pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0046680**
Facility Type	**Industrial**	APS ID	**318564**
Major / Minor	**Minor**	Authorization ID	**1364256**

NPDES PERMIT FACT SHEET INDIVIDUAL INDUSTRIAL WASTE (IW) AND IW STORMWATER

Applicant and Facility Information

Applicant Name	**Republic Service of PA LLC**	Facility Name	**Modern Landfill** (PF #255900)
Applicant Address	4400 Mount Pisgah Road York, PA 17406-8240	Facility Address	4400 Mount Pisgah Road York, PA 17406-8240
Applicant Contact	Mazen Haydar, Environmental Mgr.	Facility Contact	Mazen Haydar, Environmental Mgr.
Applicant Phone	717-887-0478 mhaydar@republicservices.com	Facility Phone	717-887-0478 mhaydar@republicservices.com
Client ID	92781	Site ID	249052
SIC Code	4953	Municipality	Windsor and Lower Windsor Townships
SIC Description	Trans. & Utilities - Refuse Systems	County	York
Date Application Received	August 4, 2021	EPA Waived?	No
Date Application Accepted	August 27, 2021	If No, Reason	Significant Chesapeake Bay Discharge
Purpose of Application	Renewal of NPDES Permit – Industrial Wastewater		

Summary of Review

The existing NPDES permit was issued on January 23, 2017, amended on April 21, 2017, and administratively extended past its expiration date of January 31, 2022. The permit renewal application was submitted on August 3, 2021 via DEP's electronic upload system, OnBase, Reference ID No. 28380. The application was assigned to this permit writer in mid-March 2022. Corrected tables of sample results were forwarded to DEP by the permittee's consultant via email on May 19, 2022 and are part of the application. Additional sampling data for some parameters, using lower quantitation levels, was uploaded to DEP's OnBase system on January 30, 2023, Reference ID No. 85673. An electronic copy of the application and May 19, 2022 and January 30, 2023 application addenda were forwarded to the U.S. EPA on April 3, 2023.

Modern Landfill (Modern LF) is a municipal solid waste and residual waste landfill encompassing approximately 750 acres in Windsor and Lower Windsor Townships, York County, Pennsylvania. It is primarily regulated by DEP's Waste Management Program under Permit No. 100113. No hazardous waste is accepted. DEP's Clean Water Program regulates wastewater discharges to waterways and stormwater discharges from Modern LF.

Modern LF's on-site treatment plant accepts leachate, gas condensate, flare condensate, gas well liquid, and de-watering liquids generated on-site. According to the permittee, sanitary wastewater is no longer introduced into the treatment plant; instead the permittee indicates that it is diverted to a holding tank for intermittent hauling and off-site disposal. The treatment plant effluent is mingled with groundwater and conveyed through air stripping towers before discharging to Kreutz Creek at outfall 001. Dating back to 1980, Volatile Organic Compounds (VOCs) and chlorinated compounds --including benzene, cis-1,2-dichloroethenene, trichloroethane, and vinyl chloride-- were previously detected in groundwater at the site. Extraction wells were installed at the site to treat contaminated groundwater and to control the plume of contaminated groundwater pursuant to a September 1984 Consent Order Agreement between Modern LF and DEP. DEP continues to review the

Approve	Deny	Signatures	Date
x		*Bonnie Boylan* Bonnie Boylan / Environmental Engineering Specialist	April 3, 2023 July 18, 2023 (requested edits) August 1, 2023 (updated data)
x		Daniel W. Martin Daniel W. Martin, P.E. / Environmental Engineer Manager	August 9, 2023
x		Maria D. Bebenek Maria D. Bebenek, P.E. / Program Manager	August 10,2023

efficacy of the groundwater remediation system. Both DEP and the U.S. EPA would need to approve eliminating the groundwater extraction system if Modern LF were to make such a request.

A Water Quality Management (WQM) permit amendment was issued to Republic Service of PA LLC (Republic Service), which owns and operates Modern LF, by DEP on September 27, 2021 for an upgrade to the treatment plant. The design flow for the treatment plant was not changed: 0.5 MGD. Modern LF reported to DEP that the new Reverse Osmosis system included in the treatment plant upgrade became operational in April 2023. (See pages 9 and 10 of the Fact Sheet for more details on the current treatment plant and the upgrade.)

The 2021 NPDES renewal application proposes transporting some quantity of untreated leachate from Conestoga Landfill (Conestoga LF) in Berks County (operated by the New Morgan Landfill Company, a subsidiary of Republic Service) to Modern LF's treatment plant. [Note: Modern LF's waste permit would have to allow for such.] Modern LF's application states that the permittee would not truck-in quantities of leachate that would exceed Modern LF's treatment plant capacity. A review of Modern LF's Discharge Monitoring Reports (DMRs) from the past three years shows that Modern LF's discharges from outfall 001 have been below the NPDES permit's design flow: the monthly average flow was 0.15 MGD and the maximum flow was 0.30 MGD, compared to the design flow of 0.50 MGD. (The summarized flow data from DMRs are attached.) Modern LF's 2021 application included lab sample results from Conestoga LF's treatment plant influent. Comparing these concentrations or values to Modern LF's influent concentrations or values a) from past DEP Form 50's (Municipal Waste Landfills Leachate Analyses) for leachate (3rd quarter 2021 through 2nd quarter 2022) and b) from Modern LF's 2021 application indicates that Conestoga LF's influent concentrations or values are potentially greater than Modern LF's influent concentrations or values for the following parameters:

Fecal Coliform
Total Residual Chlorine (TRC)
Total Antimony
Total Zinc

Total Aluminum
Total Lead
Acetone
2-Butanone (MEK)

Color
Total Cadmium
Tetrahydrofuran

-For the first group of parameters above (Fecal Coliform, TRC, Total Antimony, Total Zinc), the permit limits will be the control, to protect the receiving water.
-For the second group of parameters above (Total Aluminum, Total Lead, Acetone, MEK), the *influent* concentration for both Conestoga LF and for Modern LF are below the calculated Water Quality Based *Effluent* Limit (WQBEL) thus requiring no further action.
-Color is discussed on pages 48 through 50.
-For Total Cadmium, it is expected that the dilution of Conestoga LF leachate with Modern LF's other wastewater (including treated groundwater) will result in effluent concentrations below the calculated WQBEL but a monitoring requirement is included in the draft permit in order to confirm this (Conestoga LF influent: 2.5 ug/l for Total Cadmium; Modern LF influent: 1 ug/l for Total Cadmium; groundwater at Modern LF introduced after treatment plant: <2 ug/l for Total Cadmium; WQBEL of 1.43 ug/l)
-For Tetrahydrofuran, there is currently no promulgated surface water quality criteria such as to calculate a WQBEL; and the leachate concentration reported of 580 ug/l (0.580 mg/l) is well below the ecotoxicity levels included in Safety Data Sheets for the product Tetrahydrofuran downloaded from the internet (attached): LC50 of 2160 mg/l for 96-hour toxicity test with Fathead minnow (Pimephales promelas) and EC50 of 3485 mg/l for 48-hour toxicity test with water flea (Ceriodaphnia dubia or Daphnia magna). (LC=Lethal Concentration; EC=Effective Concentration.)

<u>Design Flow</u>

-The existing NPDES permit's effluent limits were based on a design flow of 0.50 MGD.
-The 2021 NPDES permit renewal application included a design flow of 0.50 MGD.
-The treatment plant's WQM permit issued by DEP also specifies a design Average Annual Flow (AAF) of 0.5 MGD and a Hydraulic Design Capacity of 0.5 MGD.

-DEP's Waste Program staff relayed that no application has been received for a Modern LF expansion.
-DEP's Waste Program's past Form 50's (Quarterly Municipal Waste Landfill Leachate Analyses) do not indicate flows greater than 0.50 MGD.
-DMRs from 1/1/2020 through 4/30/2023 do not indicate that a design flow greater than 0.50 MGD is needed.

The draft renewal permit includes the same design flow, 0.50 MGD.

Sludge Disposal

Sludge is deposited onsite, in the active landfill cells. Some liquid waste, however, is disposed at POTWs (Publicly Owned Treatment Works).

Outstanding Violations

As of August 1, 2023, there are no outstanding Clean Water Program violations for this client or for this facility.

For other DEP Programs, a site and facility search using DEP's Environment Facility Application Compliance Tracking System (eFacts) tool (www.ahs.dep.pa.gov/eFACTSWeb/default.aspx)* identifies no outstanding violations for this site between 1/1/2008 and 8/1/2023 (meaning any violation during that period has been resolved).

History

The groundwater extraction system has been in operation at Modern LF since 1984.

The facility's 1986 NPDES permit included limits for the following volatile organic compounds: Trichloroethylene (TCE), Tetrachloroethylene (PCE), 1,2-Trans-Dichloroethylene, 1,1-DCE [sic], Methylene Chloride, and Carbon Tetrachloride.

The 1997 Fact Sheet associated with the NPDES renewal permit issued in 1997 did not indicate that there were high effluent concentrations of most VOC's; instead most were 'Non-detect'. The highest concentrations in the influent of Modern LF's treatment plant, according to the 1991 application (with additional sampling submitted in 1997), were Tetrahydrofuran (140 ug/l), Acetone (82 ug/l), 2-Butanone (110 ug/l), TCE (20 ug/l), 1,1-DCA (7 ug/l), Total Xylenes (11 ug/l), and Toluene (9 ug/l).

In previous NPDES permit applications, Modern LF requested that the NPDES permits accommodate the potential acceptance of leachate from other landfills. For this reason, previous permits included the condition that a complete analysis of raw influent from any proposed off-site landfill that was not reflected in the permit application influent samples be submitted to DEP and that such waste could not be accepted if DEP objected. (Note: the facility would also have to be in compliance with its DEP waste permit.)

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final determination on the application. The applicant, any affected State, any affected interstate agency, the Administrator of the EPA, or any interested agency, person, or group of persons may request or petition for a public hearing with respect to the application. A public hearing will be held if DEP determines that there is significant public interest, including the filing of requests or petitions for the hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge. Notice of the public hearing will also be sent to all persons or government agencies that received a copy of the fact sheet for the draft permit.

** The hyperlinks included throughout the Fact Sheet were active as of the writing of this Fact Sheet. They could change in the future as such links are dynamic in nature.*

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001 (See map on next page)	Design Flow (MGD)	0.5
Latitude	39º 58' 2"	Longitude	-76º 35' 49"
Quad Name		Quad Code	
Wastewater Description:	Industrial wastewater - Process Effluent with ELG, sewage, miscellaneous, groundwater		
Receiving Waters	Kreutz Creek	Stream Code	07881
NHD Com ID	Com ID 57467717	RMI	12.2
Drainage Area	8.6 sq. mi.	Yield (cfs/mi^2)	0.15
Q_{7-10} Flow (cfs)	1.3	Q_{7-10} Basis	USGS PA Stream Stats, online tool
Elevation (ft)	475	Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired for Aquatic Life (Assessment ID #20492, 7/2017), both upstream and downstream of outfall		
Cause(s) of Impairment	siltation, habitat modification		
Source(s) of Impairment	unknown		
TMDL Status	No TMDL for Kreutz Creek but TMDL exists for nutrients downstream	Name	Chesapeake Bay TMDL

Secondary Water – Kreutz Creek flows into the Susquehanna River (Stream Code 06685) at RMI 27.4, WWF, impaired for aquatic life due to metals (Assessment ID 12850, 3/2006) and impaired for fish consumption due to PCBs (Assessment ID 17500, 11/2013)

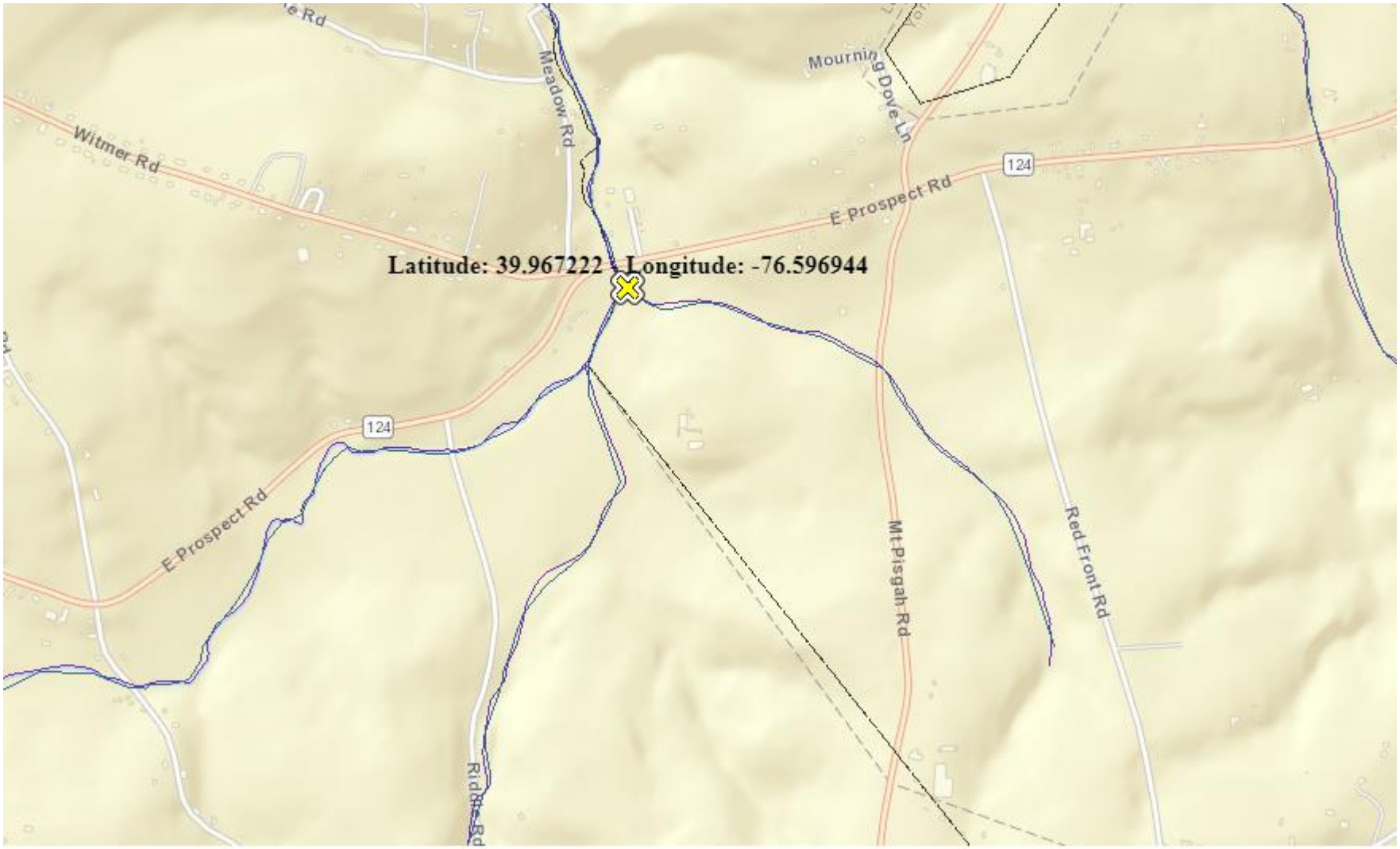
Background/Ambient Data – not available		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		
Nearest Downstream Public Water Supply Intake		York Water Co. PADWIS (7670100), Pumping capacity of 12M GPD[1]; followed by Red Lion PADWIS (7670086), Pumping Capacity of 3M GPD

PWS Waters	Susquehanna River	Flow at Intake (cfs), est.	3360 (area-averaged)
PWS RMI	23 for York Water Co	Distance from Outfall (mi)	Approx. 16.6 miles

[1]DEP's Safe Drinking Water staff communicated that this PADWIS is a back-up water supply for York Water Company but is not in use.

-Kreutz Creek is considered Trout Natural Reproduction between RMI 17.9 and 6.4. Kreutz Creek is not a Class A Trout Stream.
-There are no surface water withdrawals appearing on eMapPa (eMapPA or www.gis.dep.pa.gov/emappa/) between the landfill's outfall 001 and the Susquehanna River except at approximately RMI 0.4 on Kreutz Creek where there is an (active) quarry.
-There is a park 3.6 miles downstream of the facility, called Clayton Ely Emig Memorial Park in Hallam Boro. Kreutz Creek runs adjacent to the Park.
-DEP's eMapPA shows one Small Flow Treatment Facility (sewage < 2000 gpd) and two Municipal Separate Storm Sewer System (MS4) discharges upstream of the facility's outfall 001. Immediately upstream is an industrial stormwater discharge from a metals company.
- eMapPA shows two discharges on UNT07909 emptying into Kreutz Creek at RMI 12.2: another MS4 stormwater discharge and an alternate location for a hydrostatic discharge for Texas Eastern Marietta extension pipeline.

LOCATION OF OUTFLL 001, MODERN LANDFILL, ON KREUTZ CREEK:



Discharge, Receiving Waters and Water Supply Information			
Outfall No.	002	Design Flow (MGD)	0
Latitude	39º 57' 50"	Longitude	-76º 35' 24"
Quad Name		Quad Code	
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary to Kreutz Creek	Stream Code	07909
NHD Com ID	57467847	RMI	0.5, estimated
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired for Aquatic Life (Assess.ID 20492, 7/2017)		
Cause(s) of Impairment	Siltation, habitat modification		
Source(s) of Impairment			
TMDL Status	None	Name	-

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	003	Design Flow (MGD)	0
Latitude	39º 57' 59"	Longitude	-76º 35' 47"
Quad Name		Quad Code	
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary to Kreutz Creek	Stream Code	07909
NHD Com ID	57467847	RMI	0.06, estimated
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired for Aquatic Life (Assess.ID 20492, 7/2017)		
Cause(s) of Impairment	Siltation, habitat modification		
Source(s) of Impairment			
TMDL Status	None	Name	-

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	004	Design Flow (MGD)	0
Latitude	39º 57' 56"	Longitude	-76º 35' 29"
Quad Name		Quad Code	
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary to Kreutz Creek	Stream Code	07909
NHD Com ID	57467847	RMI	0.4, estimated
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired for Aquatic Life (Assess.ID 20492, 7/2017)		
Cause(s) of Impairment	Siltation, habitat modification		
Source(s) of Impairment			
TMDL Status	None	Name	-

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	005	Design Flow (MGD)	0
Latitude	39º 57' 49"	Longitude	-76º 35' 51"
Quad Name		Quad Code	
Wastewater Description:	Stormwater		
Receiving Waters	UNT of Kreutz Creek	Stream Code	07910
NHD Com ID	57468355	RMI	0.15 estimated
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired for Aquatic Life (Assess.ID 20492, 7/2017)		
Cause(s) of Impairment	Siltation, habitat modification		
Source(s) of Impairment			
TMDL Status	None	Name	-

The above latitude and longitude coordinates (lat/long) are taken from Modern LF's 2021 NPDES permit application and differ from the existing permit which showed the lat/long for this outfall as 39º 57' 51" and -76º 35' 57". (The lat/long shown in the existing permit dates back to a 2007 application as cited in previous Fact Sheets.) The applicant asserted in a phone conversation with DEP staff that the lat/long in the current application was correct and that the discharge is to a swale that enters Kreutz Creek. According to DEP's eMapPA (eMapPA or www.gis.dep.pa.gov/emappa/), the current application's lat/long coincides with UNT 07910 which then flows into Kreutz Creek. According to maps of the site submitted by the permittee, the lat/long from the 2021 application appears to be correct with stormwater from this outfall discharging to UNT 07910.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	006	Design Flow (MGD)	0
Latitude	39º 57' 25"	Longitude	-76º 35' 24"
Quad Name		Quad Code	
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary to Kreutz Creek	Stream Code	07909
NHD Com ID	57467847	RMI	0.4, estimated
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired for Aquatic Life (Assess.ID 20492, 7/2017)		
Cause(s) of Impairment	Siltation, habitat modification		
Source(s) of Impairment			
TMDL Status	None	Name	-

Treatment Facility Summary

Treatment Facility Name: Modern Landfill

WQM Permit No.	Issuance Date
06786201 A-2	9/27/2021
06786201 A-1	1/23/2017
06786201	Late 1980's, before DEP's eFacts database

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Industrial	Advanced	Chemical / Biologic / Filtration	No Disinfection	0.5

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.5	13,865	Not overloaded	Dewatering	Landfill

Treatment Plant Prior to Upgrade:

-4 raw leachate tanks, 2 inside building and 2 outside
-grit chamber
-1 neutralization tank
-2 inclined plate clarifiers, with flocculation
-2 anoxic tanks
-a methanol storage tank and chemical feed to the anoxic tanks
-2 aeration tanks with jet aeration systems and 3 blowers and chemical feed
-design approval (2017 WQM permit amendment) for two heat exchangers which utilize extracted groundwater as noncontact cooling water and an option for mechanical chiller(s)
-2 trains of Ultrafiltration (UF) Membrane units each with 3 membrane modules (capacity of 0.060 MGD, not 0.5 MGD)
-a membrane Clean-in-Place system including Cleaning Tank, water storage tanks, and chemical metering system (city water is used for membrane backwashing)
- a wet well that receives UF permeate and groundwater from extraction system
-2 Air Stripper Towers for the removal of VOCs using polyethylene medium; towers can be used interchangeably
-underground concrete vault, approx. 11,000 gallons capacity
-intermittent pumping of portion of treated wastewater to lagoon for onsite use
-effluent flow meter and composite sampler
-outfall at Kreutz Creek, discharge via gravity flow from vault
-alarms and supervisory control and data acquisition (SCADA)

-1 sludge holding tank
-2 sludge thickeners (according to 2017 WQM permit amendment Internal Review and Recommendations)
-1 volute sludge press for dewatering
-dewatered sludge is disposed onsite in a landfill cell

Treatment Plant Modifications as part of most recent upgrade:

-the addition of one **Dissolved Air Filtration** (DAF) influent tank, one DAF effluent tank, a DAF float sump, DAF effluent sump, & pumps
-the addition of one new leachate storage tank with transfer pumps and replacement of one leachate storage tank and associated aeration manifold
-the addition of mixing and aeration to one of the existing leachate storage tanks
-the replacement of some feed pumps and addition of some transfer pumps
-the installation of an influent basket strainer with a bag filter on the backwash
-the conversion of the existing Sludge Thickener Tank to a Pre-Selector Tank
-the conversion of the existing Anoxic Tanks to Selector Tanks (Phase II)
-the conversion of one of the existing Aeration Tanks to a MBBR Anoxic Tank (Phase II) with media
-the installation of one new Aeration Tank downstream of the Anoxic MBBR Tank, with blowers
-the installation of a spray header with spray pump on the new and existing aeration tank
-the installation of a third UF Feed pump
-the addition of automatic strainers after the Grit Chamber and prior to the UF membrane skids
-the addition of one new manual strainer in front of the new UF system
-the installation of **a third UF membrane system**
-the addition of a waste line directly off the concentrate line from the UF units to the sludge storage tanks
-the addition of **two trains of a new RO system**
-the addition of a new UF Permeate Storage Tank and truck loading station (and transfer pumps)
-the addition of a new RO Reject Storage Tank (and loadout pump)
-the addition of a new heat exchanger and chiller (for biomass)
-the addition of a new Sludge Tank (and transfer pumps)
-the replacement of the effluent wet well tank with a new tank (and mixer)
-changes to the effluent piping system
-the replacement of the lagoon with an effluent storage tank
-the addition of a water storage tank
-the installation of building sumps and pumps in the RO Building, Heat Exchanger Building, Tank Farm Area and the Truck Load Out Area

EXISTING PERMIT LIMITS, Outfall 001:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.25 Avg Mo	Report Daily Max	0.81	1/day	Grab
CBOD5	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Total Suspended Solids	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Ammonia-Nitrogen May 1 - Oct 31	4.17	8.34	XXX	1.0	2.0	2.5	2/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	12.5	25.0	XXX	3.0	6.0	7.5	2/week	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	4.0	2/week	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate	0.062	0.106	XXX	0.0149	0.0253	0.0372	1/week	24-Hr Composite
Boron, Total	17.2	23.0	XXX	4.12	5.52	10.3	1/week	24-Hr Composite
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	129	183	322	2/month	Grab
Zinc, Total	0.344	0.416	XXX	0.0825	0.0998	0.206	1/week	24-Hr Composite
Phenol	0.0289	0.0377	XXX	0.00692	0.00903	0.0173	2/month	24-Hr Composite
p-Cresol	0.0112	0.0200	XXX	0.00269	0.00480	0.00672	2/month	24-Hr Composite
a-Terpineol	0.0128	0.0264	XXX	0.00307	0.00634	0.00767	2/month	24-Hr Composite

EXISTING PERMIT LIMITS, Outfall 001 , Continued

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Benzoic Acid	0.0567	0.0959	XXX	0.0136	0.0230	0.034	2/month	24-Hr Composite
Copper, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Lead, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Tetrachloroethylene	XXX	XXX	XXX	Report	Report	XXX	1/month	Grab
Color (Pt-Co Units) Instream Monitoring	XXX	XXX	XXX	Report	Report	XXX	1/week	Grab
Color (Pt-Co Units)	XXX	XXX	XXX	Report	Report	XXX	1/week	Grab
Color (Pt-Co Units) Downstream Monitoring	XXX	XXX	XXX	Report	Report	XXX	1/week	Grab

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia—N	XXX	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Kjeldahl--N	XXX	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	XXX	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Total Nitrogen	XXX	Report	XXX	XXX	Report	XXX	1/month	Calculation
Total Phosphorus	XXX	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Net Total Nitrogen	Report	50803	XXX	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	300	XXX	XXX	XXX	XXX	1/month	Calculation

EXISTING PERMIT LIMITS, Outfalls 002 and 005:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
pH (S.U.)	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
BOD5	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Total Suspended Solids	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Ammonia-Nitrogen	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Antimony, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Boron, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Chromium, Hexavalent	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Copper, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Iron, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Lead, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Magnesium, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Nickel, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Zinc, Total	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report	XXX	2/year	Grab

Compliance History

DMR Data for Outfall 001 (from May 1, 2022 to April 30, 2023)

Parameter	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22
Flow (MGD) Average Monthly	0.137516	0.17316	0.141578	0.181617	0.176238	0.144398	0.1548	0.160866	0.160932	0.161092	0.171733	0.172778
Flow (MGD) Daily Maximum	0.200994	0.198519	0.190577	0.197584	0.19421	0.172572	0.193326	0.20076	0.197734	0.20114	0.209019	0.209019
pH (S.U.) Minimum	7.46	8.02	6.82	8.0	8.01	8.02	8.06	7.47	7.35	7.97	7.69	7.69
pH (S.U.) Maximum	8.71	8.59	8.51	8.45	8.6	8.51	8.52	8.48	8.35	8.59	8.44	8.44
DO (mg/L) Minimum	7.23	7.86	6.75	7.75	6.69	5.26	5.6	6.98	7.35	7.6	7.5	7.5
TRC (mg/L) Average Monthly	0.04	0.04	0.04	0.05	0.06	0.05	0.05	0.06	0.06	0.07	0.07	0.05
TRC (mg/L) Daily Maximum	0.08	0.11	0.1	0.10	0.09	0.10	0.09	0.10	0.14	0.12	0.2	0.1
TRC (mg/L) Instantaneous Maximum	0.08	0.11	0.10	0.10	0.09	0.10	0.09	0.10	0.14	0.12	0.2	0.10
Color (Pt-Co Units) Average Monthly	341.9	575	700	700	700	203	556	305	456	650	640	700
Color (Pt-Co Units) Downstream Monitoring Average Monthly	65	41	76	119	74	26	163	66	45	74	52	133
Color (Pt-Co Units) Instream Monitoring Average Monthly	58	19	10.6	14	16	12	14	11	14	34	26	34
Color (Pt-Co Units) Daily Maximum	700	700	700	700	700	700	700	700	700	700	700	700
Color (Pt-Co Units) Downstream Monitoring Daily Maximum	125	75	150	150	125	40	200	200	70	125	65	275
Color (Pt-Co Units) Instream Monitoring Daily Maximum	100	40	15	20	30	25	25	20	25	55	40	55

CBOD5 (lbs/day) Average Monthly	< 3.5	5.3	5.4	5.3	4.1	< 3.1	3.7	< 3.4	4.5	< 3.8	5.0	5.0

CBOD5 (lbs/day) Daily Maximum	5.3	7.0	7.9	6.4	5.3	< 3.4	4.6	4.4	5.5	4.9	7.5	6.7
CBOD5 (mg/L) Average Monthly	< 3	4	5	4	3	< 3	3	< 3	4	< 3	4	4
CBOD5 (mg/L) Daily Maximum	3.9	4.8	6.5	4.5	3.3	2.8	3.5	3.5	4	3.9	4.5	4
TSS (lbs/day) Average Monthly	4.9	10.1	9.3	14.2	6.7	2.2	5.7	4.2	7.7	4.4	11.5	4.9
TSS (lbs/day) Daily Maximum	9.5	16.7	13.6	17.6	11.0	2.8	8.0	5.8	15.3	9.6	24.9	7.4
TSS (mg/L) Average Monthly	4	8	10	10	5	2	5	4	6	4	8	4
TSS (mg/L) Daily Maximum	7	16	14	12	8	2	7	5	12	11	15	7
Osmotic Pressure (mOs/kg) Average Monthly	293	265	230	261	345	137	286	190	291	180	285	318
Osmotic Pressure (mOs/kg) Daily Maximum	322	273	290	268	459	262	310	282	291	281	317	350
Fecal Coliform (CFU/100 ml) Geometric Mean	< 6	< 10	< 10	< 10	< 10	< 2	< 10	< 10	< 10	< 10	< 10	< 10
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Nitrate-Nitrite (mg/L) Average Monthly	< 83.6	< 184.8	< 220	< 258.5	< 208.51	51.5	< 189.38	< 298.2	< 182.4	< 107	< 273.7	< 401.5
Nitrate-Nitrite (lbs) Total Monthly	< 3351	< 8066	< 6286	< 11663	< 9529	1917	< 7205	< 11181	< 7247	< 4043	< 11634	< 18124
Total Nitrogen (mg/L) Average Monthly	< 105.3	< 224.4	< 263.7	< 307.5	< 258.4	75.8	< 215.88	< 336.4	< 210	< 137.2	< 306.5	< 429.8
Total Nitrogen (lbs) Effluent Net Total Monthly	< 4228	< 9795	< 7519	< 13874	< 11755	2829	< 8220	< 12598	< 8336	< 5158	< 13033	< 19408
Total Nitrogen (lbs) Total Monthly	< 4228	< 9795	< 7519	< 13874	< 11755	2829	< 8220	< 12598	< 8336	< 5158	< 13033	< 19408
Total Nitrogen (lbs) Effluent Net Total Annual								< 47575				
Total Nitrogen (lbs) Total Annual								< 152368				
Ammonia (lbs/day) Average Monthly	< 0.1	< 0.1	< 0.7	0.8	< 0.30	0.86	< 0.64	< 0.16	< 0.13	< 0.17	0.37	0.37

Ammonia (lbs/day) Daily Maximum	< 0.2	< 0.2	1.4	1.3	0.94	2.28	3.49	0.36	< 0.15	0.39	0.60	0.62
Ammonia (mg/L) Average Monthly	< 0.1	< 0.1	< 0.6	0.6	< 0.2	0.7	< 0.5	< 0.1	< 0.1	< 0.1	0.3	0.3
Ammonia (mg/L) Daily Maximum	< 0.1	0.1	1.1	0.8	0.6	1.6	2.3	0.3	< 0.1	0.4	0.4	0.41
Ammonia (lbs) Total Monthly	< 3.3	< 4.4	< 20.4	24.9	< 9.4	25.8	< 19.8	< 4.7	< 3.9	< 5.4	11.2	11.5
Ammonia (lbs) Total Annual								< 221				
TKN (mg/L) Average Monthly	< 21.6	40	44	49	50	24	26.5	38	28	30	33	28
TKN (lbs) Total Monthly	< 877	1729	1233	2211	2226	912	1015	1417	1088	1115	1399	1284
Total Phosphorus (mg/L) Average Monthly	< 0.47	1.21	1.04	1.26	1.33	1.18	1.14	1.11	0.84	1.14	1.3	1.21
Total Phosphorus (lbs) Effluent Net Total Monthly	< 18	52	31	57	57	44	44	41	32	42	57	57
Total Phosphorus (lbs) Total Monthly	< 18	52	31	57	57	44	44	41	32	42	57	57
Total Phosphorus (lbs) Effluent Net Total Annual								-362				
Total Phosphorus (lbs) Total Annual								672				
Total Boron (lbs/day) Average Monthly	16.3	28.2	26.4	32.4	25.9	14.0	23.1	25.2	21.1	21.8	31.8	31.8
Total Boron (lbs/day) Daily Maximum	42.1	30.8	39.6	36.7	35.5	17.7	31.2	34.8	22.6	24.4	48.2	38.7
Total Boron (mg/L) Average Monthly	11.72	20.40	24.50	23.00	18.80	11.63	18.95	22.20	17.00	19.00	23.40	22.50
Total Boron (mg/L) Daily Maximum	31.00	24.00	25.00	26.00	22.00	15.00	24.00	25.00	18.00	21.00	29.00	24.00
Total Copper (mg/L) Average Monthly	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.093	0.13	0.089
Total Copper (mg/L) Daily Maximum	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.125	0.13	0.089
Total Lead (mg/L) Average Monthly	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total Lead (mg/L) Daily Maximum	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total Zinc (lbs/day) Average Monthly	< 0.018	0.020	0.022	0.032	0.031	0.023	0.014	< 0.011	0.014	0.012	0.017	< 0.008

Total Zinc (lbs/day) Daily Maximum	0.031	0.030	0.039	0.037	0.044	0.027	0.020	0.024	0.021	0.016	0.048	0.011
Total Zinc (mg/L) Average Monthly	< 0.0130	0.0126	0.0193	0.0230	0.0222	0.0185	0.0118	< 0.0094	0.0113	0.0098	0.0120	< 0.0058
Total Zinc (mg/L) Daily Maximum	0.0230	0.0170	0.0260	0.0250	0.0280	0.0220	0.0170	0.0190	0.0150	0.0120	0.03000	0.0080
Phenol (lbs/day) Average Monthly	< 0.0055	< 0.0070	< 0.0064	< 0.0072	< 0.0072	< 0.0060	< 0.0063	< 0.0044	< 0.0035	< 0.0058	< 0.0002	< 0.0006
Phenol (lbs/day) Daily Maximum	< 0.0065	< 0.0070	< 0.0073	< 0.0078	< 0.0073	< 0.0064	< 0.0068	< 0.0051	< 0.0064	< 0.0063	< 0.0002	< 0.0010
Phenol (mg/L) Average Monthly	< 0.00487	< 0.00480	< 0.00490	< 0.00500	< 0.00500	0.00495	< 0.00510	< 0.00500	< 0.00271	< 0.00490	< 0.00012	< 0.00048
Phenol (mg/L) Daily Maximum	< 0.00490	< 0.00480	< 0.00500	< 0.00500	< 0.00500	< 0.00510	< 0.00520	< 0.00500	< 0.00500	< 0.00500	< 0.00015	< 0.00048
a-Terpineol (lbs/day) Average Monthly	< 0.0023	< 0.0030	< 0.0029	< 0.0033	< 0.0033	< 0.0027	< 0.0029	< 0.0020	< 0.0035	< 0.0027	< 0.0011	< 0.0031
a-Terpineol (lbs/day) Daily Maximum	< 0.0027	< 0.0030	< 0.0034	< 0.0036	< 0.0033	< 0.0029	< 0.0031	< 0.0024	< 0.0041	< 0.0029	< 0.0013	< 0.0064
a-Terpineol (mg/L) Average Monthly	< 0.00207	< 0.00220	< 0.00225	< 0.00230	< 0.00230	< 0.00225	< 0.00235	< 0.00230	< 0.00250	< 0.00225	< 0.00076	< 0.00246
a-Terpineol (mg/L) Daily Maximum	< 0.00220	< 0.00220	< 0.00230	< 0.00230	< 0.00230	< 0.00230	< 0.00240	< 0.00230	< 0.00270	< 0.00230	< 0.00095	< 0.00570
Benzoic Acid (lbs/day) Average Monthly	< 0.0020	< 0.0010	< 0.0015	0.0026	0.0019	0.0016	< 0.0011	< 0.0016	< 0.0012	< 0.0011	< 0.0015	< 0.0012
Benzoic Acid (lbs/day) Daily Maximum	0.0028	< 0.0010	0.0017	0.0029	0.0023	0.0019	< 0.0011	0.0027	< 0.0013	< 0.0013	0.0013	< 0.0014
Benzoic Acid (mg/L) Average Monthly	< 0.0015	< 0.0009	< 0.0012	0.0018	0.0013	0.0013	< 0.0009	< 0.0016	< 0.0009	< 0.0009	< 0.0010	< 0.0009
Benzoic Acid (mg/L) Daily Maximum	0.0021	< 0.00089	0.0015	0.0019	0.0016	0.0016	< 0.0009	0.0026	< 0.0009	< 0.0010	0.0012	< 0.0009
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Average Monthly	< 0.010	< 0.018	< 0.009	< 0.014	< 0.008	< 0.019	< 0.017	< 0.0008	< 0.013	< 0.007	< 0.006	< 0.019
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Daily Maximum	< 0.013	< 0.030	< 0.015	< 0.031	< 0.015	< 0.027	< 0.030	< 0.0008	< 0.024	< 0.012	< 0.022	< 0.034
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Average Monthly	< 0.0097	< 0.0123	< 0.0132	< 0.0092	< 0.0053	< 0.0149	< 0.0124	< 0.0005	< 0.0109	< 0.0056	< 0.0040	< 0.0116
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Daily Maximum	< 0.0098	< 0.0200	< 0.0200	< 0.0200	< 0.0100	< 0.0200	< 0.0200	< 0.0005	< 0.0200	< 0.0100	< 0.0150	< 0.0200
p-Cresol (lbs/day) Average Monthly	< 0.0009	< 0.0010	< 0.0010	< 0.0011	< 0.0011	< 0.0009	< 0.0010	< 0.0007	< 0.0012	< 0.0009	< 0.0004	< 0.0013

p-Cresol (lbs/day) Daily Maximum	< 0.0010	< 0.0010	< 0.0012	< 0.0012	< 0.0011	< 0.0010	< 0.0011	< 0.0007	< 0.0014	< 0.0010	< 0.0005	< 0.0023
p-Cresol (mg/L) Average Monthly	< 0.00076	< 0.00075	< 0.00077	< 0.00079	< 0.00079	< 0.00078	< 0.00080	< 0.00079	< 0.00087	< 0.00077	< 0.00027	< 0.00110
p-Cresol (mg/L) Daily Maximum	< 0.00077	< 0.00075	< 0.00079	< 0.00079	< 0.00079	< 0.00081	< 0.00081	< 0.00079	< 0.00094	< 0.00079	< 0.00033	< 0.00200
Tetrachloro-ethylene (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Tetrachloro-ethylene (mg/L) Daily Maximum	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005

DMR Data for Outfall 002 (from May 1, 2022 to April 30, 2023)

Parameter	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22
pH (S.U.) Daily Maximum					7.4							
BOD5 (mg/L) Daily Maximum					10							
TSS (mg/L) Daily Maximum					214							
Total Dissolved Solids (mg/L) Daily Maximum					140							
Total Nitrogen (mg/L) Daily Maximum					4.1							
Ammonia (mg/L) Daily Maximum					0.26							
Total Antimony (mg/L) Daily Maximum					0.001							
Total Boron (mg/L) Daily Maximum					0.13							
Hexavalent Chromium (mg/L) Daily Maximum					0.0163							
Total Copper (mg/L) Daily Maximum					0.039							
Total Iron (mg/L) Daily Maximum					38.1							
Total Lead (mg/L) Daily Maximum					0.0247							
Total Magnesium (mg/L) Daily Maximum					7.8							

Total Nickel (mg/L) Daily Maximum					0.027							
Total Zinc (mg/L) Daily Maximum					3.7							

DMR Data for Outfall 005 (from May 1, 2022 to April 30, 2023)

Parameter	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22
pH (S.U.) Daily Maximum					7.8							
BOD5 (mg/L) Daily Maximum					10.2							
TSS (mg/L) Daily Maximum					102							
Total Dissolved Solids (mg/L) Daily Maximum					722							
Total Nitrogen (mg/L) Daily Maximum					14.4							
Ammonia (mg/L) Daily Maximum					9.6							
Total Antimony (mg/L) Daily Maximum					0.0038							
Total Boron (mg/L) Daily Maximum					1.0							
Hexavalent Chromium (mg/L) Daily Maximum					0.0085							
Total Copper (mg/L) Daily Maximum					0.027							
Total Iron (mg/L) Daily Maximum					8.3							
Total Lead (mg/L) Daily Maximum					0.0157							
Total Magnesium (mg/L) Daily Maximum					14.4							
Total Nickel (mg/L) Daily Maximum					0.018							
Total Zinc (mg/L) Daily Maximum					0.073							

Effluent Violations for Outfall 001, from: June 1, 2022 To: April 30, 2023

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Osmotic Pressure	07/31/22	Avg Mo	180	mOs/kg	129	mOs/kg
Osmotic Pressure	10/31/22	Avg Mo	286	mOs/kg	129	mOs/kg
Osmotic Pressure	01/31/23	Avg Mo	261	mOs/kg	129	mOs/kg
Osmotic Pressure	11/30/22	Avg Mo	137	mOs/kg	129	mOs/kg
Osmotic Pressure	06/30/22	Avg Mo	285	mOs/kg	129	mOs/kg
Osmotic Pressure	09/30/22	Avg Mo	190	mOs/kg	129	mOs/kg
Osmotic Pressure	12/31/22	Avg Mo	345	mOs/kg	129	mOs/kg
Osmotic Pressure	08/31/22	Avg Mo	291	mOs/kg	129	mOs/kg
Osmotic Pressure	02/28/23	Avg Mo	230	mOs/kg	129	mOs/kg
Osmotic Pressure	04/30/23	Avg Mo	293	mOs/kg	129	mOs/kg
Osmotic Pressure	03/31/23	Avg Mo	265	mOs/kg	129	mOs/kg
Osmotic Pressure	11/30/22	Daily Max	262	mOs/kg	183	mOs/kg
Osmotic Pressure	04/30/23	Daily Max	322	mOs/kg	183	mOs/kg
Osmotic Pressure	02/28/23	Daily Max	290	mOs/kg	183	mOs/kg
Osmotic Pressure	07/31/22	Daily Max	281	mOs/kg	183	mOs/kg
Osmotic Pressure	09/30/22	Daily Max	282	mOs/kg	183	mOs/kg
Osmotic Pressure	10/31/22	Daily Max	310	mOs/kg	183	mOs/kg
Osmotic Pressure	06/30/22	Daily Max	317	mOs/kg	183	mOs/kg
Osmotic Pressure	01/31/23	Daily Max	268	mOs/kg	183	mOs/kg
Osmotic Pressure	03/31/23	Daily Max	273	mOs/kg	183	mOs/kg
Osmotic Pressure	12/31/22	Daily Max	459	mOs/kg	183	mOs/kg

Osmotic Pressure	08/31/22	Daily Max	291	mOs/kg	183	mOs/kg
Ammonia	10/31/22	Daily Max	2.3	mg/L	2.0	mg/L
Total Boron	08/31/22	Avg Mo	21.1	lbs/day	17.2	lbs/day
Total Boron	09/30/22	Avg Mo	25.2	lbs/day	17.2	lbs/day
Total Boron	07/31/22	Avg Mo	21.8	lbs/day	17.2	lbs/day
Total Boron	06/30/22	Avg Mo	31.8	lbs/day	17.2	lbs/day
Total Boron	10/31/22	Avg Mo	23.1	lbs/day	17.2	lbs/day
Total Boron	03/31/23	Avg Mo	28.2	lbs/day	17.2	lbs/day
Total Boron	02/28/23	Avg Mo	26.4	lbs/day	17.2	lbs/day
Total Boron	12/31/22	Avg Mo	25.9	lbs/day	17.2	lbs/day
Total Boron	01/31/23	Avg Mo	32.4	lbs/day	17.2	lbs/day
Total Boron	04/30/23	Daily Max	42.1	lbs/day	23.0	lbs/day
Total Boron	10/31/22	Daily Max	31.2	lbs/day	23.0	lbs/day
Total Boron	07/31/22	Daily Max	24.4	lbs/day	23.0	lbs/day
Total Boron	02/28/23	Daily Max	39.6	lbs/day	23.0	lbs/day
Total Boron	03/31/23	Daily Max	30.8	lbs/day	23.0	lbs/day
Total Boron	09/30/22	Daily Max	34.8	lbs/day	23.0	lbs/day
Total Boron	01/31/23	Daily Max	36.7	lbs/day	23.0	lbs/day
Total Boron	12/31/22	Daily Max	35.5	lbs/day	23.0	lbs/day
Total Boron	06/30/22	Daily Max	48.2	lbs/day	23.0	lbs/day
Total Boron	11/30/22	Avg Mo	11.63	mg/L	4.12	mg/L
Total Boron	07/31/22	Avg Mo	19.00	mg/L	4.12	mg/L
Total Boron	01/31/23	Avg Mo	23.00	mg/L	4.12	mg/L

Total Boron	09/30/22	Avg Mo	22.20	mg/L	4.12	mg/L
Total Boron	02/28/23	Avg Mo	24.50	mg/L	4.12	mg/L
Total Boron	04/30/23	Avg Mo	11.72	mg/L	4.12	mg/L
Total Boron	03/31/23	Avg Mo	20.40	mg/L	4.12	mg/L
Total Boron	06/30/22	Avg Mo	23.40	mg/L	4.12	mg/L
Total Boron	12/31/22	Avg Mo	18.80	mg/L	4.12	mg/L
Total Boron	08/31/22	Avg Mo	17.00	mg/L	4.12	mg/L
Total Boron	10/31/22	Avg Mo	18.95	mg/L	4.12	mg/L
Total Boron	03/31/23	Daily Max	24.00	mg/L	5.52	mg/L
Total Boron	04/30/23	Daily Max	31.00	mg/L	5.52	mg/L
Total Boron	07/31/22	Daily Max	21.00	mg/L	5.52	mg/L
Total Boron	02/28/23	Daily Max	25.00	mg/L	5.52	mg/L
Total Boron	09/30/22	Daily Max	25.00	mg/L	5.52	mg/L
Total Boron	12/31/22	Daily Max	22.00	mg/L	5.52	mg/L
Total Boron	01/31/23	Daily Max	26.00	mg/L	5.52	mg/L
Total Boron	11/30/22	Daily Max	15.00	mg/L	5.52	mg/L
Total Boron	06/30/22	Daily Max	29.00	mg/L	5.52	mg/L
Total Boron	08/31/22	Daily Max	18.00	mg/L	5.52	mg/L
Total Boron	10/31/22	Daily Max	24.00	mg/L	5.52	mg/L

DEP Clean Water Program: Review of Facility Compliance

February 1, 2023 – Compliance Evaluation / Inspection

Construction in progress for the treatment plant upgrade as approved by WQM Permit 6786201 A-2.

September 15, 2022 – Administrative File Review, no violations.

September 14, 2021 – Chesapeake Bay Capload review, no violations.

August 2, 2021 - Chesapeake Bay Capload review, no violations.

May 27, 2021 - Compliance Evaluation / Inspection

Leachate is collected from the active portion of Modern LF in one influent line and leachate from capped, inactive area is collected in another influent line. Facility is currently trucking some leachate, from a specific area, to another treatment plant because it was causing the permittee to exceed the NPDES permit limits for Ammonia. The plant upgrade is expected to obviate that problem, based on information shared with DEP by the permittee. The permittee does not use chlorine for disinfection but does use city water for backwashing. Total Residual Chlorine (TRC) was detected in DEP samples collected during the May 27, 2021 inspection. Red tint to discharge was observed. Violations of effluent limits have occurred at outfall 001 and were resolved through a September 20, 2021 administrative Consent Order and Agreement (COA) between DEP and the permittee.

Effluent Temperature was measured in the field by the inspector: 29.3°C (84.7°F). Effluent samples were collected by DEP and analyzed at DEP Bureau of Labs, indicating the following exceedance of permit limit:

Parameter	Units	Reported Results	Permit Limit	Statistical Base Code (SBC)
Total Boron	mg/l	14.32	10.3	IMAX

September 2, 2020 - Chesapeake Bay Capload review, no violations.

DEP Enforcement Actions

September 20, 2021 – COA between the DEP and permittee; see previous section

August 25, 2020 - COA was executed between DEP and the permittee. As part of the COA, Republic Services agreed to submit a WQM Part II permit application to DEP for upgrades needed to achieve compliance with NPDES effluent limits and then build and install the upgrades after obtaining the WQM Part II permit. The COA is still in effect, and Republic Services has most recently paid stipulated penalties on May 12, 2023 for its delay in completing all construction of the treatment plant upgrades in accordance with the WQM Permit with the timeline required by the COA.

NPDES permit limits for wastewater treatment plants are generally the more stringent of Technology Based Effluent Limits (TBELs), Best Professional Judgement (BPJ) limits, or Water Quality Based Effluent Limits (WQBELs) if WQBELs are needed to ensure that no exceedances of water quality criteria occur in the receiving stream [DEP's Technical Guidance for the Development and Specification of Effluent Limitations, document No. 386-0400-001**, available at www.depgreenport.state. pa.us/elibrary/Search; and DEP's Standard Operating Procedure (SOP) Establishing WQBELs and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers, Version 1.5, available at SOP - WQBELs for Toxic Pollutants (state.pa.us); and 40 C.F.R. § 122.44]. These types of limits are developed separately during the permit renewal and compared to existing permit limits. If the existing permit limits are the most stringent, the existing permit limits will usually be carried forward into the new permit in accordance with the prohibition on backsliding [Title 40 of the Code of Federal Regulations (C.F.R) § 122.44(l) and 25 Pa. Code § 92a.3].

Development of Effluent Limitations - Technology-Based Effluent Limitations (TBELs)

Outfall No.	001	**Design Flow (MGD)**	0.5
Latitude	39º 58' 2"	**Longitude**	-76º 35' 49"

Wastewater Description: Industrial Wastewater Process Effluent with ELG

Effluent Limitation Guidelines (ELGs)

Given the types of industrial activities performed at the site, the facility is subject to federal ELGs found in 40 C.F.R. Part 445 Subpart B – RCRA Subtitle D Non-Hazardous Waste Landfill. These ELGs specify that both Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) effluent limitations are the same as the limitations developed as Best Practicable Technology Currently Available (BPT) effluent limitations. These BPT effluent limitations, listed at 40 C.F.R. § 445.21, are as follows:

	Concentrations (mg/L)	
Regulated parameter	**Maximum Monthly Avg.**	**Maximum Daily**
BOD	37	140
TSS	27	88
Ammonia (as N)	4.9	10
α-Terpineol	0.016	0.033
Benzoic acid	0.071	0.12
p-Cresol	0.014	0.025
Phenol	0.015	0.026
Zinc	0.11	0.20
pH	6.0-9.0 (std units)	6.0 – 9.0 (std units)

These ELGs do not apply to the groundwater that is also discharged at outfall 001, in accordance with 40 C.F.R. § 445.1 'General Applicability' and 40 C.F.R. § 445.2 'Definitions'. With respect to commingling of leachate and contaminated groundwater, EPA indicated in its Final Rule for Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Landfills Point Source Category:

> "EPA is aware that there are landfill facilities that collect and treat both landfill leachate and contaminated ground water flows. In the case of such facilities, EPA has concluded that decisions regarding the appropriate discharge limits should be left to the judgment of the permit writer. As indicated above, contaminated ground water may be very dilute or may have characteristics similar in nature to leachate. In cases where the ground water is very dilute the Agency is concerned that contaminated ground water may be used as a dilution flow. In these cases, the permit writer should develop BPJ permit limits based on separate treatment and/or discharge of the ground water flows or develop BPT/BAT limits based on a flow-weighted building block approach in order to prevent dilution of the regulated leachate flows. However, in cases where the ground water may exhibit characteristics similar to leachate, commingled treatment is appropriate because it is more cost effective and environmentally beneficial than separate treatment. EPA recommends that the permit writer consider the characteristics of the contaminated ground water before making a determination if commingling ground water and leachate for treatment is appropriate." [65 Federal Register 3007, 3015 (January 19, 2000)]

***Some DEP document numbers have recently changed and some may be changing in the future. A list of old and new document numbers is provided in the attachments to the Fact Sheet immediately behind the References page. New document numbers will also be published in the PA Bulletin.*

At the Modern LF site, comingling of leachate and groundwater still occurs prior to the discharge and prior to Modern LF's sampling point. The groundwater is dilute in comparison to the leachate for parameters included in the ELGs, as determined by comparing groundwater concentrations to Modern LF's treatment plant influent concentrations in the renewal application. As has been done in the development of past Modern LF NPDES permits, the ELGs will therefore be modified such that the permit limits are flow-weighted to recognize the leachate waste stream and the groundwater waste stream and to prevent meeting the ELG limits by dilution of the leachate waste stream with groundwater. The means of calculating modified ELGs and the data sources are described below.

The permittee has been reporting a breakout of the types of wastewater treated at the site, as an attachment to the Daily Effluent Supplemental DMR, to comply with a Part C condition in the existing permit. (A summary is attached.) For the period November 1, 2020 through April 30, 2023 approximately 48% of Modern LF's total wastewater discharge was reported as groundwater (2,661,096 gallons) and approximately 52% of Modern LF's total wastewater discharge was reported as other industrial wastewater (2,936,119 gallons), mostly leachate generated on-site. According to the Fact Sheet for the existing permit, groundwater previously comprised a larger share of the total wastewater: 81%.

Note: because the addition of Conestoga LF wastewater would be intermittent and variable, it has not been included in the flow-weighting. If additional leachate, such as from the Conestoga LF, increased the ratio of leachate to groundwater comprising the discharge, the calculated modified ELGs would be less stringent, not more.

Three years of monitoring data collected at the extraction wells were included in the 2021 NPDES permit application as well as one groundwater sample result from a 24-hour composite sample collected on May 20, 2021 at the wet well pit before mingling with treated industrial water, with the following results:

> Ammonia was detected in 21 of 49 groundwater samples. By using the reporting level for the non-detect results and including the values reported with a J qualifier (a J qualifier indicates that the parameter was detected but the concentration is an estimate) and/or a B qualifier (a B qualifier indicates that the parameter was also detected in the field blank), the average ammonia concentration in the groundwater wells was estimated as 0.29 mg/l.
>
> Total Zinc was detected in 49 out of 49 samples. The average Total Zinc concentration was 0.016 mg/l (including all values with a J qualifier and/or a B qualifier).
>
> There were no groundwater sample results reported for the other ELG parameters, either in the 2018-2021 historical well data included in the 2021 NPDES permit renewal application or in Module 2 of the 2021 NPDES permit renewal application for groundwater remediation sites.

A mass balance approach was used to calculate modified ELGs, as shown below. When no groundwater data was available, a concentration of "zero" was assumed for site groundwater for these parameters in order to produce appropriately conservative final effluent limitations (the same was done in the development of the existing permit).

(Avg. Volume of Groundwater x Site Groundwater Concentration) + (Avg. Vol. of Landfill Wastewater x Avg. Monthly ELG) = (Total Avg. Volume x Modified ELG)

Rearranging the above equation, Modified ELG =
[(Avg. Vol. of Groundwater x Site GW Conc.) + (Avg. Vol. of Landfill Wastewater x Avg. Monthly ELG)] / Total Avg. Vol.

BOD - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 37 mg/l)] / 5,597,216 gal = 19.4 mg/l
Mass limit: 19.4 mg/L x 0.500 MGD x 8.34 = 81 lbs/day

BOD – Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 140 mg/l)] / 5,597,216 gal = 73.4 mg/l
Mass limit: 73.4 mg/L x 0.500 MGD x 8.34 = 306 lbs/day

BOD – Instantaneous Maximum (Average Monthly Limit x 2.5): 48.5 mg/L

TSS - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 27 mg/l)] / 5,597,216 gal = 14.2 mg/l
Mass limit: 14.2 mg/L x 0.500 MGD x 8.34 = 59.1 lbs/day

TSS – Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 88 mg/l)] / 5,597,216 gal = 46.2 mg/l
Mass limit: 46.2 mg/L x 0.500 MGD x 8.34 = 192 lbs/day
TSS – Instantaneous Maximum (Average Monthly Limit x 2.5): 35.5 mg/L

Ammonia-Nitrogen - Average Monthly:
[(2,661,096 gal x 0.29 mg/l) + (2,936,119 gal x 4.9 mg/l)] / 5,597,216 gal = 2.71mg/l
Mass limit: 2.71 mg/L x 0.500 MGD x 8.34 = 11.3 lbs/day
Ammonia-Nitrogen – Maximum Daily:
[(2,661,096 gal x 0.29 mg/l) + (2,936,119 gal x 10 mg/l)] / 5,597,216 gal = 5.38 mg/l
Mass limit: 5.38 mg/L x 0.500 MGD x 8.34 = 22.4 lbs/day
Ammonia-Nitrogen – Instantaneous Maximum (Average Monthly Limit x 2.5): 6.8 mg/L

α-Terpineol - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.016 mg/l)] / 5,597,216 gal = 0.0084 mg/l
Mass limit: 0.0084 mg/L x 0.500 MGD x 8.34 = 0.035 lbs/day
α-Terpineol – Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.033 mg/l)] / 5,597,216 gal = 0.0173 mg/l
Mass limit: 0.0173 mg/L x 0.500 MGD x 8.34 = 0.072 lbs/day
α-Terpineol – Instantaneous Maximum (Average Monthly Limit x 2.5): 0.021 mg/L

Benzoic Acid - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.071 mg/l)] / 5,597,216 gal = 0.037 mg/l
Mass limit: 0.037 mg/L x 0.500 MGD x 8.34 = 0.155 lbs/day
Benzoic Acid – Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.12 mg/l)] / 5,597,216 gal = 0.063 mg/l
Mass limit: 0.063 mg/L x 0.500 MGD x 8.34 = 0.262 lbs/day
Benzoic Acid – Instantaneous Maximum (Average Monthly Limit x 2.5): 0.092 mg/L

p-Cresol - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.014 mg/l)] / 5,597,216 gal = 0.0073 mg/l
Mass limit: 0.0073 mg/L x 0.500 MGD x 8.34 = 0.031 lbs/day
p-Cresol - Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.025 mg/l)] / 5,597,216 gal = 0.013 mg/l
Mass limit: 0.013 mg/L x 0.500 MGD x 8.34 = 0.055 lbs/day
p-Cresol – Instantaneous Maximum (Average Monthly Limit x 2.5): 0.018 mg/L

Phenol - Average Monthly:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.015 mg/l)] / 5,597,216 gal = 0.0079 mg/l
Mass limit: 0.0079 mg/L x 0.500 MGD x 8.34 = 0.033 lbs/day
Phenol – Maximum Daily:
[(2,661,096 gal x 0 mg/l) + (2,936,119 gal x 0.026 mg/l)] / 5,597,216 gal = 0.0136 mg/l
Mass limit: 0.0136 mg/L x 0.500 MGD x 8.34 = 0.059 lbs/day
Phenol – Instantaneous Maximum (Average Monthly Limit x 2.5): 0.020 mg/L

Zinc – Average Monthly:
[(2,661,096 gal x 0.016 mg/l) + (2,936,119 gal x 0.11 mg/l)] / 5,597,216 gal = 0.065 mg/l
Mass limit: 0.065 mg/L x 0.500 MGD x 8.34 = 0.27 lbs/day
Zinc – Maximum Daily:
[(2,661,096 gal x 0.016 mg/l) + (2,936,119 gal x 0.20 mg/l)] / 5,597,216 gal = 0.11 mg/l
Mass limit: 0.112 mg/L x 0.500 MGD x 8.34 = 0.47 lbs/day
Zinc – Instantaneous Maximum (Average Monthly Limit x 2.5): 0.16 mg/L

The calculated modified ELGs for Total Zinc are more stringent than the Total Zinc limits in the existing permit and will be imposed in the draft renewal permit. DMRs from the past three years show no months where the permittee would not have met the new Total Zinc TBELs such that no compliance schedule is needed for this parameter in this permit. The permittee's Total Zinc monitoring results reported for the past 3 years (using DMRs from 4/1/2020 through 4/30/2023) are continuously below the new limits:

0.023 mg/l as the maximum monthly average concentration
0.032 lbs/day as the maximum monthly average mass load
0.079 mg/l as the highest daily maximum concentration
0.078 lbs/day as the highest daily maximum mass load

For the other parameters identified above, the calculated modified ELGs above are less stringent than the existing permit limits. As evidenced from past records, the ratio of groundwater to industrial wastewater can fluctuate. The amount of groundwater pumped and the amount of leachate generated are both impacted by the amount of precipitation that occurs. The amount of precipitation that occurs is not within the permittee's control nor is it predictable. The volume of Conestoga LF wastewater introduced is another variable. To be certain that the TBELs are sufficiently stringent in all scenarios, the existing permit limits will be carried forward in accordance with the permit writer's Best Professional Judgement (BPJ).

Non-ELG TBELs

Shown in the below tables are **Non-ELG TBELs which were considered for applicability**. Unlike the ELG TBELs which are not discretionary, the below TBELs only need to be imposed when they are appropriate, consistent with DEP's SOP for Establishing Effluent Limitations for Individual Industrial Permits, Version 1.6 (available at SOP for Establishing Limits in Industrial Permits (state.pa.us)). For example, if there is a reasonable potential that the discharge might exceed the below limits, they would be imposed. Each parameter shown in the table is therefore individually discussed below the table.

Parameter	**Limit** (mg/l, unless otherwise indicated)	**SBC**	**State Regs.**
pH	6-9 S.U.	Instant. Min-IMAX	25 Pa. Code Ch. 95.2(1)
Oil & Grease	15 / 30	Avg. Monthly/ Maximum	25 Pa. Code Ch. 95.2(2)
Dissolved Iron	7.0	Daily Maximum	25 Pa. Code Ch. 95.2(4)
Total Dissolved Solids	2000, if existing discharges increase loading by >5000 lbs/day unless variance granted by DEP	Average Monthly	25 Pa. Code Ch. 95.10(c)
Total Phosphorus	2.0, when phosphorus in discharge contributes to or threatens to impair uses in flowing surface water	Average Monthly	25 Pa. Code Chapter 96.5(c)
Total Residual Chlorine	0.5	Average Monthly	25 Pa. Code Chapter 92a.48

pH:

pH limits are being imposed, an Instantaneous Minimum and an Instantaneous Maximum.

Oil and Grease:

No Oil and Grease limit or monitoring requirement has been added to the NPDES permit renewal for the following reasons: 1) this facility is not new and Oil and Grease concentrations identified in past NPDES permit applications have not required that a permit limit be imposed; 2) the maximum effluent concentration of Oil and Grease in the sampling results reported in Modern LF's 2021 permit renewal application was 2.8 mg/l, well below the regulatory limit of 15 mg/l as an average; and 3) the Conestoga LF influent concentration of Oil and Grease was not greater than the Modern LF influent concentration as reported in Modern LF's 2021 permit renewal application.

Dissolved Iron:

No Dissolved Iron limit or monitoring requirement has been added to the NPDES permit renewal for the following reasons: 1) this facility is not new and Dissolved Iron concentrations identified in past NPDES permit applications have

not required that a permit limit be imposed; 2) the maximum effluent concentration of Dissolved Iron in the sampling results reported in the 2021 application was 1.8 mg/l, well below the regulatory limit of 7 mg/l as a maximum; and 3) the Conestoga LF influent concentration was not greater than the Modern LF influent concentration as reported in the application.

Total Dissolved Solids (TDS):

The above TDS limit is not being added to the NPDES permit renewal because the TDS load is not expected to increase by more than 5000 lbs/day: 1) the upgrade to the facility is not increasing design flow; and 2) the TDS concentrations in the Conestoga LF influent are lower than the TDS concentrations in the Modern LF influent according to the sampling data reported in Modern LF's 2021 NPDES permit renewal application. Also see the TDS Baseline section of the Fact Sheet on page 51.

Total Phosphorus (TP):

The existing permit includes the above TP limit because of the impairment of the downstream Chesapeake Bay (CB) for nutrients including TP. The same TP limit (TBEL) in the existing permit has been imposed in the renewal permit.

Total Residual Chlorine (TRC):

The facility uses chlorinated supply water and Sodium Hypochlorite for cleaning the treatment plant membranes. It is therefore appropriate to have TRC limits in the permit. The above TBEL is applicable; also see the TRC discussion in the WQBEL section of the Fact Sheet.

Because sewage is generated at both the Conestoga LF and at the Modern LF with the potential to contribute to the discharge, the following secondary treatment standards from 40 C.F.R. § 102 and 25 Pa. Code § 92a.47 are included in the renewal permit to ensure that it is sufficiently protective (and because the most recent NPDES permit issued for the Conestoga LF, PA0055328, does include sewage in the type of effluent, page 2 of the permit):

Parameter	Limit (units)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25 mg/l	Average Monthly	133.102(a)(4)(i)	25 Pa. Code § 92a.47(a)(1)
Total Suspended Solids	30 mg/l	Average Monthly	133.102(b)(1)	25 Pa. Code § 92a.47(a)(1)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	25 Pa. Code § 95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	25 Pa. Code §. 92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	25 Pa. Code § 92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	25 Pa. Code § 92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	25 Pa. Code § 92a.47(a)(5)

Other Best Professional Judgment (BPJ) Limitations

The existing permit imposed $CBOD_5$ limits instead of BOD_5 limits. The BOD_5 limits are listed in the ELGs. Because the existing permit limits for $CBOD_5$, 10 mg/l as a Monthly Average and 20 mg/l as a Daily Maximum, are more stringent than the modified-ELGs for BOD_5, 19.4 mg/l as a Monthly Average and 73.4 mg/l as a Daily Maximum (and more stringent than their estimated equivalents as $CBOD_5$ assuming 30 mg/l BOD_5 equates to 25 mg/l $CBOD_5$), the existing permit $CBOD_5$ limits in the existing permit will be carried forward into the renewal permit. BOD_5 limits are not needed in addition. Both BOD_5 and $CBOD_5$ are measures of the oxygen demand of a water sample. (BOD_5 includes the oxygen demand from both

carbonaceous and nitrogenous sources, while $CBOD_5$ excludes the oxygen demand from nitrifying bacteria that consume nitrogenous materials.)

The wintertime Ammonia limit carried forward from the existing permit was derived using a multiplier of 3 (consistent with DEP's Implementation Guidance for Section 93.7 Ammonia Criteria, document No. 386-2000-022, page 28, available at www.depgreenport.state.pa.us/elibrary/Search) applied to the modified-ELG Ammonia limit. DEP recognizes that Ammonia is less toxic in cool temperatures and allows a less stringent limit in cool months in many NPDES permits.

Development of Effluent Limitations – Water Quality-Based Effluent Limitations (WQBELs)

Total Maximum Daily Load (TMDL) for Impaired Waters

The Chesapeake Bay TMDL was established by EPA in 2010. (More information about the Chesapeake Bay TMDL is available at: Chesapeake Bay TMDL Document | US EPA or www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document). The TMDL addresses nutrient loading into the Chesapeake Bay watershed and restricts additional loading of Total Nitrogen (TN) and Total Phosphorus (TP). Cap loads were assigned to significant dischargers of TN and TP. Modern LF was assigned a cap load of 50,803 lbs of TN and a cap load of 300 lbs of TP. These cap loads were imposed in the existing permit as annual net mass load limits and have been continued in the draft renewal permit. The permittee has purchased credits, as allowed by its permit, in order to meet annual net mass load limits for nutrients. The term "Net" is used to recognize that Credits and Offsets may be used to comply with the limits.

Water Year*	TN Annual Mass Load (lbs)	TN Net Annual Mass Load (lbs)	TP Annual Mass Load (lbs)	TP Net Annual Mass Load (lbs)
2022	152,368	47,575	672	-362
2021	154,126	48,678	547	202
2020	87,115	46,959	462	232

* Water Year extends from October 1 through September 30

The proposal to transport some of Conestoga LF's raw leachate to Modern LF has not precipitated a change in Modern LF's cap loads given that this activity may or may not actually occur and that the amounts would be variable as well as the fact that Conestoga LF continues to have its own cap loads in its own NPDES permit, PA0055328. (Conestoga LF has been meeting its cap loads for nutrients.)

Consistent with Pennsylvania's Phase 3 Chesapeake Bay Watershed Implementation Plan (WIP) and Phase 3 WIP Wastewater Supplement Revised July 29, 2022 (Chesapeake Bay Wastewater (pa.gov), or www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/ChesapeakeBay.aspx), the minimum monitoring frequency for TN and TP in new or renewed NPDES permits for Significant Industrial dischargers is twice per week. The renewal permit carries forward the twice per week monitoring frequency for TN (and its constituents) and TP from the existing permit. The Phase 3 WIP Wastewater Supplement Revised July 29, 2022 establishes the delivery ratios for this discharge location as 0.631 for TN and 0.387 for TP. DEP defines "delivery ratio" as "a ratio that compensates for the natural attenuation of a pollutant as it travels in water before it reaches a defined compliance point" [25 Pa. Code § 96.8].

The draft renewal permit continues to require the permittee to use DEP's Annual Chesapeake Bay Spreadsheet (available at Annual_Chesapeake_Bay_Spreadsheet_v2.2.xlsm (live.com) or www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/ChesapeakeBay.aspx) to record all nutrient concentrations and loads throughout the Compliance Year and to document all credits sold and/or purchased and any offsets. The Spreadsheet must be submitted to DEP through the eDMR system with the Annual DMR.

DEP's October 2016 Fact Sheet, in support of the existing NPDES permit renewal, documented the establishment of the cap loads for Modern LF:

DEP's Phase 2 Watershed Implementation Plan (WIP) Wastewater Supplement listed 40,803 lbs/year for the TN Cap Load and 131 lbs/year for the TP Cap Load. These Cap Loads were developed solely based on an average of the sample results historically provided by the permittee with applying a 25% reduction to create the TMDL allocation. The permittee commented on their draft permits: 1) these Cap Loads are significantly lower than the facility's actual effluent characteristics and 2) samples used to calculate these Cap Loads were collected during the lowest discharge periods. Additionally, the permittee indicated that phosphorus deficiency in biological treatment systems can cause multiple problems, such as poor sludge settling characteristics and low nitrification efficiency. The permittee requested

that the Cap Loads be increased to 105,941 lbs/yr TN and 569 lbs/yr TP. A number of meetings between DEP and the permittee were held: June 13, 2014, August 25, 2016 and October 6, 2016.. During the October 6, 2016 meeting, DEP agreed to provide an additional 10,000 lbs/yr of TN and 129 lbs/yr of TP, by transferring load from the Point Source Reserve to the Significant IW sector. This decision was confirmed by DEP Central Office (Contact info: Sean M. Furjanic, P.E., Environmental Program Manager of Bureau of Clean Water NPDES Permitting Division; 717.787.2137 or sefurjanic@pa.gov). The plant upgrade scheduled for 2017 will enhance nitrogen removal. Cap Loads will become effective on October 1, 2017.

Besides the cap loads discussed above, the State regulations at 25 Pa. Code § 96.5 require a monthly average TP concentration limit of 2.0 mg/l (or less) to be imposed for point source discharges to waters impaired by nutrients. Section 96.5(c) also states that more stringent controls due to TMDLs may be imposed. To achieve the TP mass load limit due to the Chesapeake Bay TMDL, the target monthly average TP concentration would be 0.2 mg/l calculated thus:

Z mg/l TP x 0.5 MGD x 8.34 conversion factor x 365 days/year = 300 lbs/year.
Solving for Z,
Z = 0.2 mg/l

However, more stringent TP concentration limits corresponding to the cap load (rather than the concentration limit of 2.0 mg/l cited in Chapter 96.5 as a minimum requirement) are not typically imposed when the estimated load from the facility is ≤ 0.25 % of the estimated total TP load to the lower Susquehanna River [DEP's Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, document No. 386-2000-021, available at www.depgreenport.state.pa.us/elibrary/Search]. To determine that, an equation from EPA's Chesapeake Bay Management Report is used:

Total P @ Y = Total P x 0.99^{Y} = the actual loading at the Maryland border
Y in the equation represents the stream miles to the PA-MD border.
In this case, the approximate distance to the PA-MD border from Modern LF is 40 miles
The average concentration of TP according to DMRs for 1/1/2020 through 3/31/2023 = 1.3 mg/l
Total P (load) = 1.3 mg/l x 0.5 MGD x 8.34 conversion factor = 5.4 lbs/day
Total P @ Y = 5.4 lbs/day x 0.99^{40} = 5.4 x 0.669 = 3.6 lbs/day
Total TP load allowed of all discharges in the Lower Susquehanna River Basin = 3814 lbs/day
3.6 lbs/day / 3814 lbs/day = 0.1%, less than 0.25%

As with the existing permit, the TP concentration limits imposed in the permit will be 2.0 mg/l as a monthly average and 4.0 mg/l as an instantaneous maximum (and not 0.2 mg/l).

CBOD5, Ammonia (NH3-N), and Dissolved Oxygen (DO)

WQM 7.0 is a water quality model developed by DEP to determine appropriate permit requirements for CBOD5, NH3-N and DO. (WQM 7.0 is available at Water Quality Models and Tools (pa.gov) or www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/Water-Quality-Models-and-Tools.aspx).
The model is designed to show WQBELs as the results if those are necessary to protect the receiving water or to default to secondary treatment standards (TBELs) as the results if those are more stringent than the calculated WQBELs or to default

to existing permit limits if those are the more stringent. DEP's Technical Reference Guide (TRG) WQM 7.0 for Windows Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0 (document No. 386-2000-016, available at www.depgreenport.state.pa.us/elibrary/Search), describes the technical methods contained in the model for conducting wasteload allocation analyses and for determining recommended limits for point source discharges.

Since the time of the existing permit's development, there have been changes to the State's water quality criteria including for Ammonia. The new Ammonia criteria are embedded in the latest version of the WQM 7.0 model in order to calculate Ammonia WQBELs to compare to the TBELs already discussed. The WQM 7.0 model is consistent with DEP's Implementation Guidance of Section 93.7 Ammonia Criteria (document No. 386-2000-022, available at www.depgreenport. state.pa.us/elibrary/Search).

As with the existing permit's development, the following input values were used:

Discharge pH	=	7.8 S.U.	(same as last permit, supported by eDMR data)
Discharge Temperature	=	25°C	(Default)
Stream pH	=	7.0 S.U.	(Default)
Stream Temperature	=	25°C	(Default for WWF streams)
Background NH_3-N	=	0 mg/l	(Default)

For the first simulation, the model results defaulted to the existing permit limits of 5.0 mg/l for DO as a minimum, 10 mg/l for CBOD5 as a monthly average, and 1.0 mg/l for NH3 as a warm weather monthly average.

Because the receiving water is considered "Trout Natural Reproduction" according to DEP's eMapPA online tool (www.gis.dep.pa.gov/emappa/), the WQM 7.0 model was run a second time with a DO input value of 8 mg/l. 8 mg/l is the minimum DO in-stream criteria for waters considered as Trout Natural Reproduction, with some exceptions, for naturally reproducing salmonid waters during the species' early life stages of October through May in accordance with the State Water Quality Standards: Pa. Code § 93.7(b). In the second simulation, the stream temperature was adjusted and the stream flow was adjusted to estimate conditions correlating to early life stages following spawning. Again, WQBELs were not indicated as necessary to protect the stream. The WQM 7.0 model pages are attached for both the first and second simulations.

The existing limits for CBOD5, NH3, and DO have been carried forward. The last three years of DMR data demonstrate that the permittee is meeting its CBOD5 permit limits. The last three years of DMR data demonstrate that the permittee is mostly meeting its NH3 permit limits: there was one exceedance of the monthly average limit and three months with exceedances of the daily maximum limit, out of 38 months reviewed.

Total Residual Chlorine (TRC)

The facility uses chlorinated supply water and Sodium Hypochlorite for cleaning the treatment plant membranes. Therefore, DEP's TRC model was utilized. (The TRC model is available at Water Quality Models and Tools (pa.gov) or www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/Water-Quality-Models-and-Tools.aspx).
The model uses the equations and calculations from the DEP's Implementation Guidance for TRC (document No. 386-2000-011, available at www.depgreenport.state.pa.us/elibrary/Search). Based on the model, the facility's discharge must meet a monthly average limit of 0.26 mg/L and an instantaneous maximum limit of 0.83 mg/L. (The results are attached.) These limits are more stringent than the TBELs but slightly less stringent than the existing permit limits. The existing TRC limits of 0.25 mg/l as a monthly average and 0.81 mg/l as an Instantaneous Maximum are being carried forward consistent with DEP's anti-backsliding policies and federal regulations.

TOXICS **(also see PFAS section that starts on page 39 of Fact Sheet)**

DEP's Toxics Management Spreadsheet (TMS) is a steady-state model (available at Water Quality Models and Tools (pa.gov) or www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Pages/Water-Quality-Models-and-Tools.aspx) that evaluates a single discharger to a stream segment and can account for partial mixing in the receiving waterway. The TMS is used to calculate WQBELs for toxic parameters based on promulgated surface water quality criteria. Surface water

quality criteria are stored in the TMS. DEP's Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0 (document No. 386-2000-015, available at www.depgreenport.state.pa.us/elibrary/Search) describes the methods and calculations used in this model. (The model was previously called PENTOX; the same underlying logic and calculations used for PENTOX have been embedded in the Excel spreadsheet for TMS.)

The TMS also evaluates Reasonable Potential (RP) for individual pollutants in the discharge to cause an in-stream exceedance of a water quality criteria or standard such that a limit would be necessary. If the concentration in the discharge exceeds 50% of the WQBEL, a permit limit is recommended [DEP's Water Quality Toxics Management Strategy, document No. 361-0100-003, available at www.depgreenport.state.pa.us/elibrary/Search]. If the concentration in the discharge exceeds 10% or 25% of the WQBEL, depending on the parameter, but is less than 50% of the WQBEL, a monitoring requirement is recommended but not a permit limit, consistent with DEP's SOP: Establishing Water Quality Based Effluent Limitations (WQBELs) and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers, Version 1.5 (available at: SOP - WQBELs for Toxic Pollutants (state.pa.us)).

Site-specific data are used as model input values when available, but when not available or reliable, defaults or reasonable assumptions are made. Input values used include:

Discharge pH	=	7.8 S.U.	(same as last permit, supported by eDMR data)
Discharge Hardness	=	500 mg/l	(per permit application)
Stream pH	=	7.0 S.U.	(Default)
Stream Hardness	=	100 mg/l	(Default)

Although alpha-Terpineol and Benzoic Acid are parameters listed in the ELGs, no water quality criteria exists for these two parameters so they are not shown in the TMS. The TMS does not calculate a WQBEL for parameters for which there are no promulgated surface water quality criteria.

Acrylamide was reported as 'Non-detect' (ND) in all of Modern LF's effluent samples in the 2021 Modern LF NPDES permit renewal application but there is no DEP Target Quantitation Limit (TQL) for Acrylamide. The method used and lab data sheets were reviewed. Acrylamide was not included in the TMS model as it is not indicated as a pollutant of concern given the lack of detection in effluent samples.

There were 56 parameters reported as 'Non-detect' in Modern LF's effluent samples in the 2021 Modern LF NPDES permit renewal application for which the TMS model initially recommended a limit or a monitoring requirement solely because the lab Quantitation Level was less sensitive than DEP's TQLs. (Attached is a list of those 56 parameters, which were mostly semi-volatile organic compounds and pesticides.) Three rounds of additional samples for these parameters were collected, analyzed using more sensitive detection levels, and reported. The lab sheets, including laboratory Quality Assurance/Quality Control (QA/QC), were submitted to DEP and reviewed. The analytical methods used were EPA 624.1 for VOCs, EPA 625.1 for semi-VOCs (with Method 625 for Preparation), and Method 608.3 for pesticides (with Method 3510C for Preparation).

While 52 of the 56 parameters that were reported as Non-detect in the original effluent samples in the renewal permit application were ruled out as pollutants of concern based on the re-sampling results, the TMS recommended limits for 4 pesticides: Aldrin, beta-BHC, beta-Endosulfan, and Heptachlor Epoxide. See the attached second TMS simulation for the re-sampled parameters. These 4 pesticides were detected at concentrations greater than the lab reporting level, greater than DEP's TQLs, and at concentrations greater than 50% of the calculated WQBELs. Because the WQBELs calculated by the TMS were more stringent than DEP's TQLs for Aldrin and Heptachlor Epoxide, the TQLs are shown in the limits tables instead, consistent with DEP's SOP: Establishing Effluent Limitations for Individual Industrial Permits, Version 1.6 (available at SOP for Establishing Limits in Industrial Permits (state.pa.us)). A Part C Condition is also included in the renewal permit requiring that the DEP TQL, at a minimum, be used for monitoring for Aldrin and Heptachlor Epoxide. (If the WQBELs were instead placed in the permit limits table and coded in DEP's database, then monthly DMRs would be flagged in the eDMR system and appear on potential violation reports to be investigated.)

For the remaining parameters, the maximum effluent concentrations from Modern LF's NPDES permit renewal application addendum (2022 revised tables) were used as the discharge concentrations in the TMS model except as follows:

1) If the application's Module 2 maximum concentration for a parameter in the groundwater remediation project was greater than the concentration of the co-mingled discharge at outfall 001, it was used in the TMS to be sure the limits were sufficiently protective even if the Treatment Plant was not discharging on any given day but the groundwater was still

being pumped through the air stripper and discharged; (the discharge concentrations shown in the attached TMS simulation are from Module 2 for Total Barium, Total Iron, Total Manganese, cis-1,2-DCE, Chlorobenzene, Chlorodibromomethane, and 1,2-DCA).

2) For the parameters in the following table, there were more effluent sampling data available than just the three sampling events included in the application: monitoring for these parameters had been reported on the facility's DMRs. DEP's Water Quality Toxics Management Strategy (document No. 361-0100-003, available at www.depgreenport.state.pa.us/elibrary/Search) allows averages to be used instead of maximum discharge concentrations for reasonable potential evaluations when there are sufficient data.

Parameter	units	Average of Monthly Avg. Concentrations from DMRs 1/1/2020-2/28/2023
Bis(2-ethylhexyl phthalate)	ug/l	<6.3
Osmotic Pressure	mOs/kg	228
p-Cresol	ug/l	<1.7
Phenol	ug/l	<2.48
Tetrachloroethylene	ug/l	<1.03
Total Boron	ug/l	17,661
Total Copper	ug/l	<9.8
Total Lead	ug/l	<1.26
Total Zinc	ug/l	<9.5

Note:
DEP's TOXCONC statistical spreadsheet (based on DEP's Technical Guidance Document No. 386-2000-006, available at Microsoft Word - 391-2000-024.doc (state.pa.us)) using statistical methodologies from the EPA Technical Support Document for Water Quality-based Toxics Control, Appendix E, available at: Technical Support Document for Water Quality-Based Toxics Control (epa.gov)) was completed for the above nine parameters using discrete data points taken from the permittee's past Daily Effluent Supplemental DMRs from September 1, 2021 through February 28, 2023 . The TOXCON s9preadsheet can be used to calculate Average Monthly Effluent concentrations (AMEC) and coefficients of variation for discrete sample sizes equal to or greater than 10. The spreadsheet did not return results for four out of nine of the parameters, possibly due to the number of non-detect values, and yielded results for two parameters that could not be confirmed. Therefore the TOXCONC spreadsheet was not used as a basis for limits in the draft renewal permit. Because DEP's SOP for Establishing WQBELs and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers (available at: SOP - WQBELs for Toxic Pollutants (state.pa.us)) recommends using median values as discharge concentration inputs in TMS when TOXCONC is not used, such as if there are outliers in the data, the median values for the parameters in the above table were also used (from September 1, 2021 through February 28, 2023 Daily Effluent Supplemental DMRs) in another TMS simulation and compared to the results using the average of monthly averages: there were no differences in the results (attached).

The TMS model recommended a monitoring requirement (without a WQBEL permit limit) for the following parameters:

Total Cadmium
Total Chromium
Total Cobalt
Total Nickel

The TMS model recommended a permit limit for the following parameters:

Total Antimony
Total Arsenic
Total Boron
Total Copper
Dissolved Iron
Total Iron
Total Manganese
Total Selenium
Bis(2-ethylhexyl)Phthalate

Osmotic Pressure
Free Cyanide
Aldrin
beta-BHC
beta-Endosulfan
Heptachlor Epoxide

The TMS model pages are attached, including inputs and results. The TMS model's Recommended WQBELs and Monitoring Requirements are also shown on the following page.

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Antimony	0.063	0.098	15.0	23.4	37.5	µg/L	15.0	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Arsenic	0.11	0.17	26.8	41.8	67.0	µg/L	26.8	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Boron	17.9	27.9	4,289	6,692	10,723	µg/L	4,289	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Cadmium	Report	Report	Report	Report	Report	µg/L	1.43	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Chromium (III)	Report	Report	Report	Report	Report	µg/L	488	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Cobalt	Report	Report	Report	Report	Report	µg/L	50.9	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	0.23	0.36	54.6	85.1	136	µg/L	54.6	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	3.35	5.23	804	1,255	2,011	µg/L	804	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Iron	16.8	26.2	4,021	6,273	10,053	µg/L	4,021	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Manganese	11.2	17.4	2,681	4,182	6,702	µg/L	2,681	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Nickel	Report	Report	Report	Report	Report	µg/L	303	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Selenium	0.056	0.087	13.4	20.9	33.4	µg/L	13.4	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Bis(2-Ethylhexyl)Phthalate	0.017	0.027	4.19	6.53	10.5	µg/L	4.19	CRL	Discharge Conc ≥ 50% WQBEL (RP)
Osmotic Pressure	XXX	XXX	85.9	134	215	mOs/kg	85.9	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Free Cyanide	0.045	0.07	10.7	16.7	26.8	µg/L	10.7	THH	Discharge Conc ≥ 50% WQBEL (RP)

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Aldrin	4.36E-08	6.81E-08	0.00001	0.00002	0.00003	µg/L	0.00001	CRL	Discharge Conc ≥ 50% WQBEL (RP)
beta-BHC	0.0004	0.0007	0.1	0.16	0.26	µg/L	0.1	CRL	Discharge Conc ≥ 50% WQBEL (RP)
beta-Endosulfan	0.0006	0.001	0.15	0.23	0.38	µg/L	0.15	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Heptachlor Epoxide	0.000002	0.000003	0.0004	0.0006	0.001	µg/L	0.0004	CRL	Discharge Conc ≥ 50% WQBEL (RP)

The existing permit included more stringent limits for **Total Boron** that will be carried forward in the renewal permit to avoid backsliding.

The existing permit included limits for **Bis(2-ethylhexyl) Phthalate** and **Osmotic Pressure that are less stringent than those in the draft permit**. The reason for the different Bis(2-ethylhexyl) Phthalate WQBEL in this draft permit is that the promulgated CRL criteria have changed and are now more stringent and the draft permit reflects the new CRL criteria. The reason for the different Osmotic Pressure WQBEL in this draft permit compared to the existing permit is that the water quality criteria had been applied by the previous model PENTOX as a Chronic Fish criterion. It is now applied as an Acute Fish Criterion in the TMS. This permit writer confirmed with DEP's Bureau of Clean Water-Central Office that it should be applied as an Acute Fish criterion. The facility's DMRs from January 1, 2020 through April 30, 2023 do not indicate that it can immediately meet the new limits for these two parameters. For Bis(2-ethylhexyl) Phthalate, its average discharge concentration has been 0.0066 mg/l, which is above the new monthly average WQBEL of 0.0042 mg/l. For Osmotic Pressure, its average discharge concentration has been 230 mOs/kg, which is above the new monthly average WQBEL of 85.9 mOs/kg. A compliance schedule has therefore been included and the opportunity to collect site-specific data to refine the calculated WQBELs and possibly amend the permit if warranted, consistent with DEP's SOP: Establishing WQBELs and Permit Conditions for Toxic Pollutants, Version 1.5 (available at SOP - WQBELs for Toxic Pollutants (state.pa.us)). The compliance schedule

and the opportunity to collect site-specific data are included in the Part C conditions of the draft renewal permit.

The other WQBELs in the above tables to be imposed as permit limits are new limits, that were not in the existing permit. As with Bis(2-ethylhexyl) Phthalate and Osmotic Pressure, a compliance schedule has been included and the opportunity to collect site-specific data to refine the calculated WQBELs and possibly amend the permit if appropriate, consistent with DEP's SOP: Establishing WQBELs and Permit Conditions for Toxic Pollutants, Version 1.5 (available at: SOP - WQBELs for Toxic Pollutants (state.pa.us)).

Monitoring will be required for the new parameters with WQBELs until the limits take effect or the permit is amended, whichever occurs earlier. In order to allow sufficient time for monitoring to occur after the upgrade to the treatment plant is finished and to determine and implement any actions needed, a three year compliance schedule has been proposed subject to input by the permittee during the draft permit's comment period. Any permit amendment will be subject to the procedures in the Pennsylvania Administrative Procedure Act and Clean Streams Law and its implementing regulations: a draft permit, a public notice, a mandatory comment period, possibly a second draft and second comment period, then issuance of a final permit.

Whereas the existing permit included a reporting requirement for **Total Lead** and **Total Tetrachloroethylene (PCE)**, the results reported in the facility's DMRs have not demonstrated a need for the monitoring requirement to be continued. For Total Lead, the maximum concentration reported in the discharge in the past three years according to the facility's DMRs was <0.002 mg/l, while the average concentration reported in the discharge in the past three years according to its DMRs was <0.001 mg/l. These concentrations are well below the calculated WQBEL of 0.027 mg/l as a monthly average. For PCE, the maximum concentration reported in the discharge in the past three years according to the facility's DMRs was 0.0205 mg/l. The average concentration in the past three years according to the facility's DMRs was <0.0010 mg/l. These concentrations are well below the calculated WQBEL of 0.131 mg/l as a monthly average.

In addition, the groundwater well data supplied in the permit renewal application was reviewed together with the sampling results of Module 2 and the WQBELs in the attached TMS to determine what permit limit(s) should be imposed to ensure that the air stripper continues to be effective and adequate for remediating the groundwater before discharge. In the existing permit, the only pollutant included from the groundwater remediation was PCE; no limit for PCE was included in the existing permit, only a monitoring requirement.

Parameters detected in the extraction wells (per application)	Units	Maximum concentration in extraction wells (per application)	Number of samples	WQBEL per TMS	Groundwater concentration > WQBEL ?
Chlorobenzene	ug/l	12	Approx. 48	268	No
1,4-Dichlorobenzene	ug/l	33	Approx. 48	402	No
1,1-Dichloroethane	ug/l	9.8	Approx. 48	No water quality criteria	-
1,2-Dichloroethane	ug/l	0.95 J	Approx. 48	130	No
Cis-1,2-Dichloroethylene	ug/l	27	Approx. 48	32.2	No
Trichloroethylene	ug/l	40	Approx. 48	7.85 Avg. Mo. 12.2 Daily Max 19.6 IMAX	Yes
Tetrachloroethylene	ug/l	2.2 J	Approx. 48	131	No
Vinyl Chloride	ug/l	7.5	Approx. 48	0.26	Yes

Trichloroethylene (TCE) and Vinyl Chloride (VC) were both detected in groundwater extraction wells at concentrations greater than the WQBELs for the discharge. TCE was detected 39 times out of 48 samples. VC was detected 13 times out of 48 samples. The Henry's Law constant of TCE is smaller than the Henry's Law constant of VC, indicating it would persist in water and be less volatile for air stripping. (Henry's Law constant is an expression of the distribution of a volatile solute at equilibrium between the liquid and vapor phases. Source: Determination of Henry's Law Constants of Selected Priority Pollutants, EPA/600/D-87/229, July 1987.) Henry's Law constants are available at EPA On-line Tools for Site Assessment Calculation | Ecosystems Research | US EPA). TCE was included in the facility's previous NPDES permits and is believed to be a good indicator parameter to ensure the air stripping treatment is functional and adequate.

Therefore, the WQBELs for TCE have been imposed in the draft renewal permit: 0.0078 mg/l as an average monthly and 0.0122 mg/l as a daily maximum. Because the maximum discharge concentration for TCE was reported in the application as 0.0015 mg/l, no compliance schedule is needed.

Tritium was reported as detected in the NPDES permit renewal application, but there is no surface water quality criteria for this parameter. Tritium was reported at a concentration of 53,600 pCi/L in Modern LF's discharge and at a concentration of 34,600 pCi/L in Conestoga LF's influent. Although a WQBEL cannot be developed without promulgated criteria, an evaluation of the risk to the downstream drinking water intake was conducted using the Drinking Water Maximum Contaminant Level (MCL): 4 millirems/year from man-made radionuclides, approximately the equivalent of 20,000 pCi/L, according to a DEP environmental chemist in Bureau of Clean Water's Office of Water Programs. For the below mass balance equation, a) the Susquehanna River's harmonic mean flow at the location of the closest downstream public water supply intake was used because MCLs are based on a lifetime's continuous exposure [Why is there a need for a drinking water PAG when the EPA already has regulations for radionuclides in drinking water? | US EPA]; and b) because there is partial mixing when a tributary empties into one side of a larger waterway rather than full mixing across the width of the larger waterway, a partial mix factor (PMF) was used to reduce the river flow for this evaluation:

(Cd x Qd) + (Cs x Qs x PMF) = Ct x Qt,
where,
Cd = concentration in discharge = 53, 600 pCi/L
Qd = discharge flow = 0.5 MGD = 0.774 cfs
Cs = background concentration in Susquehanna River, Not Available
Qs = Qh = Harmonic mean flow in Susquehanna River [USGS Pa StreamStats, online tool, results attached] = 13,400 cfs
PMF = calculated by DEP's TMS model for the Susquehanna River, results attached = 0.335
Ct = concentration at downstream PWS intake
Qt = Qd + (Qs x PMF) = 0.774 cfs + (13,400 cfs x 0.335) = 4490 cfs

(53,600 pCi/L x 0.774 cfs) + (0 pCi/L assumed x 13,400 cfs x 0.335) = Ct x 4490 cfs
Solving for Ct:
Ct = 9.2 pCi/L which is less than 20,000 pCi/L, the estimated equivalent drinking water MCL (but does not consider any other discharges of Tritium and does not include the background Tritium concentration in the River, as these are unknown)

A monitoring requirement is recommended in the renewal permit to ascertain whether there are Tritium levels in the discharge such that a permit limit can be evaluated when criteria are promulgated.

Stream Sampling Submitted by Others:

Besides the application and DMR data, DEP received information from both a concerned citizen and the Lower Susquehanna Riverkeeper (LSR) containing results of stream samples collected in Kreutz Creek for various parameters. The parameters for which they submitted analytical results were already considered in the preparation of the draft permit's limits except for the following:

1) The samples included **Lithium, Uranium,** and **Per-and Polyfluoroalkyl Substances (PFAS).** The permittee's application did not include information about those parameters. (Note: approved analytical methods and lab accreditation for PFAS compounds were not established at the time that the permittee's application was submitted.)

2) LSR's stream sample results included concentrations higher than the permittee's discharge data for **Total Cobalt and Total Nickel**. The draft permit does include monitoring requirements for both Cobalt and Nickel.

PFAS is discussed at length in the next section of this Fact Sheet.

There are no State or Federal surface water quality criteria for **Lithium or Uranium**. Neither of these parameters are listed as pollutants of concern in the Federal Effluent Limitation Guidelines for Landfills [40 C.F.R. Part 445] which provide technology-based effluent standards to be used for limits in NPDES permits. There is no Drinking Water Maximum Contaminant Level (MCL) or Health Advisory Level (HAL) for Lithium, according to EPA documents and website, but there is a MCL for Uranium of 30 ug/l [65 F.R. 76707, 76710 (Dec. 7, 2000] and a Health Advisory Level of 20 ug/l [2018 Edition of the Drinking Water Standards and Health Advisories Tables (EPA 822-F-18-001)]. The maximum concentration of

Uranium measured in Kreutz Creek by either the concerned citizen or LSR was 58 ug/l. As was done for Tritium on the preceding page, the risk to the downstream drinking water intake was evaluated using the Drinking Water MCL. For the below mass balance equation, a) the Susquehanna River's harmonic mean flow at the location of the closest downstream public water supply intake was used because MCLs are based on a lifetime's continuous exposure [Why is there a need for a drinking water PAG when the EPA already has regulations for radionuclides in drinking water? | US EPA] and because the U.S. EPA and scientific advisory bodies recommend that radiation protection use linear no-threshold models where risks are proportional to doses [Radiation Health Effects | US EPA]; and b) because there is partial mixing when a tributary empties into one side of a larger waterway rather than full mixing across the width of the larger waterway, a partial mix factor (PMF) was used to reduce the river flow for this evaluation:

(Cd x Qd) + (Cs x Qs x PMF) = Ct x Qt,
where,
Cd = concentration in discharge = 58 ug/l
Qd = discharge flow = 0.5 MGD = 0.774 cfs
Cs = background concentration in Susquehanna River, Not Available
Qs = Qh = Harmonic mean flow in Susquehanna River [USGS Pa Streamstats, online tool, results attached] = 13,400 cfs
PMF = calculated by DEP's TMS model for the Susquehanna River, results attached = 0.335
Ct = concentration at downstream PWS intake
Qt = Qd + (Qs x PMF) = 0.774 cfs + (13,400 cfs x 0.335) = 4490 cfs

(58 ug/l x 0.774 cfs) + (0 ug/l assumed x 13,400 cfs x 0.335) = Ct x 4490 cfs
Solving for Ct,
Ct = 0.01 ug/l, which is less than the drinking water MCL of 30 ug/l or the HAL of 20 ug/l (but does not consider any other discharges of Uranium and does not include the background Uranium concentration in the River, as these are unknown)

A monitoring requirement is required in the renewal permit to ascertain whether there are Uranium levels in the discharge such that a permit limit can be evaluated when criteria are promulgated.

Per-and Polyfluoroalkyl Substances (PFAS)

PFAS are a class of synthetic chemicals used since the 1940s to make water-, heat-, adhesive-, and stain-resistant products such as cookware, carpets, clothing, furniture fabrics, paper packaging for food, and other resistant materials. These chemicals are persistent in the human body and throughout the environment. While PFAS have been associated with adverse health effects, they are still classified by scientists as emerging contaminants because the risks they pose to human health and the environment are not yet completely understood. It is estimated that PFAS includes thousands of individual chemical compounds.

From EPA's website (PFAS Explained | US EPA):

PFAS are widely used, long lasting chemicals, components of which break down very slowly over time.

- Because of their widespread use and their persistence in the environment, many PFAS are found in the blood of people and animals all over the world and are present at low levels in a variety of food products and in the environment.
- PFAS are found in water, air, fish, and soil at locations across the nation and the globe.
- Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals.
- There are thousands of PFAS chemicals, and they are found in many different consumer, commercial, and industrial products. This makes it challenging to study and assess the potential human health and environmental risks.

Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) are two PFAS compounds. PFOA and PFOS have thus far been the most extensively produced and most extensively studied of these chemicals [Source: Our Current Understanding of the Human Health and Environmental Risks of PFAS | US EPA].

Even in low concentrations, human studies have found associations between PFOA and/or PFOS exposure and adverse health effects [2022-13158.pdf (govinfo.gov), 87 Federal Register 36848 (June 21, 2022)] . Analytical methods have been sought to achieve lower and lower detection levels for PFAS [PA Dept. of Health PFAS Fact Sheet, revised January 30, 2023, available at PFAS Fact Sheet.pdf (pa.gov)]. Samples are easily contaminated by residue material on hands, clothing, and equipment [DEP draft PFAS sampling fact sheet, revised March 1, 2023, available at DRAFT Fact Sheet.pdf (state.pa.us) and EPA's document 821-D-21-001, August 2021, available at Draft Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS; DRAFT - August 2021 (epa.gov)].

According to Pennsylvania's Department of Health PFAS Fact Sheet (available at PFAS Fact Sheet.pdf (pa.gov)), exposure to PFOS, PFOA and other perfluorinated compounds (PFCs) like perfluorononanoic acid (PFNA) and perfluorohexane sulfonic acid (PFHxS) is widespread; all have been detected in blood samples of the general U.S. population and wildlife.

Below is a chronology of EPA and DEP efforts to regulate PFAS; for the latest updates, go to Per- and Polyfluoroalkyl Substances (PFAS) | US EPA (www.epa.gov/pfas) and/or www.dep.pa.gov/PFAS.

- EPA published 'PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024' in October 2021 (document EPA-100-K-21-002, available at PFAS Strategic Roadmap: EPA's Commitments to Action 2021—2024).

- EPA expanded nationwide monitoring for 29 PFAS in drinking water under Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5); the final rule was published in December 2021 (available at 2021-27858.pdf (govinfo.gov), 86 F.R. 73131 (Dec. 27, 2021)).

- EPA announced the following draft aquatic life water quality criteria for PFOA and PFOS in May 2022 (available at 2022-09441.pdf (govinfo.gov), 87 F.R. 26199 (May 3, 2022)):

> 49,000 ug/l acute fish criteria and 94 ug/l chronic fish criteria for PFOA; 3000 ug/l acute fish criteria and 8.4 ug/l chronic fish criteria for PFOS (expressed as mg/l but converted to ug/l here for consistency throughout the Fact Sheet).

- EPA published the following interim health advisory levels (HAL) for PFOA and PFOS on June 21, 2022 (available at 2022-13158.pdf (govinfo.gov), 87 Federal Register 36848 (June 21, 2022)):

> 0.004 parts per trillion (ppt) for PFOA and 0.020 ppt for PFOS, which are below currently achievable detection levels. Previously, the EPA's published HALs had been 70 ppt for PFOA and PFOS.
>
> Also in the June 21, 2022 Federal Register, EPA published final HALs for hexafluoropropylene oxide dimer acid (HFPO-DA) and its ammonium salt (together referred to as GenX chemicals) of 10 ppt and perfluorobutane sulfonic acid and potassium perfluorobutane sulfonate (together referred to as PFBS) of 2000 ppt.
>
> A Health Advisory Level (HAL) is an estimate of acceptable *drinking water levels* for a chemical substance over a lifetime of exposure, including for sensitive members of the population, based on health effects information. *A health advisory is not a legally enforceable standard*. HALs, unlike MCLs or technology-based standards included in ELGs, do not need to consider availability of treatment options, costs, and technical limitations such as analytical methods and detection levels because they are not enforceable.

- Federal grant money has been provided to States to address emerging contaminants, including PFAS, in drinking water across the country.

- EPA circulated a memorandum to its regional offices and State regulatory authorities, including DEP, on December 5, 2022, with recommendations for addressing PFAS in NPDES permits, including: quarterly monitoring, Best Management Practices (BMPs), and using draft **analytical method 1633** as the preferred analytical method for 40 PFAS parameters in the absence of a final 40 C.F.R. Part 136 method. The memo also instructed NPDES permitting authorities, such as DEP, to provide notification to potentially affected downstream public water systems (PWS) of draft permits with PFAS-specific monitoring, BMPs, or other conditions. (The memorandum is attached to this Fact Sheet or is available at NPDES_PFAS_State Memo_December_2022.pdf (epa.gov).

- In January 2023, Pennsylvania published a Safe Drinking Water PFAS MCL Rule (available at Pennsylvania Bulletin (pacodeandbulletin.gov), 53 Pa. Bulletin 333 (Jan. 14, 2023)(Pennsylvania PFAS MCL Rule) to protect public health by promulgating State Maximum Concentration Levels (MCLs) for PFOA and PFOS in drinking water that are currently unregulated at the Federal level. The Pennsylvania PFAS MCL Rule set **MCLs** for PFOA and PFOS as follows: **14 ppt for PFOA and 18 ppt for PFOS**. MCLs are applicable to drinking water sources after considering, by law, health effects, occurrence data, technical limitations including available analytical methods, treatability, and costs and benefits. The MCLs need to be achievable and feasible so analytical methods have to exist with acceptable quantitation levels.

The Pennsylvania PFAS MCL Rule identified the following treatment technologies as acceptable for achieving compliance with the new MCLs for PFOA and PFOS:

Granular Activated Carbon
Ion Exchange
Reverse Osmosis

- EPA announced in January 2023 that it intends to revise the Landfills Point Source Category Effluent Limitation Guidelines (ELGs) to address PFAS discharge from landfills (available at: 2023-01413.pdf (govinfo.gov), 88 F.R. 6258 (Jan. 31, 2023)).

- In March 2023, EPA proposed draft MCLs for PFOA, PFOS, and 4 other PFAS compounds (available at: Federal Register, Volume 88 Issue 60 (Wednesday, March 29, 2023) (govinfo.gov), 88 F.R. 18638 (Mar. 29, 2023)):

Compound	**Proposed MCLG (MCL Goal, not enforceable)**	**Proposed MCL (enforceable levels)**
Perfluorooctanoic acid (PFOA)	Zero	4.0 parts per trillion (also expressed as ng/L)
Perfluorooctane sulfonic acid (PFOS)	Zero	4.0 parts per trillion (also expressed as ng/L)
Perfluorononanoic acid (PFNA)	1.0 (unitless)	1.0 (unitless)
Perfluorohexane sulfonic acid (PFHxS)		
Perfluorobutane sulfonic acid (PFBS)		
Hexafluoropropylene oxide dimer acid (HFPO-DA) (commonly referred to as GenX Chemicals)	Hazard Index	Hazard Index

The comment period ended on May 30, 2023. If the above MCLs become final, the more stringent federal MCLs would supersede the less stringent State MCLs.

- Also in the March 2023 Federal Register Notice, EPA stated that analytical methods 533 and 537.1 are capable of achieving a quantitation level of 4.0 ppt and can be used for analyzing samples of finished surface water (available at Federal Register, Volume 88 Issue 60 (Wednesday, March 29, 2023) (govinfo.gov), 88 F.R. 18638 (Mar. 29, 2023)).

- Also in March 2023, EPA identified Best Available Treatment Technologies for PFAS removal from drinking water based on a review of treatment and cost literature (available at Federal Register, Volume 88 Issue 60 (Wednesday, March 29, 2023) (govinfo.gov), 88 F.R. 18638 (Mar. 29, 2023)):

- Granular Activated Carbon
- Anion Exchange
- High pressure membranes (Reverse Osmosis (RO) and Nanofiltration (NF))

RO and NF may achieve PFAS removal >99 percent (Lipp et al., 2010; Horst et al., 2018; Liu et al., 2021; Dickenson and Higgins, 2016; Steinle-Darling et al., 2008; Boonya-Atichart et al., 2016; Appleman et al., 2014; Thompson et al., 2011; CDM Smith, 2018; Dickenson and Higgins, 2016; and Dowbiggin et al., 2021).
High pressure membranes generate a relatively large concentrate stream, which will contain PFAS as well as other rejected dissolved species, which will require disposal or additional treatment.

- In April 2023, EPA issued an Advance Notice of Proposed Rulemaking, Docket No. EPA-HQ-OLEM-2019-0341, seeking public input regarding potential future hazardous substance designations of PFAS under the Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Act. On June 23, 2023, EPA announced a six-month delay of the proposed Final Rule Designating PFAS as Hazardous Substances), along with a new expected finalization of the rule in November 2024. *See* View Rule (reginfo.gov).

-In a June 22, 2023 webinar on PFAS sponsored by EPA, EPA stated that draft analytical method 1633 had been multi-lab verified for use with wastewater samples, was the recommended analytical method to use for analysis of wastewater samples, and was anticipated to be finalized as an approved method and added to 40 CFR Part 136 in due time.

NPDES permit limits are developed from federal ELGs, Federal and State regulatory standards, promulgated water quality criteria, TBEL BPJs such as performance standards, and/or from site-specific criteria after data collection, public notice, approval by EPA, and proposed rulemaking to apply the site-specific criteria to a particular water body segment.

To date, the federal ELGs for landfills have not been amended to include PFAS although EPA has announced that the landfill ELGs are being re-evaluated. Any proposed changes would have to be public noticed, have a comment period, have time to consider and respond to comments, and possibly be re-drafted to incorporate changes as a result of the comments received before they could be finalized and published with an effective date.

To date, no Federal or State surface water quality criteria have been promulgated. To date, no surface water Human Health criteria for PFOA and PFOS have yet been proposed, by EPA or by Pennsylvania. As with changes to ELGs, all surface water quality criteria must go through the regulatory process: proposal; public notice, including a comment period; responsiveness summary developed; possible second draft and second comment period if there are changes to the first proposal; then issuance as final and a public notice for the issuance. For state criteria, EPA also needs to approve the criteria before they are used to develop NPDES permit limits.

To date, there is insufficient data to impose Technology-Based Effluent Limitations (TBELs) on the facility based on Best Professional Judgement (BPJ) such as achievable concentrations based on demonstrated treatment in conformance with 40 C.F.R. § 125.3 for deriving BPJ TBELs. Reverse Osmosis (RO) has been identified as one treatment option for PFAS and the upgraded Treatment Plant at Modern LF does include RO.

PFAS Monitoring Requirements under Draft Renewal Permit

As described previously, a concerned citizen forwarded stream sampling results to DEP on April 17, 2022 that they had taken from Kreutz Creek, indicating that they had collected the sample in Kreutz Creek 300 yards downstream from Modern LF's outfall 001 in January 2022. The sample was apparently analyzed using a SimpleLab TapScore water testing kit that tested for 29 PFAS. The reported PFOA concentrations were 1.8 ppb (the equivalent of 1800 ppt) and the reported PFOS concentrations were 0.54 ppb (the equivalent of 540 ppt). Four other PFAS compounds were also detected: Perfluorohexane sulfonic acid (PFHxS) at 1.6 ppb; Perfluoroheptanoic acid (PFHpA) at 0.68 ppb; Perfluorobutane sulfonate (PFBS) at 5.6 ppb; and Perfluorononanoic acid (PFNA) at 0.059 ppb.

As described previously, on August 30, 2022, the Lower Susquehanna Riverkeeper (LSR) submitted to DEP stream sampling results it had taken and asserted that there were PFAS in Kreutz Creek. These samples were represented as having been collected from Kreutz Creek by LSR on July 15, 2022 at 5 locations. The sample that LSR identified as having been collected immediately downstream of Modern LF's outfall 001 was analyzed by an Illinois laboratory as having 1062.7 ppt of PFOA, 316.7 ppt of PFOS, and 7826.2 ppt of Total PFAS (29 compounds). The sample that LSR identified as having been collected at Emig Park in Hellam Boro, approximately 3.6 miles downstream of Modern LF's outfall 001, was analyzed as having 15.2 ppt of PFOA, 5.9 ppt of PFOS, and 181.7 ppt of Total PFAS (29 compounds). (These PFAS sampling results are attached to this Fact Sheet.) LSR also forwarded chain of custody records with the lab results pages. The Illinois lab used solid-phase extraction to recover PFAS compounds collected on an extraction disc, eluted the sample, and analyzed using HPLC-MS/MS (High Performance Liquid Chromatography-Tandem Mass Spectrometry). The lab stated: Cyclopure analytical chemists use isotope dilution methods to measure a total of 55 PFAS using HPLC-HRMS/MS (High Performance Liquid Chromatography-High Resolution Mass Spectrometry), including all PFAS listed under EPA Methods 533, 537, and 1633 draft."

Following consultation with DEP, the permittee agreed to voluntarily monitor for PFAS to develop information about baseline PFAS levels in the event that reductions of such levels become required through State or Federal laws or

regulations. The first round of discharge samples, collected January 11, 2023, and analyzed with EPA draft method 1633 yielded the following results: 1900 ppt of PFOA, 560 ppt of PFOS, and 19,400 ppt of Total PFAS for 40 compounds. The second round of discharge samples, collected February 22, 2023, and analyzed with EPA draft method 1633 yielded the following results: 2000 ppt of PFOA, non-detect for PFOS (<2.5 ppt, the Method Detection Limit), and 18,781 ppt of Total PFAS for 40 compounds. The results are attached.

A quarterly monitoring requirement for PFOA, PFOS, and Total PFAS has been added to the renewal permit to gather data in anticipation of eventual effluent limits for those substances. At this time, labs throughout the country are in the process of obtaining accreditation for PFAS analysis and will be primarily engaged in handling the drinking water samples that are now required for public water supplies. A monitoring frequency greater than quarterly has not been included in the permit both because permit limits are not yet imposed and because sufficient laboratory resources do not yet exist for analyses. As a result, a re-opener clause has been included in the draft renewal permit in the Part C conditions. If EPA publishes new ELGs that include PFAS limits or if federal or state water quality criteria are promulgated before the next renewal permit or if technology performance standards based on best professional judgment become available during the renewal permit's term, the NPDES permit can be re-opened and limits imposed for PFOA, PFOS, and possibly other PFAS. In that event, DEP would follow regulatory procedures including the issuance of a draft permit amendment, public notice of the draft amendment, a public comment period, final permit issuance and notice of issuance, and opportunity for appeal.

DEP is providing a copy of this draft renewal permit to the closest downstream public water suppliers: the York Water Company (approximately 16.6 miles downstream) and the Red Lion Water Authority (approximately 18.7 miles downstream). A copy of the draft renewal permit will also be forwarded to the DEP's Southcentral Regional Office (SCRO) Safe Drinking Water Program and to the PA Fish and Boat Commission. A public notice will be published in the PA Bulletin regarding the PFAS monitoring requirement. These measures are consistent with EPA's December 5, 2022 memorandum to EPA regional offices and States entitled "Addressing PFAS discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs", available at: NPDES_PFAS_State Memo_December_2022.pdf (epa.gov).

Evaluation of risk:

Below are mass balance equations assessing the risk of PFAS in the Modern LF discharge to the downstream drinking water intake. For this purpose, the PFAS discharge concentrations used were the maximum concentrations reported by Modern LF: 2000 ppt for PFOA and 560 ppt for PFOS (which are higher than the concentrations reported by the LSR and by the concerned citizen). For this purpose, the background concentrations in Kreutz Creek were those reported by the LSR: 2.3 ppt for PFOA and 1.8 ppt for PFOS upstream of outfall 001 at Riddle Road.

Note that DEP uses harmonic mean flow of the receiving water in the model when the water quality criterion is human health carcinogenic (CRL). CRL criteria are based on lifetime exposure. The harmonic mean flow (Qh) is greater than the stream's design low-flow (Q7-10, for lowest 7-day 10-year period) but much less than the stream's mean annual flow. The EPA has classified PFOA and PFOS as having suggestive evidence of carcinogenic potential in humans. [PFAS Explained | US EPA and 2022-13158.pdf (govinfo.gov), 87 F.R. 36848 (June 21, 2022)].

As with the previous mass balance equations in the Fact Sheet for Tritium and Uranium, a Partial Mix Factor (PMF) is included to recognize that full mixing across the wide Susquehanna River would not occur as soon as Kreutz Creek empties into the River. The TMS model was used to calculate the applicable PMF for the Susquehanna River between the mouth of the Kreutz Creek and the York Water Company intake; see the attached TMS pages. (Note: the downstream PWS intake is on the west side of the Susquehanna River; Kreutz Creek also empties into the west side of the Susquehanna River).

PFOA)

(Cd x Qd) + (Cs upstream creek x Qh creek) + (Cs River x Qh River x PMF) = Ct x Qt
where,
Cd = concentration in discharge = 2000 ppt
Qd = discharge flow = 0.5 MGD = 0.774 cfs
Cs creek = background concentration in Kreutz Creek upstream of outfall 001 = 2.3 ppt
Cs river = background concentration in Susquehanna River, Not Available
Qh creek = Harmonic mean flow in Kreutz Creek according to USGS Pa Stream Stats online tool = 2.14 cfs
Qh river = Harmonic mean flow in Susquehanna River according to USGS Pa Stream Stats online tool = 13,400 cfs

PMF = calculated by DEP's TMS model for the Susquehanna River, attached = 0.335
Ct = concentration at downstream Public Water Supply (PWS) intake
Qt = Qd + (Qh river x PMF) = 4490 cfs (the Qh of creek is already included in the Qh of the river because it is a tributary; although the results don't change if 4492 cfs is used as Qt, adding the Qh of the creek)

(2000 ppt x 0.774 cfs) + (2.3 ppt x 2.14 cfs) + (0 ppt assumed x 13,400 cfs x 0.335) = Ct x 4490 cfs
Solve for Ct,
Ct = 0.35 ppt, which is below achievable detection levels and less than the State MCL of 14 ppt and less than the proposed federal MCL of 4 ppt (but does not consider any other discharges of PFOA and does not include the background PFOA concentration in the Susquehanna River, as these are unknown at this time)
PFOS)

(Cd x Qd) + (Cs upstream creek x Qh creek) + (Cs River x Qh River x PMF) = Ct x Qt
(560 ppt x 0.774 cfs) + (1.8 ppt x 2.14 cfs) + (0 ppt assumed x 13,400 cfs x 0.335) = Ct x 4490 cfs
Solve for Ct,
Ct = 0.10 ppt, which is below achievable detection levels and less than the State MCL of 18 ppt and less than the proposed federal MCL of 4 ppt (but does not consider any other discharges of PFOS and does not include the background PFOS concentration in the River, as these are unknown at this time)

To assess the risk to aquatic life in Kreutz Creek, the results of the below mass balance equations were compared to EPA's proposed aquatic criteria:

PFOA)

(Cd x Qd) + (Cs x Qs) = Ct x Qt
where,
Cd = concentration in discharge = 2000 ppt
Qd = discharge flow = 0.5 MGD = 0.774 cfs
Cs = background concentration in Kreutz Creek upstream of outfall 001, LSR sample = 2.3 ppt
Qs = stream low-flow (Q7-10) in Kreutz Creek according to USGS Pa Stream Stats online tool = 1.27 cfs
Ct = resulting concentration downstream in Kreutz Creek
Qt = Qd + Qs = 0.774 cfs + 1.27 cfs = 2.0 cfs

(2000 ppt x 0.774 cfs) + (2.3 ppt x 1.27 cfs) = Ct x 2.0 cfs
Solve for Ct,
Ct = 775 ppt = 775 ng/l = 0.775 ug/l, which is below the EPA proposed acute aquatic criteria of 49,000 ug/l and below the EPA proposed chronic aquatic criteria of 94 ug/l (but does not consider any other discharges of PFOA to Kreutz Creek, as these are unknown at this time)
PFOS)

(Cd x Qd) + (Cs x Qs) = Ct x Qt
(560 ppt x 0.774 cfs) x (1.8 ppt x 1.27 cfs) = Ct x 2.0 cfs
Solve for Ct,
Ct = 217.9 ppt = 217.9 ng/l = 0.218 ug/l, which is below the EPA proposed acute aquatic criteria of 3,000 ug/l and below the EPA proposed chronic aquatic criteria of 8.4 ug/l (but does not consider any other discharges of PFOS to Kreutz Creek, as these are unknown at this time)

Some other states have fish consumption advisories in place for PFAS. See attached examples for New Jersey and Michigan. While these advisories are not applicable in Pennsylvania, they are included for informational purposes. Studies are ongoing for the bioaccumulation of PFAS in fish and the effect on people eating those fish.

Temperature

To gauge whether the facility's discharge could be causing stream temperatures to exceed the water quality criteria for Temperature [25 Pa. Code § 93.7], DEP's Temperature spreadsheet was used from the Implementation Guidance Temperature Criteria (document No. 386-2000-001, available at www.depgreenport.state.pa.us/ elibrary/Search). Default values were used in the model because no background stream temperatures were provided in the application or otherwise available. The spreadsheet and results are shown on the next pages.

Facility:	**Modern LF**
Permit Number:	PA0046680
Stream Name:	Kreutz Creek
Analyst/Engineer:	Boylan
Stream Q7-10 (cfs):	1.3

	Facility Flows				Stream Flows			
	Intake (Stream) (MGD)	Intake (External) (MGD)	Consumptive Loss (MGD)	Discharge Flow (MGD)	PMF	Upstream Stream Flow (cfs)	Adjusted Stream Flow (cfs)	Downstream Stream Flow (cfs)
Jan 1-31	0	0.5	0	0.5	1.00	4.02	4.02	4.79
Feb 1-29	0	0.5	0	0.5	1.00	4.55	4.55	5.32
Mar 1-31	0	0.5	0	0.5	1.00	8.45	8.45	9.22
Apr 1-15	0	0.5	0	0.5	1.00	11.65	11.65	12.42
Apr 16-30	0	0.5	0	0.5	1.00	11.65	11.65	12.42
May 1-15	0	0.5	0	0.5	1.00	6.60	6.60	7.38
May 16-31	0	0.5	0	0.5	1.00	6.60	6.60	7.38
Jun 1-15	0	0.5	0	0.5	1.00	3.85	3.85	4.62
Jun 16-30	0	0.5	0	0.5	1.00	3.85	3.85	4.62
Jul 1-31	0	0.5	0	0.5	1.00	1.77	1.77	2.54
Aug 1-15	0	0.5	0	0.5	1.00	1.81	1.81	2.58
Aug 16-31	0	0.5	0	0.5	1.00	1.81	1.81	2.58
Sep 1-15	0	0.5	0	0.5	1.00	1.40	1.40	2.18
Sep 16-30	0	0.5	0	0.5	1.00	1.40	1.40	2.18
Oct 1-15	0	0.5	0	0.5	1.00	1.66	1.66	2.44
Oct 16-31	0	0.5	0	0.5	1.00	1.66	1.66	2.44
Nov 1-15	0	0.5	0	0.5	1.00	2.35	2.35	3.13
Nov 16-30	0	0.5	0	0.5	1.00	2.35	2.35	3.13
Dec 1-31	0	0.5	0	0.5	1.00	3.90	3.90	4.67

	WWF Criteria (ºF)	CWF Criteria (ºF)	TSF Criteria (ºF)	316 Criteria (ºF)	Q7-10 Multipliers (Used in Analysis)	Q7-10 Multipliers (Default - Info Only)
Jan 1-31	40	38	40		3.09	3.2
Feb 1-29	40	38	40		3.5	3.5
Mar 1-31	46	42	46		6.5	7
Apr 1-15	52	48	52		8.96	9.3
Apr 16-30	58	52	58		8.96	9.3
May 1-15	64	54	64		5.08	5.1
May 16-31	72	58	68		5.08	5.1
Jun 1-15	80	60	70		2.96	3
Jun 16-30	84	64	72		2.96	3
Jul 1-31	87	66	74		1.36	1.7
Aug 1-15	87	66	80		1.39	1.4
Aug 16-31	87	66	87		1.39	1.4
Sep 1-15	84	64	84		1.08	1.1
Sep 16-30	78	60	78		1.08	1.1
Oct 1-15	72	54	72		1.28	1.2
Oct 16-31	66	50	66		1.28	1.2
Nov 1-15	58	46	58		1.81	1.6
Nov 16-30	50	42	50		1.81	1.6
Dec 1-31	42	40	42		3	2.4

NOTES:
WWF= Warm water fishes
CWF= Cold water fishes
TSF= Trout stocking

	WWF Ambient Stream Temperature (°F) (Default)	Ambient Stream Temperature (°F) (Site-specific data)	Target Maximum Stream Temp.[1] (°F)	WWF Daily WLA[2] (Million BTUs/day)		WWF Daily WLA[3] (°F)	at Discharge Flow (MGD)	PMF
Jan 1-31	35		40	N/A -- Case 2		66.0	0.5	1.00
Feb 1-29	35		40	N/A -- Case 2		69.4	0.5	1.00
Mar 1-31	40		46	N/A -- Case 2		110.0	0.5	1.00
Apr 1-15	47		52	N/A -- Case 2		110.0	0.5	1.00
Apr 16-30	53		58	N/A -- Case 2		110.0	0.5	1.00
May 1-15	58		64	N/A -- Case 2		110.0	0.5	1.00
May 16-31	62		72	N/A -- Case 2		110.0	0.5	1.00
Jun 1-15	67		80	N/A -- Case 2		110.0	0.5	1.00
Jun 16-30	71		84	N/A -- Case 2		110.0	0.5	1.00
Jul 1-31	75		87	N/A -- Case 2		110.0	0.5	1.00
Aug 1-15	74		87	N/A -- Case 2		110.0	0.5	1.00
Aug 16-31	74		87	N/A -- Case 2		110.0	0.5	1.00
Sep 1-15	71		84	N/A -- Case 2		107.6	0.5	1.00
Sep 16-30	65		78	N/A -- Case 2		101.6	0.5	1.00
Oct 1-15	60		72	N/A -- Case 2		97.8	0.5	1.00
Oct 16-31	54		66	N/A -- Case 2		91.8	0.5	1.00
Nov 1-15	48		58	N/A -- Case 2		88.4	0.5	1.00
Nov 16-30	42		50	N/A -- Case 2		74.3	0.5	1.00
Dec 1-31	37		42	N/A -- Case 2		67.2	0.5	1.00

[1] This is the maximum of the WWF WQ criterion or the ambient temperature. The ambient temperature may be either the design (median) temperature for WWF, or the ambient stream temperature based on site-specific data entered by the user. A minimum of 1°F above ambient stream temperature is allocated.

[2] The WLA expressed in Million BTUs/day is valid for Case 1 scenarios, and disabled for Case 2 scenarios.

[3] The WLA expressed in °F is valid only if the limit is tied to a daily discharge flow limit (may be used for Case 1 or Case 2). WLAs greater than 110°F are displayed as 110°F.

The 2021 application addendum indicated winter temperatures of 70.7°F for the influent to the Treatment Plant, 55.2°F at outfall 001 (which benefits from mixing with cooler groundwater), and 65.3°F for Conestoga LF's hauled-in wastewater. This data does not indicate an exceedance of the Daily Wasteload Allocations (WLAs) for cold months shown in the thermal model above.

The 2021 application* indicated summer temperatures of 86.7°F for the influent to the Treatment Plant, 85.2°F at outfall 001 (which benefits from mixing with cooler groundwater), and 65.3°F for Conestoga LF's hauled-in wastewater. This data does not indicate an exceedance of the Daily WLA for warm months shown in the thermal model above.

Because the application reported results from few data points and because the WQM application previously submitted to DEP notes that the effluent temperature is elevated due to biological activity during treatment, a monitoring requirement for Temperature has been added to the draft renewal permit. The Treatment Plant upgrade that includes a heat exchanger and chiller which were scheduled to be finished in May 2023. The new monitoring requirement will commence when the NPDES renewal permit is issued, which is expected to occur after the upgrade is completed. If the discharge monitoring indicates Temperatures higher than those shown in the above table in the Daily WLA column, Temperature limits could be added to the permit. However, it is noted that 1) the model is more accurate if there are actual background stream temperatures to enter as input values, such as collected by the permittee over the course of a year upstream of outfall 001 and away from interferences; and 2) a mixing zone may be acceptable under 25 Pa. Code §93.6 (General Water Quality Criteria), Notes of Decisions: "The water quality criteria do not preclude the allowance of a reasonable mixing zone if there is no significant effect on the ambient temperature of the stream outside the mixing zone. *Bartram v. Parrish,* 74 Pa. D. & C.2d 627, 649 (1974)".

Color

There is a State water quality criterion [25 Pa. Code § 93.7(a)] for Color to protect Public Water Supply (PWS) uses: "Maximum 75 units on the platinum-cobalt scale; no other colors perceptible to the human eye." However, the closest downstream surface water intake is over 16 miles away and located on the Susquehanna River. Color in the Modern LF discharge would be much diluted before it reaches the nearest surface water intake. As evident from the following mass balance equation, Modern LF's discharge is not expected to cause an exceedance of the water quality criterion for Color at the downstream PWS:

$$Cs1Qs1 + CdQd + Cs2Qs2(PMF) < CtQt$$

where,
Cs1 = background Color levels in the Kreutz Creek = 23 Platinum-Cobalt (Pt-Co) as an average from upstream sampling results reported on DMRs between 1/1/2020 and 4/30/2023
Qs1 = Kreutz Creek low-flow of Q7-10 = 1.3 cfs according to Pa Stream Stats online tool
Cd = color in the discharge = 546 Pt-Co as an average according to DMRs between 1/1/2020 and 4/30/2023
Qd = discharge flow = 0.5 MGD = 0.774 cfs
Cs2 = color levels in the Susquehanna River, unknown (use 35 Pt-Co as conservative assumption)
Qs2 = stream low-flow of Q7-10 in the Susquehanna River at the PWS location = 3360 cfs per Pa StreamStats
PMF = partial mix factor for wide river based on TMS simulation = 0.335
Ct = surface water quality criteria at the downstream PWS = 75 Pt-Co
Qt = Qd + (Qs2 x PMF) = 0.774 cfs + (3360 cfs x 0.335) = 1126.4 cfs
(since based on gage data, the estimated Q7-10 at the PWS location would already include the contributing Kreutz Creek)

(23 Pt-Co x 1.3 cfs) + (546 Pt-Co x 0.774 cfs) + (35 Pt-Co assumed x 3360 cfs x 0.335) $\leq$ (75 Pt-Co x 1126.4 cfs)
39,848.5 < 84,478.1

Color is thus expected to be well below 75 Pt-Co before it reaches the closest downstream PWS intake

*Whereas the application addendum submitted in May 2022 reported the Temperatures as 30.4°F and 29.6°F, it is believed that the units should have been °C instead of °F. The equivalent °F temperatures were reported in the original 2021 application. The original 2021 permit application reported 86.7°F for the influent summer Temperature and 85.2°F for the summer temperature of the discharge at outfall 001.

There are also regulations that consider the impact of color in the discharge on the immediate receiving water in addition to its impact at the PWS:

-25 Pa. Code § 93.6 General water quality criteria.

(a) Water may not contain substances attributable to point or nonpoint source discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life.

(b) …specific substances to be controlled include…color…

-25 Pa. Code § 92a.41 Conditions applicable to all permits

(c) The discharger may not discharge floating materials, scum, sheen, or substances that result in deposits in the receiving water. Except as provided for in the permit, the discharger may not discharge foam, oil, grease, or substances that produce an observable change in the color, taste, odor or turbidity of the receiving water.

To implement the above regulations, NPDES permits issued by DEP now contain the following language:

Part A Additional Requirements

The permittee may not discharge:

3. Substances in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life.

4. Foam or substances that produce an observed change in the color, taste, odor or turbidity of the receiving water, unless those conditions are otherwise controlled through effluent limitations or other requirements in this permit. For the purpose of determining compliance with this condition, DEP will compare conditions in the receiving water upstream of the discharge to conditions in the receiving water approximately 100 feet downstream of the discharge to determine if there is an observable change in the receiving water.

EPA published similar criteria in 1986 for color as part of the National Recommended Aquatic Life Water Quality Criteria, EPA 440/5-86-001 (available at National Recommended Water Quality Criteria - Aquatic Life Criteria Table | US EPA or www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table). This EPA document acknowledged the difficulty of establishing numerical limits due to the extreme variations in the natural background amount of color. Consistent with the EPA document, Modern LF's upstream sampling for color did show variation: the DMRs from January 1, 2020 through April 30, 2023 showed a range in upstream average color levels from 9 Pt-Co to 70 Pt-Co.

Using percent reduction and extrapolation, along with the average Color 100 feet downstream of outfall 001 of 89 Pt-Co according to the DMRs from January 1, 2023 through April 30, 2023, it appears that Color returns to upstream levels by 200 feet downstream of outfall 001:

$C_sQ_s + C_dQ_d = C_tQ_t$,
where,
C_s = background Color levels in Kreutz Creek = 23 Pt-Co as an average (based on DMRs from 1/1/2020-4/30/2023)
Q_s = Kreutz Creek low-flow of Q7-10 = 1.3 cfs according to Pa Stream Stats online tool
C_d = color level in the discharge = 546 Pt-Co as an average (based on DMRs from 1/1/2020-4/30/2023)
Q_d = discharge flow = 0.5 MGD = 0.774 cfs
C_t = resulting stream color immediately after discharge
Q_t = stream flow inclusive of discharge

(23 Pt-Co x 1.3 cfs) + (546 Pt-Co x 0.774 cfs) = C_t x (1.3 cfs + 0.774 cfs)
Solving for C_t,
C_t = resulting stream color after discharge = 219 Pt-Co

(219 Pt-Co – 89 Pt-Co downstream color / 219 Pt-Co) x 100 = 60% reduction within first 100 feet of outfall 001
89 Pt-Co x estimated 60% reduction = 36 Pt-Co within 200 feet downstream of outfall 001, anticipated
36 Pt-Co x estimated 30% reduction = 25 Pt-Co within 250 feet downstream of outfall 001, no 'observable change' since upstream average color was 23 Pt-Co

Reviewing DMR data from January 1, 2022 through February 28, 2023, the average percentage reduction in Color between the discharge (before any dilution in the Creek) and 100 feet downstream of outfall 001 was 86%, even greater than the 60% estimated above.

Conestoga LF leachate, if accepted as influent to the treatment plant, also has high Color levels. When questioned about this potential challenge by the permit writer, a representative of the permittee responded that they were expecting the upgraded Treatment Plant to reduce the Color levels in the discharge. The DMR for the reporting period May 1, 2023 through May 31, 2023 did in fact yield an improvement: the upstream color was reported to be 26 Pt-Co as a monthly average, the discharge color was reported to be 16.3 Pt-Co as a monthly average (and 20 Pt-Co as a Daily Maximum), and the downstream color was reported to be 25 Pt-Co as a monthly average. The DMR for the reporting period June 1, 2023 through June 30, 2023 shows the following: upstream color was reported to be 35 Pt-Co as a monthly average, the discharge color was reported to be 17 Pt-Co as a monthly average, and the downstream color was reported to be 34 Pt-Co as a monthly average. Continued monitoring for color in the discharge, in the creek upstream of outfall 001, and in the creek downstream of outfall 001 will be required by the permit to evaluate whether the color in the stream is consistently acceptable or whether there is a need for potential Color limits in future permit cycles.

Additional Considerations and Permit Conditions Relevant to Outfall 001

Flow Monitoring :

The requirement to monitor the volume of effluent will remain in the permit in accordance with 40 C.F.R. § 122.44(i)(1)(ii).

Monitoring Frequency and Sample Type:

The monitoring frequencies and sample types from the existing permit have not been changed. For the new parameters in the draft renewal permit, DEP's Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits (document No. 386-0400-001, available at www.depgreenport.state.pa.us/elibrary/Search) and professional judgement were used to determine the monitoring frequencies. To reduce the chance of sampling equipment contamination, the sample type required by the draft renewal permit for PFOA, PFOS, and PFAS is designated as 'Grab' as recommended by EPA.

Mass Loading Limitations:

All mass loading limits (lbs/day) are based on the formula: design flow in MGD x concentration limit in mg/l x conversion factor of 8.34, in accordance with DEP's Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits (document No. 386-0400-001, Chapter 5, available at www.depgreenport.state.pa.us/elibrary/Search)).

E. Coli. Monitoring:

Because an E. Coli. water quality criteria was added to 25 Pa. Code § 93.7 with the most recent regulatory amendments (50 Pa. Bulletin 3426 (July 11, 2020)), a monitoring requirement for this parameter has been added to the permit. DEP's SOP Establishing Effluent Limitations for Individual Sewage Permits (available at SOP for Establishing Effluent Limits in Sewage Permits (state.pa.us)) recommends that new and reissued individual sewage permits (and permits with treated sewage in the discharge) include a monitoring requirement for E. Coli, in addition to the Fecal Coliform limits, citing 25 Pa Code § 92a.61 as the basis for the requirement.

TDS Baseline:

25 Pa. Code § 95.10 requires a TDS limit for facilities which increase their TDS load by more than 5000 pounds per day (lbs/day) from the TDS loadings authorized as of August 21, 2010. The 5000 lbs/day is measured as an average daily discharge over the course of a calendar year [25 Pa. Code § 95.10(a)(7)].

Modern LF did not have a NPDES permit limit for TDS as of August 2010. The 2007 permit application reported a TDS concentration of 1320 mg/l at outfall 001. The design flow shown in the 2007 NPDES permit application's flow diagram and the design flow on which the limits were based in the NPDES permit in effect in August 2010 was 0.5 MGD. The TDS authorized as of August 2010 is thus calculated as:

1320 mg/l x 0.5 MGD x 8.34 conversion factor = 5504 lbs/day

The NPDES permit renewal application's revised tables submitted in 2022 indicate an average TDS concentration at outfall 001 of 7400 mg/l. There is no TDS monitoring requirement in the existing permit so there are no TDS concentrations or loads reported on the DMRs submitted under the existing permit. The facility's DMRs from January 1, 2020 through April 30, 2023 yield an average discharge flow from outfall 001 of 0.15 MGD. The current TDS load is thus 9257 lbs/day (7400 mg/l x 0.15 MGD x 8.34 c.f.). Because Modern LF's TDS load has not yet increased by more than 5000 lbs/day since August 2010, a TDS permit limit of 2000 mg/l as a Monthly Average is not being imposed in the renewal permit but a TDS monitoring requirement has been added to evaluate the need for potential TDS limits in future permit cycles.

The Conestoga LF influent concentration for TDS was considerably less than the Modern LF influent concentration for TDS. The wastewater trucked in from Conestoga LF could, however, increase the average flow discharging from Modern LF which could increase the facility's TDS load, further justifying the addition of the monitoring requirement for TDS.

Note: The TDS baseline does not include TDS loads from the stormwater outfalls because there is no design flow for stormwater outfalls nor is there any measured flow from which TDS loads could be calculated.

Chemical Additives:

DEP began adding 'standard' language for Chemical Additives to NPDES permits for industrial discharges since Modern LF's last permit was issued. (DEP's SOP for Clean Water Program Chemical Additives, SOP No. BPNPSM-PMT-030, rev. Jan. 13, 2015, available at BPNPSM_NPDES_SOP_Chemical_Additives.pdf (state.pa.us)). The Chemical Additive standard language, including a definition of 'Chemical Additive', has been added in Part C of the draft renewal permit in accordance with the SOP. The language requires the permittee to do the following: request new chemical additives be added to DEP's approved list; notify the DEP of changes in chemical additives used or changes in usage rates of chemical additives; submit to DEP Chemical Additives Notification Forms for chemical additives; report usage rates for approved chemical additives; and to restrict maximum usage rates for approved chemical additives so as to not exceed the calculated WQBEL. DEP's approach to chemical additives and its definition of chemical additives is further described in the SOP.

The Modern LF application listed the following as "Chemical Additives" in use for wastewater discharged at outfall 001:

MemCleen A, 20 gpd maximum usage rate
13 % Sodium Hypochlorite Solution, 25 gpd maximum usage rate
25% Sodium Hydroxide Solution, 10 gpd maximum usage rate

These chemical additives, used for membrane cleaning, are already on DEP's Approved Chemical Additives list (available at WMS_Chem_Add_Approv_ext - Report Viewer (pa.gov). The pH and TRC limits included in the draft renewal permit, together with the daily monitoring requirement, can be used to monitor any excessive Sodium Hypochlorite or Sodium Hydroxide dosages; the permittee will *not* be required to submit Chemical Additive Notification forms and report usage rates on Supplemental DMR forms for Sodium Hypochlorite and Sodium Hydroxide. **For MemCleen A, the renewal permit Part C Conditions for Chemical Additives requires submission of a Chemical Additives Notification Form** which includes a certification that the maximum usage rate will not cause an exceedance of the WQBEL of 1340 ug/l (which would cause an in-stream exceedance of the 'Safe Effect Level' shown on the Approved Chemical Additives List). (The permit writer did confirm with DEP Central Office staff who maintain the Approved Chemical Additive list that the information in the MemCleen A Safety Data Sheet submitted was consistent with the data Central Office staff used to determine the safe effect level in the list and that no updated calculation was needed.)

DEP's TMS model was used to determine the WQBEL for MemCleen A (see attached):

1.34 mg/l as a monthly average
2.1 mg/l as a daily maximum

2.1 mg/l x 0.50 MGD x 8.34 c.f. = 8.8 lbs/day = daily maximum usage rate,
unless engineering calculations or other justification is submitted and accepted by DEP to support a different maximum usage rate

If the permittee intends to keep using this additive, DEP expects that the notification form be submitted to DEP before the draft permit is issued as final.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

WATER MANAGEMENT SYSTEM
APPROVED CHEMICAL ADDITIVES

10/21/2022 2:01:45 PM

Chemical Additive Name: %Sodium Hydroxide%
Manufacturer: All

Total Chemical Additives: 1

CHEMICAL ADDITIVE NAME	MANUFACTURER	PURPOSE	AQUATIC LIFE EFFECT LEVEL ACUTE (mg/L)	AQUATIC LIFE EFFECT LEVEL CHRONIC (mg/L)	HUMAN HEALTH SAFE USAGE CONCENTRATION (mg/L)	CRL	APPROVED DATE	MSDS DATE
Sodium Hydroxide	All Manufacturers		0.91	0.1	NA	No	05/23/2014	

SSRS_WMS_488 Ver 1.0

Page 1 of 1

Chemical Additive Name: %Sodium Hypochlorite%
Manufacturer: All

Total Chemical Additives: 1

CHEMICAL ADDITIVE NAME	MANUFACTURER	PURPOSE	AQUATIC LIFE EFFECT LEVEL ACUTE (mg/L)	AQUATIC LIFE EFFECT LEVEL CHRONIC (mg/L)	HUMAN HEALTH SAFE USAGE CONCENTRATION (mg/L)	CRL	APPROVED DATE	MSDS DATE
Sodium Hypochlorite	All Manufacturers		0.01	0.0011	.21	No	03/06/2020	

Chemical Additive Name: %Sulfuric Acid%
Manufacturer: All

Total Chemical Additives: 1

CHEMICAL ADDITIVE NAME	MANUFACTURER	PURPOSE	AQUATIC LIFE EFFECT LEVEL ACUTE (mg/L)	AQUATIC LIFE EFFECT LEVEL CHRONIC (mg/L)	HUMAN HEALTH SAFE USAGE CONCENTRATION (mg/L)	CRL	APPROVED DATE	MSDS DATE
Sulfuric Acid	All Manufacturers		2.28	0.25	NA	No	12/10/2018	

CHEMICAL ADDITIVE NAME	MANUFACTURER	PURPOSE	AQUATIC LIFE EFFECT LEVEL ACUTE (mg/L)	AQUATIC LIFE EFFECT LEVEL CHRONIC (mg/L)	HUMAN HEALTH SAFE USAGE CONCENTRATION (mg/L)	CRL	APPROVED DATE	MSDS DATE
Memcleen A	Dynatec Systems, Inc.		4.48	0.5	NA	No	01/16/2015	11/07/2014

PERMIT CONDITIONS RELEVANT TO OUTFALL 001

The draft renewal permit in Part C includes, in part, the following conditions that were **carried forward** from the existing permit with the addition of the language in *italics*:

Other Requirements:

-If the applicable standard or effluent guideline limitation relating to the application for Best Available Technology BAT) Economically Achievable or to Best Conventional Technology (BCT) is developed by DEP or EPA for this type of Industry *during the permit term*, and if such standard or limitation is more stringent than the corresponding limitations of this permit (or if it controls pollutants not covered by this permit), DEP may modify or revoke and reissue the permit to conform with that standard or limitation. *Any such major permit amendment shall be considered a formal permitting action of DEP subject to applicable permit modification procedures*.

Outside Sources of Leachate:

The permittee may accept leachates from other waste management facilities throughout the term of this permit *if the facility's waste permit allows it* and contingent upon satisfaction of the following conditions:

-The permittee shall notify the Department in writing within at least 30 days prior to the acceptance and treatment of outside sources of leachate. *The notification shall be sent via Certified Mail or other means to confirm DEP's receipt.* The written notification shall include a description of the source, the anticipated volume of leachate to be treated, *the duration of the acceptance of the leachate from the outside source*, and the analytical results of a priority pollutant scan conducted within the previous 12 months. The Department will issue a written response if the acceptance will not be authorized or if additional information is needed. If a response is not received within 30 days, the permittee may proceed with acceptance and treatment. Following the permittee's initial notification of a source, no further notifications are necessary for that source for the remainder of the permit term.

-Leachates shall be treated in all unit processes (i.e., no bypassing).

-The permittee shall immediately cease the acceptance of outside sources of leachate upon notification from the Department if, at any time during the term of this permit, the Department determines that such leachates are interfering with treatment performance or are contributing to impairment of water quality.

The draft renewal permit includes, in part, the following **updated** conditions added to Part C:

- standard language added to DEP-issued NPDES permits for all landfills relative to adhering to their Waste Management
Permit and reporting requirements

- standard language added to NPDES permits for the proper handling and disposal of solid wastes and sludges

- standard language added to all significant nutrient dischargers to the Chesapeake Bay

- standard language for all dischargers of stormwater associated with industrial activity

The draft renewal permit includes, in part, the following **new** conditions added to Part C:

-The permittee is required to separately report a) the volume of groundwater discharged (at outfall 001), b) the volume of Modern LF leachate discharged (at outfall 001), c) the volume of other industrial wastewater generated on-site and discharged (at outfall 001), and d) the volume and source of leachate from off-site introduced to the treatment plant on the Daily Effluent Monitoring Supplemental Reporting Form 3800-FM-BCW0435 or as an attachment to their Daily Effluent Monitoring Supplemental Reporting Form.

-If surface water quality criteria for PFOA, PFOS, or PFAS are promulgated during the permit term or if technology-based performance standards for the treatment of PFOA, PFOS, or PFAS become available, DEP may modify

or revoke and reissue the permit to impose limits developed from the new promulgated criteria or in conformance with applicable technology- based performance standards. Any such major permit amendment shall be considered a formal permitting action of DEP subject to applicable permit modification procedures.

-Until there is an analytical method approved in 40 C.F.R. Part 136 for PFAS monitoring, all PFAS monitoring to be reported on DMRs, including for PFOA and PFOS, shall be conducted using EPA Draft Method 1633.

-The permittee has the option to gather site-specific data for determining if new permit limits based on WQBELs for 14 parameters are appropriate before those permit limits take effect (Note: these 14 parameters are listed in the draft renewal permit, Part C.III., along with a proposed compliance schedule). If this option is selected and the new data indicate that the new permit limits for these 14 parameters are not appropriate, the permit would be amended to impose appropriate limits. Any such major permit amendment would be considered a formal permitting action of DEP subject to applicable permit modification procedures.

-The permittee is required to perform a Toxics Reduction Evaluation (TRE) to assess the parameter sources and the strategies needed to meet the new permit limits based on WQBELs by the end of the proposed compliance schedule. (During the draft permit's comment period, the permittee may suggest an alternate compliance schedule with supporting reasons.) Specific requirements for the TRE and due dates are included in Part C.III.B. of the draft permit.

-The standard language in industrial NPDES permits for the use of Chemical Additives has been added in Part C.V. of the draft permit, restricting their usage and adding reporting requirements.

-The permittee is required to use analytical methods that can meet minimum Quantitation Limits for the parameters Aldrin and Heptachlor Epoxide as provided in Part C. IV. of the draft renewal permit. As previously discussed, the WQBELs for these two parameters are below DEP's target Quantitation Limits (QLs).

While Part C of each NPDES permit is used for conditions applicable to a particular facility, there are "standard" requirements and conditions in Part A and B of each NPDES permit applicable to all permittees. Note that Part A.III.C.3 of the draft renewal permit includes such a "standard" permit requirement for the acceptance of hauled-in wastewater.

Development of Permit Requirements and Conditions for Stormwater

According to the 2021 application, the facility includes the following stormwater outfalls:

Outfall 002	39°57'51"	76°35'21"	2,735,568 ft²	Sedimentation Basin C
Outfall 003	39°57'58"	76°35'48"	993,168 ft²	Sedimentation Basin D
Outfall 004	39°57'57"	76°35'27"	997,524 ft²	Sedimentation Basin F
Outfall 005	39°57'49"	76°35'51"	8,411,436 ft²	Sedimentation Basin G
Outfall 006	39°57'25"	76°35'24"	1,668,348 ft²	Sedimentation Basin H

A map with the stormwater outfall locations is attached.

The existing permit included the same five stormwater-only outfalls, although outfall 006 previously drained an inactive area but now drains active landfill cells. Outfall 005 also drains active landfill cells. Each stormwater outfall discharges from a stormwater basin constructed to manage discharge rates and sediment loads to the receiving stream. The stormwater discharging from outfalls 002-006 is considered "non-contaminated stormwater", according to the definition found in the ELGs for Landfills, 40 C.F.R. Part 445, such that the limits in the ELGs do not apply to these discharges:

> "Non-contaminated storm water means storm water which does not come in direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater that is defined in paragraph (f) of this section. Non-contaminated storm water includes storm water which flows off the cap, cover, intermediate cover, daily cover, and/or final cover of the landfill." [40 C.F.R. § 445.2(g).]

Outfall 002 includes drainage from off-site areas not owned, operated or related to Modern LF. Modern LF is not responsible for pollutants from off-site activities. The owners/operators of the adjacent sites are responsible for their own stormwater discharges and would need their own NPDES permits for stormwater if their operations meet the definition of "stormwater associated with industrial activity" in accordance with State and Federal regulations. The permittee requested that monitoring at outfall 002 be eliminated in the renewal permit.

The permittee contends that the stormwater at outfall 005 is "representative" of the other stormwater outfalls: 002, 003, 004, and 006. Federal regulations [40 C.F.R. 122.21(g)(7) and 40 C.F.R. 122.26] and DEP procedures (available at BPNPSM_NPDES_SOP_PAG-03.pdf (state.pa.us) allow for representative stormwater outfalls to be monitored in lieu of all stormwater-only outfalls having to be routinely monitored. Accordingly, after reviewing sampling results in the application and past DMRs, the renewal permit has continued the twice per year monitoring requirement at outfall 005 and dropped the monitoring requirement at outfall 002.

DEP uses DEP's NPDES PAG-03 General Permit for Industrial Stormwater as guidance to develop stormwater monitoring requirements for individual permits . The latest PAG-03 permit (available at: - DEP eLibrary (state.pa.us) and NPDES and WQM Permitting Programs (pa.gov) from which scroll to link for PAG-03) was issued March 24, 2023, after being issued as draft, public noticed and having a comment period. It requires semiannual monitoring at landfills (Appendix C) for the following parameters:

pH
TSS
COD
Ammonia-Nitrogen
TN
TP
Total Iron

The above parameters have been included in the draft renewal permit for monitoring at outfall 005.

The existing permit requires monitoring for 15 parameters, including various metals. A review of the sample results in the application and Modern LF's past DMRs did not show concentrations of concern for these parameters so that the existing permit's monitoring requirements will not be carried forward. The DMR data for outfalls 002 and 005 are attached.

The PAG-03 also recommends Sector-Specific Best Management Practices (BMPs) be included in the Part C conditions. These were added in Part C of the permit. The Part C conditions of the draft renewal permit include updated standard language included in NPDES permits for dischargers of stormwater associated with industrial activity.

Other Applicable Requirements (All Outfalls)

Anti-Backsliding:

All limits proposed for the draft renewal permit are at least as stringent as the comparable effluent limitations in the existing permit consistent with the prohibition on backsliding.

Antidegradation:

The effluent limits for this discharge have been developed to maintain the existing in-stream water uses and the level of water quality necessary to protect the existing uses [25 Pa. Code § 93.4a]. No High Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge [25 Pa. Code § 93.4a].

Streams on 33 U.S.C. § 303(d) List:

Modern LF does not discharge to any stream segment listed as impaired under section 303(d) of the Clean Water Act (CWA), 33 U.S.C**.** § 1313(d). The downstream Chesapeake Bay and its tributaries are considered impaired and are protected by a TMDL which has been discussed above in this Fact Sheet.

Class A Wild Trout Fisheries:

No Class A Wild Trout Fisheries, as defined at 58 Pa. Code 57.8a, are impacted by this discharge.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality as needed and BPJ. Instantaneous Maximum (IMAX) limits are generally determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 001, Permit Effective Date through (Proposed) Permit Effective Date + 3 Years:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Temperature (°F)	XXX	XXX	XXX	XXX	Report	XXX	1/day	I-S
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.25	XXX	0.81	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Total Suspended Solids	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Total Dissolved Solids	Report	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	129	183	322	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10,000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	12.5	25.0	XXX	3.0	6.0	7.5	2/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	4.17	8.34	XXX	1.0	2.0	2.5	2/week	24-Hr Composite

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	4	2/week	24-Hr Composite
Antimony, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Arsenic, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Boron, Total	17.2	23.0	XXX	4.12	5.52	10.3	1/week	24-Hr Composite
Cadmium, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Chromium (III), Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Cobalt, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Copper, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Cyanide, Free	XXX	XXX	XXX	Report	Report	XXX	1/month	Grab
Dissolved Iron	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Iron, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Manganese, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Nickel, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Selenium, Total	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Zinc, Total	0.27	0.47	XXX	0.065	0.11	0.16	1/week	24-Hr Composite
a-Terpineol	0.013	0.026	XXX	0.0031	0.0063	0.0077	2/month	24-Hr Composite
Benzoic Acid	0.058	0.096	XXX	0.014	0.023	0.034	2/month	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate	0.062	0.11	XXX	0.015	0.025	0.037	1/week	24-Hr Composite

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
p-Cresol	0.011	0.020	XXX	0.0027	0.0048	0.0067	2/month	24-Hr Composite
Phenol	0.029	0.038	XXX	0.0069	0.0090	0.017	2/month	24-Hr Composite
Trichloroethylene	0.032	0.050	XXX	0.0078	0.012	0.020	1/week	Grab
Tritium (pCi/L)	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	24-Hr Composite
Uranium	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	24-Hr Composite
Aldrin (ug/l)	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Beta-BHC (ug/l)	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Beta-Endosulfan (ug/l)	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Heptachlor Epoxide (ug/l)	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
PFOA (ng/L) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
PFOS (ng/L) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
PFAS (ng/l) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
Color (Pt-Co Units) **	XXX	XXX	XXX	Report**	Report **	XXX	1/week	Grab
Color (Pt-Co Units) ** Downstream Monitoring	XXX	XXX	XXX	Report **	Report **	XXX	1/week	Grab
Color (Pt-Co Units) ** Upstream Monitoring	XXX	XXX	XXX	Report **	Report **	XXX	1/week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at Outfall 001

*See Part C. Conditions: II.D., II.E., II.F.

**Instream monitoring shall be at least 50 feet upstream from outfall 001 and Downstream monitoring should be collected 100 feet downstream from outfall 001. The samples for Color in the discharge and in the stream, upstream and downstream, should occur on the same day and within 3 hours of each other.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality as needed and BPJ. Instantaneous Maximum (IMAX) limits are generally determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 001, (Proposed) Permit Effective Date + 3 Years through Permit Expiration Date:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated))				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Temperature (°F)	XXX	XXX	XXX	XXX	Report	XXX	1/day	I-S
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.25	XXX	0.81	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Total Suspended Solids	41.7	83.4	XXX	10	20	25	1/week	24-Hr Composite
Total Dissolved Solids	Report	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	85.9	134	215	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10,000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	12.5	25.0	XXX	3.0	6.0	7.5	2/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	4.17	8.34	XXX	1.0	2.0	2.5	2/week	24-Hr Composite

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated))				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	4	2/week	24-Hr Composite
Antimony, Total	0.063	0.096	XXX	0.015	0.023	0.038	1/week	24-Hr Composite
Arsenic, Total	0.11	0.18	XXX	0.027	0.042	0.067	1/week	24-Hr Composite
Boron, Total	17.2	23.0	XXX	4.12	5.52	10.3	1/week	24-Hr Composite
Cadmium, Total	XXX	XXX	XXX	Report	Report	XXX	2/month	24-Hr Composite
Chromium (III), Total	XXX	XXX	XXX	Report	Report	XXX	2/month	24-Hr Composite
Cobalt, Total	XXX	XXX	XXX	Report	Report	XXX	2/month	24-Hr Composite
Copper, Total	0.23	0.35	XXX	0.055	0.085	0.14	1/week	24-Hr Composite
Cyanide, Free	0.046	0.071	XXX	0.011	0.017	0.027	1/week	Grab
Dissolved Iron	3.34	5.25	XXX	0.80	1.26	2.01	1/week	24-Hr Composite
Iron, Total	16.8	26.1	XXX	4.02	6.27	10.05	1/week	24-Hr Composite
Manganese, Total	11.18	17.43	XXX	2.68	4.18	6.70	1/week	24-Hr Composite
Nickel, Total	XXX	XXX	XXX	Report	Report	XXX	2/month	24-Hr Composite
Selenium, Total	0.054	0.088	XXX	0.013	0.021	0.033	1/week	24-Hr Composite
Zinc, Total	0.27	0.47	XXX	0.065	0.11	0.16	1/week	24-Hr Composite
a-Terpineol	0.013	0.026	XXX	0.0031	0.0063	0.0077	2/month	24-Hr Composite
Benzoic Acid	0.058	0.096	XXX	0.014	0.023	0.034	2/month	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate	0.018	0.027	XXX	0.0042	0.0065	0.010	1/week	24-Hr Composite
p-Cresol	0.011	0.020	XXX	0.0027	0.0048	0.0067	2/month	24-Hr Composite

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day, unless otherwise indicated)		Concentrations (mg/L, unless otherwise indicated))				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Phenol	0.029	0.038	XXX	0.0069	0.0090	0.017	2/month	24-Hr Composite
Trichloroethylene	0.032	0.050	XXX	0.0078	0.012	0.020	1/week	Grab
Tritium (pCi/L)	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	24-Hr Composite
Uranium	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	24-Hr Composite
Aldrin (ug/l)	0.00021	0.00042	XXX	0.05	0.10	0.125	2/month	24-Hr Composite
Beta-BHC (ug/l)	0.00042	0.00067	XXX	0.10	0.16	0.26	2/month	24-Hr Composite
Beta-Endosulfan (ug/l)	0.00063	0.00096	XXX	0.15	0.23	0.38	2/month	24-Hr Composite
Heptachlor Epoxide (ug/l)	0.00021	0.00042	XXX	0.05	0.10	0.125	2/month	24-Hr Composite
PFOA (ng/L) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
PFOS (ng/L) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
PFAS (ng/l) *	XXX	XXX	XXX	XXX	XXX	Report *	1/quarter	Grab
Color (Pt-Co Units) **	XXX	XXX	XXX	Report**	Report **	XXX	1/week	Grab
Color (Pt-Co Units) ** Downstream Monitoring	XXX	XXX	XXX	Report **	Report **	XXX	1/week	Grab
Color (Pt-Co Units) ** Upstream Monitoring	XXX	XXX	XXX	Report **	Report **	XXX	1/week	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at Outfall 001

*See Part C. Conditions: II.D., II.E., II.F.

**Instream monitoring shall be at least 50 feet upstream from outfall 001 and Downstream monitoring should be collected 100 feet downstream from outfall 001. The samples for Color in the discharge and in the stream, upstream and downstream, should occur on the same day and within 3 hours of each other.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's **Chesapeake Bay Tributary Strategy**.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly Average	Daily Maximum	Instant. Maximum		
Ammonia-N	Report	Report	Report	XXX	XXX	2/week	24-Hr Composite
Kjeldahl-N	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Nitrogen	Report	Report	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	Report	XXX	XXX	2/week	24-Hr Composite
Net Total Nitrogen	XXX	50,803	XXX	XXX	XXX	1/year	Calculation
Net Total Phosphorus	XXX	300	XXX	XXX	XXX	1/year	Calculation

Compliance Sampling Location: at discharge

Other Comments: See Part C for Chesapeake Bay requirements.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality as needed and BPJ. Instantaneous Maximum (IMAX) limits are generally determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 005, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L, unless otherwise indicated))				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
pH (S.U.)	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Chemical Oxygen Demand (COD)	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Total Suspended Solids (TSS)	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Ammonia-Nitrogen	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab
Total Iron	XXX	XXX	XXX	XXX	Report	XXX	1/6 months	Grab

Compliance Sampling Location:

at Outfall 005

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment)
☒	Temperature Spreadsheet
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☒	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☒	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☒	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☒	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☒	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☒	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	Pennsylvania's Phase 3 Chesapeake Bay Watershed Implementation Plan (WIP)
☒	DEP's Phase 3 Watershed Implementation Plan Wastewater Supplement, revised 7/29/2022.
☒	SOP: Establishing Effluent Limitations for Individual Industrial Waste Permits, Version 1.6, 10/1/2020
☒	SOP: Establishing WQBELs and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers, Version 1.5, 5/20/2021

Note: Some DEP document ID numbers for Technical Guidance are changing/have changed. See next page for revised numbers.

Scheduled Revisions in DEP Document ID Numbers:

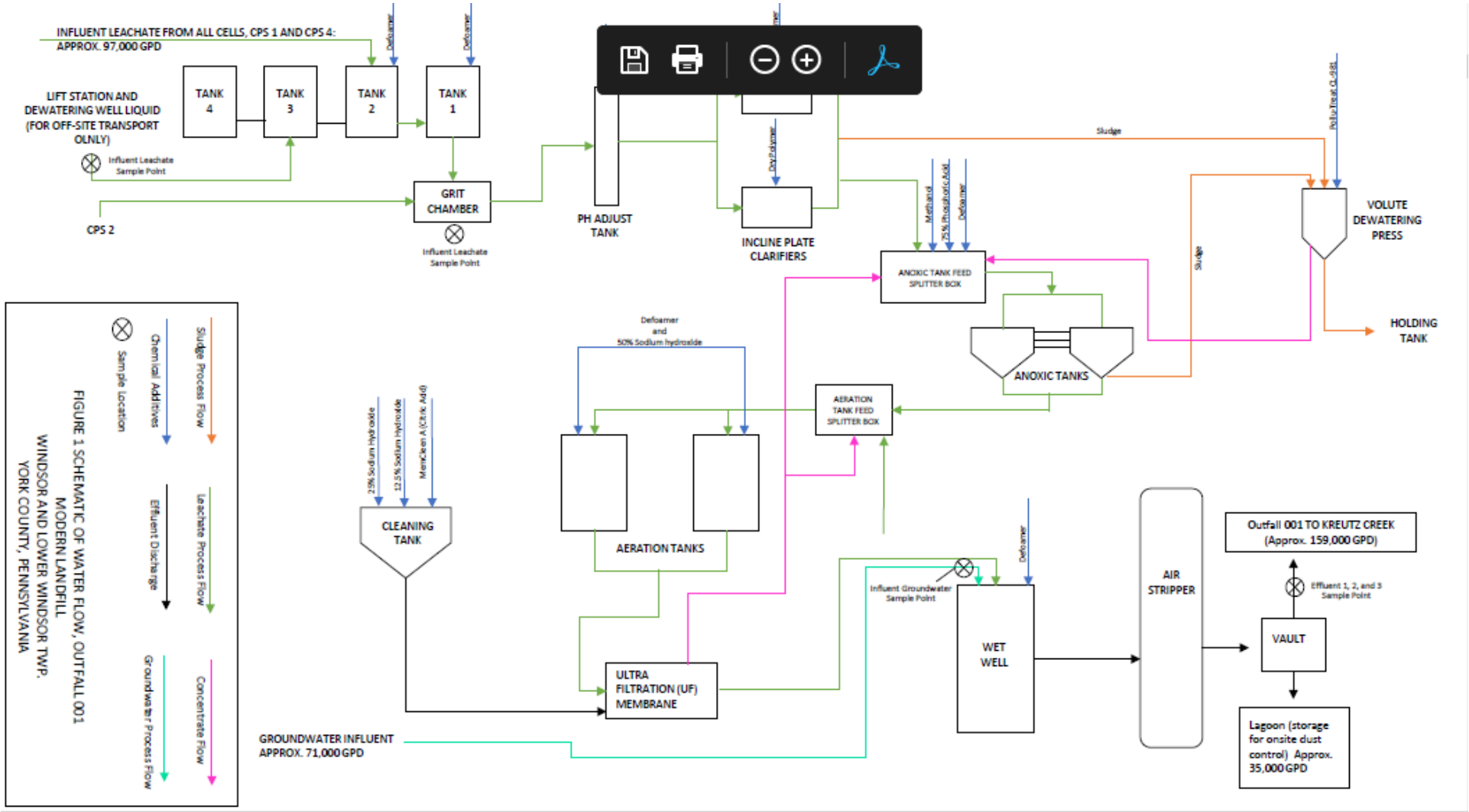
Current Doc ID No.	New Doc ID No.	Publish Date	Type	Name	Current Folder	New Folder
391-2000-017	386-2000-001	4/11/09	G	Implementation Guidance For Temperature Criteria	Water Standards and Facility Regulation	Clean Water
385-2000-011	386-2000-002	9/6/2008	G	Pennsylvania Combined Sewer Overflow (CSO) Policy	Point and Nonpoint Source Management	Clean Water
385-0810-001	386-0810-001	8/21/10	P	Chapter 95 – Total Dissolved Solids, Statement of Policy Defining the Term "Authorization"	Water Standards and Facility Regulation	Clean Water
391-2000-023	386-2000-003	9/14/98	G	Design Stream Flows	Water Supply and Wastewater Management	Clean Water
391-2000-003	386-2000-004	12/9/1997	G	Determining Water Quality Based Effluent Limits	Water Supply and Wastewater Management	Clean Water
391-2000-021	386-2000-005	3/22/99	G	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness	Water Supply and Wastewater Management	Clean Water
391-2000-024	386-2000-006	10/13/98	G	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Coefficients of Variation (CV) and Other Discharge Characteristics	Water Supply and Wastewater Management	Clean Water
391-2000-006	386-2000-007	9/15/97	G	Implementation Guidance Design Conditions	Water Supply and Wastewater Management	Clean Water
391-2000-002	386-2000-008	4/7/97	G	Implementation Guidance Evaluation & Process Thermal Discharge (316 (a)) Federal Water Pollution Act	Water Supply and Wastewater Management	Clean Water
391-2000-010	386-2000-009	3/30/99	G	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments	Water Supply and Wastewater Management	Clean Water

391-2000-022	386-2000-010	3/22/99	G	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances	Water Supply and Wastewater Management	Clean Water
391-2000-015	386-2000-011	11/15/94	G	Implementation Guidance Total Residual Chlorine (TRC) Regulation	Water Supply and Wastewater Management	Clean Water
362-0300-004	386-0300-002	10/1/97	G	Industrial Wastewater Management	Water Supply and Wastewater Management	Clean Water
391-2000-008	386-2000-012	10/24/97	G	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges	Water Supply and Wastewater Management	Clean Water
391-2000-014	386-2000-013	4/12/08	G	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers	Water Standards and Facility Regulation	Clean Water
391-2000-020	386-2000-014	9/7/95	G	Protocol for Estimating First Order Pollutant Fate Coefficients for Volatile Organic Substances	Water Supply and Wastewater Management	Clean Water
391-2000-011	386-2000-015	5/22/04	G	Technical Reference Guide (TRG) PENTOXSD for Windows PA Single Discharge Wasteload Allocation Program for Toxics Version 2.0	Water Supply and Wastewater Management	Clean Water
391-2000-007	386-2000-016	6/26/04	G	Technical Reference Guide (TRG) WQM 7.0 for Windows Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen Version 1.0	Water Supply and Wastewater Management	Clean Water
362-2000-001	386-2000-017	?	G	Permitting Policy and Procedure Manual	Water Quality	Clean Water

362-0400-001	386-0400-001	10/1/1997	G	Technical Guidance for the Development and Specification of Effluent Limitations	Water Quality	Clean Water
362-2183-003	386-2183-001	10/1/1997	G	Technology Based Control Requirements for Water Treatment Plant Wastes	Water Quality	Clean Water
362-2000-008	386-2000-018	11/1/1996	G	Policy for Conducting Technical Reviews of Minor NPDES Permit Applications	Water Quality	Clean Water
362-2000-003	386-2000-019	3/1/1998	G	Policy for Permitting Surface Water Diversions	Water Quality	Clean Water
362-2183-004	386-2183-002	12/1/1997	G	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry	Water Quality	Clean Water
391-2000-019	386-2000-020	10/28/1997	G	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids (TDS), Nitrite-Nitrate (NO2-NO3), Non-Priority Pollutant Phenolics and Fluorides	Watershed Conservation	Clean Water
391-2000-018	386-2000-021	10/27/1997	G	Implementation Guidance for Section 95.9 Phosphorus discharges to Free Flowing Streams	Watershed Conservation	Clean Water
391-2000-013	386-2000-022	11/4/1997	G	Implementation Guidance of Section 93.7 Ammonia Criteria	Watershed Management	Clean Water
385-2100-002	386-2100-002	11/12/2011	G	Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids	Water Standards and Facility Regulation	Clean Water
391-3200-013	386-3200-001	6/10/1997	G	Evaluations of Phosphorus Discharges to Lakes, Ponds, and Impoundments	Water Supply and Wastewater Management	Clean Water
392-0300-002	386-0300-003	9/28/2002	P	Comprehensive Stormwater Management Policy	Watershed Management	Clean Water

392-0300-001	386-0300-004	5/14/1985	G	Stormwater Management Guidelines and Model Ordinances	Watershed Management	Clean Water
363-4000-003	386-4000-001	38871	G	Standards and Guidelines for Identifying, Tracking, and Resolving Violations of the Storm Water Management Act	Watershed Management	Clean Water

Where G = Guidance, P = Policy



Revision 1 of 1 0 Note(s)

Flow Diagram included in 2021 NPDES application (before upgrade)

PERMIT	MON_START_	MON_END_DA	OUTFALL	PARAMETI	UNITS	1_VALUE	1_LIMIT	1_SBC	2_VALUE	2_LIMIT	LOAD_2_SBC
PA0046680	1/1/2020	1/31/2020	1	Flow	MGD	0.174161	Monitor	Average Monthly	0.304758	Monitor	Daily Maximum
PA0046680	2/1/2020	2/29/2020	1	Flow	MGD	0.157117	Monitor	Average Monthly	0.223556	Monitor	Daily Maximum
PA0046680	3/1/2020	3/31/2020	1	Flow	MGD	0.15341	Monitor	Average Monthly	0.220033	Monitor	Daily Maximum
PA0046680	4/1/2020	4/30/2020	1	Flow	MGD	0.149806	Monitor	Average Monthly	0.218939	Monitor	Daily Maximum
PA0046680	5/1/2020	5/31/2020	1	Flow	MGD	0.129765	Monitor	Average Monthly	0.225336	Monitor	Daily Maximum
PA0046680	6/1/2020	6/30/2020	1	Flow	MGD	0.111725	Monitor	Average Monthly	0.230446	Monitor	Daily Maximum
PA0046680	7/1/2020	7/31/2020	1	Flow	MGD	0.114509	Monitor	Average Monthly	0.195235	Monitor	Daily Maximum
PA0046680	8/1/2020	8/31/2020	1	Flow	MGD	0.126732	Monitor	Average Monthly	0.174913	Monitor	Daily Maximum
PA0046680	9/1/2020	9/30/2020	1	Flow	MGD	0.148703	Monitor	Average Monthly	0.242295	Monitor	Daily Maximum
PA0046680	10/1/2020	10/31/2020	1	Flow	MGD	0.173315	Monitor	Average Monthly	0.238884	Monitor	Daily Maximum
PA0046680	11/1/2020	11/30/2020	1	Flow	MGD	0.167032	Monitor	Average Monthly	0.218566	Monitor	Daily Maximum
PA0046680	12/1/2020	12/31/2020	1	Flow	MGD	0.172555	Monitor	Average Monthly	0.211583	Monitor	Daily Maximum
PA0046680	1/1/2021	1/31/2021	1	Flow	MGD	0.167159	Monitor	Average Monthly	0.222305	Monitor	Daily Maximum
PA0046680	2/1/2021	2/28/2021	1	Flow	MGD	0.161363	Monitor	Average Monthly	0.200528	Monitor	Daily Maximum
PA0046680	3/1/2021	3/31/2021	1	Flow	MGD	0.155503	Monitor	Average Monthly	0.215821	Monitor	Daily Maximum
PA0046680	4/1/2021	4/30/2021	1	Flow	MGD	0.143233	Monitor	Average Monthly	0.251125	Monitor	Daily Maximum
PA0046680	5/1/2021	5/31/2021	1	Flow	MGD	0.121926	Monitor	Average Monthly	0.169954	Monitor	Daily Maximum
PA0046680	6/1/2021	6/30/2021	1	Flow	MGD	0.125	Monitor	Average Monthly	0.171	Monitor	Daily Maximum
PA0046680	7/1/2021	7/31/2021	1	Flow	MGD	0.115401	Monitor	Average Monthly	0.165	Monitor	Daily Maximum
PA0046680	8/1/2021	8/31/2021	1	Flow	MGD	0.114642	Monitor	Average Monthly	0.157	Monitor	Daily Maximum
PA0046680	9/1/2021	9/30/2021	1	Flow	MGD	0.110257	Monitor	Average Monthly	0.164	Monitor	Daily Maximum
PA0046680	10/1/2021	10/31/2021	1	Flow	MGD	0.13185	Monitor	Average Monthly	0.168	Monitor	Daily Maximum
PA0046680	11/1/2021	11/30/2021	1	Flow	MGD	0.1549	Monitor	Average Monthly	0.2	Monitor	Daily Maximum
PA0046680	12/1/2021	12/31/2021	1	Flow	MGD	0.166217	Monitor	Average Monthly	0.189461	Monitor	Daily Maximum
PA0046680	1/1/2022	1/31/2022	1	Flow	MGD	0.17352	Monitor	Average Monthly	0.20802	Monitor	Daily Maximum
PA0046680	2/1/2022	2/28/2022	1	Flow	MGD	0.155582	Monitor	Average Monthly	0.253796	Monitor	Daily Maximum
PA0046680	3/1/2022	3/31/2022	1	Flow	MGD	0.173733	Monitor	Average Monthly	0.187159	Monitor	Daily Maximum
PA0046680	4/1/2022	4/30/2022	1	Flow	MGD	0.168086	Monitor	Average Monthly	0.196496	Monitor	Daily Maximum
PA0046680	5/1/2022	5/31/2022	1	Flow	MGD	0.172778	Monitor	Average Monthly	0.209019	Monitor	Daily Maximum
PA0046680	6/1/2022	6/30/2022	1	Flow	MGD	0.171733	Monitor	Average Monthly	0.209019	Monitor	Daily Maximum
PA0046680	7/1/2022	7/31/2022	1	Flow	MGD	0.161092	Monitor	Average Monthly	0.20114	Monitor	Daily Maximum
PA0046680	8/1/2022	8/31/2022	1	Flow	MGD	0.160932	Monitor	Average Monthly	0.197734	Monitor	Daily Maximum
PA0046680	9/1/2022	9/30/2022	1	Flow	MGD	0.160866	Monitor	Average Monthly	0.20076	Monitor	Daily Maximum
PA0046680	10/1/2022	10/31/2022	1	Flow	MGD	0.1548	Monitor	Average Monthly	0.193326	Monitor	Daily Maximum
PA0046680	11/1/2022	11/30/2022	1	Flow	MGD	0.144398	Monitor	Average Monthly	0.172572	Monitor	Daily Maximum
PA0046680	12/1/2022	12/31/2022	1	Flow	MGD	0.176238	Monitor	Average Monthly	0.19421	Monitor	Daily Maximum
PA0046680	1/1/2023	1/31/2023	1	Flow	MGD	0.181617	Monitor	Average Monthly	0.197584	Monitor	Daily Maximum
PA0046680	2/1/2023	2/28/2023	1	Flow	MGD	0.141578	Monitor	Average Monthly	0.190577	Monitor	Daily Maximum
PA0046680	3/1/2023	3/31/2023	1	Flow	MGD	0.17316	Monitor	Average Monthly	0.198519	Monitor	Daily Maximum
PA0046680	4/1/2023	4/30/2023	1	Flow	MGD	0.137516	Monitor	Average Monthly	0.200994	Monitor	Daily Maximum
						0.151	Avg		0.205	Avg	
						0.182	Max		0.305	Max	

	Reported with Daily Effl. Supplemental DMRs						
Month/Year	Groundwater (gallons)	Leachate (gallons)	Gas Condensate (gallons)	Gas Well Liquid (gallons)	Outside wastes Treated onsite (gallons)		
Apr-23	2,275,261	2,349,661	84,780	542,728	0		
Mar-23	2,320,171	2,670,751	72,128	827,202	0		
Feb-23	2,182,672	2,321,523	68,925	618,801	0		
Jan-23	2,403,764	2,728,012	81,735	392,689			
Dec-22	2,357,195	2,551,615	81,053	641,343	0		
Nov-22	2,316,765	2,226,677	68,430	563,493	0		
Oct-22	2,421,404	2,390,157	64,455	576,955	36,000	Conestoga LF - Seed Sludge	
Sep-22	2,394,604	2,113,945	69,300	495,669	0		
Aug-22	2,668,212	2,145,634	87,683	618,538	0		
Jul-22	2,390,203	2,624,795	151,950	729,717	0		
Jun-22	2,011,478	2,406,979	150,720	554,790	0		
May-22	2,482,804	3,509,972	83,303	77,380	0		
Apr-22	2,458,902	2,936,336	84,900	376,455	0		
Mar-22	2,777,923	2,877,195	85,020	348,714	36,000	Conestoga LF - Seed Sludge	
Feb-22	2,497,244	2,649,170	82,890	0	30,000	Conestoga LF - Seed Sludge	
Jan-22	2,906,744	2,744,250	144,450	0	0		
Dec-21	2,764,969	2,659,126	139,005	0	0		
Nov-21	2,849,563	2,569,089	108,230	0	0		
Oct-21	3,073,380	2,870,485	97,693	0	0		
Sep-21	2,990,705	2,639,645	105,953	0	0		
Aug-21	3,292,626	2,528,281	100,553	0	0		
Jul-21	3,394,358	2,343,134	65,933	0	0		
Jun-21	2,585,000	2,314,480	87,150	0	0		
May-21	2,699,575	2,462,110	65,925	0	0		
Apr-21	2,695,543	2,673,291	81,105	0	0		
Mar-21	2,739,649	2,964,377	82,380	0	0		
Feb-21	2,572,538	2,882,587	72,615	0	0		
Jan-21	2,953,804	2,864,467	81,015	0	0		
Dec-20	3,236,441	2,626,627	72,600	0	0		
Nov-20	3,119,396	2,285,224	65,633	0	0		
	79,832,893	77,929,595	2,687,512	7,364,474	102,000	167,916,474	Sum of treated ww, gallons
	47.5	46.4	1.6	4.4	0.06	100.00	%
	2,661,096	Avg gallons per month groundwater					
	2,936,119	Avg gallons per month landfill iw					
	5,597,216	Total avg gallons per month, gw + iw					

Workbook last saved: Just now

StreamStats Output Report-Kreutz Creek at 001

State/Reg	PA			
Workspac	PA20230616155839108000			
Latitude	39.96783			
Longitude	-76.5973			
Time	########	11:59:01 AM		

Basin Characteristics

Paramete	Paramete	Value	Unit
BSLOPD	Mean basi	4.9267	degrees
CARBON	Percentag	6.86	percent
DRNAREA	Area that	8.57	square miles
ELEV	Mean Basi	676	feet
FOREST	Percentag	19.8126	percent
PRECIP	Mean Ann	41	inches
ROCKDEP	Depth to r	5	feet
URBAN	Percentag	5.093	percent

Low-Flow	100.0 Percent Low Flow Region 1			
Statistic	Value	Unit	SE	ASEp
7 Day 2 Ye	2.51	ft^3/s	46	46
30 Day 2 Y	3.11	ft^3/s	38	38
7 Day 10 Y	1.27	ft^3/s	51	51
30 Day 10	1.6	ft^3/s	46	46
90 Day 10	2.32	ft^3/s	41	41

Annual Fl	100.0 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit	SE	ASEp
Mean Ann	10.1	ft^3/s	12	12

General F	100.0 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit	SE	ASEp
Harmonic	2.14	ft^3/s	38	38

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USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the soft
USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply e

USGS data, used for models

USGS data, used for models….

StreamStats Output Report - at confl. w/ UNT 07908 (Houghton Ln)					
State/Region ID	PA				
Workspace ID	PA20220927145134330000				
Latitude	39.97627				
Longitude	-76.59719				
Time	9/27/2022	10:51:55 AM			
Low-Flow Statistics Para	100.0 Percent Low Flow Region 1				
Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	9.23	square miles	4.78	1150
BSLOPD	Mean Basin Slope	5.0349	degrees	1.7	6.4
ROCKDEP	Depth to Rock	5	feet	4.13	5.21
URBAN	Percent Urban	5.023	percent	0	89
Low-Flow Statistics Flow	100.0 Percent Low Flow Region 1				
Statistic	Value	Unit	SE	ASEp	
7 Day 2 Year Low Flow	2.77	ft^3/s	46	46	
30 Day 2 Year Low Flow	3.42	ft^3/s	38	38	
7 Day 10 Year Low Flow	1.42	ft^3/s	51	51	
30 Day 10 Year Low Flow	1.78	ft^3/s	46	46	
90 Day 10 Year Low Flow	2.55	ft^3/s	41	41	
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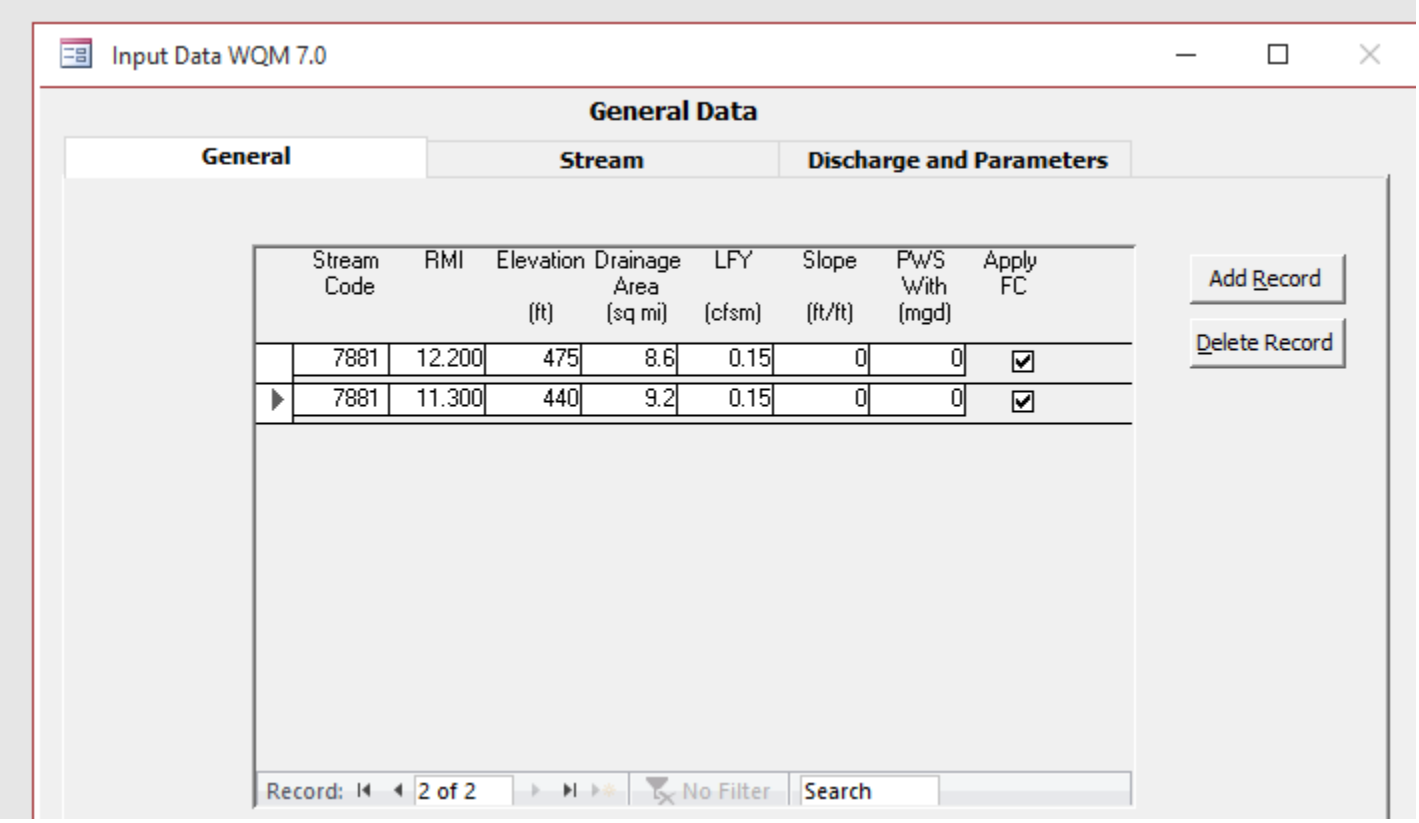
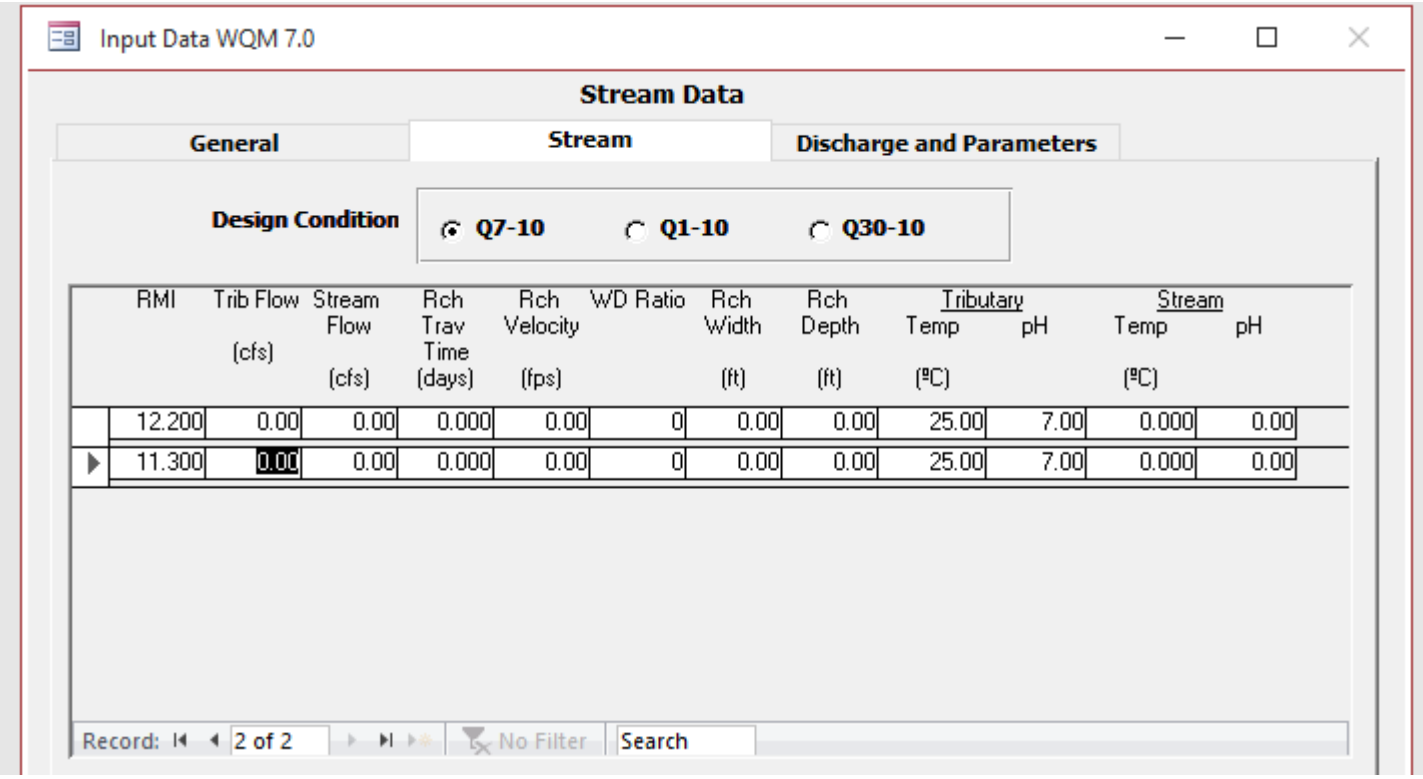
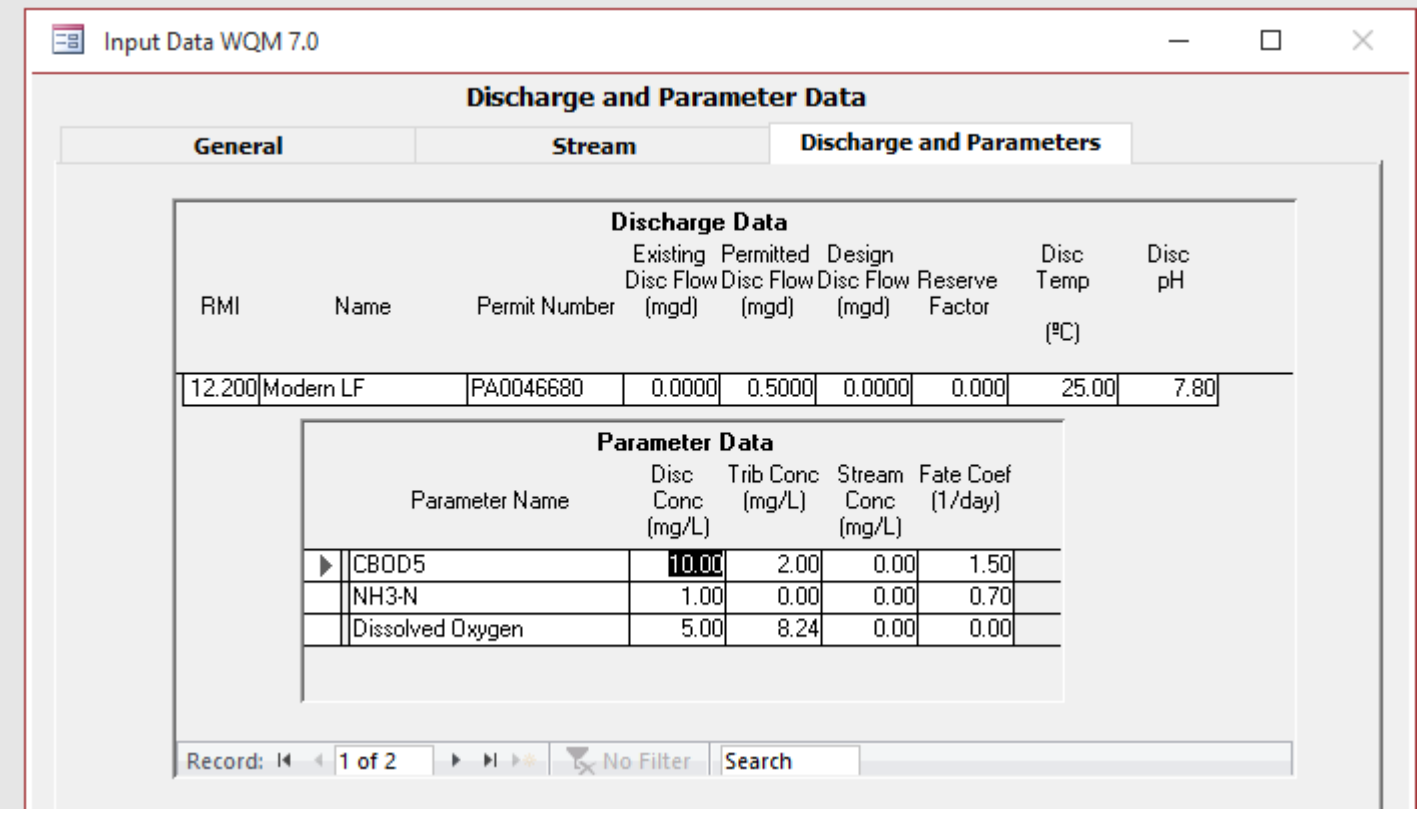
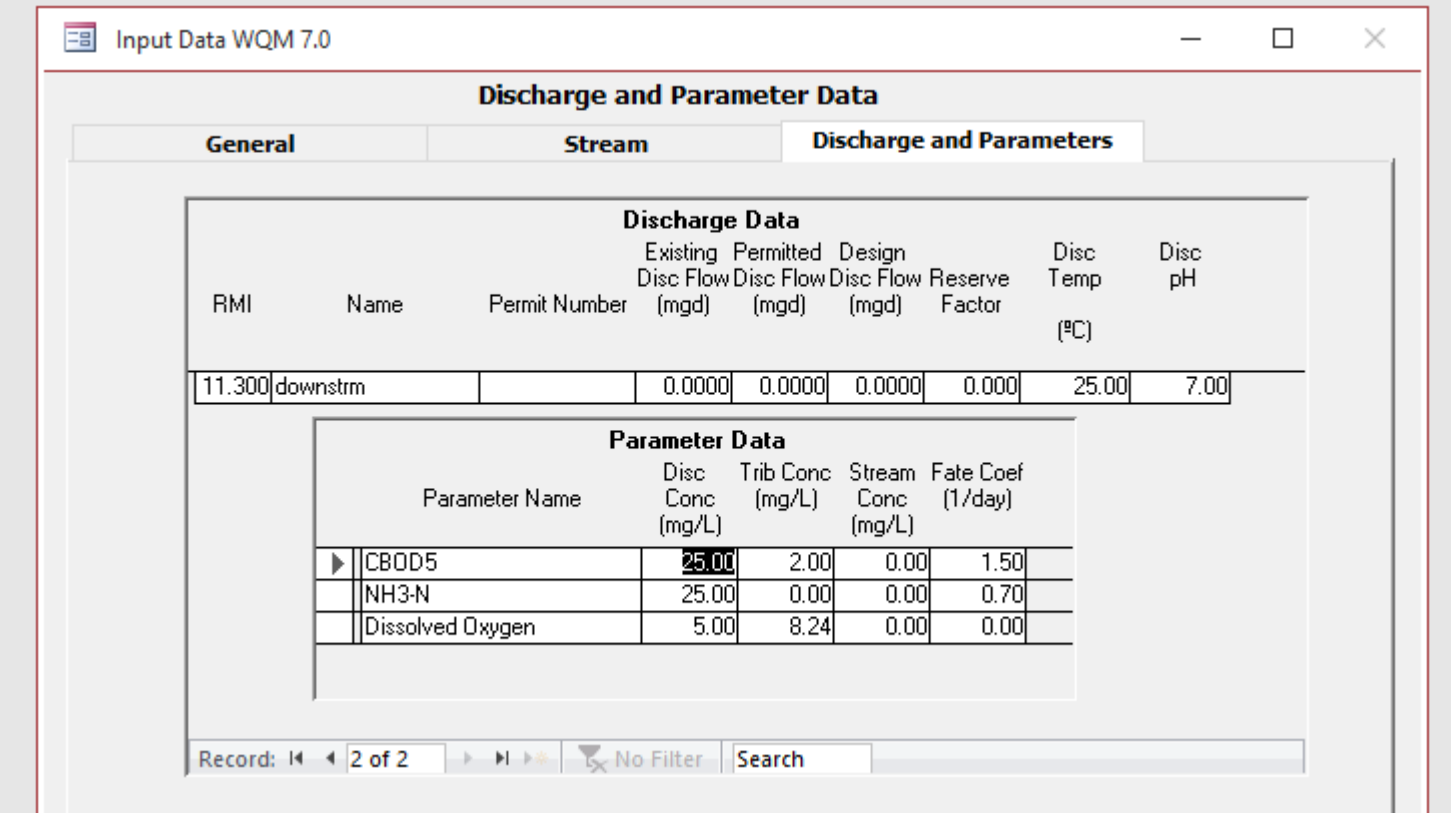
USGS Software Disclaime	the USGS reserves	expresse	is made by t	the software is released on condition that neither the USGS nor the U.S. Governn	
USGS Product Names Dis	firm	or product names is for descriptive purposes only and does not imply endorsement by the U.S. Governm			
Application Version: 4.10.1					
StreamStats Services Version: 1.2.22					
NSS Services Version: 2.2.1					

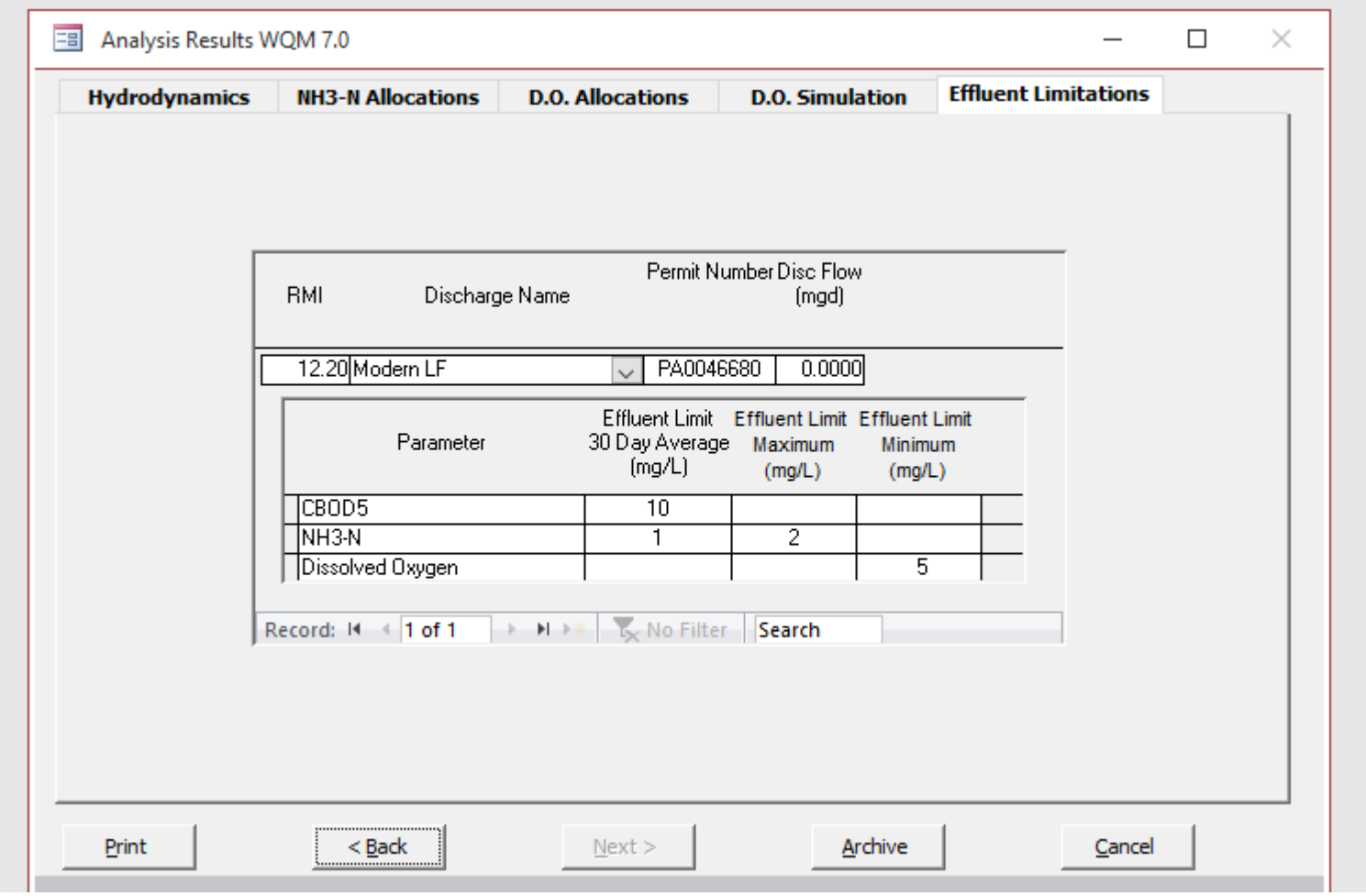
WQM 7.0 Model, current limits as Discharge Concentrations



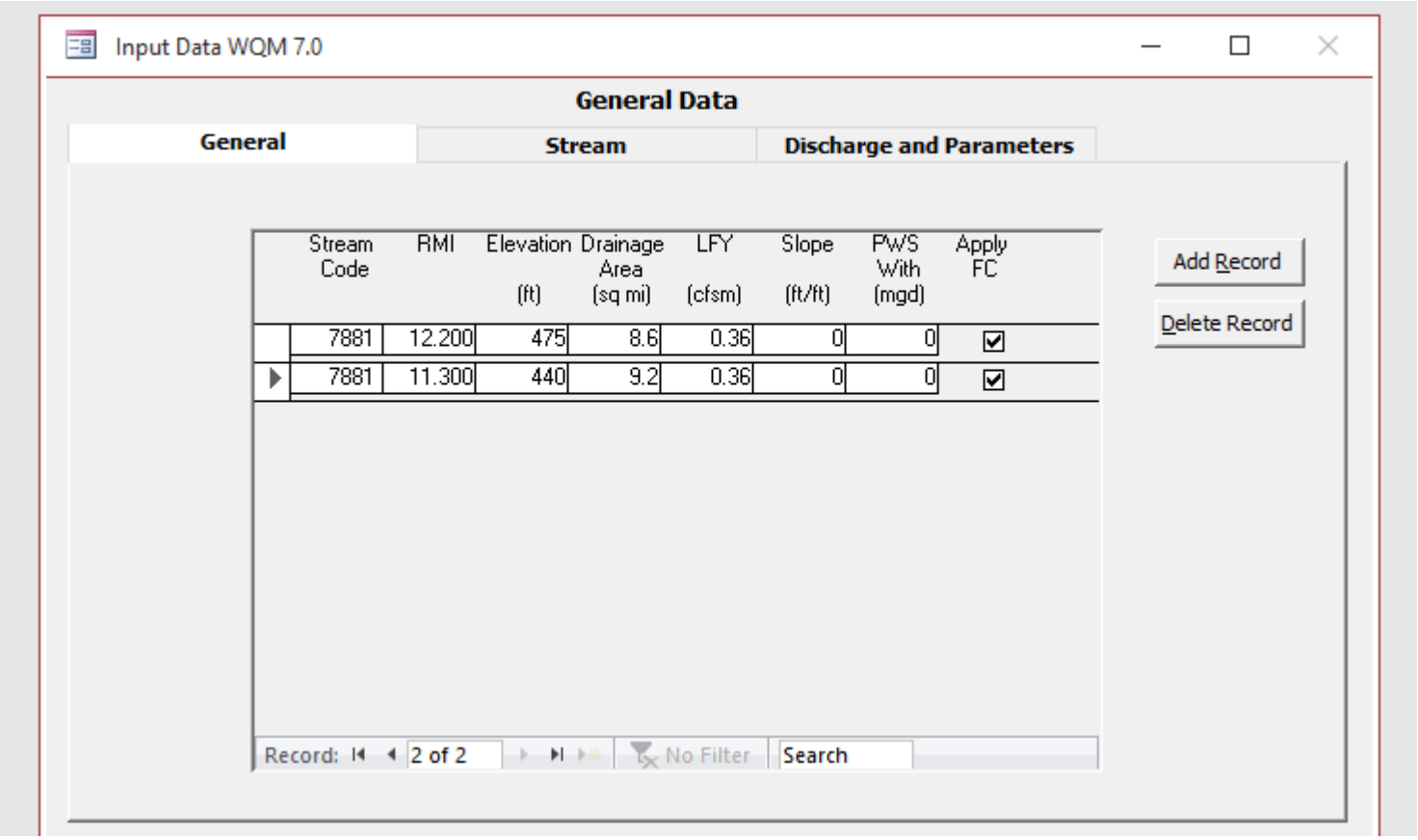


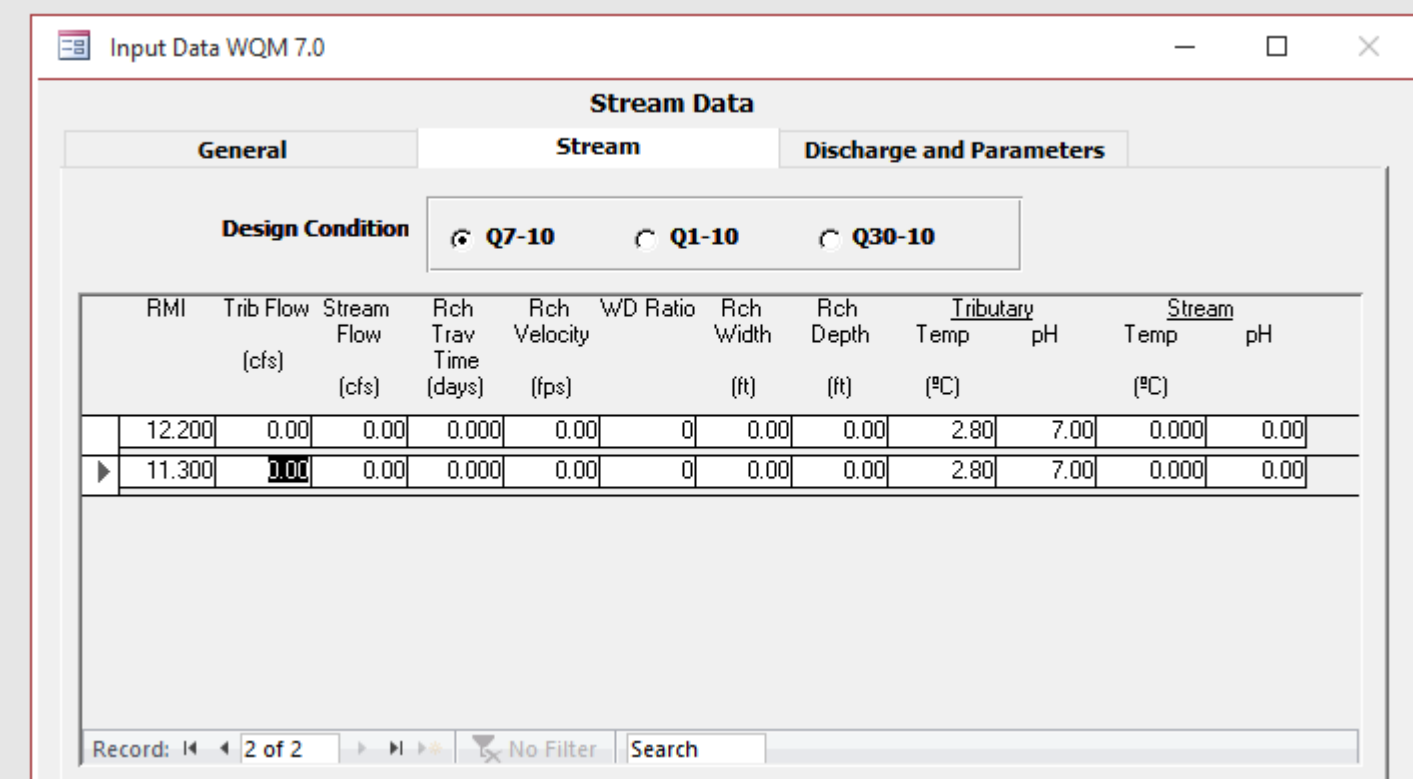

Input Data WQM 7.0
Discharge and Parameter Data
General
Stream
Discharge and Parameters
Discharge Data
RMI
Name
Permit Number
Existing Disc Flow (mgd)
Permitted Disc Flow (mgd)
Design Disc Flow (mgd)
Reserve Factor
Disc Temp (ºC)
Disc pH
12.200
Modern LF
PA0046680
0.0000
0.5000
0.0000
0.000
25.00
7.80
Parameter Data
Parameter Name
Disc Conc (mg/L)
Trib Conc (mg/L)
Stream Conc (mg/L)
Fate Coef (1/day)
CBOD5
10.00
2.00
0.00
1.50
NH3-N
1.00
0.00
0.00
0.70
Dissolved Oxygen
5.00
8.24
0.00
0.00
Record: 1 of 2
No Filter
Search

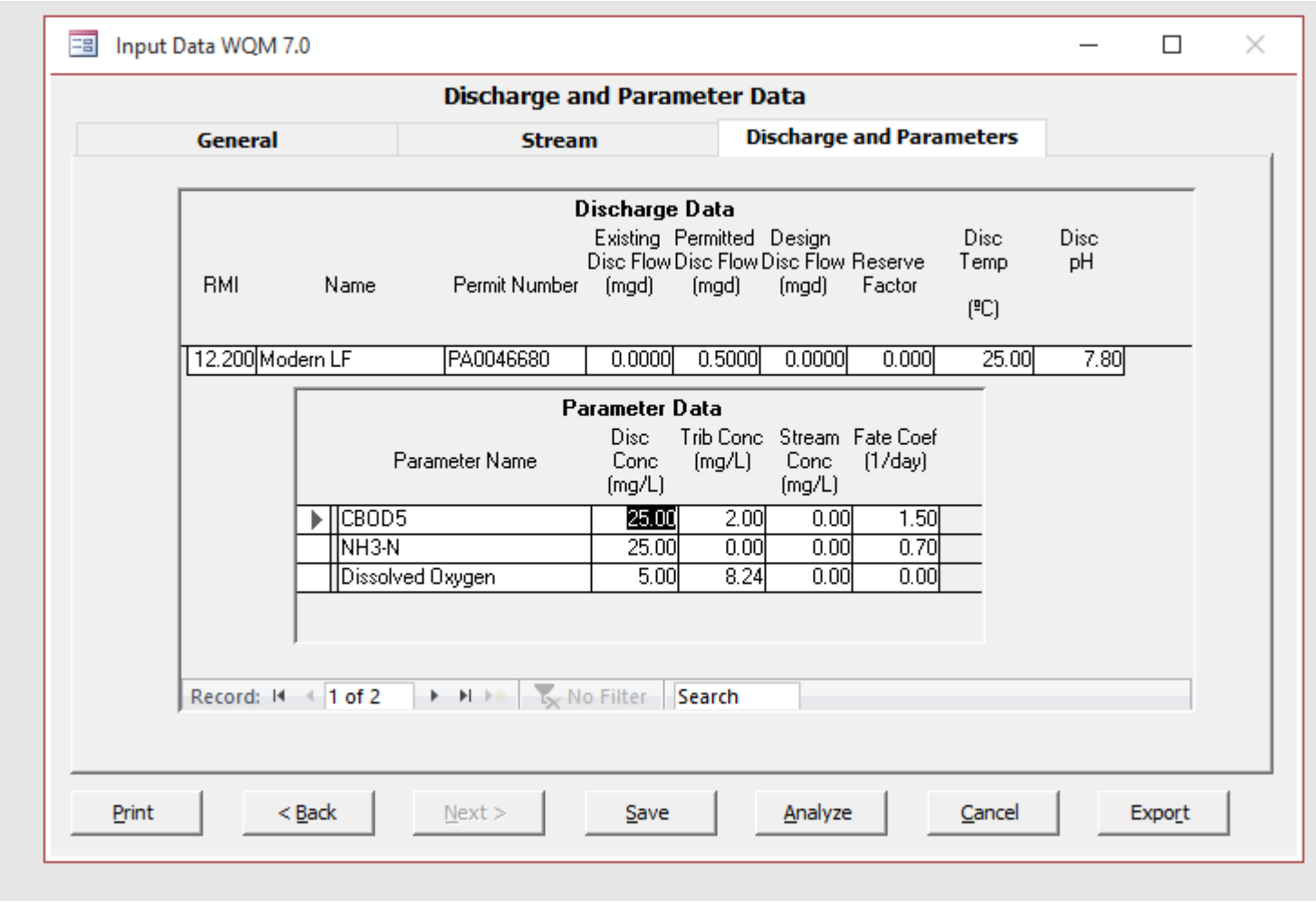

Input Data WQM 7.0
Discharge and Parameter Data
General
Stream
Discharge and Parameters
Discharge Data
RMI
Name
Permit Number
Existing Disc Flow (mgd)
Permitted Disc Flow (mgd)
Design Disc Flow (mgd)
Reserve Factor
Disc Temp (ºC)
Disc pH
11.300
downstrm
0.0000
0.0000
0.0000
0.000
25.00
7.00
Parameter Data
Parameter Name
Disc Conc (mg/L)
Trib Conc (mg/L)
Stream Conc (mg/L)
Fate Coef (1/day)
CBOD5
25.00
2.00
0.00
1.50
NH3-N
25.00
0.00
0.00
0.70
Dissolved Oxygen
5.00
8.24
0.00
0.00
Record: 2 of 2
No Filter
Search


Analysis Results WQM 7.0
Hydrodynamics
NH3-N Allocations
D.O. Allocations
D.O. Simulation
Effluent Limitations
RMI
Discharge Name
Permit Number
Disc Flow (mgd)
12.20
Modern LF
PA0046680
0.0000
Parameter
Effluent Limit 30 Day Average (mg/L)
Effluent Limit Maximum (mg/L)
Effluent Limit Minimum (mg/L)
CBOD5
10
NH3-N
1
2
Dissolved Oxygen
5
Record:
1 of 1
No Filter
Search
Print
< Back
Next >
Archive
Cancel

Re-run of WQM 7.0 for salmonid early life stages conditions,
with adjusted DO goal, adjusted stream temperature, adjusted stream flow, adjusted Low-Flow Yield……




Input Data WQM 7.0
Stream Data
General
Stream
Discharge and Parameters
Design Condition
Q7-10
Q1-10
Q30-10
RMI
Trib Flow (cfs)
Stream Flow (cfs)
Rch Trav Time (days)
Rch Velocity (fps)
WD Ratio
Rch Width (ft)
Rch Depth (ft)
Tributary Temp (ºC)
Tributary pH
Stream Temp (ºC)
Stream pH
12.200 0.00 0.00 0.000 0.00 0 0.00 0.00 2.80 7.00 0.000 0.00
11.300 0.00 0.00 0.000 0.00 0 0.00 0.00 2.80 7.00 0.000 0.00
Record: 2 of 2
No Filter
Search


Input Data WQM 7.0
Discharge and Parameter Data
General
Stream
Discharge and Parameters
Discharge Data
RMI
Name
Permit Number
Existing Disc Flow (mgd)
Permitted Disc Flow (mgd)
Design Disc Flow (mgd)
Reserve Factor
Disc Temp (ºC)
Disc pH
12.200 Modern LF PA0046680 0.0000 0.5000 0.0000 0.000 25.00 7.80
Parameter Data
Parameter Name
Disc Conc (mg/L)
Trib Conc (mg/L)
Stream Conc (mg/L)
Fate Coef (1/day)
CBOD5 25.00 2.00 0.00 1.50
NH3-N 25.00 0.00 0.00 0.70
Dissolved Oxygen 5.00 8.24 0.00 0.00
Record: 1 of 2
No Filter
Search
Print
< Back
Next >
Save
Analyze
Cancel
Export

Input Data WQM 7.0

Discharge and Parameter Data

General | Stream | Discharge and Parameters

Discharge Data

RMI	Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
11.300	downstrm		0.0000	0.0000	0.0000	0.000	3.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/day)
CBOD5	25.00	2.00	0.00	1.50
NH3-N	25.00	0.00	0.00	0.70
Dissolved Oxygen	5.00	8.24	0.00	0.00

Record: 2 of 2 | No Filter | Search

Modeling Specifications WQM 7.0

Select Parameters

- ○ NH3-N
- ○ Dissolved Oxygen
- ◉ Both

Select WLA Method

- ○ Uniform Treatment
- ◉ EMPR
- ○ D.O. Simulation

Q1-10 and Q30-10 Data

☑ Use input Q1-10 and Q30-10 data

Q1-10/Q7-10 ratio: 0.64

Q30-10/Q7-10 ratio: 1.36

WQAM 6.3 Comparison

☐ Input reach W/D ratios * ☐ Input reach travel times *

☑ Temperature Adjust Kr**

* Check to duplicate WQAM 6.3 results
** Uncheck to duplicate WQAM 6.3 results

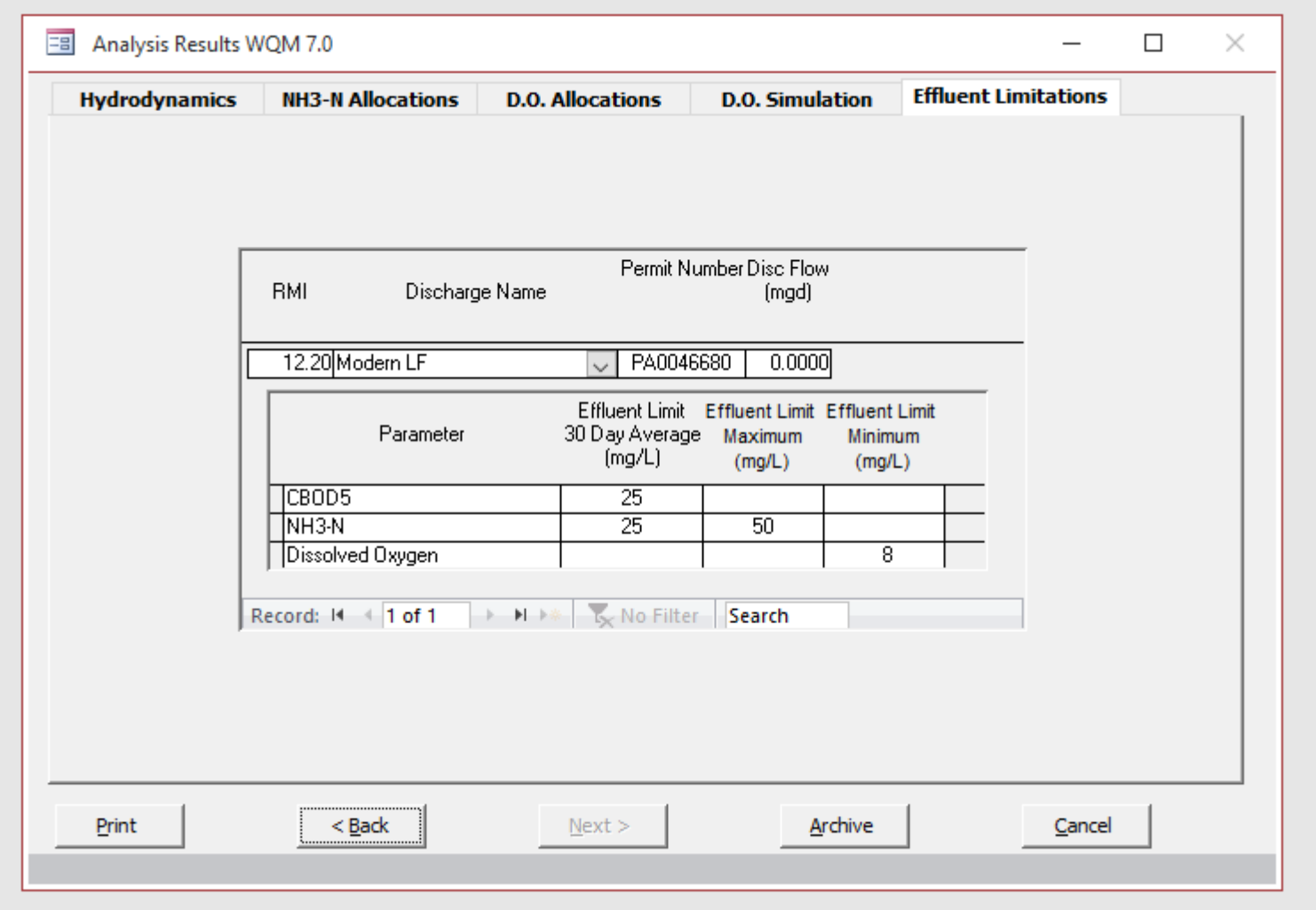
Dissolved Oxygen

DO Goal: 8.00

DO Saturation Percent: 90.0%

☑ Use Balanced Technology

Print | Next > | Cancel


Analysis Results WQM 7.0
Hydrodynamics
NH3-N Allocations
D.O. Allocations
D.O. Simulation
Effluent Limitations
RMI
Discharge Name
Permit Number
Disc Flow (mgd)
12.20
Modern LF
PA0046680
0.0000
Parameter
Effluent Limit 30 Day Average (mg/L)
Effluent Limit Maximum (mg/L)
Effluent Limit Minimum (mg/L)
CBOD5
25
NH3-N
25
50
Dissolved Oxygen
8
Record:
1 of 1
No Filter
Search
Print
< Back
Next >
Archive
Cancel

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

1.3	= Q stream (cfs)	0.5	= CV Daily
0.5	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	1.3.2.iii	WLA afc =	0.555	1.3.2.iii	WLA cfc =	0.534
PENTOXSD TRG	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRG	5.1b	LTA_afc=	0.207	5.1d	LTA_cfc =	0.310

Source		Effluent Limit Calculations		
PENTOXSD TRG	5.1f	AML MULT =	1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) =	0.255	AFC
		INST MAX LIMIT (mg/l) =	0.833	

WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)

(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....
....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)

Parameter	Group # Pollutant On DEP Applica-tion	Max dischg conc (ug/l)	QL used (ug/l)	TQL (ug/l)	TMS recommend -ation	
Acrolein	3	<17	17	2.0	Impose limit	
1,3-Dichloropropylene	3	<2.7	2.7	0.5	Impose limit	
Vinyl Chloride	3	<0.75	0.8	0.5	Impose limit	
2-Chlorophenol	4	<50	50	10	Impose limit	
2,4-Dichlorophenol	4	<50	50	10	Impose limit	
4,6 Dinitro-o-Cresol	4	<100	100	10	Impose limit	
2,4-Dinitrophenol	4	<100	100	10	Impose limit	
Pentachlorophenol	4	<100	100	10	Impose limit	
2,4,6-Trichlorophenol	4	<50	50	10	Impose limit	
Acenaphthene	5	<25	25	2.5	Impose limit	
Benzidine	5	<500	500	50	Impose limit	
Benzo(a)Anthracene	5	<25	25	2.5	Impose limit	
Benzo(a)Pyrene	5	<25	25	2.5	Impose limit	
3,4-Benzofluoranthene	5	<25	25	2.5	Impose limit	
Benzo(k)Fluoranthene	5	<25	25	2.5	Impose limit	
Bis(2-Chloroethyl)Ether	5	<50	50	5.0	Impose limit	
Butyl Benzyl Phthalate	5	<50	50	5.0	Impose limit	
Chrysene	5	<25	25	2.5	Impose limit	
Dibenzo(a,h)Anthrancene	5	<25	25	2.5	Impose limit	
3,3-Dichlorobenzidine	5	<50	50	5.0	Impose limit	
Di-n-Butyl Phthalate	5	<50	50	5.0	Impose limit	
2,4-Dinitrotoluene	5	<50	50	5.0	Impose limit	
2,6-Dinitrotoluene	5	<50	50	5.0	Impose limit	
1,2-Diphenylhydrazine	5	<100	100	10	Impose limit	
Hexachlorobenzene	5	<50	50	5.0	Impose limit	
Hexachlorobutadiene	5	<10	10	0.5	Impose limit	
Hexachlorocyclopentadiene	5	<50	50	5.0	Impose limit	
Hexachloroethane	5	<50	50	5.0	Impose limit	
Indeno(1,2,3-cd)Pyrene	5	<25	25	2.5	Impose limit	
Isophorone	5	<50	50	5.0	Impose limit	
Nitrobenzene	5	<50	50	5.0	Impose limit	
n-Nitrosodimethylamine	5	<50	50	5.0	Impose limit	
n-Nitrosodi-n-Propylamine	5	<50	50	5.0	Impose limit	
n-Nitrosodiphenylamine	5	<50	50	5.0	Impose limit	
Phenanthrene	5	<25	25	2.5	Impose limit	
1,2,4-Trichlorobenzene	5	<8.2	8.2	0.5	Impose limit	
Aldrin	6	<0.5	0.5	0.05	Impose limit	
Alpha-BHC	6	<0.5	0.5	0.05	Impose limit	
beta-BHC	6	<0.5	0.5	0.05	Impose limit	
Chlordane	6	<5	5	1.0	Impose limit	
4,4-DDT	6	<0.5	0.5	0.05	Impose limit	
4,4-DDE	6	<0.5	0.5	0.05	Impose limit	
4,4-DDD	6	<0.5	0.5	0.05	Impose limit	
Dieldrin	6	<0.5	0.5	0.05	Impose limit	
alpha-Endosulfan	6	<0.5	0.5	0.05	Impose limit	
beta-Endosulfan	6	<0.5	0.5	0.05	Impose limit	
Endrin	6	<0.5	0.5	0.05	Impose limit	
Heptachlor	6	<0.5	0.5	0.05	Impose limit	
Heptachlor Epoxide	6	<0.5	0.5	0.05	Impose limit	
Toxaphene	6	<5	5	0.5	Impose limit	
Dichlorobromomethane	3	<5	5	0.5	Monitor	
4Bromophenyl PhenylEther	5	<50	50	5.0	Monitor	
1,3-Dichlorobenzene	5	<6.9	6.9	0.5	Monitor	
Fluoranthene	5	<25	25	2.5	Monitor	
Pyrene	5	<25	25	2.5	Monitor	
gamma-BHC	6	<0.5	0.5	0.05	Monitor	

ND Parameters, resampled, TQLs

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **ModernLF-max appl effl & Module2/avgDMRs** NPDES Permit No.: **PA0046680** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **leachate+gw**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.5	500	7.8						

					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Strea m CV	Fate Coeff	FOS	Criteri a Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		10.9									
	Chloride (PWS)	mg/L		3850									
	Bromide	mg/L		63.7									
	Sulfate (PWS)	mg/L		152									
	Fluoride (PWS)	mg/L	<	20									
Group 2	Total Aluminum	µg/L		65									
	Total Antimony	µg/L		22.4									
	Total Arsenic	µg/L		105									
	Total Barium	µg/L		207									
	Total Beryllium	µg/L	<	1									
	Total Boron	µg/L		17,661									
	Total Cadmium	µg/L		0.44									
	Total Chromium (III)	µg/L		144									
	Hexavalent Chromium	µg/L	<	2.5									
	Total Cobalt	µg/L		22.9									
	Total Copper	µg/L	<	98.3									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		12.7									
	Dissolved Iron	µg/L		1790									
	Total Iron	µg/L		2360									
	Total Lead	µg/L	<	1.26									
	Total Manganese	µg/L		2900									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L		143									
	Total Phenols (Phenolics) (PWS)	µg/L	<	11.5									
	Total Selenium	µg/L		10.2									
	Total Silver	µg/L		0.29									
	Total Thallium	µg/L	<	0.4									
	Total Zinc	µg/L	<	9.53									
	Total Molybdenum	µg/L		13.2									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<	5									
	Benzene	µg/L	<	0.6									
	Bromoform	µg/L	<	0.5									

Error in above table: TDS discharge concentration should be 10,900 mg/l….did not trigger a limit recommendation when corrected in TMS

Group 3	Carbon Tetrachloride	µg/L	<	0.51									
	Chlorobenzene	µg/L		0.89									
	Chlorodibromomethane	µg/L	<	0.5									
	Chloroethane	µg/L	<	0.87									
	2-Chloroethyl Vinyl Ether	µg/L	<	5									
	Chloroform	µg/L	<	0.54									
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L		0.85									
	1,2-Dichloroethane	µg/L	<	0.6									
	1,1-Dichloroethylene	µg/L	<	0.86									
	1,2-Dichloropropane	µg/L	<	0.61									
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<	15									
	Ethylbenzene	µg/L	<	0.5									
	Methyl Bromide	µg/L	<	1.2									
	Methyl Chloride	µg/L		9.2									
	Methylene Chloride	µg/L	<	0.82									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.0006									
	Tetrachloroethylene	µg/L	<	1.03									
	Toluene	µg/L	<	0.5									
	1,2-trans-Dichloroethylene	µg/L	<	0.59									
	1,1,1-Trichloroethane	µg/L	<	0.5									
	1,1,2-Trichloroethane	µg/L	<	0.5									
	Trichloroethylene	µg/L		1.5									
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<	50									
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<	50									
	4-Nitrophenol	µg/L	<	100									
	p-Chloro-m-Cresol	µg/L	<	50									
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<	2.48									
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<	25									
	Anthracene	µg/L	<	25									
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<	25									
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<	50									
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<	50									
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	6.33									
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<	50									
	4-Chlorophenyl Phenyl Ether	µg/L	<	50									
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<	50									
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<	56									
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<	50									
	Dimethyl Phthalate	µg/L	<	50									
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<	50									
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<	8.6									
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L											
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L											
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L											
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L											
	PCB-1016	µg/L	<	0.2									
	PCB-1221	µg/L	<	0.2									
	PCB-1232	µg/L	<	0.2									
	PCB-1242	µg/L	<	0.2									
	PCB-1248	µg/L	<	0.2									
	PCB-1254	µg/L	<	0.2									
	PCB-1260	µg/L	<	0.2									
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg		228									
	p-Cresol	µg/L	<	1.7									
	Acetone	µg/L	<	5									
	2-Hexanone	µg/L	<	5									
		µg/L	<										
	Total Xylenes	µg/L	<	2									
	1,2,3-Trichloropropane	µg/L	<	1									
	1-Propanol	µg/L	<	5									
	1,2-cis-Dichloroethylene	µg/L		4.4									
	Total Vanadium	µg/L		18									
	Free Cyanide	µg/L		17.1									
	Methyl Ethyl Ketone	µg/L	<	5									

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

ModernLF-max appl effl & Module2/avgDMRs, NPDES Permit No. PA0046680, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Kreutz Creek**

No. Reaches to Model: **1**

(●) Statewide Criteria
( ) Great Lakes Criteria
( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	007881	12.2	475	8.6			Yes
End of Reach 1	078881	11.3	440	9.2			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	12.2	0.15	1.3									100	7		
End of Reach 1	11.3	0.15	1.42												

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	12.2														
End of Reach 1	11.3														

☑ ***Hydrodynamics***

$Q_{7\text{-}10}$

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.2	1.30		1.30	0.774	0.007	0.565	18.066	32.002	0.203	0.271	4.831
11.3	1.42		1.42								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.2	9.34		9.34	0.774	0.007	1.134	18.066	15.932	0.494	0.111	3.682
11.3	10.095		10.09								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	2,011	
Total Antimony	0	0		0	1,100	1,100	2,949	
Total Arsenic	0	0		0	340	340	911	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	56,294	
Total Boron	0	0		0	8,100	8,100	21,713	
Total Cadmium	0	0		0	4.889	5.4	14.5	Chem Translator of 0.906 applied
Total Chromium (III)	0	0		0	1203.624	3,809	10,211	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	43.7	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	255	
Total Copper	0	0		0	31.771	33.1	88.7	Chem Translator of 0.96 applied

Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	171.775	261	700	Chem Translator of 0.658 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	4.42	Chem Translator of 0.85 applied
Total Nickel	0	0		0	1013.837	1,016	2,723	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	15.471	18.2	48.8	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	174	
Total Zinc	0	0		0	254.024	260	696	Chem Translator of 0.978 applied
Acrylonitrile	0	0		0	650	650	1,742	
Benzene	0	0		0	640	640	1,716	
Bromoform	0	0		0	1,800	1,800	4,825	
Carbon Tetrachloride	0	0		0	2,800	2,800	7,506	
Chlorobenzene	0	0		0	1,200	1,200	3,217	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	48,252	
Chloroform	0	0		0	1,900	1,900	5,093	
1,2-Dichloroethane	0	0		0	15,000	15,000	40,210	
1,1-Dichloroethylene	0	0		0	7,500	7,500	20,105	
1,2-Dichloropropane	0	0		0	11,000	11,000	29,487	
Ethylbenzene	0	0		0	2,900	2,900	7,774	
Methyl Bromide	0	0		0	550	550	1,474	
Methyl Chloride	0	0		0	28,000	28,000	75,059	
Methylene Chloride	0	0		0	12,000	12,000	32,168	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	2,681	
Tetrachloroethylene	0	0		0	700	700	1,876	
Toluene	0	0		0	1,700	1,700	4,557	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	18,229	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	8,042	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	9,114	
Trichloroethylene	0	0		0	2,300	2,300	6,166	
2,4-Dimethylphenol	0	0		0	660	660	1,769	
2-Nitrophenol	0	0		0	8,000	8,000	21,445	
4-Nitrophenol	0	0		0	2,300	2,300	6,166	
p-Chloro-m-Cresol	0	0		0	160	160	429	
Phenol	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	12,063	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	2,198	
1,4-Dichlorobenzene	0	0		0	730	730	1,957	
Diethyl Phthalate	0	0		0	4,000	4,000	10,723	
Dimethyl Phthalate	0	0		0	2,500	2,500	6,702	
Naphthalene	0	0		0	140	140	375	
Osmotic Pressure	0	0		0	50	50.0	134	

p-Cresol	0	0		0	800	800	2,145	
Acetone	0	0		0	450,000	450,000	1,206,303	
2-Hexanone	0	0		0	21,000	21,000	56,294	
Total Xylenes	0	0		0	1,100	1,100	2,949	
1,2,3-Trichloropropane	0	0		0	N/A	N/A	N/A	
1-Propanol	0	0		0	230,000	230,000	616,555	
1,2-cis-Dichloroethylene	0	0		0	N/A	N/A	N/A	
Total Vanadium	0	0		0	510	510	1,367	
Free Cyanide	0	0		0	22	22.0	59.0	
Methyl Ethyl Ketone	0	0		0	230,000	230,000	616,555	

☑ ***CFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	590	
Total Arsenic	0	0		0	150	150	402	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	10,991	
Total Boron	0	0		0	1,600	1,600	4,289	
Total Cadmium	0	0		0	0.464	0.53	1.43	Chem Translator of 0.871 applied
Total Chromium (III)	0	0		0	156.567	182	488	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	27.9	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	50.9	
Total Copper	0	0		0	19.542	20.4	54.6	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	4,021	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	6.694	10.2	27.3	Chem Translator of 0.658 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	2.43	Chem Translator of 0.85 applied
Total Nickel	0	0		0	112.606	113	303	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	13.4	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	34.8	
Total Zinc	0	0		0	256.102	260	696	Chem Translator of 0.986 applied
Acrylonitrile	0	0		0	130	130	348	
Benzene	0	0		0	130	130	348	
Bromoform	0	0		0	370	370	992	
Carbon Tetrachloride	0	0		0	560	560	1,501	
Chlorobenzene	0	0		0	240	240	643	

Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	9,382	
Chloroform	0	0		0	390	390	1,045	
1,2-Dichloroethane	0	0		0	3,100	3,100	8,310	
1,1-Dichloroethylene	0	0		0	1,500	1,500	4,021	
1,2-Dichloropropane	0	0		0	2,200	2,200	5,897	
Ethylbenzene	0	0		0	580	580	1,555	
Methyl Bromide	0	0		0	110	110	295	
Methyl Chloride	0	0		0	5,500	5,500	14,744	
Methylene Chloride	0	0		0	2,400	2,400	6,434	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	563	
Tetrachloroethylene	0	0		0	140	140	375	

Tetrachloroethylene	0	0		0	140	140	375	
Toluene	0	0		0	330	330	885	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	3,753	
1,1,1-Trichloroethane	0	0		0	610	610	1,635	
1,1,2-Trichloroethane	0	0		0	680	680	1,823	
Trichloroethylene	0	0		0	450	450	1,206	
2,4-Dimethylphenol	0	0		0	130	130	348	
2-Nitrophenol	0	0		0	1,600	1,600	4,289	
4-Nitrophenol	0	0		0	470	470	1,260	
p-Chloro-m-Cresol	0	0		0	500	500	1,340	
Phenol	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	2,439	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	429	
1,4-Dichlorobenzene	0	0		0	150	150	402	
Diethyl Phthalate	0	0		0	800	800	2,145	
Dimethyl Phthalate	0	0		0	500	500	1,340	
Naphthalene	0	0		0	43	43.0	115	
Osmotic Pressure	0	0		0	N/A	N/A	N/A	
p-Cresol	0	0		0	160	160	429	
Acetone	0	0		0	86,000	86,000	230,538	
2-Hexanone	0	0		0	4,300	4,300	11,527	
Total Xylenes	0	0		0	210	210	563	
1,2,3-Trichloropropane	0	0		0	N/A	N/A	N/A	
1-Propanol	0	0		0	46,000	46,000	123,311	
1,2-cis-Dichloroethylene	0	0		0	N/A	N/A	N/A	
Total Vanadium	0	0		0	100	100.0	268	
Free Cyanide	0	0		0	5.2	5.2	13.9	
Methyl Ethyl Ketone	0	0		0	32,000	32,000	85,782	

☑ ***THH*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	2,000	2,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	15.0	
Total Arsenic	0	0		0	10	10.0	26.8	
Total Barium	0	0		0	2,400	2,400	6,434	
Total Boron	0	0		0	3,100	3,100	8,310	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	300	300	804	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	2,681	
Total Mercury	0	0		0	0.050	0.05	0.13	
Total Nickel	0	0		0	610	610	1,635	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	0.64	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	

Benzene	0	0		0	N/A	N/A	N/A	
Bromoform	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Chlorobenzene	0	0		0	100	100.0	268	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	15.3	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	88.5	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	182	
Methyl Bromide	0	0		0	100	100.0	268	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	N/A	N/A	N/A	
1,1,2,2-Tetrachloroethane	0	0		0	N/A	N/A	N/A	
Tetrachloroethylene	0	0		0	N/A	N/A	N/A	

Toluene	0	0		0	57	57.0	153	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	268	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	26,807	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	100	100.0	268	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	10,723	
Anthracene	0	0		0	300	300	804	
Bis(2-Chloroisopropyl)Ether	0	0		0	200	200	536	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	800	800	2,145	
1,2-Dichlorobenzene	0	0		0	1,000	1,000	2,681	
1,4-Dichlorobenzene	0	0		0	300	300	804	
Diethyl Phthalate	0	0		0	600	600	1,608	
Dimethyl Phthalate	0	0		0	2,000	2,000	5,361	
Naphthalene	0	0		0	N/A	N/A	N/A	
Osmotic Pressure	0	0		0	N/A	N/A	N/A	
p-Cresol	0	0		0	N/A	N/A	N/A	
Acetone	0	0		0	3,500	3,500	9,382	
2-Hexanone	0	0		0	N/A	N/A	N/A	
Total Xylenes	0	0		0	70,000	70,000	187,647	
1,2,3-Trichloropropane	0	0		0	210	210	563	
1-Propanol	0	0		0	N/A	N/A	N/A	
1,2-cis-Dichloroethylene	0	0		0	12	12.0	32.2	
Total Vanadium	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	4	4.0	10.7	
Methyl Ethyl Ketone	0	0		0	21,000	21,000	56,294	

☑ **CRL** CCT (min): 3.682 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	

Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	0.06	0.06	0.78	
Benzene	0	0		0	0.58	0.58	7.59	
Bromoform	0	0		0	7	7.0	91.6	
Carbon Tetrachloride	0	0		0	0.4	0.4	5.23	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	10.5	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	9.9	9.9	130	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	11.8	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methyl Bromide	0	0		0	N/A	N/A	N/A	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	20	20.0	262	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	2.62	
Tetrachloroethylene	0	0		0	10	10.0	131	
Toluene	0	0		0	N/A	N/A	N/A	
1,2-trans-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	0.55	0.55	7.19	
Trichloroethylene	0	0		0	0.6	0.6	7.85	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	

Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	4.19	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Osmotic Pressure	0	0		0	N/A	N/A	N/A	
p-Cresol	0	0		0	N/A	N/A	N/A	
Acetone	0	0		0	N/A	N/A	N/A	
2-Hexanone	0	0		0	N/A	N/A	N/A	
Total Xylenes	0	0		0	N/A	N/A	N/A	
1,2,3-Trichloropropane	0	0		0	N/A	N/A	N/A	
1-Propanol	0	0		0	N/A	N/A	N/A	
1,2-cis-Dichloroethylene	0	0		0	N/A	N/A	N/A	
Total Vanadium	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	N/A	N/A	N/A	
Methyl Ethyl Ketone	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Antimony	0.063	0.098	15.0	23.4	37.5	µg/L	15.0	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Arsenic	0.11	0.17	26.8	41.8	67.0	µg/L	26.8	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Boron	17.9	27.9	4,289	6,692	10,723	µg/L	4,289	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Cadmium	Report	Report	Report	Report	Report	µg/L	1.43	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Chromium (III)	Report	Report	Report	Report	Report	µg/L	488	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Cobalt	Report	Report	Report	Report	Report	µg/L	50.9	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	0.23	0.36	54.6	85.1	136	µg/L	54.6	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	3.35	5.23	804	1,255	2,011	µg/L	804	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Iron	16.8	26.2	4,021	6,273	10,053	µg/L	4,021	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Manganese	11.2	17.4	2,681	4,182	6,702	µg/L	2,681	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Nickel	Report	Report	Report	Report	Report	µg/L	303	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Selenium	0.056	0.087	13.4	20.9	33.4	µg/L	13.4	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Bis(2-Ethylhexyl)Phthalate	0.017	0.027	4.19	6.53	10.5	µg/L	4.19	CRL	Discharge Conc ≥ 50% WQBEL (RP)
Osmotic Pressure	XXX	XXX	85.9	134	215	mOs/kg	85.9	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Free Cyanide	0.045	0.07	10.7	16.7	26.8	µg/L	10.7	THH	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Aluminum	1,289	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	6,434	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Hexavalent Chromium	27.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Total Lead	27.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.13	µg/L	Discharge Conc < TQL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Silver	31.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	0.64	µg/L	Discharge Conc < TQL
Total Zinc	446	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrylonitrile	0.78	µg/L	Discharge Conc < TQL
Benzene	7.59	µg/L	Discharge Conc ≤ 25% WQBEL
Bromoform	91.6	µg/L	Discharge Conc < TQL
Carbon Tetrachloride	5.23	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorobenzene	268	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorodibromomethane	10.5	µg/L	Discharge Conc < TQL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	9,382	µg/L	Discharge Conc < TQL
Chloroform	15.3	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	130	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethylene	88.5	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-Dichloropropane	11.8	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	182	µg/L	Discharge Conc < TQL
Methyl Bromide	268	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Chloride	14,744	µg/L	Discharge Conc ≤ 25% WQBEL
Methylene Chloride	262	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2,2-Tetrachloroethane	2.62	µg/L	Discharge Conc < TQL
Tetrachloroethylene	131	µg/L	Discharge Conc ≤ 25% WQBEL
Toluene	153	µg/L	Discharge Conc < TQL
1,2-trans-Dichloroethylene	268	µg/L	Discharge Conc ≤ 25% WQBEL

1,1,1-Trichloroethane	1,635	µg/L	Discharge Conc < TQL
1,1,2-Trichloroethane	7.19	µg/L	Discharge Conc < TQL
Trichloroethylene	7.85	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dimethylphenol	268	µg/L	Discharge Conc ≤ 25% WQBEL
2-Nitrophenol	4,289	µg/L	Discharge Conc ≤ 25% WQBEL
4-Nitrophenol	1,260	µg/L	Discharge Conc ≤ 25% WQBEL
p-Chloro-m-Cresol	275	µg/L	Discharge Conc ≤ 25% WQBEL
Phenol	10,723	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	804	µg/L	Discharge Conc ≤ 25% WQBEL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroisopropyl)Ether	536	µg/L	Discharge Conc ≤ 25% WQBEL
2-Chloronaphthalene	2,145	µg/L	Discharge Conc ≤ 25% WQBEL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
1,2-Dichlorobenzene	429	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dichlorobenzene	402	µg/L	Discharge Conc ≤ 25% WQBEL
Diethyl Phthalate	1,608	µg/L	Discharge Conc ≤ 25% WQBEL
Dimethyl Phthalate	1,340	µg/L	Discharge Conc ≤ 25% WQBEL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
Naphthalene	115	µg/L	Discharge Conc ≤ 25% WQBEL
PCB-1016	N/A	N/A	No WQS
PCB-1221	N/A	N/A	No WQS
PCB-1232	N/A	N/A	No WQS
PCB-1242	N/A	N/A	No WQS
PCB-1248	N/A	N/A	No WQS
PCB-1254	N/A	N/A	No WQS
PCB-1260	N/A	N/A	No WQS
p-Cresol	429	µg/L	Discharge Conc < TQL
Acetone	9,382	µg/L	Discharge Conc ≤ 25% WQBEL
2-Hexanone	11,527	µg/L	Discharge Conc ≤ 25% WQBEL
Total Xylenes	563	µg/L	Discharge Conc ≤ 25% WQBEL
1,2,3-Trichloropropane	563	µg/L	Discharge Conc ≤ 25% WQBEL
1-Propanol	123,311	µg/L	Discharge Conc < TQL
1,2-cis-Dichloroethylene	32.2	µg/L	Discharge Conc ≤ 25% WQBEL
Total Vanadium	268	µg/L	Discharge Conc ≤ 10% WQBEL
Methyl Ethyl Ketone	56,294	µg/L	Discharge Conc ≤ 25% WQBEL

Using median values from Supplemental DMRs as inputs for 9 parameters gives same results:

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Modern Lf** NPDES Permit No.: **pa0046680** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **IW+GW**

Discharge Characteristics

Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.5	500	7.8						

	Discharge Pollutant	Units	Max Discharge Conc		0 if left blank: Trib Conc	0 if left blank: Stream Conc	0.5 if left blank: Daily CV	0.5 if left blank: Hourly CV	0 if left blank: Strea m CV	0 if left blank: Fate Coeff	0 if left blank: FOS	1 if left blank: Criteri a Mod	1 if left blank: Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L		21000									
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L	<	84									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L	<	6									
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										

1,1,2,2-Tetrachloroethane	µg/L	<										
Tetrachloroethylene	µg/L	<	0.5									
Toluene	µg/L	<										

Phenol	µg/L	<	3.2									
Bis(2-Chloroisopropyl)Ether	µg/L	<										
Bis(2-Ethylhexyl)Phthalate	µg/L	<	10									

Osmotic Pressure	mOs/kg		282									
p-Cresol	µg/L	<	1									

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Boron	17.9	27.9	4,289	6,692	10,723	µg/L	4,289	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Copper	0.23	0.36	54.6	85.1	136	µg/L	54.6	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Bis(2-Ethylhexyl)Phthalate	0.017	0.027	4.19	6.53	10.5	µg/L	4.19	CRL	Discharge Conc ≥ 50% WQBEL (RP)
Osmotic Pressure	XXX	XXX	85.9	134	215	mOs/kg	85.9	AFC	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments

Total Lead	N/A	N/A	Discharge Conc < TQL
Total Zinc	446	µg/L	Discharge Conc ≤ 10% WQBEL
Tetrachloroethylene	N/A	N/A	Discharge Conc < TQL
Phenol	N/A	N/A	Discharge Conc < TQL
p-Cresol	N/A	N/A	Discharge Conc < TQL

Discharge Information

Instructions | Discharge | Stream

Facility: **Modern LF - resamples using QL=< TQL** NPDES Permit No.: **PA0046680** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **leachate+gw+misc**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.5	500	7.8						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	mg/L											
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L											
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	mg/L											
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

TMS re-run for re-sampled parameters, originally Non-detect but RL>TQL

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L	<										
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										

Group 5	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										
	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L		0.2									
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L		0.12									
	gamma-BHC	µg/L		0.061									
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L		0.11									
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L		0.061									
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										

Stream / Surface Water Information

Modern LF - resamples using QL=< TQL, NPDES Permit No. PA0046680, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Kreutz Creek**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	007881	12.2	475	8.6			Yes
End of Reach 1	007881	11.3	440	9.2			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	12.2	0.15	1.3									100	7		
End of Reach 1	11.3	0.15	1.42												

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	12.2														
End of Reach 1	11.3														

☑ ***Hydrodynamics***

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.2	1.30		1.30	0.774	0.007	0.565	18.066	32.002	0.203	0.271	4.831
11.3	1.42		1.42								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.2	9.34		9.34	0.774	0.007	1.134	18.066	15.932	0.494	0.111	3.682
11.3	10.095		10.09								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Aldrin	0	0		0	3	3.0	8.04	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	0.95	0.95	2.55	
beta-Endosulfan	0	0		0	0.22	0.22	0.59	
Heptachlor Epoxide	0	0		0	0.5	0.5	1.34	

☑ ***CFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Aldrin	0	0		0	0.1	0.1	0.27	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	N/A	N/A	N/A	
beta-Endosulfan	0	0		0	0.056	0.056	0.15	
Heptachlor Epoxide	0	0		0	0.0038	0.004	0.01	

☑ ***THH*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Aldrin	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	4.2	4.2	11.3	
beta-Endosulfan	0	0		0	20	20.0	53.6	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 3.682 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Aldrin	0	0		0	0.0000008	8.00E-07	0.00001	
beta-BHC	0	0		0	0.008	0.008	0.1	
gamma-BHC	0	0		0	N/A	N/A	N/A	
beta-Endosulfan	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	0.00003	0.00003	0.0004	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Aldrin	4.36E-08	6.81E-08	0.00001	0.00002	0.00003	µg/L	0.00001	CRL	Discharge Conc ≥ 50% WQBEL (RP)
beta-BHC	0.0004	0.0007	0.1	0.16	0.26	µg/L	0.1	CRL	Discharge Conc ≥ 50% WQBEL (RP)
beta-Endosulfan	0.0006	0.001	0.15	0.23	0.38	µg/L	0.15	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Heptachlor Epoxide	0.000002	0.000003	0.0004	0.0006	0.001	µg/L	0.0004	CRL	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
gamma-BHC	1.63	µg/L	Discharge Conc ≤ 25% WQBEL

START	END	OUTFA	MONITORING_LOCATION	PARAM	CONC_UN	2_VALUE	2_LIMIT	SBC	3_VALU	3_LIMIT	3_SBC	
1/1/2022	1/31/2022	1	Final Effluent	Color (	Pt-Co Unit	613	Monitor	Avg.Mo	700	Monito	Daily Max.	
1/1/2022	1/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	21	Monitor	Avg.Mo	70	Monito	Daily Max.	
1/1/2022	1/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	58	Monitor	Avg.Mo	80	Monito	Daily Max.	91
2/1/2022	2/28/2022	1	Instream Monitoring	Color (	Pt-Co Unit	13	Monitor	Avg.Mo	25	Monito	Daily Max.	
2/1/2022	2/28/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	109	Monitor	Avg.Mo	150	Monito	Daily Max.	84
2/1/2022	2/28/2022	1	Final Effluent	Color (	Pt-Co Unit	700	Monitor	Avg.Mo	700	Monito	Daily Max.	
3/1/2022	3/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	36	Monitor	Avg.Mo	100	Monito	Daily Max.	90
3/1/2022	3/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	14	Monitor	Avg.Mo	25	Monito	Daily Max.	
3/1/2022	3/31/2022	1	Final Effluent	Color (	Pt-Co Unit	585	Monitor	Avg.Mo	700	Monito	Daily Max.	
4/1/2022	4/30/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	53	Monitor	Avg.Mo	100	Monito	Daily Max.	92
4/1/2022	4/30/2022	1	Final Effluent	Color (	Pt-Co Unit	650	Monitor	Avg.Mo	700	Monito	Daily Max.	
4/1/2022	4/30/2022	1	Instream Monitoring	Color (	Pt-Co Unit	23	Monitor	Avg.Mo	25	Monito	Daily Max.	
5/1/2022	5/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	133	Monitor	Avg.Mo	275	Monito	Daily Max.	81
5/1/2022	5/31/2022	1	Final Effluent	Color (	Pt-Co Unit	700	Monitor	Avg.Mo	700	Monito	Daily Max.	
5/1/2022	5/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	34	Monitor	Avg.Mo	55	Monito	Daily Max.	
6/1/2022	6/30/2022	1	Final Effluent	Color (	Pt-Co Unit	640	Monitor	Avg.Mo	700	Monito	Daily Max.	
6/1/2022	6/30/2022	1	Instream Monitoring	Color (	Pt-Co Unit	26	Monitor	Avg.Mo	40	Monito	Daily Max.	
6/1/2022	6/30/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	52	Monitor	Avg.Mo	65	Monito	Daily Max.	92
7/1/2022	7/31/2022	1	Final Effluent	Color (	Pt-Co Unit	650	Monitor	Avg.Mo	700	Monito	Daily Max.	
7/1/2022	7/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	74	Monitor	Avg.Mo	125	Monito	Daily Max.	89
7/1/2022	7/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	34	Monitor	Avg.Mo	55	Monito	Daily Max.	

8/1/2022	8/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	14	Monitor	Avg.Mo	25	Monito	Daily Max.		
9/1/2022	9/30/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	66	Monitor	Avg.Mo	200	Monito	Daily Max.	78	
9/1/2022	9/30/2022	1	Instream Monitoring	Color (	Pt-Co Unit	11	Monitor	Avg.Mo	20	Monito	Daily Max.		
9/1/2022	9/30/2022	1	Final Effluent	Color (	Pt-Co Unit	305	Monitor	Avg.Mo	700	Monito	Daily Max.		
10/1/2022	10/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	163	Monitor	Avg.Mo		Monito	Daily Max.	71	
10/1/2022	10/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	14	Monitor	Avg.Mo		Monito	Daily Max.		
10/1/2022	10/31/2022	1	Final Effluent	Color (	Pt-Co Unit	556	Monitor	Avg.Mo		Monito	Daily Max.		
11/1/2022	11/30/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	26	Monitor	Avg.Mo		Monito	Daily Max.	87	
11/1/2022	11/30/2022	1	Instream Monitoring	Color (	Pt-Co Unit	12	Monitor	Avg.Mo		Monito	Daily Max.		
11/1/2022	11/30/2022	1	Final Effluent	Color (	Pt-Co Unit	203	Monitor	Avg.Mo		Monito	Daily Max.		
12/1/2022	12/31/2022	1	Downstream Monitoring	Color (	Pt-Co Unit	74	Monitor	Avg.Mo		Monito	Daily Max.	89	
12/1/2022	12/31/2022	1	Instream Monitoring	Color (	Pt-Co Unit	16	Monitor	Avg.Mo		Monito	Daily Max.		
12/1/2022	12/31/2022	1	Final Effluent	Color (	Pt-Co Unit	700	Monitor	Avg.Mo		Monito	Daily Max.		
1/1/2023	1/31/2023	1	Downstream Monitoring	Color (	Pt-Co Unit	119	Monitor	Avg.Mo		Monito	Daily Max.	83	
1/1/2023	1/31/2023	1	Instream Monitoring	Color (	Pt-Co Unit	14	Monitor	Avg.Mo		Monito	Daily Max.		
1/1/2023	1/31/2023	1	Final Effluent	Color (	Pt-Co Unit	700	Monitor	Avg.Mo		Monito	Daily Max.		
2/1/2023	2/28/2023	1	Downstream Monitoring	Color (	Pt-Co Unit	76	Monitor	Avg.Mo		Monito	Daily Max.	89	
2/1/2023	2/28/2023	1	Instream Monitoring	Color (	Pt-Co Unit	10.6	Monitor	Avg.Mo		Monito	Daily Max.		
2/1/2023	2/28/2023	1	Final Effluent	Color (	Pt-Co Unit	700	Monitor	Avg.Mo		Monito	Daily Max.		
					Average reduction between discharge and downstream 100 ft, using monthly averages as reported on DMRs							86	%

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 11-Jun-2009 **Revision Date** 23-Feb-2022 **Revision Number** 7

1. Identification

Product Name **Tetrahydrofuran**

Cat No. : **BP1140-1; T424-4**

CAS No 109-99-9
Synonyms THF (Sequencing; Spectranalyzed; HPLC; OPTIDRY; OPTIMA)

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute oral toxicity	Category 4
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 2
Specific target organ toxicity (single exposure)	Category 3

Target Organs - Respiratory system, Central nervous system (CNS).

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Tetrahydrofuran	109-99-9	>95

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrahydrofuran	Not listed	2160 mg/l LC50 = 96 h Pimephales promelas Leuciscus idus: LC50: 2820 mg/L/48h	Not listed	EC50 48 h 3485 mg/l EC50: >10000 mg/L/24h

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrahydrofuran	0.45

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SAFETY DATA SHEET

Version 8.9
Revision Date 11/21/2022
Print Date 11/21/2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Tetrahydrofuran for liquid chromatography LiChrosolv®

Product Number : 1.08101
Catalogue No. : 108101
Brand : Millipore
Index-No. : 603-025-00-0
CAS-No. : 109-99-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Solvent, Analytical and preparative chromatography

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : C4H8O
Molecular weight : 72.11 g/mol

CAS-No. : 109-99-9
EC-No. : 203-726-8
Index-No. : 603-025-00-0

Component	Classification	Concentration
Tetrahydrofuran		
	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; Carc. 2; STOT SE 3; H225, H302, H319, H351, H335, H336 Concentration limits: >= 25 %: Eye Irrit. 2, H319; >= 25 %: STOT SE 3, H335;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 2,160 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 3,485 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Cell multiplication inhibition test IC5 - Scenedesmus quadricauda (Green algae) - 3,700 mg/l - 8 d Remarks: (maximum permissible toxic concentration)
Toxicity to bacteria	static test IC50 - activated sludge - 460 mg/l - 3 h (OECD Test Guideline 209)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 216 mg/l - 33 d Remarks: (ECHA)

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.9 Revision Date: 11/21/2022 Print Date: 11/21/2022

Model Results

Modern LF, NPDES Permit No. PA0046680, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | (●) All ( ) Inputs ( ) Results ( ) Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
MemCleen A	0	0		0	4,480	4,480	12,009	

☑ ***CFC*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): 249.22 Analysis pH: 7.16

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
MemCleen A	0	0		0	500	500	1,340	

☑ ***THH*** CCT (min): 4.831 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
MemCleen A	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 3.682 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
MemCleen A	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

Mass Limits	*Concentration Limits*

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

Mass Limits	*Concentration Limits*

Model Results 10/27/2022 Page 5

Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
MemCleen A	5.59	8.72	1,340	2,091	3,351	µg/L	1,340	CFC	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments

Modern LF's discharge samples for PFAS:

Date Collected		1/11/2023		
Date Analyzed		1/30/2023		
Method		EPA 1633		
Analyte	**Units**	**Final Effluent**		**MDL**
Perfluorobutanoic acid (PFBA)	ng/L	3,800		
Perfluoropentanoic acid (PFPA)	ng/L	1,800		
Perfluorohexanoic acid (PFHxA)	ng/L	2,700		
Perfluoroheptanoic acid (PFHpA)	ng/L	810		
Perfluorooctanoic acid (PFOA)	ng/L	1,900		
Perfluorononanoic acid (PFNA)	ng/L	70		
Perfluorodecanoic acid (PFDA)	ng/L	52		
Perfluoroundecanoic acid (PFUnA)	ng/L	ND	U	<0.48
Perfluorododecanoic acid (PFDoA)	ng/L	ND	U	<0.48
Perfluorotridecanoic acid (PFTriA)	ng/L	ND	U	<0.48
Perfluorotetradecanoic acid (PFTeA)	ng/L	ND	U	<0.48
Perfluorobutanesulfonic acid (PFBS)	ng/L	5,000		
Perfluoropentanesulfonic acid (PFPeS)	ng/L	440		
Perfluorohexanesulfonic acid (PFHxS)	ng/L	1,400		
Perfluoroheptanesulfonic acid (PFHpS)	ng/L	27		
Perfluorooctane sulfonate (PFOS)	ng/L	560		
Perfluorononanesulfonic acid (PFNS)	ng/L	ND	U	<0.39
Perfluorodecanesulfonic acid (PFDS)	ng/L	ND	U	<0.48
Perfluorododecanesulfonic acid (PFDoS)	ng/L	ND	U	<0.87
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	ng/L	9.5		
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	ng/L	490		
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	ng/L	8.5		
Perfluorooctanesulfonamide (FOSA)	ng/L	ND	U	<0.48
N-methylperfluorooctane sulfonamide (NMeFOSA)	ng/L	ND	U	<0.48
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ng/L	ND	U	<0.48
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ng/L	9.3		
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ng/L	13		
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ng/L	ND	U	<4.8
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ng/L	ND	U	<4.8
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ng/L	7.3	J I	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ng/L	ND	U	<1.4
Perfluoro-3-methoxypropanoic acid (PFMPA)	ng/L	ND	U	<50
Perfluoro-4-methoxybutanoic acid (PFMBA)	ng/L	ND	U	<100
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ng/L	1.6	J I	
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid(9Cl-PF3ONS)	ng/L	ND	U	<0.96
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ng/L	ND	U	<1.9
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ng/L	2.2	J I	
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ng/L	ND	U	<1.4
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ng/L	300		
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ng/L	ND	U	<9.6
Total PFAS Detected	ng/L	19,400		
PFOA+PFOS	ng/L	2,460		
UCMR 3 Compounds	ng/L	9,740		

I : Value is EMPC (estimated maximum possible concentration).
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
MDL: Method Detection Limit
U : Indicates the analyte was analyzed for but not detected.

Client Sample Results

Client: Faeger Drinker Biddle E Reath LLP
Project/Site: Modern Landfill - PFAS

Job ID: 480-206422-1

Client Sample ID: Final Effluent
Date Collected: 02/22/23 14:10
Date Received: 02/22/23 17:55

Lab Sample ID: 480-206422-1
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPA)	**1300**	**I**	20	5.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorooctanoic acid (PFOA)	**2000**		10	3.2	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorononanoic acid (PFNA)	**66**		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorodecanoic acid (PFDA)	**36**		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoroundecanoic acid (PFUnA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorododecanoic acid (PFDoA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorotridecanoic acid (PFTriA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoropentanesulfonic acid (PFPeS)	**460**		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorohexanesulfonic acid (PFHxS)	**1400**		10	2.9	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoroheptanesulfonic acid (PFHpS)	**26**		10	2.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorooctanesulfonic acid (PFOS)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorononanesulfonic acid (PFNS)	ND		10	2.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorodecanesulfonic acid (PFDS)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorododecanesulfonic acid (PFDoS)	ND		10	4.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)	**650**		40	13	ng/L		03/14/23 18:32	04/06/23 18:37	1
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)	ND		40	13	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluorooctanesulfonamide (FOSA)	**4.0**	**J**	10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-methylperfluorooctane sulfonamide (NMeFOSA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ND		10	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	6.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	**12**		10	3.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	ND		100	25	ng/L		03/14/23 18:32	04/06/23 18:37	1
N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	ND		100	25	ng/L		03/14/23 18:32	04/06/23 18:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		40	10	ng/L		03/14/23 18:32	04/06/23 18:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		40	7.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoro-3-methoxypropanoic acid (PFMPA)	**5.3**	**J**	20	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoro-4-methoxybutanoic acid (PFMBA)	**5.1**	**J**	20	5.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		20	5.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid(9Cl-PF3ONS)	ND		40	5.0	ng/L		03/14/23 18:32	04/06/23 18:37	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ND		40	10	ng/L		03/14/23 18:32	04/06/23 18:37	1
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ND		20	2.5	ng/L		03/14/23 18:32	04/06/23 18:37	1
3-Perfluoropropylpropanoic acid (3:3 FTCA)	**97**		50	7.5	ng/L		03/14/23 18:32	04/06/23 18:37	1

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Client Sample Results

Client: Faeger Drinker Biddle E Reath LLP Job ID: 480-206422-1
Project/Site: Modern Landfill - PFAS

Client Sample ID: Final Effluent **Lab Sample ID: 480-206422-1**
Date Collected: 02/22/23 14:10 **Matrix: Water**
Date Received: 02/22/23 17:55

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3-Perfluoropentylpropanoic acid (5:3 FTCA)	140	J	250	50	ng/L		03/14/23 18:32	04/06/23 18:37	1
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ND		250	50	ng/L		03/14/23 18:32	04/06/23 18:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*82.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C5 PFHxA	*75.1*	*I*	*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C4 PFHpA	*65.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C8 PFOA	*97.6*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C9 PFNA	*98.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C6 PFDA	*96.7*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C7 PFUnA	*85.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C2-PFDoDA	*68.7*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C2 PFTeDA	*64.3*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C3 PFBS	*107*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C3 PFHxS	*98.6*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C8 PFOS	*101*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C8 FOSA	*101*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d3-NMeFOSAA	*78.7*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d5-NEtFOSAA	*96.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
M2-6:2 FTS	*80.0*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
M2-8:2 FTS	*125*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
13C3 HFPO-DA	*68.6*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d7-N-MeFOSE-M	*56.9*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d9-N-EtFOSE-M	*50.3*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d5-NEtPFOSA	*70.5*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*
d3-NMePFOSA	*74.4*		*20 - 150*	*03/14/23 18:32*	*04/06/23 18:37*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2700		400	100	ng/L		03/14/23 18:32	04/11/23 22:33	10
Perfluorohexanoic acid (PFHxA)	4000		100	25	ng/L		03/14/23 18:32	04/11/23 22:33	10
Perfluoroheptanoic acid (PFHpA)	780		100	26	ng/L		03/14/23 18:32	04/11/23 22:33	10
Perfluorobutanesulfonic acid (PFBS)	5100		100	15	ng/L		03/14/23 18:32	04/11/23 22:33	10
1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2)	ND		400	85	ng/L		03/14/23 18:32	04/11/23 22:33	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*17.7*	**5-*	*20 - 150*	*03/14/23 18:32*	*04/11/23 22:33*	*10*
13C5 PFHxA	*87.5*		*20 - 150*	*03/14/23 18:32*	*04/11/23 22:33*	*10*
13C4 PFHpA	*99.2*		*20 - 150*	*03/14/23 18:32*	*04/11/23 22:33*	*10*
13C3 PFBS	*120*		*20 - 150*	*03/14/23 18:32*	*04/11/23 22:33*	*10*
M2-4:2 FTS	*85.8*		*20 - 150*	*03/14/23 18:32*	*04/11/23 22:33*	*10*

I : Value is EMPC (estimated maximum possible concentration).
J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
MDL: Method Detection Limit
U : Indicates the analyte was analyzed for but not detected.

Sum of detected compounds: 18,781 ng/l

cyclopure

Water Test Kit Pro Results Report

To: Ted Evgeniadis

Date: July 28, 2022

This report is for 5 Test Kits, Nos. 1339- 1343, sampled with unfiltered water from Wrightsville and Hellam PA. You can view results below in raw data format. PFAS detects are highlighted in yellow. All values are in part per trillion (ppt) format. Our limit of quantification is 1 ppt for all PFAS.

WTK_ID	WTK_PFAS_1339	WTK_PFAS_1340	WTK_PFAS_1341
Name	Ted Evgeniadis	Ted Evgeniadis	Ted Evgeniadis
Sampling Location	Hellam, PA 17406 Emig Park	Hellam, PA 17406 Outfall	Hellam, PA 17406 Valley Acres Road
Filtered/Unfiltered	Unfiltered	Unfiltered	Unfiltered
Sampling Date	7/15/22	7/15/22	7/15/22
Order ID	5548	5548	5548
PFBA	10.2	157.3	19
PFPeA	10.3	186.5	18.3
PFHxA	26.2	872.4	50.6
PFHpA	9.4	359.1	18.7
PFOA	15.2	1062.7	35.4
PFNA	< 1 ng/L	36.3	1.1
PFDA	< 1 ng/L	38.6	1.4
HFPO-DA (GenX)	< 2 ng/L	< 2 ng/L	< 2 ng/L
PFBS	59.3	2426.3	115
PFHxS	24.1	1376.3	52.5
PFOS	5.9	316.7	10.9
Total PFAS (Primary 11)	160.6	6832.2	322.9
Additonal PFAS			
3:3 FTCA	< 1 ng/L	5.8	< 1 ng/L
5:3 FTCA	< 1 ng/L	16.9	< 1 ng/L
7:3 FTCA	< 1 ng/L	4.7	< 1 ng/L
4:2 FTS	< 1 ng/L	1.8	< 1 ng/L
6:2 FTS	1.5	303.1	5.2
8:2 FTS	< 1 ng/L	1.9	< 1 ng/L
FBSA	7.4	103.9	13.6
FHxSA	4.1	107.8	8.5
PFOSA	< 1 ng/L	4.8	< 1 ng/L
MeFBSA	< 1 ng/L	17.9	1.3
N-AP-FHxSA	< 1 ng/L	22.6	< 1 ng/L
PFPrS	2.5	66.3	4.5
PFPeS	5.6	268.3	11.1
PFHpS	< 1 ng/L	19.3	< 1 ng/L
PFECHS	< 1 ng/L	36.6	< 1 ng/L
PFEESA	< 1 ng/L	1.4	< 1 ng/L
FOSAA	< 1 ng/L	1.6	< 1 ng/L
N-EtFOSAA	< 1 ng/L	9.3	< 1 ng/L
Total PFAS (All Detected)	181.7	7826.2	367.1

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WTK_ID	WTK_PFAS_1342	WTK_PFAS_1343
Name	Ted Evgeniadis	Ted Evgeniadis
Sampling Location	Wrightsville, PA 17368 Quarry	Hellam, PA 17406 Riddle Road
Filtered/Unfiltered	Unfiltered	Unfiltered
Sampling Date	7/15/22	7/15/22
Order ID	5548	5548
PFBA	4.1	< 1 ng/L
PFPeA	6	< 1 ng/L
PFHxA	12.8	1.3
PFHpA	5	< 1 ng/L
PFOA	11	2.3
PFNA	< 1 ng/L	< 1 ng/L
PFDA	< 1 ng/L	< 1 ng/L
HFPO-DA (GenX)	< 2 ng/L	< 2 ng/L
PFBS	29.1	1.7
PFHxS	12.6	1.2
PFOS	4.7	1.8
Total PFAS (Primary 11)	85.3	8.3
Additonal PFAS		
3:3 FTCA	< 1 ng/L	< 1 ng/L
5:3 FTCA	< 1 ng/L	< 1 ng/L
7:3 FTCA	< 1 ng/L	< 1 ng/L
4:2 FTS	< 1 ng/L	< 1 ng/L
6:2 FTS	< 1 ng/L	< 1 ng/L
8:2 FTS	< 1 ng/L	< 1 ng/L
FBSA	6.3	< 1 ng/L
FHxSA	1.7	< 1 ng/L
PFOSA	< 1 ng/L	< 1 ng/L
MeFBSA	< 1 ng/L	< 1 ng/L
N-AP-FHxSA	< 1 ng/L	< 1 ng/L
PFPrS	1.2	< 1 ng/L
PFPeS	3.2	< 1 ng/L
PFHpS	< 1 ng/L	< 1 ng/L
PFECHS	< 1 ng/L	< 1 ng/L
PFEESA	< 1 ng/L	< 1 ng/L
FOSAA	< 1 ng/L	< 1 ng/L
N-EtFOSAA	< 1 ng/L	< 1 ng/L
Total PFAS (All Detected)	97.7	8.3

Pennsylvania PFAS Regulations.

EPA has set Health Advisory Levels for PFOA (0.004 ppt); PFOS (0.02); GenX (10 ppt) and PFBS (2,000 ppt). The PA Department of Environmental Protection (DEP) has recommended maximum contaminant limits of 14 ppt PFOA and 18 ppt PFOS.

Our Lab Method

When the WTK is received by the lab, Cyclopure analytical chemists perform standard solid-phase extraction (SPE) to recover PFAS compounds collected in the DEXSORB extraction disc. The eluted PFAS sample is subsequently analyzed on a HPLC-MS/MS.

Cyclopure analytical chemists use isotope dilution methods to measure a total of 55 PFAS on HPLC-HRMS/MS, including all PFAS listed under EPA Methods 533, 537 and 1633 draft.

Cyclopure Inc 8045 Lamon Ave, Suite 140 Skokie, IL 60077 Makers of Purefast Filters

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Appendix.

PFAS detected by Cyclopure analytical methods.

Compound	Abbreviation	CAS#	EPA 1633
Perfluorobutanoic Acid	PFBA	375-22-4	Y
Perfluoropentanoic Acid	PFPeA	2706-90-3	Y
Perfluorohexanoic Acid	PFHxA	307-24-4	Y
Perfluoroheptanoic Acid	PFHpA	375-85-9	Y
Perfluorooctanoic Acid	PFOA	335-67-1	Y
Perfluorononanoic Acid	PFNA	375-95-1	Y
Perfluorodecanoic Acid	PFDA	335-76-2	Y
Perfluoroundecanoic Acid	PFUnA	2058-94-8	Y
Perfluorododecanoic Acid	PFDoA	307-55-1	Y
Perfluorotridecanoic Acid	PFTrDA	72629-94-8	Y
Perfluorotetradecanoic Acid	PFTeA	376-06-7	Y
Perfluoropropane Sulfonic Acid	PFPrS	423-41-6	
Perfluorobutane Sulfonic Acid	PFBS	375-73-5	Y
Perfluoropentane Sulfonic Acid	PFPeS	2706-91-4	Y
Perfluorohexane Sulfonic Acid	PFHxS	355-46-4	Y
Perfluoroheptane Sulfonic Acid	PFHpS	375-92-8	Y
Perfluorooctane Sulfonic Acid	PFOS	1763-23-1	Y
Perfluorononane Sulfonic Acid	PFNS	474511-07-4	Y
Perfluorodecane Sulfonic Acid	PFDS	335-77-3	Y
Perfluorododecane Sulfonic Acid	PFDoS	79780-39-5	Y
4:2 Fluorotelomer Sulfonate	4:2 FTS	414911-30-1	Y
6:2 Fluorotelomer Sulfonate	6:2 FTS	425670-75-3	Y
8:2 Fluorotelomer Sulfonate	8:2 FTS	481071-78-7	Y
10:2 Fluorotelomer Sulfonate	10:2 FTS	120226-60-0	
Perfluorobutane Sulfonamide	FBSA	30334-69-1	
N-Methylperfluorobutanesulfonamide	MeFBSA	68298-12-4	
Perfluorohexane Sulfonamide	FHxSA	41997-13-1	
Perfluorooctane Sulfonamide	PFOSA	754-91-6	Y
Perfluorodecane Sulfonamide	FDSA	N/A	
N-Ethylperfluorooctane-1-Sulfonamide	NEtFOSA	4151-50-2	Y
N-Methylperfluorooctane-1-Sulfonamide	NMeFOSA	31506-32-8	Y
Perfluorooctane Sulfonamido Acetic Acid	FOSAA	2806-24-8	
N-Ethyl Perfluorooctane Sulfonamido Acetic Acid	NEtFOSAA	2991-50-6	Y
N-Methyl Perfluorooctane Sulfonamido Acetic Acid	NMeFOSAA	2355-31-9	Y
N-methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7	Y
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2	Y
Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	13252-13-6	Y
4,8-Dioxa-3H-Perfluorononanoate	ADONA	919005-14-4	Y
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1	Y
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5	Y
Perfluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6	Y
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1	Y
11-Chloroeicosafluoro-3-Oxanonane-1-Sulfonic Acid	11CL-PF3OUdS	763051-92-9	Y
Perfluoro(2-ethoxyethane) Sulfonic acid	PFEESA	113507-82-7	Y
Perfluoro-4-ethylcyclohexane Sulfonic Acid	PFECHS	646-83-3	
8-Chloroperfluoro-1-Octanesulfonic Acid	8Cl-PFOS	777011-38-8	
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5	Y
2h,2h,3h,3h-Perfluorooctanoic Acid	5:3FTCA	914637-49-3	Y
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	Y
2H-Perfluoro-2-dodecenoic acid	FDUEA	70887-94-4	
2H-perfluoro-2-decenoic acid	FOUEA	70887-84-2	
Bis(perfluorohexyl)phosphinic acid	6:6PFPi	40143-77-9	
(Heptadecafluorooctyl)(tridecafluorohexyl) Phosphinic Acid	6:8PFPi	610800-34-5	
Bis(perfluorooctyl)phosphinic acid	8:8PFPi	40143-79-1	
N-(3-dimethylaminopropan-1-yl) perfluoro-1-hexanesulfonamide	N-AP-FHxSA	50598-28-2	

StreamStats Output Report-Susq R at Kreutz Crk				
State/Region ID	PA			
Workspace ID	PA20221117183831398000			
Latitude	40.02198			
Longitude	-76.50832			
Time	11/17/2022	1:39:09 PM		
Basin Characteristics				
Parameter Code	Parameter Description	Value	Unit	
BSLOPD	Mean basin slope measured in degrees	8.1356	degrees	
CARBON	Percentage of area of carbonate rock	6.68	percent	
DRNAREA	Area that drains to a point on a stream	26000	square miles	
ELEV	Mean Basin Elevation	1328	feet	
FOREST	Percentage of area covered by forest	67.7623	percent	
GLACIATED	Percentage of basin area that was histo	45.3719	percent	
PRECIP	Mean Annual Precipitation	40	inches	
ROCKDEP	Depth to rock	4.5	feet	
STRDEN	Stream Density -- total length of strean	1.76	miles per square mile	
URBAN	Percentage of basin with urban develo	2.8921	percent	
Annual Flow Statistics F	99.8 Percent Statewide Mean and Base	Flow		
Statistic	Value	Unit		
Mean Annual Flow	38800	ft^3/s		
General Flow Statistics	99.8 Percent Statewide Mean and Base	Flow		
Statistic	Value	Unit		
Harmonic Mean Stream	13300	ft^3/s		
USGS Data Disclaimer: U	all data	metadata	no warranty expr	nor on all
USGS Software Disclain	the USGS reserves the right to update	expresse	is made by the U	the softw
USGS Product Names D	firm	or product names is for descriptive pu		
Application Version: 4.11.1				
StreamStats Services Version: 1.2.22				
NSS Services Version: 2.2.1				

StreamStats Output Report-SusqR at YorkWater PADWIS				
State/Region ID	PA			
Workspace ID	PA20221117185619839000			
Latitude	39.96416			
Longitude	-76.47347			
Time	11/17/2022	1:56:52 PM		
Basin Characteristics				
Parameter Code	Parameter Description	Value	Unit	
BSLOPD	Mean basin slope measured in degree	8.1315	degrees	
CARBON	Percentage of area of carbonate rock	6.74	percent	
DRNAREA	Area that drains to a point on a stream	26100	square miles	
URBAN	Percentage of basin with urban develc	2.8977	percent	
Low-Flow Statistics Flow Rep	47.1 Percent Low Flow Region 5			
Statistic	Value	Unit		
7 Day 2 Year Low Flow	3540	ft^3/s		
30 Day 2 Year Low Flow	4460	ft^3/s		
7 Day 10 Year Low Flow	2270	ft^3/s		
30 Day 10 Year Low Flow	2980	ft^3/s		
90 Day 10 Year Low Flow	3840	ft^3/s		
Low-Flow Statistics Flow Rep	Area-Averaged			
Statistic	Value	Unit		
7 Day 2 Year Low Flow	4740	ft^3/s		
30 Day 2 Year Low Flow	5710	ft^3/s		
7 Day 10 Year Low Flow	3360	ft^3/s		
30 Day 10 Year Low Flow	4070	ft^3/s		
90 Day 10 Year Low Flow	5080	ft^3/s		
Annual Flow Statistics Flow R	99.8 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit		
Mean Annual Flow	38900	ft^3/s		
General Flow Statistics Flow	99.8 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit		
Harmonic Mean Streamflow	13400	ft^3/s		
Application Version: 4.11.1				
StreamStats Services Version: 1.2.22				
NSS Services Version: 2.2.1				

StreamStats Output Report-Susq R at Red Lion PWS				
State/Region ID	PA			
Workspace ID	PA20221117191451408000			
Latitude	39.94321			
Longitude	-76.45343			
Time	11/17/2022	2:15:23 PM		
Basin Characteristics				
Parameter Code	Parameter Description	Value	Unit	
BSLOPD	Mean basin slope measured in degrees	8.1305	degrees	
CARBON	Percentage of area of carbonate rock	6.73	percent	
DRNAREA	Area that drains to a point on a stream	26100	square miles	
URBAN	Percentage of basin with urban develop	2.8988	percent	
Low-Flow Statistics Flow Re	47.1 Percent Low Flow Region 5			
Statistic	Value	Unit		
7 Day 2 Year Low Flow	3530	ft^3/s		
30 Day 2 Year Low Flow	4460	ft^3/s		
7 Day 10 Year Low Flow	2270	ft^3/s		
30 Day 10 Year Low Flow	2980	ft^3/s		
90 Day 10 Year Low Flow	3840	ft^3/s		
Low-Flow Statistics Flow Re	Area-Averaged			
Statistic	Value	Unit		
7 Day 2 Year Low Flow	4750	ft^3/s		
30 Day 2 Year Low Flow	5730	ft^3/s		
7 Day 10 Year Low Flow	3370	ft^3/s		
30 Day 10 Year Low Flow	4080	ft^3/s		
90 Day 10 Year Low Flow	5100	ft^3/s		
Annual Flow Statistics Flow	99.8 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit		
Mean Annual Flow	38900	ft^3/s		
General Flow Statistics Flow	99.8 Percent Statewide Mean and Base Flow			
Statistic	Value	Unit		
Harmonic Mean Streamflow	13400	ft^3/s		
Application Version: 4.11.1				
StreamStats Services Version: 1.2.22				
NSS Services Version: 2.2.1				

Simulation of model to obtain Partial Mix Factors…..

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

Modern LF, NPDES Permit No. PA0046680, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Susquehanna River**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	006685	27.4	195	26,000			Yes
End of Reach 1	006685	22.95	192	26,100		12	Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	27.4	0.13	3340		400							100	7		
End of Reach 1	22.95	0.13	3360		400										

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	27.4		13,300		400							100	7		
End of Reach 1	22.95		13,400		400										

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Modern LF** NPDES Permit No.: **PA0046680** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **leachate, etc**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.5	500	7.8						

				0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc	Trib Conc	Stream Conc	Daily CV	Hourly CV	Strea m CV	Fate Coeff	FOS	Criteri a Mod	Chem Transl

☑ ***CRL*** CCT (min): 720 PMF: 0.335 Analysis Hardness (mg/l): N/A Analysis pH: N/A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

December 5, 2022

MEMORANDUM

SUBJECT: Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs

FROM: Radhika Fox
Assistant Administrator

TO: EPA Regional Water Division Directors, Regions 1-10

The National Pollutant Discharge Elimination System (NPDES) program is an important tool established by the Clean Water Act (CWA) to help address water pollution by regulating point sources that discharge pollutants to waters of the United States. Collectively, the U.S. Environmental Protection Agency (EPA) and states issue thousands of permits annually, establishing important monitoring and pollution reduction requirements for Publicly Owned Treatment Works (POTWs), industrial facilities, and stormwater discharges nationwide. The NPDES program interfaces with many pathways by which per-and polyfluoroalkyl substances (PFAS) travel and are released into the environment, and ultimately impact water quality and the health of people and ecosystems. Consistent with the Agency's commitments in the October 2021 *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024 (PFAS Strategic Roadmap)*, EPA will work in cooperation with our state-authorized permitting authorities to leverage the NPDES program to restrict the discharge of PFAS at their sources. In addition to reducing PFAS discharges, this program will enable EPA and the states to obtain comprehensive information on the sources and quantities of PFAS discharges, which can be used to inform appropriate next steps to limit the discharges of PFAS.

This memorandum provides EPA's guidance to states and updates the April 28, 2022 guidance[1] to EPA Regions for addressing PFAS discharges when they are authorized to administer the NPDES permitting program and/or pretreatment program. These recommendations reflect the Agency's commitments in the PFAS Strategic Roadmap, which directs the Office of Water to leverage NPDES permits to reduce PFAS discharges to waterways "*at the source and obtain more comprehensive information through monitoring on the sources of PFAS and quantity of PFAS discharged by these sources.*" While the Office of Water works to revise Effluent Limitation Guidelines (ELGs) and develop water quality criteria to support technology-based and water quality-based effluent limits for PFAS in NPDES permits, this memorandum describes steps permit writers can implement under existing authorities to reduce the discharge of PFAS.

[1] Addressing PFAS Discharges in EPA-Issued NPDES Permits and Expectations Where EPA is the Pretreatment Control Authority, https://www.epa.gov/system/files/documents/2022-04/npdes_pfas-memo.pdf.

This memorandum also provides EPA's guidance for addressing sewage sludge PFAS contamination more rapidly than possible with monitoring based solely on NPDES permit renewals. States may choose to monitor the levels of PFAS in sewage sludge across POTWs and then consider mechanisms under pretreatment program authorities to prevent the introduction of PFAS to POTWs based on the monitoring results.

EPA recommends that the following array of NPDES and pretreatment provisions and monitoring programs be implemented by authorized states and POTWs, as appropriate, to the fullest extent available under state and local law. NPDES and pretreatment provisions may be included when issuing a permit or by modifying an existing permit pursuant to 40 CFR 122.62.

A. Recommendations for Applicable Industrial Direct Dischargers

1. **Applicability:** Industry categories known or suspected to discharge PFAS as identified on page 14 of the PFAS Strategic Roadmap include: organic chemicals, plastics & synthetic fibers (OCPSF); metal finishing; electroplating; electric and electronic components; landfills; pulp, paper & paperboard; leather tanning & finishing; plastics molding & forming; textile mills; paint formulating, and airports. This is not an exhaustive list and additional industries may also discharge PFAS. For example, Centralized Waste Treatment (CWT) facilities may receive wastes from the aforementioned industries and should be considered for monitoring. There may also be categories of dischargers that do not meet the applicability criteria of any existing ELG; for instance, remediation sites, chemical manufacturing not covered by OCPSF, and military bases.

   EPA notes that no permit may be issued to the owner or operator of a facility unless the owner or operator submits a complete permit application in accordance with applicable regulations, and applicants must provide any additional information that the permitting authority may reasonably require to assess the discharges of the facility (40 CFR 122.21(e), (g)(13)).[2] The applicant may be required to submit additional information under CWA Section 308 or under a similar provision of state law.

2. **Effluent-and wastewater residuals monitoring:** In the absence of a final 40 CFR Part 136 method, EPA recommends using CWA wastewater draft analytical method 1633 (*see* 40 CFR 122.21(e)(3)(ii) and 40 CFR 122.44(i)(1)(iv)(B)). EPA also recommends that monitoring include each of the 40 PFAS parameters detectable by draft method 1633 and be conducted at least quarterly to ensure that there are adequate data to assess the presence and concentration of PFAS in discharges. All PFAS monitoring data must be reported on Discharge Monitoring Reports (DMRs) (*see* 40 CFR 122.41(l)(4)(i)). The draft Adsorbable Organic Fluorine CWA wastewater method 1621 can be used in conjunction with draft method 1633, if appropriate. Certain industrial processes may generate PFAS-contaminated solid waste or air emissions not covered by NPDES permitting and permitting agencies should coordinate with appropriate state authorities on proper containment and disposal to avoid cross-media contamination. EPA's draft analytical method 1633 may be appropriate to assess the amount and types of PFAS for some of these wastestreams.[3]

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[2] For more, see NPDES Permit Writer's Manual Section 4.5.1.

[3] See https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research for a list of EPA-approved methods for other media.

3. **Best Management Practices (BMPs) for discharges of PFAS, including product substitution, reduction, or elimination of PFAS, as detected by draft method 1633:** Pursuant to 40 CFR 122.44(k)(4), EPA recommends that NPDES permits for facilities incorporate the following conditions when the practices are "reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA."[4]
   a. BMP conditions based on pollution prevention/source reduction opportunities, which may include:
      i. Product elimination or substitution when a reasonable alternative to using PFAS is available in the industrial process.
      ii. Accidental discharge minimization by optimizing operations and good housekeeping practices.
      iii. Equipment decontamination or replacement (such as in metal finishing facilities) where PFAS products have historically been used to prevent discharge of legacy PFAS following the implementation of product substitution.
   b. Example BMP permit special condition language:
      i. *PFAS pollution prevention/source reduction evaluation*: Within 6 months of the effective date of the permit, the facility shall provide an evaluation of whether the facility uses or has historically used any products containing PFAS, whether use of those products or legacy contamination reasonably can be reduced or eliminated, and a plan to implement those steps.
      ii. *Reduction or Elimination*: Within 12 months of the effective date of the permit, the facility shall implement the plan in accordance with the PFAS pollution prevention/source reduction evaluation.
      iii. *Annual Report*: An annual status report shall be developed which includes a list of potential PFAS sources, summary of actions taken to reduce or eliminate PFAS, any applicable source monitoring results, any applicable effluent results for the previous year, and any relevant adjustments to the plan, based on the findings.
      iv. *Reporting:* When EPA's electronic reporting tool for DMRs (called "NetDMR") allows for the permittee to submit the pollution prevention/source reduction evaluation and the annual report, the example permit language can read, "The pollution prevention/source reduction evaluation and annual report shall be submitted to EPA via EPA's electronic reporting tool for DMRs (called "NetDMR").

4. **BMPs to address PFAS-containing firefighting foams for stormwater permits:** Pursuant to 122.44(k)(2), where appropriate, EPA recommends that NPDES stormwater permits include BMPs to address Aqueous Film Forming Foam (AFFF) used for firefighting, such as the following:[5]
   a. Prohibiting the use of AFFFs other than for actual firefighting.
   b. Eliminating PFOS and PFOA -containing AFFFs.
   c. Requiring immediate clean-up in all situations where AFFFs have been used, including diversions and other measures that prevent discharges via storm sewer systems.

5. **Permit Limits:** As specified in 40 CFR 125.3, technology-based treatment requirements under CWA Section 301(b) represent the minimum level of control that must be imposed in NPDES permits. Site-specific technology-based effluent limits (TBELs) for PFAS discharges developed on a best professional judgment (BPJ) basis may be appropriate for facilities for which there are no applicable effluent guidelines (*see* 40 CFR 122.44(a), 125.3). Also, NPDES permits must include water quality-based effluent limits (WQBELs) as derived from state water quality standards, in

[4] For more on BMPs, see NPDES Permit Writer's Manual Section 9.1 and EPA Guidance Manual for Developing Best Management Practices.
[5] Naval Air Station Whidbey Island MS4 permit incorporates these provisions.

addition to TBELs developed on a BPJ basis, if necessary to achieve water quality standards, including state narrative criteria for water quality (CWA Section 301(b)(1)(C); 40 CFR 122.44(d)). If a state has established a numeric criterion or a numeric translation of an existing narrative water quality standard for PFAS parameters, the permit writer should apply that numeric criterion or narrative interpretation in permitting decisions, pursuant to 40 CFR 122.44(d)(1)(iii) and 122.44(d)(1)(vi)(A), respectively.

B. Recommendations for Publicly Owned Treatment Works

1. **Applicability:** All POTWs, including POTWs that do not receive industrial discharges, and industrial users (IUs) in the industrial categories above.

2. **Effluent, influent, and biosolids monitoring:** In the absence of a final 40 CFR Part 136 method, EPA recommends using CWA wastewater draft analytical method 1633 (*see* 40 CFR 122.21(e)(3)(ii) and 40 CFR 122.44(i)(1)(iv)(B)). EPA also recommends that monitoring include each of the 40 PFAS parameters detectable by draft method 1633 and be conducted at least quarterly to ensure that there are adequate data to assess the presence and concentration of PFAS in discharges. All PFAS monitoring data must be reported on DMRs (*see* 40 CFR 122.41(l)(4)(i)). The draft Adsorbable Organic Fluorine CWA wastewater method 1621 can be used in conjunction with draft method 1633, if appropriate.

3. Pretreatment program activities:

a. Update IU Inventory: Permits to POTWs should contain requirements to identify and locate all possible IUs that might be subject to the pretreatment program and identify the character and volume of pollutants contributed to the POTW by the IUs (*see* 40 CFR 403.8(f)(2)). As EPA regulations require, this information shall be provided to the pretreatment control authority (*see* 40 CFR 122.44(j) and 40 CFR 403.8(f)(6)) within one year. The IU inventory should be revised, as necessary, to include all IUs in industry categories expected or suspected of PFAS discharges listed above (*see* 40 CFR 403.12(i)).[6]

b. Utilize BMPs and pollution prevention to address PFAS discharges to POTWs. EPA recommends that POTWs:

i. Update IU permits/control mechanisms to require quarterly monitoring. These IUs should be input into the Integrated Compliance Information System (ICIS) with appropriate linkage to their respective receiving POTWs. POTWs and states may also use their available authorities to conduct quarterly monitoring of the IUs (*see* 40 CFR 403.8(f)(2), 403.10(e) and (f)(2)).

ii. Where authority exists, develop IU BMPs or local limits. 40 CFR 403.5(c)(4) authorizes POTWs to develop local limits in the form of BMPs. Such BMPs could be like those for industrial direct discharges described in A.3 above.

iii. In the absence of local limits and POTW legal authority to issue IU control mechanisms, state pretreatment coordinators are encouraged to work with the POTWs to encourage pollution prevention, product substitution, and good housekeeping practices to make meaningful reductions in PFAS introduced to POTWs.

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[6] ELG categories of **airport deicing, landfills, textile mills, and plastics molding and forming do not have categorical pretreatment standards**, and therefore small-volume indirect dischargers in those categories would not ordinarily be considered Significant Industrial Users (SIUs) and may not be captured on an existing IU inventory. IUs under the Paint Formulating category are only subject to Pretreatment Standards for New Sources (PSNS), and existing sources may need to be inventoried.

C. Recommended Biosolids Assessment

1. Where appropriate, states may work with their POTWs to reduce the amount of PFAS chemicals in biosolids, in addition to the NPDES recommendations in Section B above, following these general steps:[7]

a. EPA recommends using draft method 1633 to analyze biosolids at POTWs for the presence of 40 PFAS chemicals.[8]

b. Where monitoring and IU inventory per section B.2 and B.3.a above indicate the presence of PFAS in biosolids from industrial sources, EPA recommends actions in B.3.b to reduce PFAS discharges from IUs.

c. EPA recommends validating PFAS reductions with regular monitoring of biosolids. States may also use their available authorities to conduct quarterly monitoring of the POTWs (*see* 40 CFR 403.10(f)(2)).

D. Recommended Public Notice for Draft Permits with PFAS-Specific Conditions

1. In addition to the requirements for public notice described in 40 CFR 124.10, EPA recommends that NPDES permitting authorities provide notification to potentially affected downstream public water systems (PWS) of draft permits with PFAS-specific monitoring, BMPs, or other conditions:

a. Public notice of the draft permit would be provided to potentially affected PWS with intakes located downstream of the NPDES discharge.

b. NPDES permit writers are encouraged to collaborate with their drinking water program counterparts to determine on a site-specific basis which PWS to notify.

   i. EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS) tool may be helpful as a screening tool to identify potentially affected PWS to notify.

c. EPA will provide instructions on how to search for facility-specific discharge monitoring data in EPA's publicly available search tools.

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[7] EPA is currently evaluating the potential risk of PFOA and PFOS in biosolids and supporting studies and activities to evaluate the presence of PFOA and PFOS in biosolids. This recommendation is not meant to supersede the PFOA and PFOS risk assessment or supporting activities. The conclusions of the risk assessment and supporting studies may indicate that regulatory actions or more stringent requirements are necessary to protect human health and the environment.

[8] While water quality monitoring activities (including monitoring of PFAS associated with NPDES permit or pretreatment requirements) at POTWs are generally not eligible for Clean Water State Revolving Fund (CWSRF), monitoring for the specific purpose of project development (planning, design, and construction) is eligible. Monitoring in this capacity, and within a reasonable timeframe, can be integral to the identification of the best solutions (through an alternatives analysis) for addressing emerging contaminants and characterizing discharge and point of disposal (e.g., land application of biosolids). Though ideally the planning and monitoring for project development would result in a CWSRF-eligible capital project, in some instances, the planning could lead to outcomes other than capital projects to address the emerging contaminants.

NJ Fish Consumption Advisories for PFAS (2018)

	General Population			High Risk Population*		
	PFOA (ng/g; ppb)	PFNA (ng/g; ppb)	PFOS (ng/g; ppb)	PFOA (ng/g; ppb)	PFNA (ng/g; ppb)	PFOS (ng/g; ppb)
Unlimited	0.62	0.23	0.56	0.62	0.23	0.56
Once/Week	4.3	1.6	3.9	4.3	1.6	3.9
Once/Month	18.6	6.9	17	18.6	6.9	17
Once/3 months	57	21	51	N/A	N/A	N/A
Once/Year	226	84	204	N/A	N/A	N/A
Do Not Eat	>226	>84	>204	>18.6	>6.9	>17

** High risk – infants, children, pregnant & nursing women, women of childbearing age.*

- **Consumption Advisory Triggers** based on NJ Reference Doses for PFOS, PFOA, and PFNA.
  - *Assume 227 g (8 oz.) meal size, 70 kg body weight.*
- **Advisories for PFOS at all study sites.**
  - *Consumption frequency ranges from once per week to once per year.*
  - *For 1 – 3 species at each site.*

15

(from **NJDEP** Safe Drinking Water's presentation to PADEP PFAS Action Team Meeting, November 30, 2018)

(matches Table 8: DRAFT Preliminary Fish Consumption Advisory Triggers in report: Investigations of Levels of Perfluorinated Compounds in NJ Fish, Surface Water , and Sediment, NJDEP, Div. of Science, Research, and Environmental Health, SR15-010, June 18, 2018, updated April 9, 2019.)

Comparison with other U.S. studies of PFAS in fish

PFAS have been reported in fish and other wildlife in studies from many locations throughout the world. In general, PFOS is the PFAS found in fish most often and at the highest concentrations (Houde et al., 2011), although other PFAS have also been frequently reported.

(Source: Investigations of Levels of Perfluorinated Compounds in NJ Fish, Surface Water , and Sediment, NJDEP, Div. of Science, Research, and Environmental Health, SR15-010, page 39, June 18, 2018, updated April 9, 2019.)

17 ppb = 17,000 ppt; 226 ppb = 226,000 ppt

Michigan's Safe to Eat Fish Lists show which streams have elevated levels of PFAS but do not list the concentrations or thresholds for stream to be restricted for fishing.

_____

Source: Michigan Live, mlive.com, published March 6, 2023

The results feature more current data, but are otherwise similar to a recent nationwide study by the Environmental Working Group and Duke University which showed that PFAS chemicals are widely detectible in freshwater fish from across the U.S. and Great Lakes.

In **Michigan**, fish consumption advisories for PFOS generally start when tissue samples exceed 9-ppb. A blanket "Do Not Eat" advisory happens when tissue samples hit 300-ppb.

[9 ppb = 9000 ppt; 300 ppb = 300,000 ppt]

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Source: wwww.theguardian.com/environment/2023/feb/24/pfas-michigan-rivers-fish-study

While no state or federal limits on the amount of PFAS in fish or other food exist, **Michigan**'s health department issues "do not eat" advisories for fish fillets with levels over 300,000 ppt of PFOS, just one kind of PFAS compound.

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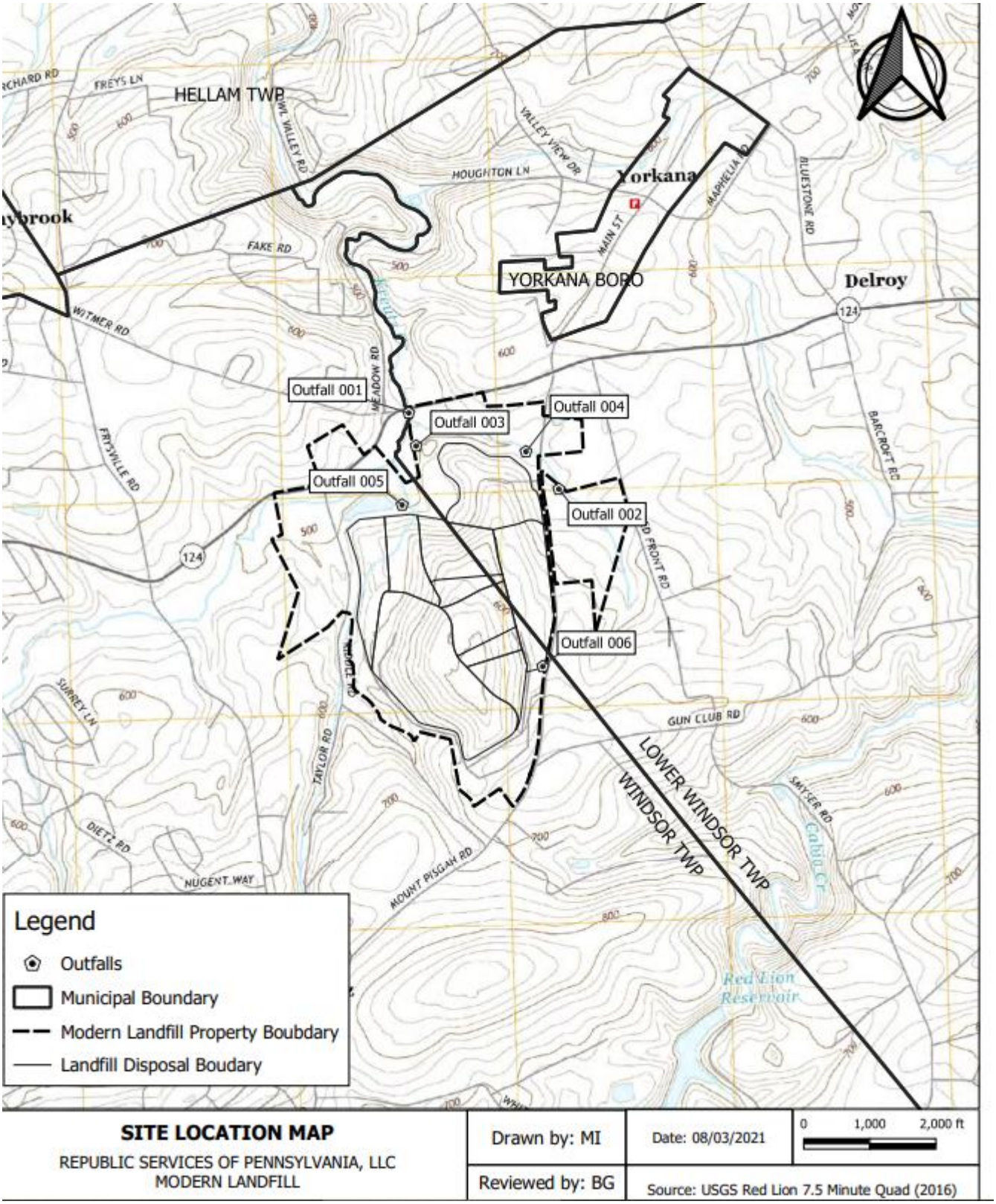
Source: www.michigan.gov/pfasresponse/faq:

- **Can I bathe or swim in water containing PFAS?**
  PFAS chemicals do not easily absorb into the skin. It is safe to bathe, as well as do your laundry and household cleaning. It is also safe to swim in and use water recreationally. Getting water with PFAS on your skin will not harm you.


HELLAM TWP
YORKANA BORO
Yorkana
Delroy
Outfall 001
Outfall 002
Outfall 003
Outfall 004
Outfall 005
Outfall 006
LOWER WINDSOR TWP
WINDSOR TWP
Red Lion Reservoir
Legend
Outfalls
Municipal Boundary
Modern Landfill Property Boubdary
Landfill Disposal Boudary
SITE LOCATION MAP
REPUBLIC SERVICES OF PENNSYLVANIA, LLC
MODERN LANDFILL
Drawn by: MI
Date: 08/03/2021
Reviewed by: BG
Source: USGS Red Lion 7.5 Minute Quad (2016)
0 1,000 2,000 ft

PERMIT	MONITORIN	MONITORING_	OUTFALL	PARAMET	LOAD_UN	CONC_UN	CONC_3_\	CONC_3	CONC_3_S	SAMPLE_F	SAMPLE_T
PA0046680	1/1/2020	12/31/2020	2	Ammonia-Nitrogen		mg/L	< 0.10	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Ammonia-Nitrogen		mg/L	0.15	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Ammonia-Nitrogen		mg/L	0.26	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Antimony, Total		mg/L	0.00064	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Antimony, Total		mg/L	0.0019	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Antimony, Total		mg/L	0.001	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Biochemical Oxygen		mg/L	< 2.0	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Biochemical Oxygen		mg/L	5.8	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Biochemical Oxygen		mg/L	10	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Boron, Total		mg/L	0.028	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Boron, Total		mg/L	0.076	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Boron, Total		mg/L	0.13	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Chromium, Hexavale		mg/L	< 0.005	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Chromium, Hexavale		mg/L	< 0.005	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Chromium, Hexavale		mg/L	0.0163	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Copper, Total		mg/L	0.0021	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Copper, Total		mg/L	0.013	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Copper, Total		mg/L	0.039	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Iron, Total		mg/L	0.61	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Iron, Total		mg/L	7.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Iron, Total		mg/L	38.1	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Lead, Total		mg/L	0.00078	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Lead, Total		mg/L	0.0107	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Lead, Total		mg/L	0.0247	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Magnesium, Total		mg/L	2.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Magnesium, Total		mg/L	3.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Magnesium, Total		mg/L	7.8	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Nickel, Total		mg/L	< 0.010	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Nickel, Total		mg/L	0.0021	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Nickel, Total		mg/L	0.027	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	pH		S.U.	7.6	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	pH		S.U.	7.6	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	pH		S.U.	7.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Total Dissolved Solic		mg/L	91	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Total Dissolved Solic		mg/L	106	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Total Dissolved Solic		mg/L	140	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Total Nitrogen		mg/L	0.94	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Total Nitrogen		mg/L	3.3	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Total Nitrogen		mg/L	4.1	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Total Suspended Sol		mg/L	< 4.0	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Total Suspended Sol		mg/L	79.2	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Total Suspended Sol		mg/L	214	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	2	Zinc, Total		mg/L	0.041	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	2	Zinc, Total		mg/L	0.16	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	2	Zinc, Total		mg/L	3.7	Monitor	Daily Max	2/year	Grab

PERMIT	MONITORIN(	MONITORING_	OUTFALL	PARAMET	LOAD_UNITS	CONC_UNIT:	CONC_3_VALUE	3_LIMIT	CONC_3_S	SAMPLE_F	SAMPLE_TYPE
PA0046680	1/1/2020	12/31/2020	5	Ammonia-Nitrogen		mg/L	38.5	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Ammonia-Nitrogen		mg/L	38.5	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Ammonia-Nitrogen		mg/L	9.6	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Antimony, Total		mg/L	0.0037	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Antimony, Total		mg/L	0.0039	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Antimony, Total		mg/L	0.0038	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Biochemical Oxygen De		mg/L	6.8	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Biochemical Oxygen De		mg/L	6.8	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Biochemical Oxygen De		mg/L	10.2	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Boron, Total		mg/L	1.7	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Boron, Total		mg/L	1.7	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Boron, Total		mg/L	1	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Chromium, Hexavalent		mg/L	< 5.0	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Chromium, Hexavalent		mg/L	< 0.005	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Chromium, Hexavalent		mg/L	0.0085	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Copper, Total		mg/L	0.034	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Copper, Total		mg/L	0.039	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Copper, Total		mg/L	0.027	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Iron, Total		mg/L	5.2	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Iron, Total		mg/L	17	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Iron, Total		mg/L	8.3	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Lead, Total		mg/L	0.0145	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Lead, Total		mg/L	0.0221	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Lead, Total		mg/L	0.0157	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Magnesium, Total		mg/L	26.9	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Magnesium, Total		mg/L	26.9	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Magnesium, Total		mg/L	14.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Nickel, Total		mg/L	0.028	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Nickel, Total		mg/L	0.028	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Nickel, Total		mg/L	0.018	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	pH		S.U.	7.9	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	pH		S.U.	7.9	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	pH		S.U.	7.8	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Total Dissolved Solids		mg/L	806	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Total Dissolved Solids		mg/L	843	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Total Dissolved Solids		mg/L	722	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Total Nitrogen		mg/L	24.5	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Total Nitrogen		mg/L	24.5	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Total Nitrogen		mg/L	14.4	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Total Suspended Solids		mg/L	69.6	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Total Suspended Solids		mg/L	218	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Total Suspended Solids		mg/L	102	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2020	12/31/2020	5	Zinc, Total		mg/L	0.069	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2021	12/31/2021	5	Zinc, Total		mg/L	0.11	Monitor	Daily Max	2/year	Grab
PA0046680	1/1/2022	12/31/2022	5	Zinc, Total		mg/L	0.073	Monitor	Daily Max	2/year	Grab

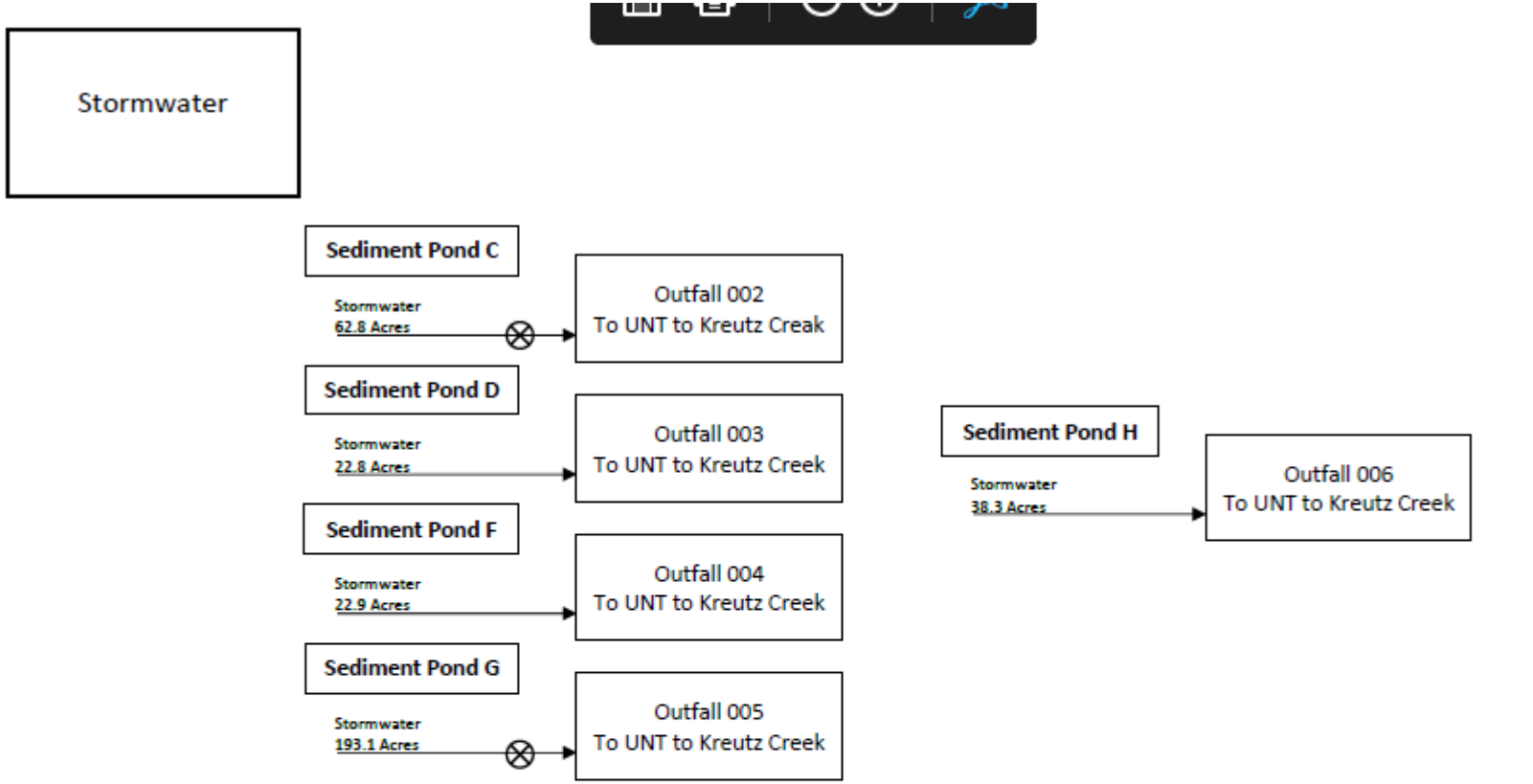


FIGURE 2. SCHEMATIC OF WATER FLOW, OUTFALLS 002 THROUGH 006
MODERN LANDFILL
WINDSOR TOWNSHIP AND LOWER WINDSOR
YORK COUNTY, PENNSYLVANIA