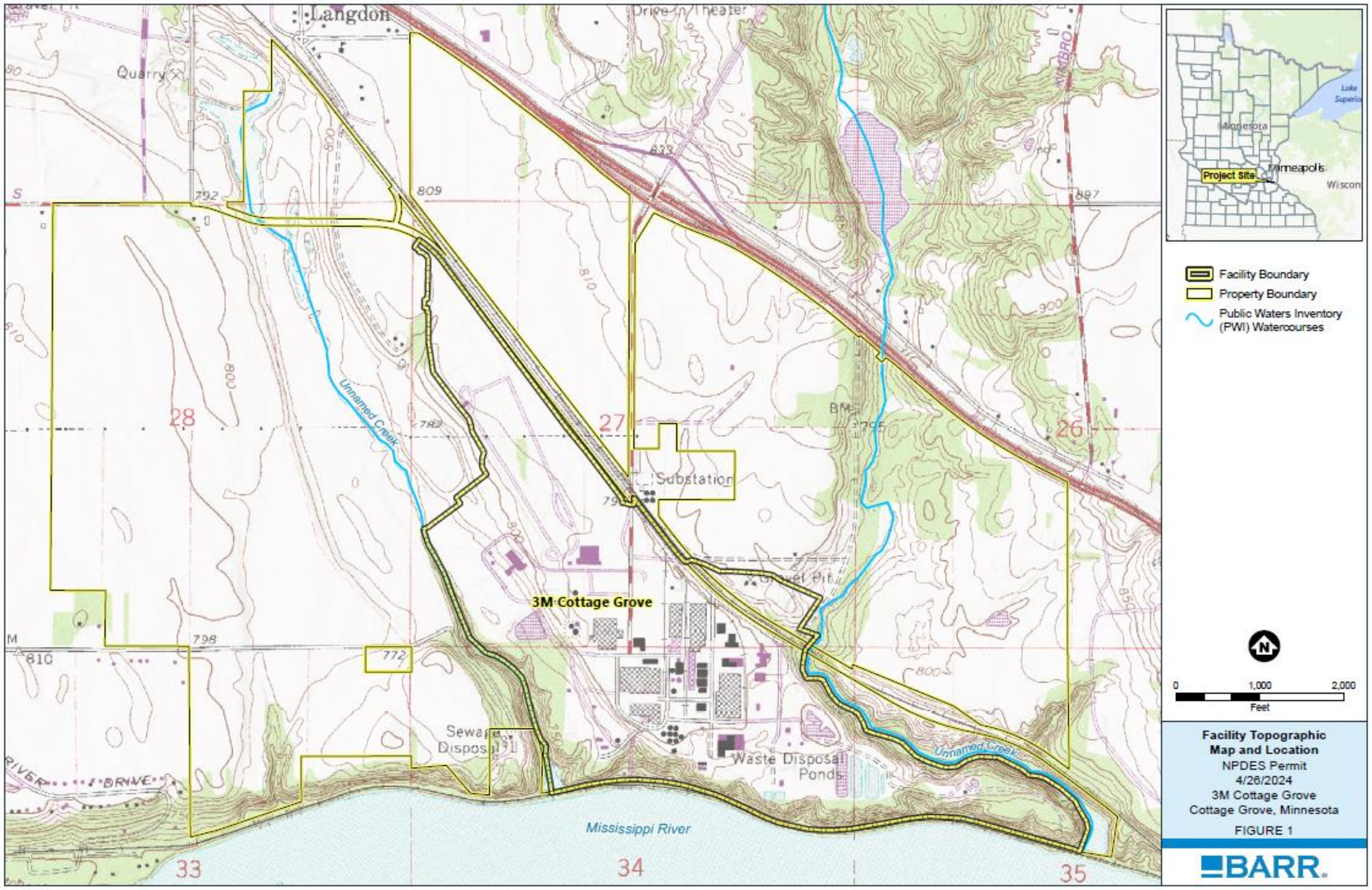
TMDL wasteload allocation modification – South Metro Mississippi River TSS TMDL

The South Metro Mississippi River TSS TMDL, approved by EPA on April 26, 2016, contains a TSS wasteload allocation (WLA) for the existing 3M Cottage Grove facility, which is equivalent to the existing permitted effluent limit of 545 kg/day as a calendar month average at SD 001 (SD 001 was the only station considered at the time of this TMDL development). The WLA was calculated for this facility using the maximum design flow of 4.8 mgd. This NPDES/SDS permit authorizes the modification of the TSS WLA (for the purpose of adding a mass limit at SD 002 calculated using the updated maximum design flow of 8.7 mgd) for the 3M Cottage Grove facility and amends the Mississippi River TSS TMDL. The facility is going to expand the maximum design flow only at SD 002, going from 6.8 mgd (cfs 10.521) to 8.7 mgd (cfs 13.461), for an increase of 1.9 mgd (cfs 2.940). Using the expanded maximum design flow of 8.7 mgd and the TSS concentration limit of 30 mg/L, the expanded WLA for SD 002 would be 987 kg/day. Adding the original WLA of 545.00 kg/day to the expanded WLA of 987 kg/day gives a total of 1,532 kg/day.

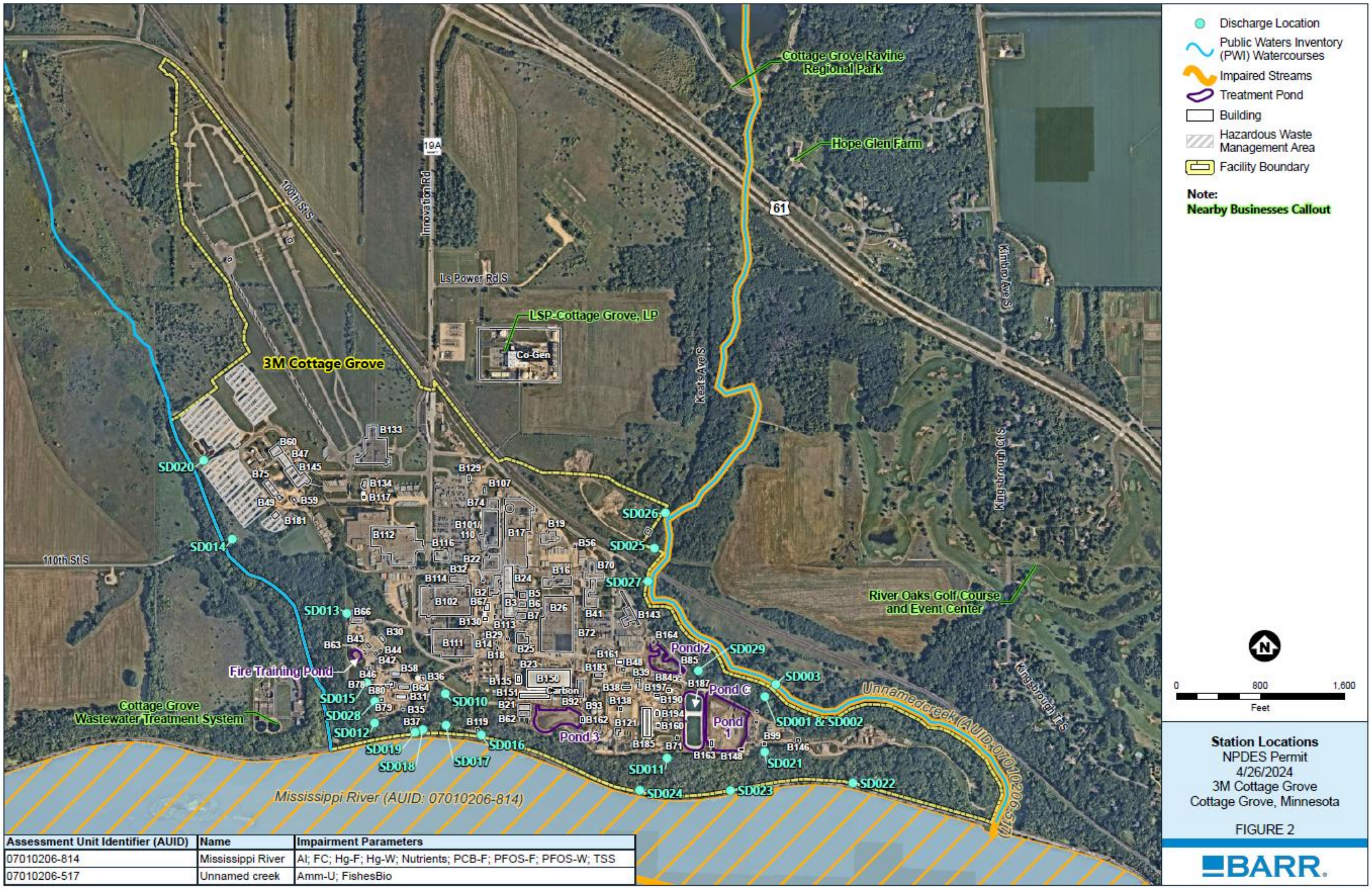
Modification of the WLA will not contribute to the TSS impairment in the South Metro Mississippi River because the NPDES/SDS permit's proposed 30 mg/L TSS discharge limits at SD 001 and SD 002 will ensure that the discharge does not have reasonable potential to cause or contribute to an exceedance of the applicable 32 mg/L TSS water quality standard.

Maps and additional figures of permitted facility

Map/Figure 1. Overall facility map



Map/Figure 2. Station location map



Assessment Unit Identifier (AUID)	Name	Impairment Parameters
07010206-814	Mississippi River	Al; FC; Hg-F; Hg-W; Nutrients; PCB-F; PFOS-F; PFOS-W; TSS
07010206-517	Unnamed creek	Amm-U; FishesBio

Map/Figure 3. Facility stormwater map

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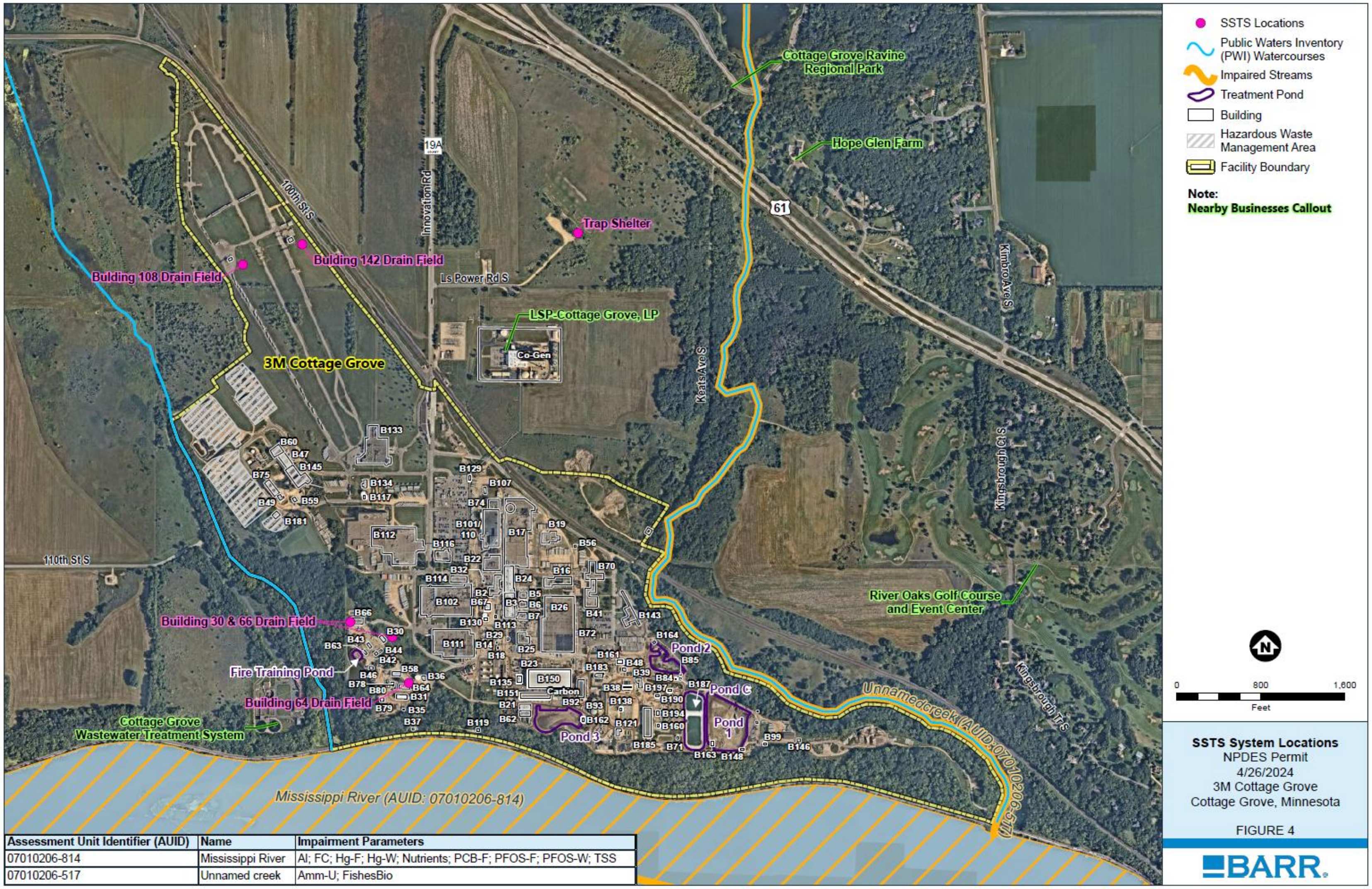
Map/Figure 4. Facility SSTS locations



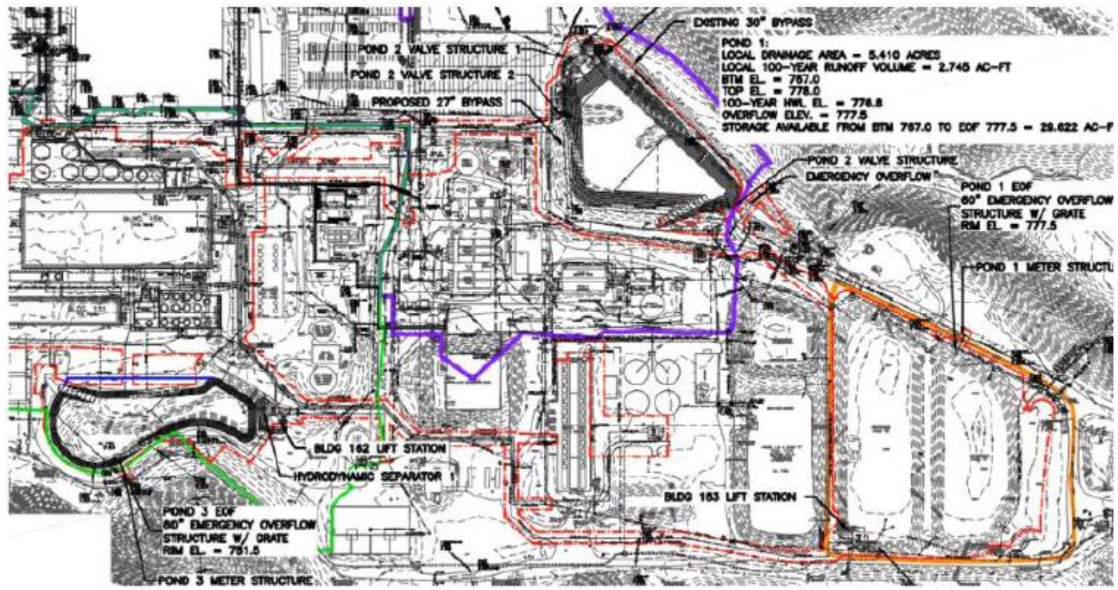
Assessment Unit Identifier (AUID)	Name	Impairment Parameters
07010206-814	Mississippi River	Al; FC; Hg-F; Hg-W; Nutrients; PCB-F; PFOS-F; PFOS-W; TSS
07010206-517	Unnamed creek	Amm-U; FishesBio

Map/Figure 5. Pond C (right side of image) and other WWTP components

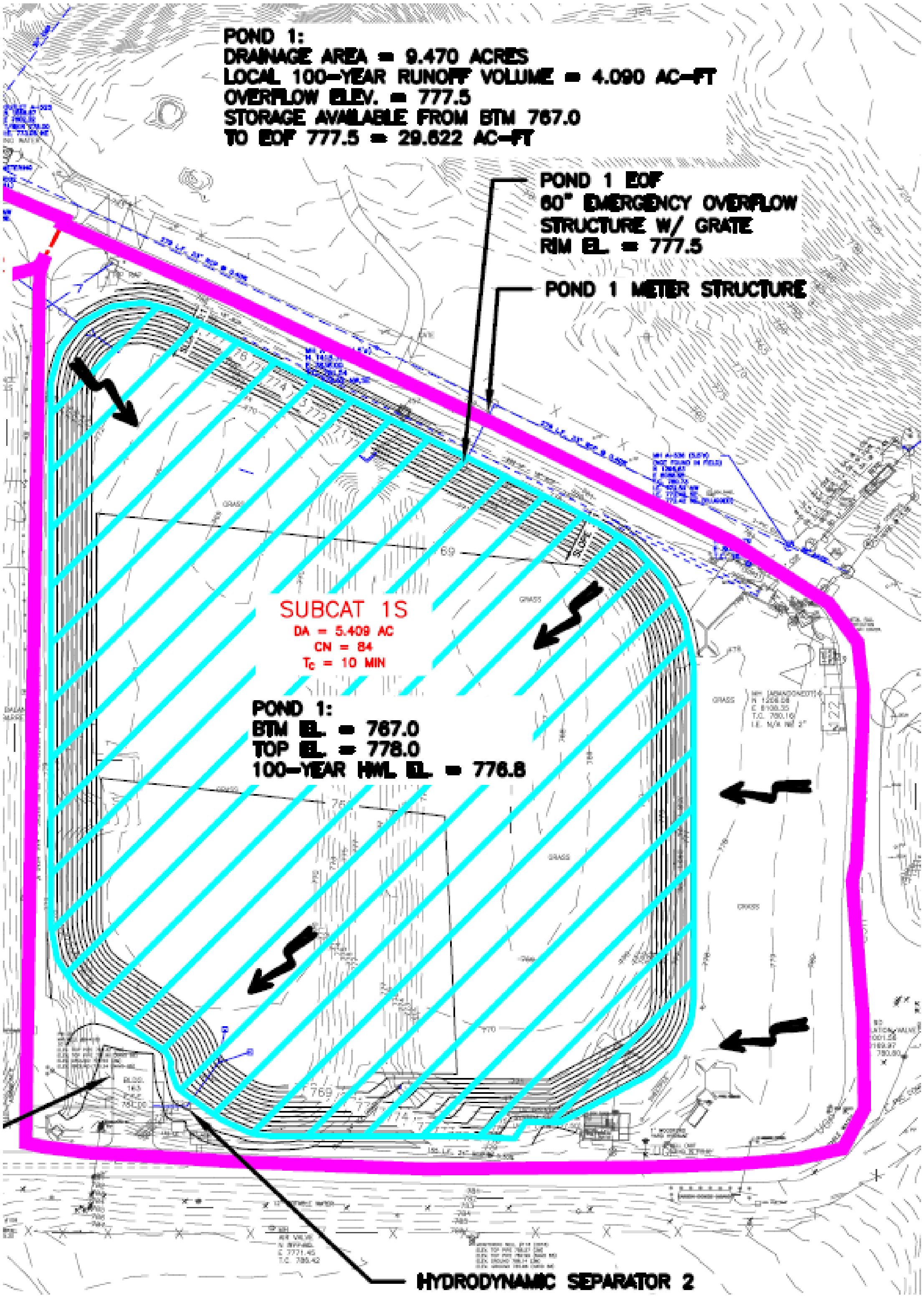
Map/Figure 6. PFAS treatment facility: Buildings 150 and 151

Map/Figure 7. Stormwater pond design (Ponds 1-3)

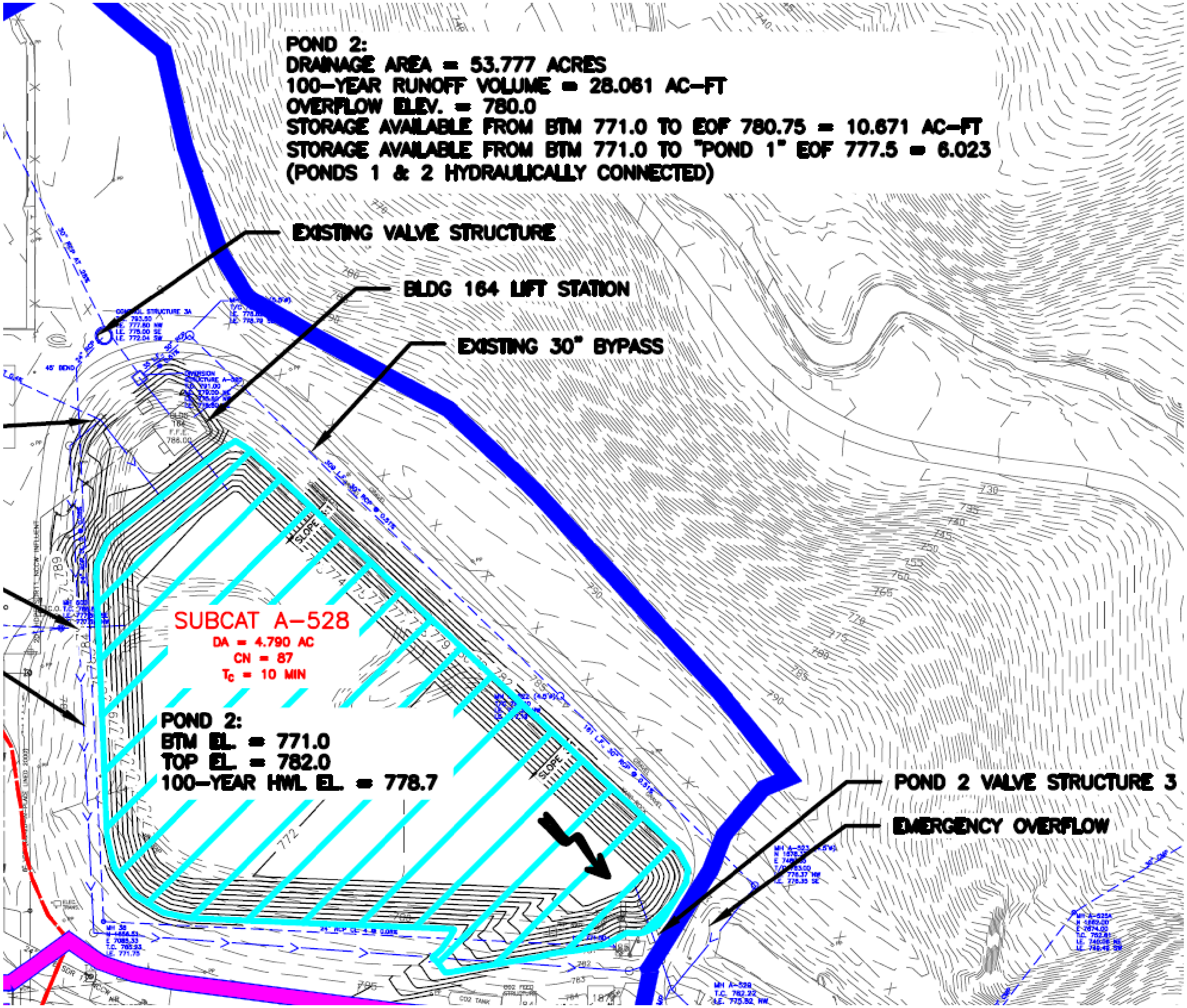
- 100-yr, 24 Hr rainfall event = 7.4”
- Captured area runoff volume from design rainfall event = 39.8 ac-ft
- Minimum treatment capacity for stormwater = 1000 gpm
- Time to empty pond = 9 days



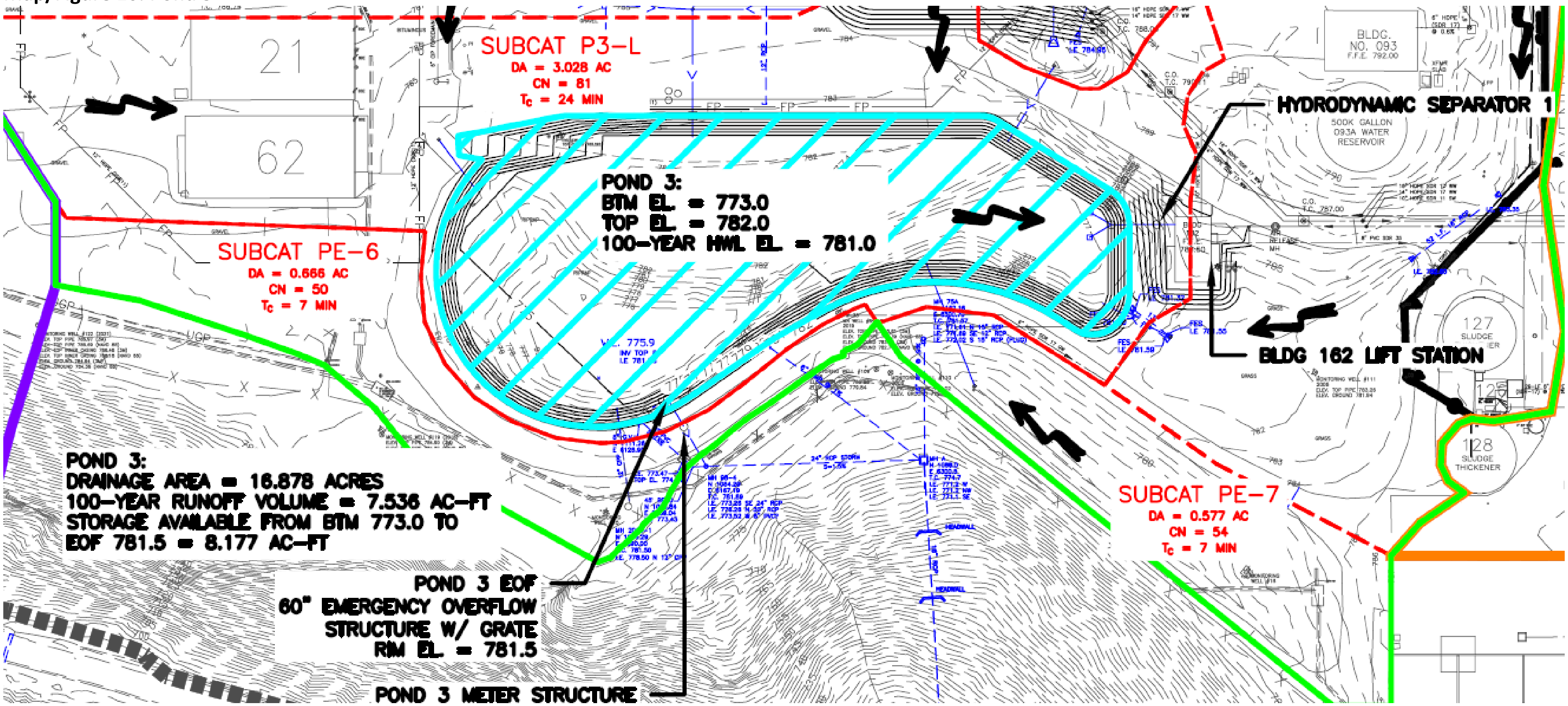
Map/Figure 8. Pond 1



Map/Figure 9. Pond 2



Map/Figure 10. Pond 3



Flow schematics

Diagram 1. Overall facility water process flow

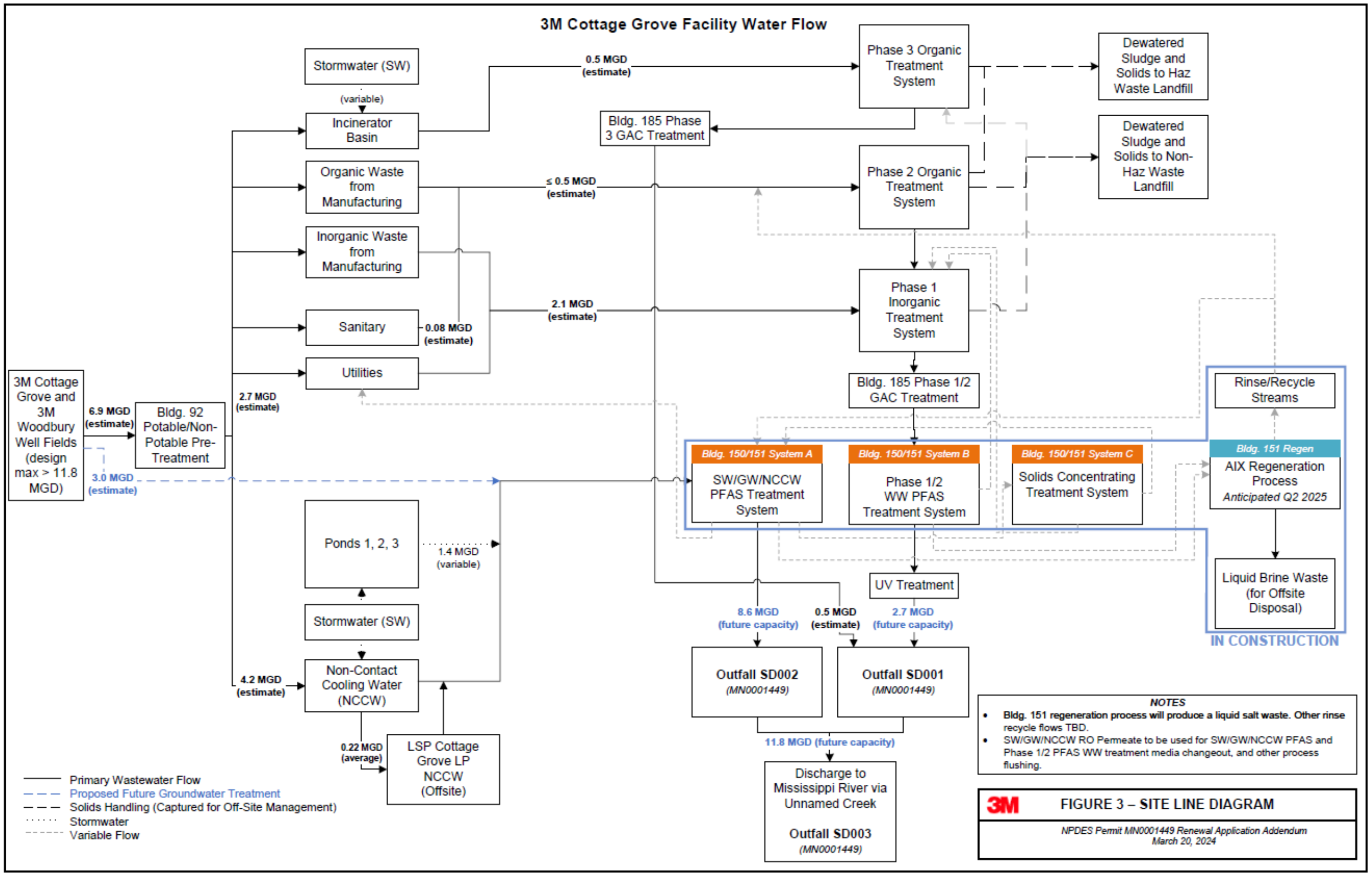


Diagram 2. Wastewater treatment system process flow

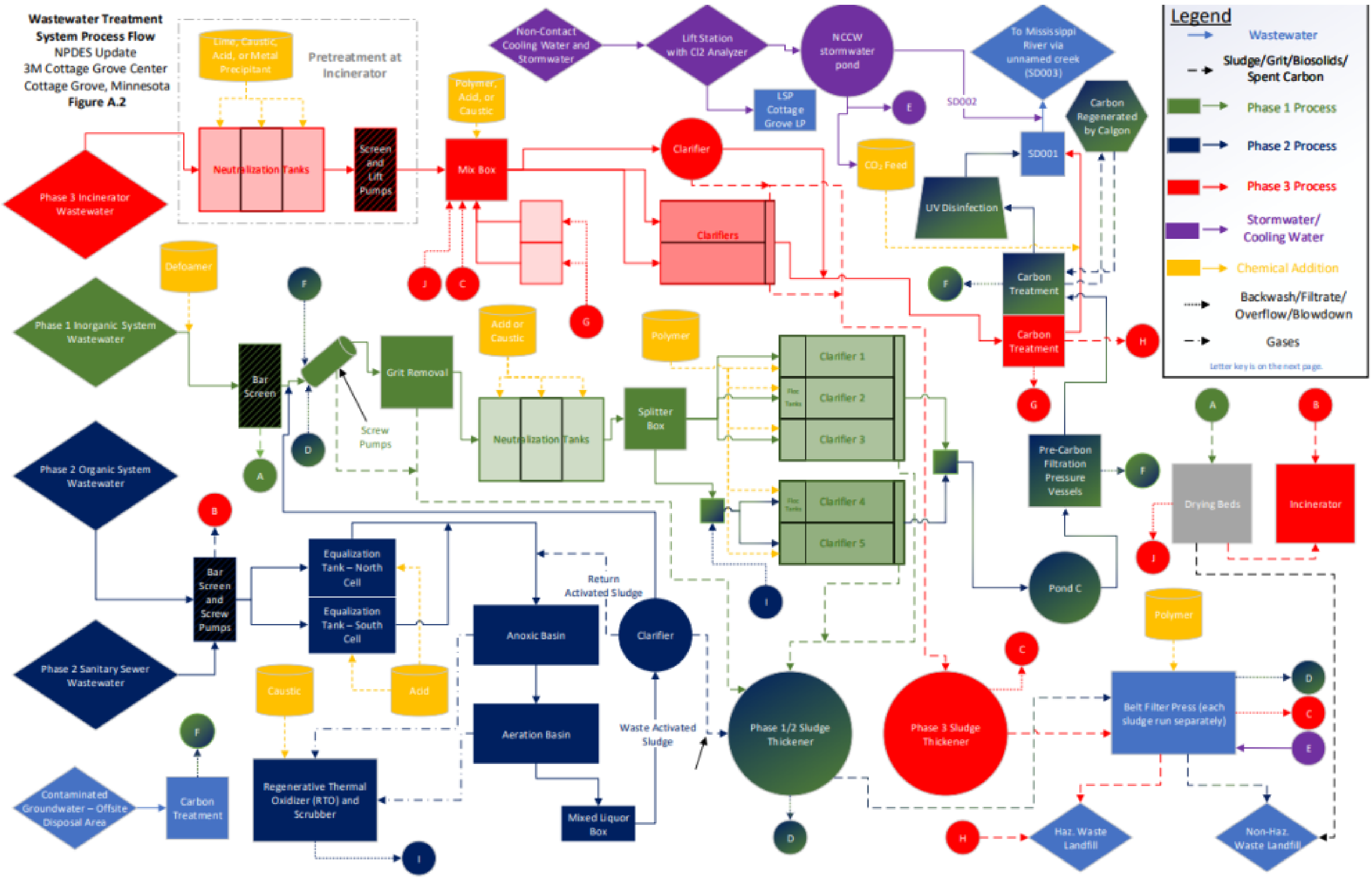


Diagram 3. Building 185 GAC diagram

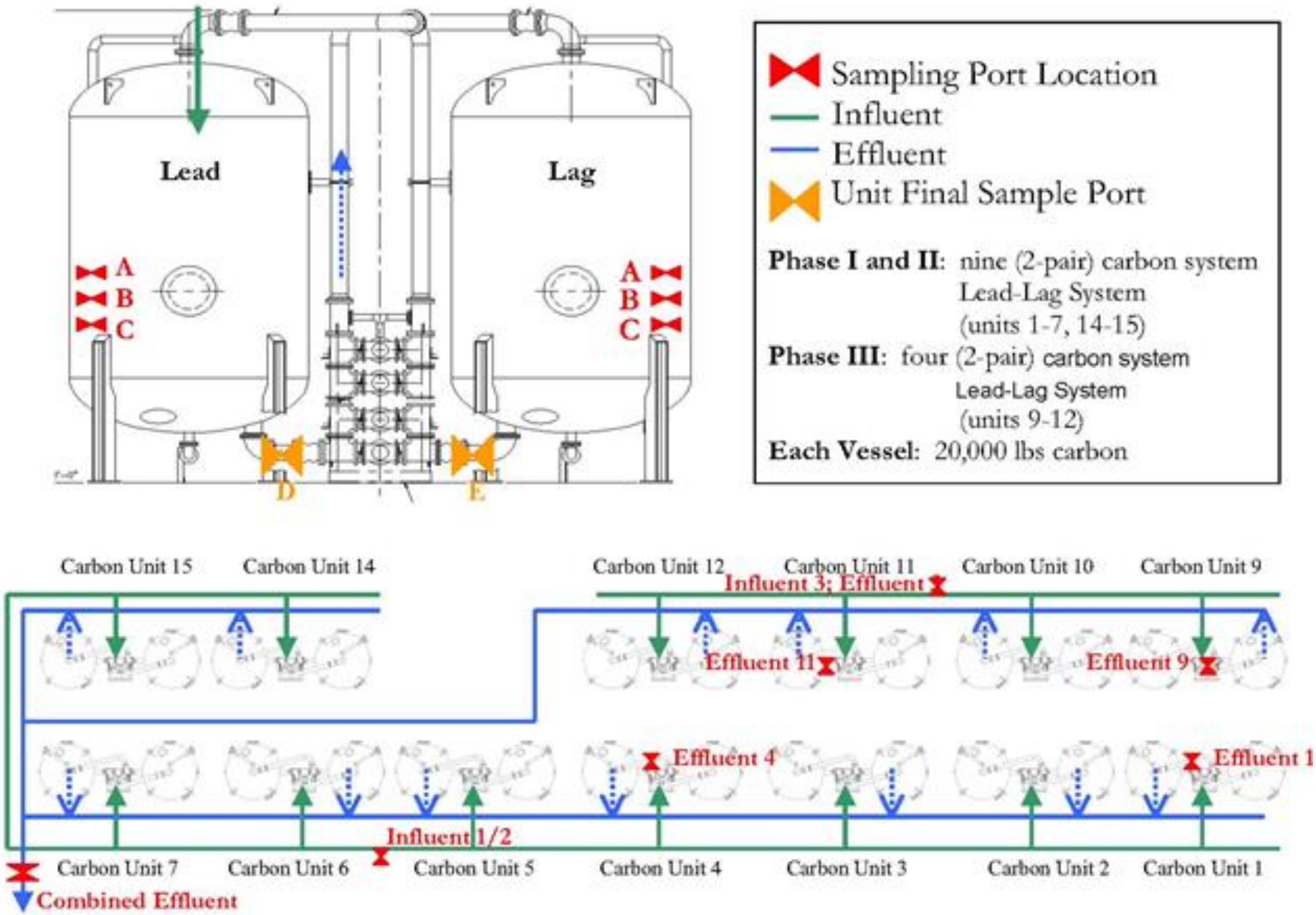


Diagram 4. Locations of WS stations in process flow

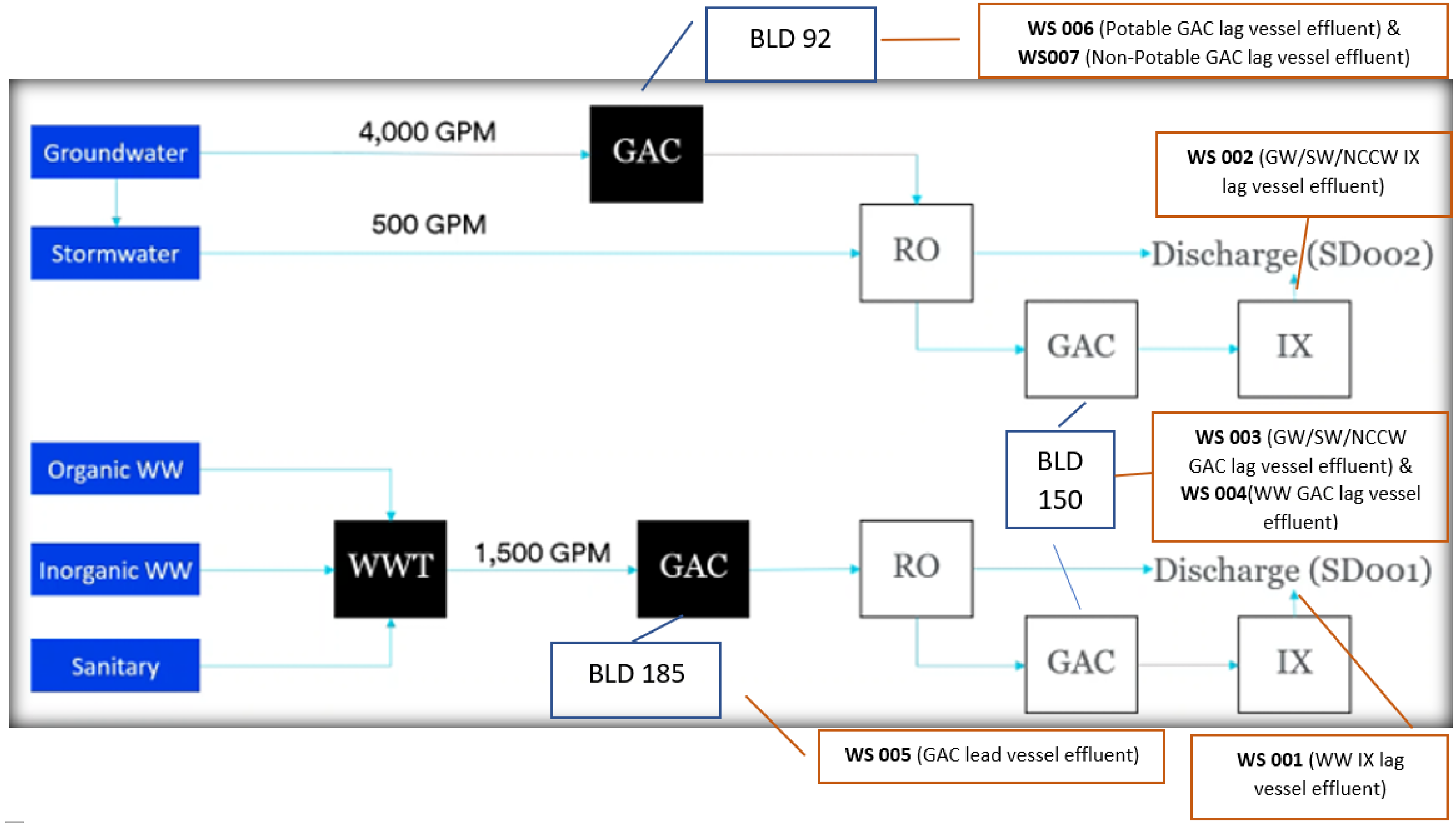
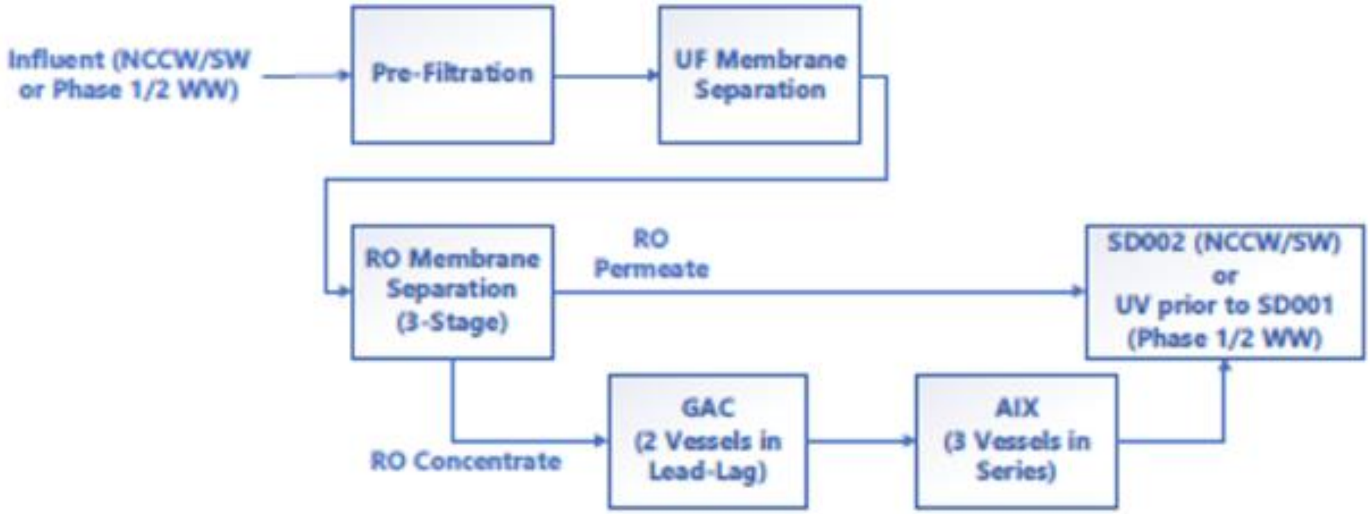
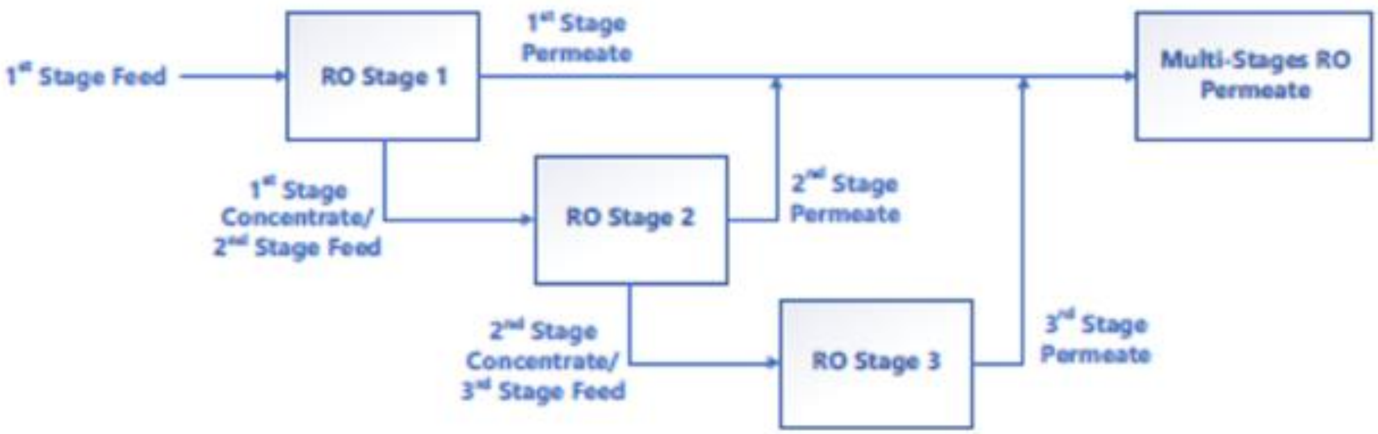


Diagram 5. Flow schematic for concentrate flow from the Building 150/151 RO treatment



Summary of full-scale treatment system process flow



Summary of full-scale treatment three-stage RO membrane separation

Diagram 6. GAC and IX treatment trains: NCCW + GW + ISW in top diagram and WW in bottom diagram

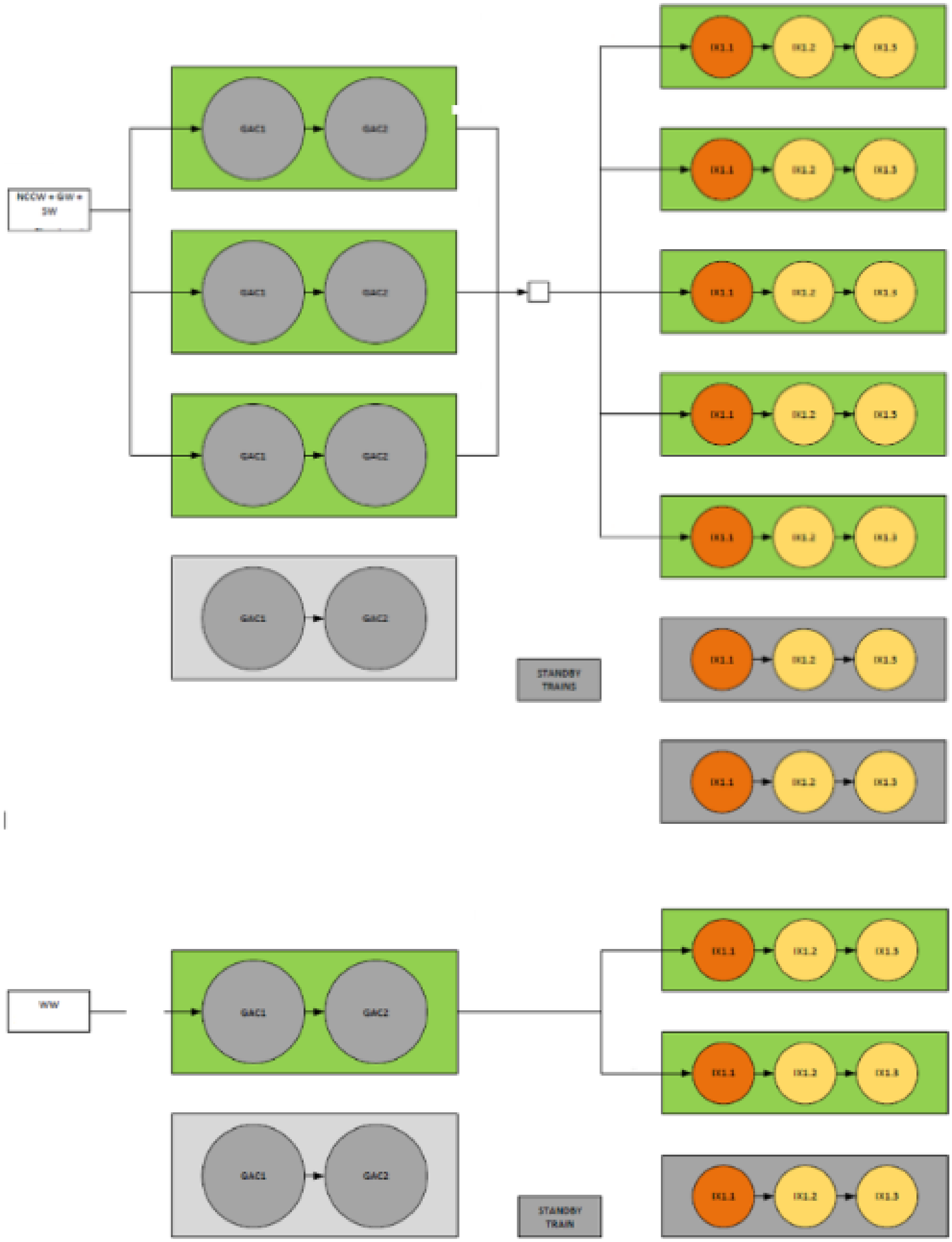


Diagram 7. Flow schematic from RO reject tanks to IX treatment

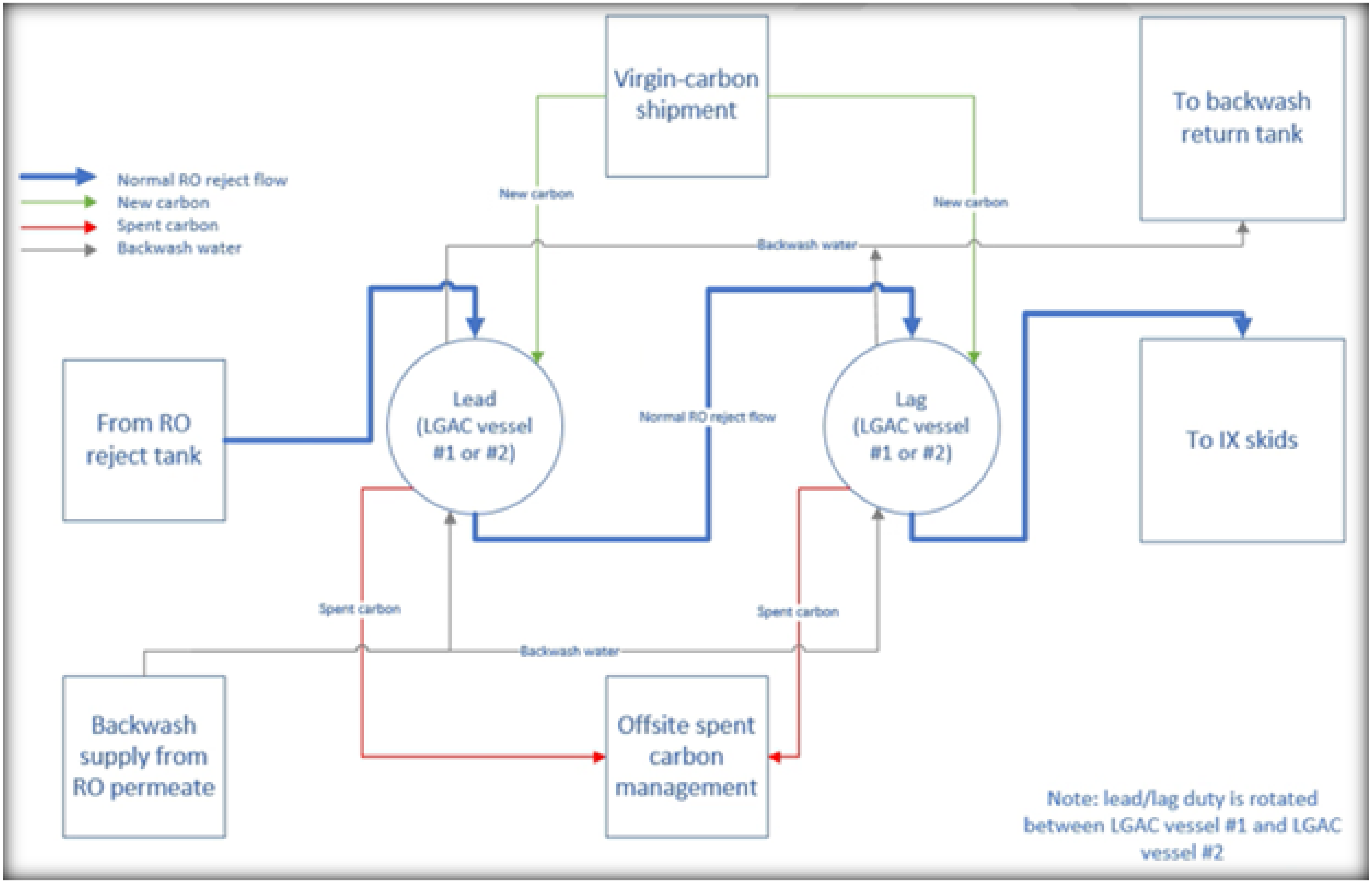
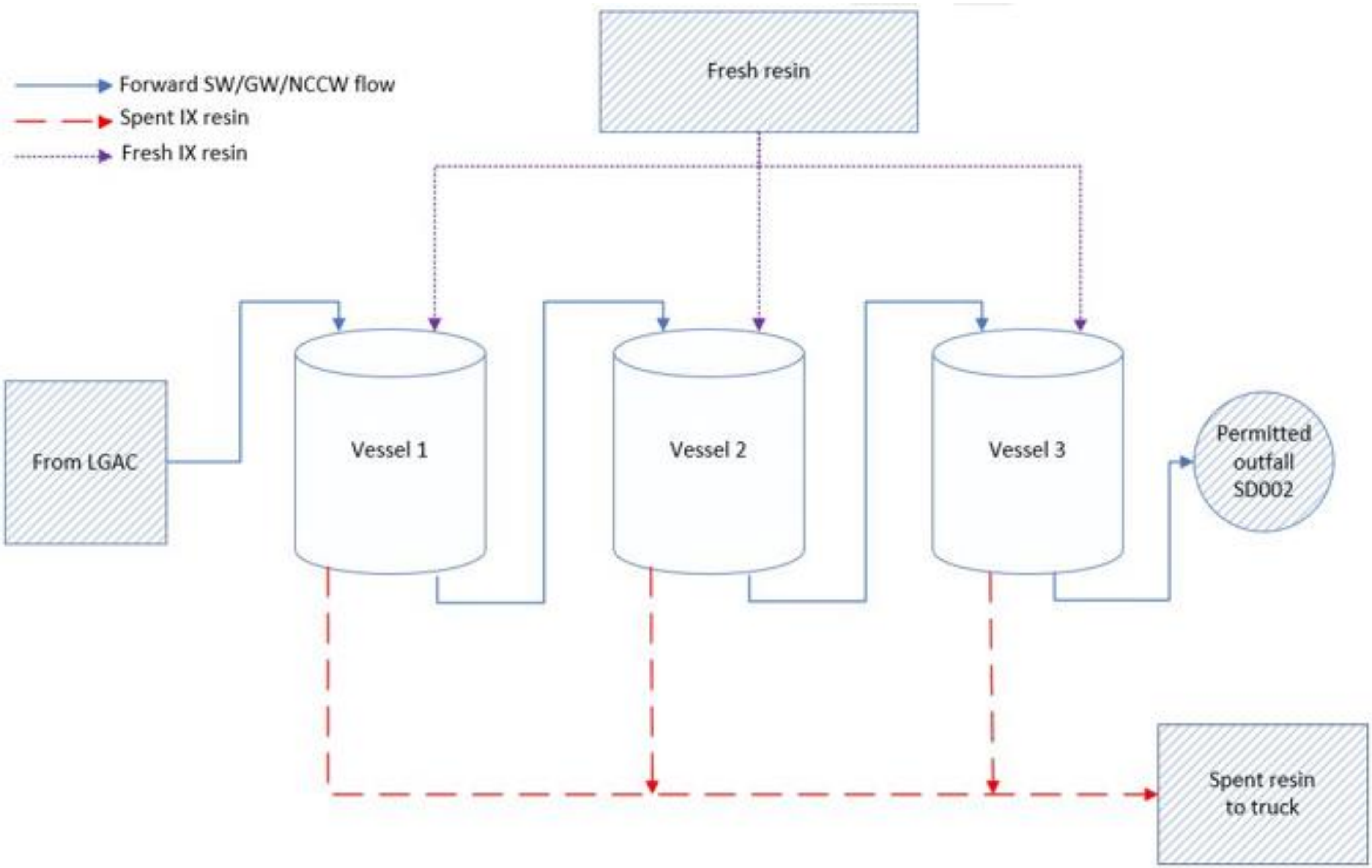


Diagram 8. Flow schematic from LGAC to IX vessels in NCCW/ISW/GW system



Historical Changes to Facility or Operation

This section lists changes to the Facility that have occurred since NPDES/SDS Permit MN0001449 was issued. Due to the nature of 3M's industrial processes and research and development needs, the manufacturing areas change somewhat frequently. This summary includes changes to NPDES program related infrastructure.

- Modified the activated sludge process to include denitrification to the Phase 2 Wastewater Treatment System
- Replaced portions of the Phase 3 Wastewater Treatment System gravity sewer and slip-lined other portions
- Added a reference to groundwater monitoring wells required under other regulatory programs.
- Added pre-carbon filtration to Phase 1 and 2 Wastewater Treatment System in Building 185
- Added carbon treatment to Phase 1, 2, and 3 Wastewater Treatment Systems in Building 185
- Lined Pond C and constructed north/south cell bypass
- Constructed Building 92 and 93
- Decommissioned/closed two wastewater ponds (formerly Ponds A and B)
    - This area has been re-graded and turned into Pond 1
- Lined Pond 1 (formerly Ponds A and B)
    - Pond 1 was lined in Fall 2023
    - Pond 1 will be water balance tested in 2024 as part of the Advanced Wastewater Treatment System start-up
- Added ultraviolet disinfection to Phase 1 and 2 Wastewater Treatment Systems and decommissioned the chlorination and dechlorination system
- Separated sludge thickening between Phase 1 and 2 Wastewater Treatment Systems and Phase 3 Wastewater Treatment System
- SD 001 flow meter relocation and replacement
- Decommissioned Building 183 lime addition system
- Decommissioned Phase 3 mix box acid/caustic chemical addition
- Replaced piping on Matsch Ave to remove stormwater inflow from Phase 1 Wastewater Treatment System and redirect to Pond 2 (formerly NCCW stormwater pond)
- Replaced/relocated the sulfuric acid line from Building 183 to Building 138
- Valve added on SD 002 line to manage discharge in emergency flow situations
- Added CO_2 pH adjustment capability prior to SD 001
- Replaced Phase 2 Wastewater Treatment System wooden activated sludge basin covers with aluminum panel covers
- Replaced partial force mains for Phase 1 and 2 Wastewater Treatment Systems
- Installed and water balance tested Pond 3
- Water Balance Test completed for Fire training basin

Additionally, 3M is working towards wastewater treatment system and general infrastructure improvements. The planned improvements are listed below, and 3M will coordinate with the MPCA as needed. The list is organized by process location.

- Wastewater Treatment System Phase 1
    - Replace five rectangular clarifiers with four conventional round clarifiers
    - Addition of hex discs to both cells of Pond C to prevent algal growth
- Wastewater Treatment System Phase 2
    - Investigate supplemental nutrient dosing at the activated sludge basin to better manage the health of the mixed liquor fauna
    - Currently replacing Phase 2 Wastewater Treatment System bar screen and rake with a new unit (replacement in-kind)
- General Wastewater Treatment Infrastructure
    - Install inline solids monitoring equipment
    - Pond 1 will be water balance tested in spring, 2024 as part of the Advanced Wastewater Treatment System start-up
    - Pond 2 (formerly the non-contact cooling water (NCCW) pond) will be upgraded, lined, and water balance tested after Pond 1 in 2024
    - Construct Water Quality Building (Building 150) Advanced Wastewater Treatment System and Ion Exchange Regeneration (Building 151)

Significant changes from the previous permit

The draft permit contains the following changes from the last issued permit:

- In the previous permit, the assumption was made that the unnamed creek was a “discharge ravine” that functioned as a direct conduit to the Mississippi River and was, thereupon, completely, and instantaneously mixed. In this permit reissuance, the unnamed creek is protected as a water of the state where surface water quality standards apply and it is not treated as a direct conduit to the Mississippi River. Water quality based effluent limits were set to protect water quality in the unnamed creek, Pool 2 of the Mississippi River, and all downstream waters.
- The design flows and antidegradation flow have changed based on plans and specs submitted by 3M and approved by the MPCA for the new treatment system. This system will be collecting more water for treatment than has been collected in the past. In the past, the 12.1 mgd antidegradation flow (facility total) applied to both SD 001 and SD 002. The antidegradation flow has now been separated between SD 001 and SD 002. The design and antidegradation flow applied to SD 001 is 6.5 mgd. The design and antidegradation flow applied to SD 002 is now 8.7 mgd, an increase from before. See the Antidegradation section towards the end of the document for further explanation.
- Added effluent monitoring for ammonia nitrogen, nitrite plus nitrate-nitrogen, total Kjeldahl nitrogen, and total nitrogen at SD 001 and SD 002.
- Added effluent monitoring for total residual oxidants at SD 001 because there are numerous chemical addition processes to the treatment system that may contain oxidants.
- Removed effluent monitoring and limits for length of individual pH excursion, percent of time exceeding pH limits, and total pH range excursions at SD 001 because the facility treats domestic wastewater and is required to remain within a pH of 6.0 – 9.0 standard units.
- Added surface discharge (SD) monitoring stations to represent industrial stormwater discharge locations (SD 009 – SD 029).
- Added four surface water monitoring stations (SW 001 – SW 004) to assess water quality upstream and downstream of the facility’s discharge. See the “PFAS Surface Water Monitoring Protocol” in Appendix A of the draft permit for additional requirements and information.

- Added waste stream (WS) monitoring stations to represent internal monitoring of treatment system effectiveness (WS 001 – 007) and industrial stormwater locations (WS 008 – 027).
- Added monitoring for PFAS compounds (see List 1 below) at SD 001, SD 002, WS 001 – WS 004, WS 006 – WS 007, SW 001 – SW 004, and at stormwater SD and WS stations (see limits and monitoring table in the draft permit).
- Added new technology-based limits (TBELs) at SD 001 based on updates to 40 CFR pt. 414 (OCPSF) subpart I since the last permit issuance. See Table 5 below for TBELs assigned to SD 001. New limits are indicated by a "*."
- Added new technology-based limits at SD 001 for BOD based on 40 CFR pt. 414 (OCPSF) subpart D.
- Added new water quality-based limits at SD 001 for antimony, cadmium, Bis(2-ethylhexyl) phthalate (DEHP), mercury, nitrogen, ammonia total (as N), perfluorobutanoic acid (PFBA), perfluorobutanesulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), perfluorohexanesulfonic acid (PFHxS/PFH1S/PFHS), perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), selenium, and zinc.
- Added effluent monitoring of dissolved mercury and total suspended solids (as grab sample with mercury) to accompany total mercury monitoring at SD 001 and SD 002.
- Added new mass limit (614 kg/day) at SD 001 for $CBOD_5$.
- Added new calendar month average water quality-based limit (167 ug/L) for zinc at SD 001 and increased the daily maximum limit from 240 ug/L (based on LC50 concentration value determined pursuant to bioassay studies completed on the SD 001 discharge – see Appendix) to 288 ug/L based on updated reasonable potential analysis and water quality-based limit calculation to protect the unnamed creek.
- Added new water quality-based limits at SD 002 for Bis(2-ethylhexyl) phthalate (DEHP), lead, mercury, perfluorobutanoic acid (PFBA), perfluorobutanesulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), perfluorohexanesulfonic acid (PFHxS/PFH1S/PFHS), perfluorooctanoic acid (PFOA), and perfluorooctanesulfonic acid (PFOS).
- Removed stations SD 004 and SD 005. These stations were used to monitor the use of bypasses/overflows in the previous permit. Moving forward, the Permittee shall follow permit requirements 5.69.116 upon discovery of a bypass, release, or overflow.
- Changed monitoring of dissolved phosphorus to total phosphorus.
- Added a new phosphorus limit (6,253 kg/yr as a 12-month moving total) at SD 003 based on the Lake Pepin and Mississippi River Eutrophication TMDL.
- Removed the acute WET limit of 0.9999 Toxic Unit acute (TUa) at SD 003. This daily maximum limit was designed to protect the Mississippi River (not the unnamed creek). To protect the unnamed creek, the Permittee is now required to perform chronic WET testing since the dilution ratio of the stream flow to the maximum design flow is less than 20:1. Since the 7Q10 is 0.0 cubic feet per second (cfs) for the unnamed creek, the Permittee will need to meet the chronic WET monitoring value of 1.0 Toxic Unit chronic (TUc). This is a monitoring threshold value, not a limit.
- Increased priority pollutant scan submittals from twice per year for the life of the permit to four times per year for the life of the permit for SD 002 (matches SD 001 frequency).
- Changed the TRC limit at SD 002 and SD 003 to 0.038 mg/L per up-to-date rule interpretation.
- Included individual subsurface/sewage treatment systems (SSTS) that were not included previously, but have been in place at the facility for decades (see Compliance Schedules section).

Special conditions

- The Permittee shall analyze per- and polyfluoroalkyl substances (PFAS) at all monitoring locations in accordance with the following:
  A. The Permittee must sample and analyze PFAS compounds using methodology capable of detecting PFAS to the minimum reporting levels available and specifically below a 4 ng/L reporting limit for PFOS, PFOA, and PFHxS, such as EPA method 1633, a method equivalent to EPA 1633, or a method better than EPA method 1633..
  Note – Reporting limit compliance will be assessed by averaging all reporting limits at each individual monitoring station within a calendar year period and comparing against the 4 ng/L limit. The annual average of the reporting limit shall be included in the comments cell of the respective DMRs for all stations with the exception of WS 005 on the December reporting requirement. A violation of the annual average RL condition is not a WQBEL limit violation but is a permit violation at the specified
  station.
  Note – Due to the variable stormwater characteristics, stormwater SD and WS stations may use all results from all stormwater stations when assessing compliance with the 4 ng/L reporting limit.
  Note – Process control sampling does not have to meet the reporting limits established in item "A" above or any other quality assurance requirements otherwise required of the monitoring required in the Limits and Monitoring Requirement table of this permit.
  B. The Permittee shall analyze for all PFAS believed to be present (including but not limited to the compounds identified in this permit) in all water required to be monitored at all locations in this permit.
  Note - Non-targeted PFAS analysis shall be conducted at a minimum frequency of once every five years of the water required to be monitored at all locations in this permit. PFAS compounds detected during the non-targeted analysis that are not identified in this permit must be added to the PFAS analysis list for the applicable station immediately upon receipt of the non-targeted analysis results.
  C. The Permittee shall analyze other PFAS compounds upon request of the MPCA should future research or environmental study determine a need for added parameters.
  D. The Permittee may request a change or reduction in monitoring frequency for PFAS analysis after 12 months if monitoring data over a 12-month period of time proves that the pollutants(s) are not present at a particular monitoring location.
  E. If the MPCA approves of the requested reduction in monitoring, the Permittee shall sample for the approved parameter(s) at a minimum of 1x/year to verify that they remain absent from the discharge.
  F. All targeted PFAS analysis results shall have results finalized for potential submission to the MPCA as soon as possible and a maximum of 51 days after sample collection.
  G. Process control sampling (see March 12, 2024 "Cottage Grove Advanced Water Treatment Proposed Draft Sampling Plan") PFAS results shall be submitted to the MPCA quarterly by 21 days after the calendar quarter as a Microsoft Excel spreadsheet output from the LIMS system attached to the DMR submittal.
- Annual PFAS Certification Statement
  The Permittee shall submit an Annual PFAS Certification Statement by January 21 of each year. Certification statements shall certify that the Permittee is monitoring for all PFAS believed to be present in its water(s) based upon but not limited to the following:
  A. A review of stormwater and wastewater discharge characteristics from other Permittee PFAS manufacturing facilities;

B. A review of both targeted and non-targeted analysis of stormwater and wastewater; and
C. A review of PFAS analysis in air, rooftop, and other potential stormwater sources.

- Annual PFAS Source Identification and Reduction Report
  The Permittee shall submit an Annual PFAS Source Identification and Reduction Report by March 31 of each year. The report shall contain a detailed account for the most likely/probable source of each PFAS compound found in the facility's discharge(s), what source reduction and/or elimination efforts the Permittee has taken in the prior calendar year, and corrective actions planned for the future.
- Annual Laboratory Analytical Method Report
  The Permittee shall submit an Annual Laboratory Analytical Method Report by March 31 of each year. The report shall identify the laboratory analytical methods, method detection and reporting limits, and reference standards for the PFAS it currently or historically has had the capability of quantifying for in wastewater, surface water, fish tissue, and groundwater. The report shall identify the year that each existing method was first developed.
  The annual report shall include but not be limited to method development status of the following PFAS compounds:
  (FHSAA) – CAS # 1003193-99-4
  (6:2 FTA) – CAS# 1383438-86-5
  (2,2,3,3,5,5,6,6- Octafluoro-4-[1,2,2- trifluoro-2-(2,2,2-trifluoroethoxy)ethyl]morpholine (PFAS compound)) – CAS # 1600-71-1
  (TBBP or TBMOPP) – CAS # 332350-90-0
  (2-FPDA) – CAS# 473-87-0
  (3,5-Bis(heptafluoropropyl)-1H-1,2,4-triazole ($C_8HF_{14}N_3$)) – CAS# 709-62-6
  (N-TamP-FhxSA) – CAS# 38850-51-0
  ($C_{10}H_3F_{18}NO_2$)
  ($C_{13}H_3F_{18}N_3O_4$)
  ($C_{15}H_{21}F_{13}N_2O_2S$)
  (Methyl 2-[[bis(trifluoromethyl)amino]-difluoromethyl]-2,3,3,3-tetrafluoropropanoate ($C_7H_3F_{12}NO_2$))
  (MeFBSEA) – CAS# 67584-55-8.
- DMR Requirements
  An individual sample result that is below its reporting limit is considered to be in compliance with the associated daily maximum limit.
  Use the following instructions to determine a reportable value where sample values are less than the RL and the permit requires reporting of an average.
  A. If some values are less than (<) the RL, substitute zero for all non-detectable values to report the average or summed concentration.
  Example: The values for the month are: 5.0 ng/L, 4.0 ng/L, 3.0 ng/L and <2.0 ng/L. Report the monthly average or sum as
  (5.0 + 4.0 + 3.0 + 0.0) = 12.0 ÷ 4 = 3.0 ng/L
  B. If all values are less than (<) the RL, use the RL for all non-detectable values to calculate the average or sum and report as < the RL calculated average or summed concentration.
  Example: The values for the month are <0.2 ng/L, <0.4 ng/L, <0.2 ng/L, <2.0 ng/L. Report the monthly average or sum as
  (0.2 + 0.4 + 0.2 + 2.0) = 2.8 ÷ 4 = < 0.7 ng/L.
  C. For calculating the average reporting limit: Average the numeric reporting limit for each PFOS or PFOA sample over the calendar year.
  If the average reporting limit is less than 4 ng/L, then the reporting limit is in compliance for that year.

Example: The reporting limits for four PFOS samples at SD 001 for a given year are: 1.8 ng/L, 3.2 ng/L, 4.0 ng/L, and 5.0 ng/L. This averages out to 3.5 ng/L as a yearly average and would be in compliance with the 4 ng/L value.

- Quality Assurance/Quality Control Verification
  At least once per year (occurrences must be spaced by at least 10 months) the Permittee shall conduct a quality assurance/quality control (QA/QC) verification of its composite sampling equipment to ensure there is no PFAS interference(s) and/or contamination. The QA/QC verification shall include but not be limited to having certified PFAS-free water flow through the composite sampling equipment and container(s) over a 24-hr period with the results reported as an attachment to the corresponding DMR.
- Annual PFAS Removal and Disposal Report
  The Permittee must report the annual (Jan-Dec) combined removal of each PFAS compound across all PFAS treatment systems in units of kilograms per year and percent removal. The goal is to quantify the total PFAS captured on all GAC and IX media in one year and explain the methodology by which the quantification was performed. The Permittee must also report where the captured PFAS is sent for disposal and whether that PFAS is fully destroyed.
- If it is found that another PFAS compound breaks through the proposed PFAS treatment more quickly than the existing WS station parameters, this permit may be modified, or revoked and reissued to incorporate a limit(s) for that/those PFAS. The addition of any new effluent limits would be considered a major modification and may be subject to public comment.
- If EPA develops new criteria or the State adopts new or revised water quality standards or develops new site-specific criteria for PFAS compounds found at the Permittee's facility, MPCA may conduct a reasonable potential analysis and reopen the permit to include new limits. The addition of any new effluent limits would be considered a major modification and may be subject to public comment.
- Non-targeted Analysis (NTA) sampling shall have results submitted to the MPCA within six months of sample collection. All new PFAS compounds identified as being present within the water(s) discharged from the facility shall have a MPCA verified Chemical Abstract Service (CAS) number provided along with their chemical structure. At least one (1) NTA Sampling Result Report shall be submitted every five years. The Permittee plans to phase out all PFAS manufacturing and processing by the end of 2025. The Permittee shall submit a report: Due by permit expiration. Subsequent results/reports shall continue to be submitted every five years (even beyond permit expiration, until reissuance where this requirement will have been reassessed).
- Instream PFAS Characterization Study
  By January 1, 2026, the Permittee shall submit a work plan for review and approval by MPCA for an instream PFAS characterization study (Characterization Study) of surface water, sediments, and fish tissue PFAS as outlined in the PFAS Surface Water Monitoring Protocol (Appendix A).
  If the Permittee would like to request a reduction in sampling, they must explain why the reduction is reasonable and needed. The MPCA reserves the right to make any changes to the sampling plan prior to approval.
  By January 1, 2028, the Permittee shall submit the results of the instream PFAS characterization study (Characterization Study) of surface water, sediments, and fish tissue for the PFAS as outlined in the Surface Water Monitoring Protocol (Appendix A). The Permittee shall continue to submit subsequent Characterization Study results every five years.
- Upon discovery of a bypass, release, or overflow, the Permittee shall monitor flow from the event and obtain samples (grab) for the same monitoring parameters as required for Station SD 001 (see limits and monitoring table for SD 001). If the event continues for more than 24 hours, continue monitoring flow during the entire period of release and obtain samples once each 24 hours. Results are to be reported on the Release Report located on the MPCA's website at https://www.pca.state.mn.us/business-with-us/discharge-monitoring-reports. The Release Report shall be submitted to the MPCA with the next DMR.

- The Permittee shall conduct a meeting annually to disclose factual information to the community regarding facility operations, changes made or planned to reduce pollutants in discharges, management of hazardous materials and compliance with environmental permits and regulations. The Permittee shall provide the time, date, location, format, and agenda of the meeting to the public and MPCA 60 days before the meeting. The Permittee shall hold a meeting: Due annually, by the 30th of June.
- Within 60 days of permit issuance the Permittee shall submit its current version of a Foam Release, Detection, and Recovery (FRDR) Plan for review and approval. The Permittee shall immediately implement and comply with the FRDR plan version submitted for approval by MPCA once approved by MPCA.
- Underground Piping Integrity Plan
  The Permittee shall submit an implementation plan within 90 days after permit issuance detailing the following:
  A. Timeline (maximum of three years for high priority/high risk pipes and maximum of ten years for all other pipes) for assessing condition of all underground piping conveying water at the facility;
  B. Timeline (maximum of one year) for restoring integrity of any underground piping found to have defects allowing either infiltration or exfiltration of water; and
  C. Maps, drawings, and diagrams along with methods for both pipe assessment and restoration of integrity.
  High priority/high risk pipes include but are not limited to (Reference: Cottage Grove Sewer Operations and Maintenance Manual dated July 28, 2023 Revision 0):
  Chem Sewer Phase 1 Group 3
  Sanitary Sewer Group 1
  Sanitary Sewer Group 2
  Sanitary Sewer Group 3
  Chem Sewer Phase 1 Group 2
  Storm Sewer Group 2
  Storm Sewer Group 3
  Chem Sewer Phase 2 Group 3
- Annual Underground Piping Report
  The Permittee shall submit an Annual Underground Piping Report by March 31 of each year. The report shall include findings (e.g. including but not limited to televising footage) and summaries of actions taken responsive to the Underground Piping Integrity Plan.
- Any river monitoring of fish, water, or sediment associated with any remedial activities must be submitted with NPDES/SDS permit reporting requirements.
- Once online, the RO and AIX treatment systems shall be operated at all times except under emergency conditions authorized by this permit, and under conditions of maintenance or downtime as described in the MPCA approved (once approved) operations and maintenance plan for the systems.
- RO & IX O&M Manual
  Within 60 days after the advanced wastewater treatment system startup date, the Permittee shall submit its Ion Exchange (IX) operations and maintenance (O&M) manual. The O&M manual shall contain a dedicated section highlighting the PFAS breakthrough monitoring, procedures, breakthrough thresholds/determination procedure and response procedure. The Permittee shall immediately implement and comply with the IX O&M

manual and submit a revised version within 365 days of any future revisions being made. The Permittee shall submit an operations and maintenance (O & M) manual: Due 5/31/2025.

- The GAC treatment systems shall be operated at all times except under emergency conditions or other conditions authorized by this permit, and under conditions of maintenance or downtime as described in the MPCA approved operations and maintenance plan for the systems.
- GAC O&M Manual
  Within 60 days of permit issuance the Permittee shall submit its current GAC O&M manual(s) for each building that contains the GAC treatment technology. The O&M manual(s) shall contain a dedicated section highlighting the PFAS breakthrough monitoring, procedures, breakthrough thresholds/determination procedure and response procedure. The Permittee shall immediately implement and comply with the GAC O&M manual(s) and submit revised versions within 30 days of any future revisions being made.
- WWTP O&M Manual
  Within 60 days of permit issuance the Permittee shall submit its Wastewater Treatment Plant (WWTP) O&M manual. The O&M manual shall contain a dedicated section highlighting the PFAS breakthrough monitoring, procedures, breakthrough thresholds/determination procedure and response procedure. The Permittee shall immediately implement and comply with the WWTP O&M manual and submit a revised version within 30 days of any future revisions being made.
- As soon as possible and no later than September 30, 2024, the Permittee shall submit the currently in effect editions/revisions of O&M manuals for all PFAS treatment technology buildings and equipment at its facility. The manuals shall specify the control system alarms and setpoints.
- As soon as possible and no later than September 30, 2024, the Permittee shall submit the currently in effect editions/revisions of Standard Operating Procedures (SOPs) for all PFAS treatment technology buildings and equipment at its facility.
- As soon as possible and no later than September 30, 2024, the Permittee shall submit the currently in effect editions/revisions of Operator Forms for all PFAS treatment technology buildings and equipment at its facility.
- Annual O&M Deviation & WWTP Optimization Report
  The Permittee shall submit an Annual O&M Deviation & WWTP Optimization Report by March 31 of each year. The report shall include all instances of effluent and intervention limit exceedances at any stations where and when related O&M deviations (e.g. including but not limited to carbon and IX changeouts not occurring prior to breakthrough and other set points established in both the IX and GAC O&M manuals) occurred.
  The report shall also contain an evaluation of the WS 001 – WS 002 PFAS treatment performance relative to the following compounds and thresholds:
  PFHpS: 10 ng/L
  PFHxA: 10 ng/L
  PFPeS: 9.4 ng/L
  PFPeA: 10 ng/L
  PFPrA: 370 ng/L
  2233-TFPA: 500 ng/L
  TFA: 10,700 ng/L
  TFMS: 25 ng/L
  If any of the treatment performance thresholds above are not achieved, the report shall address what, if any optimization steps the Permittee intends on implementing and in accordance with what timeline to achieve the performance thresholds above.

- VOCs listed in the Limits and Monitoring Requirements section shall be analyzed in accordance with 40 CFR pt. 136, Method 624-Purgeables. Acrylonitrile may be analyzed using Method 624, however if acrylonitrile is determined to be consistently present it shall be analyzed using Method 603 as described in 40 CFR pt. 136. Sampling for VOCs shall be completed in accordance with sampling requirements as stated in Method 624, section 5, Apparatus and Materials. Semi-volatile organic compounds (base/neutral extractables and acids) listed in the Limits and Monitoring Requirements shall be analyzed in accordance with 40 CFR pt. 136, Method 625-Base/Neutrals and Acids. Metals listed in the Limits and Monitoring Requirements shall be analyzed in accordance with the analytical methods for low level metals analysis as stated in 40 CFR pt. 136.
  Detection limits for the analysis of VOCs, semi-VOCs, and metals shall be below the applicable discharge limitations at all times.
- Any basins used for the purpose of fire training, or collection of fire training runoff wastewaters, shall be lined using 100 mil high density polyethylene (HDPE) or similar synthetic liners.
- The Permittee shall operate the pH adjustment/chemical precipitation systems for phase 1 (inorganic wastewater) so that metal removals are optimized. Chemical pH adjustment and precipitation systems shall be optimized for removal of nickel and zinc specifically.
- Alkyl Phenol Ethoxylate (APE) compounds used and discharged to any process wastewaters at the plant shall be discharged to the wastewater treatment system and subsequently to the granular activated carbon facility, or directly to the activated carbon treatment facility. APEs shall not be discharged to any cooling waters unless such waters receive treatment at the wastewater treatment system and the activated carbon treatment facility.
- Submit a Stormwater Annual Report by March 31 of each year following permit issuance.
- See PFAS Surface Water Monitoring Protocol (Appendix A of Draft Permit).
- The Permittee must send in the entire priority pollutant report, including the QC section each time the priority pollutant scan is performed. The permittee must send four priority pollutant scans each year for the life of the permit. DEHP sampling cannot encounter any kind of plastic, especially soft plastic. Plastic commonly leaches out DEPH and thereby contaminant the sampling. If the 24-hr. composite sampler has any kind of plastic or plastic tubing, then DEHP sampling must be taken as a grab sample using non-plastic material.

Recent compliance history

The most recent MPCA wastewater Compliance Evaluation Inspection (CEI) occurred on October 28, 2022, by Justin Barrick, Sarah Starr, Braden Orr, and Hailey Gorman of the MPCA. The CEI consisted of a visual inspection of the facility and a discussion with several 3M staff including:

Charley Kubler, Site Environmental Manager
Liz Williams, Environmental Specialist
Caroline Dooley, EHS Specialist
Andrea Kurbondski, Environmental Engineer
John Frost, Environmental Engineer
Alma Allen-Webb, Senior Environmental Specialist
Andy Schultz, Operations Director
Shane Symmank, Process Engineer
Steven Boutelle, Environmental Engineer
Dennis Conway, Wastewater Treatment Supervisor

Darren Schwankl, P.E. Facilities Engineering
Kevin O'Halloren, P.E Environmental Specialist
Oliver Winogrodzki, Manager, Environmental Compliance
Mike Rogers, Site Utilities Coordinator
Shane Waterman, Advanced Environmental Specialist

There was also a review of the monthly discharge monitoring reports (DMRs) for the time period of December 2020- October 2022. Based on the results of the inspection, there were violations of the terms and conditions set forth in the National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit.

Over the file review period the Permittee reported 11 wastewater related unauthorized releases to the Minnesota Duty Officer. The Permittee also reported nuisance conditions of foam, discoloration, and sheen at their discharge. There were three reported effluent limit exceedances (pH, BOD, and oil and grease) and the Permittee missed reporting 18 permit required parameters. Lastly, the Permittee submitted one DMR late.

Discharge Monitoring Report Submittals (June, 2020 – June, 2023):

DMR Submittal	
DMR Submitted	DMR Submitted Late
33	1

Effluent Limit Exceedances (June, 2020 – June, 2023):

Mon Start Date	Station	Station Description	Parameter	Units	Limit Type	Limit	Rpt Value
3/1/2023	SD 001	Process & Sanitary Effluent	Oil & Grease, Total Recoverable (Hexane Extraction)	mg/L	DailyMax	10	12
1/1/2023	SD 002	NC Cooling & Storm Runoff	BOD, 05 Day (20 Deg C)	mg/L	DailyMax	50	69
4/1/2022	SD 001	Process & Sanitary Effluent	Oil & Grease, Total Recoverable (Hexane Extraction)	mg/L	DailyMax	10	20
6/1/2021	SD 001	Process & Sanitary Effluent	pH	SU	CalMoMax	9	9.5

6/1/2021	SD 001	Process & Sanitary Effluent	pH, Percent of Time Exceeding pH Limits	%	CalMoTot	1	1.32

An EPA water evaluation inspection took place on September 23, 2021.
An EPA sampling inspection took place on May 19, 2021.
A MPCA wastewater Compliance Evaluation Inspection also occurred on September 14, 2020.

Recent monitoring history

The table below lists the last 12 months of monitoring data submitted by the facility and the existing monitoring parameters.

Table 1: Recent monitoring history

Station	Parameter	Limit Type	Limit	Units	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24
SD 001	Antimony, Total (as Sb)	DailyMax		ug/L	4.3	405	18	9.8	85	11	5.3	64	14	51	77	9.9	90
	BOD, Carbonaceous 05 Day (20 Deg C)	CalMoAvg	25	mg/L	0	2.2	0.38	0.78	1.8	0.8	0.42	0.76	1.8	1.9	1.4	0.82	1.4
		MxCalWkAvg	40	mg/L	0	6.7	2	2	4.7	2.4	2	2.6	6.5	3.7	5.5	2.8	2.8
	Cadmium, Total (as Cd)	DailyMax		ug/L	0	0	0	0	0	0	0	0	0	0	0	0	0
	Chromium, Total (as Cr)	DailyMax	2,770	ug/L	0	0	0	0	0	0	0	0	0	0	2.8	0	2.8
	Copper, Total (as Cu)	DailyMax	68	ug/L	3.8	3	2.6	1.8	2.6	1.8	1.5	1.9	1.2	1.2	1	1.2	1.9
	Fecal Coliform, MPN or Membrane Filter 44.5C	CalMoGeoMn	200	#/100ml	1.2	1	4.6	4.3	2.5	1.5	2.2						1.4
	Flow	CalMoAvg		mgd	2.429	1.914	2.162	2.12	2.318	2.026	2.444	2.279	2.587	2.579	2.836	2.921	2.6
		CalMoTot		Mgal	72.857	59.33	64.868	65.67	71.856	60.766	75.769	68.364	80.211	79.951	82.253	90.554	77.94
	Lead, Total (as Pb)	DailyMax	690	ug/L	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mercury, Total (as Hg)	DailyMax	0.2	ug/L	0.00201	0.0076	0.00271	0	0.0051	0.00324	0.0077	0.0052	0.0021	0.0038	0.0059	0.00493	0.0052
	Nickel, Total (as Ni)	DailyMax	480	ug/L	3.7	2.1	2.4	2.1	1.7	1.4	1.5	4.7	2.4	2.5	2.1	1.9	2.5
	Nitrogen, Ammonia, Un-ionized (as N)	DailyMax	0.458	mg/L	0.00343	0.0396	0.0203	0.0212	0.0403	0.0519	0.00697	0.0125	0.0102	0.0012	0.0015	0.00127	0.00369
	Oil & Grease, Total Recoverable (Hexane Extraction)	DailyMax	10	mg/L	0	0	5.6	0	0	0	0	0	0	0	0	0	0
	pH	CalMoMax	9	SU	8	8.6	8.4	8.1	8	8.4	8.6	8.2	8.3	8	8.6	7.8	8.1
		CalMoMin	6	SU	7.1	6.3	7.1	7.2	7.2	7.3	7.3	7.4	7.1	6.9	6.6	7.2	7
	pH, Length Of Individual pH Excursion	CalMoMax	60	min	0	0	0	0	0	0	0	0	0	0	0	0	0
	pH, Percent of Time	CalMoTot	1	%	0	0	0	0	0	0	0	0	0	0	0	0	0

	Exceeding pH Limits															
	pH, Range Excursions Total	CalMoTot	446	min	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phenols, Total	CalMoAvg	1.5	kg/d	0.5475	0.4904	0.4972	0.645	0.5517	0.4622	0.5725	0.5198	0.5475	0.6236	0.6353	0.6483	0.5748
		CalMoMax	3.6	kg/d	0.6286	0.5698	0.6534	1.3356	0.6561	0.6234	0.7315	0.654	0.6643	0.6699	0.7517	0.744	0.7006
	Phosphorus, Dissolved	SingleVal		mg/L	0.075	0.11	0.11	0.14	0.058	0.075	0.056	0.069	0.034	0.046	0.025	0.014	0.032
	Selenium, Total (as Se)	DailyMax		ug/L	0.52	0.53	0.58	0.5	0	0.51	0.65	0.66	0.74	0.59	0.54	0.63	0.58
	Solids, Total Suspended (TSS)	CalMoAvg	30	mg/L	2	0	0	0	0	0	0	0	0	0	0	2.93	0.75
			545	kg/d	21	0	0	0	0	0	0	0	0	0	0	32	8.4
		CalMoMax	1,100	kg/d	252	0	0	0	0	0	0	0	0	0	0	82	72
		MxCalWkAvg	45	mg/L	10	0	0	0	0	0	0	0	0	0	0	3.9	3.9
	Temperature, Water (F)	CalMoMax		degrees F	67	68	74	75	75	71	68	60	56	58	58	61	62
	Zinc, Total (as Zn)	DailyMax	240	ug/L	0	0	0	0	0	0	0	9.2	8.8	0	0	0	0
SD 002	BOD, 05 Day (20 Deg C)	DailyMax	50	mg/L	0	0	0	6.5	0	5.1	0	0	0	0	7.6	2.4	0
	BOD, Carbonaceous 05 Day (20 Deg C)	CalMoAvg	25	mg/L	0	0	0	1.2	0.6	2.7	0	0	0	2.6	1.4	0.6	0
	Chlorine, Total Residual	DailyMax	0	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0
	Flow	CalMoAvg		mgd	2.845	2.522	2.622	2.732	2.516	2.702	2.627	2.399	2.532	2.645	3.06	3.077	2.116
		CalMoTot		Mgal	85.357	78.197	78.647	84.681	77.982	81.054	81.442	71.958	78.486	81.994	88.731	95.374	63.481
	Oil & Grease, Total Recoverable (Hexane Extraction)	DailyMax	10	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phosphorus, Dissolved	SingleVal		mg/L	0.22	0.24	0.22	0.25	0.35	0.23	0.24	0.12	0.16	0.2	0.21	0.18	0.16
	Solids, Total Suspended (TSS)	CalMoAvg	30	mg/L	0	2.4	0	0	0	0	4	0	0	0.8	0	0.4	3
		DailyMax	60	mg/L	0	12	0	0	0	0	32	0	0	0	0	3.5	24
	Temperature, Water (F)	CalMoMax	83	degrees F	59	67	66	70	72	66	64	61	60	62	60	63	62
SD 003	Chlorine, Total Residual	DailyMax	0.04	mg/L	0	0	0	0	0	0	0	0	0.05	0	0.04	0	0
	Toxicity, Whole Effluent (Acute)	DailyMax	0.9999	TUa			0										

Receiving water(s)

Use classification

The facility has a *continuous* discharge via surface discharge stations SD 001, SD 002, and SD 003 on an unnamed creek to the Mississippi River. All waters of the state of Minnesota must be classified based on considerations of best usage in the interest of the public and in conformance with the requirements of the applicable statutes, as described in Minn. R. 7050.0140. Based on these considerations, the unnamed creek and the Mississippi River are classified as a Class 2Bg, 3, 4A, 4B, 5, 6 waters.

Class 2 waters, aquatic life, and recreation. Aquatic life and recreation includes all waters of the state that support or may support aquatic biota, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare.

Class 3 water, industrial consumption. Industrial consumption includes all waters of the state that are or may be used as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Class 4 waters, agriculture, and wildlife. Agriculture and wildlife includes all waters of the state that are or may be used for any agricultural purposes, including stock watering and irrigation, or by waterfowl or other wildlife and for which quality control is or may be necessary to protect terrestrial life and its habitat or the public health, safety, or welfare.

Class 5 waters, aesthetic enjoyment, and navigation. Aesthetic enjoyment and navigation includes all waters of the state that are or may be used for any form of water transportation or navigation or fire prevention and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Class 6 waters, other uses, and protection of border wars. Other uses includes all waters of the state that serve or may serve the uses in subparts 2 to 6 or any other beneficial uses not listed in this part, including without limitation any such uses in this or any other state, province, or nation of any waters flowing through or originating in this state, and for which quality control is or may be necessary for the declared purposes in this part, to conform with the requirements of the legally constituted state or national agencies having jurisdiction over such waters, or for any other considerations the agency may deem proper.

The beneficial use subclass designator "g" is added to the Class 2 designator as a specific additional designator. The additional subclass designator does not replace the Class 2 designator. All requirements for Class 2 stream and river habitats in Minn. R. 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Bg stream and river habitats in Minn. R. 7050.0222. This subclass designator applies to lotic waters only.

There are no endangered or threatened species living in the receiving water.

More information on the classification of waters can be found in Minn. R. 7050.0140.

Impairments

The 3M Cottage Grove facility discharges to an unnamed creek in the Mississippi River – Twin Cities Watershed. The unnamed creek is identified as one of the impaired waters in the state of Minnesota under the requirements of section 303(d) of the Clean Water Act. There are 26 impairments downstream of this discharge, including the following parameters: aluminum, fecal coliform, mercury in fish tissue, mercury in water column, nutrients, perfluorooctane sulfonate (PFOS) in fish tissue, total suspended solids (TSS), fish bioassessments, PCBs in fish tissue, perfluorooctane sulfonate (PFOS), sulfate, and unionized ammonia. The following table lists the current impairments and TMDL status for the immediate receiving waters.

Downstream Impairments	Number of Impairments	TMDL Status
Unnamed Creek (07010206-517)	**2**	
Fishes Bioassessments	1	Mississippi River – Twin Cities Watershed A TMDL has not been developed to address this impairment in the unnamed creek.
Unionized Ammonia	1	See the Additional Information section below.
Mississippi River (07010206-814)	**14**	
Mercury in Fish Tissue	2	See the WLA section below.
Mercury in Water Column	2	
Total Suspended Solids	2	Mississippi River – Twin Cities Watershed and Mississippi River – Lake Pepin Watershed South Metro Mississippi River TSS TMDL; EPA approved April 26, 2016. A WLA is assigned to this facility's discharge. See the WLA section below.
Fecal Coliform	1	Mississippi River – Twin Cities Watershed Upper Mississippi River Bacteria TMDL; EPA approved November 20, 2014. A WLA is not assigned to this facility's discharge as this pollutant is not expected to be in the effluent.
Nutrients	1	Mississippi River – Twin Cities Watershed

		Lake Pepin and Mississippi River Eutrophication TMDL; EPA approved May 19, 2021. A WLA is assigned to this facility's discharge. See the WLA section below.
PCB-F	2	
PFOS-F	1	
PFOS-W	1	
Aluminum	2	See the Additional Information section below.
Lake Pepin (25-0001-00)	**1**	
Nutrients	1	Mississippi River – Lake Pepin Watershed Lake Pepin and Mississippi River Eutrophication TMDL; EPA approved May 19, 2021. A WLA is assigned to this facility's discharge. See the WLA section below.
Mississippi River (07040003-627)	**9**	
Mercury in Fish Tissue	3	See the WLA section below.
PCB-F	3	
Aluminum	1	
Sulfate	2	See the Additional Information section below.
Grand Total	**26**	

Following are the TMDLs that are applicable to this facility's discharge.

Wasteload Allocations:

Statewide Mercury TMDL - Mercury in Fish Tissue and Mercury in Water Column Impairments

- Mercury limits, monitoring, and MMP requirements in the permit should be in accordance with the Mercury Permit Writers Guidance.

South Metro Mississippi TMDL Turbidity Impairment

- TSS WLA = 198,925 kg/year and 545.00 kg/day (Appendix A, page 89)
- This facility is included in Appendix A, A.1. Minnesota Wastewater Permits with TSS Limits ≤32 mg/L and Eligible for Future WLA Increase.
- The WLA is equivalent to the current permitted effluent TSS mass limit of 545.0 kg/day applied at SD 001.
- This Permittee is proposing to increase the facility's maximum daily flow at SD 002 from 6.8 mgd to 8.7 mgd. Because of this expansion, a Modified WLA Justification Memo has been completed. Adding the original WLA of 545 kg/day (SD 001) to the expanded WLA of 978 kg/day (SD 002) gives a total of 1,532 kg/day.

Lake Pepin and Mississippi River Eutrophication TMDL

- Total phosphorus WLA = 6,253 kg/yr and 17.13 kg/day (Appendix B, page 122) – applied at SD 003 (combined SD 001 + SD 002 station)

There are a number of aluminum, sulfate, PCB, Perfluorooctane Sulfonate in Fish Tissue (PFOS-F), Perfluorooctane Sulfonate in water (PFOS-W), and unionized ammonia impairments. TMDLs are not underway for these impairments at this time.

The MPCA has developed site-specific water quality criteria for application in the Mississippi River, Pool 2 of 0.05 ppt PFOS. The Minnesota Department of Health ("MDH") has also issued a fish consumption advisory for certain fish caught in Pool 2 of the Mississippi River because of the presence of PFOS in fish.

Existing permit effluent limits

See Appendix A and B for explanation of existing effluent limits and monitoring requirements.

Summary of Existing Permit Effluent Limits and Monitoring Requirements

Table 2 – SD 001

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
1,1,1-Trichloroethane	54	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,1,2-Trichloroethane	54	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,1-Dichloroethane	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,1-Dichloroethylene (Vinylidene chloride)	25	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,2,4-Trichlorobenzene	140	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,2-Dichlorobenzene	163	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,2-Dichloroethane	68	ug/L	Calendar Month Average	Jan-Dec	Grab	2 x Month
1,2-Dichloroethane	211	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
1,2-Dichloroethylene (trans-)	54	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,2-Dichloropropane	230	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,3-Dichlorobenzene	44	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,3-Dichloropropene	44	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
1,4-Dichlorobenzene	28	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2,4-Dichlorophenol	112	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2,4-Dimethylphenol	36	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2,4-Dinitrophenol	123	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2,4-Dinitrotoluene	285	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2,6-Dinitrotoluene	641	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2-Chlorophenol	98	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
2-Nitrophenol	69	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
4,6-Dinitro-o-cresol (2-Methyl-4,6-dinitrophenol)	277	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
4-Nitrophenol	124	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Acenaphthene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Acenaphthylene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Acrylonitrile	242	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Anthracene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Antimony, Total (as Sb)	Monitor Only	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Benzene	136	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
Benzo(a)anthracene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Benzo(a)pyrene	61	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Benzo(b)fluoranthene	61	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Benzo(k)fluoranthene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Bis (2-ethylhexyl) phthalate (DEHP)	279	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
BOD, Carbonaceous 05 Day (20 Deg C)	25	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	3 x Week
BOD, Carbonaceous 05 Day (20 Deg C)	40	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	3 x Week
Cadmium, Total (as Cd)	Monitor Only	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Carbon tetrachloride	38	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Chlorobenzene (Monochlorobenzene)	28	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Chloroethane	268	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Chloroform	21	ug/L	Calendar Month Average	Jan-Dec	Grab	2 x Month
Chloroform	46	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
Chromium, Total (as Cr)	2770	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Chrysene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Copper, Total (as Cu)	68	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Diethyl phthalate	203	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Dimethyl phthalate	47	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Di-n-butyl phthalate	57	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Ethylbenzene	32	ug/L	Calendar Month Average	Jan-Dec	Grab	2 x Month
Ethylbenzene	108	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
Fecal Coliform, MPN or Membrane Filter 44.5C	200	#100ml	Calendar Month Geometric Mean	Apr-Oct	Grab	1 x Week
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Estimate	1 x Day
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Estimate	1 x Day
Fluoranthene	68	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Fluorene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Hexachlorobenzene	28	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Hexachlorobutadiene	49	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
Hexachloroethane	54	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Lead, Total (as Pb)	690	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Mercury, Total (as Hg)	0.2	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
Methyl Chloride (Chloromethane)	190	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Methylene Chloride (Dichloromethane)	40	ug/L	Calendar Month Average	Jan-Dec	Grab	2 x Month
Methylene Chloride (Dichloromethane)	89	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
Naphthalene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Nickel, Total (as Ni)	480	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Nitrobenzene	68	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Nitrogen, Ammonia, Un-ionized (as N)	0.458	mg/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Day
Oil & Grease, Total Recoverable (Hexane Extraction)	10	mg/L	Daily Maximum	Jan-Dec	Grab	2 x Week
pH	9.0	SU	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day
pH	6.0	SU	Calendar Month Minimum	Jan-Dec	Measurement, Continuous	1 x Day
pH, Length Of Individual pH Excursion	60	min	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day
pH, Percent of Time Exceeding pH Limits	1	%	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day
pH, Range Excursions Total	446	min	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day
Phenanthrene	59	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Phenol	26	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Phenols, Total	1.5	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	2 x Week
Phenols, Total	3.6	kg/day	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	2 x Week
Phosphorus, Dissolved	Monitor Only	mg/L	Single Value	Jan-Dec	24-Hour Flow Composite	1 x Week
Pyrene	67	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Selenium, Total (as Se)	Monitor Only	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month
Solids, Total Suspended (TSS)	545.0	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	3 x Week
Solids, Total Suspended (TSS)	30	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	3 x Week
Solids, Total Suspended (TSS)	1100.0	kg/day	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	3 x Week
Solids, Total Suspended (TSS)	45	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	3 x Week
Temperature, Water	Monitor Only	Deg F	Calendar Month Maximum	Jan-Dec	Grab	1 x Day

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
Tetrachloroethylene (Perchloroethylene)	56	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Toluene	26	ug/L	Calendar Month Average	Jan-Dec	Grab	2 x Month
Toluene	80	ug/L	Daily Maximum	Jan-Dec	Grab	2 x Month
Trichloroethylene (TCE or Trichloroethene)	54	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Vinyl Chloride (Chloroethene)	268	ug/L	Daily Maximum	Jan-Dec	Grab	1 x Month
Zinc, Total (as Zn)	240	ug/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	2 x Week

Table 3 – SD 002

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
BOD, 05 Day (20 Deg C)	50	mg/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week
BOD, Carbonaceous 05 Day (20 Deg C)	25.0	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week
Chlorine, Total Residual	0	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Week
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Estimate	1 x Day
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Estimate	1 x Day
Oil & Grease, Total Recoverable (Hexane Extraction)	10	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Week
Phosphorus, Dissolved	Monitor Only	mg/L	Single Value	Jan-Dec	24-Hour Flow Composite	1 x Week
Solids, Total Suspended (TSS)	30.0	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week
Solids, Total Suspended (TSS)	60	mg/L	Daily Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week
Temperature, Water	83.0	Deg F	Calendar Month Maximum	Jan-Dec	Grab	1 x Week

Table 4 – SD 003

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency
Chlorine, Total Residual	0.04	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Week
Toxicity, Whole Effluent (Acute)	0.9999	TUa	Daily Maximum	Jun	24-Hour Flow Composite	1 x Month

Proposed permit effluent limits

Surface Water Discharge Stations SD 001, SD 002, and SD 003

Limits and monitoring requirements for surface water discharges are set in consideration of Minnesota state water discharge criteria, also known as State Discharge Restrictions (SDRs). SDRs are based on Minn. R. Ch. 7053, Minnesota state water quality-based effluent limits (WQBEL) for the receiving water use classification, federal technology-based effluent limits applicable to specific discharge types, or a combination of these limits to regulate the discharge of wastewater.

When limits overlap for a particular pollutant, the most protective limit is applied. In addition, the Minnesota Pollution Control Agency (MPCA) may derive limits that are specific to a particular discharge. These limits may be based on toxicity studies, professional judgment analysis, technology-based standards, and in some instances, standards developed by other U.S. states or regulatory agencies.

SD 001: Process and Sanitary Effluent

The receiving water lowest average seven-day flow with a once in ten-year recurrence interval ($7Q_{10}$) low flow at outfall SD 001 is zero cfs, thus no dilution factors were used in determining the discharge limits in relation to the immediate receiving waters.

The outfall SD 001 monitoring frequency is based on MPCA guidelines. The monitoring frequencies are set to achieve sufficient data to determine the compliance with limits established for this facility.

Technology-based Effluent Limits (TBELs)

The facility is subject to Effluent Limit Guidelines (ELGs): 40 CFR pt. 414, Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Point Source Category, Industry Subcategory, subp. I [Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment] and subp. D [Thermoplastic Resins]. Subpart D contains BOD, TSS, and pH limits. The BOD and pH (identical to State Discharge Restrictions (SDRs)) limits are applied to SD 001. The TSS limits are not applied because more stringent SDRs are applied (see SDRs section below). Subpart I contains limits for 56 organic compounds and 6 heavy metals. The OCPSF subp. I limitations are mass-based in that the limitations are determined by multiplying the process wastewater flow for specific subparts or processes by the concentrations listed in subpart I. The MPCA has applied the OCPSF parameters as limits on a concentration basis for the following reasons:

1. The 3M facility has numerous process wastewater flows coming from various processes. Some of these organic process flows are unrelated to OCPSF production processes but may at times contribute to the organic compounds listed in the OCPSF rule. It would be difficult to assess a mass loading of organic compounds derived from these process sources that would be consistently accurate.
2. The process flows subject to the OCPSF rule come from many different areas at the 3M facility and the flows may be variable. Because of this variability, determining mass discharge limits for each applicable process flow and proportioning mass according to each individual flow would be inaccurate.
3. The 3M facility often undertakes pilot projects where specific products may be developed. The contributions of organic compounds from these pilot projects are subject to frequent change and are not applicable in any case to the OCPSF rule. Determining the impact of these pilot processes upon mass loading limitations related to OCPSF pollutants that would be consistent over time would not be possible.
4. The MPCA believes that regulation of the OCPSF pollutants based on concentration versus mass loading limitations is more environmentally protective since all flow from the plant would be regulated via concentration standards, irrespective of whether a flow was OCPSF related. The OCPSF concentration limitations for the organic parameters are also lower than any applicable MN state standards.

For specific metals site specific toxicity criteria or MN state standards are applied in cases where these standards or site-specific criteria are more restrictive than OCPSF standards, and more restrictive standards are deemed necessary.

5. The GAC, RO, and AIX treatment systems will serve to remove the OCPSF organic compounds to the lowest levels possible, generally to non-detectable concentrations. Granular activated carbon represents the best available technology for removal of these organic compounds. Therefore, OCPSF organic compounds will consistently be removed to the lowest levels possible using the most advanced treatment technology available, irrespective of whether the limitations are mass based or concentration based.

The concentrations listed in subp. I are not applied to copper, nickel, Bis(2-ethylhexyl) phthalate (DEHP), and zinc because more stringent limits are assigned. Copper and nickel and new Bis (2-ethylhexyl) phthalate (DEHP) and zinc limits are addressed in the WQBELs section below.

The facility is also subject to ELGs: 40 CFR pt. 463, Plastics Molding and Forming Point Source Category, Industry Subcategory, subp. A [Contact Cooling and Heating Water] and 40 CFR pt. 428, Rubber Manufacturing Point Source Category, Industry Subcategory, subp. E [Small-Sized General Molded, Extruded, and Fabricated Rubber Plants]. However, the MPCA has not applied these ELGs in the draft permit to the individual building discharges because they were derived from the “model technology” of good housekeeping practices in the manufacturing process. Waste streams subject to these ELGs will be combined with other waste streams and go through primary, secondary, and tertiary treatment including RO, GAC, and AIX. These treatment technologies exceed the model technologies, and when combined, exceed the requirements of BPT, BCT, and BAT.

The SD 001 discharge is subject to the above-referenced ELGs and must stay within the parameter limits listed in the table below, which have been applied to this permit.

The permit was first issued in 1970 according to our records.

Table 5: TBELs – SD 001

Pollutant	**Calendar month average**	**Daily Maximum**	**Basis**
1,1,1-Trichloroethane	21 µg/L*	54 µg/L	40 CFR pt. 414, subp. I BAT
1,1,2-Trichloroethane	21 µg/L*	54 µg/L	40 CFR pt. 414, subp. I BAT
1,1-Dichloroethane	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
1,1-Dichloroethylene (Vinylidene chloride)	16 µg/L*	25 µg/L	40 CFR pt. 414, subp. I BAT
1,2,4-Trichlorobenzene	68 µg/L*	140 µg/L	40 CFR pt. 414, subp. I BAT
1,2-Dichlorobenzene (orth-)	77 µg/L*	163 µg/L	40 CFR pt. 414, subp. I BAT
1,2-Dichloroethane	68 µg/L	211 µg/L	40 CFR pt. 414, subp. I BAT
1,2-Dichloroethylene (trans-)	21 µg/L*	54 µg/L	40 CFR pt. 414, subp. I BAT
1,2-Dichloropropane	153 µg/L*	230 µg/L	40 CFR pt. 414, subp. I BAT
1,3-Dichlorobenzene	31 µg/L*	44 µg/L	40 CFR pt. 414, subp. I BAT
1,3-Dichloropropene	29 µg/L*	44 µg/L	40 CFR pt. 414, subp. I BAT
1,4-Dichlorobenzene (para-)	15 µg/L*	28 µg/L	40 CFR pt. 414, subp. I BAT

2,4-Dichlorophenol	39 µg/L*	112 µg/L	40 CFR pt. 414, subp. I BAT
2,4-Dimethylphenol	18 µg/L*	36 µg/L	40 CFR pt. 414, subp. I BAT
2,4-Dinitrophenol	71 µg/L*	123 µg/L	40 CFR pt. 414, subp. I BAT
2,4-Dinitrotoluene	113 µg/L*	285 µg/L	40 CFR pt. 414, subp. I BAT
2,6-Dinitrotoluene	255 µg/L*	641 µg/L	40 CFR pt. 414, subp. I BAT
2-Chlorophenol	31 µg/L*	98 µg/L	40 CFR pt. 414, subp. I BAT
2-Nitrophenol	41 µg/L*	69 µg/L	40 CFR pt. 414, subp. I BAT
4,6-Dinitro-o-cresol (2-Methyl-4,6-dinitrophenol)	78 µg/L*	277 µg/L	40 CFR pt. 414, subp. I BAT
4-Nitrophenol	72 µg/L*	124 µg/L	40 CFR pt. 414, subp. I BAT
Acenaphthene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Acenaphthylene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Acrylonitrile	96 µg/L*	242 µg/L	40 CFR pt. 414, subp. I BAT
Anthracene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Benzene	37 µg/L*	136 µg/L	40 CFR pt. 414, subp. I BAT
Benzo(a)anthracene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Benzo(b)fluoranthene (3, 4-Benzofluoranthene)	23 µg/L*	61 µg/L	40 CFR pt. 414, subp. I BAT
Benzo(k)fluoranthene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Benzo[a]pyrene	23 µg/L*	61 µg/L	40 CFR pt. 414, subp. I BAT
BOD	24 mg/L	64 mg/L	40 CFR pt. 414, subp. D BPT
Carbon tetrachloride	18 µg/L*	38 µg/L	40 CFR pt. 414, subp. I BAT
Chlorobenzene (Monochlorobenzene)	15 µg/L*	28 µg/L	40 CFR pt. 414, subp. I BAT
Chloroethane	104 µg/L*	268 µg/L	40 CFR pt. 414, subp. I BAT
Chloroform	21 µg/L	46 µg/L	40 CFR pt. 414, subp. I BAT
Chloromethane (Methyl Chloride)	86 µg/L*	190 µg/L	40 CFR pt. 414, subp. I BAT
Chromium, Total (as Cr)	1,110 µg/L*	2,770 µg/L	40 CFR pt. 414, subp. I BAT
Chrysene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Cyanide, Total (as CN)	420 µg/L*	1,200 µg/L*	40 CFR pt. 414, subp. I BAT
Dibutyl phthalate (Di-n-butyl phthalate)	27 µg/L*	57 µg/L	40 CFR pt. 414, subp. I BAT
Dichloromethane (Methylene chloride)	40 µg/L	89 µg/L	40 CFR pt. 414, subp. I BAT
Diethyl phthalate	81 µg/L*	203 µg/L	40 CFR pt. 414, subp. I BAT
Dimethyl phthalate	19 µg/L*	47 µg/L	40 CFR pt. 414, subp. I BAT
Ethylbenzene	32 µg/L	108 µg/L	40 CFR pt. 414, subp. I BAT
Fluoranthene	25 µg/L*	68 µg/L	40 CFR pt. 414, subp. I BAT
Fluorene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Hexachlorobenzene	15 µg/L*	28 µg/L	40 CFR pt. 414, subp. I BAT

Hexachlorobutadiene	20 µg/L*	49 µg/L	40 CFR pt. 414, subp. I BAT
Hexachloroethane	21 µg/L*	54 µg/L	40 CFR pt. 414, subp. I BAT
Lead, Total (as Pb)	320 µg/L*	690 µg/L	40 CFR pt. 414, subp. I BAT
Naphthalene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
Nitrobenzene	27 µg/L*	68 µg/L	40 CFR pt. 414, subp. I BAT
Phenanthrene	22 µg/L*	59 µg/L	40 CFR pt. 414, subp. I BAT
pH	Within the range of 6.0 – 9.0 SU at all times		40 CFR pt. 414, subp. D BPT
Phenol	15 µg/L*	26 µg/L	40 CFR pt. 414, subp. I BAT
Pyrene	25 µg/L*	67 µg/L	40 CFR pt. 414, subp. I BAT
Tetrachloroethylene (Perchloroethylene)	22 µg/L*	56 µg/L	40 CFR pt. 414, subp. I BAT
Toluene	26 µg/L	80 µg/L	40 CFR pt. 414, subp. I BAT
Trichloroethylene (TCE)	21 µg/L*	54 µg/L	40 CFR pt. 414, subp. I BAT
Vinyl chloride (chloroethene)	104 µg/L*	268 µg/L	40 CFR pt. 414, subp. I BAT

*New limits in this permit reissuance based on updates to 40 CFR pt. 414, subp. I since the last permit was reissued.

Water Quality-based Effluent Limits (WQBELs)

Minn. R. 7053.0205, subp. 8 requires the MPCA to develop WQBELs for point source discharges to waters of the state of Minnesota to protect receiving waters for the applicable use classifications.

Minn. R. 7050.0155 requires that all waters must maintain a level of water quality that provides for the attainment and maintenance of the water quality standards of downstream waters, including the waters of another state.

The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm aquatic biota, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water (Minn. R. 7050.0222, subp. 4).

The beneficial use subclass designator "g" is added to the Class 2 designator as a specific additional designator. The additional subclass designator does not replace the Class 2 designator. All requirements for Class 2 stream and river habitats in parts 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Bg stream and river habitats in Minn. R. 7050.0222. This subclass designator applies to lotic waters only.

The unnamed creek in listed in the 2024 Inventory of Impaired Waters as being impaired for aquatic life with the pollutant stressor being ammonia, un-ionized.

The total suspended solids (TSS) daily mass limit included in the South Metro Mississippi River TSS Total Maximum Daily Load (TMDL) is considered a WQBEL for SD 001.

Copper and nickel limits assigned in the previous permit (see Appendix A and B) are being carried over in this permit reissuance (MN.R.7053.0275). Previously, the OCPSF limitations, using concentrations listed in the rule, were compared with MN Rule 7050 standards, as described in

MN 7050.0222 Specific Standards of Quality and Purity for Class 2 Waters of the State; Aquatic Life and Recreation, subpart 3, Class 2Bd Waters to determine if state standards were more restrictive standards. LC50 values are the lethal concentrations of a toxicant or toxicants which kill 50 percent of the exposed organisms in a specific time of observation. The LC50 concentration of a toxicant is an acutely toxic parameter that may be used as a maximum allowable discharge concentration. The copper discharge limitation applied is the MN water quality standard, final acute value, of 68 ug/l. The daily maximum nickel discharge limitation applied is 480 ug/l, based on the Ontario, Canada standard for Daphnia magna, one of the required 3M bioassay test species.

The phenols, total limits (1.5 kg/day as a calendar month average and 3.6 kg/day as a calendar month maximum) in the current permit are also being carried over in this reissuance (MN.R.7053.0275). Total phenols in this instance refers to phenols analyzed by the 4-aminoantipyrine colormetric Standard Method that determines phenol, ortho, meta substituted phenols, and, under proper pH conditions, para substituted phenols. The limits being carried over were derived on the basis of the WWTP performance using a long-term average adjusted for monthly sample size for a monthly average limitation. The daily maximum limit was based on the 95th percentile level of 127 past monitoring data points.

Table 6: WQBELs – SD 001

Pollutant	Calendar month average	Daily maximum	Basis
Antimony, Total (as Sb)	20 µg/L	53.5 µg/L	Minn. R. ch. 7050.0222
Cadmium, Total (as Cd)	0.0025 mg/L	0.0043 mg/L	Minn. R. ch. 7050.0222
Copper, Total (as Cu)		68 µg/L	Minn. R. ch. 7053.0275
Bis(2-ethylhexyl) phthalate (DEHP)	3 µg/L	5.10 µg/L	Minn. R. ch. 7050.0222
Mercury, Total (as Hg)	9.7 ng/L	16.8 ng/L	Minn. R. ch. 7050
Nickel, Total (as Ni)		480 µg/L	Minn. R. ch. 7053.0275
Nitrogen, Ammonia, Total (as N)	1.0 mg/L[1] 1.1 mg/L[2] 24.6 kg/day[1] 27.0 kg/day[2]		Minn. R. ch. 7050.0220 & 0222
Nitrogen, Ammonia, Un-ionized (as N)		0.458 mg/L	Minn. R. ch. 7053.0205 & 0215
Oil and Grease, Total Recoverable		10 mg/L	Minn. R. ch. 7050.0222
Perfluorobutanoic acid (PFBA)	35,068 ng/L 861,266 g/day	60,752 ng/L	Minn. R. ch. 7050.0218
Perfluorobutanesulfonic acid (PFBS)	4,208 ng/L 103,394 g/day	7,290 ng/L	Minn. R. ch. 7050.0218

Perfluorohexanoic acid (PFHxA)	6,172 ng/L 151,645 g/day	10,692 ng/L	Minn. R. ch. 7050.0218
Perfluorohexanesulfonic acid (PFHxS / PFH1S / PFHS)	0.0032*ng/L 0.079 g/day	0.0056* ng/L	Minn. R. ch. 7050.0218
Perfluorooctanoic acid (PFOA)	0.013* ng/L 0.32 g/day	0.022*ng/L	Minn. R. ch. 7050.0218
Perfluorooctanesulfonic acid (PFOS)	0.038* ng/L 0.93 g/day	0.066* ng/L	Minn. R. ch. 7050.0218
Phenols, Total	1.5 kg/day	3.6 kg/day	Minn. R. ch. 7053.0275
Selenium, Total (as Se)	4.7 µg/L	8.2 µg/L	Minn. R. ch. 7050.0222
Solids, Total Suspended (TSS)	545 kg/day		Minn. R. ch. 7053.0225
Zinc, Total (as Zn)	167 µg/L	288 µg/L	Minn. R. ch. 7050.0222

[1]Limit applies April-November
[2]Limit applies December-March

*Since the PFOS, PFOA and PFHxS daily max and monthly average limits are below typical reporting limits, the MPCA is proposing the compliance limits below. Since the PFOS, PFOA and PFHxS daily max and monthly average limits are below typical reporting limits, the MPCA is proposing language to address reporting values below the reporting limit and this language can be found in the toxics memo.

PFHxS	**PFOA**	**PFOS**
2.1 ng/L as a daily max and monthly average	2.1 ng/L as a daily max and monthly average	2.2 ng/L as a daily max and monthly average

On March 26th, 2024, the facility requested a compliance schedule for the parameters in the table below. The following interim limits are recommended to be included during the duration of the compliance schedule.

Table 7. Recommended interim limits for SD001 to be applicable during the duration of the compliance schedule.

Compound	Value	Interim Limit Type	Unit	Method
PFBA	288,125	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month

PFBS	20,782	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month
PFHxA	1,720	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month
PFHxS	1,615	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month
PFOA	1,798	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month
PFOS	14	Monthly Max	ng/L	Jan 21, 2021 non-public enforcement action
PFOS	7	Monthly Average	ng/L	Jan 21, 2021 non-public enforcement action
Antimony	1,044	Monthly Max	ug/L	99th percentile value of reported data assuming 2 samples per month
DEHP	73.1	Monthly Max	ug/L	99th percentile value of reported data assuming 2 samples per month
Mercury	11.8	Monthly Max	ng/L	99th percentile value of reported data assuming 2 samples per month
Selenium	29.6	Monthly Max	ug/L	99th percentile value of reported data assuming 2 samples per month
Cadmium	11.8	Monthly Max	ug/L	99th percentile value of reported data assuming 2 samples per month

Background for Reasonable Potential Review

Reasonable Potential for Chemical Specific Pollutants (40 CFR pt. 122.44 (d)(1))

Federal regulations (40 CFR §122.44(d)(1)) require the MPCA to evaluate the discharge to determine whether the discharge has the reasonable potential (RP) to cause or contribute to a violation of WQS. The MPCA must use acceptable technical procedures, accounting for variability (coefficient of variation, or CV), when determining whether the effluent causes, has the reasonable potential to cause, or contribute to an excursion of an applicable WQS. Projected effluent quality (PEQ) derived from effluent monitoring data is compared to Preliminary Effluent Limits (PELs) determined from mass balance inputs. Both determinations account for effluent variability. Where PEQ exceeds the PEL, there is RP to cause or contribute to a WQS excursion. When RP is indicated, the permit must contain a WQBEL for that pollutant.

Per- and Polyfluorinated (PFAS) Substances

The following PFAS effluent limits are included in the draft permit. Mass limits were calculated based on the monthly average limit and the max design flow. PFBA, PFBS, PFHxA, PFHxS, PFOA and PFOS abbreviate perfluorbutanoic acid, perfluorobutnesulfonoic acid, perfluorhexanoic acid, perfluorohexanesulfonic acid, perfluorooctanoic acid, and perfluorooctanesulfonic acid, respectively.

Table 8: PFAS effluent limits

Limit Type	**Units**	**PFBA**	**PFBS**	**PFHxA**	**PFHxS**	**PFOA**	**PFOS**	**Hazard Index**
Daily Max	ng/L	60,752	7,290	10,692	0.0056	0.022	0.066	Monitor Only
Monthly Average	ng/L	35,068	4,208	6,172	0.0032	0.013	0.038	Monitor Only
Monthly Average	g/day	861,622	103,394	151,645	0.079	0.32	0.93	Monitor Only
Compliance Limit for a WQBEL that is below the detection limit		Not Applicable	Not Applicable	Not Applicable	2.1 ng/L as a daily max and monthly average	2.1 ng/L as a daily max and monthly average	2.2 ng/L as a daily max and monthly average	Not Applicable

PFAS Site-Specific Criteria

No Per- and Polyfluorinated Substance (PFAS) compound has a statewide water quality standard listed in rule and Minnesota has no PFAS site-specific standard for any water. Since PFAS are discharged by 3M Cottage Grove to waters of the state and PFAS have the potential to cause toxic effects, the MPCA derived site-specific criteria for six PFAS compounds (Table 7) using the procedures outlined in Minn. R. 7050.0217, Minn. R. 7050.0218 and Minn. R. 7050.0219. These PFAS site-specific criteria were derived to be specific to the point source being addressed and to protect water quality in Pool 2 of the Mississippi River for human health. The Permittee must be given notice of any specific effluent limitation derived from these criteria and given opportunity to request a hearing as provided in Minn. R. 7000.1800.

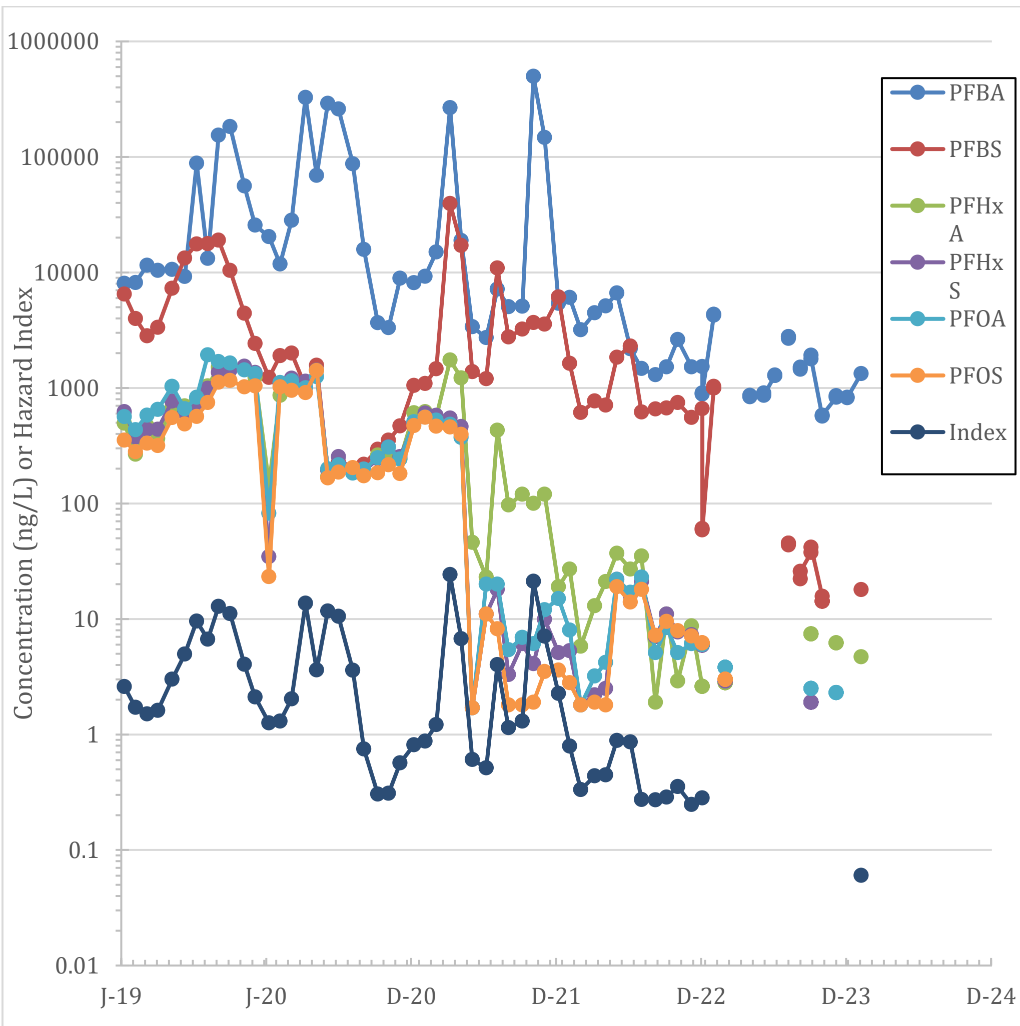
Table 9. Summary of PFAS site-specific criteria.

PFAS **(CAS No. see Table 2-1)**	**Site-specific water quality criteria: Chronic Criteria (CC)**		***Health Risk Index Endpoints*** **(Additive Risk)**
	Class 2B – fish consumption and recreational exposure (CC_{FR}) (30-day average)	**Class 2 fish-tissue** (CC_{FT}) (90th percentile of 5 fish minimum per water body)	
PFOS	0.027 ng/L	0.021 ng/g	Developmental, Liver System, Immune System, Cancer (MDH 2024b)
PFOA	0.0092 ng/L	0.00036 ng/g	Developmental, Liver System, Immune System, Cancer (MDH 2024a)
PFHxS	0.0023 ng/L	0.000043 ng/g	Liver System, Thyroid (endocrine) (MDH 2023b)
PFHxA	4,400 ng/L	Not applicable	Developmental, Thyroid (endocrine) (MDH 2023c)
PFBS	3,000 ng/L	Not applicable	Thyroid (endocrine) (MDH 2023a)
PFBA	25,000 ng/L	Not applicable	Liver System, Thyroid (endocrine) (MDH 2018)
Mixtures containing two or more of PFBA + PFBS + PFHxA	≤ 1 (unitless) Health Risk Index	Not applicable	Thyroid (endocrine)
Definitions of CC: CC_{FR}: Applied in Class 2B surface waters (F: Fish consumption and R: Recreational exposure) CC_{FT}: Applied for Bioaccumulative Chemicals of Concern (BCC) in fish (fillet/muscle) for all Class 2 waters (FT: fish-tissue)			

The proposed PFAS site-specific criteria are applicable to the Mississippi River between river miles 812-820 and do not apply to the immediate receiving water of Unnamed Creek. The site-specific criteria have a 30-day duration and a once in three-year allowable frequency of exceedance. Effluent limitations for PFAS were set to protect water quality in Pool 2 of the Mississippi River. MPCA's reasonable potential analysis was performed only for the six PFAS compounds with developed site-specific criteria (see section below).

3M SD 001 PFAS Monitoring Data
A summary of 3Ms reported PFAS data for station SD001 from 2019 to February 2024 can be seen in Figure 11 below.

Figure 11. Reported SD001 PFAS concentration in ng/L. Note the log scale. Non-detect values are not plotted on this figure.



PFAS Surface Water Monitoring
There is sufficient data to characterize PFAS levels in the receiving waters for surface water, fish tissue and macro invertebrates. A summary of PFAS surface water monitoring found in the

2023 report titled 'Instream PFAS Characterization Study Interim Report Mississippi River Cottage Grove, Minnesota' can be seen in the Figures 12 and 13 and Table 10. The samples in the report represented the most recent PFAS monitoring and were collected in July and August of 2021.

There is evidence that the 3M discharges are causing PFAS levels to increase in the unnamed creek downstream of the discharges (Table 10). It is not possible to say exactly how much of that PFAS increase is attributable to SD 001 versus SD 002 because the two discharges have not been sampled on the days of the surface water sampling and the flow in the unnamed creek on those days was not measured. Not every PFAS compound increased downstream of 3M on the unnamed creek by the same amount, but this can be explained by the high variability of PFAS concentrations in 3M discharges (Figure 11). If the unnamed creek had been sampled at a different moment when 3M was discharging a different mixture of PFAS, then different, but still elevated, concentrations of individual PFAS in the unnamed creek would likely have been measured.

There is also evidence that the elevated levels of PFAS in the unnamed creek (attributable to the 3M discharges) have the reasonable potential to cause an exceedance of a PFAS site-specific criteria in Pool 2 of the Mississippi River, especially since the 3M discharges have PFAS levels well above the site-specific criteria in Pool 2 of the Mississippi River (Figure 11 and Table 10). For example, PFBS concentrations in the unnamed creek are several-fold higher than the Pool 2 PFBS site-specific criterion and a PFBS value above the site-specific criterion was measured at the confluence of the unnamed creek with the Mississippi River. This analysis of discharge and surface water monitoring data is a supplementary line of evidence in MPCA's reasonable potential analysis for PFAS compounds. The analysis justifies the assumptions that PFAS have a conservative fate and transport between the discharges and Pool 2 of the Mississippi River and that the 3M discharge is not completely and instantaneously mixed into Pool 2 of the Mississippi River.

It is possible that PFAS contaminated groundwater in the East Cove is contributing PFAS into the unnamed creek despite the nearby groundwater pump-system, local topography, soils, and depth to groundwater. More data explaining the flow of groundwater in the East Cove is available upon request in the report titled '2021 Annual Perfluorochemical (PFCs) Groundwater Report for the 3M Cottage Grove Site'.

Figure 12. Map of surface water PFAS sampling locations. Red dots are locations in the unnamed creek and blue dots are in the Mississippi River. Crosses represent transect sample locations.

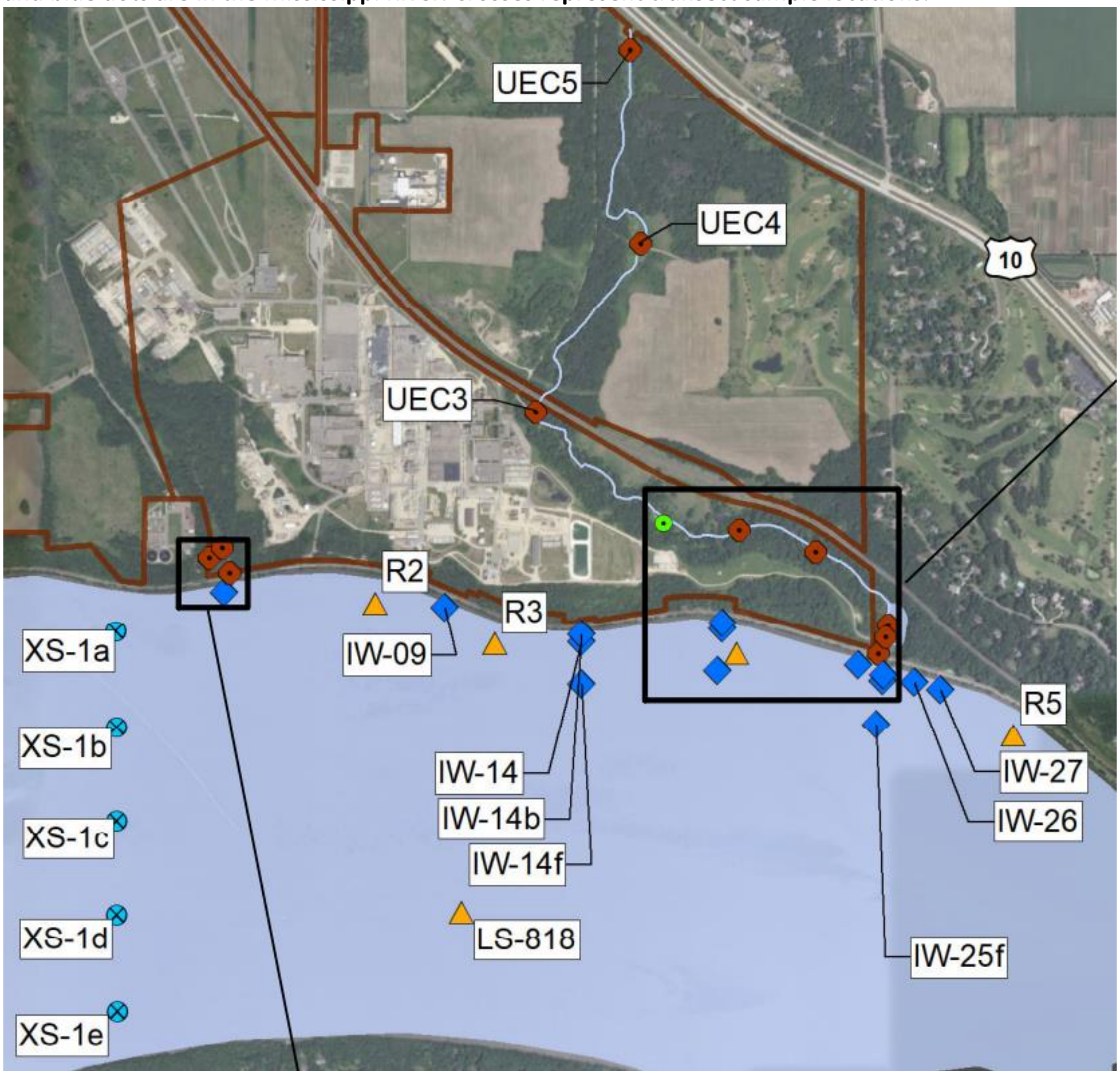


Figure 13. Close up of sample locations on the unnamed creek and the East Cove of the Mississippi River. Red dots are locations in the unnamed creek and blue dots are in the Mississippi River.

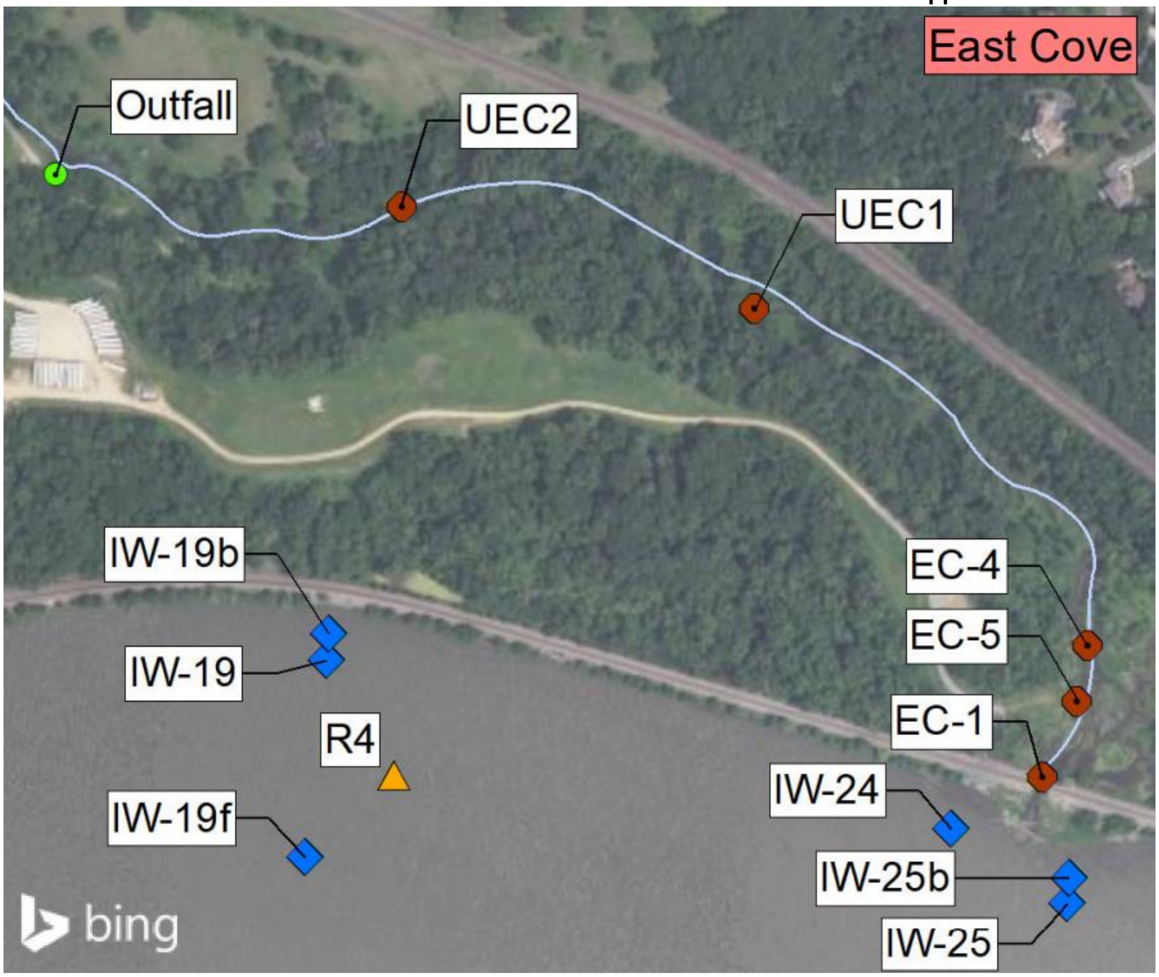


Table 10. PFAS surface water monitoring data. Units are ng/L. Values above the criteria in the Mississippi (Miss.) River are in bold. Italics indicate that the values are from the 3M discharge.

			PFBS	PFBA	PFOS	PFOA	PFHxS	PFHxA
Site-Specific Criteria (ng/L)			350	10,000	0.05	88	36	950
Location	**Waterbody**	**Description**						
UEC5	Unnamed Creek	Upstream of discharge	16	1,800	3.9	63	10	60
UEC4	Unnamed Creek	Upstream of discharge	16	1,800	4.2	110	10	61
UEC3	Unnamed Creek	Upstream of discharge	17	1,900	4.6	110	11	65
Discharge	SD001	Projected Effluent Quality (max value)	*39,400*	*498,000*	*1,410*	*1,930*	*1,740*	*1,540*
Discharge	SD002	Projected Effluent Quality (max value)	7,720	20,600	6,300	11,100	9,380	6,200
UEC2	Unnamed Creek	Downstream of discharge	2,900	6,000	3.2	63	37	250
UEC1	Unnamed Creek	Downstream of discharge	2,500	5,400	45	76	39	210
EC-5	Unnamed Creek	Downstream of discharge	5,700	6,900	36	68	47	380
EC-4	Unnamed Creek	Downstream of discharge	5,500	7,000	28	74	42	380
EC-1	Unnamed Creek	Downstream of discharge	4,300	6,400	45	70	44	360
IW-24	Miss. River	Upstream of Unnamed Creek	17	190	**28**	54	7.2	15
IW-19b	Miss. River	Upstream of Unnamed Creek	20	130	**96**	**200**	12	28
IW-19	Miss. River	Upstream of Unnamed Creek	10	75	**39**	70	7.2	14
IW-19f	Miss. River	Upstream of Unnamed Creek	11	68	**47**	52	6	13
IW-25b	Miss. River	At confluence of Unnamed Creek	**560**	560	**21**	34	5.9	42
IW-25	Miss. River	At confluence of Unnamed Creek	240	1,200	**16**	29	7.2	24
IW-26	Miss. River	Immediately downstream of Unnamed Creek	180	470	**82**	**130**	14	30
IW-27	Miss. River	Immediately downstream of Unnamed Creek	110	42	**72**	**130**	12	130
XS-1a	Miss. River	Transect upstream of 3M Cottage Grove	3.3	39	**49**	11	10	7.1
XS-1b	Miss. River	Transect upstream of 3M Cottage Grove	3.5	42	**91**	11	11	8
XS-1c	Miss. River	Transect upstream of 3M Cottage Grove	2.9	31	**7.1**	11	3.3	6.4
XS-1d	Miss. River	Transect upstream of 3M Cottage Grove	4.1	130	**14**	14	5.3	9.2
XS-1e	Miss. River	Transect upstream of 3M Cottage Grove	4	97	**7.5**	11	3.5	8.1

Fish Tissue Monitoring
PFAS are accumulating in fish tissue in the Mississippi River (Figure 14) and mean fish tissue are above the fish tissue criteria for the three PFAS with applicable fish tissue criteria (Table 11). This is strong line of evidence that no receiving water dilution should be allowed for PFOA, PFOS and PFHxS in the Mississippi River.

Table 11. Comparison of the fish tissue site-specific criteria to the in-stream measured mean fish tissue concentrations. The mean fish tissue concentrations were calculated using non-detection methodologies detailed in the PFAS site-specific criteria document.

	Fish Tissue Site-Specific Criteria (ng/g)	Mean Fish Tissue Concentration in SSC area (ng/g)
PFOS	0.021	17.9
PFOA	0.00036	0.454
PFHxS	0.000043	0.192
PFHxA	Not Calculated	0.147
PFBA	Not Calculated	0.31
PFBS	Not Calculated	0.175

The MPCA will allow no receiving water dilution for PFHxA, PFBA and PFBS when calculating limits, for the following reasons:

- The measured fish tissue concentrations of PFHxA, PFBA and PFBS are similar to the three PFAS with fish tissue site-specific criteria (Table 4). This means that all six PFAS are accumulating in fish tissue at similar, but still elevated concentrations.
- While there are no PFAS criteria for benthic macroinvertebrates, every single benthic macroinvertebrate in Pool 2 had a detectable level of PFOS, PFOA and many other PFAS were also present in benthic macroinvertebrates (Figure 15). This is another line of evidence that PFAS is generally accumulating in aquatic life in Pool 2 of the Mississippi River and that there is no assimilative capacity or dilution for PFAS in Pool 2 of the Mississippi River.
- Treating PFHxA, PFBA and PFBS similarly with respect to dilution increases consistency when considering limits to protect the hazard index site-specific criteria.

Figure 14. Box and whisker plots for natural log transformed raw PFAS data (ng/g) by taxa.

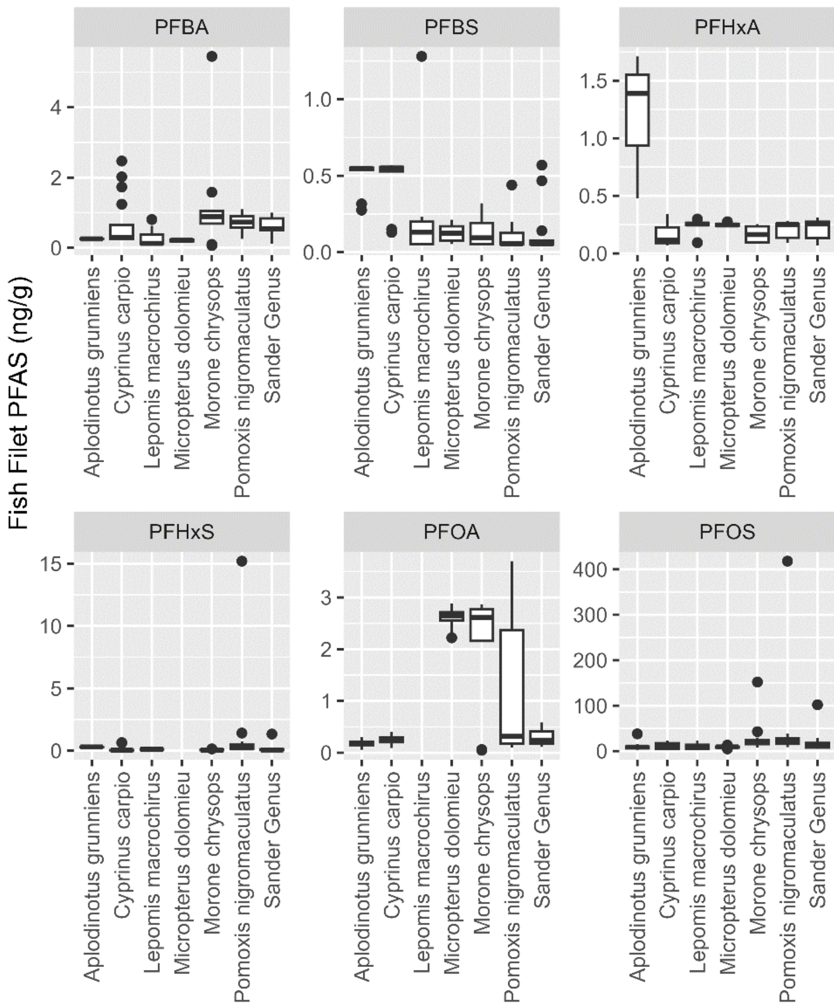
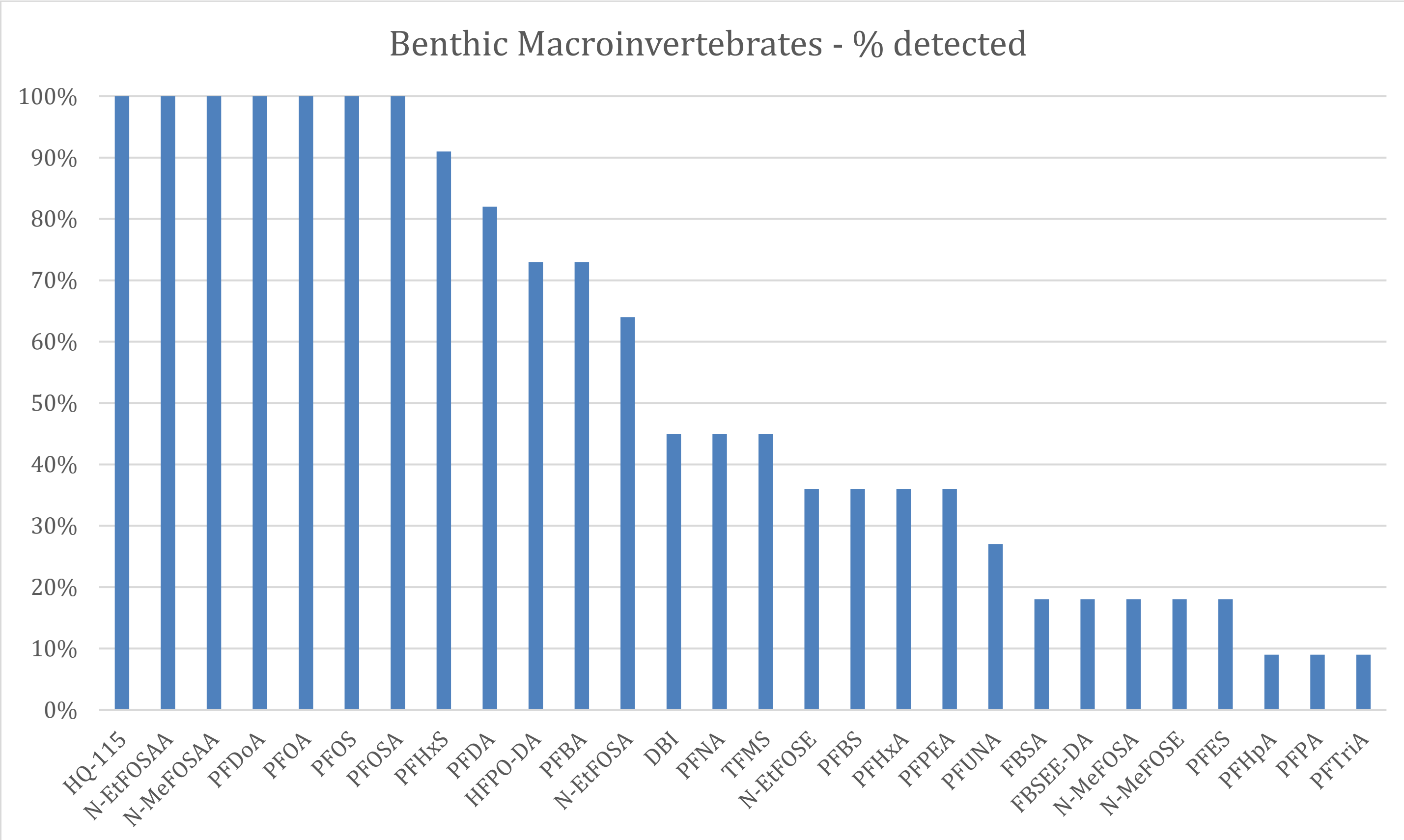


Figure 15. Benthic macroinvertebrates detection rates for selected PFAS compounds.



PFBS Reasonable Potential Analysis

Using the methodologies in the 1991 TSD, the 3M discharge has RP to cause an exceedance of the PFBS site-specific criterion in the Mississippi River. The 3M PFBS effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (75,800 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 3,000 ng/L PFBS site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFBA Reasonable Potential Analysis

Using the methodologies in the 1991 TSD, the 3M discharger has RP to cause an exceedance of the PFBA site-specific criterion in the Mississippi River. The 3M PFBA effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (498,000 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 25,000 ng/L PFBA site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFHxA Reasonable Potential Analysis

Using the methodologies in the 1991 TSD, the 3M discharger has RP to cause an exceedance of the PFHxA site-specific criterion in the Mississippi River. The 3M PFHxA effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (1,740 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 4,400 ng/L PFHxA site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFHxS Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharger has RP to cause an exceedance of the PFHxS site-specific criterion in the Mississippi River. The 3M PFHxS effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (1,540 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.0023 ng/L PFHxS site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFOA Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharge also has RP to cause an exceedance of the PFOA site-specific criterion in the Mississippi River. The 3M PFOA effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (1,930 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.0092 ng/L PFOA site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under zero a $7Q_{10}$ low flow condition.

PFOS Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharge also has RP to cause an exceedance of the PFOS site-specific criterion in the Mississippi River. The 3M PFOS effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (1,410 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.027 ng/L PFOS site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a $7Q_{10}$ low flow condition.

PFAS Hazard Index Reasonable Potential Analysis
The 3M discharge does not have the reasonable potential to cause an exceedance of the PFAS site-specific criterion hazard index of 1.0 in the Mississippi River and no effluent limit for the hazard index is recommended. There is no additional monitoring needed because PFBA, PFBS and PFHxA are already required to be monitored.

Individual effluent limitations for PFBA, PFBS and PFHxA are being included and compliance with those limits, will bound the concentrations of PFBA, PFBS and PFHxA that can be discharged. These three individual limits significantly reduce the likelihood that the cumulative hazard index for these three compounds will be exceeded.

From an engineering perspective, the low-level limits for PFOS, PFOA and PFHxS will also force PFBA, PFBS and PFHxA to be treated to low levels. In order to comply with the PFOS, PFOA and PFHxS limits, a greater than 99.8% removal of those compounds is required. The reverse osmosis and media sorption treatment processes that remove PFOS, PFOA and PFHxS at a greater than 99.8% removal rate will also remove PFBA, PFBS and PFHxA at removal rate greater than 99% (Source: 2021 3M treatability study). A greater than 99% removal rate for PFBA, PFBS and PFHxA will lower PFBA, PFBS and PFHxA concentrations to low enough levels that it is unlikely that the 1.0 hazard unit will be exceeded in the receiving waters.

PFAS Monitoring
The PFOS, PFOA and PFHxS limits are below the conventional (<2-4 ng/L) reporting limit for currently available analytical technology such as EPA method 1633. These limits are so low that a separate compliance limit must be established for the purposes of reporting limit compliance to the MPCA.

PFAS compound and total organic fluorine (TOF) and Adsorbable Organic Fluorine (AOF) monitoring frequency is based on the estimated change-out rate of granular GAC and the concern about sampling only happening after the GAC is changed. This monitoring frequency will monitor changes in PFAS and TOF and AOF levels and relate that back to GAC change-outs.

List 1. PFAS compound monitoring parameters.

PFAS Compound	CAS #
1. (Perfluorobutyl) sulfonamido acetic acid (FBSAA)	347872-22-4
2. 1,1,2,2-Tetrafluoro-2-[(1,1,1,2,3,3,4,4-octafluorobutan-2-yl)oxy]ethane-1-sulfonic acid (R-PSDCA / Byproduct 6)	2416366-21-5
3. 10:2 Fluorotelomer sulfonic acid (10:2 FTSA)	120226-60-0
4. 11-Chloroperfluoro-3-oxaundecanesulfonic acid (11Cl-PF3OUdS / F-53B Minor)	763051-92-9
5. 2,2'-(((Nonafluorobutyl)sulfonyl)imino)diacetic acid (FBSEE-DA)	1268835-43-3
6. 2,2,3,3-Tetrafluoro-3-methoxypropanoic acid (MTP)	93449-21-9
7. 2,2,3,3-Tetrafluoro-3-[1,1,1,2,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxypropanoic acid (Hydro-EVE Acid)	773804-62-9
8. 2,3,3,3-Tetrafluoro-2-(trifluoromethyl)propanamide (PIBA)	662-20-4
9. 2,3,3,3-Tetrafluoropropanoic acid (2333-TFPA)	359-49-9
10. 2-(N-(Perfluorobutylsulfonyl)-N-methylamino)ethanol (MeFBSE)	34454-97-2
11. 2-(N-Ethylperfluorooctanesulfonamido)acetic acid (N-EtFOSAA / NEtFOSAA / EtFOSAA)	2991-50-6
12. 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (NMeFOSE)	24448-09-7
13. 2-(N-Methylperfluorooctanesulfonamido)acetic acid (N-MeFOSAA / NMeFOSAA / MeFOSAA)	2355-31-9
14. 2-(Perfluorodecyl)ethanoic acid (10:2 FTCA / FDEA)	53826-13-4
15. 2-(Perfluorodecyl)ethanol (10:2 FTOH)	865-86-1
16. 2-(Perfluorohexyl)ethanoic acid (6:2 FTCA / FHEA)	53826-12-3
17. 2-(Perfluorohexyl)ethanol (6:2 FTOH)	647-42-7
18. 2-(Perfluorooctyl)ethanoic acid (8:2 FTCA)	27854-31-5
19. 2-(Perfluorooctyl)ethanol (8:2 FTOH)	678-39-7
20. 2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)	914637-49-3
21. 2H-Perfluoro-2-decenoic acid (8:2 FTUCA)	70887-84-2
22. 2H-Perfluoro-2-dodecenoate (10:2 FTUCA)	70887-94-4
23. 2H-Perfluoro-2-octenoic acid (6:2) (6:2 FTUCA)	70887-88-6
24. 3-((3-((2-Carboxyethyl)((tridecafluorohexyl)sulfonyl)amino)propyl) (dimethyl)azaniumyl) propanoate (PHSA-DC)	756771-34-3

25. 3-((3-((2-Hydroxyethyl)(dimethyl)azaniumyl)propyl)((perfluorobutyl)sulfonyl)amino)propane-1-sulfonate (PBSA-S1)	2089108-94-9
26. 3-((3-((N-(2-Carboxyethyl)-perfluorobutyl)sulfonamido)propyl)-dimethylammonio)propanoate (PBSA-DC)	2254560-13-7
27. 3-(Dimethyl(3-(((tridecafluorohexyl)sulfonyl)amino)propyl)azaniumyl)-2-hydroxypropane-1-sulfonate (PHSA-OH1)	73772-32-4
28. 3-(Dimethyl(3-(((tridecafluorohexyl)sulfonyl)amino)propyl)azaniumyl)propanoate (PHSA-C2)	81190-41-2
29. 3-(Perfluoroheptyl)propanoic acid (7:3 FTCA)	812-70-4
30. 3-(3-[(2-Hydroxyethyl)(dimethyl)azaniumyl]propyl[(perfluorohexyl)sulfonyl]amino)-1-propanesulfonate (PHSA-S1)	38850-58-7
31. 3-[[3-(Dimethylamino)propyl][(1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexyl)sulfonyl]amino]-1-propanesulfonic acid (PHSA-S3)	38850-60-1
32. 3:3 Fluorotelomer carboxylic acid (3:3 FTCA)	356-02-5
33. 4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4
34. 4-(2-Carboxy-1,1,2,2-tetrafluoroethoxy)-perfluoropentanoic acid (R-EVE)	2416366-22-6
35. 4:2 Fluorotelomer alcohol (4:2 FTOH)	2043-47-2
36. 4H-Perfluorobutanoic acid (4H-PFBA)	679-12-9
37. 5-(1,2,2,2-Tetrafluoro)ethoxy-perfluoro-3-oxa-4-methylpentanesulfonic acid (Hydro-PS Acid / PFESA BP 2)	749836-20-2
38. 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2
39. 7:2 sFluorotelomer alcohol (7:2 FTOH)	24015-83-6
40. Benzyltriphenylphosphonium (TPBP)	15853-35-7
41. Bisphenol AF (BPAF)	1478-61-1
42. Fluorine, Adsorbable Organic (AOF)	-
43. Fluorine, Total Organic (TOF)	-
44. Fluoro[perfluoro-2-(perfluoro-2-sulfoethoxy)propoxy]acetic acid (Hydrolyzed PSDA / 49 Byproduct 5)	2416366-19-1
45. Lithium bis[(trifluoromethyl)sulfonyl]azanide (HQ-115 / TFSI-LI)	90076-65-6
46. Methane, bis[(trifluoromethyl)sulfonyl]- (MEDSULF)	428-76-2
47. N,N-Bis(2-hydroxyethyl)perfluorobutanesulfonamide (FBSEE / FBSEE Diol)	34455-00-0
48. N-(2-Hydroxyethyl)-N,N-dimethyl-3-(((tridecafluorohexyl)sulfonyl)amino)propan-1-aminium (PHSA-E1)	736877-37-5
49. N-(3-(Dimethylamino)propyl) perfluorohexane sulfonamide (PHSA)	50598-28-2
50. N-(Methyl)nonafluorobutanesulfonamide (MeFBSA)	68298-12-4
51. N-(Perfluorobutanesulfonyl)-N-(3-dimethylaminopropyl)-3-aminopropanoic acid (PBSA-C1)	172616-04-5

52. N-(Perfluorohexanesulfonyl)-N-(3-dimethylaminopropyl)-3-aminopropanoic acid (PHSA-C1)	141607-32-1
53. N-Ethyl-N-(2-hydroxyethyl)perfluorooctane sulfonamide (N-EtFOSE)	1691-99-2
54. N-Ethylperfluorooctanesulfonamide (EtFOSA / N-EtFOSA)	4151-50-2
55. N-Methyl-N-[(perfluorobutyl)sulfonyl]glycine (MeFBSAA)	159381-10-9
56. N-methylperfluoro-1-octanesulfonamide (MeFOSA / NMeFOSA)	31506-32-8
57. Perfluoro(2-((6-chlorohexyl)oxy)ethanesulfonic acid) (9Cl-PF3ONS / F53B Major)	756426-58-1
58. Perfluoro(4-methoxybutanoic acid) (PFECA-A / PFMBA)	863090-89-5
59. Perfluoro-2-(perfluoromethoxy)propanoic acid (PMPA / PFECA F)	13140-29-9
60. Perfluoro-2-ethoxyethanesulfonic acid (PFEESA)	113507-82-7
61. Perfluoro-2-ethoxypropanoic acid (PEPA)	267239-61-2
62. Perfluoro-2-methoxyaceticacid (PFMOAA)	674-13-5
63. Perfluoro-2-methyl-3-oxahexanoic acid (HFPO-DA)	13252-13-6
64. Perfluoro-3,5,7,9,11-pentaoxadodecanoic acid (PFO5DA)	39492-91-6
65. Perfluoro-3,5,7,9-butaoxadecanoic acid (PFO4DA)	39492-90-5
66. Perfluoro-3,5,7-trioxaoctanoic acid (PFO3OA)	39492-89-2
67. Perfluoro-3,5-dioxahexanoic acid (PFO2HxA)	39492-88-1
68. Perfluoro-3,6-dioxa-4-methyl-7-octene-1-sulfonic acid (PS Acid / PFESA BP 1)	29311-67-9
69. Perfluoro-3,6-dioxaheptanoic acid (PFECA-B / NFDHA)	151772-58-6
70. Perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1
71. Perfluoro-3-[1-(ethenyloxy)propan-2-yl]oxypropanoic acid (EVE Acid)	69087-46-3
72. Perfluoro-4-(2-sulfoethoxy)pentanoic acid (R-PSDA / BPFESA)	2416366-18-0
73. Perfluoro-4-isopropoxybutanoic acid (PFECA-G)	801212-59-9
74. Perfluorobutane-1-sulfinic acid (PFBSi)	34642-43-8
75. Perfluorobutane-1-sulfonamidoethanol (FBSE)	34454-99-4
76. Perfluorobutane-N-(3-(dimethylamino)propyl)-1-sulfonamide sulfonamido amine (PBSA)	68555-77-1
77. Perfluorobutanesulfonamide (FBSA)	30334-69-1
78. Perfluorobutanesulfonic acid (PFBS)	375-73-5
79. Perfluorobutanoic acid (PFBA)	375-22-4

80. Perfluorodecanesulfonic acid (PFDS)	335-77-3
81. Perfluorodecanoic acid (PFDA)	335-76-2
82. Perfluorododecanesulfonic acid (PFDoS)	79780-39-5
83. Perfluorododecanoic acid (PFDoA)	307-55-1
84. Perfluoroethanesulfonic acid (PFES / PFEtS)	2837-92-5
85. Perfluoroheptanesulfonic acid (PFHpS)	375-92-8
86. Perfluoroheptanoic acid (PFHpA)	375-85-9
87. Perfluorohexadecanoic acid (PFHxDA)	67905-19-5
88. Perfluorohexanesulfonamide (PFHxSA)	41997-13-1
89. Perfluorohexanesulfonic acid (PFH1S / PFHS / PFHxS)	355-46-4
90. Perfluorohexanoic acid (PFHxA)	307-24-4
91. Perfluorononanesulfonic acid (PFNS)	68259-12-1
92. Perfluorononanoic acid (PFNA)	375-95-1
93. Perfluorooctadecanoic acid (PFODA)	16517-11-6
94. Perfluorooctanesulfonamide (PFOSA / FOSA)	754-91-6
95. Perfluorooctanesulfonic acid (PFOS)	1763-23-1
96. Perfluorooctanoic acid (PFOA)	335-67-1
97. Perfluoropentanesulfonic acid (PFPeS)	2706-91-4
98. Perfluoropentanoic acid (PFPeA)	2706-90-3
99. Perfluoropropanesulfonic acid (PFPrS)	423-41-6
100. Perfluoropropanoic acid (PFPA / PFPrA)	422-64-0
101. Perfluorotetradecanoic acid (PFTeDA / PFTeA / PFTA)	376-06-7
102. Perfluorotridecanoic acid (PFTrA / PFTrDA)	72629-94-8
103. Perfluoroundecanoic acid (PFUnA)	2058-94-8
104. Potassium 2,2,3,3-tetrafluoropropanoate (2233-TFPA)	756-09-2
105. Potassium N,N-bis(perfluorobutanesulfonyl)amide (DBI)	39847-39-7
106. Potassium perfluoro-4-ethylcyclohexanesulfonate (PECHS / PFECHS)	335-24-0
107. Sodium 1,1,2,2-tetrafluoro-2-(1,2,2,2-tetrafluoroethoxy)ethane-1-sulfonate (NVHOS)	801209-99-4

108. Trifluoroacetic acid (TFA)	76-05-1
109. Trifluoromethanesulfonic acid (TFMS / PFMeS)	1493-13-6
110. [3-(Heptadecafluorooctylsulfonylamino)propyl]dimethylamine N-oxide (AOF / PFOSA-NO)	30295-51-3

Non-PFAS Pollutants

SD 001 has shown RP for total cadmium, antimony, Di-2-ethyhexylphthalate (DEHP), total selenium, total zinc, and total mercury.

The existing limits for total copper, total nickel, and total zinc were re-examined by MPCA staff. When these limits were derived in the past, MPCA based the limits on FAV or acute LC50's. Since the unnamed creek is now being protected, the acute LC50's and BPJs for acute toxicity no longer apply. The chronic WQS for each of these three metals now drive any potential RP to protect the unnamed creek. As shown below, only total zinc illustrated RP to need a WQBEL.

Reasonable Potential Conclusions for total cadmium
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for total cadmium. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A).
The calculation of WQBELs are as follows:

Daily Max = 4.3 ug/L

Monthly Ave. = 2.5 ug/L (based on sampling 2x/month)

Reasonable Potential Conclusions for total antimony
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for total antimony. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A).
The calculation of WQBELs are as follows:

Daily Max = 53.5 ug/L

Monthly Ave. = 20 ug/L (based on sampling 2x/month)

Reasonable Potential Conclusions for DEHP
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for DEHP. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A).
The calculation of WQBELs are as follows:

Daily Max = 5.10 ug/L

Monthly Ave. = 3 ug/L (based on sampling 2x/month)

Reasonable Potential Conclusions for total selenium
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for total selenium. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A). The calculation of WQBELs are as follows:

Daily Max = 8.2 ug/L

Monthly Ave. = 4.7 ug/L (based on sampling 2x/month)

Reasonable Potential Conclusions for total zinc
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for total zinc. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A). The calculation of WQBELs are as follows:

Daily Max = 288 ug/L

Monthly Ave. = 167 ug/L (based on sampling 2x/month)

Reasonable Potential Conclusions for total mercury

Monitoring results of the effluent include 45 data points at a calculated a default CV of 0.6. The default statistics were used because several of the mercury data points were below the reporting level. Projected effluent quality (PEQ) is derived as an upper bound value from the highest value measured (120 ng/l), and the determined variability (CV = 0.6) and number of data points (45). The preliminary effluent limit (PEL) calculation assumes that the background mercury concentration is at the water quality standard (6.9 ng/l) when no local river water column analytical data exist. To assure that the discharge does not cause or contribute to a water quality standards excursion for mercury impaired waters, the numeric water quality standard (6.9) is applied at the point of discharge for the mass balance equation for the subsequent preliminary effluent limit calculations. Where PEQ exceeds the PEL, there is reasonable potential to cause or contribute to a water quality standards excursion. Since PEQ exceeds the PEL in this case, reasonable potential to cause or contribute to an excursion above water quality standards is indicated. A water quality-based effluent limit (WQBEL) is needed. Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for total mercury. The effluent limits were derived from water quality standards pursuant to 40 CFR 122.44 (d)(1)(vii)(A). The calculation of WQBELs are as follows:

Daily Max = 16.8 ng/L

Monthly Ave. = 9.7 ng/L (based on sampling 2x/month)

Table 12 contains the inputs to the RP analysis for 1,2 Dichloroethane, arsenic, cadmium, antimony, hexavalent chromium, copper, free cyanide, chloroform, Di-2-ethylhexylthalate, methylene chloride, nickel, lead, phenol, selenium, toluene, zinc and mercury. The analysis is made with effluent data that is expressed as total metal except hexavalent chromium. Table 12 also has RP calculations for perfluorbutanoic acid (PFBA), perfluorobutnesulfonoic acid (PFBS), perfluorhexanoic acid (PFHxA), perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctanesulfonic acid (PFOS). These pollutants were evaluated on the basis of analytical measurements that made evident the need for a full determination. Please note that there is no dilution given for total mercury or for PFOS since Pool 2 of the Mississippi River is listed as an impaired water for these two pollutants.

Table 12: Summary of RP Calculations – SD 001

Table 6. Reasonable Potential Results for 3M Cottage Grove (SD001).							
Parameter	1,2-DCA (ug/L)	T. Arsenic (ug/L)	T. Cd (ug/L)	T. Sb (ug/L)	Cr6 (ug/L)	T. Cu (ug/L)	Free CN (ug/L)
Plant flow ADW (mgd)	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Rec. water flow, 7Q10(mgd)	0	0	0	0	0	0	0
Background Conc.	0	0	0	0	0	0	0
Chronic Std (cs)	190.00	53.00	2.62	31.00	11.00	19.02	5.20
290							
ppm hard							
Maximum Std (ms)	45050.00	360.00	111.12	90.00	16.00	48.34	22.00
290							
ppm hard							
Final Acute Value (FAV)	90100	720	222	180	32	97	45
290							
ppm hard							
Mass Balance -cs	190.00	53.00	2.62	31.00	11.00	19.02	5.20
Mass Balance -ms	45050.00	360.00	111.12	90.00	16.00	48.34	22.00
Coeff of Variation (CV)	0.60000	0.60000	0.60000	2.08951	0.60000	0.60000	0.60000
Long Term Avg-cs	148.26	41.36	1.38	6.08	5.80	10.03	2.74
Long Term Avg-ms	14465.35	115.59	35.68	10.23	5.14	15.52	7.06
Preliminary Effl limits:							
Daily Max	461.72	128.80	4.30	53.46	16.00	31.24	8.54
Monthly Ave (2x/month)	266.52	74.34	2.48	20.00	9.24	18.03	4.93
Max Measured Value	2.4100	5.3000	7.4000	1400.0000	67.0000	7.6000	41.0000
# data points	89	43	118	118	17	118	88
PEQ	2.166	5.755	6.218	931.966	96.438	7.220	36.900
Reasonable Potential							
PEQ>Daily max	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	TRUE
PEQ>Monthly Ave.	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE
Final Reasonable Potential	No	No	Yes	Yes	NO!	No	NO!
Notes							
The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water							
The Mississippi River is a class 2Bg, 3, 4A, 4B, 5, 6 water							
The unnamed stream ihas a 7Q10 of 0.0cfs							
The Mississippi River 7Q10 = 2167 cfs							
Max Design flow equals 6.5 mgd							
The Mississippi River has aTMDL for PFOS and total mercury							
No!-Chromium will need to be re-evaluated. The Chromium data is total chromium , not Cr 6.							
No!- the cyanide data is based on total cyanide. The WQS is free CN. Monitoring for free or amendable CN will be needed							
Phenol data is limited to non AAP method for phenol.							
Phenol method ifor routine monitoring specifically did not include the							
AAP method to measure phenol.							
Routine monitoring was required for							
T. cadmuim, T. antimony, T selenium, T. zinc, and phenol were routinely sampled							
as part of the permit requirement for outfall SD001.							
copper and nickel were re-done using DMR data							
Zinc wasn’t re-done with dMR data since it already had reasonable potential							

Table 12: Summary of RP Calculations – SD 001 (continued)

Table 6. Reasonable Potential Results for 3M Cottage Grove (SD001).

Parameter	Chloroform (ug/L)	DEHP (ug/L)	Methylene Chloride (ug/L)	T. Ni (ug/L)	Pb (ug/L)	Phenol (ug/L)	T. Se (ug/L)
Plant flow ADW (mgd)	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Rec. water flow, 7Q10(mgd)	0	0	0	0	0	0	0
Background Conc.	0	0	0	0	0	0	0
Chronic Std (cs)	155.00	2.10	1940.00	388.08	12.34	123.00	5.00
290							
ppm hard							
Maximum Std (ms)	1392.00	210.00	13875.00	3490.92	316.64	2214.00	20.00
290							
ppm hard							
Final Acute Value (FAV)	2784	420	27749	3491	635	4428	40
290							
ppm hard							
Mass Balance -cs	155.00	2.10	1940.00	388.08	12.34	123.00	5.00
Mass Balance -ms	1392.00	210.00	13875.00	3490.92	316.64	2214.00	20.00
Coeff of Variation (CV)	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000
Long Term Avg-cs	81.75	1.64	1513.77	204.68	6.51	64.87	2.64
Long Term Avg-ms	446.96	67.43	4455.20	1120.92	101.67	710.91	6.42
Preliminary Effl limits:							
Daily Max	254.60	5.10	4714.40	637.46	20.27	202.04	8.21
Monthly Ave (2x/month)	146.96	2.95	2721.28	367.96	11.70	116.62	4.74
Max Measured Value	3.0100	57.2000	20.7000	55.0000	3.8000	2.6000	30.0000
# data points	89	88	89	118	117	88	118
PEQ	2.706	51.559	18.607	52.250	3.199	2.344	25.207
Reasonable Potential							
PEQ>Daily max	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
PEQ>Monthly Ave.	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Final Reasonable Potential	No	Yes	No	No	No	No	Yes

Notes

The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water

The Mississippi River is a class 2Bg, 3, 4A, 4B, 5, 6 water

The unnamed stream ihas a 7Q10 of 0.0cfs

The Mississippi River 7Q10 = 2167 cfs

Max Design flow equals 6.5 mgd

The Mississippi River has aTMDL for PFOS and total mercury

No!-Chromium will need to be re-evaluated. The Chromium data is total chromium , not Cr 6.

No!- the cyanide data is based on total cyanide. The WQS is free CN. Monitoring for free or amendable CN will be needed

Phenol data is limited to non AAP method for phenol.

Phenol method ifor routine monitoring specifically did not include the

AAP method to measure phenol.

Routine monitoring was required for

T. cadmuim, T. antimony, T selenium, T. zinc, and phenol were routinely sampled

as part of the permit requirement for outfall SD001.

copper and nickel were re-done using DMR data

Zinc wasn't re-done with dMR data since it already had reasonable potential

Table 12: Summary of RP Calculations – SD 001 (continued)

Table 6. Reasonable Potential Results for 3M Cottage Grove (SD001).

Parameter	Toluene (ug/L)	Zn (ug/L)	Hg (ng/L)	PFBA (ng/L)	PFBS (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFOA (ng/L)	PFOS (ng/L)
Plant flow ADW (mgd)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Rec. water flow, 7Q10(mgd)	0	0	0	0	2040	0	0	0	0
Background Conc.	0	0	6.9	13.5	0	15.63333	0	19.358	0.05
Chronic Std (cs)	253.00	261.28	6.90	25000.00	3000.00	4400.00	0.0023	0.0092	0.027
290									
ppm hard									
Maximum Std (ms)	1352.00	288.44	2400.00	NA	NA	NA	NA	NA	NA
290									
ppm hard									
Final Acute Value (FAV)	2703	577	4900	NA	NA	NA	NA	NA	NA
290									
ppm hard									
Mass Balance -cs	253.00	261.28	6.90	25000.00	3000.00	4400.00	0.00	0.01	0.03
Mass Balance -ms	1352.00	288.44	2400.00	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Coeff of Variation (CV)	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000
Long Term Avg-cs	133.44	137.81	5.38	19507.37	2340.88	3433.30	0.00	0.01	0.02
Long Term Avg-ms	434.12	92.62	770.63	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Preliminary Effl limits:									
Daily Max	415.57	288.44	16.77	60752.55	7290.31	10692.45	0.01	0.02	0.06561
Monthly Ave (2x/month)	239.88	166.50	9.68	35068.08	4208.17	6171.98	0.00	0.01	0.03787
Max Measured Value	2.3000	247.0000	120.0000	498000.0000	39400.0000	1740.0000	1540.0000	1930.0000	1410.0000
# data points	88	102	45	105	106	78	80	78	79
PEQ	2.067	214.823	128.687	498000.000	39400.000	1740.000	1540.000	1930.000	1410.000
Reasonable Potential									
PEQ>Daily max	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE
PEQ>Monthly Ave.	FALSE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Final Reasonable Potential	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Notes

The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water

The Mississippi River is a class 2Bg, 3, 4A, 4B, 5, 6 water

The unnamed stream ihas a 7Q10 of 0.0cfs

The Mississippi River 7Q10 = 2167 cfs

Max Design flow equals 6.5 mgd

The Mississippi River has aTMDL for PFOS and total mercury

No!-Chromium will need to be re-evaluated. The Chromium data is total chromium , not Cr 6.

No!- the cyanide data is based on total cyanide. The WQS is free CN. Monitoring for free or amendable CN will be needed

Phenol data is limited to non AAP method for phenol.

Phenol method ifor routine monitoring specifically did not include the

AAP method to measure phenol.

Routine monitoring was required for

T. cadmuim, T. antimony, T selenium, T. zinc, and phenol were routinely sampled

as part of the permit requirement for outfall SD001.

copper and nickel were re-done using DMR data

Zinc wasn't re-done with dMR data since it already had reasonable potential

Monitoring for Non-PFAS Chemicals

Hexavalent Chromium

A reasonable potential analysis for hexavalent chromium was not able to be performed because total chromium was analyzed, not hexavalent chromium. The federal requirements in the priority pollutant scan require chromium to be sampled as total chromium. However, the Class 2B WQS for chromium is hexavalent chromium. When this facility performs priority pollutant scans for this outfall, it will sample for hexavalent chromium as well as total chromium. This will provide data that matches the hexavalent chromium WQS. The reporting limit for hexavalent chromium shall be 11 ug/L.

Cyanide Sampling

A reasonable potential analysis for cyanide was not able to be performed because total cyanide was analyzed, not free cyanide. The federal requirements in the priority pollutant scan require cyanide to be sampled as total cyanide. However, the Class 2B WQS for cyanide is free cyanide. This facility will need to monitor for total cyanide and free cyanide (or amendable cyanide method since free cyanide chemistry is rarely available. The reporting limits for total cyanide and amendable cyanide shall be as close to the chronic WQS of 5.2 ug/L as possible.

Total Lithium

Because of the lithium salts associated with the PFAS in the effluent, this outfall will monitor quarterly for total lithium. Standard Method 3111 B with a reporting limit of 2 ug/L shall be used.

Reporting Limits for Metals

The reporting limits for total cadmium, total lead, total copper, total nickel, total zinc, and total antimony shall be no greater than 10 ug/L.

Salty Monitoring

The Permittee has not reported any data for salty parameters such as total dissolved solids, chloride, sulfate or specific conductance. Due to the low stream dilution ratio, this outfall must sample quarterly for the following salty parameters: total chloride, total dissolved salts (as total dissolved solids), total sulfate, specific conductivity, and total hardness (Mg +Ca as $CaCO_3$).

State Discharge Restrictions (SDRs)

SDRs are not considered WQBELs. The MPCA requires secondary treatment or the equivalent as a minimum to protect water quality and maintain in-stream WQS[1]. Therefore, the restrictions are generally stringent enough to protect WQS, except where there is inadequate dispersion, or dilution at applicable minimum stream flows.

Limits are applied pursuant to Minn. R. 7053.0225, subp. 1(B). SDRs requiring effluent quality based on secondary treatment are applied in this permit for five-day carbonaceous biochemical oxygen demand ($CBOD_5$), potential of hydrogen (pH – same as TBELs from the ELGs above), and total suspended solids (TSS) (Minn. R. 7053.0215, subp. 1 and 7053.0225, subp. 1.B).

The 200 organisms per 100 milliliters (orgs/100mL) calendar month geometric mean limit for fecal coliform is based on Minn. R. 7053.0215, subp. 1.

The limits on discharge of floating solids, visible foam, and oil are based on Minn. R. 7050.0210. The pH limits and the $CBOD_5$ and TSS monthly average limits are established based on Minn. R. 7053.0225 and 7053.0215. The $CBOD_5$ and TSS monthly average limits are used to determine the daily maximum limits. These limits are based on 40 CFR §122.45 and Minn. R. 7053.0225 and 7053.0215.

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[1] Minnesota Regulation WPC 15, Criteria for the Classification of the Interstate Waters of the State and the Establishment of Standard of Quality and Purity. Minnesota Pollution Control Agency, April 8, 1969.

Table 13: SDRs – SD 001

Pollutant	Calendar month average	Calendar month maximum	Calendar month geometric mean	Maximum calendar week average	Basis
BOD, Carbonaceous 05 Day (20 Deg C)	25 mg/L 614 kg/day			40 mg/L	Minn. R. ch. 7053.0225 subp. 1.B
Fecal Coliform, MPN or Membrane Filter 44.5C			200 orgs/100 mL[1]		Minn. R. ch. 7053.0215 subp. 1
pH	Within Range of 6.0 -9.0 SU				Minn. R. ch. 7053.0215
Solids, Total Suspended (TSS)	30 mg/L	1100 kg/day		45 mg/L	Minn. R. ch. 7053.0225 subp. 1.B

[1] Limit applies April - October

Summary of Proposed Effluent Limit and Monitoring Requirements

Table 14 – SD 001

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
List 1. PFAS compound monitoring parameters					Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
1,1,1-Trichloroethane					21 calendar month average	54 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,1,2-Trichloroethane					21 calendar month average	54 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,1-Dichloroethane					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,1-Dichloroethylene (Vinylidene chloride)					16 calendar month average	25 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,2,4-Trichlorobenzene					68 calendar month average	140 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,2-Dichlorobenzene (orth-)					77 calendar month average	163 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,2-Dichloroethane					68 calendar month average	211 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,2-Dichloroethylene (trans-)					21 calendar month average	54 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,2-Dichloropropane					153 calendar month average	230 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,3-Dichlorobenzene					31 calendar month average	44 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,3-Dichloropropene					29 calendar month average	44 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
1,4-Dichlorobenzene (para-)					15 calendar month average	28 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2,4-Dichlorophenol					39 calendar month average	112 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
2,4-Dimethylphenol					18 calendar month average	36 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2,4-Dinitrophenol					71 calendar month average	123 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2,4-Dinitrotoluene					113 calendar month average	285 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2,6-Dinitrotoluene					255 calendar month average	641 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2-Chlorophenol					31 calendar month average	98 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
2-Nitrophenol					41 calendar month average	69 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
4,6-Dinitro-o-cresol (2-Methyl-4,6-dinitrophenol)					78 calendar month average	277 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
4-Nitrophenol					72 calendar month average	124 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Acenaphthene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Acenaphthylene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Acrylonitrile					96 calendar month average	242 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Anthracene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Antimony, Total (as Sb)					20 calendar month average	53.5 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec
Benzene					37 calendar month average	136 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Benzo(a)anthracene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Benzo(b)fluoranthene					23 calendar month average	61 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Benzo(k)fluoranthene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
Benzo[a]pyrene					23 calendar month average	61 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Bis(2-ethylhexyl) phthalate					3 calendar month average	5.10 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec
BOD, 05 Day (20 Deg C)					24 calendar month average	64 daily maximum	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec
BOD, Carbonaceous 05 Day (20 Deg C)	614 calendar month average	Monitor only. maximum calendar week average	kilograms per day		25 calendar month average	40 maximum calendar week average	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec
Cadmium, Total (as Cd)					0.0025 calendar month average	0.0043 daily maximum	milligrams per liter	twice per month	24-Hour Flow Composite	Jan-Dec
Carbon tetrachloride					18 calendar month average	38 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Chloride, Total						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Chlorobenzene (Monochlorobenzene)					15 calendar month average	28 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Chloroethane					104 calendar month average	268 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Chloroform					21 calendar month average	46 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Chloromethane					86 calendar month average	190 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Chromium, Hexavalent (as Cr)						Monitor only. daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Chromium, Total (as Cr)					1110 calendar month average	2770 daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Chromium, Trivalent (as Cr+3)						Monitor only. daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Chrysene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Copper, Total (as Cu)						68 daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
Cyanide, Free (as CN)						Monitor only. daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Cyanide, Total (as CN)					1200 calendar month average	420 daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Dibutyl phthalate (Di-n-butyl phthalate)					27 calendar month average	57 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Dichloromethane (Methylene chloride)					40 calendar month average	89 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Diethyl phthalate					81 calendar month average	203 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Dimethyl phthalate					19 calendar month average	47 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Ethylbenzene					32 calendar month average	108 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Fecal Coliform, MPN or Membrane Filter 44.5C					200 calendar month geometric mean		organisms per 100 milliliter	twice per week	Grab	Apr-Oct
Flow		Monitor only. calendar month total	million gallons		Monitor only. calendar month average	Monitor only. calendar month maximum	million gallons per day	once per day	Measurement, Continuous	Jan-Dec
Fluoranthene					25 calendar month average	68 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Fluorene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Hardness, Calcium & Magnesium, Calculated (as CaCO3)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Hexachlorobenzene					15 calendar month average	28 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Hexachlorobutadiene					20 calendar month average	49 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Hexachloroethane					21 calendar month average	54 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Lead, Total (as Pb)					320 calendar month average	690 daily maximum	micrograms per liter	once per month	24-Hour Flow Composite	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
Lithium, Total (as Li)						Monitor only. daily maximum	micrograms per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Mercury, Dissolved (as Hg)					Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	twice per month	Grab	Jan-Dec
Mercury, Total (as Hg)					9.7 calendar month average	16.8 daily maximum	nanograms per liter	twice per month	Grab	Jan-Dec
Naphthalene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Nickel, Total (as Ni)						480 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Nitrite Plus Nitrate, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec
Nitrobenzene					27 calendar month average	68 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Nitrogen, Ammonia, Total (as N)	24.6 calendar month average		kilograms per day		1.0 calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Apr-Nov
Nitrogen, Ammonia, Total (as N)	27.0 calendar month average		kilograms per day		1.1 calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Dec-Mar
Nitrogen, Ammonia, Un-ionized (as N)						0.458 daily maximum	milligrams per liter	once per day	24-Hour Flow Composite	Jan-Dec
Nitrogen, Kjeldahl, Total					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec
Nitrogen, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	Calculation	Jan-Dec
Oil & Grease, Total Recoverable (Hexane Extraction)						10 daily maximum	milligrams per liter	twice per week	Grab	Jan-Dec
Oxidants, Total Residual						Monitor only. daily maximum	milligrams per liter	twice per year	24-Hour Flow Composite	Mar, Sep

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**
Perfluorobutanesulfonic acid (PFBS)	103,394 calendar month average		grams per day		4,208 calendar month average	7,290 daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorobutanoic acid (PFBA)	861,622 calendar month average		grams per day		35,068 calendar month average	60,752 daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorohexanesulfonic acid (PFH1S / PFHS / PFHxS)	0.079 calendar month average		grams per day		2.1*RL (0.0032) calendar month average	2.1*RL (0.0056) daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorohexanoic acid (PFHxA)	151,645 calendar month average		grams per day		6,172 calendar month average	10,692 daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorooctanesulfonic acid (PFOS)	0.93 calendar month average		grams per day		2.2*RL (0.038) calendar month average	2.2*RL (0.066)daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorooctanoic acid (PFOA)	0.32 calendar month average		grams per day		2.1*RL (0.013) calendar month average	2.1*RL (0.022) daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
pH				6.0 calendar month minimum		9.0 calendar month maximum	standard units	once per day	Measurement, Continuous	Jan-Dec
Phenanthrene					22 calendar month average	59 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Phenol					15 calendar month average	26 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Phenols, Total	1.5 calendar month average	3.6 daily maximum	kilograms per day		Monitor only. calendar month average	Monitor only. daily maximum	micrograms per liter	twice per week	Grab	Jan-Dec
Phosphorus, Total (as P)					Monitor only. calendar month average		milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec
Pyrene					25 calendar month average	67 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Selenium, Total (as Se)					4.7 calendar month average	8.2 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec

	Discharge limitations							Monitoring requirements		
Parameter	**Quantity /Loading avg.**	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**
Solids, Total Dissolved (TDS)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Solids, Total Suspended (TSS)	545 calendar month average	1100 maximum calendar week average	kilograms per day		30 calendar month average	45 maximum calendar week average	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec
Solids, Total Suspended (TSS) grab (Mercury)					Monitor only. calendar month average	Monitor only. daily maximum	milligrams per liter	twice per month	Grab	Jan-Dec
Specific Conductance						Monitor only. calendar quarter maximum	micromhos per cm	once per quarter	Measurement	Mar, Jun, Sep, Dec
Sulfate, Total (as SO4)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Temperature, Water (F)				Monitor only. calendar month minimum		Monitor only. calendar month maximum	degrees Fahrenheit	once per day	Measurement, Instantaneous	Jan-Dec
Tetrachloroethylene (Perchloroethylene)					22 calendar month average	56 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Toluene					26 calendar month average	80 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Trichloroethylene (TCE)					21 calendar month average	54 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Vinyl chloride (chloroethene)					104 calendar month average	268 daily maximum	micrograms per liter	once per month	Grab	Jan-Dec
Zinc, Total (as Zn)					167 calendar month average	288 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec

SD 002: NCCW, GW, and Stormwater Runoff

The receiving water lowest average seven-day flow with a once in ten-year recurrence interval ($7Q_{10}$) low flow at outfall SD 002 is zero cfs, thus no dilution factors were used in determining the discharge limits in relation to the immediate receiving waters.

The outfall SD 002 monitoring frequency is based on MPCA guidelines. The monitoring frequencies are set to achieve sufficient data to determine the compliance with limits established for this facility.

Technology based effluent limits

The 40 CFR pt. 414 Point Source Category ELGs are not applicable to the stormwater, groundwater, and utility wastewater discharges from SD 002. The permit requirements are set according to 40 CFR §122 and Minn. R. chs. 7001, 7050, 7053, 7060 and 7090.

Water quality based limits

Minn. R. 7053.0205, subp. 8 requires the MPCA to develop WQBELs for point source discharges to waters of the state of Minnesota to protect receiving waters for the applicable use classifications.

Minn. R. 7050.0155 requires that all waters must maintain a level of water quality that provides for the attainment and maintenance of the water quality standards of downstream waters, including the waters of another state.

The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm aquatic biota, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water (Minn. R. 7050.0222, subp. 4).

The beneficial use subclass designator "g" is added to the Class 2 designator as a specific additional designator. The additional subclass designator does not replace the Class 2 designator. All requirements for Class 2 stream and river habitats in parts 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Bg stream and river habitats in Minn. R. 7050.0222. This subclass designator applies to lotic waters only.

The total residual chlorine (TRC) limit, based on Class 2B waters, is established equal to the final acute value (FAV) in Minn R. 7050.0222, according to Minn. R. 7053.0225 and 7053.0215, and Section 101 of the Clean Water Act, that prohibit the discharge of toxic pollutants in toxic amounts.

The WQBEL for temperature is being carried over from the previous permit (Minn. R. 7050.0222 & 7053.0275).

Table 15: WQBELs – SD 002

Pollutant	Calendar month average	Calendar month maximum	Daily maximum	Basis
Chlorine, Total Residual			0.038 mg/L	Minn. R. ch. 7050.0222
Bis(2-ethylhexyl) phthalate (DEHP)	2.9		5.1	Minn. R. ch. 7050.0222
Lead, Total	12 ug/L		20 ug/L	Minn. R. ch. 7050.0222
Mercury, Total (as Hg)	9.7 ng/L		16.8 ng/L	Minn. R. ch. 7050
Oil & Grease, Total Recoverable (Hexane Extraction)			10 mg/L	Minn. R. ch. 7050.0222
Perfluorobutanesulfonic acid (PFBS)	4,208 ng/L 138,390 g/day		7,290 ng/L	Minn. R. ch. 7050.0218
Perfluorohexanoic acid (PFHxA)	6,172 ng/L 202,972 g/day		10,692 ng/L	Minn. R. ch. 7050.0218
Perfluorohexanesulfonic acid (PFHxS / PFH1S / PFHS)	0.0032* ng/L 0.11 g/day		0.0056* ng/L	Minn. R. ch. 7050.0218
Perfluorooctanoic acid (PFOA)	0.013* ng/L 0.42 g/day		0.022* ng/L	Minn. R. ch. 7050.0218
Perfluorooctanesulfonic acid (PFOS)	0.038* ng/L 1.25 g/day		0.066* ng/L	Minn. R. ch. 7050.0218
Temperature		83.0 degrees F		Minn. R. ch. 7050.0222 & 7053.0275

*Since the PFOS, PFOA and PFHxS daily max and monthly average limits are below typical reporting limits, the MPCA is proposing the compliance limits below. Since the PFOS, PFOA and PFHxS daily max and monthly average limits are below typical reporting limits, the MPCA is proposing language to address reporting values below the reporting limit and this language can be found in the toxics memo.

PFHxS	**PFOA**	**PFOS**
2.1 ng/L as a daily max and monthly average	2.1 ng/L as a daily max and monthly average	2.2 ng/L as a daily max and monthly average

On March 26th, 2024 the facility requested a compliance schedule for the parameters in the table below. The following interim limits are recommended to be included during the duration of the compliance schedule.

Table 16. Recommended interim limits for SD002 to be applicable during the duration of the compliance schedule.

Compound	Value	Interim Limit Type	Unit	Method
PFBS	7,299	Monthly Max	ng/L	99th percentile of reported data with 2 samples per month
PFHxA	6,729	Monthly Max	ng/L	99th percentile of reported data with 2 samples per month
PFHxS	9,250	Monthly Max	ng/L	99th percentile of reported data with 2 samples per month
PFOA	11,287	Monthly Max	ng/L	99th percentile of reported data with 2 samples per month
PFOS	14	Monthly Max	ng/L	Jan 21, 2021 non-public enforcement action
PFOS	7	Monthly Average	ng/L	Jan 21, 2021 non-public enforcement action
DEHP	72	Monthly Max	ug/L	99th percentile of reported data with 2 samples per month
Mercury	11.8	Monthly Max	ng/L	99th percentile of reported data with 2 samples per month

Background for Reasonable Potential Review

Reasonable Potential for Chemical Specific Pollutants (40 CFR pt. 122.44 (d)(1))

Federal regulations (40 CFR §122.44(d)(1)) require the MPCA to evaluate the discharge to determine whether the discharge has the reasonable potential to cause or contribute to a violation of WQS. The MPCA must use acceptable technical procedures, accounting for variability (coefficient of variation, or CV), when determining whether the effluent causes, has the reasonable potential to cause, or contribute to an excursion of an applicable WQS. Projected effluent quality (PEQ) derived from effluent monitoring data is compared to PELs determined from mass balance inputs. Both determinations account for effluent variability. Where PEQ exceeds the PEL, there is reasonable potential to cause or contribute to a WQS excursion. When Reasonable Potential is indicated, the permit must contain a WQBEL for that pollutant.

Per- and Polyfluorinated (PFAS) Substances

The following PFAS effluent limits are included in the draft permit. Mass limits were calculated based on the monthly average limit and the max design flow.

Table 17. PFAS effluent limit summary

Limit Type	Units	PFBA	PFBS	PFHxA	PFHxS	PFOA	PFOS	Hazard Index
Daily Max	ng/L	Monitor Only	7,290	10,692	0.0056	0.022	0.066	Monitor Only
Monthly Average	ng/L	Monitor Only	4,208	6,172	0.0032	0.013	0.038	Monitor Only
Monthly Average	g/day	Monitor Only	138,390	202,972	0.11	0.42	1.25	Monitor Only
Compliance Limit for a WQBEL that is below the detection limit		Not Applicable	Not Applicable	Not Applicable	2.1 ng/L as a daily max and monthly average	2.1 ng/L as a daily max and monthly average	2.2 ng/L as a daily max and monthly average	Not Applicable

PFAS Site-Specific Criteria
No Per- and Polyfluorinated Substance (PFAS) compound has a statewide water quality standard listed in rule and Minnesota has no PFAS site-specific standard for any water. Since PFAS are discharged by 3M Cottage Grove to waters of the state and PFAS have the potential to cause toxic effects, the MPCA derived site-specific criteria for six PFAS compounds (Table 7) using the procedures outlined in Minn. R. 7050.0217, Minn. R. 7050.0218 and Minn. R. 7050.0219. These PFAS site-specific criteria were derived to be specific to the point source being addressed and to protect water quality in Pool 2 of the Mississippi River for human health. The Permittee must be given notice of any specific effluent limitation derived from these criteria and given opportunity to request a hearing as provided in Minn. R. 7000.1800.

Table 18. Summary of PFAS site-specific criteria.

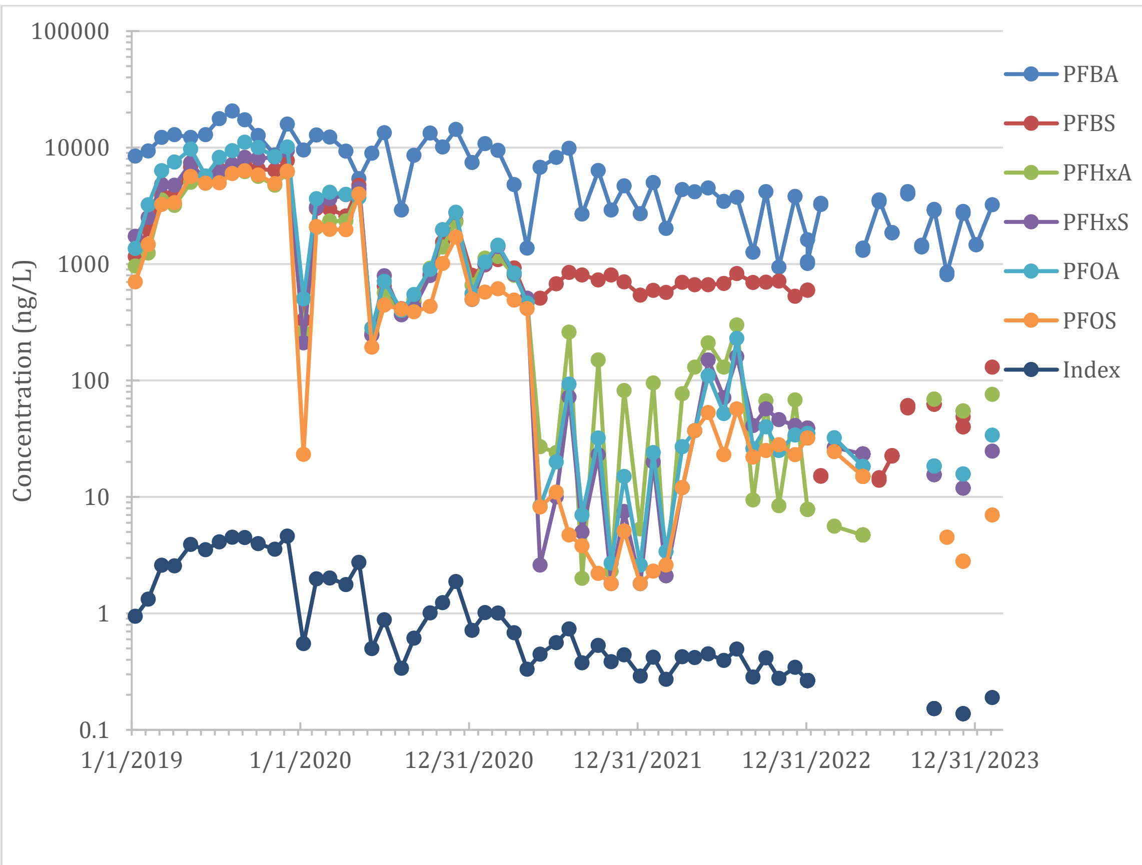
PFAS (CAS No. see Table 2-1)	**Site-specific water quality criteria: Chronic Criteria (CC)**		***Health Risk Index Endpoints* (Additive Risk)**
	Class 2B – fish consumption and recreational exposure (CC_{FR}) (30-day average)	**Class 2 fish-tissue** (CC_{FT}) (90^{th} percentile of 5 fish minimum per water body)	
PFOS	0.027 ng/L	0.021 ng/g	Developmental, Liver System, Immune System, Cancer (MDH 2024b)
PFOA	0.0092 ng/L	0.00036 ng/g	Developmental, Liver System, Immune System, Cancer (MDH 2024a)
PFHxS	0.0023 ng/L	0.000043 ng/g	Liver System, Thyroid (endocrine) (MDH 2023b)
PFHxA	4,400 ng/L	Not applicable	Developmental, Thyroid (endocrine) (MDH 2023c)
PFBS	3,000 ng/L	Not applicable	Thyroid (endocrine) (MDH 2023a)
PFBA	25,000 ng/L	Not applicable	Liver System, Thyroid (endocrine) (MDH 2018)
Mixtures containing two or more of PFBA + PFBS + PFHxA	≤ 1 (unitless) Health Risk Index	Not applicable	Thyroid (endocrine)
Definitions of CC: $CC_{FR:}$ Applied in Class 2B surface waters (F: Fish consumption and R: Recreational exposure) CC_{FT}: Applied for Bioaccumulative Chemicals of Concern (BCC) in fish (fillet/muscle) for all Class 2 waters (FT: fish-tissue)			

The proposed PFAS site-specific criteria are applicable to the Mississippi River between river miles 812-820 and do not apply to the immediate receiving water of Unnamed Creek. The site-specific criteria have a 30-day duration and a once in three-year allowable frequency of exceedance. Effluent limitations for PFAS were set to protect water quality in Pool 2 of the Mississippi River. MPCA's reasonable potential analysis was performed only for the six PFAS compounds with developed site-specific criteria (see section below).

3M SD 002 PFAS Monitoring Data

A summary of 3M's reported PFAS data for station SD 002 from 2019 to 2023 can be seen in Figure 16 below.

Figure 16. Reported SD002 PFAS concentration in ng/L. Note the log scale. Values below detection are not visualized on this figure.



PFAS Surface Water Monitoring

There is sufficient data to characterize PFAS levels in the receiving waters for surface water, fish tissue and macro invertebrates. A summary of PFAS surface water monitoring found in the 2023 report titled 'Instream PFAS Characterization Study Interim Report Mississippi River Cottage Grove, Minnesota' can be seen in the Figures 17 and 18 and Table 19. The samples in the report represented the most recent PFAS monitoring and were collected in July and August of 2021.

There is evidence that the 3M discharges are causing PFAS levels to increase in the unnamed creek downstream of the discharges (Table 19). It is not possible to say exactly how much of that PFAS increase is attributable to SD 001 versus SD 002 because the two discharges have not been sampled on the days of the surface water sampling and the flow in the unnamed creek on those days was not measured. Not every PFAS compound increased downstream of 3M on the unnamed creek by the same amount, but this can be explained by the high variability of PFAS concentrations in 3M discharges (Figure 16). If the unnamed creek had been sampled at a different moment when 3M was discharging a different mixture of PFAS, then different, but still elevated, concentrations of individual PFAS in the unnamed creek would likely have been measured.

There is also evidence that the elevated levels of PFAS in the unnamed creek (attributable to the 3M discharges) have the reasonable potential to cause an exceedance of a PFAS site-specific criteria in Pool 2 of the Mississippi River, especially since the 3M discharges have PFAS levels well above the site-specific criteria in Pool 2 of the Mississippi River. For example, PFBS concentrations in the unnamed creek are several-fold higher than the Pool 2 PFBS site-specific criterion and a PFBS value above the site-specific criterion was measured at the confluence of the unnamed creek with the Mississippi River. This analysis of discharge and surface water monitoring data is a supplementary line of evidence in MPCA's reasonable potential analysis for PFAS compounds. The analysis justifies the assumptions that PFAS have a conservative fate and transport between the discharges and Pool 2 of the Mississippi River and that the 3M discharge is not completely and instantaneously mixed into Pool 2 of the Mississippi River.

It is uncertain whether PFAS contaminated groundwater in the East Cove is contributing PFAS into the Unnamed Creek despite the nearby groundwater pump-system, local topography, soils, and depth to groundwater. More data explaining the flow of groundwater in the East Cove is available upon request in the report titled '2021 Annual Perfluorochemical (PFCs) Groundwater Report for the 3M Cottage Grove Site.'

Figure 17. Map of surface water PFAS sampling locations. Red dots are locations in Unnamed Creek and blue dots are in the Mississippi River. Crosses represent transect sample locations.

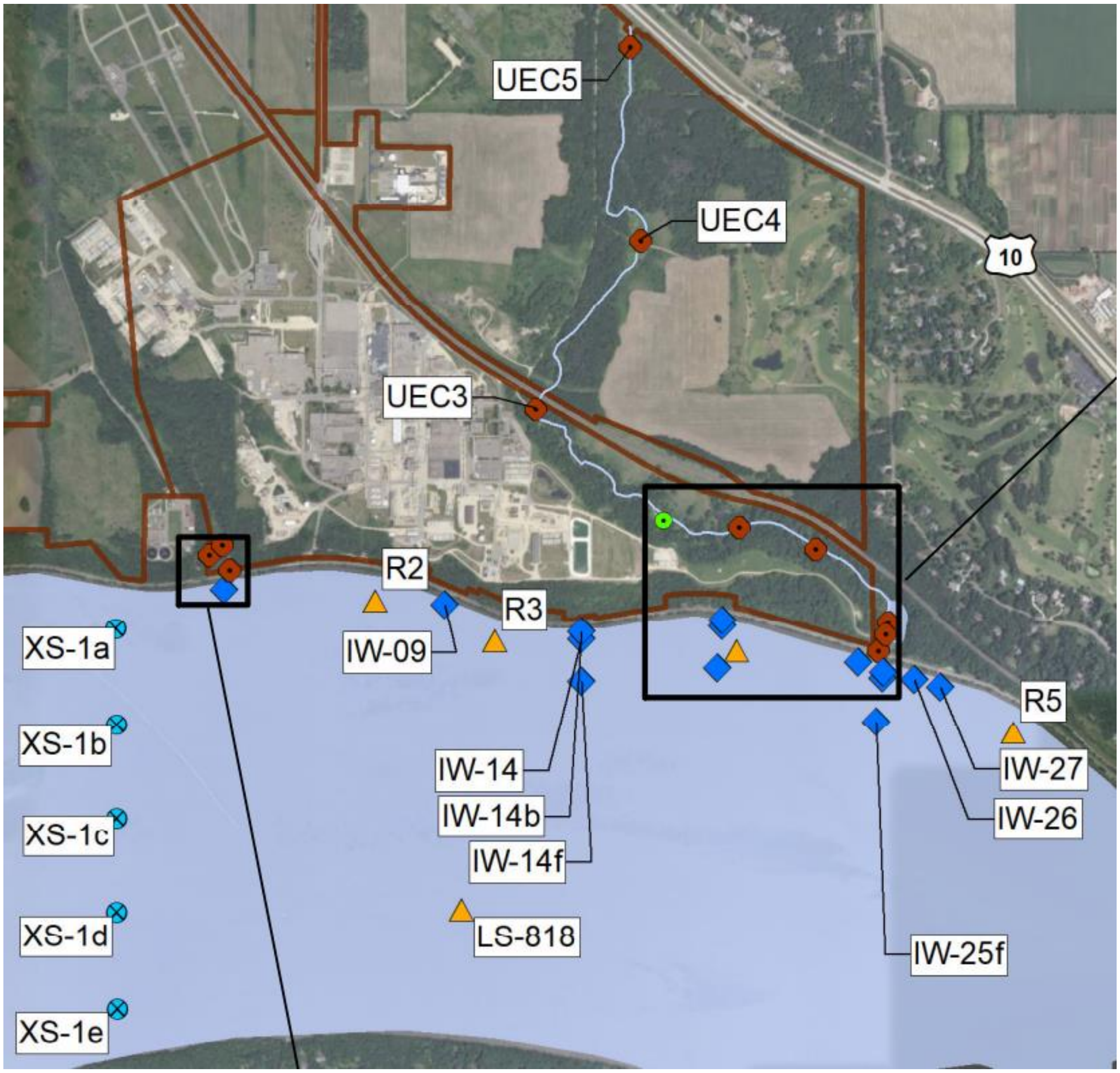


Figure 18. Close up of sample locations on Unnamed Creek and the East Cove of the Mississippi River. Red dots are locations in Unnamed Creek and blue dots are in the Mississippi River.

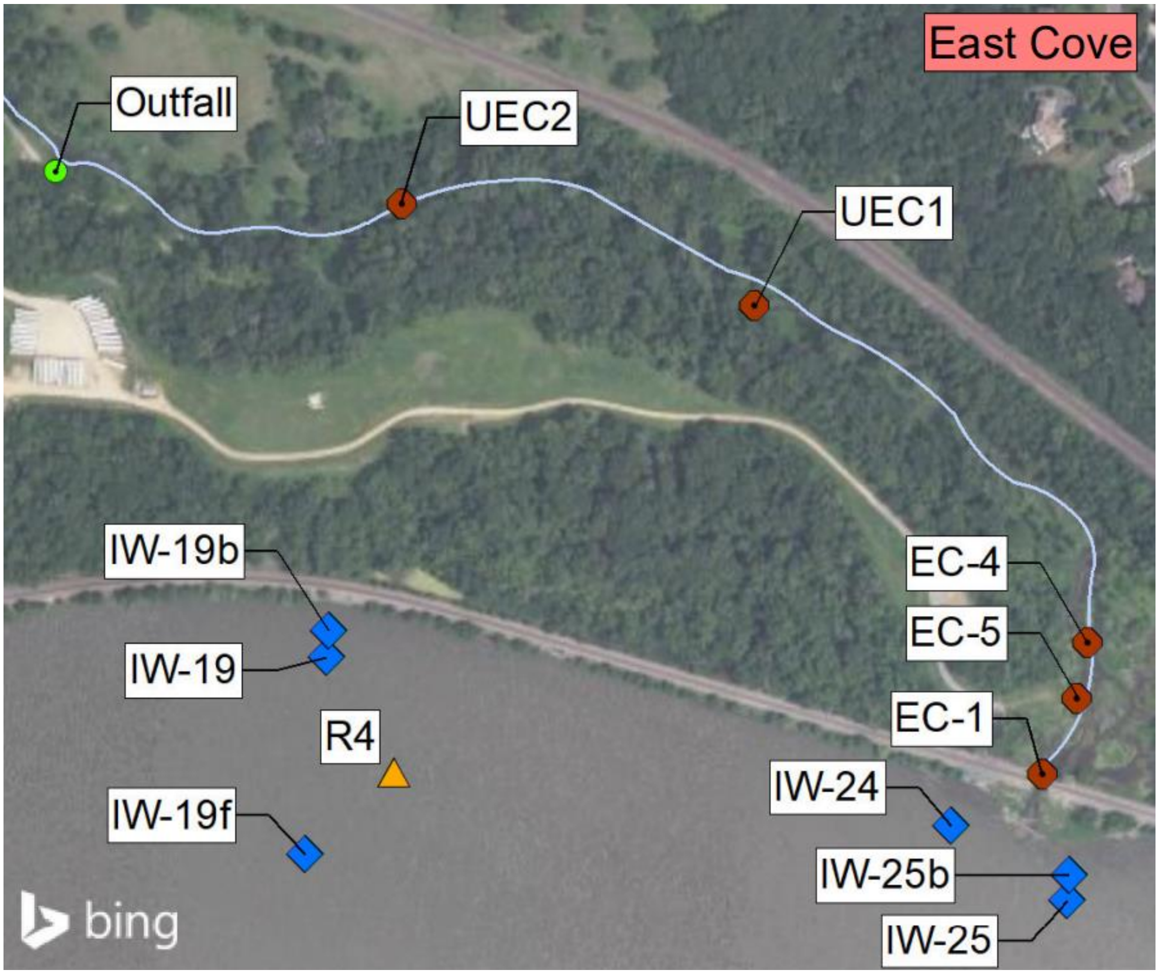


Table 19. PFAS surface water monitoring data. Units are ng/L. Values above the criteria in the Mississippi (Miss.) River are in bold. Italics indicate that the values are from the 3M discharge.

			PFBS	PFBA	PFOS	PFOA	PFHxS	PFHxA
Site-Specific Criteria (ng/L)			350	10,000	0.05	88	36	950
Location	**Waterbody**	**Description**						
UEC5	Unnamed Creek	Upstream of discharge	16	1,800	3.9	63	10	60
UEC4	Unnamed Creek	Upstream of discharge	16	1,800	4.2	110	10	61
UEC3	Unnamed Creek	Upstream of discharge	17	1,900	4.6	110	11	65
Discharge	SD001	Projected Effluent Quality (max value)	*39,400*	*498,000*	*1,410*	*1,930*	*1,740*	*1,540*
Discharge	SD002	Projected Effluent Quality (max value)	7,720	20,600	6,300	11,100	9,380	6,200
UEC2	Unnamed Creek	Downstream of discharge	2,900	6,000	3.2	63	37	250
UEC1	Unnamed Creek	Downstream of discharge	2,500	5,400	45	76	39	210
EC-5	Unnamed Creek	Downstream of discharge	5,700	6,900	36	68	47	380
EC-4	Unnamed Creek	Downstream of discharge	5,500	7,000	28	74	42	380
EC-1	Unnamed Creek	Downstream of discharge	4,300	6,400	45	70	44	360
IW-24	Miss. River	Upstream of Unnamed Creek	17	190	**28**	54	7.2	15
IW-19b	Miss. River	Upstream of Unnamed Creek	20	130	**96**	**200**	12	28

IW-19	Miss. River	Upstream of Unnamed Creek	10	75	**39**	70	7.2	14
IW-19f	Miss. River	Upstream of Unnamed Creek	11	68	**47**	52	6	13
IW-25b	Miss. River	At confluence of Unnamed Creek	**560**	560	**21**	34	5.9	42
IW-25	Miss. River	At confluence of Unnamed Creek	240	1,200	**16**	29	7.2	24
IW-26	Miss. River	Immediately downstream of Unnamed Creek	180	470	**82**	**130**	14	30
IW-27	Miss. River	Immediately downstream of Unnamed Creek	110	42	**72**	**130**	12	130
XS-1a	Miss. River	Transect upstream of 3M Cottage Grove	3.3	39	**49**	11	10	7.1
XS-1b	Miss. River	Transect upstream of 3M Cottage Grove	3.5	42	**91**	11	11	8
XS-1c	Miss. River	Transect upstream of 3M Cottage Grove	2.9	31	**7.1**	11	3.3	6.4
XS-1d	Miss. River	Transect upstream of 3M Cottage Grove	4.1	130	**14**	14	5.3	9.2
XS-1e	Miss. River	Transect upstream of 3M Cottage Grove	4	97	**7.5**	11	3.5	8.1

Fish Tissue Monitoring

PFAS are accumulating in fish tissue in the Mississippi River (Figure 4) and mean fish tissue are above the fish tissue criteria for the three PFAS with applicable fish tissue criteria (Table 4). This is strong line of evidence that no receiving water dilution should be allowed for PFOA, PFOS and PFHxS in the Mississippi River.

Table 20. Comparison of the fish tissue site-specific criteria to the in-stream measured mean fish tissue concentrations. All mean fish tissue concentrations were calculated using non-detection methodologies detailed in the PFAS site-specific criteria document.

	Fish Tissue Site-Specific Criteria (ng/g)	Mean Fish Tissue Concentration in SSC area (ng/g)
PFOS	0.021	17.9
PFOA	0.00036	0.454
PFHxS	0.000043	0.192
PFHxA	Not Calculated	0.147
PFBA	Not Calculated	0.31
PFBS	Not Calculated	0.175

The MPCA will allow no receiving water dilution for PFHxA, PFBA and PFBS when calculating limits, for the following reasons:

- The measured fish tissue concentrations of PFHxA, PFBA and PFBS are similar to the three PFAS with fish tissue site-specific criteria (Table 20). This means that all six PFAS are accumulating in fish tissue at similar, but still elevated concentrations.
- While there are no PFAS criteria for benthic macroinvertebrates, every single benthic macroinvertebrate in Pool 2 had a detectable level of PFOS, PFOA and many other PFAS were also present in benthic macroinvertebrates (Figure 20). This is another line of evidence that PFAS is generally accumulating in aquatic life in Pool 2 of the Mississippi River and that there is no assimilative capacity or dilution for PFAS in Pool 2 of the Mississippi River.
- Treating PFHxA, PFBA and PFBS similarly with respect to dilution increases consistency when considering limits to protect the hazard index site-specific criteria.

Figure 19. Box and whisker plots for natural log transformed raw PFAS data (ng/g) by taxa.

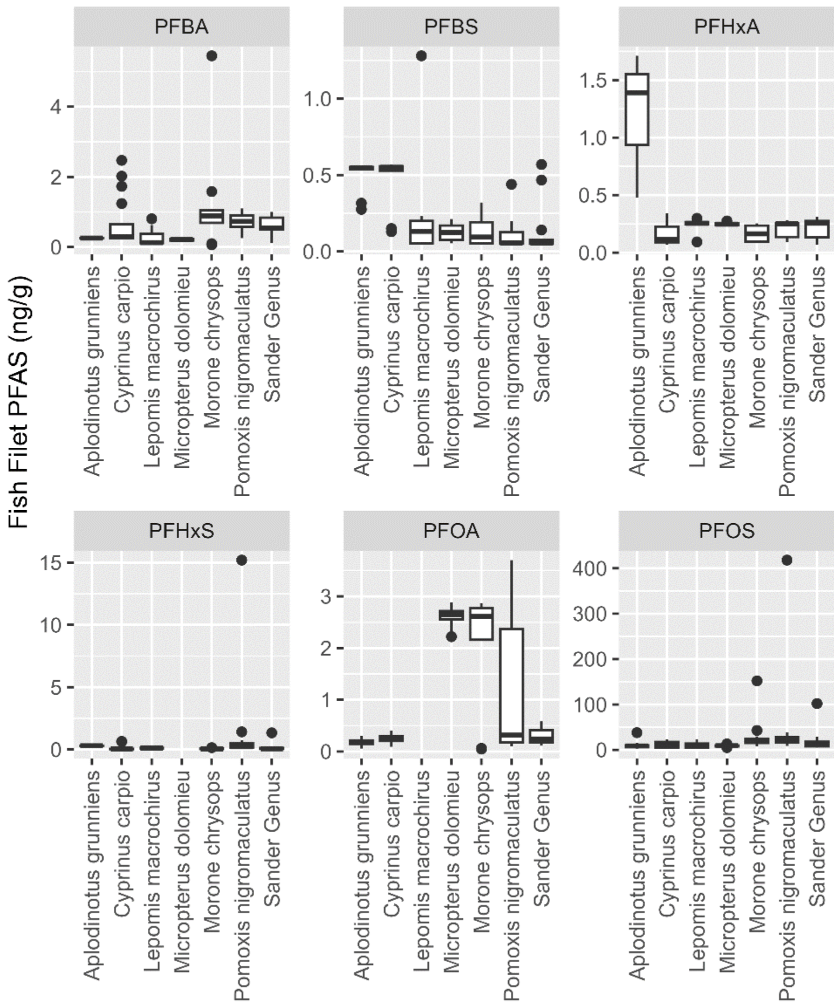
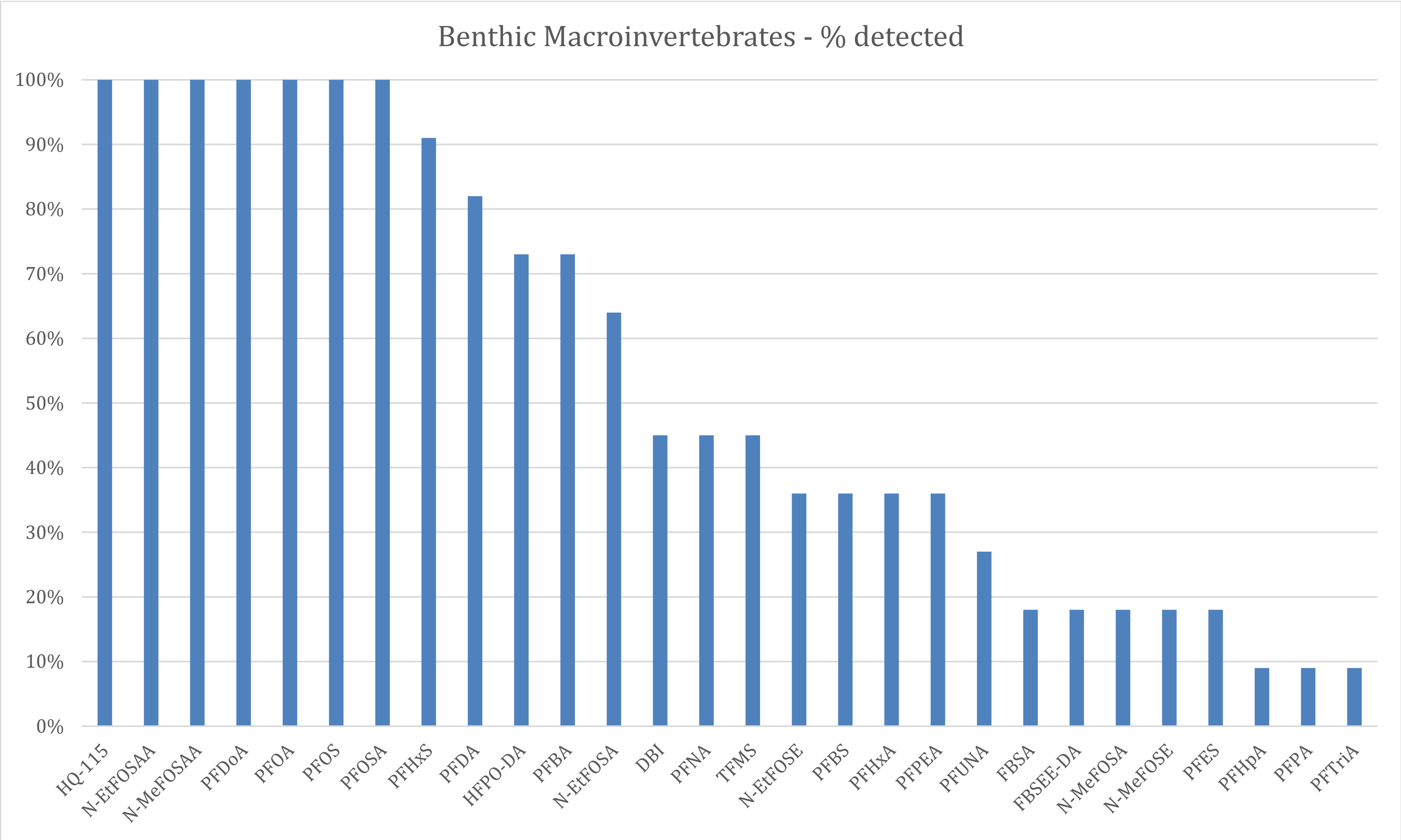


Figure 20. Benthic macroinvertebrates detection rates for selected PFAS compounds.



PFBS Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharge has the reasonable potential to cause an exceedance of the PFBS site-specific criterion in the Mississippi River. The 3M PFBS effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (7,720 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 3,000 ng/L PFBS site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFBA Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharger has the reasonable potential to cause an exceedance of the PFBA site-specific criterion in the Mississippi River. The 3M PFBA effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (20,600 ng/L) and a PEQ factor of one. No WQBEL was recommended for PFBA.

PFHxA Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharger has the reasonable potential to cause an exceedance of the PFHxA site-specific criterion in the Mississippi River. The 3M PFHxA effluent data are highly variable and have a CV greater than three. Since that variability is so high, the MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (6,200 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 4,400 ng/L PFHxA site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFHxS Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharger has the reasonable potential to cause an exceedance of the PFHxS site-specific criterion in the Mississippi River. The 3M PFHxS effluent data are highly variable and have a CV greater than three. Since that variability is so high, MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (9,380 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.0023 ng/L PFHxS site-specific criterion was met at the confluence of the unnamed creek and the Mississippi River under a zero $7Q_{10}$ low flow condition.

PFOA Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharge also has the reasonable potential to cause an exceedance of the PFOA site-specific criterion in the Mississippi River. The 3M PFOA effluent data are highly variable and have a CV greater than three. Since that variability is so high, MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (11,100 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.0092 ng/L PFOA site-specific criterion was met at the confluence of Unnamed Creek and at the stream's confluence with the Mississippi River under zero a $7Q_{10}$ low flow condition.

PFOS Reasonable Potential Analysis
Using the methodologies in the 1991 TSD, the 3M discharge also has the reasonable potential to cause an exceedance of the PFOS site-specific criterion in the Mississippi River. The 3M PFOS effluent data are highly variable and have a CV greater than three. Since that variability is so high, MPCA's default CV of 0.6 was used to set limits. The PEQ was based on the highest reported value (6,300 ng/L) and a PEQ factor of one. WQBELs were set to ensure that the 0.027 ng/L PFOS site-specific criterion was met at the confluence of Unnamed Creek and at the confluence with the Mississippi River under a $7Q_{10}$ low flow condition.

<u>PFAS Hazard Index Reasonable Potential Analysis</u>
The 3M discharge does not have the reasonable potential to cause an exceedance of the PFAS site-specific criterion hazard index of 1.0 in the Mississippi River and no effluent limit for the hazard index is recommended. There is no additional monitoring needed because PFBA, PFBS and PFHxA are already required to be monitored.

Individual effluent limitations for PFBS and PFHxA are being included and compliance with those limits, will bound the concentrations of PFBS and PFHxA that can be discharged. These three individual limits significantly reduce the likelihood that the cumulative hazard index for these two compounds will be exceeded.

From an engineering perspective, the low-level limits for PFOS, PFOA and PFHxS will also force PFBA, PFBS and PFHxA to be treated to low levels. In order to comply with the PFOS, PFOA and PFHxS limits, a greater than 99.8% removal of those compounds will be required. The reverse osmosis and media sorption treatment processes that remove PFOS, PFOA and PFHxS at a greater than 99.8% removal rate will likely also remove PFBA, PFBS and PFHxA at removal rate greater than 99% (Source: 2021 3M treatability study). A greater than 99% removal rate for PFBA, PFBS and PFHxA will lower PFBA, PFBS and PFHxA concentrations to low enough levels that it is unlikely that the 1.0 hazard unit will be exceeded in the receiving waters.

<u>PFAS Monitoring</u>
The PFOS, PFOA and PFHxS limits are below the conventional (<2-4 ng/L) reporting limit for currently available analytical technology such as EPA method 1633. These limits are so low that a separate compliance limit must be established for the purposes of reporting limit compliance to the MPCA.

PFAS compound and total organic fluorine (TOF) and Adsorbable Organic Fluorine (AOF) monitoring frequency is based on the estimated change-out rate of granular GAC and the concern about sampling only happening after the GAC is changed. This monitoring frequency will monitor changes in PFAS and TOF and AOF levels and relate that back to GAC change-outs.

<u>Non-PFAS Pollutants</u>

Outfall SD 002 has shown RP for Di-2-ethyhexylphthalate (DEHP), total lead, and total mercury.

<u>Reasonable Potential Conclusions for DEHP</u>
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for <u>DEHP</u>. The effluent limits were derived from water quality standards pursuant to 40 CFR pt. 122.44 (d)(1)(vii)(A).
The calculation of WQBELs are as follows:

Daily Max = 5.1 ug/L

Monthly Ave. = 2.9 ug/L (based on sampling 2x/month).

<u>Reasonable Potential Conclusions for total lead</u>
Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for <u>total lead</u>. The effluent limits were derived from water quality standards pursuant to 40 CFR pt. 122.44 (d)(1)(vii)(A).
The calculation of WQBELs are as follows:

Daily Max = 20 ug/L

Monthly Ave. = 12 ug/L (based on sampling 2x/month).

Reasonable Potential Conclusions for total mercury

Monitoring results of the effluent include 47 data points at a calculated a default CV of 0.6. The default statistics were used because several of the mercury data points were below the reporting level. Projected effluent quality (PEQ) is derived as an upper bound value from the highest value measured (43 ng/l), and the determined variability (CV = 0.6) and number of data points (47). The preliminary effluent limit (PEL) calculation assumes that the background mercury concentration is at the water quality standard (6.9 ng/l) when the listed stream impairment is for fish consumption advice, and no local river water column analytical data exist. To assure that the discharge does not cause or contribute to a water quality standards excursion for mercury impaired waters, the numeric water quality standard (6.9) is applied at the point of discharge for the mass balance equation for the subsequent preliminary effluent limit calculations. Where PEQ exceeds the PEL, there is reasonable potential to cause or contribute to a water quality standards excursion. Since PEQ exceeds the PEL in this case, reasonable potential to cause or contribute to an excursion above water quality standards is indicated. A water quality-based effluent limit (WQBEL) is needed. The effluent limits were derived from water quality standards pursuant to 40 CFR pt. 122.44 (d)(1)(vii)(A). The calculation of WQBELs are as follows:

Daily Max = 16.8 ng/L

Monthly Ave. = 9.7 ng/L (based on sampling 2x/month).

Table 13 contains the inputs to the reasonable potential analysis for 1,2 Dichloroethane, arsenic, cadmium, antimony, hexavalent chromium, copper, free cyanide, chloroform, Di-2-ethylhexylthalate, methylene chloride, nickel, lead, phenol, selenium, toluene, zinc and mercury. The analysis is made with effluent data that is expressed as total metal except hexavalent chromium. Table 13 also has reasonable potential calculations for perfluorbutanoic acid (PFBA), perfluorobutnesulfonoic acid (PFBS), perfluorhexanoic acid (PFHxA), perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA), and perfluorooctanesulfonic acid (PFOS). These pollutants were evaluated on the basis of analytical measurements that made evident the need for a full determination. Where Projected Effluent Quality (PEQs) exceed Preliminary Effluent Limitations (PELs), a Water Quality-based Effluent Limit (WQBEL) is needed. Please note there is no dilution given for total mercury or for PFOS since pool 2 of the Mississippi River is listed as an impaired water for these two pollutants.

Table 21: Summary of RP Calculations – SD 002

Table 6. Reasonable Potenital For Outfall SD002.

Parameter	1,2-DCA (ug/L)	T. As (ug/L)	Bromoform (ug/L)	Cr6 (ug/L)	Free CN (ug/L)
Plant flow MDF (mgd)	8.7	8.7	8.7	8.7	8.7
Rec. water flow, 7Q10(mgd)	0	0	0	0	0
Background Conc.	0	0	0	0	0
Chronic Std (cs)	190.00	53.00	466.00	11.00	5.20
290					
ppm hard					
Maximum Std (ms)	45050.00	360.00	2900.00	16.00	22.00
290					
ppm hard					
Final Acute Value (FAV)	90100	720	5800	32	45
290					
ppm hard					
Mass Balance -cs	190.00	53.00	466.00	11.00	5.20
Mass Balance -ms	45050.00	360.00	2900.00	16.00	22.00
Coeff of Variation (CV)	0.60000	0.60000	0.60000	0.60000	0.60000
Long Term Avg-cs	148.26	41.36	363.62	5.80	2.74
Long Term Avg-ms	14465.35	115.59	931.18	5.14	7.06
Preliminary Effl limits:					
Daily Max	461.72	128.80	1132.43	16.00	8.54
Monthly Ave (2x/month)	266.52	74.34	653.67	9.24	4.93
Max Measured Value	0.1300	3.2000	2.4000	0.9900	20.1000
# data points	72	35	72	35	74
PEQ	0.123	3.683	2.274	1.139	18.915
Reasonable Potential					
PEQ>Daily max	FALSE	FALSE	FALSE	FALSE	TRUE
PEQ>Monthly Ave.	FALSE	FALSE	FALSE	FALSE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	FALSE	FALSE
Final Reasonable Potential	No	No	No	No	NO!

Notes

The Mississippi River is a class 2Bg, 3, 4A, 4B, 5 and 6 water
The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water
The unnamed stream 7Q10 is 0.0cfs
The Mississippi River 7Q10 equals 2167 cfs
Max Design Flow is 8.7 mgd
The Mississippi River has TMDL for PFOS and mercury
The unnamed stream has a TMDL for total mercury
No- the Cyanide based data is based on total cyanide, not free or amendable CN
The phenol data from the priority pollutant scans did not follow the chemistry method
described for routine monitoring for outfall SD001. RP was not found with phenol for outfall
SD002
PFAS RP applied to the mouth of the unnamed stream

Table 21: Summary of RP Calculations – SD 002 (continued)

Table 6. Reasonable Potenital For Outfall SD002 (Continued).

Parameter	T. Cu (ug/L)	DEHP (ug/L)	T. Ni (ug/L)	T. Pb (ug/L)	T. Se (ug/L)	Toluene (ug/L)	T. Hg (ng/L)
Plant flow MDF (mgd)	8.7	8.7	8.7	8.7	8.7	8.7	8.7
Rec. water flow, 7Q10(mgd)	0	0	0	0	0	0	0
Background Conc.	0	0	0	0	0	0	6.9
Chronic Std (cs)	19.02	2.10	388.08	12.34	5.00	253.00	6.90
290							
ppm hard							
Maximum Std (ms)	48.34	210.00	3490.92	316.64	20.00	1352.00	2400.00
290							
ppm hard							
Final Acute Value (FAV)	97	410	6982	635	40	2703	4900
290							
ppm hard							
Mass Balance -cs	19.02	2.10	388.08	12.34	5.00	253.00	6.90
Mass Balance -ms	48.34	210.00	3490.92	316.64	20.00	1352.00	2400.00
Coeff of Variation (CV)	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000
Long Term Avg-cs	10.03	1.64	204.68	6.51	2.64	133.44	5.38
Long Term Avg-ms	15.52	67.43	1120.92	101.67	6.42	434.12	770.63
Preliminary Effl limits:							
Daily Max	31.24	5.10	637.46	20.27	8.21	415.57	16.77
Monthly Ave (2x/month)	18.03	2.95	367.96	11.70	4.74	239.88	9.68
Max Measured Value	14.4000	211.0000	3.0000	92.0000	2.6000	4.4000	43.0000
# data points	35	71	35	34	34	72	37
PEQ	16.572	200.643	3.452	106.764	3.017	4.169	48.705
Reasonable Potential							
PEQ>Daily max	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE
PEQ>Monthly Ave.	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Final Reasonable Potential	No	Yes	No	Yes	No	No	Yes

Notes

The Mississippi River is a class 2Bg, 3, 4A, 4B, 5 and 6 water

The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water

The unnamed stream 7Q10 is 0.0cfs

The Mississippi River 7Q10 equals 2167 cfs

Max Design Flow is 8.7 mgd

The Mississippi River has TMDL for PFOS and mercury

The unnamed stream has a TMDL for total mercury

No- the Cyanide based data is based on total cyanide, not free or amendable CN

The phenol data from the priority pollutant scans did not follow the chemistry method described for routine monitoring for outfall SD001. RP was not found with phenol for outfall SD002

PFAS RP applied to the mouth of the unnamed stream

Table 21: Summary of RP Calculations – SD 002 (continued)

Table 6. Reasonable Potenital For Outfall SD002 (Continued).						
Parameter	PFBA (ng/L)	PFBS (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFOA (ng/L)	PFOS (ng/L)
Plant flow MDF (mgd)	8.7	8.7	8.7	8.7	8.7	8.7
Rec. water flow, 7Q10(mgd)	0	0	0	0	0	0
Background Conc.	0	0	0	0	0	0
Chronic Std (cs)	25000.00	3000.00	4400.00	0.0023	0.0092	0.027
290						
ppm hard						
Maximum Std (ms)	NA	NA	NA	NA	NA	NA
290						
ppm hard						
Final Acute Value (FAV)	NA	NA	NA	NA	NA	NA
290						
ppm hard						
Mass Balance -cs	25000.00	3000.00	4400.00	0.00	0.01	0.03
Mass Balance -ms	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Coeff of Variation (CV)	0.60000	0.60000	0.60000	0.60000	0.60000	0.60000
Long Term Avg-cs	19507.37	2340.88	3433.30	0.00	0.01	0.02
Long Term Avg-ms	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Preliminary Effl limits:						
Daily Max	60752.55	7290.31	10692.45	0.01	0.02	0.06561
Monthly Ave (2x/month)	35068.08	4208.17	6171.98	0.00	0.01	0.03787
Max Measured Value	20600.0000	7720.0000	6200.0000	9380.0000	11100.0000	6300.0000
# data points	106	106	77	80	78	79
PEQ	20600.000	7720.000	6200.000	9380.000	11100.000	6300.000
Reasonable Potential						
PEQ>Daily max	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
PEQ>Monthly Ave.	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
PEQ> FAV	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Final Reasonable Potential	No	Yes	Yes	Yes	Yes	Yes
Notes						
The Mississippi River is a class 2Bg, 3, 4A, 4B, 5 and 6 water						
The unnamed stream is a class 2Bg, 3, 4A, 4B, 5, 6 water						
The unnamed stream 7Q10 is 0.0cfs						
The Mississippi River 7Q10 equals 2167 cfs						
Max Design Flow is 8.7 mgd						
The Mississippi River has TMDL for PFOS and mercury						
The unnamed stream has a TMDL for total mercury						
No- the Cyanide based data is based on total cyanide, not free or amendable CN						
The phenol data from the priority pollutant scans did not follow the chemistry method						
described for routine monitoring for outfall SD001. RP was not found with phenol for outfall						
SD002						
PFAS RP applied to the mouth of the unnamed stream						

Monitoring for Non-PFAS Chemicals
Hexavalent Chromium
A reasonable potential analysis for hexavalent chromium was not able to be performed because total chromium was analyzed not hexavalent chromium. The federal requirements in the priority pollutant scan require chromium to be sampled as total chromium. However, the Class 2B WQS for chromium is hexavalent chromium. When this facility performs priority pollutant scans for this outfall, they will sample for hexavalent chromium as well as total chromium. This will provide data that matches the hexavalent chromium WQS. The reporting limit for hexavalent chromium shall be 11 ug/L.

Cyanide Sampling
A reasonable potential analysis for cyanide was not able to be performed because total cyanide was analyzed not free cyanide. The federal requirements in the priority pollutant scan require cyanide to be sampled as total cyanide. However, the Class 2B WQS for cyanide is free cyanide. This facility will need to monitor for total cyanide and free cyanide (or amendable cyanide) methods since free cyanide chemistry is rarely available. The reporting limits for total cyanide and amendable cyanide shall be as close to the chronic WQS of 5.2 ug/L as possible.

Total Lithium
Because of the lithium salts associated with the PFAS in the effluent, this outfall will monitor quarterly for total lithium. Standard Method 3111 B with a reporting limit of 2 ug/L shall be used.

Reporting Limits for Metals
The reporting limits for total cadmium, total lead, total copper, total nickel, total zinc, and total antimony shall be no greater than 10 ug/L.

Salty Monitoring
The Permittee has not reported any data for salty parameters such as total dissolved solids, chloride, sulfate, or specific conductance. Due to the low stream dilution ratio, this outfall must sample quarterly for the following salty parameters: total chloride, total dissolved salts (as total dissolved solids), total sulfate, specific conductivity, and total hardness (Mg +Ca as CaCO3).

State Discharge Restrictions (SDR)

SDRs are not considered WQBELs. The MPCA requires secondary treatment or the equivalent as a minimum to protect water quality and maintain in-stream WQS[2]. Therefore, the restrictions are generally stringent enough to protect WQS, except where there is inadequate dispersion, or dilution at applicable minimum stream flows.

Limits are applied pursuant to Minn. R. 7053.0225, subp. 1(B). SDRs requiring effluent quality based on secondary treatment are applied in this permit for five-day carbonaceous biochemical oxygen demand ($CBOD_5$), potential of hydrogen (pH), and Total Suspended Solids (TSS) (Minn. R. 7053.0215, subp. 1 and 7053.0225, subp. 1.B).

The limits on discharge of floating solids, visible foam, and oil are based on Minn. R. 7050.0210. The pH limits and the $CBOD_5$ and TSS monthly average limits are established based on Minn. R. 7053.0225 and 7053.0215. The $CBOD_5$ and TSS monthly average limits are used to determine the daily maximum limits. These limits are based on 40 CFR §122.45 and Minn. R. 7053.0225 and 7053.0215.

[2] Minnesota Regulation WPC 15, Criteria for the Classification of the Interstate Waters of the State and the Establishment of Standard of Quality and Purity. Minnesota Pollution Control Agency, April 8, 1969.

Table 22: SDRs – SD 002

Pollutant	Calendar month average	Calendar month maximum	Daily maximum	Basis
BOD, Carbonaceous 05 Day (20 Deg C)	25 mg/L 822 kg/day			Minn. R. ch. 7053.0225 subp. 1.B
pH	Within Range of 6.0 -9.0 SU			Minn. R. ch. 7053.0215
Solids, Total Suspended (TSS)	30 mg/L 987 kg/day	1,973 kg/day	60 mg/L	Minn. R. ch. 7053.0225 subp. 1.B

Summary of Proposed Effluent Limit and Monitoring Requirements

Table 23 – SD 002

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
List 1. PFAS compound monitoring parameters					Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	once per month	24-Hour Flow Composite	Jan-Dec
Bis(2-ethylhexyl) phthalate					2.9 calendar month average	5.1 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec
BOD, 05 Day (20 Deg C)		1644 maximum calendar week average	kilograms per day			50 maximum calendar week average	milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec
BOD, Carbonaceous 05 Day (20 Deg C)	822 calendar month average		kilograms per day		25 calendar month average		milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec
Chloride, Total						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Chlorine, Total Residual						0.038 daily maximum	milligrams per liter	once per week	Grab	Jan-Dec
Cyanide, Free (as CN)						Monitor only. calendar quarter maximum	micrograms per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Flow		Monitor only. calendar month total	million gallons		Monitor only. calendar month average	Monitor only. calendar month maximum	million gallons per day	once per day	Measurement, Continuous	Jan-Dec
Hardness, Calcium & Magnesium, Calculated (as CaCO3)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Lead, Total (as Pb)					12 calendar month average	20 daily maximum	micrograms per liter	twice per month	24-Hour Flow Composite	Jan-Dec
Lithium, Total (as Li)						Monitor only. calendar quarter maximum	micrograms per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Mercury, Total (as Hg)					9.7 calendar month average	16.8 daily maximum	nanograms per liter	twice per month	Grab	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**
Mercury, Dissolved (as Hg)					Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	twice per month	Grab	Jan-Dec
Nitrite Plus Nitrate, Total (as N)						Monitor only. daily maximum	milligrams per liter	twice per year	24-Hour Flow Composite	Mar, Sep
Nitrogen, Ammonia, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec
Nitrogen, Kjeldahl, Total						Monitor only. daily maximum	milligrams per liter	twice per year	24-Hour Flow Composite	Mar, Sep
Nitrogen, Total (as N)						Monitor only. daily maximum	milligrams per liter	twice per year	Calculation	Mar, Sep
Oil & Grease, Total Recoverable (Hexane Extraction)						10 daily maximum	milligrams per liter	once per week	Grab	Jan-Dec
Oxidants, Total Residual						Monitor only. daily maximum	milligrams per liter	twice per year	24-Hour Flow Composite	Mar, Sep
Perfluorobutanesulfonic acid (PFBS)	138,390 calendar month average		grams per day		4,208 calendar month average	7,290 daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorobutanoic acid (PFBA)	Monitor only. calendar month average		grams per day		Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorohexanesulfonic acid (PFH1S / PFHS / PFHxS)	0.11 calendar month average		grams per day		2.1*RL (0.0032) calendar month average	2.1*RL (0.0056) daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorohexanoic acid (PFHxA)	202,972 calendar month average		grams per day		6,172 calendar month average	10,692 daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorooctanesulfonic acid (PFOS)	1.25 calendar month average		grams per day		2.2*RL (0.038) calendar month average	2.1*RL (0.066) daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
Perfluorooctanoic acid (PFOA)	0.42 calendar month average		grams per day		2.1*RL (0.013) calendar month average	2.1*RL (0.022) daily maximum	nanograms per liter	once per week	24-Hour Flow Composite	Jan-Dec
pH				6.0 calendar month minimum		9.0 calendar month maximum	standard units	once per day	Measurement, Continuous	Jan-Dec

Parameter	Discharge limitations							Monitoring requirements		
	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period
Phosphorus, Total (as P)					Monitor only. calendar month average		milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec
Solids, Total Dissolved (TDS)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Solids, Total Suspended (TSS)	987 calendar month average	1,973 calendar month maximum	kilograms per day		30 calendar month average	60 daily maximum	milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec
Solids, Total Suspended (TSS) grab (Mercury)					Monitor only. calendar month average	Monitor only. daily maximum	milligrams per liter	twice per month	Grab	Jan-Dec
Specific Conductance						Monitor only. calendar quarter maximum	micromhos per cm	once per quarter	Measurement	Mar, Jun, Sep, Dec
Sulfate, Total (as SO4)						Monitor only. calendar quarter maximum	milligrams per liter	once per quarter	24-Hour Flow Composite	Mar, Jun, Sep, Dec
Temperature, Water (F)						83.0 calendar month maximum	degrees Fahrenheit	once per week	Measurement, Instantaneous	Jan-Dec

SD 003: Combined Discharge from SD 001 and SD 002

The receiving water lowest average seven-day flow with a once in ten-year recurrence interval ($7Q_{10}$) low flow at outfall SD 003 is zero cfs, thus no dilution factors were used in determining the discharge limits in relation to the immediate receiving waters.

The outfall SD 003 monitoring frequency is based on MPCA guidelines. The monitoring frequencies are set to achieve sufficient data to determine the compliance with limits established for this facility.

Technology-based effluent limits

The 40 CFR pt. 414 Point Source Category ELGs are not applicable to the combined (SD 001 and SD 002) discharges from SD 003. The permit requirements are set according to 40 CFR §122 and Minn. R. chs. 7001, 7050, 7053, 7060 and 7090.

Water quality-based limits

Minn. R. 7053.0205, subp. 8 requires the MPCA to develop WQBELs for point source discharges to waters of the state of Minnesota to protect receiving waters for the applicable use classifications.

Minn. R. 7050.0155 requires that all waters must maintain a level of water quality that provides for the attainment and maintenance of the water quality standards of downstream waters, including the waters of another state.

WQBELs for total residual chlorine are based on Class 2B waters (Minn. R. 7050.0222) and phosphorus (Minn. R. 7053.0255). For total phosphorus, WQBELs are derived from numeric lake and river eutrophication standards (Minn. R. 7050.0222). See the 'Explanation of Total Phosphorus Review' section below for additional information regarding the development of the total phosphorus limit(s).

The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm aquatic biota, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water (Minn. R. 7050.0222, subp. 4).

The beneficial use subclass designator "g" is added to the Class 2 designator as a specific additional designator. The additional subclass designator does not replace the Class 2 designator. All requirements for Class 2 stream and river habitats in parts 7050.0222 and 7052.0100 continue to apply in addition to requirements for Class 2Bg stream and river habitats in Minn. R. 7050.0222. This subclass designator applies to lotic waters only.

The TRC limit is established equal to the FAV in Minn R. 7050.0222, according to Minn. R. 7053.0225 and 7053.0215, and Section 101 of the Clean Water Act, that prohibit the discharge of toxic pollutants in toxic amounts.

Table 24: WQBELs – SD 003

Pollutant	Calendar month average	12 Month moving total	Daily maximum	Basis
Chlorine, Total Residual			0.038 mg/L	Minn. R. ch. 7050.0222
Phosphorus, Total (as P)		6,253 kg/yr		Minn. R. ch. 7050.0222

Background for Reasonable Potential Review

Reasonable Potential for Whole Effluent Toxicity (WET)

The discharger previously had an acute WET limit of 0.9999 Toxic Unit acute (TUa). This daily maximum limit was designed to protect the Mississippi River (not the unnamed creek). From 2012 through 2022, the facility had no problems meeting this limit at SD 003.

To protect the unnamed creek, the Permittee is now required to perform chronic WET testing since the dilution ratio of the stream flow to the maximum design flow is less than 20:1. Since the 7Q10 is 0.0 cfs for the unnamed creek, the Permittee will need to meet the chronic WET monitoring value of 1.0 Toxic Unit chronic (TUc) at SD 003. This is a monitoring threshold value, not a limit. Chronic WET monitoring will be required once per year.

Summary of Proposed Effluent Limit and Monitoring Requirements

Table 25 – SD 003

	Discharge limitations							Monitoring requirements		
Parameter	**Quantity /Loading avg.**	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**
Chlorine, Total Residual						0.038 daily maximum	milligrams per liter	once per week	Grab	Jan-Dec
Flow		Monitor only. calendar month total	million gallons		Monitor only. calendar month average	Monitor only. calendar month maximum	million gallons per day	once per day	Measurement, Continuous	Jan-Dec
Phosphorus, Total (as P)		6,253 12-month moving total	kilograms per year					once per month	Calculation	Jan-Dec
Chronic WET							Toxic Unit chronic	once per year	Flow proportion 24-hr composite	Jan-Dec

Explanation of total phosphorus limit review

Total phosphorus WQBEL

Federal law [40 CFR §122.44(d)] restricts mass increases of pollutants upstream of an impaired water and requires WQBEL(s) to be established for pollutant parameters where it is found that a NPDES/SDS discharger has the reasonable potential (RP) to cause or contribute to an excursion above a state WQS. An effluent limits analysis was completed to determine if the facility's discharge has RP to cause or contribute to an exceedance of a state WQS or contribute to any downstream impairment. As a result of the analysis, total phosphorus effluent limits were established for the facility to ensure protection of downstream waters and to comply with Lake Eutrophication Standards. A summary of the effluent limits analysis and the assigned total phosphorus limit are included below. For additional details regarding the effluent limits analysis, please see the "*Lower Portion of Mississippi River – Twin Cities Watershed Review."* A copy of the MPCA memorandum is available upon request.

Lake Eutrophication Standards

Effluent from the facility is discharged upstream of Lake Pepin which currently exceeds numeric lake eutrophication standards. Eutrophication standards for lakes, shallow lakes, and reservoirs can be found in Minn. R. 7050.0222 (https://www.revisor.mn.gov/rules/?id=7050.0222). Federal law [40 CFR §122.44(d)] restricts mass increases upstream of impaired waters and states that NPDES/SDS permits for all dischargers that have the RP to cause or contribute to downstream impaired waters are required to contain WQBELs derived from the WQS. When determining RP, the Code of Federal Regulations also states that MPCA shall use procedures which account for existing controls on point and nonpoint sources of pollution. Permittees are found to have RP for TP if: 1) they discharge upstream of a nutrient impaired waterbody, 2) they discharge at TP concentrations greater than the ambient target, and 3) there is no geographical barrier capable of trapping a significant mass of nutrients between the outfall and the impairment. For all reasons listed above, the facility is found to have RP for TP upstream of Lake Pepin. Therefore, the facility has been assigned a 12-month moving total mass TP WQBEL as a result of the Waste Load Allocation (WLA) derived from the WQS. Final WLAs in combination with other point and nonpoint allocations are calculated to achieve the nutrient/eutrophication WQS for Lake Pepin.

Currently there are 407 dischargers upstream of Lake Pepin with RP. The gross WLA was split between the affected dischargers, in consideration of facility size and type. More detail regarding the method used to split the gross WLA into individual WLAs is provided in the MPCA memorandum for the watershed effluent limit analysis.

The TP effluent limit assigned to the facility (applied to SD 003) to protect for eutrophication impairment in Lake Pepin is 6,253 kilograms per year (kg/yr) as a 12-month moving total.

River Eutrophication Standards (RES)

The Lower Portion of the Mississippi River – Twin Cities Watershed analysis demonstrated that the facility does not have RP to cause or contribute to a river eutrophication impairment in the Mississippi River – Twin Cities Watershed, under permitted effluent conditions. As such, the 6,253 kg/yr (12-month moving total) limit described above is sufficient to achieve the river eutrophication criterion of 125 µg/L TP in Pool 2 of the Mississippi River and the lake eutrophication criterion of 100 µg/L in Lake Pepin.

The monitoring frequencies for outfalls SD 001 – SD 003 are set to achieve sufficient data to determine the compliance with established limits. The proposed limit and monitoring requirements for the surface discharge stations are found in the limits and monitoring table in the accompanying draft permit document.

Waste stream stations

Limits and monitoring requirements for waste streams are assigned in order to ascertain a waste stream's impact on wastewater treatment processes, another treatment facility, and/or land treatment/discharge sites. Requirements are based on MPCA sampling policies and/or state health requirements.

WS 001 – WS 007

This permit contains seven waste streams, that have been assigned a WS station for monitoring and reporting purposes. The process and sanitary WW AIX effluent prior to the confluence with the RO permeate for SD 001 will be monitored as WS 001. The NCCW, GW, and ISW AIX effluent prior to the confluence with the RO permeate for SD 002 will be monitored as WS 002. The effluent from the lag vessels of the GW/ISW/NCCW GAC system in Building 150 will be monitored as WS 003. The effluent from the lag vessels of the WW GAC system in Building 150 will be monitored as WS 004. The effluent from the lead vessels of the Phase 1 and 2 GAC system in Building 185 will be monitored as WS 005. The effluent from the lag vessels of the Potable GAC system in Building 92 will be monitored as WS 006. The effluent from the lag vessels of the Non-Potable GAC system in Building 92 will be monitored as WS 007. The following tables outline the associated intervention limit and monitoring requirements for the waste streams. Intervention limits at WS 001-WS 002 are calculated from the six PFAS compounds with limits at SD 001 and SD 002 using dilution ratios. Intervention limits at WS 005 are based on the 3M GAC Treatment System O&M Plan dated June 27, 2003. If an intervention limit is exceeded, the Permittee must take action as described in the Intervention Limits section that corresponds to the particular WS station in the permit.

The remaining waste stream stations (WS 008 – WS 027) represent industrial stormwater monitoring and are described in the stormwater management section.

Table 26: WS 001 – WS 002: (Process & Sanitary AIX Effluent Prior to Confluence with RO Permeate for SD 001 and NCCW, GW, & ISW AIX Effluent Prior to Confluence with RO Permeate for SD 002)

Pollutant	Calendar month average intervention limit (ng/L)	Daily maximum intervention limit (ng/L)	Frequency	Which months
2,3,3,3-Tetrafluoropropanoic acid (2333-TFPA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Flow	Monitor Only	Monitor Only	once per day	Jan-Dec
Fluorine, Adsorbable Organic (AOF)	Monitor Only	Monitor Only	once per month	Jan-Dec
Fluorine, Total Organic (TOF)	Monitor Only	Monitor Only	once per month	Jan-Dec
Lithium bis[(trifluoromethyl)sulfonyl]azanide (HQ-115 / TFSI-LI)	Monitor Only	Monitor Only	once per month	Jan-Dec
Perfluorobutanesulfonic acid (PFBS)	22,429	38,856	once per week	Jan-Dec
Perfluorobutanoic acid (PFBA)* This Intervention limit only applies to WS 001.	186,912	323,808	once per week	Jan-Dec
Perfluoroheptanesulfonic acid (PFHpS)	Monitor Only	Monitor Only	once per month	Jan-Dec
Perfluoroheptanoic acid (PFHpA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Perfluorohexanesulfonic acid (PFH1S /PFHS / PFHxS)	0.0171	0.0298	once per week	Jan-Dec

Perfluorohexanoic acid (PFHxA)	32,897	56,988	once per week	Jan-Dec
Perfluorooctanesulfonic acid (PFOS)	0.155	0.27	once per week	Jan-Dec
Perfluorooctanoic acid (PFOA)	0.069	0.117	once per week	Jan-Dec
Perfluoropentanesulfonic acid (PFPeS)	Monitor Only	Monitor Only	once per month	Jan-Dec
Perfluoropentanoic acid (PFPeA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Perfluoropropanoic acid (PFPA / PFPrA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Potassium 2,2,3,3-tetrafluoropropanoate (2233-TFPA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Trifluoroacetic acid (TFA)	Monitor Only	Monitor Only	once per month	Jan-Dec
Trifluoromethanesulfonic acid (TFMS / PFMeS)	Monitor Only	Monitor Only	once per month	Jan-Dec

Table 27: WS 003 – WS 004: (BLD 150 GW/ISW/NCCW GAC Lag Vessel Effluent and BLD 150 WW GAC Lag Vessel Effluent)

Pollutant	**Daily maximum (ng/L)**	**Frequency**	**Which months**
2,3,3,3-Tetrafluoropropanoic acid (2333-TFPA)	Monitor Only	once per month	Jan-Dec
Fluorine, Adsorbable Organic (AOF)	Monitor Only	once per month	Jan-Dec
Fluorine, Total Organic (TOF)	Monitor Only	once per month	Jan-Dec
Lithium bis[(trifluoromethyl)sulfonyl]azanide (HQ-115 / TFSI-LI)	Monitor Only	once per month	Jan-Dec
Perfluorobutanesulfonic acid (PFBS)	Monitor Only	once per week	Jan-Dec
Perfluorobutanoic acid (PFBA)	Monitor Only	once per week	Jan-Dec
Perfluoroheptanesulfonic acid (PFHpS)	Monitor Only	once per month	Jan-Dec
Perfluoroheptanoic acid (PFHpA)	Monitor Only	once per month	Jan-Dec
Perfluorohexanesulfonic acid (PFH1S /PFHS / PFHxS)	Monitor Only	once per week	Jan-Dec

Perfluorohexanoic acid (PFHxA)	Monitor Only	once per week	Jan-Dec
Perfluorooctanesulfonic acid (PFOS)	Monitor Only	once per week	Jan-Dec
Perfluorooctanoic acid (PFOA)	Monitor Only	once per week	Jan-Dec
Perfluoropentanesulfonic acid (PFPeS)	Monitor Only	once per month	Jan-Dec
Perfluoropentanoic acid (PFPeA)	Monitor Only	once per month	Jan-Dec
Perfluoropropanoic acid (PFPA / PFPrA)	Monitor Only	once per month	Jan-Dec
Potassium 2,2,3,3-tetrafluoropropanoate (2233-TFPA)	Monitor Only	once per month	Jan-Dec
Trifluoroacetic acid (TFA)	Monitor Only	once per month	Jan-Dec
Trifluoromethanesulfonic acid (TFMS / PFMeS)	Monitor Only	once per month	Jan-Dec

Table 28: WS 005 (Effluent from the Lead Vessels of the Phase 1 and 2 GAC System in Building 185)

Pollutant	**Daily maximum intervention limit**	**Frequency**	**Which months**
1,1-Dichloroethane	59 ug/l	once per week	Jan-Dec
1,2-Dichloroethane	68 ug/l	once per week	Jan-Dec
Benzene	136 ug/l	once per week	Jan-Dec
Chemical Oxygen Demand (COD)	40 mg/l	once per week	Jan-Dec
Chloroform	21 ug/l	once per week	Jan-Dec
Ethylbenzene	32 ug/l	once per week	Jan-Dec
Dichloromethane (Methylene chloride)	40 ug/l	once per week	Jan-Dec
Diethyl Phthalate	203 ug/l	once per week	Jan-Dec
Toluene	26 ug/l	once per week	Jan-Dec

Table 29: WS 006 – WS 007 (Effluent from the Lag Vessels of the Potable GAC System in Building 92 and Effluent from the Lag Vessels of the Non-Potable GAC System in Building 92)

Pollutant	Calendar quarter average (ng/L)	Daily maximum (ng/L)	Frequency	Which months
List 1. PFAS compound monitoring parameters	Monitor Only	Monitor Only	once per quarter	Mar, Jun, Sep, Dec

Surface water stations

Monitoring of nearby surface waters is required in the permit. SW 001 and SW 003 monitoring upstream of the facility discharge is used to establish background conditions at the site and this data is compared to downstream monitoring results from SW 002 and SW 004 to determine any potential impacts from the facility.

The proposed limits and monitoring requirements for the surface water stations are found in the limits and monitoring table in the accompanying draft permit document. List 1 (PFAS compound monitoring parameters) shall be monitored quarterly at SW 001 – SW 004. See the "PFAS Surface Water Monitoring Protocol" (Appendix A in draft permit) for additional requirements and information.

Pollutants of concern

Mercury

This permit contains requirements for mercury monitoring and limits. These requirements were added in response to the U.S. Environmental Protection Agency's (EPA's) approval of the Minnesota statewide Mercury Total Maximum Daily Load (TMDL) plan. More information on the TMDL can be found on the MPCA internet site at http://www.pca.state.mn.us/water/statewide-mercury-reduction-plan. Specific mercury monitoring requirements are found in the Waste Stream Stations and/or Surface Discharge Stations chapters of this permit. Those requirements include sampling for TSS via a grab sample taken at the same time as the total and dissolved mercury grab samples are taken.

The mercury monitoring at outfalls SD 001 and SD 002 is consistent with the *MPCA Permitting Strategy for Addressing Mercury in Municipal and Industrial Wastewater Permits* (2013) located on the MPCA website at https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-16.pdf.

Nitrogen

Nitrogen is a pollutant that can negatively impact the quality of Minnesota's water resources, including water used for drinking. Studies have shown that nitrogen in lakes and streams has a toxic effect on aquatic life such as fish. Like phosphorus, nitrogen is a nutrient that promotes algae and aquatic plant growth often resulting in decreased water clarity and oxygen levels. The Statewide Nutrient Reduction Strategy (http://www.pca.state.mn.us/zihy1146) identifies goals and milestones for nitrogen reductions for both point and non-point nitrogen sources in Minnesota. To gain a better understanding of the current nitrogen concentrations and loadings received by and discharged from the facility, effluent nitrogen monitoring is required, in accordance with Minn. Stat. ch. 115.03.

The draft permit includes effluent monitoring for ammonia-nitrogen, nitrite plus nitrate-nitrogen, total Kjeldahl nitrogen and total nitrogen at a frequency of once per month for the five-year term of the permit. Ammonia-nitrogen limits apply to outfall SD 001.

This nitrogen monitoring will provide the data necessary to develop a better understanding of the total nitrogen concentrations and loadings that are discharged. Once a more extensive total nitrogen data set is established, nitrogen reduction work can begin to achieve the necessary reductions to meet the goal of a 20% reduction in total nitrogen loads from point source dischargers by 2025. The changes and/or increases in total nitrogen monitoring in wastewater permits as a result of the *Statewide Nutrient Reduction Strategy* is outlined in the *Minnesota NPDES Wastewater Permit Nitrogen Monitoring Implementation Plan* document located on the MPCA's Wastewater permits webpage at https://www.pca.state.mn.us/water/wastewater-additional-guidance-and-information.

Per- and Polyfluoroalkyl substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a group of more than 5,000 human-made chemicals that do not break down over time. They are a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom. Their extreme resistance to degradation in the environment and resistance to destruction in wastewater treatment plants, landfills, and incinerators has led to the nickname "forever chemicals."

Many PFAS are known to be health hazards to humans. Several specific PFAS have been linked to increased risks for cancer, liver disease, immune system disfunction, and other negative health impacts. PFAS can also negatively impact aquatic life and wildlife.

Please refer to the Background for Reasonable Potential Review sections related to PFAS for SD 001 and SD 002.

Phosphorus

Phosphorus is a common constituent in many wastewater discharges and a pollutant that has the potential to negatively impact the quality of Minnesota's lakes, wetlands, rivers, and streams. Phosphorus promotes algae and aquatic plant growth, often resulting in decreased water clarity and oxygen levels. In addition to creating general aesthetic problems, these conditions can also impact a water body's ability to support healthy fish and other aquatic species. Therefore, phosphorus discharges are being carefully evaluated throughout the state.

The Permittee is required to meet a phosphorus limit as specified in the limits and monitoring section of this permit. Although the Permittee is not required to prepare a Phosphorus Management Plan, elimination or reduction of phosphorus at the source will decrease the influent load to the wastewater treatment facility and has the potential to improve treatment efficiency and reduce treatment costs. The MPCA strongly encourages the Permittee to identify and eliminate/reduce sources of phosphorus to, and optimize phosphorus management within, the facility.

All phosphorus samples must be analyzed by a certified laboratory and the data submitted to the MPCA. If the laboratory would like more information about becoming certified, please call the Environmental Laboratory Certification Unit at 612-676-5200. Samples must be collected in a clean bottle (preferably cleaned by a certified laboratory) that was not washed with phosphate detergent. Also, a sulfuric acid preservative must be added immediately after the sample is collected, and it must be stored at four degrees Celsius until analysis. If a contract laboratory is used, the bottle and preservative would typically be provided by the laboratory analyzing the sample.

Salty discharge monitoring

In recent years, MPCA staff became aware of issues associated with "salty discharges." As a result, MPCA staff began to request monitoring for these facilities and began assigning effluent limits to facilities that already have data that show a reasonable potential to exceed a WQS for Classes 2, 3 and 4.

Because of increased concern regarding salty discharges, MPCA staff determined that there is a need to obtain more information from dischargers. Facilities with continuous, periodic/seasonal, or intermittent waste flows where the receiving water stream flow to effluent design flow dilution ratio under low flow conditions is less than 5:1 (annual climatic $7Q_{10}$: Maximum Daily Design Flow) will be required to monitor effluent for the following parameters: chloride, hardness, total dissolved solids, specific conductance, and sulfate.

Specific conductance and total salinity are inter-related measures of the ionic composition of waters. In studies of waters for use in irrigation and fish production, the salinity is often expressed as specific electrical conductance. Since specific conductance is a reliable method of measuring the ionic concentration of waters, it serves as a surrogate measures for salinity, and can be used to calculate salinity.

Samples will be collected from surface discharge stations SD 001 and SD 002. Sample frequency is once per quarter.

If monitoring results indicate RP for any of the parameters, the Permittee will be required to submit an application for permit modification and, if necessary, a compliance schedule will be added to the permit to ensure progress towards meeting the WQS.

Sulfate

Sulfate monitoring for protection of wild rice waters

In 1973 Minnesota adopted a sulfate water quality standard to protect wild rice. In a February 16, 2022, letter to the MPCA, the US Environmental Protection Agency (EPA) stated their expectations that MPCA issued NPDES/SDS permits are required to comply with the federally-approved sulfate water quality standard and Minnesota Rules.

In order to comply with the total sulfate water quality standard, MPCA is including total sulfate limits (if applicable) and monitoring requirements in permits that are upstream of a water used for the production of wild rice. There are currently approximately 2400 waters within the state of MN have been identified as waters used for the production of wild rice (this includes the 35 waters identified on the 303(d) impaired waters list). The draft permit contains quarterly monitoring for sulfate.

Temperature

The applicable Class 2B WQS (Minn. R. 7050.0222, subp. 4) for temperature consists of two parts; one is to maintain an increase in temperature of less than five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes; and the other is a maximum daily average temperature not to exceed 86 degrees Fahrenheit. However, instead of 86 degrees Fahrenheit as a maximum daily average limit, the 83 degrees Fahrenheit limit as a calendar month maximum is being carried over in this reissuance due to anti-backsliding (Minn. R. 7053.0275). In general, the MPCA requires temperature monitoring in the receiving water only for very large facilities, or discharges that MPCA staff determine, using best professional judgment, to have a high probability to negatively impact the aquatic community in the receiving water. This approach is consistent with Section 316(a) of the Clean Water Act, which requires discharges of large thermal loads to conduct extensive studies and modeling to determine that their thermal discharge will assure a balanced indigenous aquatic community. As a safeguard, MPCA staff recommend the application of 83 degrees as a permit limit in order to be protective of the designated uses of the receiving waters and ensure that both parts of the WQS for temperature are attained and maintained.

Total residual chlorine (TRC)/oxidants

Dechlorination requirements for Class 7 discharges

In 1984, the EPA established water quality criteria for total residual chlorine based on toxicity thresholds. The EPA's maximum chlorine concentration criteria is 19 micrograms per liter (µg/L). Minn. R. 7050.0220 includes chronic, maximum, and final acute toxicity standards for TRC of 11, 19, and 38 µg/L, respectively. NPDES permits for discharges to Class 2 waters in Minnesota include the 38 µg/L standard as an effluent limitation.

The MPCA has historically applied TRC limits to discharges to Class 2 waters and dischargers to Class 7 waters that directly affect Class 2 waters. The application of limits to these facilities has evolved. Over time, MPCA staff determined that all discharges to Class 2 waters need a TRC limit "end of pipe" regardless of the dilution potential of the receiving water. Subsequently staff applied TRC limits to facilities that discharge to Class 7 waters with less than 24 hours of the travel time to a downstream Class 2 water. The application of TRC limits to the latter group was to prevent the Class 2 water from exceeding the 11 µg/L TRC chronic WQS. The assumption for all other discharges to Class 7 waters was that the chlorine demand in the Class 7 receiving water would alleviate the impact of the chlorine on downstream Class 2 waters.

With assistance from the Minnesota Attorney General's office in the spring of 2009, MPCA staff determined that the application of TRC limits should be extended to all wastewater discharges. This decision was made consistent with Minn. R. 7053.0215 and 7052.0210 and Section 101 of the Clean Water Act. These regulations prohibit the discharge of toxic pollutants in toxic amounts. Minn. R. 7053.0245, which includes requirements for point source discharges to Class 7 waters, states that the standards in 7053.0215 apply to point source dischargers of sewage to Class 7 waters under certain conditions. Subpart 2 of Minn. R. 7053.0245 states that the MPCA shall allow sewage discharges to Class 7 waters "up to" the levels provided in 7053.0215 if it is demonstrated that the standards will be met in the Class 7 waters during all periods of discharge. To protect receiving streams from residual chlorine toxicity MPCA staff must apply TRC limits during periods of discharge. This position is further supported by Dann White's 1991 MPCA policy memo, which recommended that Class 7 discharges of sewage be required to meet acute toxicity standards for a pollutant identified in a specific influent waste stream.

Total suspended solids (TSS)

Suspended Solids may include both organic and inorganic matter. The inorganic compounds may include sand, silt, clay and precipitated metals. The organic fraction may include such materials as wood fibers and unsettled biomass from biological treatment systems.

These solids may settle out rapidly and bottom deposits are often a mixture of both organic and inorganic solids. Solids may be suspended in water for a time and then settle to the bed of the stream or lake. They may be inert, slowly biodegradable materials, or rapidly decomposable substances. While in suspension they increase the turbidity of the water, reduce light penetration, and impair the photosynthetic activity of aquatic plants. Suspended solids may kill fish and shellfish by causing abrasive injuries, by clogging gills and respiratory passages, by screening out light and by promoting and maintaining the development of noxious conditions through oxygen depletion. Suspended solids also reduce the recreational value of water.

The outfall monthly average 30 mg/L TSS limit is more protective than the 32 mg/L reach-specific TSS standard determined for the South Metro Mississippi River (MPCA, 2015). The South Metro Mississippi River Total Suspended Solids TMDL contains a WLA for this facility; the daily mass limit of 545 kg/day as a calendar month average is applied at SD 001 in the permit. This draft permit also includes a modification to the TMDL to include the WLA for SD 002. Adding the original WLA of 545 kg/day (SD 001) to the expanded WLA of 987 kg/day (SD 002) gives a total of 1,532 kg/day.

Total Maximum Daily Load (TMDL) Study

To address water quality impairments, future TMDL studies of the Mississippi River – Twin Cities watershed may be conducted. The studies will determine the capacity to assimilate pollutant loads as the basis for recommendations of wasteload allocation for point sources and load allocation for nonpoint sources within the watershed. An appropriate balance of point and nonpoint source controls that attain water quality objectives will be selected with full stakeholder involvement. Based on the results of the TMDL studies, the permit may be reopened and effluent limitations for this facility may be re-examined. This permit will be modified or reissued as needed to incorporate effluent loading recommendations from future TMDL studies.

The unnamed creek has been identified as impaired and is currently on the 2024 MPCA 303d Impaired Waters List, for fish Indices of Biological Integrity (IBIs) (MPCA, 2024). A TMDL stressor identification process has not yet been done, related to the IBI impairments, to establish IBI-impairment-related waste load allocations, for dischargers to the creek and its tributaries.

The Mississippi River has been identified as impaired and is currently on the 2024 EPA-approved MPCA 303d Impaired Waters List, for *Escherichia coli*. Since the facility discharge is not expected to contain significant concentrations of fecal coliform or *E. coli* bacteria, neither an NPDES permit limit nor TMDL WLA for bacteria is required.

Whole effluent toxicity

The discharge is located on an unnamed creek to the Mississippi River. This creek is a Class 2Bg, 3, 4A, 4B, 5, 6 water and so is this section of the Mississippi River. This outfall is where outfalls SD 001 and SD 002 combine. The $7Q_{10}$ for this section of the Mississippi River is 2167 cfs. The Permittee previously had an acute Whole Effluent Toxicity (WET) test daily limit of 0.9999 Toxic Unit acute (TUa) applied at SD 003 right going into the Mississippi River to protect the Mississippi River (not the unnamed creek). This facility performed eleven acute WET tests from 2012 through 2022. All eleven acute WET tests had results of less than 1.0 Toxic Unit acute (TUa) for each animal tested. There were no violations of the acute WET limit during this time.

To protect the unnamed creek, the Permittee is now required to perform chronic WET testing since the dilution ratio of the stream flow to the maximum design flow is less than 20:1. Since the 7Q10 is 0.0 cfs for the unnamed creek, the Permittee will need to meet the chronic WET monitoring value of 1.0 Toxic Unit chronic (TUc). This is a monitoring threshold value, not a limit. Chronic WET monitoring will be required once per year.

Chemical additives

Chemical additives are addressed by the additive limits and associated monitoring in the permit.

Table 30: Chemical additives currently approved for use at this facility consist of the following:

Additive Brand Name	Dose Per Day	Dosing Units	Discharge Station	Location and/or Purpose
Azone 15	11,193	gal/year	SD 001 and SD 002	System A, UF location
	11,552	gal/year	SD 001 and SD 002	System C feed location
	45,168	gal/year	SD 001 and SD 002	System B Feed location
	74,977	gal/year	SD 001 and SD 002	System A feed location
	2975	gal/year	SD 001 and SD 002	System C UF location
	4,210	gal/year	SD 001 and SD 002	System B UF location
B-22b	6.12	gal/day	SD 001	RO biocide, used 1 hr every 5 days
BoreSaver IKL Pro	20	gal/day	SD 001	Well additive, was a one-time use for 3-4 weeks
Chemtreat C-2189T	1.5	lbs/day	SD 002	Cooling Towers water treatment
Chemtreat CL-2250	0.086	gal/day	SD 002	Cooling Towers water treatment
Chemtreat CL-5643	0.45	gal/day	SD 002	Cooling Towers water treatment
Chemtreat P828IL	150	lbs/day	SD 001	Cooling Towers water treatment

Citric Acid 50% FG	439	gal/year	SD 001 and SD 002	System B, UF location *
	775	gal/year	SD 001 and SD 002	System C, UF location *
	1167	gal/year	SD 001 and SD 002	System A, UF location *
Evonik TMT 15	16.72	gal/day	SD 001	
Evoqua Alumafloc 1	0.67	gal/day	SD 001	
Glycerine 99,5	100	lbs/day	SD 003	1 x use for equipment start up at several locations
Hawkins Phosphorus** 75%	10	gal/day	SD 001 – SD 003	Used to feed bugs in WWTP
Hawkins Urea 32%**	50	gal/day	SD 001 – SD 003	Used to feed bugs in WWTP
KBAC-1020	6.12	gal/day	SD 001 and SD 002	System B, RO location
Kemira PIX-312	27,124	gal/year	SD 001 and SD 002	System B, location feed
	3,566	gal/year	SD 001 and SD 002	System A, feed location
	4,187	gal/year	SD 001 and SD 002	System C feed location
MEM 1905	76.6	gal/day	SD 001	RO anti scaling additive
MEM-2930	9.86	gal/day	SD 001 and SD 002	
MEM-3900	9.37	gal/day	SD 001 and SD 002	
Muric acid	185	gal/day	SD 001	Well additive, 1time use for 3-4 weeks
Nalco 3D Trasar 3DT401	6.4	gal/day	SD 001	
Nalco 9005 microbiocide	5	gal/day	SD 001	Microbiocide
Nalco PP01 3911	1.47	gal/day	SD 001	System B, UF location
Nalco PP01-3911	4.9	gal/day	SD 001	Updated defoamer
Nalco Rustphree 73924	100	gal/day	SD 001	

Nalco Trasar Trac 100	0.329	gal/day	SD 001	
NW-310	9	gal/day	SD 001	Used in wells. 1 time use 3-4 weeks
Sodium Bisulfite (SBS)	715	gal/year	SD 001 and SD 002	System C, UF location *
	972	gal/year	SD 001 and SD 002	System B, UF location *
	2583	gal/year	SD 001 and SD 002	System A, UF location *
	8424	gal/year	SD 001 and SD 002	System B, location Feed *
	22817	gal/year	SD 001 and SD 002	System A, RO location *
Sodium hydroxide 50% diaphragm	408	gal/year	SD 001 and SD 002	System B, UF location
	454	gal/year	SD 001 and SD 002	System C, UF location
	1086	gal/year	SD 001 and SD 002	System A, UF location
Sulfuric Acid 66'	18,091	gal/year	SD 001 and SD 002	System B, location Feed
	39,406	gal/year	SD 001 and SD 002	System A, Location Feed
Water Safe	185	gal/day	SD 001	Well use. 1 time use 3-4 weeks

*For cleaning and regen process, not an intended additive for discharge

**Conditional approval – The facility must still meet ammonia and phosphorus WQBELs established at outfalls SD 001, SD 002, and SD 003

Additional additive approvals will need to be submitted through the additive approval process online.

Stormwater management

Industrial facilities with Standard Industrial Classifications of 2295, 2297, 2672, 2821, 2824, 2843, 2851, 2865, 2869, 2891, 3069, 3081, 3083, 3089, 3229, 3291, 3299, 4225, and 4953 are required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for industrial stormwater disposal.

This permit addresses stormwater discharges associated with industrial activity for facilities that discharge stormwater to waters of the state.

The MPCA has added the necessary industrial stormwater requirements language and limits and monitoring to this permit. The Permittee does not need to obtain separate Industrial Stormwater General Permit Coverage. Stormwater monitoring is represented by SD 009 – SD 029 and WS 008 – WS 027.

This permit covers the following three types of stormwater stations at the 3M Cottage Grove facility:

1) Direct runoff from individual stormwater locations (SD 009 – SD 029)
2) Runoff from combined stormwater locations that collects and infiltrates into the ground (WS 020 and WS 023)

3) Runoff from combined stormwater locations that is collected and transferred to the main WWTP (WS 008 – WS 027 with the exception of WS 020 and WS 023)

Stormwater may discharge through the permitted SD 009 – SD 029 stormwater outfalls. Stations SD 009 – SD 012 and SD 025 are benchmark monitoring locations for different sectors with varying intervention limits as described in the table below (Table 22). The intervention limits are EPA technology-based limits. SD 009 – SD 012 and SD 025 will cease coverage under the Industrial Stormwater General Permit upon the reissuance date of this permit.

Table 31: Benchmark Monitoring Locations

Station	Subsectors	Intervention Limits
SD 009	K1: Hazardous Waste Treatment, Storage, or Disposal Facilities: Industrial Activity Code HZ. Benchmark Parameters Only Applicable to Discharges Not Subject to Effluent Limitations in 40 CFR pt. 445 subp. A	Arsenic 0.680 mg/L $CBOD_5$ 25 mg/L Cadmium 0.0078 mg/L Chromium 3.5 mg/L COD 120 mg/L Cyanide 0.045 mg/L Lead 0.164 mg/L Nitrogen, Ammonia Total (as N) 2.8 mg/L pH 6.0 – 9.0 SU Selenium 0.040 mg/L Silver, Total (as Ag) 0.0041 mg/L TSS 100 mg/L Zinc 0.234 mg/L
SD 010	B1: Pulp, Paper, Cardboard, Converted Paper & Paperboard Products C6: Medicinal Chemicals & Botanical Products E4: Glass, Stone, Abrasive, & Asbestos Manufacturing P4: Warehousing & Storage: General, Farm Product Warehousing, Refrigerated Warehousing Y1: Fabricated Rubber Products	COD 120 mg/L Lead, Total (as Pb) 0.164 mg/L TSS 100 mg/L Zinc 0.234 mg/L
SD 011	T1: Treatment Works	$CBOD_5$ 25 mg/L TSS 100 mg/L
SD 012	P4: Warehousing & Storage: General, Farm Product Warehousing, Refrigerated Warehousing	TSS 100 mg/L
SD 025	E4: Glass, Stone, Abrasive, & Asbestos Manufacturing V1: Textile, Fabric, & Apparel Manufacturing, Leather &Leather Products Y2: Plastic Products	TSS 100 mg/L

Current monitoring and intervention limits included with this permit at stormwater stations encompass analytes and parameters of concern associated with the applicable subsectors and PFAS. List 1 (PFAS compound monitoring parameters) shall be monitored at all SD and WS stormwater stations. See the tables below for monitoring requirements based on the type of stormwater station.

Table 32: PFAS compound monitoring at SD stormwater stations

Pollutant	**Calendar quarter total (ng/L)**	**Calendar quarter average (ng/L)**	**Calendar quarter maximum**	**Daily maximum (ng/L)**	**Frequency**	**Which months**
List 1. PFAS compound monitoring parameters		Monitor Only		Monitor Only	once per quarter	Jan-Dec
Flow	Monitor Only	Monitor Only (mgd)	Monitor Only (mgd)		once per day	Jan-Dec

Table 33: PFAS compound monitoring at WS infiltration stormwater stations

Pollutant	**Calendar quarter total (ng/L)**	**Calendar quarter average (ng/L)**	**Calendar quarter maximum**	**Daily maximum (ng/L)**	**Frequency**	**Which months**
List 1. PFAS compound monitoring parameters		Monitor Only		Monitor Only	once per quarter	Jan-Dec
Flow	Monitor Only (million gallons)	Monitor Only (mgd)	Monitor Only (mgd)		once per day	Jan-Dec

Table 34: PFAS compound monitoring at WS stormwater stations that are sent to the WWTP

Pollutant	**Calendar year total (ng/L)**	**Calendar year average (ng/L)**	**Calendar year maximum**	**Daily maximum (ng/L)**	**Frequency**	**Which months**
List 1. PFAS compound monitoring parameters		Monitor Only		Monitor Only	once per year	Jan-Dec
Flow	Monitor Only (million gallons)	Monitor Only (mgd)	Monitor Only (mgd)		once per day	Jan-Dec

The proposed limit and monitoring requirements for the stormwater stations are found in the limits and monitoring table in the accompanying draft permit document.

An exceedance of an applicable intervention limit does not constitute a violation under this permit. However, the Permittee is required to perform any necessary corrective action(s) to address stormwater control measures, including the maintenance or implementation of BMPs, when an exceedance of an applicable intervention limit occurs. Failure to respond to intervention limit exceedances is a violation of the permit.

The provisions for runoff control are based on Minn. Stat. ch. 115 and state WQS, according to Minn. R. 7001.1080, 7050.0210 and 7050.0220, and 40 CFR §122.26. The best management practices requirements are based on Minn. R. 7001.1080.

Pond system

A pond performance evaluation and certification report is due by 180 days before permit expiration. See the Industrial Pond Chapter for more information.

The pond freeboard monitoring is established to ensure regular verification of wastewater levels throughout the year, related to preventing overflows, at the typical weekly frequency for wastewater ponds.

Compliance schedules

Proposed wastewater treatment system:
As soon as possible and no later than March 31, 2025, the Permittee shall initiate startup to cause the proposed advanced wastewater treatment system to become operational. The Permittee shall submit a notice of initiation of operation within 90 days of initiating startup operations. The Permittee shall submit notice of initiation of operation: Due 06/30/2025.

The Permittee shall attain compliance with six PFAS compounds by December 31, 2026. The Permittee shall attain compliance with antimony, mercury, and bis(2-ethylhexyl) phthalate final limits by permit expiration.

ISTS systems:
As soon as possible and no later than October 31, 2027, the Permittee shall have the five systems associated with B30, B64, B66, B108, and B142 connected to the main wastewater treatment system and/or a pump and haul system in place with the requisite oversight of a certified SSTS maintainer. The Permittee shall submit a completion report certifying to MPCA that all of the referenced systems have been connected to the main wastewater treatment system and/or a pump and haul system and that the land treatment components are no longer in use. The report may be in a format of the Permittee's choosing and include photos, work plans, work receipts, etc. During the interim period of developing a long-term solution, all wastewater from these sites shall be pumped and hauled by a certified SSTS maintainer for treatment. The Permittee shall submit a report: Due 10/31/2027.

As soon as possible and no later than October 31, 2027, the Permittee shall have the trap range shelter system connected to a holding tank. The tank contents shall be pumped and hauled to the main wastewater treatment system. The Permittee shall submit a completion report certifying to MPCA that the trap range shelter system has been connected to a holding tank and the land treatment component is no longer in use. The report may be in a format of the Permittee's choosing and include photos, work plans, work receipts, etc.
During the interim period of developing a long-term solution, all wastewater from this site shall be pumped and hauled by a certified SSTS maintainer for treatment. The Permittee shall submit a report: Due 10/31/2027.

Flow monitoring at SW 001:
Flow monitoring (once per day) is required to be conducted at surface water station SW 001. By one year after permit issuance, the Permittee shall have installed a flow monitoring device at station SW 001 so daily flow monitoring may be conducted. The Permittee shall notify the MPCA once installation is complete and the device is operational. Flow monitoring and eDMR reporting of flow (Phase 1) will become effective once the MPCA receives notification.
The Permittee shall submit notice of equipment installation: Due by one year after permit issuance.

Variances

There are no variances in the draft permit.

Total facility requirements

Certified laboratory

Effective January 1, 2013, all Minnesota municipal, county, or industrial laboratories that analyze wastewater per Clean Water Act requirements must be certified by the MPCA or the Minnesota Department of Health. Information regarding MPCA laboratory certification is located on the MPCA website at https://www.pca.state.mn.us/water/mpca-laboratory-certification. If there are any questions concerning the MPCA laboratory certification, please contact the MPCA at 800-657-3864 or by email at qa.questions.mpca@state.mn.us. Commercial laboratories doing these analyses must maintain Minnesota Department of Health certification.

Electronic Discharge Monitoring Reports (eDMRs)

The eDMRs, Sample Values/Operational Spreadsheets, and related attachments shall be electronically submitted via the MPCA e-Services (https://rsp.pca.state.mn.us/TEMPO_RSP/Orchestrate.do?initiate=true). Paper copies of DMRs will no longer be accepted. The eDMR and Sample Value/Operational Spreadsheets are generated directly from the limits and monitoring requirements in the reissued permit for the facility. They are generated by the Pollution Control Data Specialist assigned to manage the data for the facility and will be available online within 30 days of the permit action, please make sure to download the most recent version of the eDMR and Sample Value/Operational Spreadsheet prior to submitting the next monthly eDMRs.

Construction projects

Separate written approval of plans and specifications, in addition to the final issued permit, must be obtained from the MPCA before construction can begin for any planned construction projects.

Additional requirements

Minnesota NPDES/SDS Permits contain certain conditions that remain the same regardless of the size, location, or type of discharge. These standard conditions satisfy the requirements outlined in 40 CFR pt. 122.41, Minn. R. 7001.0150 and Minn. R. 7001.1090. These requirements cover a wide range of areas, including operation and maintenance, outfall erosion control, best management practices, equipment calibration and maintenance, monitoring and analysis, recordkeeping, reporting, upsets, bypass, solids handling, changes in operation, inspections, records retention, general prohibitions, duty to notify, compliance responsibilities, compliance/noncompliance notification, entry and inspection, and permit modification and reissuance.

Antidegradation and anti-backsliding

Antidegradation: Changes to the facility may result in an increase in pollutant loading to surface waters or other causes of degradation to surface waters. If a change to the facility will result in a net increase in pollutant loading or other causes of degradation that exceed the maximum loading authorized through conditions specified in the existing permit, the changes to the facility are subject to antidegradation requirements found in Minn. R. 7050.0250 to 7050.0335. The permit does not propose to allow a new or increased discharge and does not trigger antidegradation.

Facility Design and Antidegradation Flows: The design flows and antidegradation flow have changed based on plans and specs submitted by 3M and approved by the MPCA for the new treatment system. This system will be collecting more water for treatment than has been collected in the past. In the past, the 12.1 mgd antidegradation flow (facility total) applied to both SD 001 and SD 002. The antidegradation flow has now been separated between SD 001 and SD 002. The design and antidegradation flow applied to SD 001 is 6.5 mgd. The design and antidegradation flow applied to SD 002 is now 8.7 mgd, an increase from before. Usually this would trigger an antidegradation analysis. In this case, the MPCA does not believe this triggers antidegradation. While the flows are increasing, the mass of pollutants will be reduced from what is currently going to the surface waters through the surface water discharge, runoff, and groundwater. Currently there is very little treatment of the collected water, and the uncollected water receives no treatment. Plus,

there are currently very few concentration and mass limits on this discharge. A new treatment system is being installed and additional concentration and mass limits are being implemented in this permit reissuance. More water is being collected for treatment, which is the reason for the flow increase. Because of all the above-mentioned items, the MPCA expects lower mass amounts of pollutants to be discharged, therefore antidegradation does not apply.
The antidegradation flow now applied to SD 003 is 15.2 mgd (6.5 (SD 001) + 8.7 (SD 002)).

Anti-backsliding: Any point source discharger of sewage, industrial, or other wastes for which a NPDES Permit has been issued by the MPCA that contains effluent limits more protective than those that would be established by Minn. R. 7053.0215 to 7053.0265 shall continue to meet the effluent limits established by the permit, unless the permittee establishes that less protective effluent limits are allowable pursuant to federal law, under section 402(o) of the Clean Water Act, United States Code, title 33, section 1342. The permit complies with Minn. R. 7053.0275 regarding anti-backsliding.

Term of permit

The effective date of the permit and the permit expiration date will be determined at the time of issuance.

The MPCA has made a preliminary determination to reissue this NPDES/SDS permit for a term of approximately five years.

Appendix A

Basis for Derivation of NPDES Discharge Limits

Prepared by Don Kriens P.E., Principal Engineer, MPCA – November 2002

Appendix A describes the basis of derivation of the discharge limitations for this NPDES permit for discharges SD 001, SD 002, SD 003, SD004, and SD005. The MPCA may use standards based on MN state water quality standards, federal categorical standards applicable to specific industrial categories, or a combination of these standards to derive the discharge limitations. In addition, the MPCA may also derive standards which are site specific to a particular discharge. These standards may be based on toxicity studies, best professional judgment analysis, technology based standards, and in some instances standards developed by other U.S. states or other governments if these standards are appropriate. For industrial categories the MPCA typically uses the federal categorical standards, required by MN rule and the U.S. Code of Federal Regulations, and state standards if appropriate.

SD 001

In accordance with MN Rule the MPCA is required to apply federal categorical standards or effluent standards which may apply to specific industrial categories. This is stated under MN Rule 7050.0212 Requirements for Point Source Dischargers of Industrial or Other Wastes. Subpart 1. as follows: Applicable effluent limitations. Any person discharging industrial or other wastes from a point source shall comply with the following requirements: A. Point source dischargers of industrial or other wastes shall comply with all applicable federal standards promulgated by the United States Environmental Protection Agency under sections 301, 306, and 307 of the Clean Water Act, United States Code, title 33, sections 1311, 1316, and 1317. Code of Federal Regulations, title 40, parts 401 through 469, are incorporated by reference. If no federal categorical treatment standards for a particular industry are available, or when the application of federal categorical standards to a specific industry is unclear, the MPCA may use its Best Professional Judgment (BPJ) in assigning standards or discharge limitations. This may be appropriate where industrial operations use similar chemistry, processes, or produce intermediate or end products similar to those described in a promulgated industrial source category.

Using BPJ, the MPCA has determined that the specific industrial category and federal effluent guidelines that may be applied to the 3M facility are the federal effluent limitations guidelines (categorical standards) described under federal regulation 40 CFR Part 414 for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industry subcategory.

SD 001 is the process wastewater discharge location at the 3M facility which discharges effluent from the wastewater treatment plant (WWTP). All process wastewaters generated at the facility including incinerator scrubber blowdown, inorganic wastewaters, and sanitary and organic wastewaters are discharged to the WWTP, or portions of the WWTP, for treatment. The Limits and Monitoring Section of the draft permit contains discharge limits at SD 001 for a number of volatile organic compounds, semi-volatile compounds, metals, and conventional parameters including BOD (biological oxygen demand), TSS (total suspended solids), ammonia, phenols, oil and grease, and pH. The discharge limits for SD 001 are based upon the following:

Volatile Organic Compounds and Semivolatile Organic Compounds

The permit contains effluent limitations for 56 volatile (purgeable) and semi-volatile (base/neutral extractables and acids) organic compounds. These limitations were derived on the basis of federal effluent limitations guidelines (categorical standards) described under federal regulation 40 CFR Part 414 for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industry subcategory. These guidelines are best available technology (BAT) guidelines promulgated by the U.S. Environmental Protection Agency (EPA) for the control of toxic pollutants that may be discharged from industries producing certain organic chemicals, plastics, and synthetic fibers. The MPCA evaluated the production processes and chemistry of processes used at the 3M facility and determined that 3M processes and products manufactured are similar or the same as those which are regulated under the OCPSF guidelines. Therefore, using its best professional judgment the MPCA has used the OCPSF guidelines for derivation of certain discharge limitations of the 3M permit.

Specific subparts of the OCPSF guidelines regulate the discharge of organic chemicals including rayon fibers, other organic fibers, thermoplastic resins, thermosetting resins, commodity organic chemicals, bulk organic chemicals, and specialty organic chemicals. The OCPSF guidelines are applicable to process wastewater discharges from all establishments or portions of establishments that manufacture the organic chemicals, plastics, and synthetic fibers products or product groups specified in the subparts of the federal regulation. The products produced are described under certain SIC (standard industrial classification) codes. The MPCA determined that a number of products or product groups manufactured at the 3M facility were either covered, or similar to products covered, under these SIC codes. Specifically, the MPCA determined that SIC code 2821 under the OCPSF rule includes certain polymerization reaction processes that are the same as, or similar to, those at the facility which produce emulsion, bead, solution, and suspension polymers. Applicability of these polymerization processes to the OCPSF rule is described further under the EPA sector notebook for the Plastic Resins and Man-Made Fiber Industry. These polymer organic compounds are regulated under the Thermoplastic subpart of the OCPSF rule. The 3M facility also manufactures phenolic resins, certain fine chemicals, polyester resins, epoxy resins, urethane, and curative organic compounds which are the same as, or similar to, those regulated either the Thermosetting, Thermoplastic, or Specialty Organic Chemicals subparts of the OCPSF rule.

The OCPSF rule contains specific BAT effluent limitations for 56 organic compounds and 6 heavy metals. The BAT portion of the rule applies to OCPSF industries whose total OCPSF product production is greater than 5,000,000 lbs per year. The MPCA determined that the 3M facility produces more than 5,000,000 lbs of OCPSF type products and therefore, using its best professional judgment, used the OCPSF limitations for derivation of certain discharge limitations. The specific discharge limitations are listed in Subpart I of 40 CFR Part 414 for direct discharge point sources that use end-of-pipe biological treatment. The OCPSF limitations described are mass-based in that the limitations are determined by multiplying the process wastewater flow for specific subparts or processes times the concentrations listed in subpart I. The

MPCA, using best professional judgment, has used the OCPSF parameters to derive discharge limitations on a concentration basis for the following reasons:

1. The 3M facility has numerous process wastewater flows coming from various processes. Some of these organic process flows are unrelated to OCPSF production processes but may at times contribute to the organic compounds listed in the OCPSF rule. It would be difficult to assess a mass loading of organic compounds derived from these process sources that would be consistently accurate.
2. The process flows subject to the OCPSF rule come from many different areas at the 3M facility and the flows may be variable. Because of this variability, determining mass discharge limits for each applicable process flow and proportioning mass according to each individual flow would be inaccurate.
3. The 3M facility often undertakes pilot projects where specific products may be developed. The contributions of organic compounds from these pilot projects is subject to frequent change, and are not applicabel in any case to the OCPSF rule. Determining the impact of these pilot processes upon mass loading limitations related to OCPSF pollutants that would be consistent over time would not be possible.
4. The MPCA believes that regulation of the OCPSF pollutants on the basis of concentrations versus mass loading limitations is more environmentally protective since all flow from the plant would be regulated via concentration standards, irrespective of whether a flow was OCPSF related. The OCPSF concentration limitations for the organic parameters are also lower than any applicable MN state standards. For specific metals site specific toxicity criteria or MN state standards are applied in cases where these standards or site specific criteria are more restrictive than OCPSF standards, and more restrictive standards are deemed necessary.
5. In any case the installation of a granular activated carbon treatment system, proposed by the Permittee and described in a later section of this appendix, will serve to remove the OCPSF organic compounds to the lowest levels possible, generally to non-detectable concentrations. Granular activated carbon represents the best available technology for removal of these organic compounds. Therefore, OCPSF organic compounds will consistently be removed to the lowest levels possible using the most advanced treatment technology available, irrespective of whether the limitations are mass based or concentration based.

The MPCA asked the EPA to review MPCA's assessment of the applicability of the OCPSF guidelines to the 3M facility. The EPA concurred with the applicability of the OCPSF guidelines to the 3M facility and the use of concentration based limitations, based on the concentrations listed in subpart I of the OCPSF guidelines provided that these concentration based limitations would provide adequate environmental protection. With the required installation of the activated carbon treatment system providing removal of organics to the lowest levels possible, maximum environmental protection will consistently be provided.

The 3M facility has conducted priority pollutant scans on a quarterly basis which includes most of the organic compounds listed in the OCPSF rule. Based on MPCA review of these analyses the MPCA has decided to require monitoring 2 times per month for 5 of the organic compounds listed with the remainder to be monitored on a monthly basis. With installation of granular activated carbon it is expected that levels of the organic compounds will be well below the OCPSF concentration guidelines, typically at less than detectable levels using state-of-the-art low level analytical techniques.

The activated carbon system should consistently reduce the concentrations of most volatiles and semi-volatiles to extremely low levels. MPCA may reduce or eliminate the monitoring frequency for those compounds consistently reduced to low levels after 18 months if operational data confirms this assumption.

Metals

The OCPSF guidelines contains limitations for the following metals: total chromium, copper, lead, nickel, and zinc. The OCPSF limitations, using concentrations listed in the rule, were compared with MN rule 7050 standards, as described in MN 7050.0222 Specific Standards of Quality and Purity for Class 2 Waters of the State; Aquatic Life and Recreation, subpart 3, Class 2Bd Waters to determine if state standards were more restrictive standards. In addition, LC50 values for zinc developed site-specifically for the SD 001 discharge were reviewed to determine if this value is more restrictive. (LC50 values are the lethal concentrations of a toxicant or toxicants which kill 50 percent of the exposed organisms in a specific time of observation. The LC50 concentration of a toxicant is an acutely toxic parameter that may be used as a maximum allowable discharge concentration.) The OCPSF guidelines were used as the basis to derive discharge limitations for total chromium and lead since they are more restrictive than applicable MN state water quality standards. The LC50 concentration value of 240 ug/l for zinc was used as the daily maximum discharge limitation for zinc since it is more restrictive than the OCPSF or MN state water quality standards. The zinc LC50 value was determined pursuant to bioassay studies completed on the SD 001 discharge. The basis of the zinc limitation is explained more fully in Appendix B, Resolution of Acute Toxicity at SD 001. The copper discharge limitation applied is the MN water quality standard, final acute value, of 68 ug/l. This copper concentration is more restrictive than using the OCPSF standard for copper at 1450 ug/l daily maximum.

Nickel toxicity standards based on either MN state or federal (OCPSF) standards, or other federal nickel standards, may be inadequate with respect to protection of aquatic species for the 3M SD 001 discharge. This is because of potentially additive effects of metals in the SD 001 effluent. To assure non-toxicity related to these metals combinations the nickel discharge limitation proposed is much lower than the MN state nickel standard or the OCPSF nickel standard. A review of several other U.S. states nickel standards indicates that a wide range of acute toxicity nickel discharge standards exists, ranging from 458 ug/l (Florida) to about 1361 ug/l at 100 mg/l hardness for Wisconsin. The MN acute toxicity standard for nickel is 2836 ug/l at 100 mg/l hardness. Toxicity from nickel is hardness dependent with softer waters causing greater toxicity. The Ontario, Canada standard LC50 (acute toxicity) for daphnia magna is 260 ug/l to 480 ug/l depending on the hardness level. The federal standard for nickel is 940 ug/l, based on the federal CMC (criterion maximum concentration) of 470 ug/l. (The CMC is one half the final acute value). The MPCA is using best professional judgment to apply a daily maximum nickel discharge limitation of 480 ug/l, based on the Ontario, Canada standard for Daphnia Magna, one of the required 3M bioassay test species. The 480 ug/l Ontario standard would correspond to the higher hardness levels in the discharge. A review of the discharge data for SD 001 indicates that a daily maximum nickel limitation of 480 ug/l is consistently met.

With recent improvements in pH adjustment and precipitation technologies implemented at the 3M facility, refinement of the pH setpoints for metals precipitation, and pollution prevention efforts, acute toxicity resulting from metals concentrations has been resolved.

The permit requires monitoring for selenium and cadmium. No effluent limitations are applied for these metals because levels have generally not exceeded applicable MN Rule 7050.0222 final acute values.

The permit also requires monitoring for antimony. Antimony has been found to be elevated at times in the SD001 discharge although antimony has not been shown to cause any acute toxicity in the effluents. Minimal information is available concerning antimony and aquatic toxicity compared to other metals. The USEPA Environmental Research Lab has completed studies on the aquatic toxicity of antimony. Acute toxicity of antimony to several freshwater species did not occur below the limits of solubility of antimony salts, however, acute toxicities to certain freshwater species varied from 500 to 21,000 ug/l. The acute toxicity of antimony is related in part to the antimony species or oxidation state present, oxygen concentrations present, chloride content, and attachment to particles and reactions with organics present. To ensure that antimony in the discharge remain non-toxic 3M will conduct an antimony impact study. The study may include determination of antimony species present, literature reviews of antimony aquatic toxicities, evaluation of potential toxicity of antimony in the discharge, and potential for reduction efforts if necessary. By January 1, 2004 3M will submit a study plan for evaluation of the potential impacts of antimony. The study will be conducted during the period 2004-2007 and a final report with results will be submitted to the MPCA by June 1, 2007.

Quarterly monitoring required to be completed for SD 001 will include analysis for all heavy metals.

Cyanide

The OCPSF guidelines contain a discharge limitation for total cyanide. MN Rule 7050 contains a standard for free cyanide only. Cyanide has never been detected at the 3M discharges at appreciable levels. Therefore, the permit will not contain a discharge limitations for cyanide or routine monitoring. However, cyanide will continue to be monitored in conjunction with the quarterly priority pollutant analyses conducted for SD001.

Mercury

The existing permit contained a mass limitation for mercury of .0113 kg/day on a monthly average basis and .0398 kg/day as a daily maximum. These limitations were based on a waste load allocation calculation which determined an allowable daily maximum concentration of 2416 ng/l (2.416 ug/l) and monthly average concentration of 572 ng/l (.572 ug/l). The mass loading limitations of .0113 kg/day and .0398 kg/day were determined using an average process wastewater effluent flow rate. The new mercury limitation proposed is a daily maximum concentration of .2 ug/l. This mercury limitation is in accordance with MPCA policy to place a maximum allowable concentration limitation for mercury of .2 ug/l limitation in permits which previously contained a higher or less restrictive mercury limitation, with the .2 ug/l based on the pre-existing mercury analytical procedure detection limit of .2 ug/l. At the same time Permittees with pre-existing mercury limitations, or Permittees which may have mercury in their effluents, are required to conduct low level mercury analyses of their discharges. In this case 3M is required to conduct low level mercury analyses for SD 001 using the new EPA low level mercury analytical method (1631) which allows mercury detection to .2 ng/l (.0002 ug/l).

The Minnesota mercury water quality standard is 6.9 ug/l, except for the Lake Superior basin where the standard is 1.3 ug/l. A water body that is impaired is not achieving the standard. In this instance the Mississippi River does not meet the standard, in part because fish consumption advisories in the Mississippi River do exist for mercury. The tool used to bring a water body into attainment or to a non-impaired status is the TMDL (total maximum daily load). The TMDL needs to account for all point and non point sources and is iterative in nature in that the TMDL will monitor progress in reduction towards attaining the standard. In order to develop the TMDL for mercury in the Mississippi River, analytical data for mercury in discharges is required. The recent promulgation of a new low level mercury analytical method (Method 1631) by the U.S. EPA will allow measurement of detectable levels of virtually all surface waters and discharges. The previous method was considerably less sensitive at 200 ng/l (.2 ug/l) and was largely incapable of providing any useful data. The new method allows reliable quantitation of mercury to about .5 ng/l (detection limit of .2 ng/l), and thus will allow development of a TMDL.

The MPCA has chosen to take a phased approach to develop a mercury TMDL and mercury effluent limitations in reissued NPDES permits. The MPCA has found that most dischargers have never used the low level mercury analytical methods to monitor mercury. In the first phase (interim phase) existing dischargers will be required to monitor mercury using the low level technique. This requirement will be inserted as the permits are reissued. Monitoring will continue for the permit term of 5 years. Note that during this period if mercury levels are found to be high the permit can be reopened and modified to require a mercury limitation or a revised mercury limitation in the event a permit contains a prior mercury limitation. The purpose of this monitoring is to gather data to develop a TMDL and to establish the basis for a potential effluent limitation, required via the permit. These limits will be placed in the permits based on a determination of reasonable potential to cause or contribute to a water quality standards violation, or "reasonable potential", as described under 40 CFR 122.44(d)(1). The effluent limitation used to make the reasonable potential determination will be based on the MN state chronic mercury water quality standard applied directly to the discharge as a waste load allocation. For those few dischargers with existing low level mercury data, and for those that will develop low level data in the next permit period, and reasonable potential is demonstrated, a limit will be included in the permit along with a compliance schedule to meet that limit. Requiring the low level mercury analysis in affected permits during the next 5 years will also allow the MPCA to conduct a TMDL so that mercury effluent limitations may also be determined in accordance with appropriate cost benefit analysis.

3M has implemented aggressive product review and waste management practices to prevent the introduction of mercury into wastewaters at the Cottage Grove site. These measures have been effective in maintaining the mercury concentration at or below the current method detection limit of 0.2 ug/l for many years. The 3M discharge does not have adequate low level mercury data to assess "reasonable potential" pursuant to the federal rule. Therefore, pursuant to the strategy described above for assessing mercury in discharges to develop any needed effluent limitation, the MPCA is requiring low level mercury analysis in the 3M discharge 2 times per month. Although most other

Permittees are or will be required to conduct low level analysis on a quarterly basis, the 3M permit requires monitoring mercury using low level analysis more frequently at 2 times per month since the existing permit required mercury monitoring at a greater frequency than quarterly.

3M will be voluntarily installing an activated carbon treatment system as discussed in Appendix B, following a schedule described in this permit, that is likely to provide the best available technology that is economically achievable for mercury removal. Literature reviews and evaluation of wastewater treatability studies by the MPCA indicates that high levels of effluent solids removal offers effective removal of mercury to relatively low levels for certain wastewater effluents. MPCA literature review also found that granular activated carbon may offer the best available technology for end of pipe treatment for mercury removal in certain wastewaters, although full scale activated carbon systems have not been widely used to remove mercury to low part per trillion (ppt) concentrations. Research conducted by Oakridge National Laboratories indicates that granular activated carbon is probably the best available technology that is cost effective to remove mercury from wastewaters to low ppt levels, depending on the wastewater characteristics. Research conducted at Oakridge evaluated many treatment methods and activated carbon was shown to provide equivalent or superior treatment for mercury that may be present in the parts per trillion concentrations.

BOD (Biological Oxygen Demand) and Total Suspended Solids (TSS)

The federal OCPSF categorical standards require that BOD and TSS be limited in accordance with limitations set forth by subcategories. The BOD and TSS standards are best practicable standards (BPT) which are applicable to conventional pollutants such as BOD and TSS. If more than one subcategory is applicable to the industry then a proportioned calculation according to subcategories is completed to derive the mass loading limitations for BOD and TSS. The specific subcategories applicable to the 3M facility are subpart D Thermoplastic Resins, subpart E Thermosetting Resins, and subpart H Specialty Organic Chemicals. The BOD mass discharge limitations for these 3 subcategories are based on BOD concentrations of 24 mg/l, 61 mg/l, and 45 mg/l monthly averages, and 64 mg/l, 163 mg/l and 120 mg/l daily maximum, respectively. The TSS mass discharge limitations for these 3 subcategories are based on TSS concentrations of 40 mg/l, 67 mg/l, and 57 mg/l monthly average, and 130 mg/l, 216 mg/l , and 183 mg/l daily maximum, respectively.

The minimum MN state BOD and TSS standards applicable to secondary (biological treatment facilities) are 25 mg/l monthly average and 40 mg/l weekly average for BOD, and 30 mg/l monthly average and 45 mg/l weekly average for TSS. Because these standards are much lower than the applicable federal BPT standards for BOD and TSS the MPCA is applying MN state BOD and TSS concentration standards in the permit for these conventional pollutants. In addition, MN Rule requires the application of a minimum of these state secondary standards in instances where there is a point source discharge of sewage as described under MN Rule 7050.0211 subpart 1. as follows: "Minimum secondary treatment for municipal point source and other point source dischargers of sewage. It is established that the agency shall require secondary treatment as a minimum for all municipal point source dischargers and other point source dischargers of sewage." The 3M facility discharges sanitary wastewater or sewage (up to 100,000 gallons per day) to its WWTP. Therefore, MN Rule 7050.0211 subpart 1 is applicable.

The application of MN state secondary standards of BOD 25 mg/l monthly average, 40 mg/l weekly average and TSS 30 mg/l monthly average, 45 mg/l weekly average is more restrictive than the applicable BPT federal categorical standards for the OCPSF category. The existing permit discharge limitations for BOD and TSS were also based on state secondary standards but are mass based, using a specific process wastewater flow. The process wastewater flows used are higher than the actual flows which yielded mass limitations effectively based on BOD and TSS concentration values greater than MN secondary BOD and TSS standards. The proposed BOD and TSS limitations will be concentration based using the BOD 25 mg/l monthly average/40 mg/l weekly average and TSS 30 mg/l monthly average/45 mg/l weekly average limitations in accordance with requirements of MN Rules, which in effect are more restrictive than the existing discharge limitations and applicable BPT OCPSF standards.

The activated carbon system should consistently reduce the concentrations of BOD and TSS to extremely low levels. MPCA may reduce the monitoring frequency from 3 times per week to 2 times per week after 18 months if operational data confirms this assumption.

Oil and Grease

The existing permit contains a monthly average discharge limitations for oil and grease of 10 mg/l and a daily maximum discharge limitations of 15 mg/l. The proposed new limitation for oil and grease is 10 mg/l daily maximum which is based on MN Rule 7050.0222 Specific Standards for Quality and Purity for Class 2 Waters of the State; Aquatic Life and Recreation Subpart 3. 2Bd Waters. The standard applied is the final acute value of 10 mg/l for Oil. This limitation is more restrictive than the current discharge limitation of 15 mg/l daily maximum. The OCPSF guidelines do not contain a standard for oil and grease. 3M will be required to use the new U.S. EPA analytical technique for oil and grease using hexane.

Ammonia

The existing permit contains mass discharge limitations for ammonia. One of the prior 3M facility production processes included a so-called iron oxide plant or "mag-oxide" plant which manufactured a product used in magnetic tape production. This process produced large amounts of ammonia in wastewaters. The major portions of ammonia generated from this process were removed using a vapor compression technology, and the existing mass limitations were derived on the basis of the efficiency of this removal technology. The iron oxide production process has since been closed. However, some ammonia remains present in the SD 001 process wastewaters due to concentrations of ammonia present in the production wells (groundwater) at the facility used for process water makeup. The ammonia is present in the groundwater under the 3M facility site as a result of a past liner failure at the basin where concentrated ammonia waste (from the vapor compression treatment system) was stored. Ammonia present in groundwater has decreased considerably over time and is expected to eventually return to background levels. Because of the pre-existing ammonia concentrations in groundwater, eventually discharged to the WWTP, the permit will continue to limit unionized ammonia concentrations. Total ammonia mass loading limitations will be deleted in the permit since total ammonia mass loading limitations are largely redundant due to termination of operations contributing mass loads of ammonia, and the primary controlling limitation of concern is unionized ammonia. 3M will continue to monitor total ammonia concentrations, however, in order to calculate an unionized ammonia concentration, and total ammonia concentration data will be maintained as required by the permit.

Unionized ammonia is the molecular species of ammonia that is primarily responsible for acute toxicity of ammonia to aquatic organisms. Ammonia dissociates into ionized and unionized forms in accordance with an equilibrium equation, and the relative concentrations of unionized and ionized ammonia forms occur primarily in accordance with pH and, to a much lesser extent, temperature. The unionized ammonia fraction causing toxicity is relatively low in concentration, with its concentration increasing with increasing pH. Therefore the allowable total ammonia concentration in an effluent at higher pHs is lower due to the unionized fraction increasing with increasing pH.

Unionized ammonia is limited in the existing permit at a daily maximum discharge limitation of 1.0 mg/l. This limitation will be lowered to a more restrictive limitation of .46 mg/l. The new unionized ammonia discharge limitation of .46 mg/l is derived using the EPA National Criterion for Ammonia in Freshwater (1999). The EPA National Criterion actually limits total ammonia concentrations. The EPA total ammonia concentration criterion therefore changes according to the effluent pH on any certain test. Therefore, the applicable total ammonia discharge limitations based on total ammonia could change day to day depending on the effluent pH on any particular day. Requiring a discharge limitation that may change day to day would be very cumbersome for the MPCA and a Permittee with respect to tracking compliance and anticipating the status of the effluent in order to respond to treatment needs. The MPCA, however, prefers to use the EPA data and criterion which is the most up to date toxicity evaluation for ammonia. Therefore, the MPCA has developed an unionized ammonia concentration limitation that is based on the EPA data set for total ammonia concentrations (criterion). This was accomplished by determining individual increments of unionized ammonia concentrations at specific pH increments of .10 pH corresponding to total ammonia concentrations at those pH increments in the EPA data set. A pH range of 6.5 to 8.5 was used which corresponds to a MN State pH standard range of 6.5 to 8.5. A temperature of 20 °C was used in the calculations. The average unionized ammonia calculated from the pH increments over this range was determined to be .46 mg/l. The MPCA believes that this new unionized ammonia limitation, much lower than the existing concentration of 1.0 mg/l, will be protective under all discharge conditions.

In addition to the new unionized ammonia discharge limitation the permit also contains a condition that the Permittee may not adjust the pH for the purpose of meeting the unionized ammonia limitation, with the exception that the discharge pH may be adjusted during any upset conditions in order to meet the permit discharge pH limitations. This pH adjustment restriction does not affect pH adjustment done at wastewater treatment process units, such as pH adjustment for the purpose of optimizing metals removal, or at the WWTP for optimization of treatment. The MPCA is prohibiting Permittees from using pH adjustment solely as a means to meet unionized ammonia limitations, rather than implementing more appropriate wastewater treatment methods such as nitrification to lower any excessive total ammonia levels.

Phenols

The permit contains mass based monthly average and daily maximum discharge limitations for total phenols. Total phenols in this instance refers to phenols analyzed by the 4-aminoantipyrine colorometric Standard Method that determines phenol, ortho, and meta substituted phenols and, under proper pH conditions, para substituted phenols. The limitations for total phenols were derived in the existing permit on the basis of the WWTP performance using a long term average adjusted for monthly sample size for a monthly average limitation. The daily maximum for total phenols is based on the 95th percentile level of 127 past monitoring data points. The permit also contains a separate discharge limitation for the individual phenol compound which is based on the federal BAT OCPSF standards.

Quarterly Organic Analysis

The permit requires quarterly analysis of organics using EPA method 624 and 625, and metals analysis for SD 001 on a quarterly basis. In addition, any additional organics noted in chromatograhs with chromatograph peaks more than 10 times the adjacent peak to peak background noise must be identified and quantified.

SD 002

SD 002 is the facility cooling water discharge. Non-contact cooling waters (once through and recirculating), occasional stormwater runoff, and cooling waters from the Cogentrix co-generating facility adjacent to the 3M facility are discharged into a cooling pond on the 3M facility. In addition, groundwater from the 3M Woodbury groundwater protection system (barrier wells) is discharged to the 3M facility and used as process and cooling water at the 3M Cottage Grove plant. Therefore, this cooling water also eventually discharges to the process wastewater system (SD001) and the cooling pond (SD 002). A portion of the pond cooling water is diverted back to the Cogentrix facility for reuse as cooling water. The Cogentrix facility is regulated under a separate NPDES permit MN0062821. SD 002 discharges at an average rate of 3.8 MGD and a maximum rate of 5.5 MGD. Cooling waters are treated with biocides (chlorine). The SD 002 discharge from the pond is required to show nondetectable levels of total residual chlorine.

The discharge limitations for SD 002 are as follows:

BOD/TSS

The existing permit contained BOD discharge limitations of 25 mg/l monthly average and 50 mg/l daily maximum and TSS discharge limitations of 30 mg/l monthly average and 60 mg/l daily maximum. These limitations will be maintained in the proposed permit and are consistent with MN state secondary treatment standards.

Chlorine, Total Residual

The existing permit required that total residual chlorine be non-detect (reported as 0 mg/l) in the SD 002 discharge which will be maintained in the permit.

Oil and Grease

The existing permit contains oil and grease discharge limitations of 10 mg/l monthly average and 15 mg/l daily maximum concentrations. This will be changed to a daily maximum discharge limitation of 10 mg/l which is more restrictive and consistent with current MN state standards described in MN 7050.0222 Specific Standards for Quality and Purity for Class 2 Waters of the State; Aquatic life and Recreation. Subpart 3.

Temperature

The existing permit contains a temperature limitation for SD 002 of 83°F. This temperature limitation will be maintained in the permit.

Organic Analysis

The permit will require continuation of organic analyses using EPA methods 624 and 625 and metals analysis for SD 002 on a semi-annual frequency. this requirement is described under Chapter 1 section 3.1 of the draft permit. The requirement also includes identification and quantification of any additional organics found, indicated by presence in gas chromatographic analysis where peaks on the chromatograms are more than 10 times higher than the adjacent peak to peak background noise. Organic analyses will continue to assure that the cooling water discharge, including groundwater pumped from the Woodbury well system, is not causing any environmental impact.

SD 003

SD 003 discharge is the monitoring point for the combined discharges of SD 001 treated process wastewater and SD 002 cooling waters at the ravine. SD 001 and SD 002 currently discharge separately into a ravine (waters of the state). (Note that, as discussed in Appendix B, Surface Discharge Locations, SD002 will be repiped to the parshall flume confluence with SD001 in conjunction with installation of the activated carbon treatment systems and reconfiguration of polishing pond #1 and repiping projects, eliminating the separate SD002 and SD001 discharges to the ravine.) SD 003 has the following discharge limitations:

Chlorine, Total Residual

The existing permit contains a discharge limitation for total residual chlorine of .04 mg/l in accordance with MN state standards described under MN 7050.0222 subpart 3. The chlorine standard applies to conditions of continuous exposure, where continuous exposure refers to chlorinated effluents that are discharged for more than a total of two hours in any 24-hour period. The .04 mg/l limitation is derived by rounding off the .038 mg/l standard described in the rule. The .04 mg/l discharge limitation will be maintained.

Toxicity, Whole Effluent

SD 003 is required to meet a whole effluent toxicity maximum discharge limitation of .9999 TUa (toxicity units). Toxic units are described in MN 7050.0218 subpart 3. EE as follows: "Toxic unit" means a measure of acute or chronic toxicity in an effluent. One acute toxic unit (TUa) is the reciprocal of the effluent concentration that causes 50 percent effect or mortality to organisms for acute exposures (100/LC50); one chronic toxic unit (TUa) is the reciprocal of the effluent concentration that causes no observable adverse effect level on test organisms for chronic exposures (100/NOAEL). MN rule states that an effluent is considered non-toxic if there is 50% mortality or less in 100% effluent. A 1.0 TUa concentration is equivalent to 50% mortality in 100% effluent. Therefore, the TUa discharge limitation must be less than 1.0 TUa in accordance with the rule. Accordingly the new limitation is < 1.0 TUa and is expressed numerically in the permit as .9999 TUa. Because the test methodology does not express results to the .9999 digit level, using a .9999 TUa limitation will not cause a conflict in assuring that toxicity results are less than 1.0 TUa.

Whole effluent toxicity testing is required to be completed at SD 003 during June of each year, with testing methodology completed in accordance with the requirements described in the permit.

SD 004

SD004 is the Woodbury Groundwater Emergency Bypass. Barrier well groundwater from a 3M Woodbury site is pumped to the 3M Cottage Grove facility and is used in total for process water and cooling water purposes at the Cottage Grove plant. The Woodbury groundwater therefore is eventually discharged and monitored via the SD001 and SD002 discharges. On certain occasions during plant slowdowns or slowdowns in production excess pressure in the Woodbury pipeline causes a release of the Woodbury groundwater. This release is directed to the ravine adjacent to the plant site. 3M will be installing additional equipment that will allow this released water to be directed instead to the cooling pond for nearly all high pressure situations. Woodbury groundwater releases in the future to the ravine will be minimal, anticipated to be less than once per year only during higher setpoint pressures. During maintenance periods releases of Woodbury groundwater may also occur. SD004 requires flow monitoring only since the waters released are limited to groundwaters only, and are of the same as those waters normally discharged in any case via SD002.

SD005

SD005 is the emergency stormwater bypass discharge for SD002 which will originate after the repiping project for cooling/stormwaters (SD002) is completed. The repiping of cooling/stormwaters for SD002 consists of construction of a pipeline carrying cooling and stormwaters from the final cooling/stormwater pond so that the discharge of SD002 will occur at the parshall flume confluence point of SD001. SD002 currently discharges to the ravine adjacent to the plant site. After the repiping project the separate ravine discharges for SD001 and SD002 will be eliminated. The repiping project will be completed in conjunction with the installation of proposed granular activated carbon systems and the reconfiguration of polishing pond #1.

After completion of the repiping project for SD002, discharging SD002 to the parshall flume confluence point with SD001, all cooling and stormwaters will normally be discharged to that point. However, on certain infrequent occasions during high rainfall events a portion of the excess stormwater generated may overflow at a constructed weir at the final cooling pond. This overflow would occur only during infrequent events when stormwater runoff volumes exceed the design capacity of the pipeline carrying cooling/stormwaters. This would occur during rainfall events that typically exceed a once in 10 year occurrence interval over a 24 hour period. The overflow, designated SD005 Stormwater Emergency Bypass, would consist of cooling/stormwaters only and would be discharged to the ravine adjacent to the plant site. Only flow monitoring is required for this emergency discharge since the water discharged is the same as the portion of water discharged and monitored simultaneously at the SD002 discharge.

Appendix B

Other Permit Requirements/Issues

Prepared by Don Kriens P.E., Principal Engineer, MPCA – November 2002

Surface Discharge Locations and Changes

Current discharges at the 3M plant include the process wastewater discharge SD001, the cooling and stormwater discharge SD002, and SD003 which is the combined discharges of SD001 and SD002. After the WWTP and the polishing ponds, SD001 currently discharges to a parshall flume located near the last polishing pond and hence to the ravine located adjacent to the plant site. SD002 discharges from the last cooling pond to a separate point in the ravine. SD003 is the combined discharges taken at a point after combination of SD001 and SD002.

3M will be installing a new granular activated carbon treatment system for treatment of phase 1 and 2 wastewater streams and a separate new granular activated carbon treatment system for treatment of the phase 3 wastewater stream (incinerator scrubber wastewaters). The combined effluents from these granular activated carbon treatment systems will comprise SD001 after completion of these systems. SD001 will flow to the existing parshall flume for discharge. The activated carbon treatment system installation project will also include reconfiguration of polishing pond 1 and repiping of SD002. The SD002 repiping project will allow treatment of cooling stormwater at the phase1/2 activated carbon treatment system in the event of an emergency or spill to cooling waters. After the repiping project SD002 will be discharged to the parshall flume which also receives the SD001 effluent, and therefore the separate discharges of SD001 and SD002 to the ravine will be eliminated. SD003 will be the discharge monitoring point after the confluence of the SD001 and SD002 discharges at the parshall flume. SD003 will be the only discharge to waters of the state, with the exception of the infrequent bypass of Woodbury groundwater, and excess stormwaters discharged during infrequent high rainfall events, to ravine discharge points.

SD001 and SD002 will continue to be monitored separately for flow and the parameters required pursuant to the permit. The permit requires that the applicable discharge limitations for these individual discharges be met prior to combining with each other. The combined effluents, designated SD003, will be monitored for acute toxicity and total residual chlorine. SD001 will be monitored for acute toxicity to demonstrate removal of toxicity after completion of the activated carbon treatment system and, upon successful demonstration of toxicity removal, toxicity testing at SD001 is eliminated. Toxicity testing will continue at SD003 on an annual basis.

As defined in Appendix A, SD004, consisting of Woodbury groundwater used for cooling water purposes at the plant, may be discharged on very infrequent occasions. In addition, as defined in Appendix A, SD005, consisting of excess stormwaters generated during a high rainfall event typically exceeding the once in 10 rainfall interval, may also discharge to a point at the ravine. These bypasses are permitted and will be monitored separately.

Resolution of Acute Toxicity at Surface Discharge 001 (SD 001)

The existing permit required annual acute toxicity testing for both SD 001 and SD 003. SD 003 has been found consistently non-toxic and has met the existing discharge limitation of 1.0 TUa. SD 001 exhibited acute toxicity to aquatic test species during the period 1995 through 2000. Although SD 001 did not have a toxicity discharge limitation, in the event that the toxicity results at SD 001 demonstrated acute toxicity to any test species 3M was required to conduct further toxicity testing in order to determine the toxicity sources or causes and to conduct a toxicity reduction evaluation.

At the request of the MPCA 3M began a comprehensive study on the toxicity problem at SD 001 in January 2001 to determine the cause of the acute toxicity. This study, called the 3M Wastewater Toxicity Reduction Study, dated June 2001, is available in MPCA files for public review. The study determined that the occasional toxicity demonstrated at SD 001 during the period 1995 through 2000 was caused from elevated levels of zinc, nickel, and copper. The acute toxicity was demonstrated primarily in the Ceriodaphnia test species. Zinc was determined as the primary toxic metal contributor. As zinc became elevated to its LC50 level for Ceriodaphnia relatively low concentrations of nickel and copper, normally at levels which would not cause toxicity, would also contribute to acute toxicity at times due to the additive toxic effects of these 3 metals. Based on these evaluations, beginning in January 2001 3M adjusted the pH adjustment setpoints at the WWTP metals precipitation systems, which further maximized removal of zinc from the process wastewaters. It is believed that this has effectively removed the acute toxicity problem related to zinc, and any additive toxicity effects due to zinc, nickel, and copper.

Results have shown that heavy metals concentrations are controlled below toxic threshold levels by the measures implemented to enhance zinc and metals removals. The proposed permit contains discharge limitations based in part on the 3M site-specific LC50 toxicity values developed for Ceriodaphnia, as described in the 3M Wastewater toxicity Reduction Study with zinc at 240 ug/l and copper at 68 ug/l. These discharge concentrations are more restrictive than MN state standards or the OCPSF standards. The nickel discharge limitation used for this permit is 480 ug/l, which is also more restrictive than MN standards or OCPSF standards, and lower than the LC50 of 940 ug/l used in the 3M Wastewater Toxicity Reduction Study. The basis for the proposed nickel discharge limitation is discussed more fully in Appendix A Basis for Derivation of NPDES Discharge Limits, Metals section.

Beginning in the last quarter of 2000 and continuing through 2001, fathead minnows became the primary impacted species exhibiting acute toxicity. The fathead minnow toxicant is believed to be an organic compound. The 3M Wastewater Toxicity Reduction Study included an evaluation of 3M processes and chemistry, review of raw materials used in processes, chemical analysis of separate process streams, whole effluent toxicity testing, toxicity index evaluations, literature reviews, and treatability studies. The study concluded that the primary organic toxicant was related to an acrylamide latex emulsion process used in an automotive product production area at the 3M facility. The acrylamide latex process included alkyl phenol ethoxylates (APEs) used in the raw materials. Further testing and evaluation determined that the APEs were responsible for the acute toxicity impacts on the fathead minnow test species. The APEs are discharged from a building process at the 3M facility discharging into the phase 1 wastewater stream. The phase 1 wastewater stream is treated at the WWTP by a physical/chemical treatment system designed to neutralize acidic or basic wastewaters, provide for pH adjustment and precipitation of metals for removal, and sedimentation. It is not an organic oxidation process, therefore, organic compounds such as APEs would not normally be removed by the phase 1 treatment process.

Published LC50s for many of these APE compounds indicate that acute toxicity can occur in the low ppm (mg/l) range. In particular 2 APEs, (2-[2-[4-(1,1,3,3-tetramethylbutyl) phenoxy]ethoxy]-ethanol and 4-(1,1,3,3-tetramethylbutyl)-phenol, were found at elevated concentrations in 3M tested effluents demonstrating acute toxicity to fathead minnows. Focused treatability studies conducted by a 3M consultant for this work found that carbon treatment effectively removed the toxicity present in the toxic phase 1 wastewater streams. Carbon or activated carbon therefore effectively removes the APE compounds responsible for acute toxicity.

APE compounds are commonly used as surfactants in detergents and may also be used in a variety of applications including plastic additives, dispersants or wetting agents, emulsion polymerizations, and pesticide formulations. APEs have been found to cause acute toxicity to various aquatic species. APEs have also been found to cause endocrine disruption, or cause oestrogenic effects in humans and animals. In general APEs biodegrade to alkyl phenols and alkylphenoxy carboxylic acids in wastewater treatments systems and the environment. There is some dispute as to whether APEs completely biodegrade or oxidize in biological wastewater treatment systems. Therefore, restrictions on APE use and regulations regarding the discharge of APEs is increasing. The MPCA does not have any current restriction requirements on the use and discharge of APEs. In some instances, however, the MPCA has requested Permittees to substitute APEs with linear alcohol ethoxylates (LAE), surfactant compounds which do not appear to cause oestrogenic impacts and more completely break down biologically, in those situations where biological wastewater treatment is not provided, such as in cooling water systems or relatively clean water discharges.

The proposed permit requires that the acute toxicity at SD 001 be resolved. To accomplish this 3M has proposed to install a granular activated carbon treatment system for advanced treatment of the effluent from the existing WWTP. The granular activated carbon treatment system will effectively remove the acute toxicity caused by these compounds as well as eliminate any potential chronic impacts in the river, such as oestrogenic effects, caused by these compounds. Therefore, the permit contains a requirement for the installation of the granular activated carbon treatment system with a schedule for its installation.

Granular Activated Carbon Treatment Systems

3M proposes to install granular activated carbon treatment systems for treatment of the WWTP effluents. An activated carbon treatment system will be installed for phase 1 and 2 treated effluents, and 3M proposes to install a separate granular activated carbon system for phase 3 treated effluent. The phase 1 and 2 activated carbon treatment system will be installed according to a schedule described in the permit.

The activated carbon treatment system for treatment of phase 1 and phase 2 treated wastewater effluents will allow removal of any organic compounds causing acute toxicity in the SD 001 effluent. In addition, this activated carbon system will allow removal of organic compounds and will result in an additional system of removal in meeting the discharge limitations listed in the Limits and Monitoring Section. The complexity of the

3M facility, the varying nature of pollutant characteristics, and product development frequently done at the facility through pilot studies (reactors) leads to the intermittent generation of additional organic compounds and other pollutants. The activated carbon treatment at the 3M facility will enable enhanced removal of organic pollutants, that may not be totally removed by existing biological wastewater treatment, and help to assure that future generated organic pollutants are effectively removed. MPCA staff believes that an activated carbon treatment system is the best available technology that is economically achievable, or BAT, for end of pipe treatment of organic materials in general and for organic compounds causing acute toxicity in the phase 1 and 2 wastewaters.

The MPCA believes that the addition of granular activated carbon treatment systems for tertiary treatment of phase 1, 2, and 3 effluents will likely enhance removal of low levels of mercury contained in these effluents. Most states and regulatory authorities recognize that the most effective option for reducing mercury in the environment is source control or pollution prevention (P2) where mercury is removed through material substitution, recycling, or other P2 efforts thus minimizing or eliminating mercury from entry into wastewaters. However, in some cases end of pipe or wastewater treatment may also be necessary, or may be the only or most viable option, for mercury removal in wastewater effluents. Mercury may exist in several forms in wastewater effluents, including ionic or organic forms. The efficiency of removal by wastewater or removal technologies is significantly affected by the mercury forms present. Based on studies completed at wastewater treatment facilities at numerous locations in the U.S. it has been found that often the majority of mercury is present in a particulate form, or attached to particles of solids in the wastewaters. Therefore, increasing the removal of effluent solids, or total suspended solids, in wastewater effluents has been found to provide for a significant increased removal of low level concentrations of mercury.

A number of treatment technologies have also been evaluated for low-level mercury removal in wastewaters and water streams, beyond improved solids or effluent particulate removal. These technologies are more applicable to mercury in effluents in a “non-particulate” form. In general many of these technologies applicable to mercury removal are at an emerging or developmental state. These technologies range from activated carbon, impregnated activated carbon, enhanced precipitation, specific sorption technologies, reverse osmosis, and ion exchange. Certain advanced removal technologies such as reverse osmosis, ion exchange, and specific or specialty sorbents are typically only applicable to low flow streams due to the extraordinary high cost of these technologies.

MPCA staff evaluated these technologies and believes that the best available technology that may be economically achievable, BAT technology, in general for end of pipe treatment of phase 3 wastewaters containing mercury is increased efficiency of effluent solids removal through sand filtration and activated carbon treatment. In some cases activated carbon may function both for improved solids removal and adsorption of mercury. This type of treatment system will allow for maximum removal of mercury attached to effluent solids, and maximum removal of forms of mercury amenable to removal by adsorption technologies (activated carbon). The MPCA believes that the treatment systems proposed to be installed on the 3M treated phase 3 effluent currently represents best available technology for mercury removal through end of pipe treatment technologies. The phases 1 and 2 treatment systems at 3M will initially be used as activated carbon treatment systems only, without using pre-sand filtration. However, the system will be designed to accommodate treatment of the effluents with sand filtration prior to activated carbon.

3M is proposing to install a granular activated carbon treatment system on the phase 3 effluent, in addition to the phase 1 and 2 activated carbon system. This is for the purpose of installing state of the art treatment technology and to proactively enhance mercury removal.

Fluorochemical Analysis Requirement

3M produced fluorochemicals at the 3M Cottage Grove facility. These fluorochemicals were used in numerous consumer products and as a raw material used in products made by others. The major uses were as surface protectors and surfactants. One of the fluorochemicals produced by 3M was perfluorooctanesulfonyl fluoride (POSF) which was then used to create several fluorochemical product lines. POSF is an eight carbon straight chain alkane with complete substitution of fluorine for hydrogen on the molecule. The carbon-fluorine bond formed by the process to make these fluorochemicals is very stable. POSF and POSF-based fluorochemical compounds ultimately degrade in the environment to perfluorooctane sulfonate (PFOS) and a few other perfluorinated forms. PFOS has been found to not degrade further in the environment.

In 1997, after improving analytical techniques for these fluorochemical compounds, 3M discovered PFOS concentrations in the human blood sera of the U.S. population. This unexpected discovery prompted 3M to immediately proceed with further investigation. Further studies found PFOS in various species of animals across the world. It was determined that PFOS is bioaccumulative and persistent. PFOS is distributed in blood serum and the liver in humans and animals. Recent data indicates that PFOS is present in human adult serum in the general population at about 37 ppb, taken from diverse locations in the U.S.

Because of the discovery of PFOS in the U.S. human population and the widespread distribution of PFOS in the environment 3M began a voluntary phase out in production of perfluorooctanyl chemistry including POSF-based substances in year 2000. 3M is the sole producer of these specific fluorochemicals in the U.S. 3M also commissioned a great number of studies to evaluate the sources, dispersion, fate, and effects of these sulfonated fluorochemicals in the environment including environmental transformation/biodegradation studies, environmental distribution and transport studies, physical/chemical studies, environmental sampling studies, human exposure studies, ecotoxicity testing, and animal testing including carcinogenicity studies, etc. A large number of study reports are available and the studies are ongoing. These studies have been submitted by 3M to the EPA as 3M Fluorochemical EPA Submissions.

The 3M Cottage Grove facility has produced some POSF based products and a related fluorochemical, perfluorooctanoic acid (PFOA) in the past. All of these production processes have been terminated. Related to the studies described above, in September-October 2001 3M found concentrations of these perfluorochemicals in the 3M Cottage Grove SD 001 treated discharge. Discharge concentrations ranged from an average of 11 ug/l to 346 ug/l, with PFOS and PFOA at averages of 262 ug/l and 216 ug/, respectively. 3M has also found low levels of PFOS in the groundwater under the

3M facility. The source of PFOS and related fluorochemicals in the groundwater discharge is unknown.

Repeated dose studies to date demonstrate that the primary target organ of PFOS is the liver. High doses of PFOS have caused some liver enlargement and alterations in liver metabolic processes in test animals. PFOS causes liver enzyme elevations and hepatic vacuolization in rats and hepatic hypertrophy at high doses. Extensive toxicological research and laboratory animal studies have been completed and continue for the purpose of determining toxicological effects and potential health impacts, and to establish no effect levels in test animals, including rats and primates, for endpoints of importance.

PFOS and related sulfonated perfluorochemicals, and PFOA have been found to be relatively non-toxic with respect to acute toxicity of aquatic organisms. The concentrations of these fluorochemicals found in the SD 001 discharge are well below any LC50s for any aquatic species. For example the 96-HR LC50 of PFOS for Fathead Minnows is 9.5 mg/l.

The MPCA does not have any standards or discharge limitations for sulfonated fluorochemical compounds. However the MPCA believes that these compounds should be monitored. The activated carbon treatment system proposed to be installed by 3M will attenuate the PFOS and PFOA that may be present in these wastewaters. Activated carbon represents the best available technology for removal of these organics.

The MPCA is evaluating a resolution to groundwater under the 3M facility contaminated by PFOS. 3M uses groundwater for its processes, supplied by production wells. Although PFOS, PFOA, and related fluorochemicals should have diminished in concentrations in wastewaters influent to the WWTP as a result of termination of production processes for these compounds, concentrations of these fluorochemicals will continue to be present in the influent wastewater for some time due to their low level presence in the groundwater. The activated carbon system has the potential to remove these compounds and thus serve, in part, as a remediation system for removal of these compounds from the groundwater.

The fluorochemicals will be analyzed to detection levels pursuant to the method techniques developed for these compounds.

Wastewater Basin Liner Requirements

The permit requires that the first polishing pond or basin #1 that immediately receives effluent from the wastewater treatment plant be upgraded with a new basin liner system. Basin 1 will continue to receive effluent from the existing wastewater treatment facilities at the site treating phase 1 and 2 wastewaters, and will serve as an "equalization" basin to direct treated wastewater effluent to the proposed new activated carbon treatment system. The liner will be upgraded to meet MPCA engineering design requirements for wastewater basins or ponds, in accordance with a schedule provided in the permit.

The other existing polishing ponds at the WWTP system, polishing ponds 2 and 3 which successively follow polishing pond #1, will be taken out of operation after completion of installation of the activated carbon treatment system, reconfiguration of polishing pond #1 and liner installation, and the repiping project for SD002. After removal from operation these polishing ponds will receive only direct rainfall. At some point, at 3M's discretion, these ponds will be abandoned and sludges accumulated in the ponds will be removed and disposed of in accordance with federal and state rules. A portion of polishing pond 2 may be converted for use as a stormwater retention basin at pond abandonment. In that event 3M will submit plans for such conversion to the MPCA for review.