Pennsylvania Department of Environmental Protection

Southwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0026981**
Facility Type	**Non-Municipal**	APS ID	**956101**
Major / Minor	**Major**	Authorization ID	**1208327**

Applicant and Facility Information

Applicant Name	**Pennsylvania American Water Company**	Facility Name	**City of Duquesne Wastewater Treatment Plant (WWTP)**
Applicant Address	852 Wesley Drive	Facility Address	N Duquesne Boulevard
	Mechanicsburg, PA 17055		Duquesne, PA 15110
Applicant Contact	Jim Runzer	Facility Contact	Charles Schultz
Applicant Phone	717.550.1540	Facility Phone	724.493.1181
Client ID	87712	Site ID	262922
Ch 94 Load Status	Not Overloaded	Municipality	Duquesne City
Connection Status	**No Restrictions**	County	Allegheny
Date Application Received	October 24, 2017	EPA Waived?	No
Date Application Accepted		If No, Reason	Major Facility

Purpose of Application: Application for a renewal and transfer of an NPDES permit for discharge of treated Sewage.

Summary of Review

The permittee has applied for the renewal and transfer of NPDES Permit No. PA0026981. A renewal application, dated October 29, 2008, was submitted to the Department in the name of the City of Duquesne Sanitary Authority. Transfer Applications were then submitted to the Department, dated October 27, 2011 & October 23, 2017, transferring ownership of the combined sewer system (CSS) & WWTP to the Municipal Authority of the City of McKeesport (MACM), and later to Pennsylvania American Water Company (PAWC).

NPDES Permit No. PA0026981 was previously issued by the Department on September 05, 2003. That permit expired on September 5, 2008. The previous permit was issued following the requirements of a Municipal owned POTW, and the renewal permit will be issued following the requirements of a Non-Municipal owned Sewage Treatment Works.

PAWC has entered into a Consent Order and Agreement (COA) with the Department on December 13, 2017 (covering facilities previously owned by MACM). The COA covers the transfer of all NPDES and WQM Permits, addresses O&M of the CSS & WWTP, continued implementation of Nine Minimum Controls (NMC), submission of a revised Long Term Control Plan (LTCP), submission of an Act 537 Plan Update, submission of WQM Permits, construction of WWTP & CSO structure improvement projects, and submittal of a Post Construction Compliance Monitoring Plan (PCCMP) for Department Approval.

Outfalls 002, 003, 005 & IMP 201 are again permitted to serve as Combined Sewer Overflows (CSO). Please note that Outfall 004, Overland Avenue has been renamed IMP 201, as it combines with flow from WWTP prior to discharge through Outfall 001.

Approve	Deny	Signatures	Date
X		William C. Mitchell, E.I.T. / Project Manager	February 7, 2025
X		Mahbuba Jasmin, Ph.D., P.E. / Environmental Engineering Manager	February 7, 2025

Summary of Review

Part C.II, Combined Sewer Overflows, has been incorporated into the permit, and the permittee shall implement the LTCP in accordance with the implementation schedule taken from the Department's LTCP Approval Letter, dated January 28, 2025, which was based upon the revised LTCP Report (dated August 16, 2022).

In summary, the LTCP proposes to:

- Comply with EPA CSO Policy's Presumption Approach criteria to meet receiving Water Quality Standards (WQS) by capturing no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a system-wide average annual basis.

In addition to the LTCP approach, these requirements are established for LTCP approval:

- PAWC shall submit a PCCMP for Department approval. The PCCMP should be sufficient to demonstrate to the Department that the selected LTCP approach meets the Presumption Approach narrative and capture criteria in addition to meeting receiving WQS in accordance with EPA CSO Policy.

The CSO Control Measures of the LTCP are based upon implementation of Alternative 5:

- City of Duquesne WWTP stress test
- Year-long continuous flow monitoring and additional modeling
- CSO Structure Upgrades
- Interceptor optimization for additional storage
- Construction of additional alternatives if needed

Part C.II also requires the permittee to continue implementation of the NMCs and demonstrate system-wide compliance with the NMCs. Site specific O&M obligations were taken from the NMC Plan Update (submitted December 5, 2017, and updated on April 8, 2021). A Department NMC inspection will occur after permit issuance to ensure continued compliance.

WWTP effluent sampling shall be taken at an Internal Monitoring Point (IMP) 101, which is located at the discharge pipe of the chlorine contact tank prior to combining with the flow from the CSO diversion chamber. CSO monitoring shall be taken at IMP 201, which is located at the diversion chamber of the CSO prior to combining with the effluent from the WWTP.

IMP 101 & IMP 201 are authorized to discharge from Outfall 001 to the Thompson Run, which is classified as a WWF, located in State Watershed No. 19-C.

Effluent limits for IMP 101 are based on discharge modeling at the point of first use: the Monongahela River (WWF). Outfall 001 discharges to Thompson Run 49 ft. from where the stream is culverted (running under the former US Steel Duquesne Works) to the Monongahela River (WWF), Stream Code 37185, River Mile Index 12.26.

Application data indicates that there are no industrial/commercial users in the City of Duquesne collection system.

Storm Water Outfall 010 is again permitted for the discharge of un-contaminated storm water runoff from areas in and around the treatment plant. This outfall is subject to the Departments current requirements applicable to stormwater outfalls, Part C.V. Please note that Outfall 010 was previously named Outfall SW-1.

Changes since last permit draft include:

- Technology-Based TRC Limit (0.5 mg/L) imposed per 25 Pa. Code § 92a.48(b)(2).
- Monthly E. Coli monitoring
- Annual PFOA, PFOS, PFBS, and HFPO-DA Monitoring
- Revised Part C.II, Combined Sewer Overflow, language
- Revised Part C.IV, Whole Effluent Toxicity, language consistent with 40 CFR 122.21(j)(5)(iv)

Please note that revision made to Part C.II and Part C.IV should address EPA's comments on the previous draft permit that was issued on January 18, 2018.

Sludge use and disposal description and location(s): The Applicant indicates that liquid sludge from this facility is hauled to the McKeesport WPCP (NPDES Permit No. PA0026913) for dewatering. Dewatered sludge from McKeesport WWPCP is then hauled to the Westmoreland Waste Site (Permit No. 100277) for landfill. Application data indicates that this facility does not accept hauled in waste.

Summary of Review

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 decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a 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.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001 - discharge point for IMP 101* and IMP 201	Design Flow (MGD)	2.0
Latitude	40º 22' 45.00"	Longitude	-79º 51' 2.00"
Quad Name	Braddock	Quad Code	1507
Wastewater Description:	Sewage Effluent & Combined Sewer Overflow		

Receiving Waters	Thompson Run	Stream Code	37449
NHD Com ID	134839893	RMI	0.30
Drainage Area	5.32	Yield (cfs/mi^2)	0.0114
Q_{7-10} Flow (cfs)	0.0607	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	734	Slope (ft/ft)	
Watershed No.	19-A	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	METALS		
Source(s) of Impairment	ACID MINE DRAINAGE		
TMDL Status	Final	Name	Thompson Run

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake	Pennsylvania American Water Company – Pittsburgh		
PWS Waters	Monongahela River	Flow at Intake (cfs)	1,230
PWS RMI	4.6	Distance from Outfall (mi)	7.96

Other Comments:

*Effluent limits for IMP 101 are based on discharge modeling at the point of first use: the Monongahela River (WWF). Outfall 001 discharges to Thompson Run 49 ft. from where the stream is culverted (running under the former US Steel Duquesne Works) to the Monongahela River (WWF), Stream Code 37185, River Mile Index 12.26.

The discharge is to Thompson Run, which has a Final TMDL and is impaired by metals. This sewage discharge is not expected to contribute to stream impairment for which abandoned mine drainage is source of such impairment. No WLAs have been developed for this sewage discharge and they are not expected to contribute to the stream impairment for these pollutants. Application data states that maximum concentration values for total aluminum, total iron, and total manganese are 0.073 mg/L, 0.163 mg/L, and 0.0675 mg/L, which are below the criteria-based concentration values. No additional monitoring requirements for these pollutants will be placed on this facility at this time, and these pollutants will be re-evaluated during the next permit renewal cycle.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	Point of First Use for Outfall 001	Design Flow (MGD)	2.0
Latitude	40º 22' 53.40"	Longitude	-79º 50' 41.79"
Quad Name	Braddock	Quad Code	1507
Wastewater Description:	Sewage Effluent		
Receiving Waters	Monongahela River	Stream Code	37185
NHD Com ID	99408094	RMI	12.26
Drainage Area	7180	Yield (cfs/mi^2)	0.147
Q_{7-10} Flow (cfs)	1060	Q_{7-10} Basis	US Army Corp of Engineers & USGS StreamStats
Elevation (ft)	712	Slope (ft/ft)	0.00076
Watershed No.	19-A	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	PCB		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final	Name	Monongahela River TMDL

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake	Pennsylvania-American Water Company - Pittsburgh		
PWS Waters	Monongahela River	Flow at Intake (cfs)	1,230
PWS RMI	4.6	Distance from Outfall (mi)	7.66

Other Comments:

The STP discharges indirectly to the Monongahela River which has an EPA Approved TMDL and is impaired by PCBs and Chlordane. No WLAs have been developed for this sewage discharge as neither PCB nor Chlordane is typically found in sewage, but instead found in legacy sediments. No additional monitoring requirements for these pollutants will be placed on this facility at this time.

Treatment Facility Summary

Treatment Facility Name: Duquesne STP

WQM Permit No.	Issuance Date
462S022	06/26/1962
462S022 A-1	08/2000

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Activated Sludge Facility Consisting of Trash Rack, Parshall Flume, Comminutor/Bypass Bar Screen Chamber, Grit Removal, 4 Aeration Tanks, 2 Clarifiers, and Chlorine Contact Tank	Tablet Chlorination	

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
2.0	2,780	Not Overloaded		

Changes Since Last Permit Issuance: N/A

Other Comments: N/A

Compliance History

Operations Compliance Check Summary Report

Facility: Duquesne STP

NPDES Permit No.: PA0026981

Compliance Review Period: 1/1/20-1/30/25

Inspection Summary:

INSPECTED DATE	INSP TYPE	AGENCY	INSPECTION RESULT DESC
06/12/2024	Compliance Evaluation	County Health Dept	Violation(s) Noted
04/20/2023	Compliance Evaluation	County Health Dept	Violation(s) Noted
06/22/2022	Combined Sewer Overflow-Non-Sampling	County Health Dept	No Violations Noted
04/25/2022	Compliance Evaluation	County Health Dept	Violation(s) Noted
04/07/2021	Compliance Evaluation	County Health Dept	Violation(s) Noted

Violation Summary:

VIOLATION DATE	VIOLATION TYPE	VIOLATION TYPE DESC	RESOLVED DATE	VIOLATION COMMENT
06/12/2024	92A.44	NPDES - Violation of effluent limits in Part A of permit	12/04/2024	9/23 Fecal Coliform IMAX
06/12/2024	FLOW DEVICE	NPDES - 92A.61(D)ND Failure to monitor flow as required by the NPDES permit- No Flow Measurement Device	12/04/2024	facilty does not have an effluent flow meter
06/12/2024	92A.41(A)10B	NPDES - Failure to utilize approved analytical methods	12/04/2024	treatment plant does not take flow proportional effluent samples
06/12/2024	92A.41(A)5	NPDES - Failure to properly operate and maintain all facilities which are installed or used by the permittee to achieve compliance	12/04/2024	

04/20/2023	92A.41(A)5	NPDES - Failure to properly operate and maintain all facilities which are installed or used by the permittee to achieve compliance	08/18/2023	
04/20/2023	92A.41(A)10B	NPDES - Failure to utilize approved analytical methods	08/18/2023	
04/25/2022	92A.41(A)5	NPDES - Failure to properly operate and maintain all facilities which are installed or used by the permittee to achieve compliance	05/27/2022	
04/25/2022	92A.41(A)10B	NPDES - Failure to utilize approved analytical methods	05/27/2022	
04/07/2021	92A.44	NPDES - Violation of effluent limits in Part A of permit	05/06/2021	
04/07/2021	92A.41(A)5	NPDES - Failure to properly operate and maintain all facilities which are installed or used by the permittee to achieve compliance	05/06/2021	
04/07/2021	92A.41(A)10B	NPDES - Failure to utilize approved analytical methods	05/06/2021	

Open Violations by Client ID:

FACILITY	INSP PROGRAM	PROGRAM SPECIFIC ID	INSP ID	VIOLATION ID	VIOLATION DATE	VIOLATION CODE	VIOLATION	INSP REGION
PA AMER WATER CO/SCRANTON	Air Quality	25-1008096-5	3850104	8204416	10/10/2024	127.444	Construction, Modification, Reactivation and Operation of Sources, Operating Permit Requirements, Compliance requirements. A person may not cause or permit the operation of a source subject to this article unless the source and air cleaning devices identified in the application for the plan approval and operating permit and the plan approval issued to the source are operated and maintained in accordance with specifications in the application and conditions in the plan approval and operating permit issued by the Department. A person may not cause or permit the operation of an air contamination source subject to this chapter in a manner inconsistent with good operating practices.	NERO
COATESVILLE WWTP	Storage Tanks	15-35902	3899999	8213605	11/20/2024	245.612(D)	Failure to meet aboveground storage tank secondary and/or emergency containment requirements	SERO
PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3830416	8201850	08/21/2024	92A.44	NPDES - Violation of effluent limits in Part A of permit	NERO
PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3830416	8201851	08/21/2024	92A.61(C)	NPDES - Failure to monitor pollutants as required by the NPDES permit	NERO

PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3830416	8201852	08/21/2024	92A.47(C)	NPDES - Illegal discharge to waters of the Commonwealth from a sanitary sewer overflow (SSO)	NERO
PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3831748	8201290	08/21/2024	92A.44	NPDES - Violation of effluent limits in Part A of permit	NERO
PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3831748	8201291	08/21/2024	92A.61(C)	NPDES - Failure to monitor pollutants as required by the NPDES permit	NERO
PA AMERICAN WATER COMPANY SCRANTON WWTP	WPC NPDES	PA0026492	3831748	8201292	08/21/2024	92A.47(C)	NPDES - Illegal discharge to waters of the Commonwealth from a sanitary sewer overflow (SSO)	NERO
EXETER TWP STP	WPC NPDES	PA0026972	3848782	8204100	07/23/2024	CSL201	CSL - Unauthorized, unpermitted discharge of sewage to waters of the Commonwealth	SCRO
UPPER POTTSGROVE SEWERS TO POTTSTOWN BORO STP	WPC State Water Pollution Control	WQG02460510	3605646	8156718	08/21/2023	92A.47(C)	NPDES - Illegal discharge to waters of the Commonwealth from a sanitary sewer overflow (SSO)	SERO

Enforcement Summary:

ENF TYPE	ENF TYPE DESC	EXECUTED DATE	VIOLATIONS	ENF FINALSTATUS	ENF CLOSED DATE
NOV	Notice of Violation	05/27/2022	92A.41(A)10B; 92A.41(A)5	Comply/Closed	05/27/2022
NOV	Notice of Violation	05/06/2021	92A.41(A)10B; 92A.41(A)5; 92A.44	Administrative Close Out	09/07/2023

Unauthorized Discharges

MON_PD	Discharge Comment
Oct-22	Broken Terracotta pipe and grit washed down the line causing a blockage at the regulator of the CSO. The Operator that found the blockage was able to clean out the debris and end the overflow.

Effluent Violation Summary:

MON PD	PARAMETER	REPORTED VALUE	PERMIT LIMIT	UNIT	STAT_BASE_CODE
Aug-20	Carbonaceous Biochemical Oxygen Demand (CBOD5)	29.9	25.0	mg/L	Average Monthly
Jul-20	Carbonaceous Biochemical Oxygen Demand (CBOD5)	29.4	25.0	mg/L	Average Monthly
Jul-20	Fecal Coliform	1838	200	CFU/100 ml	Geometric Mean
Jul-20	Total Suspended Solids	35.0	30.0	mg/L	Average Monthly
Jul-20	Total Suspended Solids	48.0	45.0	mg/L	Weekly Average
Mar-20	Total Suspended Solids	156.0	45.0	mg/L	Weekly Average
Mar-20	Total Suspended Solids	55.0	30.0	mg/L	Average Monthly

Compliance Status: Facility is inspected yearly by Allegheny County Health Department and violations have been noted accordingly. There are no pending enforcement actions at this time. PA American Water has open violations with Air Quality, Storage Tanks and Clean Water Programs in Northeast, Southeast & South Central Regions, but there no open violations with any program in Southwest Region.

Completed by: Amanda Illar **Completed date:** 2/4/25

Other Comments:

PAWC has entered into a Consent Order and Agreement (COA) with the Department on December 13, 2017 (covering facilities previously owned by MACM). The COA covers the transfer of all NPDES and WQM Permits, addresses O&M of the combined sewer system (CSS) & WWTP, continued implementation of Nine Minimum Controls (NMC), submission of a revised Long Term Control Plan (LTCP), submission of an Act 537 Plan Update, submission of WQM Permits, construction of WWTP & CSO structure improvement projects, and submittal of a Post Construction Compliance Monitoring Plan (PCCMP) for Department Approval.

Development of Effluent Limitations

Outfall No.	001 (IMP 101) – POFU Monongahela River	**Design Flow (MGD)**	2.0
Latitude	40º 22' 45.00"	**Longitude**	-79º 51' 2.00"

Wastewater Description: Sewage Effluent, Untreated Combined Sewer Overflow

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Comments: The discharge was evaluated using WQM 7.0 Version 1.1 (Attachment 2) & TRC_CALC (Attachment 4) to evaluate $CBOD_5$, Ammonia Nitrogen, Dissolved Oxygen, and TRC. The modeling results show the above technology based effluent limitations are appropriate.

For existing discharges, if WQM modeling results for summer indicates that an average monthly limit of 25 mg/L (ammonia-nitrogen) is acceptable, the application manager will generally establish a year-round monitoring requirement for ammonia-nitrogen (Section I.A, Note 5, SOP No. BCW-PMT-033, Establishing Effluent Limitations for Individual Sewage Permits).

Water Quality-Based Limitations

Comments: Based upon module output files (WQM 7.0, TMS, and TRC_CALC), no WQBELs will be established at this time for this facility (Attachments 2, 3, & 4).

Best Professional Judgment (BPJ) Limitations

Comments: A minimum Dissolved Oxygen (DO) limit of 4.0 mg/L will be established based on BPJ to ensure adequate operation and maintenance (Section I.A, Note 6, SOP No. BCW-PMT-033, Establishing Effluent Limitations for Individual Sewage Permits).

Anti-Backsliding

Section 402(o) of the Clean Water Act (CWA), enacted in the Water Quality Act of 1987, establishes anti-backsliding rules governing two situations. The first situation occurs when a permittee seeks to revise a Technology-Based effluent limitation based on BPJ to reflect a subsequently promulgated effluent guideline which is less stringent. The second situation addressed by Section 402(o) arises when a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard of water quality standard.

Previous limits can be used pursuant to EPA's anti-backsliding regulation 40 CFR 122.44 (l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued. Interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit

(unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62). (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.

The facility is not seeking to revise the previously permitted effluent limits.

Per- and Polyfluoroalkyl Substances (PFAS)

In February 2024, DEP implemented a new monitoring initiative for PFAS consistent with an EPA memorandum that provides guidance to states for addressing PFAS discharges. PFAS are a family of thousands of synthetic organic chemicals that contain a chain of strong carbon-fluorine bonds. Many PFAS are highly stable, water- and oil-resistant, and exhibit other properties that make them useful in a variety of consumer products and industrial processes. PFAS are resistant to biodegradation, photooxidation, direct photolysis, and hydrolysis and do not readily degrade naturally; thus, many PFAS accumulate over time. According to the United States Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), the environmental persistence and mobility of some PFAS, combined with decades of widespread use, have resulted in their presence in surface water, groundwater, drinking water, rainwater, soil, sediment, ice caps, outdoor and indoor air, plants, animal tissue, and human blood serum across the globe. ATSDR also reported that exposure to certain PFAS can lead to adverse human health impacts Due to their durability, toxicity, persistence, and pervasiveness, PFAS have emerged as potentially significant pollutants of concern.

In accordance with Section II.G of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Sewage Permits" [SOP No. BCW-PMT-033] and under the authority of 25 Pa. Code § 92a.61(b), DEP has determined that monitoring for a subset of common/well-studied PFAS including Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorobutanesulfonic acid (PFBS), and Hexafluoropropylene oxide dimer acid (HFPO-DA) is necessary to help understand the extent of environmental contamination by PFAS in the Commonwealth and the extent to which point source dischargers are contributors. SOP BCW-PMT-033 directs permit writers to consider special monitoring requirements for PFOA, PFOS, PFBS, and HFPO-DA in the following instances:

a. If sampling that is completed as part of the permit renewal application reveals a detection of PFOA, PFOS, HFPO-DA or PFBS (any of these compounds), the application manager will establish a quarterly monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds) in the permit.

b. If sampling that is completed as part of the permit renewal application demonstrates non-detect values at or below the Target QLs for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds in a minimum of 3 samples), the application manager will establish an annual monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS in the permit.

c. In all cases the application manager will include a condition in the permit that the permittee may cease monitoring for PFOA, PFOS, HFPO-DA and PFBS when the permittee reports non-detect values at or below the Target QL for four consecutive monitoring periods for each PFAS parameter that is analyzed. Use the following language: The permittee may discontinue monitoring for PFOA, PFOS, HFPO-DA, and PFBS if the results in 4 consecutive monitoring periods indicate non-detects at or below Quantitation Limits of 4.0 ng/L for PFOA, 3.7 ng/L for PFOS, 3.5 ng/L for PFBS and 6.4 ng/L for HFPO-DA. When monitoring is discontinued, permittees should enter a No Discharge Indicator (NODI) Code of "GG" on DMRs.

The Authority's application was submitted before the NPDES permit application forms were updated to require sampling for PFOA, PFOS, PFBS, and HFPO-DA. Therefore, annual reporting of PFOA, PFOS, PFBS, and HFPO-DA will be established consistent with Section II.G of SOP BCW-PMT-033 and under the authority of 25 Pa. Code § 92a.61(b).

As stated in Section II.G.3 of SOP BCW-PMT-0332, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (i.e., four consecutive annual results), then the monitoring may be discontinued. Footnote (3) has been added to Part A of the NPDES Permit, which further discusses monitoring and reporting requirements.

Additional Considerations

Monitoring frequency for the proposed effluent limits are based upon Table 6-3, Self-Monitoring Requirements for Sewage Dischargers, from the Departments Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits (Document No. 386-0400-001).

Mass loading limits will be established for $CBOD_5$, TSS, NH_3-N, and where necessary Total P and Total N. In general, average monthly mass loading limits will be established for $CBOD_5$, TSS, NH_3-N, and where necessary Total P and Total N, and average weekly mass loading limits will be established for $CBOD_5$ and TSS (Section IV, SOP No. BCW-PMT-033, Establishing Effluent Limitations for Individual Sewage Permits).

For POTWs with design flows greater than 2,000 GPD and for non-municipal sewage facilities that service municipalities or portions thereof, the application manager will establish influent BOD_5 and TSS monitoring in the permit using the same frequency and sample type as is used for other effluent parameters (Section IV.E.8, SOP No BCW-PWT-002, New and Reissuance Sewage Individual NPDES Permit Applications).

Sewage discharges will include monitoring, at a minimum, for *E. Coli*, in new and reissued permits, with a monitoring frequency of 1/month for design flows >= 1 MGD per 25 Pa. Code § 92a.061 and Section I.A, Note 12, SOP No. BCW-PMT-033, Establishing Effluent Limitations for Individual Sewage Permits.

Nutrient monitoring is required to establish the nutrient load from the wastewater treatment facility and the impacts that load may have on the quality of the receiving stream(s). The discharge is to waters not impaired for nutrients. A 1/year monitoring requirement for Total N & Total P has been added to the permit per 25 Pa. Code § 92a.61 and Section I.A, Note 7 & 8, SOP No. BCW-PMT-033, Establishing Effluent Limitations for Individual Sewage Permits.

Whole Effluent Toxicity (WET)

For IMP 101, ☒ **Acute** ☐ **Chronic** WET Testing was completed:

☒ For the permit renewal application (4 tests).
☐ Quarterly throughout the permit term.
☐ Quarterly throughout the permit term and a TIE/TRE was conducted.
☐ Other:

The dilution series used for the tests was: 100%, 50%, 25%, 12.5%, and 6.25%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 9.63.

Summary of Four Most Recent Test Results

(NOTE – Enter results into one table, depending on which data analysis method was used). WET Testing data submitted with the renewal application reported Acute LC50 Data only.

NOEC/LC50 Data Analysis

Test Date	*Ceriodaphnia* Results (% Effluent)			*Pimephales* Results (% Effluent)			Pass? *
	NOEC Survival	NOEC Reproduction	LC50	NOEC Survival	NOEC Growth	LC50	
09/04/2008			95			90	Yes
11/07/2008			100			95	Yes
01/07/2009			90			95	Yes
02/07/2009			95			95	Yes

***** *A "passing" result is that which is greater than or equal to the TIWC value.*

Is there reasonable potential for an excursion above water quality standards based on the results of these tests? (*NOTE – In general, reasonable potential is determined anytime there is at least one test failure in the previous four tests).*

☐ **YES** ☒ **NO**

Evaluation of Test Type, IWC and Dilution Series for Renewed Permit

Acute Partial Mix Factor (PMFa): **0.098** Chronic Partial Mix Factor (PMFc): **0.67**

1. Determine IWC – Acute (IWCa):

$(Q_d \times 1.547) / ((Q_{7\text{-}10} \times PMFa) + (Q_d \times 1.547))$

[(2.0 MGD x 1.547) / ((1060 cfs x 0.098) + (2.0 MGD x 1.547))] x 100 = **2.89%**

Is IWCa < 1%? ☐ **YES** ☒ **NO** **(YES - Acute Tests Required OR NO - Chronic Tests Required)**

Type of Test for Permit Renewal: **Chronic Tests Required**

2a. Determine Target IWCa (If Acute Tests Required)

TIWCa = 2.89 / 0.3 = 9.63**%**

2b. Determine Target IWCc (If Chronic Tests Required)

$(Q_d \times 1.547) / (Q_{7\text{-}10} \times PMFc) + (Q_d \times 1.547)$

[(2.0 MGD x 1.547) / ((1060 cfs x 0.679) + (2.0 MGD x 1.547))] x 100 = **0.43% PART C.V. States TIWC = 1%**

3. Determine Dilution Series

Dilution Series = 100%, 60%, 30%, 2%, and 1%.

WET Limits

Has reasonable potential been determined? ☐ YES ☒ NO

Will WET limits be established in the permit? ☐ YES ☒ NO

Comments: This permit was last issued by the Department on September 5, 2003. The expired permit required that 4 WET Tests be submitted with the renewal application, which was received on November 10, 2008. The draft permit will require that WET Test be conducted annually, and Part C.V. language has been added consistent with 40 CFR 122.21(j)(5)(iv).

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 and BPJ. Instantaneous Maximum (IMAX) limits are 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" (386-0400-001), SOPs and/or BPJ.

IMP 101, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	415.0	665.0	XXX	25.0	40.0	50	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	2/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	2/week	24-Hr Composite
TSS	500.0	750.0	XXX	30.0	45.0	60	2/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000.0 Geo Mean	XXX	10000.0	2/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200.0 Geo Mean	XXX	1000.0	2/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	24-Hr Composite
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	24-Hr Composite

IMP 101 , Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
PFOA (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
PFOS (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
PFBS (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
HFPO-DA (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

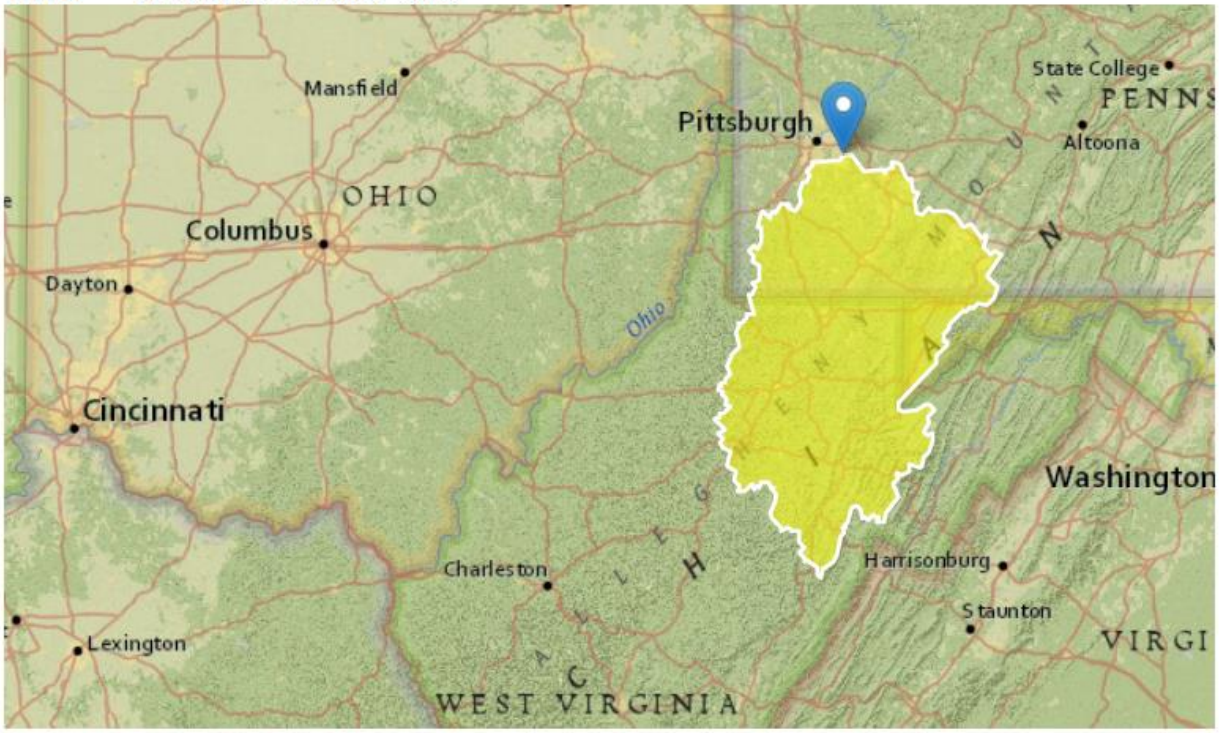
Compliance Sampling Location: IMP 101

Other Comments: IMP 101, located at the discharge pipe of the chlorine contact tank prior to combining with flow from CSO diversion chamber.

Attachment 1 – USGS StreamStats Report

StreamStats Report

Region ID: PA
Workspace ID: PA20250203144432572000
Clicked Point (Latitude, Longitude): 40.38104, -79.84445
Time: 2025-02-03 09:45:02 -0500



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	7180	square miles
ELEV	Mean Basin Elevation	1857	feet

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	7180	square miles	2.26	1400
ELEV	Mean Basin Elevation	1857	feet	1050	2580

Low-Flow Statistics Disclaimers [Low Flow Region 4]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [Low Flow Region 4]

Statistic	Value	Unit
7 Day 2 Year Low Flow	999	ft^3/s
30 Day 2 Year Low Flow	1310	ft^3/s
7 Day 10 Year Low Flow	599	ft^3/s
30 Day 10 Year Low Flow	684	ft^3/s
90 Day 10 Year Low Flow	1000	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does

not imply endorsement by the U.S. Government.

Application Version: 4.26.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

Attachment 2 – WQM 7.0 Version 1.1 – Summer Period

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19A	37185	MONONGAHELA RIVER	**12.260**	712.00	7180.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.147	0.00	1060.00	0.000	0.000	0.0	845.00	8.00	25.00	7.00	20.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Duquesne STP	PA0026981	0.0000	0.0000	2.0000	0.000	20.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.38	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19A	37185	MONONGAHELA RIVER	**11.760**	710.00	7190.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.147	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	20.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19A	37185	MONONGAHELA RIVER

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
12.260	1060.00	0.00	1060.00	3.094	0.00076	8	845	105.62	0.16	0.194	20.00	7.00
Q1-10 Flow												
12.260	678.40	0.00	678.40	3.094	0.00076	NA	NA	NA	0.10	0.303	20.00	7.00
Q30-10 Flow												
12.260	1441.60	0.00	1441.60	3.094	0.00076	NA	NA	NA	0.21	0.143	20.00	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19A	37185	MONONGAHELA RIVER

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
12.260	Duquesne STP	16.76	50	16.76	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
12.260	Duquesne STP	1.89	25	1.89	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
12.26	Duquesne STP	25	25	25	25	3	3	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19A	37185	MONONGAHELA RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
12.260	2.000	20.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
845.000	8.000	105.625	0.157
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.07	0.046	0.07	0.700
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.364	0.226	O'Connor	5
Reach Travel Time (days)			
0.194			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.019	2.07	0.07	8.24
0.039	2.06	0.07	8.24
0.058	2.06	0.07	8.24
0.078	2.06	0.07	8.24
0.097	2.06	0.07	8.24
0.117	2.06	0.07	8.24
0.136	2.05	0.07	8.24
0.155	2.05	0.07	8.24
0.175	2.05	0.06	8.24
0.194	2.05	0.06	8.24

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19A	37185	MONONGAHELA RIVER

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
12.260	Duquesne STP	PA0026981	0.000	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3

Attachment 3 – TMS Version 1.4

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **City of Duquesne WWTP** NPDES Permit No.: **PA0026981** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Treated Effluent**

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
2	100	7						

					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		550									
	Chloride (PWS)	mg/L		200									
	Bromide	mg/L		1									
	Sulfate (PWS)	mg/L		100									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		73									
	Total Antimony	µg/L		0.5									
	Total Arsenic	µg/L		0.6									
	Total Barium	µg/L		17.2									
	Total Beryllium	µg/L		0.5									
	Total Boron	µg/L		187									
	Total Cadmium	µg/L		0.1									
	Total Chromium (III)	µg/L		5.5									
	Hexavalent Chromium	µg/L		0.5									
	Total Cobalt	µg/L		2									
	Total Copper	µg/L		4.4									
	Free Cyanide	µg/L	<	10									
	Total Cyanide	µg/L		10									
	Dissolved Iron	µg/L		30									
	Total Iron	µg/L		163									
	Total Lead	µg/L		0.6									
	Total Manganese	µg/L		67.5									
	Total Mercury	µg/L		0.0031									
	Total Nickel	µg/L		10.2									
	Total Phenols (Phenolics) (PWS)	µg/L		2.5									
	Total Selenium	µg/L		1									
	Total Silver	µg/L		0.1									
	Total Thallium	µg/L		0.1									
	Total Zinc	µg/L		38.5									
	Total Molybdenum	µg/L		10									
	Acrolein	µg/L	<	1									
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<	0.5									
	Benzene	µg/L	<	0.2									
	Bromoform	µg/L	<	0.2									

Group 3	Carbon Tetrachloride	µg/L	<	0.2									
	Chlorobenzene	µg/L	<	0.2									
	Chlorodibromomethane	µg/L	<	0.4									
	Chloroethane	µg/L	<	0.2									
	2-Chloroethyl Vinyl Ether	µg/L	<	0.5									
	Chloroform	µg/L		4.6									
	Dichlorobromomethane	µg/L		1.9									
	1,1-Dichloroethane	µg/L	<	0.2									
	1,2-Dichloroethane	µg/L	<	0.2									
	1,1-Dichloroethylene	µg/L	<	0.2									
	1,2-Dichloropropane	µg/L	<	0.2									
	1,3-Dichloropropylene	µg/L	<	0.2									
	1,4-Dioxane	µg/L	<	20									
	Ethylbenzene	µg/L	<	0.2									
	Methyl Bromide	µg/L	<	0.5									
	Methyl Chloride	µg/L	<	0.2									
	Methylene Chloride	µg/L	<	0.2									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.2									
	Tetrachloroethylene	µg/L	<	0.2									
	Toluene	µg/L		1.2									
	1,2-trans-Dichloroethylene	µg/L	<	0.5									
	1,1,1-Trichloroethane	µg/L	<	0.2									
	1,1,2-Trichloroethane	µg/L	<	0.5									
	Trichloroethylene	µg/L	<	0.2									
	Vinyl Chloride	µg/L	<	0.2									
Group 4	2-Chlorophenol	µg/L	<	0.21									
	2,4-Dichlorophenol	µg/L	<	0.21									
	2,4-Dimethylphenol	µg/L	<	0.21									
	4,6-Dinitro-o-Cresol	µg/L											
	2,4-Dinitrophenol	µg/L	<	1.03									
	2-Nitrophenol	µg/L	<	0.21									
	4-Nitrophenol	µg/L	<	0.21									
	p-Chloro-m-Cresol	µg/L											
	Pentachlorophenol	µg/L	<	0.2									
	Phenol	µg/L	<	0.2									
	2,4,6-Trichlorophenol	µg/L		0.3									
Group 5	Acenaphthene	µg/L	<	0.1									
	Acenaphthylene	µg/L	<	0.1									
	Anthracene	µg/L	<	0.1									
	Benzidine	µg/L	<	0.1									
	Benzo(a)Anthracene	µg/L	<	0.4									
	Benzo(a)Pyrene	µg/L	<	0.3									
	3,4-Benzofluoranthene	µg/L	<	0.1									
	Benzo(ghi)Perylene	µg/L	<	0.1									
	Benzo(k)Fluoranthene	µg/L	<	0.1									
	Bis(2-Chloroethoxy)Methane	µg/L	<	0.1									
	Bis(2-Chloroethyl)Ether	µg/L	<	0.1									
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.1									
	Bis(2-Ethylhexyl)Phthalate	µg/L		1.7									
	4-Bromophenyl Phenyl Ether	µg/L	<	0.1									
	Butyl Benzyl Phthalate	µg/L	<	1.03									
	2-Chloronaphthalene	µg/L	<	0.1									
	4-Chlorophenyl Phenyl Ether	µg/L	<	0.1									
	Chrysene	µg/L		0.3									
	Dibenzo(a,h)Anthrancene	µg/L	<	0.1									
	1,2-Dichlorobenzene	µg/L	<	0.1									
	1,3-Dichlorobenzene	µg/L	<	0.1									
	1,4-Dichlorobenzene	µg/L	<	0.1									
	3,3-Dichlorobenzidine	µg/L	<	0.1									
	Diethyl Phthalate	µg/L	<	1.03									
	Dimethyl Phthalate	µg/L	<	1.03									
	Di-n-Butyl Phthalate	µg/L	<	1.03									
	2,4-Dinitrotoluene	µg/L	<	0.1									

	2,6-Dinitrotoluene	µg/L	<	0.1									
	Di-n-Octyl Phthalate	µg/L	<	1.03									
	1,2-Diphenylhydrazine	µg/L	<	0.1									
	Fluoranthene	µg/L		1									
	Fluorene	µg/L	<	0.1									
	Hexachlorobenzene	µg/L	<	0.1									
	Hexachlorobutadiene	µg/L	<	0.1									
	Hexachlorocyclopentadiene	µg/L	<	0.1									
	Hexachloroethane	µg/L	<	0.1									
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.1									
	Isophorone	µg/L	<	0.1									
	Naphthalene	µg/L	<	0.1									
	Nitrobenzene	µg/L	<	0.1									
	n-Nitrosodimethylamine	µg/L	<	0.1									
	n-Nitrosodi-n-Propylamine	µg/L	<	0.1									
	n-Nitrosodiphenylamine	µg/L	<	0.1									
	Phenanthrene	µg/L		0.4									
	Pyrene	µg/L		0.6									
	1,2,4-Trichlorobenzene	µg/L	<	0.1									
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	<										
	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	<										
	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											

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

City of Duquesne WWTP, NPDES Permit No. PA0026981, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Clearfield Creek**

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	037185	12.26	712	7180	0.00076		Yes
End of Reach 1	037185	11.76	710	7190	0.00076		Yes

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

Location	RMI	LFY (cfs/mi²)*	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	12.26	0.147	1060			845	8					100	7		
End of Reach 1	11.76	0.147													

Q_h

Location	RMI	LFY (cfs/mi²)	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	12.26														
End of Reach 1	11.76														

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

City of Duquesne WWTP, NPDES Permit No. PA0026981, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☑ ***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)
12.26	1,060		1,060	3.094	0.00076	8.	845.	105.625	0.157	0.194	1559.795
11.76	1061.470		1061.47								

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)
12.26	3274.21		3274.21	3.094	0.00076	13.129	845.	64.362	0.295	0.103	744.861
11.76	3278.175		3278.18								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.098 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

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	
Total Aluminum	0	0		0	750	750	25,948	
Total Antimony	0	0		0	1,100	1,100	38,056	
Total Arsenic	0	0		0	340	340	11,763	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	726,532	
Total Boron	0	0		0	8,100	8,100	280,234	
Total Cadmium	0	0		0	2.014	2.13	73.8	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	569.763	1,803	62,380	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	564	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	3,287	
Total Copper	0	0		0	13.439	14.0	484	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	761	

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	64.581	81.6	2,825	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	57.0	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.236	469	16,232	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	3.217	3.78	131	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	2,249	
Total Zinc	0	0		0	117.180	120	4,145	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	104	
Acrylonitrile	0	0		0	650	650	22,488	
Benzene	0	0		0	640	640	22,142	
Bromoform	0	0		0	1,800	1,800	62,274	
Carbon Tetrachloride	0	0		0	2,800	2,800	96,871	
Chlorobenzene	0	0		0	1,200	1,200	41,516	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	622,742	
Chloroform	0	0		0	1,900	1,900	65,734	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	518,951	
1,1-Dichloroethylene	0	0		0	7,500	7,500	259,476	
1,2-Dichloropropane	0	0		0	11,000	11,000	380,564	
1,3-Dichloropropylene	0	0		0	310	310	10,725	
Ethylbenzene	0	0		0	2,900	2,900	100,331	
Methyl Bromide	0	0		0	550	550	19,028	
Methyl Chloride	0	0		0	28,000	28,000	968,709	
Methylene Chloride	0	0		0	12,000	12,000	415,161	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	34,597	
Tetrachloroethylene	0	0		0	700	700	24,218	
Toluene	0	0		0	1,700	1,700	58,814	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	235,258	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	103,790	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	117,629	
Trichloroethylene	0	0		0	2,300	2,300	79,573	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	19,374	
2,4-Dichlorophenol	0	0		0	1,700	1,700	58,814	
2,4-Dimethylphenol	0	0		0	660	660	22,834	
2,4-Dinitrophenol	0	0		0	660	660	22,834	
2-Nitrophenol	0	0		0	8,000	8,000	276,774	
4-Nitrophenol	0	0		0	2,300	2,300	79,573	
Pentachlorophenol	0	0		0	8.723	8.72	302	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	15,915	
Acenaphthene	0	0		0	83	83.0	2,872	
Anthracene	0	0		0	N/A	N/A	N/A	

Benzidine	0	0		0	300	300	10,379	
Benzo(a)Anthracene	0	0		0	0.5	0.5	17.3	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	30,000	30,000	1,037,903	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	155,685	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	9,341	
Butyl Benzyl Phthalate	0	0		0	140	140	4,844	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	28,369	
1,3-Dichlorobenzene	0	0		0	350	350	12,109	
1,4-Dichlorobenzene	0	0		0	730	730	25,256	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	138,387	
Dimethyl Phthalate	0	0		0	2,500	2,500	86,492	
Di-n-Butyl Phthalate	0	0		0	110	110	3,806	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	55,355	
2,6-Dinitrotoluene	0	0		0	990	990	34,251	
1,2-Diphenylhydrazine	0	0		0	15	15.0	519	
Fluoranthene	0	0		0	200	200	6,919	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	10	10.0	346	
Hexachlorocyclopentadiene	0	0		0	5	5.0	173	
Hexachloroethane	0	0		0	60	60.0	2,076	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	345,968	
Naphthalene	0	0		0	140	140	4,844	
Nitrobenzene	0	0		0	4,000	4,000	138,387	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	588,145	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	10,379	
Phenanthrene	0	0		0	5	5.0	173	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	4,498	

☑ ***CFC*** CCT (min): 720 PMF: 0.679 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

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	

Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	51,428	
Total Arsenic	0	0		0	150	150	35,065	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	958,437	
Total Boron	0	0		0	1,600	1,600	374,024	
Total Cadmium	0	0		0	0.246	0.27	63.3	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.115	86.2	20,146	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	2,430	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	4,442	
Total Copper	0	0		0	8.956	9.33	2,181	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	1,216	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	515,398	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.517	3.18	744	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	212	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.007	52.2	12,194	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	1,166	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	3,039	
Total Zinc	0	0		0	118.139	120	28,009	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	701	
Acrylonitrile	0	0		0	130	130	30,389	
Benzene	0	0		0	130	130	30,389	
Bromoform	0	0		0	370	370	86,493	
Carbon Tetrachloride	0	0		0	560	560	130,908	
Chlorobenzene	0	0		0	240	240	56,104	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	818,178	
Chloroform	0	0		0	390	390	91,168	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	724,672	
1,1-Dichloroethylene	0	0		0	1,500	1,500	350,648	
1,2-Dichloropropane	0	0		0	2,200	2,200	514,283	
1,3-Dichloropropylene	0	0		0	61	61.0	14,260	
Ethylbenzene	0	0		0	580	580	135,584	
Methyl Bromide	0	0		0	110	110	25,714	
Methyl Chloride	0	0		0	5,500	5,500	1,285,708	
Methylene Chloride	0	0		0	2,400	2,400	561,036	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	49,091	
Tetrachloroethylene	0	0		0	140	140	32,727	
Toluene	0	0		0	330	330	77,143	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	327,271	
1,1,1-Trichloroethane	0	0		0	610	610	142,597	

1,1,2-Trichloroethane	0	0		0	680	680	158,960	
Trichloroethylene	0	0		0	450	450	105,194	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	25,714	
2,4-Dichlorophenol	0	0		0	340	340	79,480	
2,4-Dimethylphenol	0	0		0	130	130	30,389	
2,4-Dinitrophenol	0	0		0	130	130	30,389	
2-Nitrophenol	0	0		0	1,600	1,600	374,024	
4-Nitrophenol	0	0		0	470	470	109,870	
Pentachlorophenol	0	0		0	6.693	6.69	1,564	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	21,273	
Acenaphthene	0	0		0	17	17.0	3,974	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	13,792	
Benzo(a)Anthracene	0	0		0	0.1	0.1	23.4	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	6,000	6,000	1,402,591	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	212,726	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	12,623	
Butyl Benzyl Phthalate	0	0		0	35	35.0	8,182	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	37,402	
1,3-Dichlorobenzene	0	0		0	69	69.0	16,130	
1,4-Dichlorobenzene	0	0		0	150	150	35,065	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	187,012	
Dimethyl Phthalate	0	0		0	500	500	116,883	
Di-n-Butyl Phthalate	0	0		0	21	21.0	4,909	
2,4-Dinitrotoluene	0	0		0	320	320	74,805	
2,6-Dinitrotoluene	0	0		0	200	200	46,753	
1,2-Diphenylhydrazine	0	0		0	3	3.0	701	
Fluoranthene	0	0		0	40	40.0	9,351	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	2	2.0	468	
Hexachlorocyclopentadiene	0	0		0	1	1.0	234	
Hexachloroethane	0	0		0	12	12.0	2,805	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	490,907	

Naphthalene	0	0		0	43	43.0	10,052	
Nitrobenzene	0	0		0	810	810	189,350	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	794,802	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	13,792	
Phenanthrene	0	0		0	1	1.0	234	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	6,078	

☑ ***THH*** CCT (min): 720 PMF: 0.679 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	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	1,309	
Total Arsenic	0	0		0	10	10.0	2,338	
Total Barium	0	0		0	2,400	2,400	561,036	
Total Boron	0	0		0	3,100	3,100	724,672	
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	
Free Cyanide	0	0		0	4	4.0	935	
Dissolved Iron	0	0		0	300	300	70,130	
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	233,765	
Total Mercury	0	0		0	0.050	0.05	11.7	
Total Nickel	0	0		0	610	610	142,597	
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	56.1	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	701	
Acrylonitrile	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	23,377	
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	1,332	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	7,714	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	15,896	
Methyl Bromide	0	0		0	100	100.0	23,377	
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	13,325	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	23,377	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	2,337,652	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	30	30.0	7,013	
2,4-Dichlorophenol	0	0		0	10	10.0	2,338	
2,4-Dimethylphenol	0	0		0	100	100.0	23,377	
2,4-Dinitrophenol	0	0		0	10	10.0	2,338	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	935,061	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	16,364	
Anthracene	0	0		0	300	300	70,130	
Benzidine	0	0		0	N/A	N/A	N/A	
Benzo(a)Anthracene	0	0		0	N/A	N/A	N/A	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	200	200	46,753	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	0.1	0.1	23.4	
2-Chloronaphthalene	0	0		0	800	800	187,012	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	1,000	1,000	233,765	
1,3-Dichlorobenzene	0	0		0	7	7.0	1,636	

1,4-Dichlorobenzene	0	0		0	300	300	70,130	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	140,259	
Dimethyl Phthalate	0	0		0	2,000	2,000	467,530	
Di-n-Butyl Phthalate	0	0		0	20	20.0	4,675	
2,4-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	
Fluoranthene	0	0		0	20	20.0	4,675	
Fluorene	0	0		0	50	50.0	11,688	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	N/A	N/A	N/A	
Hexachlorocyclopentadiene	0	0		0	4	4.0	935	
Hexachloroethane	0	0		0	N/A	N/A	N/A	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	34	34.0	7,948	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	2,338	
n-Nitrosodimethylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	N/A	N/A	N/A	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	20	20.0	4,675	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	16.4	

☑ ***CRL*** CCT (min): 720 PMF: 0.983 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	
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	
Free Cyanide	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	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	0.06	0.06	62.5	
Benzene	0	0		0	0.58	0.58	604	
Bromoform	0	0		0	7	7.0	7,290	
Carbon Tetrachloride	0	0		0	0.4	0.4	417	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	833	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	0.95	0.95	989	
1,2-Dichloroethane	0	0		0	9.9	9.9	10,310	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	937	
1,3-Dichloropropylene	0	0		0	0.27	0.27	281	
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	20,829	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	208	
Tetrachloroethylene	0	0		0	10	10.0	10,414	
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	573	
Trichloroethylene	0	0		0	0.6	0.6	625	
Vinyl Chloride	0	0		0	0.02	0.02	20.8	
2-Chlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dichlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
2,4-Dinitrophenol	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	
Pentachlorophenol	0	0		0	0.030	0.03	31.2	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	1,562	
Acenaphthene	0	0		0	N/A	N/A	N/A	

Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.0001	0.0001	0.1	
Benzo(a)Anthracene	0	0		0	0.001	0.001	1.04	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.1	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	1.04	
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	10.4	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	31.2	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	333	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	0.12	0.12	125	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.1	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,3-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
3,3-Dichlorobenzidine	0	0		0	0.05	0.05	52.1	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Di-n-Butyl Phthalate	0	0		0	N/A	N/A	N/A	
2,4-Dinitrotoluene	0	0		0	0.05	0.05	52.1	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	52.1	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	31.2	
Fluoranthene	0	0		0	N/A	N/A	N/A	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	0.00008	0.00008	0.083	
Hexachlorobutadiene	0	0		0	0.01	0.01	10.4	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	104	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	1.04	
Isophorone	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	N/A	N/A	N/A	
n-Nitrosodimethylamine	0	0		0	0.0007	0.0007	0.73	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	5.21	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	3,437	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	N/A	N/A	N/A	

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

No. Samples/Month: 4

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			

☑ ***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
Total Aluminum	16,631	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	1,309	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	2,338	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	465,678	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	179,619	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	47.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	20,146	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	361	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	2,107	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	310	µg/L	Discharge Conc ≤ 10% WQBEL
Free Cyanide	488	µg/L	Discharge Conc ≤ 25% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	70,130	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	515,398	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	744	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	233,765	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	11.7	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	10,404	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	1,166	µg/L	Discharge Conc ≤ 10% WQBEL
Total Silver	83.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	56.1	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	2,657	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	66.5	µg/L	Discharge Conc < TQL
Acrylonitrile	62.5	µg/L	Discharge Conc < TQL
Benzene	604	µg/L	Discharge Conc < TQL
Bromoform	7,290	µg/L	Discharge Conc < TQL

Carbon Tetrachloride	417	µg/L	Discharge Conc < TQL
Chlorobenzene	23,377	µg/L	Discharge Conc < TQL
Chlorodibromomethane	833	µg/L	Discharge Conc < TQL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	399,152	µg/L	Discharge Conc < TQL
Chloroform	1,332	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	989	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	10,310	µg/L	Discharge Conc < TQL
1,1-Dichloroethylene	7,714	µg/L	Discharge Conc < TQL
1,2-Dichloropropane	937	µg/L	Discharge Conc < TQL
1,3-Dichloropropylene	281	µg/L	Discharge Conc < TQL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	15,896	µg/L	Discharge Conc < TQL
Methyl Bromide	12,196	µg/L	Discharge Conc < TQL
Methyl Chloride	620,903	µg/L	Discharge Conc < TQL
Methylene Chloride	20,829	µg/L	Discharge Conc < TQL
1,1,2,2-Tetrachloroethane	208	µg/L	Discharge Conc < TQL
Tetrachloroethylene	10,414	µg/L	Discharge Conc < TQL
Toluene	13,325	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-trans-Dichloroethylene	23,377	µg/L	Discharge Conc < TQL
1,1,1-Trichloroethane	66,525	µg/L	Discharge Conc < TQL
1,1,2-Trichloroethane	573	µg/L	Discharge Conc < TQL
Trichloroethylene	625	µg/L	Discharge Conc < TQL
Vinyl Chloride	20.8	µg/L	Discharge Conc < TQL
2-Chlorophenol	7,013	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	2,338	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	14,636	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	2,338	µg/L	Discharge Conc < TQL
2-Nitrophenol	177,401	µg/L	Discharge Conc < TQL
4-Nitrophenol	51,003	µg/L	Discharge Conc < TQL
Pentachlorophenol	31.2	µg/L	Discharge Conc < TQL
Phenol	935,061	µg/L	Discharge Conc < TQL
2,4,6-Trichlorophenol	1,562	µg/L	Discharge Conc ≤ 25% WQBEL
Acenaphthene	1,841	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	70,130	µg/L	Discharge Conc < TQL
Benzidine	0.1	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	1.04	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	0.1	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	1.04	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	10.4	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	31.2	µg/L	Discharge Conc < TQL

Bis(2-Chloroisopropyl)Ether	46,753	µg/L	Discharge Conc < TQL
Bis(2-Ethylhexyl)Phthalate	333	µg/L	Discharge Conc ≤ 25% WQBEL
4-Bromophenyl Phenyl Ether	5,987	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	23.4	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	187,012	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	125	µg/L	Discharge Conc ≤ 25% WQBEL
Dibenzo(a,h)Anthrancene	0.1	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	18,184	µg/L	Discharge Conc < TQL
1,3-Dichlorobenzene	1,636	µg/L	Discharge Conc < TQL
1,4-Dichlorobenzene	16,188	µg/L	Discharge Conc < TQL
3,3-Dichlorobenzidine	52.1	µg/L	Discharge Conc < TQL
Diethyl Phthalate	88,700	µg/L	Discharge Conc < TQL
Dimethyl Phthalate	55,438	µg/L	Discharge Conc < TQL
Di-n-Butyl Phthalate	2,439	µg/L	Discharge Conc < TQL
2,4-Dinitrotoluene	52.1	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	52.1	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	31.2	µg/L	Discharge Conc < TQL
Fluoranthene	4,435	µg/L	Discharge Conc ≤ 25% WQBEL
Fluorene	11,688	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.083	µg/L	Discharge Conc < TQL
Hexachlorobutadiene	10.4	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	111	µg/L	Discharge Conc < TQL
Hexachloroethane	104	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	1.04	µg/L	Discharge Conc < TQL
Isophorone	7,948	µg/L	Discharge Conc < TQL
Naphthalene	3,105	µg/L	Discharge Conc < TQL
Nitrobenzene	2,338	µg/L	Discharge Conc < TQL
n-Nitrosodimethylamine	0.73	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	5.21	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	3,437	µg/L	Discharge Conc < TQL
Phenanthrene	111	µg/L	Discharge Conc ≤ 25% WQBEL
Pyrene	4,675	µg/L	Discharge Conc ≤ 25% WQBEL
1,2,4-Trichlorobenzene	16.4	µg/L	Discharge Conc < TQL

Attachment 4 – TRC_CALC

PA0026981_ TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

1060	= Q stream (cfs)	0.5	= CV Daily
2	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	0.098	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	0.679	= 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 =	10.729	1.3.2.iii	WLA cfc =	72.357
PENTOXSD TRG	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRG	5.1b	LTA_afc=	3.998	5.1d	LTA_cfc =	42.065

Source		Effluent Limit Calculations		
PENTOXSD TRG	5.1f	AML MULT =	1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) =	0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) =	1.635	

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)