Pennsylvania Department of Environmental Protection

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	**NPDES PERMIT FACT SHEET INDIVIDUAL INDUSTRIAL WASTE (IW) AND IW STORMWATER**	Application No.	**PA0002208**
Facility Type	**Industrial**		APS ID	**1144955**
Major / Minor	**Major**		Authorization ID	**1540235**

Applicant and Facility Information

Applicant Name	**Shell Chemical Appalachia LLC**	Facility Name	**Shell Polymers Monaca Site**
Applicant Address	300 Frankfort Road Monaca, PA 15061-2210	Facility Address	300 Frankfort Road Monaca, PA 15061-2210
Applicant Contact	Kimberly Kaal, Environmental Manager	Facility Contact	***same as applicant***
Applicant Phone	(724) 709-2467	Facility Phone	***same as applicant***
Applicant Email	kimberly.kaal@shell.com	Facility Email	***same as applicant***
Client ID	311950	Site ID	102360
SIC Code	2821, 2869	Municipality	Potter Township
SIC Description	Manufacturing - Industrial Organic Chemicals, NEC, Manufacturing - Plastics Materials and Resins	County	Beaver
Date Application Received	August 29, 2025	EPA Waived?	No
Date Application Accepted		If No, Reason	Major Facility
Purpose of Application	Renewal of an NPDES permit for discharges of industrial waste, cooling water, and storm water from a petrochemical manufacturing facility.		

Summary of Review

On August 27, 2025, Shell Chemical Appalachia LLC (Shell) submitted an application dated August 26, 2025 to the Department of Environmental Protection ("DEP") to renew NPDES Permit PA0002208 for discharges of treated process wastewaters, cooling tower blowdown, intake screen backwash water, steam condensate, treated and untreated storm water associated with industrial activities, hydrostatic test water, and groundwater from the Shell Polymers Monaca Site ("SPMS"). The current NPDES permit was issued on February 24, 2021 with an effective date of March 1, 2021 and an expiration date of February 28, 2026. The deadline to submit the renewal application was September 1, 2025, so the renewal application was timely.

SPMS employs four processing units (an Ethylene Cracker Unit and three Polyethylene Units) and a Steam and Power Generation Unit to convert a feedstock composed of natural gas liquids containing ethane into polyethylene pellets. The SPSM also operates a cooling water intake structure to withdraw water from the Ohio River; a raw water treatment plant to treat water from the Ohio River for Shell's industrial uses; and a wastewater treatment plant to treat process wastewaters prior to discharge. SPMS began production operations in November 2022 and employed a phased approach to reach full operations.

The NPDES permit will authorize twenty-two outfalls and three internal monitoring points (IMPs). Outfall 001 is the facility's primary discharge location for treated process wastewater (including various non-process wastewaters managed as process wastewaters) and storm water from the wastewater treatment plant (monitored at IMP 101) and cooling tower blowdown (monitored at IMP 201). The process wastewaters are regulated by 40 CFR part 414 – Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category Effluent Limitations Guidelines. Outfalls 002, 003, 006, 007, 008, 009, 010, 012, 013, 014, 016, 017, 018, 019, 020, 021, and 022 will discharge storm water associated with industrial activities with a portion of those outfalls (Outfalls 003, 007, 009, 012, 014, 017, 018, and 020) acting as storm water basin overflows that only discharge when there is an excess of storm water.

Approve	Deny	Signatures	Date
✓		Ryan C. Decker, P.E. / Environmental Engineer	August 6, 2026
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	August 21, 2026

Summary of Review

Outfall 004 is the overflow structure from the Accidentally Contaminated ("AC") Pond, which discharges storm water (potentially mixed with process and non-process wastewaters). Outfall 005 discharges groundwater and storm water. Outfall 011 discharges backwash water from the cooling water intake structure's intake screen. Outfall 015 discharges groundwater from a small seepage area along the Ohio River. Shell's sanitary wastewater is conveyed to the local sanitary sewer for treatment by the Center Township Sanitary Authority.

Changes made to the NPDES permit for this renewal include the following:

- Flow-normalized mass limits at IMP 101 calculated based on the performance standards in 40 CFR part 414 are revised using an average maximum daily flow of 1.375 MGD
- Production-proportioned mass limits for BOD5 and TSS at IMP 101 are updated using updated production data
- Monitoring requirements for Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorobutanesulfonic acid (PFBS), and Hexafluoropropylene oxide dimer acid (HFPO-DA) are added to IMPs 101 and 201, and to Outfalls 001, 005, and 015
- Water quality-based effluent limits for total mercury are added to Outfall 001 subject to a three-year schedule of compliance
- Sampling and analysis of the facility's intake water from the Ohio River is required to characterize the extent to which total mercury, PFOA, PFOS, PFBS, and HFPO-DA are present in the SPMS's effluent due to the presence of those pollutants in the Ohio River
- Monitoring requirements for total aluminum, total copper, hexavalent chromium, and benzene are removed from Outfall 001 consistent with allowable exceptions to anti-backsliding
- Storm water benchmark values are added to the permit for total aluminum, total lead, total mercury, nitrate-nitrite nitrogen, pH, total selenium, total phosphorus, and total zinc
- Outfall 004 effluent limits are updated to be consistent with revised limits imposed at IMP 101
- Monitoring requirements for total copper, total nickel, and total zinc are added to Outfall 005
- Case-by-case technology-based effluent limits for total zinc are added to Outfall 015
- Additional Best Management Practices and reporting requirements are added to the permit to control releases of plastic pellets (a.k.a. "nurdles")

<u>Clean Water Act Section 316(b) – Cooling Water Intake Structures</u>

Shell operates a cooling water intake structure on the Ohio River that supplies the SPMS with cooling water and water for manufacturing. Section 316(b) of the Clean Water Act requires the use of Best Technology Available (BTA) to minimize adverse environmental impact, which includes the minimization of impingement mortality and entrainment of all life stages of fish and shellfish at cooling water intake structures for power-generating and manufacturing facilities.

On August 15, 2014, EPA promulgated regulations to implement Section 316(b) of Clean Water Act pertaining to existing cooling water intake structures. The regulations established BTA standards to reduce impingement mortality and entrainment of all life stages of fish and shellfish at existing power-generating and manufacturing facilities. The Final Rule took effect on October 14, 2014. Regulations implementing the 2014 Final Rule (and the previously promulgated Phase I Rule) are provided in 40 CFR part 125, Subparts I and J for new facilities and existing facilities, respectively. Associated NPDES permit application requirements for facilities with cooling water intake structures are provided in 40 CFR part 122, Subpart B – Permit Application and Special NPDES Program Requirements (§ 122.21(r)).

Shell's cooling water intake structure is subject to the existing facility requirements under 40 CFR part 125, Subpart J, §§ 125.94 through 125.99. Shell complies with BTA standards for impingement and entrainment using a closed-cycle recirculating system.

Shell completed impingement and entrainment sampling during the previous permit term from August 2024 through July 2025. The impingement sampling results did not identify any threatened or endangered species, so no further impingement requirements are considered. Entrainment sampling results were largely indeterminate, so entrainment sampling will be required again under the renewed permit. Further discussion of cooling water intake structure requirements is provided in the "Development of Effluent Limitations" section of this Fact Sheet for Outfall 011.

Summary of Review

Nurdles

In 2019, DEP received inquiries from the press about how Shell will manage nurdles—the plastic pellets produced at the SPMS. Generally, discharges of nurdles are regulated by the NPDES permit's prohibition on the discharge of "floating materials, scum, sheen, or substances that result in deposits in the receiving water" imposed in the permit pursuant to 25 Pa. Code § 92a.41(c). The general water quality criteria regulations in 25 Pa. Code § 93.6 also state that "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" with the specific substances to be controlled including, among other things, "floating materials, oil, grease, scum and substances that produce color, tastes, odors, turbidity or settle to form deposits."

Separate from the water regulations, the Solid Waste Management Act also regulates nurdle releases. The Act defines pollution as "contamination of any air, water, land or other natural resources of the Commonwealth such as will create or is likely to create a public nuisance or to render such air, water, land or other natural resources harmful, detrimental or injurious to public health, safety or welfare, or to domestic, municipal, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other life." The Act also states, "it shall be unlawful for any person or municipality to dump or deposit any solid waste onto the ground or into the waters of the Commonwealth, by any means, unless a permit has been obtained from the department."

The SPMS is designed to conform to the standards of Operation Clean Sweep Blue. Operation Clean Sweep (OCS) is an industry-led program that supports companies in their goal towards achieving zero plastic resin loss in operations. "OCS Blue" status is characterized as "the most robust tier of OCS in the US" including data reporting and a verification framework with external inspectors to verify that twenty-five required management practices have been successfully implemented. OCS is a voluntary program and thus is not enforceable under the permit and, as an industry-led program currently outside the scope of the NPDES permit, the verification framework and reporting does not encompass DEP.

To bolster nurdle controls under the NPDES permit, additional BMPs have been added to the permit based on those identified in EPA's "Industrial Stormwater Fact Sheet Series – Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries". The permit also will require Shell to report annually a list of all incidents in which there were releases from containment of any plastic pellets, nurdles, flakes, powders, or granules during the previous calendar year including:

(a) The date of each incident;
(b) The location of each incident;
(c) A description of the cause of each incident;
(d) Measures implemented to recover released materials for each incident;
(e) Whether each incident resulted in the offsite release of unrecovered plastic pellets, nurdles, flakes, powders, or granules and;
(f) For each offsite release, the estimated total weight or volume of any unrecovered plastic pellets, nurdles, flakes, powders, or granules.

Reporting all incidents involving the release of plastic materials from containment, whether onsite or offsite, will allow DEP to evaluate the effectiveness of Shell's BMPs as technology-based controls.

Permit Modification Requests

In October 2024, DEP received requests from several Non-Governmental Organizations and numerous individuals to modify various aspects of Shell's NPDES permit. DEP provided written responses to those requests on January 23, 2025. The permit was not modified at that time. DEP stated in its written responses that additional requirements would be considered as part of this permit renewal.

The requested modifications are discussed in this Fact Sheet in each outfall's "Development of Effluent Limitations" section to the extent modifications were requested for an outfall.

One general request related to groundwater remediation at the site was for Shell to "draft a full plan to remediate the groundwater on site to meet drinking water standards, with enforceable deadlines, and that Shell begin implementing such plan within the year." DEP addressed this request in its January 23, 2025 response but is providing a response again for completeness.

Summary of Review
As part of the construction of the site, Shell remediated the contaminated former Horsehead Corporation zinc smelter property under Pennsylvania's Land Recycling program (Act 2 of 1995: Land Recycling and Environmental Remediation Standards Act). Shell submitted and DEP approved a remedial investigation report, risk assessment, cleanup plan, and final report under the Act 2 program. Pursuant to the Cleanup Plan, Shell covered most of the site with clean fill and has installed a synthetic cap over previous disposal areas on the property to prevent contact with any contaminated soils. Shell collected all potentially contaminated storm water during construction and treated it prior to discharge under its NPDES permit. Groundwater use at the site is restricted under an environmental covenant following completion of Act 2. DEP approved the final report demonstrating attainment of site-specific and statewide health standards for cleanup of historic contamination in soil and groundwater. Shell attained a Site-Specific Standard for antimony, arsenic, cadmium, lead, manganese, nickel, selenium, silver, thallium, and zinc in soil and Shell attained a Site-Specific Standard for aluminum, arsenic, cadmium, cobalt, iron, lead, manganese, mercury, selenium, and zinc in groundwater. Cleanup standards were achieved through remediation of soils and groundwater with institutional and engineering controls including a groundwater use restriction and pathway elimination for direct contact of contaminated soils. A post remediation care plan and soil management plan were included and approved with the final report. An environmental covenant is required for the site to ensure compliance with achieved remediation under the site-specific standard. In summary, pursuant to the completion of cleanup under Act 2 and the elimination of exposure pathways, there is no reason to require further groundwater remediation. Interested parties can review Shell's November 17, 2023 Act 2 Final Report, which is available on DEP's website at: https://www.pa.gov/agencies/dep/dep-regions/southwest-regional-office/shell/facility-information. 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	Design Flow (MGD)	2.7 (avg.); 3.75 (max)
Latitude	40° 40' 22.996"	Longitude	-80° 20' 18.489"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Treated process water and storm water from the wastewater treatment plant (monitored at IMP 101) and cooling tower blowdown (monitored at IMP 201)		
Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679552	RMI	952.70
Drainage Area	22,771.80 mi^2	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)	682 (normal pool)	Slope (ft/ft)	
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Sources unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River

Background/Ambient Data		Data Source
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)
Other:		

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.99

Changes Since Last Permit Issuance: None.

Discharge, Receiving Waters and Water Supply Information			
IMP No.	101	Design Flow (MGD)	1.375
Latitude	40° 40' 3.0"	Longitude	-80° 20' 45.5"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Treated process water and storm water from the wastewater treatment plant		
Receiving Waters	Ohio River through Outfall 001	Stream Code	32317

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
IMP No.	201	Design Flow (MGD)	2.47
Latitude	40° 40' 22.0"	Longitude	-80° 20' 17.5"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Cooling tower blowdown		
Receiving Waters	Ohio River through Outfall 001	Stream Code	32317

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	002	Design Flow (MGD)	Variable
Latitude	40° 40' 36.32"	Longitude	-80° 19' 43.83"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the East RR Pond		
Receiving Waters	Rag Run (WWF)	Stream Code	33949
NHD Com ID	99679382	RMI	0.05
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation		
Source(s) of Impairment	Removal of riparian vegetation, Road Runoff		
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	1.04

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	Variable
Latitude	40° 40' 36.32"	Longitude	-80° 19' 43.51"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the East RR Pond		

Receiving Waters	Rag Run (WWF)	Stream Code	33949
NHD Com ID	99679382	RMI	0.05
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation		
Source(s) of Impairment	Removal of riparian vegetation, Road Runoff		
TMDL Status		Name	

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.99

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	004	Design Flow (MGD)	Variable
Latitude	40° 39' 57.4943"	Longitude	-80° 20' 40.5531"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the Accidentally Contaminated (AC) Pond		

Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99700118	RMI	0.25
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.35

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	005	Design Flow (MGD)	0.0472
Latitude	40° 40' 50.29"	Longitude	-80° 19' 11.14"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Groundwater discharges from Mall Lot 2		
Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	134396158	RMI	953.78
Drainage Area	22,763.34 mi^2	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)		Slope (ft/ft)	0.0001
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Sources Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Background/Ambient Data		Data Source	
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)	
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)	
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)	
Other:			
Nearest Downstream Public Water Supply Intake		NOVA Chemicals Corporation	
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	2.07

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	006	Design Flow (MGD)	Variable
Latitude	40° 39' 57.17"	Longitude	-80° 20' 9.11"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the South Ponds		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.74
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.84

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	007	Design Flow (MGD)	Variable
Latitude	40° 39’ 57.0622”	Longitude	-80° 20’ 9.1604”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the South Ponds		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.74
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.84

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	008	Design Flow (MGD)	Variable
Latitude	40° 39’ 56.27”	Longitude	-80° 20’ 32.18”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the Clean Rainwater (CR) Pond; steam condensate		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.36
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.46

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
IMP No.	108	Design Flow (MGD)	Variable
Latitude	N/A	Longitude	N/A
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Hydrostatic test water		
Receiving Waters	Poorhouse Run through Outfall 008 or the Ohio River through Outfall 013	Stream Code	33932

her Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	009	Design Flow (MGD)	Variable
Latitude	40° 39’ 56.2702”	Longitude	-80° 20’ 32.187”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the Clean Rainwater (CR) Pond; steam condensate		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.37
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.47

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	010	Design Flow (MGD)	Variable
Latitude	40° 39’ 54.71”	Longitude	-80° 20’ 22.16”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the West RR Basin		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.50
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.60

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	011	Design Flow (MGD)	0.69
Latitude	40° 40’ 4.00”	Longitude	-80° 20’ 48.00”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Intake screen backwash water		

Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679932	RMI	952.10
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)		Slope (ft/ft)	0.0001
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River

Background/Ambient Data		Data Source
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)
Other:		

Nearest Downstream Public Water Supply Intake		NOVA Chemicals Corporation	
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.39

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	012	Design Flow (MGD)	Variable
Latitude	40° 39’ 54.3288”	Longitude	-80° 20’ 21.869”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the West RR Basin		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.50
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.60

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	013	Design Flow (MGD)	Variable
Latitude	40° 40’ 33”	Longitude	-80° 20’ 3”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the North Pond; steam condensate		

Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679932	RMI	952.90
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)		Slope (ft/ft)	0.0001
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River

Background/Ambient Data		Data Source
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)
Other:		

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	1.19

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	014	Design Flow (MGD)	Variable
Latitude	40° 40’ 29.23”	Longitude	-80° 19’ 58.05”
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows of storm water from the North Pond		
Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679932	RMI	952.90
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)		Slope (ft/ft)	0.0001
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Background/Ambient Data		Data Source	
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)	
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)	
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)	
Other:			
Nearest Downstream Public Water Supply Intake		NOVA Chemicals Corporation	
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	1.19

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	015	Design Flow (MGD)	Variable
Latitude	40° 40' 47.53"	Longitude	-80° 19' 19.32"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Groundwater seep		
Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679932	RMI	953.70
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	ORSANCO Pollution Control Standards
Elevation (ft)		Slope (ft/ft)	0.0001
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	*Add* Navigation	Exceptions to Criteria	See ORSANCO P.C.S.
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Background/Ambient Data		Data Source	
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)	
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)	
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)	
Other:			
Nearest Downstream Public Water Supply Intake		NOVA Chemicals Corporation	
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	1.99

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	016	Design Flow (MGD)	Variable
Latitude	40° 40' 37.223"	Longitude	-80° 19' 50.142"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the plant and Duquesne Light and PennDOT rights-of-way		

Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99679932	RMI	953.11
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Pathogens, PCB, Dioxins		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River

Background/Ambient Data		Data Source
pH (SU)	7.33	Mean pH; USGS Gage 03086000 (2000 – 2013)
Temperature (°F)	66.2	Mean temp; USGS Gage 03086000 (2000 – 2013)
Hardness (mg/L)	98	Mean hardness; USGS Gage 03086000 (2000 – 2013)
Other:		

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	1.4

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	017	Design Flow (MGD)	Variable
Latitude	40° 39' 56.295"	Longitude	-80° 20' 48.680"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water runoff from wastewater treatment plant areas		

Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99679956	RMI	0.13
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.23

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	018	Design Flow (MGD)	Variable
Latitude	40° 39' 22.355"	Longitude	-80° 20' 56.304"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water runoff from Parking Area Pond A West		

Receiving Waters	Raccoon Creek (WWF)	Stream Code	33564
NHD Com ID	99680646	RMI	0.45
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Raccoon Creek Watershed

Nearest Downstream Public Water Supply Intake	Midland Borough Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	945.38	Distance from Outfall (mi)	6.49

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	019	Design Flow (MGD)	Variable
Latitude	40° 39' 26.757"	Longitude	-80° 20' 50.466"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Overflows from the Parking Area Pond A West		

Receiving Waters	Raccoon Creek (WWF)	Stream Code	33564
NHD Com ID	99680646	RMI	0.45
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Raccoon Creek Watershed

Nearest Downstream Public Water Supply Intake	Midland Borough Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	945.38	Distance from Outfall (mi)	6.49

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	020	Design Flow (MGD)	Variable
Latitude	40° 39' 32.633"	Longitude	-80° 20' 41.880"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water from the Parking Area Pond B East		
Receiving Waters	Raccoon Creek (WWF)	Stream Code	33564
NHD Com ID	99680646	RMI	0.45
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake	Midland Borough Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	945.38	Distance from Outfall (mi)	6.49

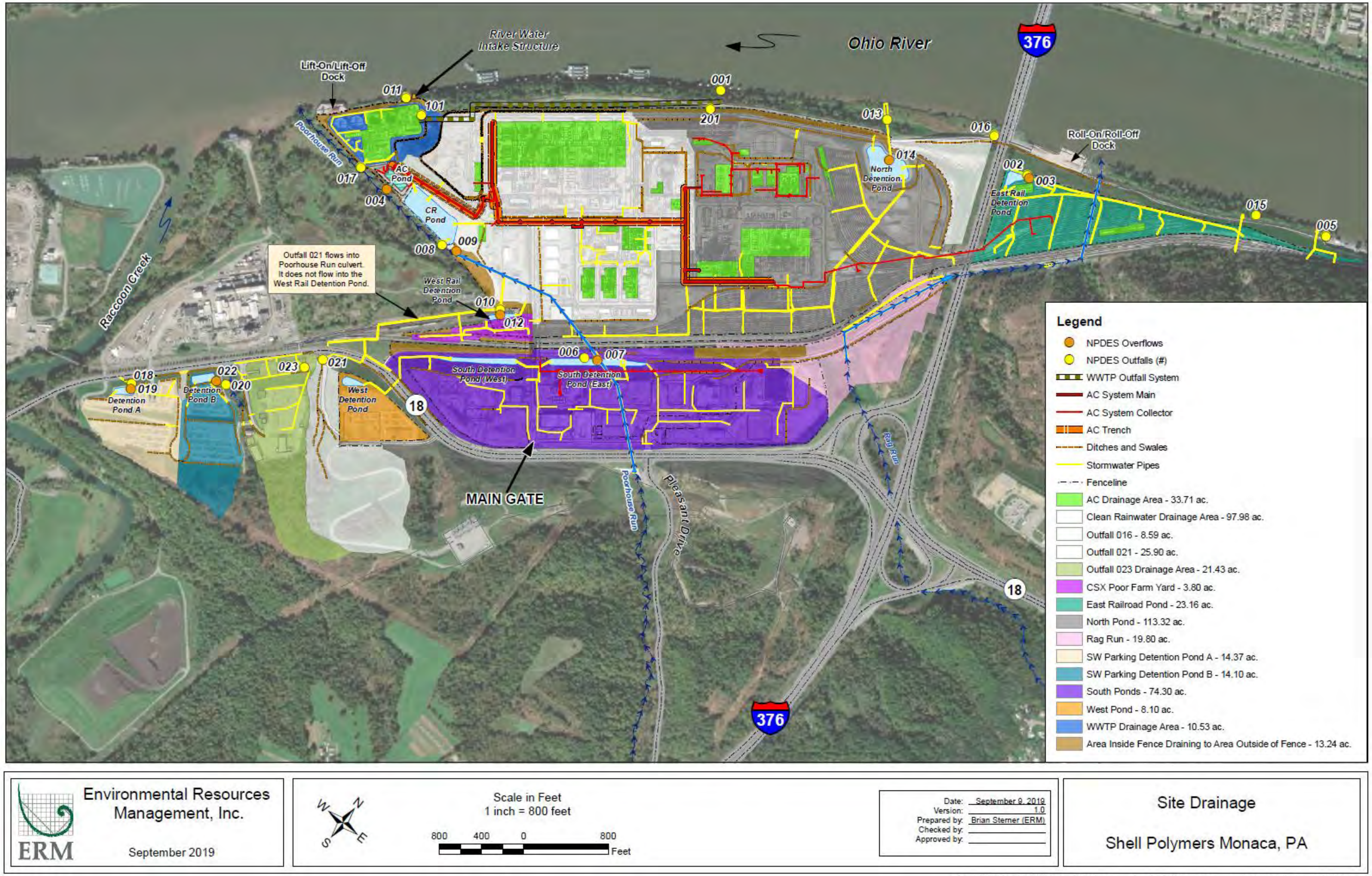
Other Comments:

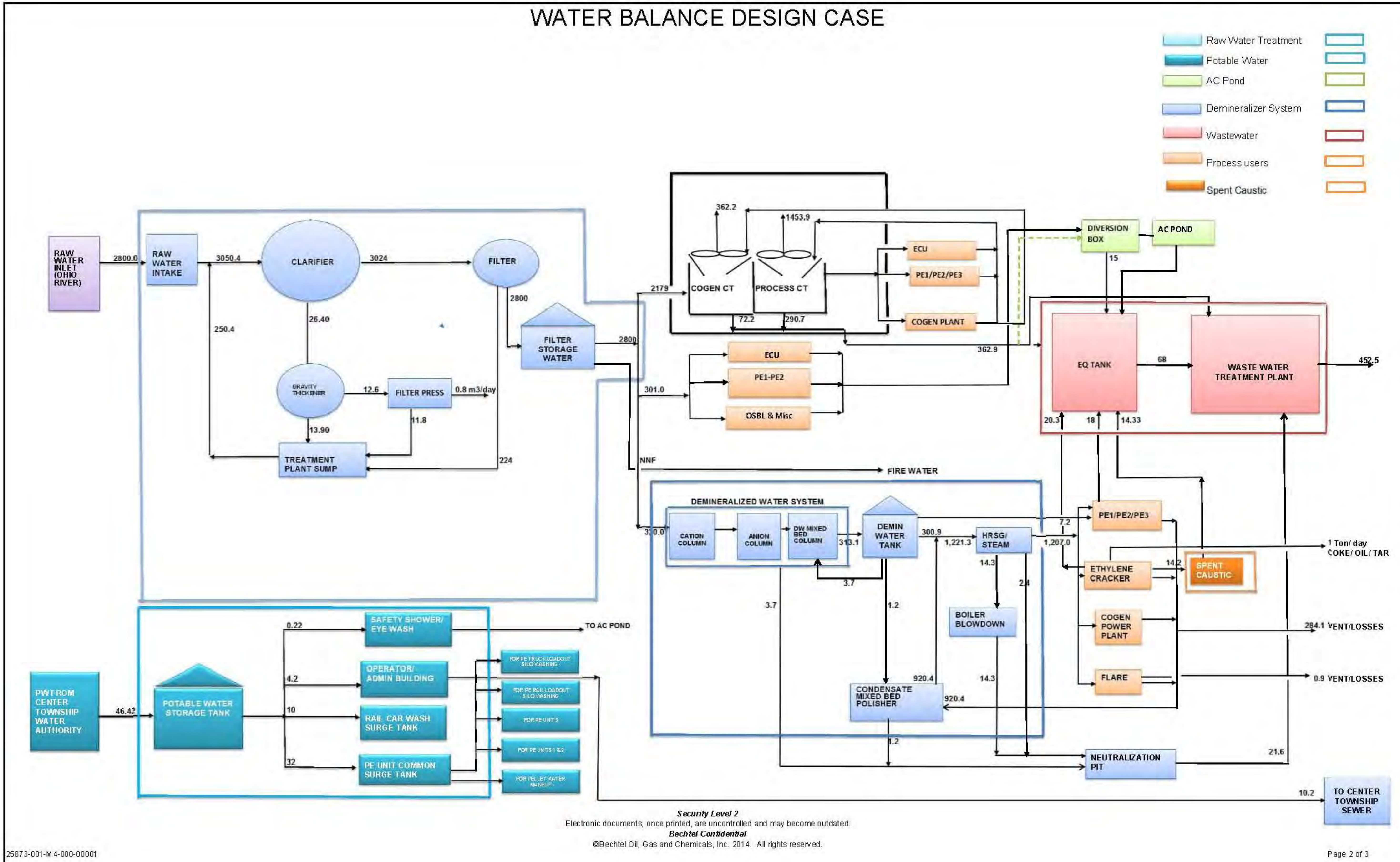
Discharge, Receiving Waters and Water Supply Information			
Outfall No.	021	Design Flow (MGD)	Variable
Latitude	40° 39' 40.28"	Longitude	-80° 20' 33.68"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water runoff from Electric Tower Road		
Receiving Waters	Poorhouse Run (WWF)	Stream Code	33932
NHD Com ID	99680192	RMI	0.50
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	NOVA Chemicals Corporation		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	951.71	Distance from Outfall (mi)	0.60

Other Comments:

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	022	Design Flow (MGD)	Variable
Latitude	40° 39' 38.651"	Longitude	-80° 20' 35.918"
Quad Name	Beaver	Quad Code	1303
Wastewater Description:	Storm water runoff from the Training Center		
Receiving Waters	Raccoon Creek (WWF)	Stream Code	33564
NHD Com ID	99680646	RMI	0.45
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake	Midland Borough Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	4,730
PWS RMI	945.38	Distance from Outfall (mi)	6.49

Other Comments:


Ohio River
376
River Water Intake Structure
Lift-On/Lift-Off Dock
Roll-On/Roll-Off Dock
Poorhouse Run
Raccoon Creek
Rag Run
Pleasant Drive
AC Pond
CR Pond
North Detention Pond
East Rail Detention Pond
West Rail Detention Pond
South Detention Pond (West)
South Detention Pond (East)
Detention Pond A
Detention Pond B
West Detention Pond
Outfall 021 flows into Poorhouse Run culvert. It does not flow into the West Rail Detention Pond.
MAIN GATE
18
001
002
003
004
005
006
007
008
009
010
011
012
013
014
015
016
017
018
019
020
021
022
023
101
201
Legend
NPDES Overflows
NPDES Outfalls (#)
WWTP Outfall System
AC System Main
AC System Collector
AC Trench
Ditches and Swales
Stormwater Pipes
Fenceline
AC Drainage Area - 33.71 ac.
Clean Rainwater Drainage Area - 97.98 ac.
Outfall 016 - 8.59 ac.
Outfall 021 - 25.90 ac.
Outfall 023 Drainage Area - 21.43 ac.
CSX Poor Farm Yard - 3.80 ac.
East Railroad Pond - 23.16 ac.
North Pond - 113.32 ac.
Rag Run - 19.80 ac.
SW Parking Detention Pond A - 14.37 ac.
SW Parking Detention Pond B - 14.10 ac.
South Ponds - 74.30 ac.
West Pond - 8.10 ac.
WWTP Drainage Area - 10.53 ac.
Area Inside Fence Draining to Area Outside of Fence - 13.24 ac.
Environmental Resources Management, Inc.
ERM
September 2019
Scale in Feet
1 inch = 800 feet
800 400 0 800
Feet
Date: September 9, 2019
Version: 1.0
Prepared by: Brian Sterner (ERM)
Checked by:
Approved by:
Site Drainage
Shell Polymers Monaca, PA



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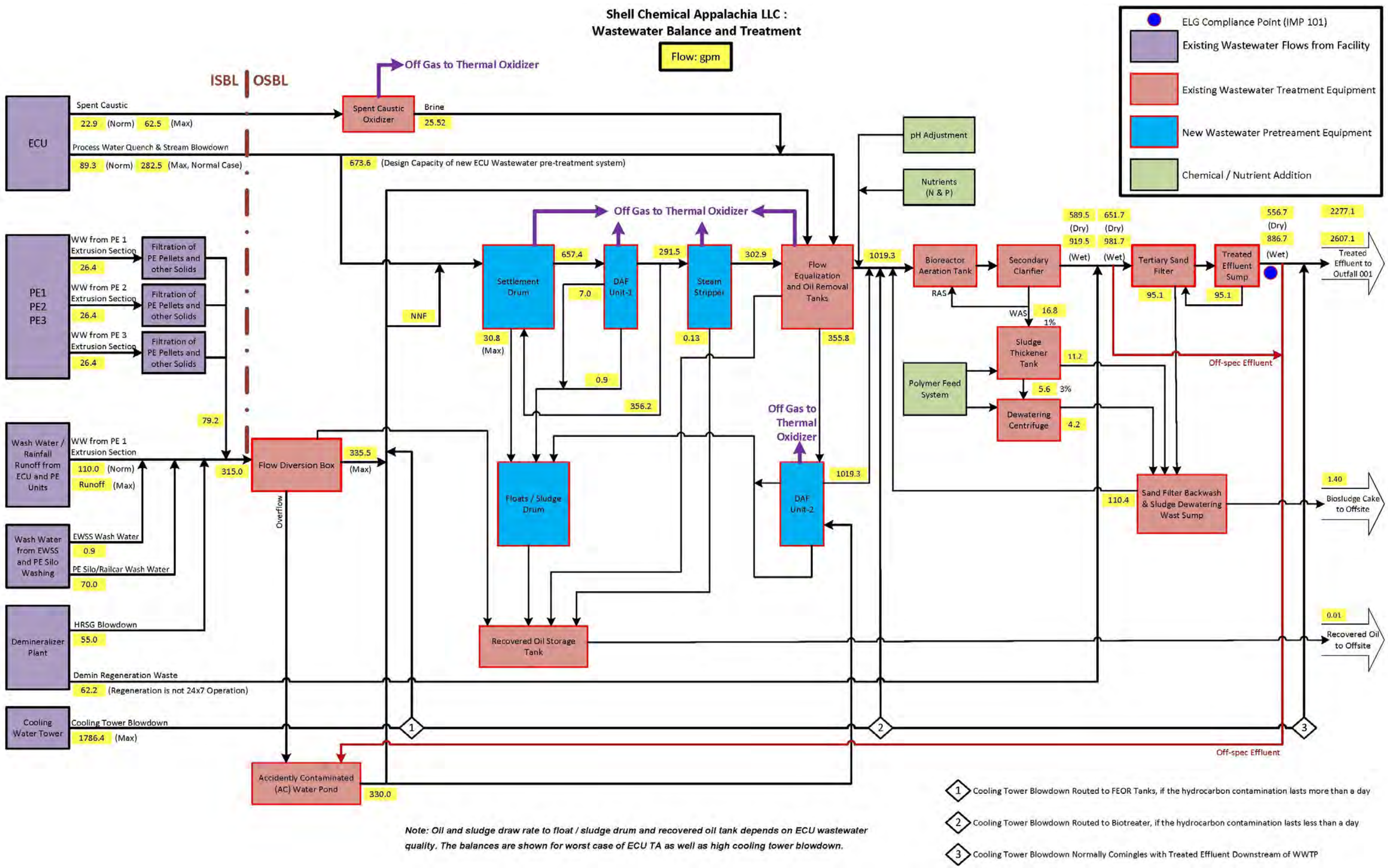

Shell Chemical Appalachia LLC :
Wastewater Balance and Treatment
Flow: gpm
ELG Compliance Point (IMP 101)
Existing Wastewater Flows from Facility
Existing Wastewater Treatment Equipment
New Wastewater Pretreament Equipment
Chemical / Nutrient Addition
ISBL
OSBL
ECU
Spent Caustic
22.9 (Norm) 62.5 (Max)
Process Water Quench & Stream Blowdown
89.3 (Norm) 282.5 (Max, Normal Case)
Spent Caustic Oxidizer
Off Gas to Thermal Oxidizer
Brine
25.52
673.6 (Design Capacity of new ECU Wastewater pre-treatment system)
pH Adjustment
Nutrients (N & P)
PE1 PE2 PE3
WW from PE 1 Extrusion Section
26.4
WW from PE 2 Extrusion Section
26.4
WW from PE 3 Extrusion Section
26.4
Filtration of PE Pellets and other Solids
79.2
NNF
Settlement Drum
657.4
DAF Unit-1
291.5
Steam Stripper
302.9
Flow Equalization and Oil Removal Tanks
1019.3
Bioreactor Aeration Tank
Secondary Clarifier
Tertiary Sand Filter
Treated Effluent Sump
Treated Effluent to Outfall 001
589.5 (Dry) 919.5 (Wet)
651.7 (Dry) 981.7 (Wet)
556.7 (Dry) 886.7 (Wet)
2277.1
2607.1
95.1
95.1
RAS
WAS 16.8 1%
Sludge Thickener Tank
11.2
5.6 3%
Polymer Feed System
Dewatering Centrifuge
4.2
Off-spec Effluent
7.0
0.9
30.8 (Max)
0.13
355.8
356.2
Off Gas to Thermal Oxidizer
Wash Water / Rainfall Runoff from ECU and PE Units
WW from PE 1 Extrusion Section
110.0 (Norm)
Runoff (Max)
315.0
Flow Diversion Box
335.5 (Max)
Overflow
Floats / Sludge Drum
DAF Unit-2
1019.3
Sand Filter Backwash & Sludge Dewatering Wast Sump
110.4
1.40
Biosludge Cake to Offsite
Wash Water from EWSS and PE Silo Washing
EWSS Wash Water
0.9
PE Silo/Railcar Wash Water
70.0
Demineralizer Plant
HRSG Blowdown
55.0
Recovered Oil Storage Tank
0.01
Recovered Oil to Offsite
Demin Regeneration Waste
62.2 (Regeneration is not 24x7 Operation)
Cooling Water Tower
Cooling Tower Blowdown
1786.4 (Max)
1
2
3
Off-spec Effluent
Accidently Contaminated (AC) Water Pond
330.0
Note: Oil and sludge draw rate to float / sludge drum and recovered oil tank depends on ECU wastewater quality. The balances are shown for worst case of ECU TA as well as high cooling tower blowdown.
1 Cooling Tower Blowdown Routed to FEOR Tanks, if the hydrocarbon contamination lasts more than a day
2 Cooling Tower Blowdown Routed to Biotreater, if the hydrocarbon contamination lasts less than a day
3 Cooling Tower Blowdown Normally Comingles with Treated Effluent Downstream of WWTP

Treatment Facility Summary		
Treatment Facility Name: Wastewater Treatment Plant (WWTP)		
WQM Permit No.	**Issuance Date**	**Purpose**
0417201	May 15, 2018	Permit issued to Shell Chemical Appalachia LLC for the industrial wastewater treatment system: one diversion box with underflow and overflow baffles, pipe oil skimmer, oil pump, and wastewater transfer pumps; two flow equalization and oil removal tanks; one recovered oil tank; chemical feed systems; two extended aeration activated sludge bioreactors; a centrifuge for sludge dewatering; tertiary dual-media gravity filters; effluent sumps and pumps
0417201 A-1	January 25, 2019	Permit issued to Shell Chemical Appalachia LLC for in-ground concrete tank ("AC Pond") to collect excess wastewaters from the diversion box that routes wastewaters to the wastewater treatment plant and, if necessary, off-spec effluent and cooling tower blowdown
0417201 A-2	January 4, 2024	Permit issued to Shell Chemical Appalachia LLC for temporary treatment systems in response to excessive hydrocarbon emissions from the bioreactors including: one (1) WEMCO Depurator Model 84 mechanically induced nitrogen gas flotation unit and one (1) ENVIRO-CELL Model EC-15 hydraulically induced nitrogen gas flotation unit between the FEOR tanks and bioreactors; coagulant and flocculant additions before the flotation units, as needed.
0417201 A-3	June 27, 2025	Permit issued to Shell Chemical Appalachia LLC for additional permanent treatment system improvements including: one (1) 31,783 ft^3 settlement drum for emulsion breaking and the separation of light oil and viscous hydrocarbons; two (2) dissolved nitrogen flotation units for primary treatment of ethylene cracking unit wastewater and pre-treatment polishing; one (1) steam stripper column to remove volatile organic compounds; chemical storage and feed systems for coagulant and flocculant additions to the settlement drum and dissolved nitrogen flotation units; associated support systems and facilities including piping, service and standby pumps, vent gas blowers, heat exchangers, residuals storage tanks, etc.

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Industrial	Primary, secondary, and tertiary	Flow equalization, oil skimming, extended aeration activated sludge, clarification, gravity filtration, sludge dewatering	No Disinfection	1.35

Compliance History

DMR Data for Internal Monitoring Point 101 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Monthly	1.17	1.4	1.35	1.35	1.35	1.219	1.188	1.059	1.243	1.15	1.48	1.16
Flow (MGD) Daily Maximum	1.43	1.63	1.9	1.65	1.9	1.53	1.41	1.212	1.393	1.49	1.65	1.3
pH (S.U.) Daily Minimum	7.28	7.28	7.4	7.08	7.23	7.09	6.99	7.18	7.13	7.34	7.53	7.53
pH (S.U.) Daily Maximum	7.98	7.78	7.98	7.95	7.64	7.73	7.36	7.76	7.52	7.53	7.64	7.76
BOD5 (lbs/day) Average Monthly	< 29	< 25	< 36	< 39	< 23	< 29	< 50	< 36	< 34	< 29	< 31	< 17
BOD5 (lbs/day) Daily Maximum	65	< 27	81	58	< 32	43	112	90	53	47	52	< 22
BOD5 (mg/L) Average Monthly	< 3.0	< 2.2	< 3.0	< 3.5	< 2.0	< 3.0	< 4.6	< 4.3	< 3.3	< 3.2	< 2.5	< 1.7
BOD5 (mg/L) Daily Maximum	6.9	2.6	5.1	5.6	< 2.0	4.5	9.5	11.0	4.6	6.2	4.0	< 2.0
TSS (lbs/day) Average Monthly	< 12	63	26	72	41	16	21	12	62	< 8	50	< 8
TSS (lbs/day) Daily Maximum	20	204	37	155	78	27	48	21	151	16	144	10
TSS (mg/L) Average Monthly	< 1.2	4.9	2.4	6.9	4.5	1.5	2.1	1.4	5.9	< 1.0	3.9	< 0.8
TSS (mg/L) Daily Maximum	2.1	15.0	3.1	16.0	11.0	2.1	4.1	2.6	13.0	2.1	11.0	1.3
Oil and Grease (mg/L) Average Monthly	< 1.4	< 1.9	< 1.4	< 3.3	< 1.4	< 1.4	< 2.1	< 1.4	< 1.5	< 1.5	< 1.3	< 15
Oil and Grease (mg/L) Daily Maximum	1.5	< 3.4	1.4	9.1	< 1.4	< 1.4	4	1.5	1.7	2.2	< 1.4	< 19
2-Chlorophenol (lbs/day) Average Monthly	< 0.002	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
2-Chlorophenol (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.003	< 0.003	< 0.004	< 0.003	< 0.003	< 0.002	< 0.003	< 0.003	< 0.003	< 0.002
2-Chlorophenol (mg/L) Average Monthly	< 0.0002	< 0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
2-Chlorophenol (mg/L) Daily Maximum	< 0.00024	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00023	< 0.00022
2,4-Dichlorophenol (lbs/day) Average Monthly	< 0.0005	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0006	< 0.0005

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
2,4-Dichlorophenol (lbs/day) Daily Maximum	< 0.0007	< 0.0007	< 0.0008	< 0.0007	< 0.0008	< 0.0007	< 0.0006	< 0.0005	< 0.0006	< 0.0007	< 0.0007	< 0.0005
2,4-Dichlorophenol (mg/L) Average Monthly	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
2,4-Dichlorophenol (mg/L) Daily Maximum	< 0.000055	< 0.00005	< 0.000051	< 0.000051	< 0.000051	< 0.000051	< 0.00051	< 0.000053	< 0.000051	< 0.000053	< 0.000053	< 0.000049
2,4-Dimethylphenol (lbs/day) Average Monthly	< 0.006	< 0.007	< 0.006	< 0.006	< 0.007	< 0.006	< 0.006	< 0.005	< 0.006	< 0.006	< 0.007	< 0.005
2,4-Dimethylphenol (lbs/day) Daily Maximum	< 0.008	< 0.008	< 0.009	< 0.008	< 0.009	< 0.008	< 0.007	< 0.006	< 0.007	< 0.008	< 0.008	< 0.006
2,4-Dimethylphenol (mg/L) Average Monthly	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
2,4-Dimethylphenol (mg/L) Daily Maximum	< 0.00064	< 0.00059	< 0.00059	< 0.00059	< 0.00059	< 0.00059	< 0.00059	< 0.00061	< 0.00059	< 0.00061	< 0.00061	< 0.00056
Fluorene (lbs/day) Average Monthly	< 0.0007	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0007	< 0.0007	< 0.0006	< 0.0007	< 0.0007	< 0.0009	< 0.0006
Fluorene (lbs/day) Daily Maximum	< 0.0009	< 0.0009	< 0.001	< 0.0009	< 0.001	< 0.0009	< 0.0008	< 0.0007	< 0.0008	< 0.0009	< 0.001	< 0.0007
Fluorene (mg/L) Average Monthly	< 0.000075	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007
Fluorene (mg/L) Daily Maximum	< 0.00007	< 0.000069	< 0.000069	< 0.000069	< 0.000069	< 0.000069	< 0.000069	< 0.000072	< 0.000069	< 0.000072	< 0.000072	< 0.000066
2,4-Dinitrophenol (lbs/day) Average Monthly	< 0.030	< 0.040	< 0.040	< 0.040	< 0.040	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.040	< 0.030
2,4-Dinitrophenol (lbs/day) Daily Maximum	< 0.040	< 0.040	< 0.050	< 0.050	< 0.050	< 0.040	< 0.040	< 0.030	< 0.040	< 0.040	< 0.050	< 0.030
2,4-Dinitrophenol (mg/L) Average Monthly	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol (mg/L) Daily Maximum	< 0.0035	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0034	< 0.0033	< 0.0034	< 0.0034	< 0.0031

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
2,4-Dinitrotoluene (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.004	< 0.004	< 0.004	< 0.003	< 0.003	< 0.003	< 0.004	< 0.003	< 0.004	< 0.003
2,4-Dinitrotoluene (lbs/day) Daily Maximum	< 0.005	< 0.005	< 0.005	< 0.005	< 0.006	< 0.004	< 0.004	< 0.004	< 0.004	< 0.005	< 0.005	< 0.004
2,4-Dinitrotoluene (mg/L) Average Monthly	< 0.0004	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.0003	< 0.0004	< 0.0004	< 0.0003
2,4-Dinitrotoluene (mg/L) Daily Maximum	< 0.00038	< 0.00035	< 0.00035	< 0.00035	< 0.00035	< 0.00035	< 0.00035	< 0.00037	< 0.00035	< 0.00037	< 0.00037	< 0.00034
2,6-Dinitrotoluene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.005	< 0.002	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002
2,6-Dinitrotoluene (lbs/day) Daily Maximum	< 0.002	< 0.002	< 0.003	< 0.002	< 0.003	< 0.020	< 0.002	< 0.010	< 0.002	< 0.002	< 0.002	< 0.002
2,6-Dinitrotoluene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0002	< 0.0006	< 0.0002	< 0.0002	< 0.0002	< 0.0002
2,6-Dinitrotoluene (mg/L) Daily Maximum	< 0.00019	< 0.00017	< 0.00017	< 0.00017	< 0.00017	< 0.0017	< 0.00017	< 0.0017	< 0.00017	< 0.00018	< 0.00018	< 0.00017
4,6-dinitro-o-cresol (lbs/day) Average Monthly	< 0.010	< 0.020	< 0.020	< 0.020	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.010
4,6-dinitro-o-cresol (lbs/day) Daily Maximum	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
4,6-dinitro-o-cresol (mg/L) Average Monthly	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001
4,6-dinitro-o-cresol (mg/L) Daily Maximum	< 0.0016	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0014
2-Nitrophenol (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.0002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
2-Nitrophenol (lbs/day) Daily Maximum	< 0.001	< 0.003	< 0.003	< 0.00019	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
2-Nitrophenol (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
2-Nitrophenol (mg/L) Daily Maximum	< 0.00021	< 0.00019	< 0.00019	< 0.003	< 0.00019	< 0.00019	< 0.00019	< 0.0002	< 0.00019	< 0.0002	< 0.0002	< 0.00019
4-Nitrophenol (lbs/day) Average Monthly	< 0.009	< 0.010	< 0.010	< 0.010	< 0.010	< 0.009	< 0.009	< 0.008	< 0.009	< 0.009	< 0.010	< 0.009
4-Nitrophenol (lbs/day) Daily Maximum	< 0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
4-Nitrophenol (mg/L) Average Monthly	< 0.0009	< 0.001	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.001	< 0.001	< 0.0009
4-Nitrophenol (mg/L) Daily Maximum	< 0.001	< 0.001	< 0.00094	< 0.00094	< 0.00094	< 0.00094	< 0.00094	< 0.00098	< 0.00094	< 0.00098	< 0.00098	< 0.0009
Phenol (lbs/day) Average Monthly	< 0.005	< 0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.004	< 0.005	< 0.005	< 0.006	< 0.004
Phenol (lbs/day) Daily Maximum	< 0.006	< 0.006	< 0.007	< 0.007	< 0.008	< 0.006	< 0.006	< 0.005	< 0.006	< 0.006	< 0.007	< 0.005
Phenol (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenol (mg/L) Daily Maximum	< 0.00053	< 0.00049	< 0.00049	< 0.00049	< 0.00049	< 0.00049	< 0.00049	< 0.00051	< 0.00049	< 0.00051	< 0.00051	< 0.00047
Acenaphthene (lbs/day) Average Monthly	< 0.0006	< 0.0008	< 0.0007	< 0.0007	< 0.001	< 0.0006	< 0.0006	< 0.0006	< 0.0007	< 0.0006	< 0.0008	< 0.0006
Acenaphthene (lbs/day) Daily Maximum	< 0.0008	< 0.0009	< 0.001	< 0.0009	0.002	< 0.0008	< 0.0008	< 0.0007	< 0.0008	< 0.0008	< 0.0009	< 0.0007
Acenaphthene (mg/L) Average Monthly	< 0.00007	< 0.00006	< 0.00006	< 0.00006	< 0.0001	< 0.00006	< 0.00006	< 0.00007	< 0.00006	< 0.00007	< 0.00007	< 0.00006
Acenaphthene (mg/L) Daily Maximum	< 0.000075	< 0.000065	< 0.000065	< 0.000065	0.00025	< 0.000065	< 0.000065	< 0.000068	< 0.000065	< 0.000068	< 0.000068	< 0.000063
Acenaphthylene (lbs/day) Average Monthly	< 0.0006	< 0.0008	< 0.0007	< 0.0007	< 0.0007	< 0.0006	< 0.0006	< 0.0006	< 0.0007	< 0.0006	< 0.0008	< 0.0006
Acenaphthylene (lbs/day) Daily Maximum	< 0.0008	< 0.0009	< 0.001	< 0.0009	< 0.001	< 0.0008	< 0.0008	< 0.0007	< 0.0008	< 0.0008	< 0.0009	< 0.0007
Acenaphthylene (mg/L) Average Monthly	< 0.00007	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00007	< 0.00006	< 0.00007	< 0.00007	< 0.00006
Acenaphthylene (mg/L) Daily Maximum	< 0.000071	< 0.000065	< 0.000065	< 0.000065	< 0.000065	< 0.000065	< 0.000065	< 0.000068	< 0.000065	< 0.000068	< 0.000068	< 0.000063
Acrylonitrile (lbs/day) Average Monthly	< 0.01	< 0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.070	< 0.010	< 0.010

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Acrylonitrile (lbs/day) Daily Maximum	< 0.01	< 0.01	< 0.020	< 0.020	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.100	< 0.020	< 0.010
Acrylonitrile (mg/L) Average Monthly	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.007	< 0.001	< 0.001
Acrylonitrile (mg/L) Daily Maximum	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0055	< 0.011	< 0.0011	< 0.0011
Anthracene (lbs/day) Average Monthly	< 0.0005	< 0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0005	< 0.0005	< 0.0006	< 0.0004
Anthracene (lbs/day) Daily Maximum	< 0.0006	< 0.0006	< 0.0007	< 0.0007	< 0.0008	< 0.0006	< 0.0006	< 0.0005	< 0.0006	< 0.0006	< 0.0007	< 0.0005
Anthracene (mg/L) Average Monthly	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Anthracene (mg/L) Daily Maximum	< 0.000053	< 0.000049	< 0.000049	< 0.000049	< 0.000049	< 0.000049	< 0.000049	< 0.000051	< 0.000049	< 0.000051	< 0.000051	< 0.000047
Chlorobenzene (lbs/day) Average Monthly	< 0.005	< 0.006	< 0.004	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.003	< 0.020	< 0.003	< 0.002
Chlorobenzene (lbs/day) Daily Maximum	< 0.006	< 0.007	< 0.008	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.030	< 0.003	< 0.003
Chlorobenzene (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0004	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.002	< 0.0003	< 0.0003
Chlorobenzene (mg/L) Daily Maximum	< 0.0005	< 0.0005	< 0.0005	< 0.00025	< 0.00025	< 0.00025	< 0.00025	< 0.00025	< 0.0013	< 0.0025	< 0.00025	< 0.00025
1,2-Dichlorobenzene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.005	< 0.002	< 0.002	< 0.003	< 0.002
1,2-Dichlorobenzene (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.010	< 0.002	< 0.003	< 0.003	< 0.002
1,2-Dichlorobenzene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0007	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2-Dichlorobenzene (mg/L) Daily Maximum	< 0.00023	< 0.00021	< 0.00021	< 0.00021	< 0.00021	< 0.00021	< 0.00021	< 0.0021	< 0.00021	< 0.00022	< 0.00022	< 0.0002
1,3-Dichlorobenzene (lbs/day) Average Monthly	< 0.002	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
1,3-Dichlorobenzene (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.003	< 0.003	< 0.003	< 0.002

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,3-Dichlorobenzene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,3-Dichlorobenzene (mg/L) Daily Maximum	< 0.00023	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00022	< 0.00021
1,4-Dichlorobenzene (lbs/day) Average Monthly	< 0.002	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
1,4-Dichlorobenzene (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.004	< 0.003	< 0.004	< 0.003	< 0.003	< 0.002	< 0.003	< 0.003	< 0.003	< 0.002
1,4-Dichlorobenzene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,4-Dichlorobenzene (mg/L) Daily Maximum	< 0.00026	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00025	< 0.00024	< 0.00025	< 0.00025	< 0.00023
1,3-Dichloro-propylene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.010	< 0.002	< 0.002
1,3-Dichloro-propylene (lbs/day) Daily Maximum	< 0.002	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.020	< 0.003	< 0.002
1,3-Dichloro-propylene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0003	< 0.001	< 0.0002	< 0.0002
1,3-Dichloro-propylene (mg/L) Daily Maximum	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.002	< 0.0002	< 0.0002
1,2,4-Trichloro-benzene (lbs/day) Average Monthly	< 0.002	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
1,2,4-Trichloro-benzene (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.004	< 0.003	< 0.004	< 0.003	< 0.003	< 0.002	< 0.003	< 0.003	< 0.003	< 0.002
1,2,4-Trichloro-benzene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2,4-Trichloro-benzene (mg/L) Daily Maximum	< 0.00027	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00024	< 0.00025	< 0.00024	< 0.00025	< 0.00025	< 0.00023
Ethylbenzene (lbs/day) Average Monthly	< 0.005	< 0.006	< 0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.010	< 0.002	< 0.002

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Ethylbenzene (lbs/day) Daily Maximum	< 0.006	< 0.007	< 0.008	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.020	< 0.003	< 0.002
Ethylbenzene (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0003	< 0.001	< 0.0002	< 0.0002
Ethylbenzene (mg/L) Daily Maximum	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.002	< 0.0002	< 0.0002
Hexachloro-benzene (lbs/day) Average Monthly	< 0.0005	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0005	< 0.0006	< 0.0005	< 0.0007	< 0.0005
Hexachlorobenzene (lbs/day) Daily Maximum	< 0.0007	< 0.0007	< 0.0009	< 0.0008	< 0.0009	< 0.0007	< 0.0007	< 0.0006	< 0.0007	< 0.0007	< 0.0008	< 0.0006
Hexachloro-benzene (mg/L) Average Monthly	< 0.00006	< 0.00006	< 0.00006	< 0.00005	< 0.00006	< 0.00005	< 0.00006	< 0.00006	< 0.00005	< 0.00006	< 0.00006	< 0.00005
Hexachlorobenzene (mg/L) Daily Maximum	< 0.000061	< 0.000056	< 0.000056	< 0.000056	< 0.000056	< 0.000056	< 0.000056	< 0.000058	< 0.000056	< 0.000058	< 0.000058	< 0.000054
Nitrobenzene (lbs/day) Average Monthly	< 0.005	< 0.006	< 0.006	< 0.005	< 0.006	< 0.005	< 0.005	< 0.004	< 0.005	< 0.005	< 0.006	< 0.005
Nitrobenzene (lbs/day) Daily Maximum	< 0.006	< 0.007	< 0.008	< 0.007	< 0.008	< 0.006	< 0.006	< 0.005	< 0.006	< 0.006	< 0.007	< 0.005
Nitrobenzene (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Nitrobenzene (mg/L) Daily Maximum	< 0.00054	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00052	< 0.0005	< 0.00052	< 0.00052	< 0.00048
Benzene (lbs/day) Average Monthly	< 0.003	0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
Benzene (lbs/day) Daily Maximum	< 0.004	0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
Benzene (mg/L) Average Monthly	< 0.0004	0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.003	< 0.0003	< 0.0003
Benzene (mg/L) Daily Maximum	0.0021	0.0003	< 0.00081	< 0.00033	0.00092	0.00074	< 0.0003	< 0.0003	< 0.0015	0.003	< 0.0003	< 0.0003
Benzo(a)-Anthracene (lbs/day) Average Monthly	< 0.0007	< 0.0009	< 0.0008	< 0.0008	< 0.0008	< 0.0007	< 0.0007	< 0.0007	< 0.0008	< 0.0007	< 0.0009	< 0.0007
Benzo(a)-Anthracene (lbs/day) Daily Maximum	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0009	< 0.0008	< 0.0009	< 0.001	< 0.001	< 0.0008
Benzo(a)-Anthracene (mg/L) Average Monthly	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00008	< 0.00007	< 0.00008	< 0.00008	< 0.00007

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Benzo(a)-Anthracene (mg/L) Daily Maximum	< 0.000082	< 0.000075	< 0.000075	< 0.000075	< 0.000075	< 0.000075	< 0.000075	< 0.000078	< 0.000075	< 0.000078	< 0.000078	< 0.000072
Benzo(a)Pyrene (lbs/day) Average Monthly	< 0.001	< 0.001	< 0.0007	< 0.0006	< 0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0007	< 0.0005
Benzo(a)Pyrene (lbs/day) Daily Maximum	< 0.002	< 0.002	< 0.001	< 0.0007	< 0.0008	< 0.0007	< 0.0006	< 0.0005	< 0.0006	< 0.0007	< 0.0008	< 0.0006
Benzo(a)Pyrene (mg/L) Average Monthly	< 0.0001	< 0.0001	< 0.00007	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Benzo(a)Pyrene (mg/L) Daily Maximum	< 0.00014	< 0.00013	< 0.00013	< 0.000053	< 0.000053	< 0.000053	< 0.000053	< 0.000055	< 0.000053	< 0.000055	< 0.000055	< 0.000051
Benzo(k)Fluor-anthene (lbs/day) Average Monthly	< 0.0009	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0009	< 0.0009	< 0.0008	< 0.0009	< 0.0009	< 0.001	< 0.0008
Benzo(k)Fluor-anthene (lbs/day) Daily Maximum	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0009	< 0.001	< 0.001	< 0.001	< 0.0009
Benzo(k)Fluor-anthene (mg/L) Average Monthly	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00008
Benzo(k)Fluor-anthene (mg/L) Daily Maximum	< 0.000096	< 0.000088	< 0.000088	< 0.000088	< 0.000088	< 0.000088	< 0.000088	< 0.000092	< 0.000088	< 0.000092	< 0.000092	< 0.000085
3,4-Benzo-fluoranthene (lbs/day) Average Monthly	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0009	< 0.001	< 0.0007	< 0.001	< 0.0009
3,4-Benzo-fluoranthene (lbs/day) Daily Maximum	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
3,4-Benzo-fluoranthene (mg/L) Average Monthly	< 0.0001	< 0.0001	< 0.0001	< 0.00009	< 0.0001	< 0.00009	< 0.0001	< 0.0001	< 0.00009	< 0.00008	< 0.0001	< 0.00009
3,4-Benzo-fluoranthene (mg/L) Daily Maximum	< 0.00011	< 0.000097	< 0.000097	< 0.000097	< 0.000097	< 0.000097	< 0.000097	< 0.0001	< 0.000097	< 0.0001	< 0.0001	< 0.000093
Carbon Tetrachloride (lbs/day) Average Monthly	< 0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.030	< 0.005	< 0.004
Carbon Tetrachloride (lbs/day) Daily Maximum	< 0.005	< 0.006	< 0.007	< 0.006	< 0.007	< 0.005	< 0.005	< 0.004	< 0.005	< 0.050	< 0.006	< 0.005

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Carbon Tetrachloride (mg/L) Average Monthly	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.003	< 0.0004	< 0.0004
Carbon Tetrachloride (mg/L) Daily Maximum	< 0.00042	< 0.00042	< 0.00042	< 0.00042	< 0.00042	< 0.00042	< 0.00042	< 0.00042	< 0.0021	< 0.0042	< 0.00042	< 0.00042
Chloroethane (lbs/day) Average Monthly	< 0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.004	< 0.004	< 0.005	< 0.030	< 0.006	< 0.004
Chloroethane (lbs/day) Daily Maximum	< 0.005	< 0.006	< 0.007	< 0.006	< 0.007	< 0.006	< 0.005	< 0.005	< 0.005	< 0.060	< 0.006	< 0.005
Chloroethane (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0006	< 0.003	< 0.0005	< 0.0005
Chloroethane (mg/L) Daily Maximum	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.0023	< 0.0045	< 0.00045	< 0.00045
1,1,1-Trichloroethane (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
1,1,1-Trichloroethane (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
1,1,1-Trichloroethane (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
1,1,1-Trichloroethane (mg/L) Daily Maximum	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
1,1,2-Trichloroethane (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
1,1,2-Trichloroethane (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
1,1,2-Trichloroethane (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
1,1,2-Trichloroethane (mg/L) Daily Maximum	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
1,1-Dichloroethane (lbs/day) Average Monthly	< 0.004	< 0.005	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.020	< 0.005	< 0.004

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,1-Dichloroethane (lbs/day) Daily Maximum	< 0.005	< 0.005	< 0.006	< 0.006	< 0.006	< 0.005	< 0.005	< 0.004	< 0.005	< 0.050	< 0.006	< 0.004
1,1-Dichloroethane (mg/L) Average Monthly	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.003	< 0.0004	< 0.0004
1,1-Dichloroethane (mg/L) Daily Maximum	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.002	< 0.004	< 0.0004	< 0.0004
1,2-Dichloroethane (lbs/day) Average Monthly	< 0.004	< 0.005	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.004	< 0.004	< 0.020	< 0.005	< 0.004
1,2-Dichloroethane (lbs/day) Daily Maximum	< 0.005	< 0.005	< 0.006	< 0.006	< 0.006	< 0.005	< 0.005	< 0.004	< 0.005	< 0.050	< 0.006	< 0.004
1,2-Dichloroethane (mg/L) Average Monthly	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.003	< 0.0004	< 0.0004
1,2-Dichloroethane (mg/L) Daily Maximum	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.002	< 0.004	< 0.0004	< 0.0004
1,2-Dichloropropane (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
1,2-Dichloropropane (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
1,2-Dichloropropane (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
1,2-Dichloropropane (mg/L) Daily Maximum	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Average Monthly	< 0.03	< 0.02	< 0.070	< 0.070	< 0.070	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.200	< 0.070
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Daily Maximum	0.04	< 0.03	< 0.10	< 0.090	< 0.100	< 0.080	< 0.070	< 0.060	< 0.070	< 0.080	0.400	< 0.090
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Average Monthly	< 0.003	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.010	< 0.007

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Daily Maximum	0.0069	< 0.0021	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0065	< 0.0062	< 0.0065	0.026	< 0.011
Chloroform (lbs/day) Average Monthly	< 0.010	0.030	< 0.040	0.030	0.050	0.010	0.020	0.030	< 0.010	< 0.020	< 0.004	< 0.005
Chloroform (lbs/day) Daily Maximum	0.030	0.080	0.070	0.070	0.100	0.020	0.020	0.040	0.020	< 0.040	0.006	0.010
Chloroform (mg/L) Average Monthly	< 0.001	0.002	< 0.003	0.002	0.005	0.001	0.002	0.002	< 0.001	< 0.002	< 0.0003	< 0.0005
Chloroform (mg/L) Daily Maximum	0.0045	0.0062	0.0068	0.0065	0.021	0.003	0.0029	0.0057	0.0022	< 0.003	0.00047	0.0012
Chrysene (lbs/day) Average Monthly	< 0.0008	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0008	< 0.0008	< 0.0007	< 0.0008	< 0.0008	< 0.001	< 0.0007
Chrysene (lbs/day) Daily Maximum	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0008	< 0.0009	< 0.001	< 0.001	< 0.0008
Chrysene (mg/L) Average Monthly	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Chrysene (mg/L) Daily Maximum	< 0.000088	< 0.000081	< 0.000081	< 0.000081	< 0.000081	< 0.000081	< 0.000081	< 0.000084	< 0.000081	< 0.000084	< 0.000084	< 0.000078
Diethyl Phthalate (lbs/day) Average Monthly	< 0.002	< 0.003	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006	< 0.006	< 0.007	< 0.005
Diethyl Phthalate (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.009	< 0.008	< 0.009	< 0.007	< 0.007	< 0.006	< 0.007	< 0.007	< 0.008	< 0.006
Diethyl Phthalate (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0005
Diethyl Phthalate (mg/L) Daily Maximum	< 0.00027	< 0.00025	< 0.00057	< 0.00057	< 0.00057	< 0.00057	< 0.00057	< 0.00059	< 0.00057	< 0.00059	< 0.00059	< 0.00055
Dimethyl Phthalate (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002
Dimethyl Phthalate (lbs/day) Daily Maximum	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.003	0.004	< 0.002
Dimethyl Phthalate (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dimethyl Phthalate (mg/L) Daily Maximum	< 0.00022	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.00021	< 0.0002	< 0.00021	0.00033	< 0.00019

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Di-n-Butyl Phthalate (lbs/day) Average Monthly	< 0.004	< 0.004	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.040	< 0.050	< 0.050	< 0.060	< 0.040
Di-n-Butyl Phthalate (lbs/day) Daily Maximum	< 0.005	< 0.005	< 0.070	< 0.070	< 0.080	< 0.060	< 0.060	< 0.050	< 0.060	< 0.060	< 0.070	< 0.050
Di-n-Butyl Phthalate (mg/L) Average Monthly	< 0.0004	< 0.0004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Di-n-Butyl Phthalate (mg/L) Daily Maximum	< 0.00041	< 0.00038	< 0.0049	< 0.0049	< 0.0049	< 0.0049	< 0.0049	< 0.0051	< 0.0049	< 0.0051	< 0.0051	< 0.0047
Fluoranthene (lbs/day) Average Monthly	< 0.0006	< 0.0007	< 0.0009	< 0.0007	< 0.0007	< 0.0006	< 0.0006	< 0.0005	< 0.0006	< 0.0006	< 0.0008	< 0.0006
Fluoranthene (lbs/day) Daily Maximum	< 0.0008	< 0.0008	0.002	< 0.0008	< 0.001	< 0.0008	< 0.0007	< 0.0006	< 0.0007	< 0.0008	< 0.0009	< 0.0006
Fluoranthene (mg/L) Average Monthly	< 0.00006	< 0.00006	< 0.00009	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Fluoranthene (mg/L) Daily Maximum	< 0.000065	< 0.00006	0.0002	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.000063	< 0.00006	< 0.000063	< 0.000063	< 0.000058
Hexachloro-butadiene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.0009	< 0.0008	< 0.0008	< 0.0007	< 0.0007	< 0.0006	< 0.0007	< 0.0007	< 0.0009	< 0.0006
Hexachloro-butadiene (lbs/day) Daily Maximum	< 0.002	< 0.002	< 0.001	< 0.0009	< 0.001	< 0.0009	< 0.0008	< 0.0007	< 0.0008	< 0.0009	< 0.001	< 0.0007
Hexachloro-butadiene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.00009	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007	< 0.00007
Hexachloro-butadiene (mg/L) Daily Maximum	< 0.00017	< 0.00016	< 0.00016	< 0.000069	< 0.000069	< 0.000069	< 0.000069	< 0.000072	< 0.000069	< 0.000072	< 0.000072	< 0.000066
Hexachloroethane (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001
Hexachloroethane (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.002	< 0.002	< 0.002	< 0.001
Hexachloroethane (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Hexachloroethane (mg/L) Daily Maximum	< 0.00035	< 0.00032	< 0.00032	< 0.00013	< 0.00013	< 0.00013	< 0.00013	< 0.00014	< 0.00013	< 0.00014	< 0.00014	< 0.00013

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Methyl Chloride (lbs/day) Average Monthly	< 0.006	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.006	< 0.006	< 0.007	< 0.040	< 0.008	< 0.006
Methyl Chloride (lbs/day) Daily Maximum	< 0.008	< 0.009	< 0.010	< 0.009	< 0.010	< 0.008	< 0.008	< 0.006	< 0.007	< 0.080	< 0.009	< 0.007
Methyl Chloride (mg/L) Average Monthly	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0008	< 0.004	< 0.0006	< 0.0006
Methyl Chloride (mg/L) Daily Maximum	< 0.00064	< 0.00064	< 0.00064	< 0.00064	< 0.00064	< 0.00064	< 0.00064	< 0.00064	< 0.0032	< 0.0064	< 0.00064	< 0.00064
Methylene Chloride (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
Methylene Chloride (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
Methylene Chloride (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
Methylene Chloride (mg/L) Daily Maximum	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	0.00038	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
Naphthalene (lbs/day) Average Monthly	< 0.0006	< 0.001	< 0.0007	< 0.0006	< 0.006	< 0.0006	< 0.002	< 0.020	< 0.0006	< 0.0009	< 0.003	< 0.0006
Naphthalene (lbs/day) Daily Maximum	< 0.0008	0.002	< 0.0009	< 0.0008	0.020	< 0.0008	0.007	0.090	< 0.0007	0.002	0.008	0.0007
Naphthalene (mg/L) Average Monthly	< 0.000064	< 0.00009	< 0.00006	< 0.00006	< 0.0007	< 0.00006	< 0.0002	< 0.002	< 0.00006	< 0.0001	< 0.0002	< 0.00006
Naphthalene (mg/L) Daily Maximum	< 0.00006	0.00019	< 0.000059	< 0.000059	0.0025	0.000059	0.00078	0.0091	< 0.000059	0.00024	0.00066	0.000084
Phenanthrene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.002	< 0.002	< 0.002	< 0.001
Phenanthrene (lbs/day) Daily Maximum	< 0.002	< 0.002	< 0.002	< 0.002	< 0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Phenanthrene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Phenanthrene (mg/L) Daily Maximum	< 0.00017	< 0.00016	0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00016	< 0.00015

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Pyrene (lbs/day) Average Monthly	< 0.001	< 0.001	< 0.0008	< 0.0006	< 0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0007	< 0.0005
Pyrene (lbs/day) Daily Maximum	< 0.001	< 0.001	0.001	< 0.0007	< 0.0009	< 0.0007	< 0.0006	< 0.0006	< 0.0006	< 0.0007	< 0.0008	< 0.0006
Pyrene (mg/L) Average Monthly	< 0.0001	< 0.0001	< 0.00008	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Pyrene (mg/L) Daily Maximum	< 0.00012	< 0.00011	0.00011	< 0.000054	< 0.000054	< 0.000054	< 0.000054	< 0.000056	< 0.000054	< 0.000056	< 0.000056	< 0.000052
1,1-Dichloroethylene (lbs/day) Average Monthly	< 0.007	< 0.008	< 0.006	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
1,1-Dichloroethylene (lbs/day) Daily Maximum	< 0.008	< 0.010	< 0.010	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003
1,1-Dichloroethylene (mg/L) Average Monthly	< 0.0007	< 0.0007	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
1,1-Dichloroethylene (mg/L) Daily Maximum	< 0.0007	< 0.0007	< 0.0007	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
trans-1,2-Dichloroethylene (lbs/day) Average Monthly	< 0.008	< 0.009	< 0.009	< 0.009	< 0.009	< 0.008	< 0.008	< 0.007	< 0.008	< 0.050	< 0.010	< 0.008
trans-1,2-Dichloroethylene (lbs/day) Daily Maximum	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.009	< 0.008	< 0.009	< 0.100	< 0.010	< 0.009
trans-1,2-Dichloroethylene (mg/L) Average Monthly	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.001	< 0.005	< 0.0008	< 0.0008
trans-1,2-Dichloroethylene (mg/L) Daily Maximum	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.0008	< 0.004	< 0.008	< 0.0008	< 0.0008
Tetrachloroethylene (lbs/day) Average Monthly	< 0.003	< 0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.020	< 0.004	< 0.003
Tetrachloroethylene (lbs/day) Daily Maximum	< 0.004	< 0.004	< 0.005	< 0.004	< 0.005	< 0.004	< 0.004	< 0.003	< 0.003	< 0.040	< 0.004	< 0.003

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Tetrachloroethylene (mg/L) Average Monthly	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0004	< 0.002	< 0.0003	< 0.0003
Tetrachloroethylene (mg/L) Daily Maximum	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0015	< 0.003	< 0.0003	< 0.0003
Toluene (lbs/day) Average Monthly	< 0.005	< 0.006	< 0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.010	< 0.002	< 0.002
Toluene (lbs/day) Daily Maximum	< 0.006	< 0.007	< 0.008	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.020	< 0.003	< 0.002
Toluene (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0003	< 0.001	< 0.0002	< 0.0002
Toluene (mg/L) Daily Maximum	0.00065	< 0.0005	< 0.0005	< 0.0002	0.00032	0.00027	< 0.0002	< 0.0002	< 0.001	< 0.002	< 0.0002	< 0.0002
Trichloroethylene (lbs/day) Average Monthly	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.010	< 0.002	< 0.002
Trichloroethylene (lbs/day) Daily Maximum	< 0.002	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	< 0.020	< 0.003	< 0.002
Trichloroethylene (mg/L) Average Monthly	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0003	< 0.001	< 0.0002	< 0.0002
Trichloroethylene (mg/L) Daily Maximum	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.001	< 0.002	< 0.0002	< 0.0002
Vinyl Chloride (lbs/day) Average Monthly	< 0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.004	< 0.004	< 0.005	< 0.030	< 0.006	< 0.004
Vinyl Chloride (lbs/day) Daily Maximum	< 0.005	< 0.006	< 0.007	< 0.006	< 0.007	< 0.006	< 0.005	< 0.005	< 0.005	< 0.060	< 0.006	< 0.005
Vinyl Chloride (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00005	< 0.0005	< 0.0006	< 0.003	< 0.0005	< 0.0005
Vinyl Chloride (mg/L) Daily Maximum	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.00045	< 0.0023	< 0.0045	< 0.00045	< 0.00045

DMR Data for Internal Monitoring Point 201 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Monthly	0.924	0.947	0.703	0.808	0.995	0.896	0.7398982	1.17	1.18	1.21	1.05	1.03
Flow (MGD) Daily Maximum	1.206	1.49	1.324	1.093	1.516	1.218	1.4928462	1.79	1.69	1.5	1.25	1.36

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
pH (S.U.) Daily Minimum	7.284	7.03	7.17	6.92	7.05	6.78	6.91	7.16	7.04	6.53	7.27	7.14
pH (S.U.) Daily Maximum	7.819	7.95	7.54	7.41	7.64	7.61	7.25	7.63	7.62	7.48	7.58	7.84
Free Available Chlorine (mg/L) Average Monthly	0.1	0.1	0.02	0.1	0.1	0.05	0.03	0.02	0.0004	0.03	0.02	0.02
Free Available Chlorine (mg/L) Daily Maximum	0.145	0.107	0.07	0.11	0.111	0.196	0.048	0.26	0.014	0.08	0.04	0.10

DMR Data for Outfall 001 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Monthly	2.3	2.2	1.81	2.1	2.0	2.1	2	2.3	2.3	2.3	2.4	2.3
Flow (MGD) Daily Maximum	2.7	2.7	2.6	2.7	2.7	2.4	2.7	2.7	2.8	2.8	2.8	2.7
pH (S.U.) Daily Minimum	7.36	6.9	7.46	6.67	6.49	7.13	7.15	7.26	7.54	7.29	7.83	7.72
pH (S.U.) Daily Maximum	8.09	8.05	8.01	7.83	8.01	7.93	7.67	8.09	8.08	7.93	8.04	8.04
TRC (mg/L) Average Monthly	0.1	0.1	0.1	0.1	0.1	0.1	0.04	0.1	0.1	0.1	0.1	0.1
TRC (mg/L) Daily Maximum	0.113	0.14	0.237	0.092	0.106	0.113	0.064	0.147	0.12	0.161	0.161	0.216
Temperature (ºF) Daily Maximum	95.5	90.9	86.7	87.6	81.1	79.7	77.9	85.7	90.7	91.5	95.9	95.6
Total Dissolved Solids (mg/L) Average Monthly	2760	2500	2580	2500	2575	2520	2325	2850	3050	3460	3650	3360
Total Dissolved Solids (mg/L) Daily Maximum	3300	2700	3000	2700	2700	2800	2700	3000	3500	3800	3800	3800
Oil and Grease (mg/L) Average Monthly	< 1.6	< 1.6	< 1.9	< 4.1	< 1.8	< 1.7	< 2.4	< 2.3	< 2.1	< 1.7	< 2.3	< 3.9
Oil and Grease (mg/L) Instantaneous Maximum	3.3	3.3	8.4	46.0	3.5	4.3	9.6	5.6	6.8	3.2	7.3	44.7
Total Aluminum (mg/L) Average Monthly	< 0.14	< 0.15	< 0.16	< 0.19	< 0.13	< 0.23	< 0.1	0.19	0.27	0.31	0.17	0.28

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Aluminum (mg/L) Daily Maximum	0.16	0.26	0.19	0.31	0.17	0.39	0.11	0.21	0.35	0.47	0.25	0.55
Hexavalent Chromium (mg/L) Average Monthly	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.0047	< 0.006	< 0.006	< 0.006
Hexavalent Chromium (mg/L) Daily Maximum	< 0.006	< 0.006	0.006	< 0.006	< 0.006	< 0.006	0.007	< 0.006	< 0.006	< 0.006	< 0.006	0.006
Total Copper (mg/L) Average Monthly	< 0.0089	0.0111	0.0117	0.016	< 0.013	< 0.015	< 0.011	< 0.0084	0.0102	< 0.0147	< 0.0095	0.0096
Total Copper (mg/L) Daily Maximum	0.012	0.014	0.015	0.021	0.017	0.022	0.014	0.0094	0.011	0.031	0.012	0.013
Total Mercury (mg/L) Daily Maximum	0.000032			0.000012			0.000024			0.000009		
Sulfate (mg/L) Average Monthly	1600	1450	1460	1425	1450	1420	1400	1750	1925	2240	2100	2020
Sulfate (mg/L) Daily Maximum	2000	1700	1700	1600	1600	1600	1600	1800	2200	2500	2200	2400
Pentachloro-benzene (mg/L) Daily Maximum	< 0.0015			< 0.0016			< 0.0015			< 0.0015		
Hexachloro-benzene (mg/L) Daily Maximum	< 0.00015			< 0.00016			< 0.00015			< 0.00015		
Benzene (mg/L) Average Monthly	< 0.0003	< 0.00035	< 0.0003	< 0.0003	< 0.0006	< 0.0003	< 0.0003	< 0.00061	< 0.0016	< 0.0008	< 0.0003	< 0.0003
Benzene (mg/L) Daily Maximum	< 0.0003	0.00051	< 0.0003	< 0.0003	< 0.0015	< 0.0003	0.0003	< 0.0015	< 0.003	< 0.003	< 0.0003	< 0.0003
Chloride (mg/L) Average Monthly	154	136	140	175	215	168	153	158	153	170	158	152
Chloride (mg/L) Daily Maximum	250	160	160	230	300	190	180	170	170	200	170	180
Bromide (mg/L) Average Monthly	2.3	< 1.05	< 0.13	< 0.111	< 0.13	< 0.89	< 0.48	< 0.13	< 0.13	< 0.115	< 0.13	< 0.099
Bromide (mg/L) Daily Maximum	2.7	2.5	< 0.13	< 0.13	< 0.13	< 2.5	< 1.3	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
Hexachloro-butadiene (mg/L) Daily Maximum	< 0.0005			< 0.00054			< 0.00052			< 0.0005		
1,2,4,5-Tetrachlorobenzene (mg/L) Daily Maximum	< 0.00046			< 0.00049			< 0.000482			< 0.00046		

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,2,3,4-Tetrachlorobenzene (mg/L) Daily Maximum	< 0.00092			< 0.00099			< 0.00095			< 0.00092		

DMR Data for Outfall 002 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum							0.19					
pH (S.U.) Daily Maximum							8.38					
COD (mg/L) Daily Maximum							20					
TSS (mg/L) Daily Maximum							7.8					
Nitrate-Nitrite (mg/L) Daily Maximum							0.12					
Total Phosphorus (mg/L) Daily Maximum							< 0.04					
Total Aluminum (mg/L) Daily Maximum							0.14					
Total Iron (mg/L) Daily Maximum							0.37					
Total Lead (mg/L) Daily Maximum							< 0.0071					
Total Mercury (mg/L) Daily Maximum							0.000032					
Total Selenium (mg/L) Daily Maximum							< 0.016					
Total Thallium (mg/L) Daily Maximum							< 0.012					
Total Zinc (mg/L) Daily Maximum							0.025					

DMR Data for Outfall 004 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Monthly					0.44							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum					0.44							
pH (S.U.) Daily Minimum					7.3							
pH (S.U.) Daily Maximum					7.3							
BOD5 (lbs/day) Average Monthly					< 7							
BOD5 (lbs/day) Daily Maximum					< 7							
BOD5 (mg/L) Average Monthly					< 2.0							
BOD5 (mg/L) Daily Maximum					< 2.0							
TSS (lbs/day) Average Monthly					9							
TSS (lbs/day) Daily Maximum					9							
TSS (mg/L) Average Monthly					2.6							
TSS (mg/L) Daily Maximum					2.55							
Oil and Grease (mg/L) Average Monthly					< 1.3							
Oil and Grease (mg/L) Instantaneous Maximum					< 1.3							
2-Chlorophenol (lbs/day) Average Monthly					< 0.0008							
2-Chlorophenol (lbs/day) Daily Maximum					< 0.0008							
2-Chlorophenol (mg/L) Average Monthly					< 0.0002							
2-Chlorophenol (mg/L) Daily Maximum					< 0.00022							
2,4-Dichlorophenol (lbs/day) Average Monthly					< 0.0002							
2,4-Dichlorophenol (lbs/day) Daily Maximum					< 0.0002							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
2,4-Dichlorophenol (mg/L) Average Monthly					< 0.00005							
2,4-Dichlorophenol (mg/L) Daily Maximum					< 0.000049							
2,4-Dimethylphenol (lbs/day) Average Monthly					< 0.002							
2,4-Dimethylphenol (lbs/day) Daily Maximum					< 0.002							
2,4-Dimethylphenol (mg/L) Average Monthly					< 0.0006							
2,4-Dimethylphenol (mg/L) Daily Maximum					< 0.00056							
Fluorene (lbs/day) Average Monthly					< 0.0002							
Fluorene (lbs/day) Daily Maximum					< 0.0002							
Fluorene (mg/L) Average Monthly					< 0.00007							
Fluorene (mg/L) Daily Maximum					< 0.000066							
2,4-Dinitrophenol (lbs/day) Average Monthly					< 0.010							
2,4-Dinitrophenol (lbs/day) Daily Maximum					< 0.010							
2,4-Dinitrophenol (mg/L) Average Monthly					< 0.003							
2,4-Dinitrophenol (mg/L) Daily Maximum					< 0.0031							
2,4-Dinitrotoluene (lbs/day) Average Monthly					< 0.001							
2,4-Dinitrotoluene (lbs/day) Daily Maximum					< 0.001							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
2,4-Dinitrotoluene (mg/L) Average Monthly					< 0.0003							
2,4-Dinitrotoluene (mg/L) Daily Maximum					< 0.00034							
2,6-Dinitrotoluene (lbs/day) Average Monthly					< 0.0006							
2,6-Dinitrotoluene (lbs/day) Daily Maximum					< 0.0006							
2,6-Dinitrotoluene (mg/L) Average Monthly					< 0.0002							
2,6-Dinitrotoluene (mg/L) Daily Maximum					< 0.00017							
4,6-dinitro-o-cresol (lbs/day) Average Monthly					< 0.005							
4,6-dinitro-o-cresol (lbs/day) Daily Maximum					< 0.005							
4,6-dinitro-o-cresol (mg/L) Average Monthly					< 0.001							
4,6-dinitro-o-cresol (mg/L) Daily Maximum					< 0.0014							
2-Nitrophenol (lbs/day) Average Monthly					< 0.0007							
2-Nitrophenol (lbs/day) Daily Maximum					< 0.0007							
2-Nitrophenol (mg/L) Average Monthly					< 0.0002							
2-Nitrophenol (mg/L) Daily Maximum					< 0.00019							
4-Nitrophenol (lbs/day) Average Monthly					< 0.003							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
4-Nitrophenol (lbs/day) Daily Maximum					< 0.003							
4-Nitrophenol (mg/L) Average Monthly					< 0.0009							
4-Nitrophenol (mg/L) Daily Maximum					< 0.0009							
Phenol (lbs/day) Average Monthly					< 0.002							
Phenol (lbs/day) Daily Maximum					< 0.002							
Phenol (mg/L) Average Monthly					< 0.0005							
Phenol (mg/L) Daily Maximum					< 0.00047							
Acenaphthene (lbs/day) Average Monthly					< 0.0002							
Acenaphthene (lbs/day) Daily Maximum					< 0.0002							
Acenaphthene (mg/L) Average Monthly					< 0.00006							
Acenaphthene (mg/L) Daily Maximum					< 0.000063							
Acenaphthylene (lbs/day) Average Monthly					< 0.0002							
Acenaphthylene (lbs/day) Daily Maximum					< 0.0002							
Acenaphthylene (mg/L) Average Monthly					< 0.00006							
Acenaphthylene (mg/L) Daily Maximum					< 0.000063							
Acrylonitrile (lbs/day) Average Monthly					< 0.004							
Acrylonitrile (lbs/day) Daily Maximum					< 0.004							
Acrylonitrile (mg/L) Average Monthly					< 0.001							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Acrylonitrile (mg/L) Daily Maximum					< 0.0011							
Anthracene (lbs/day) Average Monthly					< 0.0002							
Anthracene (lbs/day) Daily Maximum					< 0.0002							
Anthracene (mg/L) Average Monthly					< 0.00005							
Anthracene (mg/L) Daily Maximum					< 0.000047							
Chlorobenzene (lbs/day) Average Monthly					< 0.0009							
Chlorobenzene (lbs/day) Daily Maximum					< 0.0009							
Chlorobenzene (mg/L) Average Monthly					< 0.0003							
Chlorobenzene (mg/L) Daily Maximum					< 0.00025							
1,2-Dichlorobenzene (lbs/day) Average Monthly					< 0.0007							
1,2-Dichlorobenzene (lbs/day) Daily Maximum					< 0.0007							
1,2-Dichlorobenzene (mg/L) Average Monthly					< 0.0002							
1,2-Dichlorobenzene (mg/L) Daily Maximum					< 0.0002							
1,3-Dichlorobenzene (lbs/day) Average Monthly					< 0.0008							
1,3-Dichlorobenzene (lbs/day) Daily Maximum					< 0.0008							
1,3-Dichlorobenzene (mg/L) Average Monthly					< 0.0002							
1,3-Dichlorobenzene (mg/L) Daily Maximum					< 0.00021							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,4-Dichlorobenzene (lbs/day) Average Monthly					< 0.0008							
1,4-Dichlorobenzene (lbs/day) Daily Maximum					< 0.0008							
1,4-Dichlorobenzene (mg/L) Average Monthly					< 0.0002							
1,4-Dichlorobenzene (mg/L) Daily Maximum					< 0.00023							
1,3-Dichloro-propylene (lbs/day) Average Monthly					< 0.0007							
1,3-Dichloro-propylene (lbs/day) Daily Maximum					< 0.0007							
1,3-Dichloro-propylene (mg/L) Average Monthly					< 0.0002							
1,3-Dichloro-propylene (mg/L) Daily Maximum					< 0.0002							
1,2,4-Trichloro-benzene (lbs/day) Average Monthly					< 0.0008							
1,2,4-Trichloro-benzene (lbs/day) Daily Maximum					< 0.0008							
1,2,4-Trichloro-benzene (mg/L) Average Monthly					< 0.0002							
1,2,4-Trichloro-benzene (mg/L) Daily Maximum					< 0.00023							
Ethylbenzene (lbs/day) Average Monthly					< 0.0007							
Ethylbenzene (lbs/day) Daily Maximum					< 0.0007							
Ethylbenzene (mg/L) Average Monthly					< 0.0002							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Ethylbenzene (mg/L) Daily Maximum					< 0.0002							
Hexachloro-benzene (lbs/day) Average Monthly					< 0.0002							
Hexachloro-benzene (lbs/day) Daily Maximum					< 0.0002							
Hexachloro-benzene (mg/L) Average Monthly					< 0.00005							
Hexachloro-benzene (mg/L) Daily Maximum					< 0.000054							
Nitrobenzene (lbs/day) Average Monthly					< 0.002							
Nitrobenzene (lbs/day) Daily Maximum					< 0.002							
Nitrobenzene (mg/L) Average Monthly					< 0.0005							
Nitrobenzene (mg/L) Daily Maximum					< 0.00048							
Benzene (lbs/day) Average Monthly					< 0.001							
Benzene (lbs/day) Daily Maximum					< 0.001							
Benzene (mg/L) Average Monthly					< 0.0003							
Benzene (mg/L) Daily Maximum					< 0.0003							
Benzo(a)-Anthracene (lbs/day) Average Monthly					< 0.0003							
Benzo(a)-Anthracene (lbs/day) Daily Maximum					< 0.0003							
Benzo(a)-Anthracene (mg/L) Average Monthly					< 0.00007							
Benzo(a)-Anthracene (mg/L) Daily Maximum					< 0.000072							
Benzo(a)Pyrene (lbs/day) Average Monthly					< 0.0002							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Benzo(a)Pyrene (lbs/day) Daily Maximum					< 0.0002							
Benzo(a)Pyrene (mg/L) Average Monthly					< 0.00005							
Benzo(a)Pyrene (mg/L) Daily Maximum					< 0.000051							
Benzo(k)Fluor-anthene (lbs/day) Average Monthly					< 0.0003							
Benzo(k)Fluor-anthene (lbs/day) Daily Maximum					< 0.0003							
Benzo(k)Fluor-anthene (mg/L) Average Monthly					< 0.00009							
Benzo(k)Fluor-anthene (mg/L) Daily Maximum					< 0.000085							
3,4-Benzo-fluoranthene (lbs/day) Average Monthly					< 0.0003							
3,4-Benzo-fluoranthene (lbs/day) Daily Maximum					< 0.0003							
3,4-Benzo-fluoranthene (mg/L) Average Monthly					< 0.00009							
3,4-Benzo-fluoranthene (mg/L) Daily Maximum					< 0.000093							
Carbon Tetrachloride (lbs/day) Average Monthly					< 0.002							
Carbon Tetrachloride (lbs/day) Daily Maximum					< 0.002							
Carbon Tetrachloride (mg/L) Average Monthly					< 0.0004							
Carbon Tetrachloride (mg/L) Daily Maximum					< 0.00042							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Chloroethane (lbs/day) Average Monthly					< 0.002							
Chloroethane (lbs/day) Daily Maximum					< 0.002							
Chloroethane (mg/L) Average Monthly					< 0.0005							
Chloroethane (mg/L) Daily Maximum					< 0.00045							
1,1,1-Trichloroethane (lbs/day) Average Monthly					< 0.001							
1,1,1-Trichloroethane (lbs/day) Daily Maximum					< 0.001							
1,1,1-Trichloroethane (mg/L) Average Monthly					< 0.0003							
1,1,1-Trichloroethane (mg/L) Daily Maximum					< 0.0003							
1,1,2-Trichloroethane (lbs/day) Average Monthly					< 0.001							
1,1,2-Trichloroethane (lbs/day) Daily Maximum					< 0.001							
1,1,2-Trichloroethane (mg/L) Average Monthly					< 0.0003							
1,1,2-Trichloroethane (mg/L) Daily Maximum					< 0.0003							
1,1-Dichloroethane (lbs/day) Average Monthly					< 0.001							
1,1-Dichloroethane (lbs/day) Daily Maximum					< 0.001							
1,1-Dichloroethane (mg/L) Average Monthly					< 0.0004							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,1-Dichloroethane (mg/L) Daily Maximum					< 0.0004							
1,2-Dichloroethane (lbs/day) Average Monthly					< 0.001							
1,2-Dichloroethane (lbs/day) Daily Maximum					< 0.001							
1,2-Dichloroethane (mg/L) Average Monthly					< 0.0004							
1,2-Dichloroethane (mg/L) Daily Maximum					< 0.0004							
1,2-Dichloropropane (lbs/day) Average Monthly					< 0.001							
1,2-Dichloropropane (lbs/day) Daily Maximum					< 0.001							
1,2-Dichloropropane (mg/L) Average Monthly					< 0.0003							
1,2-Dichloropropane (mg/L) Daily Maximum					< 0.0003							
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Average Monthly					< 0.020							
Bis(2-Ethyl-hexyl)Phthalate (lbs/day) Daily Maximum					< 0.020							
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Average Monthly					< 0.006							
Bis(2-Ethyl-hexyl)Phthalate (mg/L) Daily Maximum					< 0.006							
Chloroform (lbs/day) Average Monthly					0.030							
Chloroform (lbs/day) Daily Maximum					0.030							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Chloroform (mg/L) Average Monthly					0.008							
Chloroform (mg/L) Daily Maximum					0.0081							
Chrysene (lbs/day) Average Monthly					< 0.0003							
Chrysene (lbs/day) Daily Maximum					< 0.0003							
Chrysene (mg/L) Average Monthly					< 0.00008							
Chrysene (mg/L) Daily Maximum					< 0.000078							
Diethyl Phthalate (lbs/day) Average Monthly					< 0.002							
Diethyl Phthalate (lbs/day) Daily Maximum					< 0.002							
Diethyl Phthalate (mg/L) Average Monthly					< 0.0006							
Diethyl Phthalate (mg/L) Daily Maximum					< 0.00055							
Dimethyl Phthalate (lbs/day) Average Monthly					< 0.0007							
Dimethyl Phthalate (lbs/day) Daily Maximum					< 0.0007							
Dimethyl Phthalate (mg/L) Average Monthly					< 0.0002							
Dimethyl Phthalate (mg/L) Daily Maximum					< 0.00019							
Di-n-Butyl Phthalate (lbs/day) Average Monthly					< 0.020							
Di-n-Butyl Phthalate (lbs/day) Daily Maximum					< 0.020							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Di-n-Butyl Phthalate (mg/L) Average Monthly					< 0.005							
Di-n-Butyl Phthalate (mg/L) Daily Maximum					< 0.0047							
Fluoranthene (lbs/day) Average Monthly					< 0.0002							
Fluoranthene (lbs/day) Daily Maximum					< 0.0002							
Fluoranthene (mg/L) Average Monthly					< 0.00006							
Fluoranthene (mg/L) Daily Maximum					< 0.000058							
Hexachloro-butadiene (lbs/day) Average Monthly					< 0.0002							
Hexachloro-butadiene (lbs/day) Daily Maximum					< 0.0002							
Hexachloro-butadiene (mg/L) Average Monthly					< 0.00007							
Hexachloro-butadiene (mg/L) Daily Maximum					< 0.000066							
Hexachloroethane (lbs/day) Average Monthly					< 0.0005							
Hexachloroethane (lbs/day) Daily Maximum					< 0.0005							
Hexachloroethane (mg/L) Average Monthly					< 0.0001							
Hexachloroethane (mg/L) Daily Maximum					< 0.00013							
Methyl Chloride (lbs/day) Average Monthly					< 0.002							
Methyl Chloride (lbs/day) Daily Maximum					< 0.002							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Methyl Chloride (mg/L) Average Monthly					< 0.0006							
Methyl Chloride (mg/L) Daily Maximum					< 0.00064							
Methylene Chloride (lbs/day) Average Monthly					< 0.001							
Methylene Chloride (lbs/day) Daily Maximum					< 0.001							
Methylene Chloride (mg/L) Average Monthly					< 0.0003							
Methylene Chloride (mg/L) Daily Maximum					< 0.0003							
Naphthalene (lbs/day) Average Monthly					0.002							
Naphthalene (lbs/day) Daily Maximum					0.002							
Naphthalene (mg/L) Average Monthly					0.0004							
Naphthalene (mg/L) Daily Maximum					0.00043							
Phenanthrene (lbs/day) Average Monthly					< 0.0006							
Phenanthrene (lbs/day) Daily Maximum					< 0.0006							
Phenanthrene (mg/L) Average Monthly					< 0.0002							
Phenanthrene (mg/L) Daily Maximum					< 0.00015							
Pyrene (lbs/day) Average Monthly					< 0.0002							
Pyrene (lbs/day) Daily Maximum					< 0.0002							
Pyrene (mg/L) Average Monthly					< 0.00005							
Pyrene (mg/L) Daily Maximum					< 0.000052							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
1,1-Dichloroethylene (lbs/day) Average Monthly					< 0.001							
1,1-Dichloroethylene (lbs/day) Daily Maximum					< 0.001							
1,1-Dichloroethylene (mg/L) Average Monthly					< 0.0003							
1,1-Dichloroethylene (mg/L) Daily Maximum					< 0.0003							
trans-1,2-Dichloroethylene (lbs/day) Average Monthly					< 0.003							
trans-1,2-Dichloroethylene (lbs/day) Daily Maximum					< 0.003							
trans-1,2-Dichloroethylene (mg/L) Average Monthly					< 0.0008							
trans-1,2-Dichloroethylene (mg/L) Daily Maximum					< 0.0008							
Tetrachloro-ethylene (lbs/day) Average Monthly					< 0.001							
Tetrachloro-ethylene (lbs/day) Daily Maximum					< 0.001							
Tetrachloro-ethylene (mg/L) Average Monthly					< 0.0003							
Tetrachloro-ethylene (mg/L) Daily Maximum					< 0.0003							
Toluene (lbs/day) Average Monthly					< 0.0007							
Toluene (lbs/day) Daily Maximum					< 0.0007							

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Toluene (mg/L) Average Monthly					< 0.0002							
Toluene (mg/L) Daily Maximum					< 0.0002							
Trichloroethylene (lbs/day) Average Monthly					< 0.0007							
Trichloroethylene (lbs/day) Daily Maximum					< 0.0007							
Trichloroethylene (mg/L) Average Monthly					< 0.0002							
Trichloroethylene (mg/L) Daily Maximum					< 0.0002							
Vinyl Chloride (lbs/day) Average Monthly					< 0.002							
Vinyl Chloride (lbs/day) Daily Maximum					< 0.002							
Vinyl Chloride (mg/L) Average Monthly					< 0.0005							
Vinyl Chloride (mg/L) Daily Maximum					< 0.00045							

DMR Data for Outfall 005 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Quarterly	0.0074			0.00576			0.00504			0.0054		
Flow (MGD) Daily Maximum	0.0076			0.00864			0.0072			0.0072		
pH (S.U.) Daily Minimum	6.28			7.9			6.14			6.88		
pH (S.U.) Daily Maximum	7.45			8.3			6.9			7.04		
TSS (mg/L) Average Quarterly	0.51			2.0			< 0.75			< 0.8		
TSS (mg/L) Daily Maximum	0.52			2.2			< 1.0			1.1		
Nitrate-Nitrite (mg/L) Average Quarterly	1.08			1.03			0.75			0.76		

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Nitrate-Nitrite (mg/L) Daily Maximum	1.3			1.1			0.78			0.78		
Total Arsenic (mg/L) Average Quarterly	< 0.016			< 0.016			< 0.016			< 0.016		
Total Arsenic (mg/L) Daily Maximum	< 0.016			< 0.016			< 0.016			< 0.016		
Total Cadmium (mg/L) Average Quarterly	0.009			0.0095			0.007			0.008		
Total Cadmium (mg/L) Daily Maximum	0.0098			0.013			0.0067			0.008		
Hexavalent Chromium (mg/L) Average Quarterly	< 0.006			< 0.006			< 0.006			< 0.006		
Hexavalent Chromium (mg/L) Daily Maximum	< 0.006			< 0.006			< 0.006			< 0.006		
Total Lead (mg/L) Average Quarterly	< 0.007			< 0.007			< 0.007			< 0.007		
Total Lead (mg/L) Daily Maximum	< 0.0071			< 0.0071			< 0.0071			< 0.0071		
Total Mercury (mg/L) Average Quarterly	0.0000026			0.000002885			0.000002			0.0000026		
Total Mercury (mg/L) Daily Maximum	0.0000033			0.0000048			0.0000023			0.0000033		
Total Selenium (mg/L) Average Quarterly	< 0.02			< 0.02			< 0.02			< 0.02		
Total Selenium (mg/L) Daily Maximum	< 0.016			< 0.016			< 0.016			< 0.016		

DMR Data for Outfall 006 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	0.78						0.842					
pH (S.U.) Daily Maximum	7						8.28					
COD (mg/L) Daily Maximum	31						10					
TSS (mg/L) Daily Maximum	12						16					
Nitrate-Nitrite (mg/L) Daily Maximum	0.5						0.34					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Phosphorus (mg/L) Daily Maximum	0.21						0.081					
Total Aluminum (mg/L) Daily Maximum	0.16						1.1					
Total Iron (mg/L) Daily Maximum	0.27						0.82					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.000013						0.000021					
Total Selenium (mg/L) Daily Maximum	0.016						< 0.016					
Total Thallium (mg/L) Daily Maximum	0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.073						0.052					

DMR Data for Outfall 008 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	1.56						1.84					
pH (S.U.) Daily Maximum	8.12						7.96					
COD (mg/L) Daily Maximum	17						21					
TSS (mg/L) Daily Maximum	9.3						8.6					
Nitrate-Nitrite (mg/L) Daily Maximum	0.36						< 0.065					
Total Phosphorus (mg/L) Daily Maximum	< 0.03						0.11					
Total Aluminum (mg/L) Daily Maximum	< 0.1						< 0.1					
Total Iron (mg/L) Daily Maximum	0.11						0.08					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.000019						0.0000083					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Selenium (mg/L) Daily Maximum	< 0.016						< 0.016					
Total Thallium (mg/L) Daily Maximum	< 0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.044						0.027					

DMR Data for Outfall 011 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Monthly	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Flow (MGD) Daily Maximum	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

DMR Data for Outfall 013 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	1.9						1.03					
pH (S.U.) Daily Maximum	7.38						7.6					
COD (mg/L) Daily Maximum	10						10					
TSS (mg/L) Daily Maximum	5.4						38					
Nitrate-Nitrite (mg/L) Daily Maximum	0.67						0.89					
Total Phosphorus (mg/L) Daily Maximum	< 0.03						0.12					
Total Aluminum (mg/L) Daily Maximum	0.1						0.46					
Total Iron (mg/L) Daily Maximum	0.082						1.1					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.0000082						0.000041					
Total Selenium (mg/L) Daily Maximum	< 0.016						< 0.016					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Thallium (mg/L) Daily Maximum	< 0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.19						0.085					

DMR Data for Outfall 015 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Average Quarterly	0.0027			0.0005976			0.000792			0.00108		
Flow (MGD) Daily Maximum	0.0037			0.00072			0.00144			0.00144		
pH (S.U.) Daily Minimum	7.34			7.91			7.79			6.94		
pH (S.U.) Daily Maximum	7.78			8.9			7.9			7.78		
TSS (mg/L) Average Quarterly	0.7			95.25			2.7			3.4		
TSS (mg/L) Daily Maximum	0.71			190.0			4.5			5.9		
Oil and Grease (mg/L) Average Quarterly	< 1.4			< 1.35			2.4			< 1.5		
Oil and Grease (mg/L) Daily Maximum	< 1.4			< 1.4			2.5			< 1.5		
Total Antimony (mg/L) Daily Maximum	< 0.016			< 0.016			< 0.016			< 0.016		
Total Arsenic (mg/L) Daily Maximum	< 0.016			0.023			0.019			0.03		
Total Boron (mg/L) Daily Maximum	3.2			3.8			2.8			3.4		
Total Cadmium (mg/L) Daily Maximum	0.0096			0.008			0.0027			0.0026		
Total Iron (mg/L) Daily Maximum	< 0.08			0.67			0.19			0.24		
Total Lead (mg/L) Daily Maximum	< 0.0071			< 0.0071			< 0.0071			< 0.0071		
Total Manganese (mg/L) Daily Maximum	0.69			0.76			0.49			0.57		
Total Mercury (mg/L) Daily Maximum	0.0000022			0.000012			0.0000014			0.0000062		
Total Nickel (mg/L) Daily Maximum	0.072			0.012			0.005			0.0064		

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Selenium (mg/L) Daily Maximum	< 0.016			< 0.016			< 0.016			< 0.016		
Total Zinc (mg/L) Daily Maximum	2.9			0.78			0.27			0.25		

DMR Data for Outfall 016 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	0.00636						0.00072					
pH (S.U.) Daily Maximum	7.46						7.76					
COD (mg/L) Daily Maximum	18.5						16					
TSS (mg/L) Daily Maximum	110						88.33					
Nitrate-Nitrite (mg/L) Daily Maximum	1.9						2.97					
Total Phosphorus (mg/L) Daily Maximum	0.13						0.21					
Total Aluminum (mg/L) Daily Maximum	0.55						0.603					
Total Iron (mg/L) Daily Maximum	2.5						1.78					
Total Lead (mg/L) Daily Maximum	< 0.0071						0.0074					
Total Mercury (mg/L) Daily Maximum	0.000027						0.000035					
Total Selenium (mg/L) Daily Maximum	< 0.016						0.017					
Total Thallium (mg/L) Daily Maximum	< 0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.22						0.19					

DMR Data for Outfall 017 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum							0.0083					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
pH (S.U.) Daily Maximum							7.29					
COD (mg/L) Daily Maximum							33					
TSS (mg/L) Daily Maximum							14					
Nitrate-Nitrite (mg/L) Daily Maximum							0.48					
Total Phosphorus (mg/L) Daily Maximum							0.21					
Total Aluminum (mg/L) Daily Maximum							0.37					
Total Iron (mg/L) Daily Maximum							0.36					
Total Lead (mg/L) Daily Maximum							< 0.0071					
Total Mercury (mg/L) Daily Maximum							0.0000064					
Total Selenium (mg/L) Daily Maximum							< 0.016					
Total Thallium (mg/L) Daily Maximum							< 0.012					
Total Zinc (mg/L) Daily Maximum							0.048					

DMR Data for Outfall 019 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	0.264						0.1191075					
pH (S.U.) Daily Maximum	7.7						7.65					
COD (mg/L) Daily Maximum	12						19.5					
TSS (mg/L) Daily Maximum	16						6.15					
Nitrate-Nitrite (mg/L) Daily Maximum	0.25						0.7					
Total Phosphorus (mg/L) Daily Maximum	0.06						0.104					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Aluminum (mg/L) Daily Maximum	< 0.1						0.22					
Total Iron (mg/L) Daily Maximum	0.21						0.25					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.000002						0.0000028					
Total Selenium (mg/L) Daily Maximum	< 0.016						< 0.016					
Total Thallium (mg/L) Daily Maximum	< 0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.22						0.0248					

DMR Data for Outfall 021 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	0.00864						0.000288					
pH (S.U.) Daily Maximum	7.53						7.09					
COD (mg/L) Daily Maximum	5.4						30					
TSS (mg/L) Daily Maximum	2.2						4.3					
Nitrate-Nitrite (mg/L) Daily Maximum	2.1						0.36					
Total Phosphorus (mg/L) Daily Maximum	< 0.03						0.3					
Total Aluminum (mg/L) Daily Maximum	< 0.1						0.11					
Total Iron (mg/L) Daily Maximum	< 0.08						0.1					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.0000019						0.0000046					
Total Selenium (mg/L) Daily Maximum	< 0.016						< 0.016					

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Total Thallium (mg/L) Daily Maximum	< 0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.068						0.006					

DMR Data for Outfall 022 (from July 1, 2025 to June 30, 2026)

Parameter	JUN-26	MAY-26	APR-26	MAR-26	FEB-26	JAN-26	DEC-25	NOV-25	OCT-25	SEP-25	AUG-25	JUL-25
Flow (MGD) Daily Maximum	0.0058						0.00144					
pH (S.U.) Daily Maximum	7.98						8.39					
COD (mg/L) Daily Maximum	32						31					
TSS (mg/L) Daily Maximum	9.3						1.8					
Nitrate-Nitrite (mg/L) Daily Maximum	1.8						2.1					
Total Phosphorus (mg/L) Daily Maximum	0.042						0.092					
Total Aluminum (mg/L) Daily Maximum	0.21						0.29					
Total Iron (mg/L) Daily Maximum	0.3						< 0.08					
Total Lead (mg/L) Daily Maximum	< 0.0071						< 0.0071					
Total Mercury (mg/L) Daily Maximum	0.000007						0.000005					
Total Selenium (mg/L) Daily Maximum	< 0.016						< 0.016					
Total Thallium (mg/L) Daily Maximum	0.012						< 0.012					
Total Zinc (mg/L) Daily Maximum	0.056						0.046					

Compliance History

Effluent Violations for Outfall 001, from: August 1, 2025 To: June 30, 2026

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Oil and Grease	03/31/26	IMAX	46.0	mg/L	30.0	mg/L

Summary of Inspections:

Other Comments:

Effluent Violations for Outfall 015, from: August 1, 2025 To: June 30, 2026

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TSS	03/31/26	Avg Qrtly	95.25	mg/L	30.0	mg/L
TSS	03/31/26	Daily Max	190.0	mg/L	100.0	mg/L

Summary of Inspections:

Other Comments:

Development of Effluent Limitations

IMP No. 101 **Design Flow (MGD)** 1.375
Latitude 40° 40' 3.0" **Longitude** -80° 20' 45.5"
Wastewater Description: Treated process water and storm water from the wastewater treatment plant

Effluent limits are imposed at IMP 101 rather than another monitoring location because 40 CFR § 125.3(f) prohibits compliance with technology-based treatment requirements using "non-treatment" techniques such as flow augmentation (*i.e.*, dilution). Since the wastewaters monitored at IMP 101 combine with other wastewaters before the next downstream monitoring location (Outfall 001), IMP 101 is the only point at which compliance with applicable Federal Effluent Limitations Guidelines can be determined without the interference of other wastewaters. This rationale is consistent with 40 CFR § 122.45(h)[1], which allows for the imposition of effluent limitations on internal waste streams in these circumstances. This rationale also applies to IMPs 201 and 108, which are discussed later in this Fact Sheet.

Current Effluent Limits

Wastewaters regulated at IMP 101 are currently subject to the following effluent limits and monitoring requirements.

Table 1. IMP 101: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	Continuous	Recorded
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	1/week	Grab
BOD-5	287	766	27.0	72.0	90.0	1/week	24-Hr. Comp.
Total Suspended Solids	458	1,487	43.0	139.0	174.0	1/week	24-Hr. Comp.
Oil and Grease	—	—	Report	Report	—	1/week	Grab
Acenaphthene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Acenaphthylene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Acrylonitrile	1.03	2.59	0.096	0.242	0.302	1/week	4 Grab/24 Hr.
Anthracene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Benzene	0.395	1.45	0.037	0.136	0.170	1/week	4 Grab/24 Hr.
Benzo(a)anthracene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
3,4-Benzofluoranthene	0.245	0.651	0.023	0.061	0.076	1/week	24-Hr. Comp.
Benzo(k)fluoranthene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Benzo(a)pyrene	0.245	0.651	0.023	0.061	0.076	1/week	24-Hr. Comp.
Bis(2-ethylhexyl) phthalate	1.10	2.98	0.103	0.279	0.348	1/week	24-Hr. Comp.
Carbon Tetrachloride	0.192	0.405	0.018	0.038	0.047	1/week	4 Grab/24 Hr.
Chlorobenzene	0.160	0.299	0.015	0.028	0.035	1/week	4 Grab/24 Hr.
Chloroethane	1.11	2.86	0.104	0.268	0.335	1/week	4 Grab/24 Hr.
Chloroform	0.224	0.491	0.021	0.046	0.057	1/week	4 Grab/24 Hr.
2-Chlorophenol	0.331	1.05	0.031	0.098	0.122	1/week	24-Hr. Comp.
Chrysene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Di-n-butyl phthalate	0.288	0.608	0.027	0.057	0.071	1/week	24-Hr. Comp.
1,2-Dichlorobenzene	0.822	1.74	0.077	0.163	0.203	1/week	24-Hr. Comp.
1,3-Dichlorobenzene	0.331	0.470	0.031	0.044	0.055	1/week	24-Hr. Comp.
1,4-Dichlorobenzene	0.160	0.299	0.015	0.028	0.035	1/week	24-Hr. Comp.
1,1-Dichloroethane	0.235	0.630	0.022	0.059	0.073	1/week	4 Grab/24 Hr.
1,2-Dichloroethane	0.726	2.25	0.068	0.211	0.263	1/week	4 Grab/24 Hr.
1,1-Dichloroethylene	0.170	0.267	0.016	0.025	0.031	1/week	4 Grab/24 Hr.

[1] 40 CFR § 122.45(h)(1): "When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams."

Table 1 (cont'd). IMP 101: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
1,2-trans-Dichloroethylene	0.224	0.576	0.021	0.054	0.067	1/week	4 Grab/24 Hr.
2,4-Dichlorophenol	0.416	1.20	0.039	0.112	0.140	1/week	24-Hr. Comp.
1,2-Dichloropropane	1.63	2.46	0.153	0.230	0.287	1/week	4 Grab/24 Hr.
1,3-Dichloropropylene	0.309	0.470	0.029	0.044	0.055	1/week	4 Grab/24 Hr.
Diethyl phthalate	0.865	2.17	0.081	0.203	0.253	1/week	24-Hr. Comp.
2,4-Dimethylphenol	0.192	0.384	0.018	0.036	0.045	1/week	24-Hr. Comp.
Dimethyl phthalate	0.202	0.502	0.019	0.047	0.058	1/week	24-Hr. Comp.
4,6-Dinitro-o-cresol	0.833	2.96	0.078	0.277	0.346	1/week	24-Hr. Comp.
2,4-Dinitrophenol	0.758	1.31	0.071	0.123	0.153	1/week	24-Hr. Comp.
2,4-Dinitrotoluene	1.21	3.04	0.113	0.285	0.356	1/week	24-Hr. Comp.
2,6-Dinitrotoluene	2.72	6.85	0.255	0.641	0.801	1/week	24-Hr. Comp.
Ethylbenzene	0.341	1.15	0.032	0.108	0.135	1/week	4 Grab/24 Hr.
Fluoranthene	0.267	0.726	0.025	0.068	0.085	1/week	4 Grab/24 Hr.
Fluorene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Hexachlorobenzene	0.106	0.213	0.010	0.020	0.025	1/week	24-Hr. Comp.
Hexachlorobutadiene	0.213	0.523	0.020	0.049	0.061	1/week	24-Hr. Comp.
Hexachloroethane	0.224	0.576	0.021	0.054	0.067	1/week	24-Hr. Comp.
Methyl Chloride	0.918	2.03	0.086	0.190	0.237	1/week	4 Grab/24 Hr.
Methylene Chloride	0.427	0.950	0.040	0.089	0.111	1/week	4 Grab/24 Hr.
Naphthalene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Nitrobenzene	0.288	0.726	0.027	0.068	0.085	1/week	24-Hr. Comp.
2-Nitrophenol	0.437	0.737	0.041	0.069	0.086	1/week	24-Hr. Comp.
4-Nitrophenol	0.769	1.32	0.072	0.124	0.155	1/week	24-Hr. Comp.
Phenanthrene	0.235	0.630	0.022	0.059	0.073	1/week	24-Hr. Comp.
Phenol	0.160	0.277	0.015	0.026	0.032	1/week	24-Hr. Comp.
Pyrene	0.267	0.715	0.025	0.067	0.083	1/week	24-Hr. Comp.
Tetrachloroethylene	0.235	0.598	0.022	0.056	0.070	1/week	4 Grab/24 Hr.
Toluene	0.277	0.854	0.026	0.080	0.100	1/week	4 Grab/24 Hr.
1,2,4-Trichlorobenzene	11.9	29.6	0.068	0.140	0.175	1/week	24-Hr. Comp.
1,1,1-Trichloroethane	15.5	36.1	0.021	0.054	0.067	1/week	4 Grab/24 Hr.
1,1,2-Trichloroethane	4.49	12.8	0.021	0.054	0.067	1/week	4 Grab/24 Hr.
Trichloroethylene	3.42	7.37	0.021	0.054	0.067	1/week	4 Grab/24 Hr.
Vinyl Chloride	18.1	42.5	0.104	0.268	0.335	1/week	4 Grab/24 Hr.

The effluent limits and monitoring requirements in **Table 1** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

101.A. Technology-Based Effluent Limitations (TBELs)

Federal Effluent Limitations Guidelines and New Source Determination

Process wastewaters from the SPMS are subject to Federal Effluent Limitations Guidelines (ELGs) under 40 CFR part 414 – Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) Point Source Category. Shell produces two types of products: polyethylene and ethylene. Pursuant to the applicability description in 40 CFR § 414.40, polyethylene is a Thermoplastic Resin under Subpart D of the OCPSF ELGs. Pursuant to the applicability description in 40 CFR § 414.60, ethylene is a Commodity Organic Chemical under Subpart F of the OCPSF ELGs.

Based on definitions given in 40 CFR §§ 122.2 and 122.29, the SPMS is a "new source." Classification of the facility as a "new source" is based on 40 CFR § 122.29(b), which states the following:

(b) Criteria for new source determination.

(1) Except as otherwise provided in an applicable new source performance standard, a source is a "new source" if it meets the definition of "new source" in §122.2, and

(i) It is constructed at a site at which no other source is located; or

(ii) It totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or

(iii) Its processes are substantially independent of an existing source at the same site. In determining whether these processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source.

(2) A source meeting the requirements of paragraphs (b)(1) (i), (ii), or (iii) of this section is a new source only if a new source performance standard is independently applicable to it. If there is no such independently applicable standard, the source is a new discharger. See §122.2."

As § 122.29(b)(1) states, a source is a new source if it meets the definition of "new source" in § 122.2 and is described by any of the subsections of § 122.29(b)(1) reproduced above. Section 122.2 defines "new source" as:

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants," the construction of which commenced:

(a) After promulgation of standards of performance under section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal.

Construction of the SPMS commenced in 2015/2016 after promulgation of standards of performance applicable to discharges from the facility—those being the New Source Performance Standards (NSPS) under 40 CFR part 414, which were promulgated in 1987 and last updated in 1993. Additionally, pursuant to § 122.2(b)(1), the facility was constructed at a site where no other source is located. The former Horsehead Monaca Smelter Plant and associated George F. Weaton coal-fired power station previously at the site were demolished completely. For those reasons, the SPMS is a new source.

Table 2 lists the specific sections of the ELGs that apply to the SPMS's process wastewater streams, which are generated from four process units including one Ethylene Cracker Unit (ECU) and three Polyethylene Units (PEU).

Table 2. Production Information and Applicable Federal Effluent Limitations Guidelines

Product	Production Rate (million tons/year)	Percentage of Total Production	Applicable Effluent Limitations Guidelines
Ethylene Cracker Unit – SIC Code 2869 Industrial Organic Chemicals, Not Elsewhere Classified			
Ethylene	1.6	49.23%	Subpart F – Commodity Organic Chemicals 40 CFR § 414.64 (and § 414.91 by reference)
Polyethylene Units 1 and 2 – SIC Code 2821 Plastics Materials, Synthetic Resins and Nonvulcanizable Elastomers			
Polyethylene	1.17	36.00%	Subpart D – Thermoplastic Resins 40 CFR § 414.44 (and § 414.91 by reference)
Polyethylene Unit 3 – SIC Code 2821 Plastics Materials, Synthetic Resins and Nonvulcanizable Elastomers			
Polyethylene	0.48	14.77%	Subpart D – Thermoplastic Resins 40 CFR § 414.44 (and § 414.91 by reference)
Total Production	3.25		

The OCSPF ELGs are primarily flow-normalized guidelines where mass limits are calculated by multiplying a reasonable measure of the actual daily flow rate of OCPSF-regulated wastewaters by the concentrations listed in the regulation. As an exception, when a discharge is composed of wastewaters regulated by more than one subpart of part 414, final effluent limits for parameters with limits that differ between the applicable subparts are determined using production-proportioned calculations. Production-proportioned mass limits at IMP 101 are calculated for the conventional pollutants Biochemical Oxygen Demand 5-day (BOD5) and Total Suspended Solids (TSS). Concentration limits for toxic pollutants under Subparts D and F are the same, so there is no production-proportioning for toxic pollutants.

With respect to the identification of a reasonable measure of the actual daily flow rate of OCPSF-regulated wastewaters, DEP notes that, consistent with Table VII-50 on pp.VII-155 through VII-157 of EPA's "Final Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category, Volume I" (October 1987) (see **Attachment A**), "process wastewaters" under part 414 include contaminated non-process wastewaters that are managed as process wastewaters. In a November 12, 2020 letter to DEP, Shell identified the following non-process wastewaters (designated as process wastewaters) that could be generated by the SPMS and treated by the WWTP.

- Air Pollution Control Wastewater (Catalyst Wash)
- Boiler Blowdown
- Steam Condensate
- Storage, Shops
- Lab Drains and Miscellaneous Lab Wastewater
- Raw Water Clarification
- Water Treatment
- Technical Center (R&D Center)
- Utility Water Streams
- Washdown of Equipment / Buildings and General Operational Areas
- Contact Cooling Water
- Water Demineralizer Wash Water
- Filter Backwash
- Demineralizer Wash, Blowdown and Wastewater
- Utility Clarifier Blowdown
- Steam Generation
- Reverse Osmosis Rejection Water
- Potable Water Treatment
- Non-Contact Floor Cleaning
- Vacuum Truck
- Ion Bed Regeneration
- Tank Car Washing
- Generator Blowdown
- Ion Exchange Resin Rinse
- Hydraulic Leaks
- Contact Rainwater
- Product wash
- Backflush from Demineralizer
- Water Clarifier Blowdown
- Water Treatment Filter Press water and wash water
- Secondary Containment Wash Water
- Bundle Wash Water
- Gas Turbine Wash Water

Shell also directs "accidentally contaminated" storm water from process areas of the SPMS to the WWTP. That storm water is a non-process wastewater that is managed and treated as process wastewater. Generally, all the wastewaters directed to the WWTP and IMP 101 are expected to contain some pollutant loading that requires treatment, so no accounting for dilution by uncontaminated wastewaters is necessary. That is, all flow passing through IMP 101 is OCPSF-regulated wastewater consistent with the reason IMP 101 was created.

Under the current permit, Shell continuously records the flow rate of wastewaters at IMP 101. To determine a reasonable measure of the actual daily flow rate of OCPSF-regulated wastewaters to calculate ELG mass limits, DEP calculated the average of the average monthly flow rates reported at IMP 101 from November 2022 through June 2026. That average flow rate is 1.375 MGD.

The other factors that differentiate applicable TBELs under the OCPSF ELGs is whether a facility is a direct discharger and whether a facility uses end-of-pipe biological treatment. Shell discharges directly to the Ohio River and uses end-of-pipe biological treatment, so the NSPS that apply to such facilities are used to calculate mass limits.

<u>TBELs for Toxic Pollutants</u>

NSPS under 40 CFR §§ 414.44(a) (Subpart D) and 414.64(a) (Subpart F) both refer to Subpart I (§ 414.91) for toxic pollutant effluent limits applicable to "Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment." Mass TBELs for toxic pollutants are calculated by multiplying the average process wastewater flow rate at IMP 101 (1.375 MGD) by the concentrations listed in § 414.91. **Table 3** summarizes the concentration-based effluent limits and calculated mass limits.

Table 3. Technology-Based Limits for Toxic Pollutants

Parameter	Concentration Limits (mg/L)		Mass Limits (lbs/day)	
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Acenaphthene	0.022	0.059	0.252	0.677
Acenaphthylene	0.022	0.059	0.252	0.677
Acrylonitrile	0.096	0.242	1.10	2.78
Anthracene	0.022	0.059	0.252	0.677
Benzene	0.037	0.136	0.424	1.56
Benzo(a)anthracene	0.022	0.059	0.252	0.677
3,4-Benzofluoranthene	0.023	0.061	0.263	0.699
Benzo(k)fluoranthene	0.022	0.059	0.252	0.677
Benzo(a)pyrene	0.023	0.061	0.263	0.699
Bis(2-ethylhexyl) phthalate	0.103	0.279	1.18	3.20
Carbon Tetrachloride	0.018	0.038	0.206	0.436
Chlorobenzene	0.015	0.028	0.172	0.321
Chloroethane	0.104	0.268	1.19	3.08
Chloroform	0.021	0.046	0.240	0.527
2-Chlorophenol	0.031	0.098	0.355	1.12
Chrysene	0.022	0.059	0.252	0.677
Di-n-butyl phthalate	0.027	0.057	0.309	0.654
1,2-Dichlorobenzene	0.077	0.163	0.883	1.87
1,3-Dichlorobenzene	0.031	0.044	0.355	0.504
1,4-Dichlorobenzene	0.015	0.028	0.172	0.321
1,1-Dichloroethane	0.022	0.059	0.252	0.677
1,2-Dichloroethane	0.068	0.211	0.780	2.42
1,1-Dichloroethylene	0.016	0.025	0.183	0.286
1,2-trans-Dichloroethylene	0.021	0.054	0.240	0.619
2,4-Dichlorophenol	0.039	0.112	0.447	1.29
1,2-Dichloropropane	0.153	0.230	1.76	2.64
1,3-Dichloropropylene	0.029	0.044	0.332	0.504
Diethyl phthalate	0.081	0.203	0.929	2.33
2,4-Dimethylphenol	0.018	0.036	0.206	0.413
Dimethyl phthalate	0.019	0.047	0.218	0.539
4,6-Dinitro-o-cresol	0.078	0.277	0.895	3.18
2,4-Dinitrophenol	0.071	0.123	0.814	1.41
2,4-Dinitrotoluene	0.113	0.285	1.30	3.27
2,6-Dinitrotoluene	0.255	0.641	2.93	7.36
Ethylbenzene	0.032	0.108	0.367	1.24
Fluoranthene	0.025	0.068	0.286	0.780
Fluorene	0.022	0.059	0.252	0.677
Hexachlorobenzene	0.015	0.028	0.172	0.321
Hexachlorobutadiene	0.020	0.049	0.229	0.562
Hexachloroethane	0.021	0.054	0.240	0.619
Methyl Chloride	0.086	0.190	0.986	2.18
Methylene Chloride	0.040	0.089	0.458	1.02
Naphthalene	0.022	0.059	0.252	0.677
Nitrobenzene	0.027	0.068	0.309	0.780
2-Nitrophenol	0.041	0.069	0.470	0.791
4-Nitrophenol	0.072	0.124	0.826	1.42

Table 3 (cont'd). Technology-Based Limits for Toxic Pollutants

Parameter	Concentration Limits (mg/L)		Mass Limits (lbs/day)	
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Phenanthrene	0.022	0.059	0.252	0.677
Phenol	0.015	0.026	0.172	0.298
Pyrene	0.025	0.067	0.286	0.768
Tetrachloroethylene	0.022	0.056	0.252	0.642
Toluene	0.026	0.080	0.298	0.917
1,2,4-Trichlorobenzene	0.068	0.140	0.780	1.61
1,1,1-Trichloroethane	0.021	0.054	0.240	0.619
1,1,2-Trichloroethane	0.021	0.054	0.240	0.619
Trichloroethylene	0.021	0.054	0.240	0.619
Vinyl Chloride	0.104	0.268	1.19	3.08

Section 414.91 also provides limits for chromium, copper, lead, nickel, zinc, and total cyanide, but DEP is not imposing limits for those pollutants pursuant to § 414.91(b), which states:

> In the case of chromium, copper, lead, nickel, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for these pollutants times the flow from metal-bearing waste streams for the metals and times the flow from cyanide bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional OCPSF process wastewater streams identified by the permitting authority on a case-by-case basis as metal or cyanide bearing based upon a determination that such streams contain significant amounts of the pollutants identified above. Any such streams designated as metal or cyanide bearing must be treated independently of other metal or cyanide bearing waste streams unless the permitting authority determines that the combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants. This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Shell does not generate any metals or cyanide-bearing waste streams (*i.e.*, waste streams identified in Appendix A of part 414) at the SPMS. To the extent that DEP has the discretion to impose metals and cyanide limits from § 414.91 if DEP determines that those pollutants are present in significant amounts, DEP observes that the concentrations of metals and cyanide in the influent wastewaters to the WWTP (and in the treated effluent) are low compared to the concentration limits in § 414.91 (see **Table 4**). Therefore, limits for those parameters are not imposed.

Table 4. Comparison of Influent and Effluent Concentrations of Metals and Cyanide to ELG Concentration Limits

Parameter	Influent Conc. (µg/L)	IMP 101 Effluent Conc. (µg/L) – Avg.	IMP 101 Effluent Conc. (µg/L) – Max	ELG Concentration Limit – Avg.	ELG Concentration Limit – Max
Chromium, Total	5.8	1.5	2.3	1,110	2,770
Copper, Total	9.5	4.4	8.5	1,450	3,380
Cyanide, Total	160	15	15	420	1,200
Lead, Total	0.12	< 0.41	0.61	320	690
Nickel, Total	8.5	7.7	9.2	1,690	3,980
Zinc, Total	30	25	42	1,050	2,610

<u>TBELs for Conventional Pollutants</u>

Limits for the conventional pollutants BOD5 and TSS are subpart specific. For process wastewater discharges that are subject to more than one subpart like those from the SPMS, 40 CFR § 414.11(i) specifies the following procedure to calculate production-proportioned BOD5 and TSS effluent limits:

> (i) BOD5 and TSS limitations for plants with production in two or more subcategories. Any existing or new source direct discharge point source subject to two or more of subparts B through H must achieve BOD5 and TSS discharges not exceeding the quantity (mass) determined by multiplying the total OCPSF process wastewater flow subject to subparts B through H times the following "OCPSF production-proportioned concentration": For a specific

plant, let w_j be the proportion of the plant's total OCPSF production in subcategory j. Then the plant-specific production-proportioned concentration limitations are given by:

$$\text{Plant BOD}_5\text{ Limit} = \sum_{j=B}^{H}(w_j)(BOD_5\,Limit_j)$$

and

$$\text{Plant TSS Limit} = \sum_{j=B}^{H}(w_j)(TSS\ Limit_j).$$

The “BOD5 Limit_j” and “TSS Limit_j” are the respective subcategorical BOD5 and TSS Maximum for Any One Day or Maximum for Monthly Average limitations.

BOD5 and TSS concentration TBELs are calculated using the proportion of total production attributable to each subcategory (summarized in **Table 5**) and the BOD5 and TSS concentrations given in Subparts D and F (summarized in **Table 6**).

Table 5. Production for Subparts D and F

Subcategory	Subcategory Production (million tons/year)	Percentage of Total Production (w_j)
Subpart D	1.65 (PEU 1-3)	1.65/3.25 = 50.77%
Subpart F	1.6 (ECU)	1.6/3.25 = 49.23%

Table 6. NSPS for Conventional Pollutants BOD5 and TSS

Parameter	Subpart D (§ 414.44)		Subpart F (§ 414.64)	
	Average Monthly (mg/L)	Maximum Daily (mg/L)	Average Monthly (mg/L)	Maximum Daily (mg/L)
BOD5	24	64	30	80
TSS	40	130	46	149

Production-Proportioned BOD_5 Conc. = $(w_D)(BOD_5\ Limit_D) + (w_F)(BOD_5\ Limit_F)$

Production-Proportioned TSS Conc. = $(w_D)(TSS\ Limit_D) + (w_F)(TSS\ Limit_F)$

Technology-based mass limits for BOD5 and TSS are then calculated using the production-proportioned concentrations derived from the formulas above and the process wastewater flow rate (1.375 MGD).

Table 7. TBELs for Conventional Pollutants

Parameter	Production-Proportioned Concentration (mg/L)		Production-Proportioned Mass (lb/day)	
	Avg. Monthly	Max Daily	Avg. Monthly	Max Daily
BOD5	27.0	72.0	309.0	824.0
TSS	43.0	139.0	492.0	1599.0
pH*	within the range of 6.0 to 9.0 at all times			

*NSPS under §§ 414.44 and 414.64 require that pH be within the range of 6.0 to 9.0 at all times.

Some of the mass TBELs for ELG-regulated pollutants are higher than those imposed in the previous permit, but that does not implicate backsliding because the mass TBELs still reflect the same level of treatment performance as the previous permit (*i.e.*, the same mass per unit volume). To the extent the higher mass limits could be construed as backsliding, such backsliding would be consistent with the anti-backsliding exception under 40 CFR § 122.44(l)(2)(i)(B)*(1)* regarding new information that justifies the application of less stringent effluent limits—in this case, an update to the reasonable measure of the actual daily flow rate of OCPSF-regulated wastewaters used to calculate the mass TBELs.

Regulatory Effluent Standards and Monitoring Requirements

Based on applicable state regulations, the following effluent standards and monitoring requirements are imposed:

- Flow monitoring is required in accordance with 25 Pa. Code § 92a.61(d)(1).
- Limits for pH (6.0 minimum and 9.0 maximum) are imposed at Outfall 001 based on 25 Pa. Code § 95.2(1) in addition to the NSPS for pH at IMP 101 from 40 CFR part 414 (see **Table 7**).
- Process wastewaters at IMP 101 may contain oil and grease; however, effluent standards for oil-bearing wastewaters given by 25 Pa. Code § 95.2(2) will be imposed at Outfall 001 rather than IMP 101 because the cooling tower blowdown that mixes with treated process wastewaters prior to discharge also might contain oil and grease. Even though no effluent standards are imposed at IMP 101, reporting will be required for oil and grease.

Concentration-Based Limits for IMP 101

To supplement the mass limits calculated from the ELGs, concentration limits also are imposed under the authority of 40 CFR § 122.45(f)(2).[2] As discussed in Section 5.2.2.5 of USEPA's NPDES Permit Writers' Manual (September 2010), supplementing mass-based limitations with concentration-based limitations is appropriate where ELG requirements are flow-normalized to assure proper operation and maintenance of the treatment facility during periods of low production. The major advantage of this approach is simplicity, and it in no way restricts production levels at the facility, since effluent concentrations from the treatment plant remain fairly constant over wide ranges of production levels. This approach is useful at facilities where production is either moderately or highly variable and/or where multiple production lines with a centralized treatment facility are involved. It is also useful at new facilities where production records do not exist.

The OCPSF ELGs are flow-normalized, and Shell operates multiple production lines (one ECU and three PEUs) with a centralized treatment facility employed to treat process wastewaters from those production lines with other contaminated wastewater sources like contaminated storm water, so supplemental concentration limits are consistent with the recommended conditions for their use. Also, consistent with those recommended conditions, supplemental concentration limits were imposed before the SPMS began operating when production records did not exist. Apart from those bases, concentration limits will be maintained based on anti-backsliding requirements.

The concentration limits for toxic parameters come directly from § 414.91, which applies to both Subpart D and Subpart F wastes. The concentration limits for conventional pollutants are the production-proportioned concentrations listed in **Table 7**. Since the mass limits required by the ELG are based on the process wastewater flow rate and the concentrations given in the ELG, Shell can comply with both sets of limits.

Per- and Polyfluoroalkyl Substances (PFAS)

In February 2024, DEP implemented a new monitoring initiative for PFAS. 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. Consequently, many PFAS accumulate in the environment. 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.[3] Due to their durability, toxicity, persistence, and pervasiveness, PFAS have emerged as significant pollutants of concern.

In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] 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-032 directs permit writers to consider special monitoring requirements for PFOA, PFOS, PFBS, and HFPO-DA in the following instances:

[2] 40 CFR §122.45(f)(2) states: "Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations."

[3] ATSDR, "Toxicological Profile for Perfluoroalkyls". Patrick N. Breysse, Ph.D., CIH Director, National Center for Environmental Health and Agency for Toxic Substances and Disease Registry Centers for Disease Control and Prevention, May 2021.

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.

As stated in the SOP, in all cases a condition is included in the permit that the permittee may cease monitoring for PFOA, PFOS, PFBS, and HFPO-DA when the permittee reports non-detect values at or below the Target QLs for four consecutive monitoring periods for each PFAS parameter that is analyzed. Shell reported results for PFOA, PFOS, PFBS, and HFPO-DA at Outfall 001 in the permit renewal application. The results are summarized in **Table 8**.

Table 8. Analytical Results for PFAS at Outfall 001

Parameter	Units	Reported Concentration	Permit Quantitation Limit
Perfluorooctanoic acid (PFOA)	ng/L	3.7	4.0
Prefluorooctanesulfonic acid (PFOS)	ng/L	2.1	3.7
Perfluorobutanesulfonic acid (PFBS)	ng/L	5.3	3.5
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	< 1.4	6.4

Consistent with Section II.I.a of SOP No. BCW-PMT-032, the detection of PFOA, PFOS, and PFBS in the effluent means that quarterly monitoring will be required for all four of the PFAS parameters. As stated in Section II.I.c of the SOP, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (*i.e.*, four consecutive quarterly results), then the monitoring may be discontinued.

Additionally, Section IV.N of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – New and Reissuance Industrial Waste and Industrial Stormwater Individual NPDES Permit Applications" [SOP No. BCW-PMT-001] requires that, when there are detections of PFOA, PFOS, PBFS, or HFPO-DA in the application screening analysis or where it is known that materials or wastes containing PFAS was or is used, stored, or disposed of at the facility, a PFAS Reduction Plan will be required by the permit to identify and minimize/eliminate sources of PFAS within one year of the permit effective date.

In February 2019, EPA announced in its PFAS Action Plan that it was taking steps to evaluate whether industrial sources warranted regulation to address PFAS discharges. After studying available data regarding wastewater discharges from facilities that manufacture PFAS, EPA published an advance notice of proposed rulemaking (ANPRM) on March 17, 2021 to solicit data and information regarding manufacturers of PFAS and the presence and treatment of PFAS in discharges from facilities in the OCPSF industrial category. No proposed or final rulemaking has been promulgated to date.

Based on data collected by USGS/DEP in 2019 and by the Ohio River Valley Water Sanitation Commission in 2021, the Ohio River is known to contain ambient concentrations of PFAS. Since Shell withdraws water from the Ohio River for industrial uses and discharges that water back to the Ohio River, sampling of the intake water for PFOA, PFOS, PFBS, and HFPO-DA will be required to determine the extent to which PFAS are present in Shell's effluent from the source water. This monitoring will be listed under Outfall 001 but must take place at the intake.

101.B. <u>Water Quality-Based Effluent Limitations (WQBELs)</u>

WQBELs will not be evaluated at this internal monitoring point. WQBELs are designed to protect water quality by ensuring that water quality standards are met in the receiving water and IMP 101 is not a final stream discharge location. Therefore, water quality limits will be evaluated at Outfall 001 where the combination of IMP 101's wastewaters and cooling tower blowdown from IMP 201 discharge to waters of the Commonwealth.

101.C. Effluent Limitations and Monitoring Requirements for IMP 101

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges monitored at IMP 101 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. In addition to the average monthly and maximum daily concentration limits, instantaneous maximum concentration limits also are included in the permit. Instantaneous maximum limits are for compliance monitoring use by DEP personnel and do not need to be reported on monthly DMRs unless grab samples are taken in place of 24-hour composite samples. The magnitudes of the instantaneous maximum limits are calculated by multiplying the maximum daily limits by 1.25 in accordance with the maximum daily-to-instantaneous maximum ratio given in Chapter 2, Section C of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations". Applicable requirements are summarized in the following table.

Table 9. Effluent Limits and Monitoring Requirements for IMP 101

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	40 CFR §§ 414.44 and 414.64
BOD-5	309.0	824.0	27.0	72.0	90.0	40 CFR §§ 414.44 and 414.64
Total Suspended Solids	492.0	1599.0	43.0	139.0	174.0	40 CFR §§ 414.44 and 414.64
Oil and Grease	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Acenaphthene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Acenaphthylene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Acrylonitrile	1.10	2.78	0.096	0.242	0.302	40 CFR § 414.91
Anthracene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Benzene	0.424	1.56	0.037	0.136	0.170	40 CFR § 414.91
Benzo(a)anthracene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
3,4-Benzofluoranthene	0.263	0.699	0.023	0.061	0.076	40 CFR § 414.91
Benzo(k)fluoranthene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Benzo(a)pyrene	0.263	0.699	0.023	0.061	0.076	40 CFR § 414.91
Bis(2-ethylhexyl) phthalate	1.18	3.20	0.103	0.279	0.348	40 CFR § 414.91
Carbon Tetrachloride	0.206	0.436	0.018	0.038	0.047	40 CFR § 414.91
Chlorobenzene	0.172	0.321	0.015	0.028	0.035	40 CFR § 414.91
Chloroethane	1.19	3.08	0.104	0.268	0.335	40 CFR § 414.91
Chloroform	0.240	0.527	0.021	0.046	0.057	40 CFR § 414.91
2-Chlorophenol	0.355	1.12	0.031	0.098	0.122	40 CFR § 414.91
Chrysene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Di-n-butyl phthalate	0.309	0.654	0.027	0.057	0.071	40 CFR § 414.91
1,2-Dichlorobenzene	0.883	1.87	0.077	0.163	0.203	40 CFR § 414.91
1,3-Dichlorobenzene	0.355	0.504	0.031	0.044	0.055	40 CFR § 414.91
1,4-Dichlorobenzene	0.172	0.321	0.015	0.028	0.035	40 CFR § 414.91
1,1-Dichloroethane	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
1,2-Dichloroethane	0.780	2.42	0.068	0.211	0.263	40 CFR § 414.91
1,1-Dichloroethylene	0.183	0.286	0.016	0.025	0.031	40 CFR § 414.91
1,2-trans-Dichloroethylene	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
2,4-Dichlorophenol	0.447	1.29	0.039	0.112	0.140	40 CFR § 414.91
1,2-Dichloropropane	1.76	2.64	0.153	0.230	0.287	40 CFR § 414.91
1,3-Dichloropropylene	0.332	0.504	0.029	0.044	0.055	40 CFR § 414.91
Diethyl phthalate	0.929	2.33	0.081	0.203	0.253	40 CFR § 414.91
2,4-Dimethylphenol	0.206	0.413	0.018	0.036	0.045	40 CFR § 414.91

Table 9 (cont'd). Effluent Limits and Monitoring Requirements for IMP 101

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Dimethyl phthalate	0.218	0.539	0.019	0.047	0.058	40 CFR § 414.91
4,6-Dinitro-o-cresol	0.895	3.18	0.078	0.277	0.346	40 CFR § 414.91
2,4-Dinitrophenol	0.814	1.41	0.071	0.123	0.153	40 CFR § 414.91
2,4-Dinitrotoluene	1.30	3.27	0.113	0.285	0.356	40 CFR § 414.91
2,6-Dinitrotoluene	2.93	7.36	0.255	0.641	0.801	40 CFR § 414.91
Ethylbenzene	0.367	1.24	0.032	0.108	0.135	40 CFR § 414.91
Fluoranthene	0.286	0.780	0.025	0.068	0.085	40 CFR § 414.91
Fluorene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Hexachlorobenzene	0.172	0.321	0.010	0.020	0.025	40 CFR § 414.91
Hexachlorobutadiene	0.229	0.562	0.020	0.049	0.061	40 CFR § 414.91
Hexachloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
Methyl Chloride	0.986	2.18	0.086	0.190	0.237	40 CFR § 414.91
Methylene Chloride	0.458	1.02	0.040	0.089	0.111	40 CFR § 414.91
Naphthalene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Nitrobenzene	0.309	0.780	0.027	0.068	0.085	40 CFR § 414.91
2-Nitrophenol	0.470	0.791	0.041	0.069	0.086	40 CFR § 414.91
4-Nitrophenol	0.826	1.42	0.072	0.124	0.155	40 CFR § 414.91
Phenanthrene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Phenol	0.172	0.298	0.015	0.026	0.032	40 CFR § 414.91
Pyrene	0.286	0.768	0.025	0.067	0.083	40 CFR § 414.91
Tetrachloroethylene	0.252	0.642	0.022	0.056	0.070	40 CFR § 414.91
Toluene	0.298	0.917	0.026	0.080	0.100	40 CFR § 414.91
1,2,4-Trichlorobenzene	0.780	1.61	0.068	0.140	0.175	40 CFR § 414.91
1,1,1-Trichloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
1,1,2-Trichloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
Trichloroethylene	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
Vinyl Chloride	1.19	3.08	0.104	0.268	0.335	40 CFR § 414.91
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)

Monitoring frequencies and sample types are imposed in accordance with the recommendations for process wastewater discharges from Chapter 6, Table 6-4 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits". Based on that guidance, flow must be recorded continuously; pH and Oil & Grease will require 1/week grab samples; volatile pollutants will require 1/week 4-grabs/24-hours composite sampling, and all the remaining parameters will require 1/week 24-hour composite sampling. PFAS parameters will require grab sampling 1/quarter of both the SPMS's intake water (specified at Outfall 001) and IMP 101's effluent.

Development of Effluent Limitations

IMP No. 201 **Design Flow (MGD)** 2.47
Latitude N/A **Longitude** N/A
Wastewater Description: Cooling tower blowdown

Effluent limits are imposed at IMP 201 rather than another monitoring location because 40 CFR § 125.3(f) prohibits compliance with technology-based treatment requirements using "non-treatment" techniques such as flow augmentation (*i.e.*, dilution). Since the wastewaters monitored at IMP 201 combine with other wastewaters before the next downstream monitoring location (Outfall 001), IMP 201 is the only point at which compliance with applicable technology-based performance standards may be determined without the interference of other wastewaters. This rationale is consistent with 40 CFR § 122.45(h), which allows for the imposition of effluent limitations on internal waste streams in these circumstances.

Current Effluent Limits

Wastewaters regulated at IMP 101 are currently subject to the following effluent limits and monitoring requirements.

Table 10. IMP 201: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	1/day	Metered
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	1/day	Grab
Free Available Chlorine	—	—	0.2	0.5	—	1/week	Grab

The effluent limits and monitoring requirements in **Table 10** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

201.A. Technology-Based Effluent Limitations (TBELs)

Effluent Limitations Guidelines

Cooling tower blowdown is not regulated by 40 CFR part 414. However, cooling tower blowdown is regulated by 40 CFR part 423 – Steam Electric Power Generating Point Source Category. Even though the SPMS is not a steam electric power generating facility (Shell operates a cogeneration unit in addition to the ethylene and polyethylene production units), the cooling tower blowdown limits under part 423 reasonably inform DEP's permitting of Shell's cooling tower blowdown pursuant to Sections 304(b)(2)(B), 304(b)(4)(B), and 402(a)(1) of the Clean Water Act and implementing regulations under 40 CFR § 125.3, which allow for the establishment of effluent limits on a case-by-case basis using Best Professional Judgment (BPJ).

Section 423.11(j) defines "blowdown" as "the minimum discharge of recirculating water for the purpose of discharging materials contained in the water, the further buildup of which would cause concentration in amounts exceeding limits established by best engineering practices." This definition does not include language specific to the steam electric power generating industry, so the performance standards applicable to "blowdown" under the Steam Electric Power Generating Point Source Category and the rationale given by EPA for those limits in documentation supporting the Steam Electric Power Generating ELGs are appropriate for blowdown discharged elsewhere.

Based on DEP's BPJ, cooling tower blowdown monitored at IMP 201 is subject to the most stringent TBELs and narrative limitations from § 423.12(b) paragraphs (1) and (7) for Best Practicable Control Technology Currently Available (BPT) and § 423.13(d) paragraphs (1), (2), and (3) for Best Available Technology Economically Achievable (BAT). TBELs based on the use of Best Conventional Pollutant Control Technology (BCT) are reserved under § 423.14, so BPT limits will control conventional pollutants in the facility's blowdown. The chromium and zinc limits from 40 CFR § 423.13(d)(1) are not imposed at IMP 201. Based on the Development Document for the Steam Electric ELGs, chromium and zinc were included as pollutants of concern for discharges of cooling tower blowdown due to the widespread use of chromium and zinc-based corrosion inhibitors when the Steam Electric ELGs were developed and promulgated. Based on the list of chemical additives provided in Shell's NPDES permit application, no chromium or zinc-based additives are used at the facility and the concentrations of chromium and zinc are low in the effluent. The applicable TBELs are summarized in **Tables 11 and 12**.

Table 11. 40 CFR part 423 – Steam Electric BPT Effluent Limitations for IMP 201

Pollutant	Average Concentration (mg/L)	Maximum Concentration (mg/L)	Basis
Free Available Chlorine	0.2	0.5	40 CFR § 423.12(b)(7)
pH	within the range of 6.0 to 9.0		40 CFR § 423.12(b)(1)

Table 12. 40 CFR part 423 – Steam Electric BAT Effluent Limitations for IMP 201

Pollutant	Average Concentration (mg/L)	Maximum Concentration (mg/L)	Basis
Free Available Chlorine	0.2	0.5	40 CFR § 423.13(d)(1)
The 126 priority pollutants contained in chemicals added for cooling tower maintenance	No detectable amount	No detectable amount	40 CFR § 423.13(d)(1)
Pollutant	**Average of daily values for 30 consecutive days (mg/L)**	**Maximum for any 1 day (mg/L)**	**Basis**
Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.			40 CFR § 423.13(d)(2)
At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.			40 CFR § 423.13(d)(3)

The most stringent TBELs from the BPT and BAT levels of control include the pH limits from **Table 11** and all the limits from **Table 12**.

<u>Regulatory Effluent Standards and Monitoring Requirements</u>

Flow monitoring will be required in accordance with 25 Pa. Code § 92a.61(b). Effluent standards for pH are imposed on industrial wastes by 25 Pa. Code § 95.2(1). The § 95.2(1) pH limits are the same as those imposed based on BPJ (see **Table 11**).

<u>Thermal TBELs for Heated Discharges</u>

No TBELs are developed to control thermal pollution. However, DEP's "Implementation Guidance for Temperature Criteria" and the "Ohio River Valley Water Sanitation Commission (ORSANCO) Pollution Control Standards for Discharges to the Ohio River" (2019 Revision) recommend/require the imposition of a maximum temperature limit of 110°F for public safety purposes. The 110°F instantaneous maximum temperature limit is treated as an effluent standard for heated discharges. The 110°F limit is imposed at Outfall 001 (the final discharge location where public access is possible) if thermal water quality-based effluent limitations do not apply at Outfall 001 (see Section 001.B).

<u>Per- and Polyfluoroalkyl Substances (PFAS)</u>

As discussed in Section 101.A of this Fact Sheet, DEP implemented a new monitoring initiative for PFAS in February 2024. In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] 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. Shell reported results for PFOA, PFOS, PFBS, and HFPO-DA at IMP 201 in the permit renewal application. The results are summarized in **Table 13**.

Table 13. Analytical Results for PFAS at IMP 201

Parameter	Units	Reported Concentration	Permit Quantitation Limit
Perfluorooctanoic acid (PFOA)	ng/L	8.2	4.0
Prefluorooctanesulfonic acid (PFOS)	ng/L	7.3	3.7
Perfluorobutanesulfonic acid (PFBS)	ng/L	9.9	3.5
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	< 1.4	6.4

Consistent with Section II.I.a of SOP No. BCW-PMT-032, the presence of PFOA, PFOS, and PFBS in the effluent means that quarterly monitoring will be required for all four of the PFAS parameters at IMP 201. As stated in Section II.I.c of the SOP, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (*i.e.*, four consecutive quarterly results), then the monitoring may be discontinued.

201.B. Water Quality-Based Effluent Limitations (WQBELs)

WQBELs will be evaluated at Outfall 001 where the combination of IMP 101's wastewaters and IMP 201's cooling tower blowdown discharge to waters of the Commonwealth.

201.C. Effluent Limitations and Monitoring Requirements for IMP 201

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges monitored at IMP 201 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 14. Effluent Limits and Monitoring Requirements for IMP 201

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(b)
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	25 Pa. Code § 92a.48(a)(3) [BPJ]; 40 CFR 122.44(l)(2)
Free Available Chlorine	—	—	0.2	0.5	—	25 Pa. Code § 92a.48(a)(3) [BPJ]; 40 CFR 122.44(l)(2)
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Narrative limits in Table 11 are imposed as conditions in Part C of the permit.						

Based on DEP's Permit Writers' Manual, flow must be measured daily (metered); pH will require daily grab samples; and free available chlorine will require 1/week grab samples. PFAS parameters will require grab sampling 1/quarter.

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	2.7 (avg.); 3.75 (max)
Latitude	40° 40’ 22.996”	**Longitude**	-80° 20’ 18.489”

Wastewater Description: Treated process water and storm water from the wastewater treatment plant (monitored at IMP 101) and cooling tower blowdown (monitored at IMP 201)

Wastewaters regulated at Outfall 001 are currently subject to the following effluent limits and monitoring requirements.

Table 15. Outfall 001: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	1/day	Metered
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	1/day	Grab
Total Residual Chlorine (TRC)	—	—	0.5	1.0	1.25	1/week	Grab
Temperature (°F)	—	—	—	110	—	1/day	I-S
Total Dissolved Solids	—	—	Report	Report	—	1/week	24-Hr. Comp.
Oil and Grease	—	—	15.0	—	30.0	1/day	Grab
Aluminum, Total	—	—	Report	Report	—	1/week	24-Hr. Comp.
Chromium Hexavalent	—	—	Report	Report	—	1/week	24-Hr. Comp.
Copper, Total	—	—	Report	Report	—	1/week	24-Hr. Comp.
Sulfate, Total	—	—	Report	Report	—	1/week	24-Hr. Comp.
Benzene	—	—	Report	Report	—	1/week	Grab
Chloride	—	—	Report	Report	—	1/week	24-Hr. Comp.
Bromide	—	—	Report	Report	—	1/week	24-Hr. Comp.
Mercury, Total	—	—	—	Report	—	1/quarter	Grab
Pentachlorobenzene	—	—	—	Report	—	1/quarter	Grab
Hexachlorobenzene	—	—	—	Report	—	1/quarter	Grab
Hexachlorobutadiene	—	—	—	Report	—	1/quarter	Grab
1,2,4,5-Tetrachlorobenzene	—	—	—	Report	—	1/quarter	Grab
1,2,3,4-Tetrachlorobenzene	—	—	—	Report	—	1/quarter	Grab

The effluent limits and monitoring requirements in **Table 15** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

001.A. Technology-Based Effluent Limitations (TBELs)

Federal ELGs and BPJ TBELs that apply to the individual sources contributing to discharges at Outfall 001 are imposed at IMPs 101 and 201 pursuant to 40 CFR § 122.45(h). Therefore, no TBELs will be imposed at Outfall 001. However, regulatory effluent standards and monitoring requirements are imposed on the combined discharge.

Regulatory Effluent Standards and Monitoring Requirements

Flow monitoring will be required in accordance with 25 Pa. Code § 92a.61(d)(1). Effluent standards for pH (6.0 instantaneous minimum and 9.0 instantaneous maximum) are imposed at Outfall 001 based on 25 Pa. Code §§ 92a.48(a)(2) and 95.2(1). Pursuant to 25 Pa. Code §§ 92a.48(a)(2), as oil-bearing wastewater, discharges from Outfall 001 are subject to effluent standards for oil and grease from 25 Pa. Code § 95.2(2).

Shell uses chemical additives containing chlorine. Therefore, effluent limits for Total Residual Chlorine (TRC) are imposed at Outfall 001 in accordance with 25 Pa. Code § 92a.48(b)(2).

No TBELs are developed to control thermal pollution. However, a maximum daily temperature limit of 110°F is imposed in the absence of thermal WQBELs (refer to Section 001.B, below). The 110°F temperature limit is imposed to protect human health caused by exposure resulting from water contact pursuant to 25 Pa. Code § 92a.12(b) and Chapter 3, Section 3.3.F of the “ORSANCO Pollution Control Standards for Discharges to the Ohio River” (2019 Revision) and the recommendations of DEP’s “Implementation Guidance for Temperature Criteria” (Doc. No. 386-2000-001), and as an implementation of general water quality criteria under 25 Pa. Code § 93.6(a), which states that “[w]ater 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.”

25 Pa. Code § 95.10 - Treatment requirements for new and expanding mass loadings of Total Dissolved Solids

Section 95.10 of 25 Pa. Code Chapter 95 was promulgated on August 21, 2010 and was intended to address the limited assimilative capacity of Pennsylvania's rivers and streams for Total Dissolved Solids (TDS). The regulation exempts existing mass loadings of TDS from treatment requirements, while new or expanding mass loadings of TDS are subject to the treatment requirements specified in the regulation. DEP's guidance document titled "Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) -- 25 Pa. Code §95.10" provides additional explanation of the implementation procedures for the regulation as follows:

> "Integral to the implementation of §95.10 is the principle that existing, authorized mass loadings of TDS are exempt from any treatment requirements under §95.10. Section 95.10(a)(1) effectively exempts any existing mass loading of TDS up to and including the maximum daily discharge loading for any existing discharge, provided that the loading was authorized prior to August 21, 2010. In addition, §95.10 (a)(7) sets a de minimus threshold value of 5,000 lb/d on an average annual basis, below which DEP will not consider the expanding mass loading as sufficient to trigger the treatment requirements. If there is a net increase in TDS loading of more than 5,000 lb/d above the previously authorized loading, treatment requirements may be required for certain discharges, but the treatment requirements are only applicable for the expanding mass loading (the wastewater associated with the portion of the loading in excess of the existing mass loading, as per §95.10 (a)(1)(ii))."
>
> "…Generally, existing mass loadings need be evaluated only at the point that an existing discharge proposes a hydraulic expansion or a change of wastestream. Existing mass loadings should be expressed on both an average daily and a maximum daily basis in order to conform with the requirements of §95.10 (a)(1) and (7)."

Shell has not proposed a new discharge or a hydraulic expansion or a change of waste stream as part of this NPDES permit renewal. Therefore, treatment requirements under § 95.10 are not considered for this permit renewal. The existing permit condition identifying Shell’s existing authorized TDS discharge loading that was authorized prior to August 21, 2010 (65,556 lb/day average and 73,184 lb/day maximum) will remain in the permit for future evaluations of 95.10 treatment requirements in the event that Shell proposes a new discharge, hydraulic expansion, or change of waste stream. Monitoring for TDS loadings and concentrations will continue to be required at Outfall 001.

Per- and Polyfluoroalkyl Substances (PFAS)

As discussed in Section 101.A of this Fact Sheet, DEP implemented a new monitoring initiative for PFAS in February 2024. In accordance with Section II.I of DEP’s “Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits” [SOP No. BCW-PMT-032] 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. Shell reported results for PFOA, PFOS, PFBS, and HFPO-DA at Outfall 001 in the permit renewal application. The results are summarized in **Table 16**.

Table 16. Analytical Results for PFAS at Outfall 001

Parameter	Units	Reported Concentration	Permit Quantitation Limit
Perfluoroooctanoic acid (PFOA)	ng/L	3.7	4.0
Prefluorooctanesulfonic acid (PFOS)	ng/L	2.1	3.7
Perfluorobutanesulfonic acid (PFBS)	ng/L	5.3	3.5
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	<1.4	6.4

Consistent with Section II.I.a of SOP No. BCW-PMT-032, the presence of PFOA and PFOS in the effluent means that quarterly monitoring will be required for all four of the PFAS parameters. As stated in Section II.I.c of the SOP, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (*i.e.*, four consecutive quarterly results), then the monitoring may be discontinued. As described in Section 101.A of this Fact Sheet, intake sampling also will be required.

001.B. Water Quality-Based Effluent Limitations (WQBELs)

ORSANCO Pollution Control Standards

The Ohio River Valley Water Sanitation Commission (ORSANCO)—an interstate commission established by interstate compact—sets water quality standards (Pollution Control Standards or "ORSANCO's Standards") that apply to the Ohio River, a surface water of the Commonwealth, and the primary receiving water for the SPMS's discharges. DEP implements ORSANCO's Standards pursuant to 25 Pa. Code § 93.2(b), which states:

> When an interstate or international agency under an interstate compact or international agreement establishes water quality standards regulations applicable to surface waters of this Commonwealth, including wetlands, more stringent than those in this title, the more stringent standards apply.

Section 5.1.B of ORSANCO's Standards requires a permanent marker at each outfall discharging directly to the Ohio River. That requirement is imposed as a condition in Part C of Shell's current permit and will be maintained in the renewed permit.

Chapter 4, Section F.4 of the 2019 ORSANCO Standards states, among other things, that:

> F. 4. Mixing zones shall continue to be prohibited for [bioaccumulative chemicals of concern] BCCs for discharges from facilities that came into existence after October 16, 2003.

The SPMS is a facility that came into existence after October 16, 2003, which means that BCCs in the facility's discharges are not eligible for a mixing zone allowance. DEP's regulations do not define mixing zones or the conditions under which mixing zones can be used for water quality standards implementation. However, DEP's implementation guidance for toxic pollutants—the "Water Quality Toxics Management Strategy" (Doc. No. 386-0100-001)—identifies design conditions for modeling that include, among other things, criteria compliance times, which are used in combination with other information to establish the locations where compliance with water quality criteria are to occur. For acute aquatic life criteria, the maximum criteria compliance time is fifteen minutes or the travel time until a discharge has completely mixed with the receiving stream, whichever occurs first. For chronic aquatic life criteria, the maximum criteria compliance time is twelve hours or the travel time until a discharge has completely mixed with the receiving stream, whichever occurs first. For human health criteria, the maximum criteria compliance time is twelve hours or the travel time until a discharge has completely mixed with a receiving stream, or the travel time to the nearest potable water supply intake, whichever occurs first.[4] In effect, the criteria compliance times, the discharge flow rate, and the receiving stream's flow rate and cross-sectional area define the "mixing zone" allowable for each pollutant analyzed.

Per ORSANCO's Standards, BCCs include the following: lindane, hexachlorocyclohexane, alpha-hexachlorocyclohexane, beta-hexachlorocyclohexane, delta-hexachlorocyclohexane, hexachlorobutadiene, photomirex, 1,2,4,5-tetrachlorobenzene, toxaphene, pentachlorobenzene, 1,2,3,4-tetrachlorobenzene, mirex, hexachlorobenzene, chlordane, DDD, DDT, DDE, octachlorostyrene, PCBs, 2,3,7,8-TCDD, mercury, and dieldrin. Most of those compounds are pesticides or are associated with pesticides that are no longer in use but that persist in the environment.

Effluent data from Shell indicate that hexachlorobutadiene, 1,2,4,5-tetrachlorobenzene, toxaphene, pentachlorobenzene, 1,2,3,4-tetrachlorobenzene, hexachlorobenzene, chlordane, DDD, DDT, DDE, PCBs, and dieldrin are not detectable in the effluent.[5] Mercury is detected in the effluent.

Hexachlorobenzene and hexachlorobutadiene are regulated at IMP 101 as part of the suite of organic parameters regulated by 40 CFR part 414 (irrespective of their presence in a specific OCPSF facility's wastewater). Shell has never detected those pollutants in IMP 101's effluent and influent sample analyses for the application indicate those pollutants are not present in the facility's raw wastewaters.

[4] Per 25 Pa. Code § 96.3(d), the criteria compliance time for total dissolved solids, nitrite-nitrate nitrogen, phenolics, chloride, sulfate, and fluoride is 12 hours or the travel time to the nearest downstream potable water supply withdrawal.

[5] Shell reported one non-detect result for pentachlorobenzene using a Reporting Limit 3.2 µg/L, which is higher than DEP's Target QL of 2.5 µg/L. Water quality modeling will account for that value and others.

The following BCCs are not expected to be present in SPMS's effluent and will not be subject to any requirements in the permit: lindane, hexachlorocyclohexane and its isomers, mirex, photomirex, octachlorostyrene, and 2,3,7,8-TCDD. To the extent that other BCCs have numerical water quality criteria either under Pennsylvania regulations or ORSANCO's Standards (some BCCs do not), they are modeled as part of the reasonable potential analysis for Outfall 001.

Toxics Management Spreadsheet Water Quality Modeling Program and Procedures for Evaluating Reasonable Potential

WQBELs are developed pursuant to Section 301(b)(1)(C) of the Clean Water Act and, per 40 CFR § 122.44(d)(1)(i), are imposed to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality." The Department of Environmental Protection developed the DEP Toxics Management Spreadsheet (TMS) to facilitate calculations necessary to complete a reasonable potential (RP) analysis and determine WQBELs for discharges of toxic and some nonconventional pollutants.

The TMS is a single discharge, mass-balance water quality modeling program for Microsoft Excel® that considers mixing, first-order decay, and other factors to determine WQBELs for toxic and nonconventional pollutants. Required input data including stream code, river mile index, elevation, drainage area, discharge flow rate, low-flow yield, and the hardness and pH of both the discharge and the receiving stream are entered into the TMS to establish site-specific discharge conditions. Other data such as reach dimensions, partial mix factors, and the background concentrations of pollutants in the stream also may be entered to further characterize the discharge and receiving stream. The pollutants to be analyzed by the model are identified by inputting the maximum concentrations reported in the permit application or Discharge Monitoring Reports, or by inputting an Average Monthly Effluent Concentration (AMEC) calculated using DEP's ToxStats spreadsheet for datasets of ten or more effluent samples. Pollutants with no entered concentration data and pollutants for which numeric water quality criteria in 25 Pa. Code Chapter 93 have not been promulgated are excluded from the modeling. If warranted, ammonia-nitrogen, CBOD-5, and dissolved oxygen are analyzed separately using DEP's WQM 7.0 model.

The TMS evaluates each pollutant by computing a wasteload allocation for each applicable criterion, determining the most stringent governing WQBEL, and comparing that governing WQBEL to the input discharge concentration to determine whether permit requirements apply in accordance with the following RP thresholds:

- Establish limits in the permit where the maximum reported effluent concentration or calculated AMEC equals or exceeds 50% of the WQBEL. Use the average monthly, maximum daily, and instantaneous maximum (IMAX) limits for the permit as recommended by the TMS (or, if appropriate, use a multiplier of 2 times the average monthly limit for the maximum daily limit and 2.5 times the average monthly limit for IMAX).
- For non-conservative pollutants, establish monitoring requirements where the maximum reported effluent concentration or calculated AMEC is between 25% - 50% of the WQBEL.
- For conservative pollutants, establish monitoring requirements where the maximum reported effluent concentration or calculated AMEC is between 10% - 50% of the WQBEL.

In most cases, pollutants with effluent concentrations that are not detectable at the level of DEP's Target Quantitation Limits are eliminated as candidates for WQBELs and water quality-based monitoring requirements.

Reasonable Potential Analysis and WQBEL Development for Outfall 001

Discharges from Outfall 001 are evaluated based on either maximum concentrations reported on the permit renewal application or AMECs calculated using maximum concentrations reported on DMRs (for datasets containing ten or more results). The TMS model is run for Outfall 001 with the modeled discharge and receiving stream characteristics shown in **Table 17**. Pollutants for which specific water quality criteria have not been promulgated (*e.g.*, TSS, Oil and Grease, etc.) are excluded from the modeling. Modeling is performed using the most stringent of DEP's water quality criteria in Chapter 93 and ORSANCO's water quality criteria from ORSANCO's Pollution Control Standards (2019 Revision).

The ambient background concentrations of naturally occurring pollutants in the Ohio River and corresponding coefficients of variation (CVs) are input into the TMS to account for the decreased capacity of the river to assimilate those pollutants without violating water quality criteria. Except for copper, pH, and hardness, the ambient background concentrations and CVs are based on statistical calculations using long-term data (100 samples) from Water Quality Network Station 902 – Ohio River at Sewickley from September 2016 through March 2025. Reporting limits for analyses of copper at WQN 902 were revised downward beginning in 2022, so available data from June 2022 through March 2025 are used for copper. The background pH and hardness of the river are, respectively, the median and mean of all available data for those parameters at WQN Station 902 from October 1998 through March 2025.

The Q_{7-10} and harmonic mean flows of the Ohio River are given in ORSANCO's Pollution Control Standards (2019) as 4,730 cfs, and 16,200 cfs, respectively. The nearest downstream potable water supply intake (BVPV Styrenics) is included as the downstream point in the TMS.[6] Additionally, a partial mix factor of 0.2 is applied to the minimum regulated flow of the Ohio River for chronic criteria based on DEP's best professional judgment. DEP uses partial mix factors (PMFs) in the TMS to represent the fractional portion of the receiving stream that mixes with a discharge. A PMF of 0.2 provides the discharge with 20% of the receiving stream's Q_{7-10} flow for mixing and dilution. The PMF is manually applied because, as a single discharge model, the TMS allocates high percentages of stream flow to individual discharges, which often results in those discharges being modeled with most or all of a stream's assimilative capacity. This would leave little or no assimilative capacity for other dischargers to the same receiving stream.

Table 17. TMS Inputs for Outfall 001

Discharge Characteristics		
Parameter		**Value**
Discharge Flow (MGD)		2.7
Discharge Hardness (mg/L)		343
Discharge pH (S.U.)		7.47
Receiving Stream Characteristics		
Parameter	**Outfall 001**	**End of Segment**
Stream Code	32317	32317
River Mile Index	952.70	951.71
Drainage Area (mi^2)	22,771.8	22772.85
Q_{7-10} (cfs)	4,730	see results
Elevation (ft)	681.8	681.67
Slope (ft/ft)	0.0001	0.0001
Average Width (ft)	240	240
Average Depth (ft)	15	15
PWS Withdrawal (MGD)	—	216

DEP performed a reasonable potential analysis that resulted in the WQBELs and reporting requirements in **Table 18**. The WQBELs and reporting requirements for acrylonitrile, benzidine, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, 3,3-dichlorobenzidine, hexachlorobutadiene, and toxaphene are the result of Shell's attainment of analytical reporting limits that are less stringent (*i.e.*, higher) than DEP's Target QLs. Even though the results were reported as less than laboratory reporting limits, those reporting limits are too high to rule out the possibility that discharges will result in excursions above Pennsylvania's water quality criteria. When new WQBELs are calculated for a facility, DEP sends applicants a pre-draft survey. The survey requests applicants to submit information to facilitate the development of permit conditions (*e.g.*, schedules of compliance) including whether the applicant is aware of the source(s) of pollutants, whether any studies were performed in the past to control or treat the pollutants, and when the applicant believes it will be able to comply with the proposed WQBELs. The pre-draft survey also provides applicants an opportunity to collect additional samples and analyze them using reporting limits that are no greater than the Target QLs. With new results, DEP can re-evaluate whether reasonable potential exists and/or whether monitoring is necessary. DEP transmitted a pre-draft survey letter to Shell on February 10, 2026. On March 10, 2026, Shell responded to the pre-draft survey and indicated that it intended to collect additional samples.[7]

Table 18. Preliminary Water Quality-Based Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Permit Limits			Discharge Conc. (µg/L)	Target QL (µg/L)	Governing WQBEL	Governing WQBEL Basis†
	Avg Mo. (µg/L)	Max Daily (µg/L)	IMAX (µg/L)				
Mercury, Total (ng/L)	12.0	17.4	30.0	14	0.2	12.0	THH
Acrolein	Report	Report	Report	<60	2	147	AFC
~~Acrylamide~~	~~54.4~~	~~84.8~~	~~136~~	~~<210~~	~~0.1~~	~~54.4~~	~~CRL~~
Acrylonitrile	Report	Report	Report	<17	5	39.6	CRL
Benzidine	0.067	0.1	0.17	<95	50	0.067	CRL
Bis(2-Ethylhexyl)Phthalate	Report	Report	Report	<65	5	249	CRL
Butyl Benzyl Phthalate	Report	Report	Report	<10	5	35.5	THH
3,3-Dichlorobenzidine	Report	Report	Report	<6.1	5	16.3	CRL
Hexachlorobutadiene	0.01	0.016	0.025	<1.1	0.5	0.01	CRL
Toxaphene	0.0002	0.0003	0.0005	<2	0.5	0.0002	CFC

† AFC = Acute Fish Criterion; CFC = Chronic Fish Criterion; THH = Threshold Human Health; CRL = Cancer Risk Level

†† The discharge concentration for Total Mercury is based on the mean of a lognormal distribution of quarterly results reported through eDMR from 1st Quarter 2023 through 3rd Quarter 2025.

6 The cogeneration plant previously located at BVPV Styrenics' facility that made substantial use of the 216 MGD design flow of BVPV's intake was permanently shut down in 2015, which reduced withdrawals from BVPV's intake to about 33 MGD. Also, BVPV Styrenics and its intake are currently idled. Therefore, the inclusion of a 216 MGD withdrawal at the end of the modeled segment is conservative.

7 The pre-draft survey letter allowed Shell to collect a minimum of four (4) additional effluent samples, as 24-hour composites, collected at least one week apart.

On April 17, 2026, Shell submitted analytical results from additional samples collected in March 2026. The results are summarized in **Table 19**.

Table 19. Additional Sample Results at Outfall 001 in Response to Pre-Draft Survey

Parameter	3/12/2026		3/20/2026		3/26/2026		3/31/2026		Target QL
	Result	MDL	Result	MDL	Result	MDL	Result	MDL	
Mercury	38	0.56	55	0.56	82	1.4	96	1.4	1.0
Acrolein	<3.0	3	<3.0	3	<3.0	3	<3.0	3	2.0
Acrylonitrile	<1.1	1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	5.0
Benzidine	<8.9	8.9	<8.7	8.7	<9.0	9.0	<8.7	8.7	50
Bis(2-Ethylhexyl)Phthalate	<6.0	6.0	<5.9	5.9	<6.1	6.1	<5.9	5.9	5.0
Butyl Benzyl Phthalate	<0.91	0.91	<0.89	0.89	<0.92	0.92	<0.89	0.89	5.0
3,3-Dichlorobenzidine	<0.57	0.57	<0.56	0.56	<0.57	0.57	<0.56	0.56	5.0
Hexachlorobutadiene	<0.067	0.067	<0.066	0.066	<0.068	0.068	<0.066	0.066	0.5
Toxaphene	<0.047	0.047	<0.047	0.047	<0.047	0.047	<0.047	0.047	0.5

DEP re-evaluated reasonable potential using the new results. Output from the TMS model is included in **Attachment B** to this Fact Sheet. As explained previously, the TMS compares the input discharge concentrations to the calculated WQBELs using DEP's reasonable potential thresholds to evaluate the need to impose WQBELs or monitoring requirements in the permit. The results of the modeling indicate that the water quality-based reporting requirements in **Table 20** apply to discharges from Outfall 001.

Table 20. Water Quality-Based Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Permit Limits			Discharge Conc. (µg/L)	Target QL (µg/L)	Governing WQBEL	Governing WQBEL Basis†
	Avg Mo. (µg/L)	Max Daily (µg/L)	IMAX (µg/L)				
Mercury, Total (ng/L)	12.0	22.0	30.0	65.8 ††	0.2	12.0	THH
~~Acrylamide~~	~~54.4~~	~~84.8~~	~~136~~	~~<210~~	~~0.1~~	~~54.4~~	~~CRL~~

† AFC = Acute Fish Criterion; CFC = Chronic Fish Criterion; THH = Threshold Human Health; CRL = Cancer Risk Level

†† The discharge concentration for Total Mercury is based on the mean of a lognormal distribution of quarterly results reported through eDMR and Shell's supplemental analytical results reported in its pre-draft survey response.

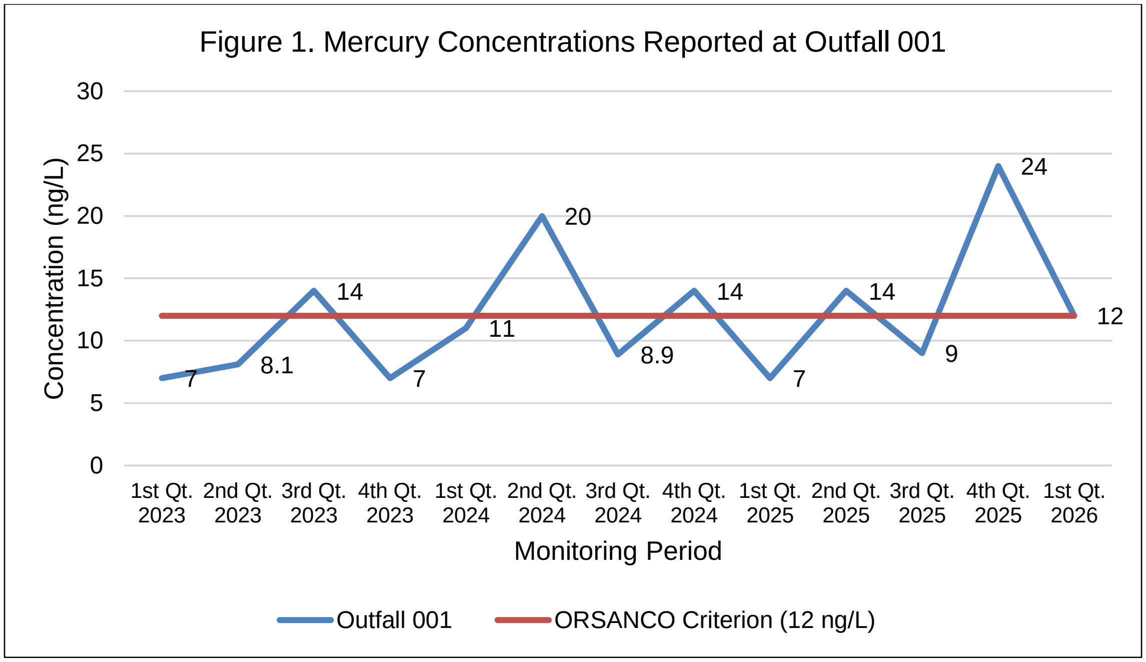
Shell reported results for Acrylamide using an analytical reporting limit of 210 µg/L. For modeling purposes, the TMS uses a Target QL of 0.1 µg/L for Acrylamide. The permit application instructions do not identify a Target QL for Acrylamide, so applicants are not held to the TMS's Target QL for Acrylamide. Also, according to the application, Shell does not use chemical additives containing Acrylamide. Therefore, the TMS's WQBELs for Acrylamide are not imposed at Outfall 001. Notwithstanding the modeling results, quarterly analyses for hexachlorobutadiene, 1,2,4,5-tetrachlorobenzene, pentachlorobenzene, 1,2,3,4-tetrachlorobenzene, hexachlorobenzene will continue to be required at Outfall 001.

The WQBELs for mercury are based on detected concentrations that exhibit a reasonable potential to cause or contribute to an instream excursion above the applicable water quality criterion. Quarterly analytical results for mercury at Outfall 001 from the first quarter of 2023 through the first quarter of 2026 are summarized in Figure 1. The long-term average mercury concentration at Outfall 001 based on the quarterly results is 18.8 ng/L. The concentration is substantially higher when the pre-draft survey results from March 2026 are included.

Pursuant to Chapter 4, Paragraph F.4 of ORSANCO's Pollution Control Standards (2019), mixing zones are prohibited for discharges from facilities that came into existence after October 16, 2003 like the SPMS. With mixing zones (*i.e.*, criteria compliance times) disallowed for ORSANCO-listed BCCs discharged from facilities that came into existence after October 16, 2003, ORSANCO's 12 ng/L criterion for mercury becomes an end-of-pipe effluent limit.

Based on EPA's "Final Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category, Volume I" (October 1987) and information from Shell, mercury is not known to be associated with the types of industrial processes performed at the SPMS. As stated previously, Shell does not generate any metals or cyanide-bearing waste streams (*i.e.*, waste streams identified in Appendix A of part 414) at the SPMS. When the OCPSF ELGs were developed, OCPSF plants existing at that time submitted responses to Section 308 questionnaires sent by EPA. In those questionnaires, EPA asked facilities to affiliate the presence of priority pollutants in their wastewaters with the facilities' various products/processes. After data validation by EPA, only one product/process at one plant was affiliated with the presence of mercury (OSCPF Development Document, Table V-50).

Based on those results, EPA excluded mercury from regulation because it was “detected in the effluent from a small number of sources and [was] uniquely related to those sources”.



In its pre-draft survey response, Shell requested additional time to evaluate potential mercury sources and/or contributions to Outfall 001’s discharges. Shell posited that the concentrations of mercury reported at Outfall 001 may be caused by Shell’s evaporative cooling system concentrating the ambient concentration of mercury in the water withdrawn from the Ohio River, or from low-level mercury contaminants present in treatment chemicals used onsite.

DEP agrees that mercury present at Outfall 001 may originate from the Ohio River. Mercury is present in the Ohio River at varying concentrations and, according to a report from ORSANCO titled “Ohio River Basin Mercury Loading Analysis” from June 2020, the presence of mercury in the Ohio River is primarily attributable to atmospheric deposition with point sources contributing between 2% and 5% of the mercury loads reported in the river (see Figure 21 below from ORSANCO’s report). Also, among those point source load contributors, about 60% were from upstream discharges and not direct dischargers to the Ohio River (see Figure 24 below from ORSANCO’s report). DMR data summarized in Figure 1 and supplemental analytical data collected by Shell in March 2026 indicate that Shell will not comply with a 12 ng/L limit for mercury.

Schedule of Compliance for WQBELs

Pursuant to 25 Pa. Code § 92a.51(a), schedules of compliance are permissible when an existing discharge is not (or will not be) in compliance with effluent limitations. DEP’s “Standard Operating Procedure for Clean Water Program – Establishing Water Quality-Based Effluent Limitations (WQBELs) and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers” [SOP No. BCW-PMT-037] states that, if the permittee indicates that it is uncertain when compliance could be achieved, then a Final WQBEL Effective Date of no more than three years should be established. Shell indicated in its pre-draft survey that it was uncertain when the WQBELs for mercury could be achieved, so a three-year compliance schedule will be included in the permit for the new mercury WQBELs. Monitoring and reporting will be required during the interim three-year period before the new mercury WQBELs take effect.

Consistent with § 92a.51(a), during the interim period, the permit will require Shell to take specific steps to achieve compliance including requirements to collect site-specific data and to perform a Toxics Reduction Evaluation (TRE). In response to the pre-draft survey, Shell has already voluntarily initiated investigations similar to those required by the permit, but Shell will be given time to complete specific activities under the terms and conditions of the renewed permit.

After collecting site-specific data and performing a TRE, Shell must summarize the result in a Final WQBEL Compliance Report to DEP. DEP may respond to the Final WQBEL Compliance Report in one of the following ways:

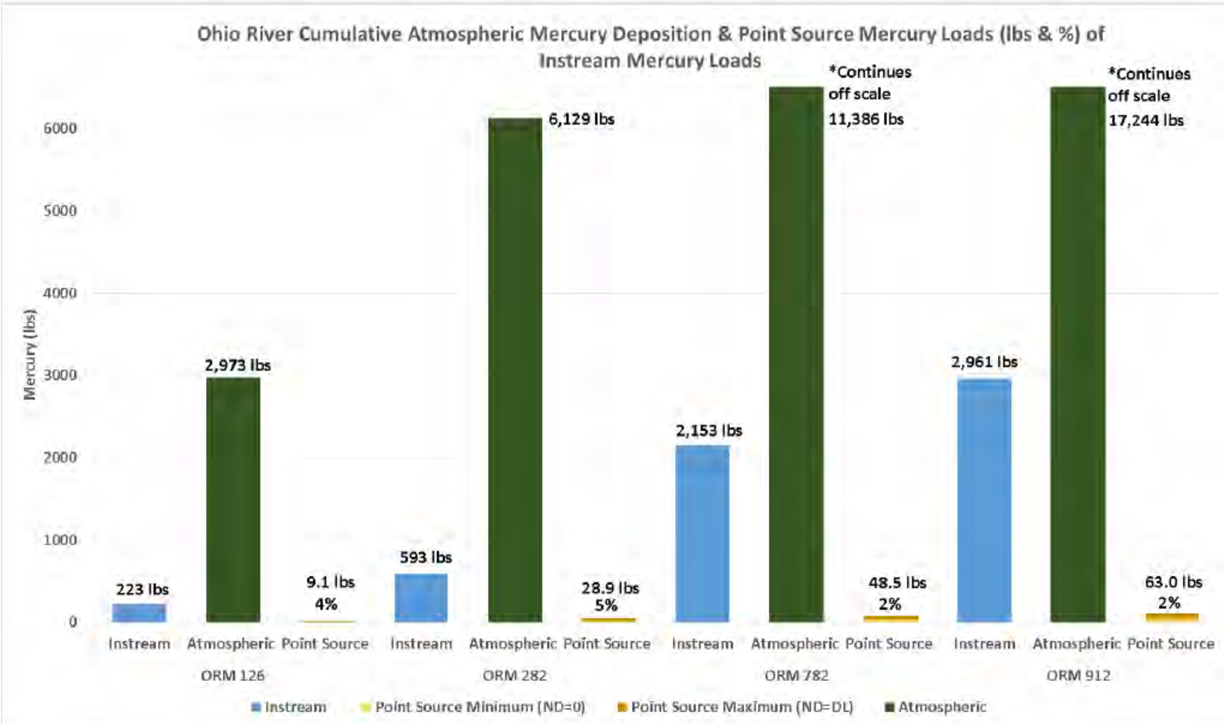


Figure 21. Comparing instream mercury loads at four Ohio River stations to monitored point source cumulative mercury loads and cumulative atmospheric deposition.

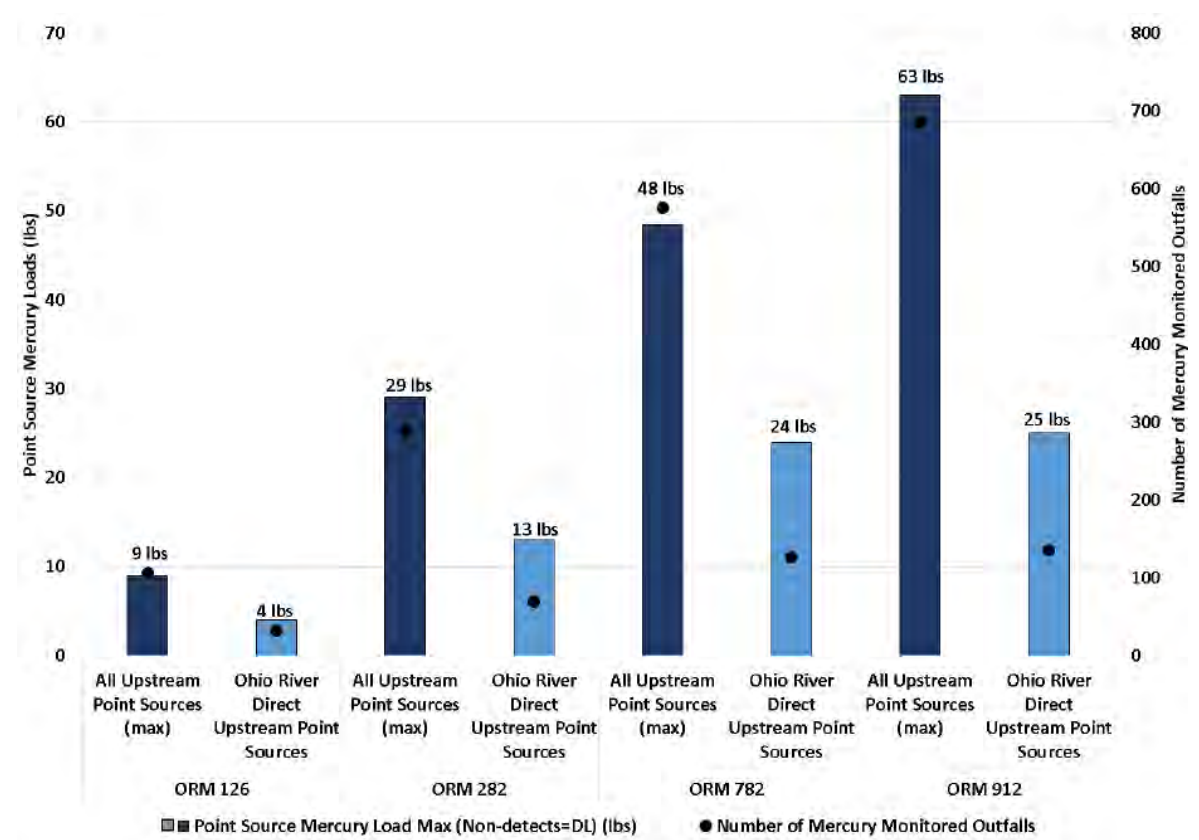


Figure 24. Comparison of cumulative upstream mercury loads for the entire basin to cumulative upstream loads from discharges direct to the Ohio River.

a. Request additional research, studies or clarification if the permittee concludes that it cannot achieve final WQBELs by the WQBEL Effective Date or compliance is infeasible and DEP disagrees with this conclusion or believes that additional efforts are necessary before reaching this conclusion. The permittee shall comply with the schedule provided by DEP in writing for such additional efforts or an alternative agreed upon schedule.

b. Issue a draft Major Amendment to the permit that modifies the WQBELs in response to site-specific data or modifies the WQBEL Effective Date, for public comment.

d. Deny the application for a Major Amendment to the permit or place review of the application on hold until additional research or studies requested by DEP are complete.

d. Notify the permittee that DEP will consider a time extension to achieve the final WQBELs under 25 Pa. Code § 95.4 for the discharge upon the receipt of a request submitted by the permittee using Form No. 3800-FM-BCW0302, if it can be demonstrated that the criteria for a time extension under § 95.4 are met.

e. Notify the permittee that DEP will consider the submission of a site-specific criterion study (SSCS) to further modify WQBELs, where applicable. The permittee shall comply with the requirements set forth in DEP's notification letter for completion of a SSCS, including submission of a SSCS work plan.

Shell could also pursue a variance and/or net effluent limitations consistent with the requirements in Sections 1.6 and 5.5 of ORSANCO's Standards to the extent Shell complies with the requirements for granting a variance and/or net effluent limits.

The permit will require Shell to monitor the intake concentration and intake loading of mercury in addition to the effluent concentration and effluent loading of mercury to determine whether mercury in the effluent originates from the Ohio River and to what extent mercury levels in the intake water are altered by Shell's industrial processes.

The modeling results do not identify WQBELs or monitoring requirements for total aluminum, hexavalent chromium, total copper, or benzene (monitoring requirements for those parameters in the previous permit were based on water quality modeling). Therefore, monitoring requirements for those parameters will be removed from Outfall 001 pursuant to the anti-backsliding exception under 40 CFR § 122.44(l)(2)(i)(B)*(1)* regarding new information that justifies the application of less stringent effluent limits—in this case, effluent data collected during the previous permit term that do not exceed DEP's thresholds for requiring monitoring or WQBELs.

<u>Thermal Limits</u>

Thermal WQBELs are evaluated using a DEP program called "Thermal Limits Spreadsheet" created with Microsoft Excel for Windows. This program calculates temperature wasteload allocations (WLAs) by applying a heat transfer equation, which takes two forms in the program depending on the source of the facility's cooling water. In Case 1, intake water to a facility is from the receiving stream upstream of the discharge location. In Case 2, intake water is from a source other than the receiving stream (*e.g.*, municipal water supply). The determination of which case applies to a given discharge is made based on the input data which include the receiving stream flow rate ($Q_{7\text{-}10}$ or other as appropriate), the stream intake flow rate, external source intake flow rates, consumptive flow rates, and site-specific ambient stream temperatures. Case 1 limits are generally expressed as heat rejection rates while Case 2 limits are usually expressed as temperatures.

DEP's "Implementation Guidance for Temperature Criteria" (Doc. No. 386-2000-001) directs permit writers to assume instantaneous complete mixing of the discharge with the receiving stream when calculating thermal effluent limits unless adverse factors exist. One such factor listed in the guidance is that the "discharge is to a receiving water that is very wide, resulting in restricted dispersion of the plume, and horizontal stratification of the plume." The Ohio River is wide and Outfall 001 discharges at the riverbank, so instantaneous complete mixing is not assumed. Therefore, a PMF of 0.2 is applied to the receiving stream's low flow for the thermal limit analysis (0.2 × 4,730 cfs = 946 cfs). A PMF of 0.2 provides the discharge with 20% of the Ohio River's flow for mixing and dilution.

Shell withdraws its cooling water from the Ohio River using an existing intake structure located on the property. Outfall 001 and Shell's intake are both located on the Ohio River, but the intake is located approximately 0.6 miles downstream of the discharge, which does not trigger a Case 1 thermal analysis because the downstream intake would not affect the assimilative capacity at the upstream outfall. For this reason, the discharge is analyzed as Case 2.

The results of the thermal discharge analysis using the Thermal Limits Spreadsheet (included in **Attachment C**) show that WQBELs for temperature are not required. Therefore, a maximum temperature limit of 110°F is imposed pursuant to ORSANCO's Pollution Control Standards and DEP's temperature guidance.

Total Residual Chlorine

To determine if WQBELs are required for discharges containing TRC, a discharge evaluation is performed using a DEP program called TRC_CALC created with Microsoft Excel for Windows. TRC_CALC calculates TRC waste load allocations by applying a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the TRC_CALC program include flow rates and chlorine demands for the receiving stream and the discharge (default chlorine demands of 0.3 and 0.0, respectively), the number of samples taken per month, coefficients of TRC variability, partial mix factors and an optional factor of safety. The mass balance model calculates waste load allocations for acute and chronic criteria that are then converted to long term averages using calculated multipliers. The multipliers are functions of the number of samples taken per month and the TRC variability coefficients (normally kept at default values unless site specific information is available). The most stringent limitation between the acute and chronic long-term averages is converted to an average monthly limit for comparison to the BAT average monthly limit of 0.5 mg/L from 25 Pa. Code § 92a.48(b)(2). The more stringent of these average monthly TRC limits is imposed in the permit.

The stream flow and discharge flow entered into the TRC_CALC spreadsheet are 4,730 cfs and 2.7 MGD, respectively. A PMF of 0.2 is input for the CFC criteria and a PMF of 0.067 (calculated based on the toxic analysis) is input for the AFC criteria. The results of the analysis, included in **Attachment D**, indicate that no WQBELs are required for TRC.

Ohio River TMDL for PCBs and Chlordane

DEP has a final approved TMDL for the Ohio River dated April 9, 2001. The TMDL addresses fish consumption use impairments caused by PCBs and chlordane. As explained previously, PCBs and chlordane are not present in Shell's effluent, so Shell is unaffected by the TMDL. However, the following narrative limitation will be included as a condition in Part C of the permit: "There shall be no discharges of polychlorinated biphenyl (PCB) compounds or chlordane at any time."

001.C. Modification Requests

In October 2024, DEP received requests from several Non-Governmental Organizations and numerous individuals (hereafter "Requesters") to modify various aspects of Shell's NPDES permit. With respect to Outfall 001, the requests included the following:

- add limits for 1,2,4,5-tetrachlorobenzene and pentachlorobenzene based on Pennsylvania's numeric water quality criteria and ORSANCO's narrative standard
- add case-by-case technology-based effluent limits for aluminum
- add monthly monitoring for antimony, arsenic, cadmium, lead, selenium, thallium, zinc, and PFAS

DEP provided written responses to Requesters on January 23, 2025. The permit was not modified at that time. DEP stated in its written responses that additional requirements would be considered as part of this permit renewal.

1,2,4,5-Tetrachlorobenzene & Pentachlorobenzene

As described in a preceding section of this Fact Sheet, DEP does not find cause to impose WQBELs for 1,2,4,5-tetrachlorobenzene and pentachlorobenzene because those pollutants are not present in detectable concentrations in Outfall 001's effluent and do not exhibit "reasonable potential" that would support the imposition of WQBELs. However, Shell will be required to continue monitoring those pollutants.

TBELs for Aluminum

Requesters' request to add case-by-case TBELs for aluminum was based on notification requirements under 40 CFR § 122.42(a) and Shell's reporting of effluent concentrations for aluminum that exceeded 100 µg/L. 40 CFR § 122.42(a) states:

(a) ***Existing manufacturing, commercial, mining, and silvicultural dischargers.*** In addition to the reporting requirements under § 122.41(1), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

(1) That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(i) One hundred micrograms per liter (100 µg/l);

(ii) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

(iii) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with § 122.21(g)(7); or

(iv) The level established by the Director in accordance with § 122.44(f).

(2) That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following “notification levels”:

(i) Five hundred micrograms per liter (500 µg/l);

(ii) One milligram per liter (1 mg/l) for antimony;

(iii) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with § 122.21(g)(7).

(iv) The level established by the Director in accordance with § 122.44(f).

Aluminum is not a toxic pollutant (see 40 CFR § 401.15) and is not subject to notification requirements under 40 CFR § 122.42(a). Additionally, § 122.42(a) only requires facilities to notify the Director if a discharge exceeds one of the listed thresholds. DEP would still determine whether effluent limitations are warranted based on the normal statutory and regulatory procedures for developing effluent limits.

Shell did report a maximum aluminum concentration of 250 mg/L in September 2022 as Requesters noted in their October 2024 permit modification request. However, compared to other effluent data for aluminum, the 250 mg/L result is an outlier that is not characteristic of Outfall 001’s effluent. Other than the result from September 2022, the highest concentration of aluminum reported at Outfall 001 from January 2022 through July 2025 was 2.3 mg/L in November 2024. The long-term average aluminum concentration at Outfall 001 is 0.336 mg/L. Case-by-case TBELs for aluminum are not necessary at those levels.

Metals Monitoring

Requesters requested monthly monitoring for antimony, arsenic, cadmium, lead, selenium, thallium, and zinc at Outfall 001 because those metals are present in other storm water discharges at the SPMS. As explained in DEP’s January 23, 2025 response, Outfall 001’s discharges are not composed primarily of process area storm water. Metals in process area storm water would need to be present in significant concentrations to show up in the effluent at Outfall 001 because storm water mixes with process wastewaters and cooling tower blowdown before discharging. Storm water data reported by Shell at other storm water outfalls do not suggest that metals are present in significant concentrations at Outfall 001.

The influent and effluent concentrations of antimony, arsenic, cadmium, lead, selenium, thallium, and zinc to and from the wastewater treatment system reported on the 2025 permit application are summarized in **Table 21** in addition to effluent concentrations reported at IMPs 101 and 201 that contribute to discharges at Outfall 001. For comparison, benchmark values from the Environmental Protection Agency’s 2021 Multi-Sector General Permit are shown representing target effluent concentrations for industrial storm water. The 2021 MSGP does not identify a benchmark value for thallium, so the acute aquatic life water quality criterion is shown consistent with EPA’s procedure for establishing benchmark values.

Table 21. Influent and Effluent Concentrations of Metals

Parameter	Influent (µg/L)	Outfall 001		IMP 101		IMP 201		EPA MSGP Benchmark
		Average	Maximum	Average	Maximum	Average	Maximum	
Antimony	0.21	1.8	<1	<0.84	1.8	1.1	1.9	640
Arsenic	0.9	2.2	<1.5	<0.77	1.2	2.1	2.9	69
Cadmium	<0.15	<0.2	0.34	<0.17	0.34	<0.19	0.34	1.8
Lead	<0.12	<0.51	0.89	<0.41	0.61	<1.2	3.9	82
Selenium	0.97	2.2	2.5	<2	2.6	2.3	2.9	3.1
Thallium	<0.13	<0.47	0.69	<0.46	<0.69	<0.35	<0.69	65
Zinc	30	40	110	25	42	<89	170	120

As shown in **Table 21**, the concentrations of antimony, arsenic, cadmium, lead, selenium, thallium, and zinc in both treated and untreated wastewaters are lower than benchmark values for industrial storm water. That is, the concentrations of metals in Shell's combined process wastewater and process area storm water are lower than target effluent concentrations for storm water alone. Based on that comparison, monitoring for antimony, arsenic, cadmium, lead, selenium, thallium, and/or zinc at Outfall 001 is not warranted.

As discussed previously, PFAS monitoring will be imposed at Outfall 001 consistent with DEP's PFAS monitoring initiative.

001.D. Effluent Limitations and Monitoring Requirements for Outfall 001

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges from Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 22. Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
pH (S.U.)	—	—	6.0 Inst. Min.	—	9.0	25 Pa. Code § 95.2(1)
Oil and Grease	—	—	15.0	—	30.0	25 Pa. Code § 95.2(2)
Temperature (°F)	—	—	—	110	—	ORSANCO Pollution Ctrl Stds.
Total Residual Chlorine	—	—	0.5	1.0	1.25	25 Pa. Code § 92a.48(b)(2)
Total Dissolved Solids	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Bromide, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Chloride, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Sulfate, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Mercury, Total (Interim) †	Report	Report	Report	Report	Report	ORSANCO; § 92a.61(b)
Mercury, Total (Final)	0.0003	0.0005	12.0	22.0	30.0	ORSANCO; § 92a.61(b)
Mercury, Total (Intake)	Report	Report	Report	Report	Report	25 Pa. Code § 92a.61(b)
Pentachlorobenzene	—	—	—	Report	—	ORSANCO; § 92a.61(b)
Hexachlorobenzene	—	—	—	Report	—	ORSANCO; § 92a.61(b)
Hexachlorobutadiene	—	—	—	Report	—	ORSANCO; § 92a.61(b)
1,2,4,5-Tetrachlorobenzene	—	—	—	Report	—	ORSANCO; § 92a.61(b)
1,2,3,4-Tetrachlorobenzene	—	—	—	Report	—	ORSANCO; § 92a.61(b)
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
PFOA (ng/L) (Intake)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
PFOS (ng/L) (Intake)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
PFBS (ng/L) (Intake)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
HFPO-DA (ng/L) (Intake)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)

† Reporting is required for a period of three years from the permit effective date.

Based on DEP's Permit Writers' Manual, flow must be measured daily (metered). Oil and grease and pH will require daily grab samples. Temperature must be monitored daily using immersion stabilization sampling. Benzene and TRC will require

1/week grab sampling and all remaining parameters will require 1/week 24-hour composite sampling. Hexachlorobutadiene, 1,2,4,5-tetrachlorobenzene, pentachlorobenzene, 1,2,3,4-tetrachlorobenzene, hexachlorobenzene, PFOA, PFOS, PFBS, and HFPO-DA will require 1/quarter grab sampling. PFOA, PFOS, PFBS, and HFPO-DA also will require quarterly intake sampling. Mercury will require grab sampling 2/month (intake and effluent). Parameters with both intake and effluent sampling (mercury, PFOA, PFOS, PFBS, and HFPO-DA) must be sampled on the same day (to the extent practicable) to facilitate comparisons between intake and effluent results.

Development of Effluent Limitations

Outfall Nos. 002, 003, 006-010, 012-014, 016-022 **Design Flow (MGD)** Variable
Wastewater Description: Storm water

Storm water outfalls at the SPMS are listed in **Table 23**. The storm water discharged at those outfalls is storm water associated with industrial activities. However, Shell has separated the storm water runoff that may be contaminated by activities in process areas of the site (*i.e.*, "accidentally contaminated" storm water that will be managed as process wastewater) from storm water runoff from other areas of the site with less potential for contamination like runoff from administration buildings. Shell did not claim that any of the storm water outfalls are not exposed to industrial activities.

Table 23. Storm Water Outfalls

Outfall	Drainage Area (ft^2)	Description
002	1,051,520	East Railroad Pond
003	—	East Railroad Pond Overflow
006	3,221,610	South Ponds
007	—	South Ponds' Overflow
008	4,686,388	Clean Rainwater (CR) Pond
009	—	Clean Rainwater Pond Overflow
010	164,993	West Railroad Basin
012	—	West Railroad Basin Overflow
013	4,935,212	North Pond
014	—	North Pond Overflow
016	373,966	Storm water from plant and both Duquesne and PennDOT rights-of-way
017	612,323	Parking Area Pond A West
018	—	Parking Area Pond A West Overflow
019	614,443	Parking Area Pond B East
020	—	Parking Area Pond B East Overflow
021	340,525	Storm water runoff from Electric Tower Road
022	1,128,045	Storm water runoff from the Training Center

SWO.A. Technology-Based Effluent Limitations (TBELs)

Storm water discharging from the SPMS that is not managed as process wastewater is not subject to any federal ELGs. Therefore, effluent limits and/or monitoring requirements are developed based on applicable state regulations and guidance.

Regulatory Monitoring Requirements

A reporting requirement for flow will be imposed in accordance with 25 Pa. Code § 92a.61(h).

Storm Water Monitoring Requirements

Consistent with 25 Pa. Code § 92a.61(h) and DEP's policy for permitting storm water discharges associated with industrial activities, minimum standards described in DEP's "PAG-03 NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity" (PAG-03) are imposed on storm water discharges authorized by individual industrial waste NPDES permits.[8] Based on Shell's SIC Codes of 2821 and 2869, the facility will be classified under Appendix F – Chemicals and Allied Products of the PAG-03 General Permit.[9] To ensure baseline consistency with other Chemicals and Allied Products facilities in Pennsylvania that discharge storm water associated with their industrial activities, the monitoring requirements and sector-specific Best Management Practices (BMPs) of the PAG-03, Appendix F are imposed at Shell's storm water outfalls. The monitoring requirements of Appendix F are shown in **Table 24**. Monitoring requirements for additional pollutants are considered to the extent that baseline monitoring requirements from Appendix F do not capture the range of analytes present in Shell's storm water discharges.

[8] Standard Operating Procedure (SOP) for Clean Water Program, Establishing Effluent Limitations for Individual Industrial Permits, Section III.C. (SOP No. BCW-PMT-032, October 1, 2020, Version 1.6): "The applicable appendix of the PAG-03 General Permit should be considered the minimum standards for limits, benchmarks and monitoring requirements for individual industrial stormwater permits. The application manager may include other limits, benchmarks and monitoring requirements as justified in the fact sheet."

[9] The determination of which of the PAG-03 General Permit's appendices applies to a facility is based on a facility's SIC Code.

Table 24. PAG-03 Appendix F – Minimum Monitoring Requirements

Parameter	Measurement Frequency	Sample Type	Benchmark Values
pH (S.U.)	1 / 6 months	Grab	XXX
Chemical Oxygen Demand (COD)	1 / 6 months	Grab	120
Total Suspended Solids (TSS)	1 / 6 months	Grab	100
Nitrate + Nitrite-Nitrogen	1 / 6 months	Grab	XXX
Total Phosphorus	1 / 6 months	Grab	XXX
Total Lead	1 / 6 months	Grab	XXX
Total Zinc	1 / 6 months	Grab	XXX
Total Iron	1 / 6 months	Grab	XXX
Total Aluminum	1 / 6 months	Grab	XXX

Storm water discharges are intermittent, are usually characterized by high flows occurring over relatively short time intervals, and can carry a variety of pollutants whose source, nature, and extent varies. This contrasts with process wastewater discharges where the effluent is generally more predictable and can be more effectively analyzed to develop numeric effluent limitations. Based on those circumstances and consistent with 40 CFR § 122.44(k)(2), DEP regulates storm water discharges associated with industrial activities using non-numeric effluent limits in the form of best management practices (BMPs). BMPs specified in the permit are designed to minimize various types of pollutant discharges to the extent technologically possible and economically practicable and achievable considering best industry practices. The non-numeric BMPs satisfy the control level requirements of the Clean Water Act (BAT/BPT/BCT) for storm water discharges associated with industrial activities. DEP considers the combination of pollution prevention practices and BMPs to be the best technologically available and economically practicable and achievable controls, as well as the most environmentally sound way to control the discharge of pollutants in storm water discharges from industrial facilities.

The effectiveness of an industrial facility's BMPs is evaluated through a benchmark monitoring program that compares effluent results to certain benchmark values. The benchmark values are the pollutant concentrations above which a storm water discharge could potentially impair or contribute to impairing water quality or affect human health from ingestion of water or fish. The benchmarks also are set at a level, that if below, a facility's discharges pose less potential for a water quality concern. As such, the benchmarks provide an appropriate level to determine whether a facility's BMPs are successfully implemented. The benchmark values listed in **Table 24** are not effluent limitations and exceedances do not constitute permit violations. However, if sampling demonstrates exceedances of benchmark values for two consecutive monitoring periods, then Shell must submit a Corrective Action Plan within 90 days of the end of the monitoring period triggering the plan. Continued exceedances of the benchmark values will require a graduated response. Benchmark values and corrective action plan requirements will be specified in a condition in Part C of the permit.

Overflow discharges through Outfalls 003, 007, 009, 012, 014, 019, and 022 will be subject to the same monitoring requirements as the primary discharge locations from the site's storm water ponds and basins because overflows from those structures also are storm water discharges associated with industrial activities. The monitoring frequencies for overflow discharges will be 1/discharge because overflows are not expected to occur regularly. However, since overflows could occur at any time, Discharge Monitoring Reports for overflow outfalls must be submitted monthly rather than semi-annually.

Additional Parameters

Shell reported storm water sample results for discharges from all storm water outfalls except overflow outfalls from storm water ponds/basins at the site because the effluent quality of the primary outfall structures from those ponds/basins is expected to be the same as the effluent quality from the overflow structures. Consistent with the application instructions and in addition to the baseline general chemistry parameters required for all storm water outfalls (Oil & Grease, BOD5, COD, TSS, Total Nitrogen, Total Phosphorus, and pH), Shell sampled each storm water outfall for all pollutants regulated by 40 CFR part 414. Among the results, Shell reported detectable concentrations of the following pollutants: 1,2-Dichloroethane-d4; 2,4,6-Tribromophenol; 2-Fluorobiphenyl; 2-Fluorophenol; 4-Bromofluorobenzene; DCB Decachlorobiphenyl; Dibromofluoromethane; Nitrobenzene-d5; Phenol-d5; Terphenyl-d14; Tetrachlor-m-xylene; and Toluene-d8. In DEP's February 10, 2026 pre-draft survey letter, DEP requested Shell to confirm the source of those pollutants. In a March 10, 2026 letter, Shell confirmed with its contracted laboratory that those compounds are related to surrogate compounds used in the analytical procedures for EPA Methods 624.1, 625.1 and 608.3 and are not characteristic of the effluent. Therefore, they are excluded from further consideration.

Table 25 presents the maximum effluent concentrations reported on Module 1 of the updated NPDES permit application for each storm water outfall. All results are in unit of µg/L except as noted.

Table 25. Storm Water Outfalls

Parameter	002 (003)	006 (007)	008 (009)	013 (014)	016	017 (018)	019 (020)	021	022
Oil & Grease (mg/L)	<4.4	4.2	<4.5	<4.3	<4.2	<4.15	<4.2	<4.4	4.3
BOD5 (mg/L)	<2	120	3.5	<2	2.7	<2.2	2.1	<2	5.4
COD (mg/L)	<9.1	<9.4	<9.1	<9.1	64.00	<12.05	<11.05	<9.1	33.00
TSS (mg/L)	15.00	9.7	29.00	12.00	1500.00	124.50	21.50	12.80	15.00
Tot. Nitrogen (mg/L)	<0.79	<1.01	1.68	0.95	2.19	<0.87	<0.72	<0.80	1.20
Tot. Phosphorus (mg/L)	0.04	<0.04	0.16	0.041	1.30	0.26	0.23	0.05	0.09
pH (S.U.)	8.10	7.60	8.70	8.00	8.00	7.80	7.50	7.30	7.40
1,1,1-Trichloroethane	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,2,2-Tetrachloroethane	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,2-Trichloroethane	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
1,1-Dichloroethane	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63
1,1-Dichloroethene	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55
1,2,4-Trichlorobenzene	<0.21	<0.24	<0.25	<0.25	<0.24	<0.24	<0.25	<0.25	<0.24
1,2-Dichlorobenzene	<0.17	<0.21	<0.22	<0.22	<0.21	<0.21	<0.22	<0.22	<0.21
1,2-Dichloroethane	<0.57	<0.57	<0.57	<0.57	<0.57	<0.57	<0.57	<0.57	<0.57
1,2-Dichloropropane	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66
Diphenylhydrazine (as Azobenzene	<0.23	<0.21	<0.21	<0.2	<0.2	<0.23	<0.25	<0.25	<0.2
1,3-Dinitrobenzene	<0.53	<0.5	<0.5	<0.48	<0.48	<0.55	<0.57	<0.57	<0.46
1,4-Dichlorobenzene	<0.16	<0.24	<0.25	<0.25	<0.24	<0.24	<0.25	<0.25	<0.24
1,4-Dioxane	<43	<43	<43	<43	<43	<43	<43	<43	<43
2,2'oxybis[1-chloropropane]	<0.073	<0.063	<0.063	<0.06	<0.06	<0.069	<0.073	<0.073	<0.058
2,4,6-Trichlorophenol	<0.28	<0.24	<0.24	<0.23	<0.23	<0.27	<0.28	<0.28	<0.22
2,4-Dichlorophenol	<0.064	<0.055	<0.055	<0.053	<0.053	<0.061	<0.064	<0.064	<0.051
2,4-Dimethylphenol	<0.61	<0.59	<0.61	<0.61	<0.59	<0.59	<0.61	<0.61	<0.59
2,4-Dinitrophenol	<3.4	<3.3	<3.4	<3.4	<3.3	<3.3	<3.4	<3.4	<3.3
2,4-Dinitrotoluene	<0.44	<0.38	<0.38	<0.37	<0.37	<0.42	<0.44	<0.44	<0.35
2,6-Dinitrotoluene	<0.22	<0.19	<0.19	<0.18	<0.18	<0.21	<0.22	<0.22	<0.17
2-Chlorethyl vinyl ether	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
2-Chloronaphthalene	<0.074	<0.064	<0.064	<0.061	<0.061	<0.07	<0.074	<0.074	<0.059
2-Chlorophenol	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23
2-Nitrophenol	<0.24	<0.21	<0.21	<0.2	<0.2	<0.23	<0.24	<0.24	<0.19
3,3'-Dichlorobenzidine	<0.73	<0.63	<0.63	<0.61	<0.61	<0.69	<0.73	<0.73	<0.58
4,4'-DDD	<0.00084	<0.00053	<0.00052	<0.00051	<0.00052	<0.00051	<0.00051	<0.00051	<0.00051
4,4'-DDE	<0.00029	<0.0003	<0.0003	<0.00028	<0.00029	<0.00028	<0.00028	<0.00028	<0.00028
4,4'-DDT	<0.00068	<0.00069	<0.00068	<0.00066	<0.00067	<0.00066	<0.00066	<0.00066	<0.00066
4,6-Dinitro-2-methylphenol	<1.8	<1.6	<1.6	<1.5	<1.5	<1.8	<1.8	<1.8	<1.5
4-Bromophenyl phenyl ether	<0.4	<0.35	<0.35	<0.33	<0.33	<0.38	<0.4	<0.4	<0.32
4-Chloro-3-methylphenol	<0.45	<0.44	<0.45	<0.45	<0.44	<0.44	<0.45	<0.45	<0.44
4-Chlorophenyl phenyl ether	<0.28	<0.24	<0.24	<0.23	<0.23	<0.26	<0.28	<0.28	<0.22
4-Nitrophenol	<1.2	<1	<1	<0.98	<0.98	<1.1	<1.2	<1.2	<0.94
Acenaphthene	<0.081	<0.071	<0.071	<0.068	<0.068	<0.077	<0.081	<0.081	<0.065
Acenaphthylene	<0.081	<0.071	<0.071	<0.068	<0.068	<0.077	<0.081	<0.081	<0.065
Acrolein	<16	<16	<16	<16	<16	<16	<16	<16	<16
Acrylamide	<21	<21	<21	<21	<21	<21	<21	<21	<21
Acrylonitrile	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8	<7.8
Aldrin	<0.00035	<0.00036	<0.00036	<0.00034	<0.00035	<0.00034	<0.00034	<0.00034	<0.00034
alpha-BHC	<0.00023	<0.00024	<0.00024	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023	<0.00023
Aluminum	910	480	540	340	9500	4500	3500	210	190
Ammonia (mg/L)	<0.088	0.15	<0.088	0.17	<0.088	0.16	<0.088	<0.088	0.12
Anthracene	<0.061	<0.053	<0.053	<0.051	<0.051	<0.058	<0.061	<0.061	<0.049
Antimony	1.1	0.71	<0.68	0.6	1.3	1	0.77	<0.68	<0.57
Arsenic	1.3	1	2.6	1.2	14	3.6	4.2	<0.75	<0.75
Barium	100	61	69	47	500	87	110	110	26
Benzene	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Benzidine	<11	<9.9	<9.9	<9.5	<9.5	<11	<11	<11	<9.1
Benzo[a]anthracene	<0.094	<0.082	<0.082	<0.078	<0.078	<0.089	<0.094	<0.094	<0.075
Benzo[a]pyrene	<0.066	<0.058	<0.058	<0.055	<0.055	<0.063	<0.066	<0.066	<0.053
Benzo[b]fluoranthene	<0.12	<0.11	<0.11	<0.1	<0.1	<0.12	<0.12	<0.12	<0.097
Benzo[g,h,i]perylene	<0.086	<0.075	<0.075	<0.072	<0.072	<0.082	<0.086	<0.086	<0.069
Benzo[k]fluoranthene	<0.11	<0.096	<0.096	<0.092	<0.092	<0.1	<0.11	<0.11	<0.088

Parameter	002 (003)	006 (007)	008 (009)	013 (014)	016	017 (018)	019 (020)	021	022
Beryllium	<0.62	<0.62	<0.62	<0.62	0.83	0.72	<0.62	<0.62	<0.62
beta-BHC	<0.000036	<0.00037	<0.00037	<0.00035	<0.00036	<0.00035	<0.00035	<0.00035	<0.00035
Bis(2-chloroethoxy)methane	<0.19	<0.17	<0.17	<0.16	<0.16	<0.18	<0.19	<0.19	<0.15
Bis(2-chloroethyl)ether	<0.05	<0.043	<0.043	<0.042	<0.042	<0.048	<0.05	<0.05	<0.04
Bis(2-ethylhexyl) phthalate	<7.8	<6.8	<6.8	<6.5	<6.5	<7.4	<7.8	<7.8	<6.2
Boron	<63	<63	<63	36	<63	<63	<63	65	32
Bromide	773	<53	<53	<53	<133	<53	<53	470	<53
Bromoform	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
Bromomethane	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89
Butyl benzyl phthalate	<0.98	<0.94	<0.98	<0.98	<0.94	<0.94	<0.98	<0.98	<0.94
Cadmium	0.27	0.87	0.26	0.41	17	0.45	<0.21	2.4	0.54
Calcium (mg/L)	72	260	48	71	510	65	91	78	25
Carbon tetrachloride	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88
Chlordane	<0.0071	<0.0073	<0.0073	<0.007	<0.007	<0.0069	<0.0069	<0.0069	<0.0069
Chloride (mg/L)	384	1100	143	56.2	428	36.3	115	201	316
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84
Chloroethane	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chloroform	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Chloromethane	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chromium	2	<1.2	<1.2	<1.2	16	7.1	5.5	<1.2	26
Chrysene	<0.1	<0.088	<0.088	<0.084	<0.084	<0.096	<0.1	<0.1	<0.081
cis-1,3-Dichloropropene	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59
Cobalt	0.44	1	0.65	0.44	9.4	3.2	3.1	0.2	<0.19
Color, Apparent (Color Units)	20	25	20	15	<5	30	30	15	—
Color, True (Color Units)	15	5	15	5	15	15	15	10	40
Copper	4.6	3.4	3.9	3.1	98	13	7.5	<1.7	3.6
Cr (VI)	<6	<6	<6	<6	<6	<6	<6	<6	—
Cyanide, Total	<8	<8	<8	—	<8	11	<8	<8	<6
delta-BHC	<0.00063	<0.00064	<0.00064	<0.00062	<0.00062	<0.00061	<0.00061	<0.00061	<0.00061
Dibenz(a,h)anthracene	<0.09	<0.078	<0.078	<0.075	<0.075	<0.086	<0.09	<0.09	<0.072
Dichlorobromomethane	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64
Dieldrin	<0.00027	<0.00027	<0.00027	<0.00026	<0.00027	<0.00026	<0.00026	<0.00026	<0.00026
Diethyl phthalate	<0.71	<0.62	<0.62	<0.59	<0.59	<0.68	<0.71	<0.71	<0.57
Dimethyl phthalate	<0.25	<0.22	<0.22	0.35	<0.21	<0.24	<0.25	<0.25	<0.2
Di-n-butyl phthalate	5.9	5.2	<5.1	7.2	<4.9	<4.9	<5.1	8.4	<4.9
Di-n-octyl phthalate	<0.86	<0.74	<0.74	<0.71	<0.71	<0.82	<0.86	<0.86	<0.69
Endosulfan I	<0.00067	<0.00069	<0.00069	<0.00066	<0.00067	<0.00065	<0.00065	<0.00065	<0.00065
Endosulfan II	<0.00031	<0.00032	<0.00032	<0.0003	<0.00031	<0.0003	<0.0003	<0.0003	<0.0003
Endosulfan sulfate	<0.00063	<0.00064	<0.00064	<0.00061	<0.00062	<0.00061	<0.00061	<0.00061	<0.00061
Endrin	<0.00022	<0.00023	<0.00023	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022	<0.00022
Endrin aldehyde	<0.00051	<0.00052	<0.00052	<0.0005	<0.0005	<0.00049	<0.00049	<0.00049	<0.00049
Ethylbenzene	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Fluoranthene	<0.075	<0.065	<0.065	<0.063	<0.063	<0.071	<0.075	<0.075	<0.06
Fluorene	<0.086	<0.075	<0.075	<0.072	<0.072	<0.082	<0.086	<0.086	<0.069
Fluoride (mg/L)	2.984	15.4	0.13	0.285	0.194	0.194	0.14	0.25	0.402
gamma-BHC	<0.00029	<0.00029	<0.00029	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028
Hardness as $CaCO_3$	240	1000	160	<4.3	1400	170	240	230	74
Heptachlor	<0.00044	<0.00045	<0.00045	<0.00043	<0.00044	<0.00043	<0.00043	<0.00043	<0.00043
Heptachlor epoxide	<0.00033	<0.00034	<0.00034	<0.00033	<0.00033	<0.00032	<0.00032	<0.00032	<0.00032
Hexachlorobenzene	<0.07	<0.061	<0.061	<0.058	<0.058	<0.067	<0.07	<0.07	<0.056
Hexachlorobutadiene	<0.086	<0.075	<0.075	<0.072	<0.072	<0.082	<0.086	<0.086	<0.069
Hexachlorocyclopenta-diene	<0.62	<0.54	<0.54	<0.52	<0.52	<0.59	<0.62	<0.62	<0.5
Hexachloroethane	<0.17	<0.14	<0.14	<0.14	<0.14	<0.16	<0.17	<0.17	<0.13
Indeno[1,2,3-cd]pyrene	<0.11	<0.092	<0.092	<0.089	<0.089	<0.1	<0.11	<0.11	<0.085
Iron (mg/L)	0.74	0.55	0.71	0.44	21	6.4	6.6	0.29	0.33
Isophorone	<0.24	<0.2	<0.2	<0.2	<0.2	<0.22	<0.24	<0.24	<0.19
Lead	3	1.2	2.2	1.6	110	8.8	4.3	0.76	<0.45
Magnesium (mg/L)	16	97	8.7	20	32	11	16	19	2.8
Manganese	15	290	67	49	1000	240	560	63	22

Parameter	002 (003)	006 (007)	008 (009)	013 (014)	016	017 (018)	019 (020)	021	022
Mercury	<0.13	<0.13	<0.13	<0.13	2.5	<0.13	<0.13	<0.13	<0.13
Methylene Blue Active Substance	100	160	87	99	670	110	93	<49	650
Methylene Chloride	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89
Molybdenum	4.3	2.6	2.6	3	3.8	1.7	1.1	1.1	9.1
Naphthalene	<0.074	<0.064	0.16	<0.061	<0.061	0.13	0.25	0.074	<0.059
Nickel	2.6	6	2.7	2.7	3.4	1.2	1.1	<1.5	1.6
Nitrate Nitrite as N (mg/L)	0.31	0.53	0.81	0.53	0.69	0.41	0.23	0.75	0.47
Nitrobenzene	<0.63	<0.54	<0.54	<0.52	<0.52	<0.6	<0.63	<0.63	<0.5
Nitrogen, Kjeldahl (mg/L)	<0.48	<0.48	0.87	0.42	1.5	0.74	0.66	0.52	0.73
N-Nitrosodiumethylamine	<0.27	<0.26	<0.27	<0.27	<0.26	<0.26	<0.27	<0.27	<0.26
N-Nitrosodi-n-propylamine	<0.089	<0.077	<0.077	<0.074	<0.074	<0.085	<0.089	<0.089	<0.071
N-Nitrosodiumphenylamine	<0.15	<0.13	<0.13	<0.12	<0.12	<0.14	<0.15	<0.15	<0.12
PCB-1016	<0.0047	<0.0048	<0.0048	<0.0046	<0.0046	<0.0045	<0.0045	<0.0045	<0.0045
PCB-1221	<0.0056	<0.0057	<0.0057	<0.0055	<0.0056	<0.0054	<0.0054	<0.0054	<0.0054
PCB-1232	<0.0051	<0.0052	<0.0052	<0.005	<0.0051	<0.005	<0.005	<0.005	<0.005
PCB-1242	<0.009	<0.0091	<0.0089	<0.0088	<0.0089	<0.0087	<0.0087	<0.0087	<0.0087
PCB-1248	<0.0029	<0.003	<0.003	<0.0029	<0.0029	<0.0028	<0.0028	<0.0028	<0.0028
PCB-1254	<0.0093	<0.0095	<0.0095	<0.0092	<0.0092	<0.0091	<0.0091	<0.0091	<0.0091
PCB-1260	<0.0039	<0.0039	<0.0039	<0.0038	<0.0038	<0.0037	<0.0037	<0.0037	<0.0037
Pentachlorophenol	<1.1	<0.92	<0.92	<0.88	<0.88	<1	<1.1	<1.1	<0.85
Phenanthrene	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.1	<0.16	<0.16
Phenol	<0.56	<0.53	<0.53	<0.51	<0.51	<0.58	<0.61	<0.61	<0.49
Phosphorous as P (mg/L)	<0.017	0.047	<0.017	—	2.3	0.09	0.052	<0.017	—
Pyrene	<0.068	<0.059	<0.059	<0.056	<0.056	<0.064	<0.068	<0.068	<0.054
Selenium	1.2	2.2	0.92	1.5	6.7	1	<0.89	1	<0.89
Silver	<0.79	<0.79	<0.79	<0.053	<0.79	<0.79	<0.79	<0.79	<0.53
Sulfate (mg/L)	132	474	97.4	163	437	63.2	94.6	92	36.4
Sulfide (mg/L)	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	1.4	<1.3
Tetrachloroethene	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47
Thallium	<0.38	<0.38	<0.38	<0.2	<0.38	<0.38	<0.38	<0.38	<0.2
Toluene	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
TDS (mg/L)	890	2900	420	470	750	340	1500	460	630
TOC (mg/L)	2.1	60	5.5	1.9	4.3	4.4	2.8	1.8	28
Toxaphene	<0.048	<0.049	<0.049	<0.047	<0.048	<0.047	<0.047	<0.047	<0.047
trans-1,2-Dichloroethene	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67
trans-1,3-Dichloropropene	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Trichloroethene	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Vinyl chloride	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41
Zinc	61	59	59	52	1800	110	62	59	66

Based on the results in **Table 25**, semi-annual monitoring for BOD5 will be added to Outfalls 006 and 007.

Additional BMPs

Given the presence of nurdles at the SPMS and the lack of sector-specific BMPs in Appendix F of the PAG-03 to control nurdles, DEP referred to EPA's "Industrial Stormwater Fact Sheet Series - Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries" [Doc. No. EPA-833-F-06-040] (see **Attachment E**) for a listing of relevant BMPs for the SPMS. BMPs from EPA's Fact Sheet and BMPs already implemented by SPMS will be included in the NPDES permit as sector- and site-specific BMPs and must be implemented and maintained to the extent practicable.

SWO.B. Water Quality-Based Effluent Limitations (WQBELs)

For the reasons previously discussed, DEP does not develop numerical limits for storm water discharges. Pursuant to 25 Pa. Code § 96.4(g), mathematical modeling used to develop WQBELs must be performed at steady state design flows. As explained in Section SWO.A of this Fact Sheet, storm water discharges are intermittent, are usually characterized by high flows occurring over relatively short time intervals, and can carry a variety of pollutants whose source, nature, and extent varies. Those characteristics are not conducive to the steady state modeling required by 25 Pa. Code § 96.4(g), so no modeling is performed.

Even though no mathematical modeling is performed, conditions in Part C of the permit will ensure compliance with water quality standards through a combination of 1) BMPs including pollution prevention and exposure minimization, good housekeeping, erosion and sediment control, and spill prevention and response; and 2) benchmark monitoring requirements where benchmark values are set at levels below which a storm water discharge represents less potential for water quality concern.[10]

SWO.C. Modification Requests

In October 2024, DEP received requests from several Non-Governmental Organizations and numerous individuals (hereafter "Requesters") to modify various aspects of Shell's NPDES permit. For outfalls covered by this section, Requesters requested the following:

Table 26. Commenter Requests for Modifications

Outfall No.	Modification Requested
002	Add case-by-case technology-based zinc and aluminum limits.
006	Add case-by-case technology-based aluminum limits.
007	Add case-by-case technology-based aluminum limits.
008	Add case-by-case technology-based zinc and aluminum limits.
013	Add case-by-case technology-based aluminum limits.
014	Add case-by-case technology-based lead and aluminum limits.
016	Add case-by-case technology-based zinc, lead, and aluminum limits.
017	Add case-by-case technology-based aluminum limits.
019	Add case-by-case technology-based aluminum limits.
021	Add case-by-case technology-based zinc and aluminum limits.

As stated above, DEP's approach to regulating storm water discharges associated with industrial activities requires facilities to implement certain minimum BMPs (both general and industry-specific) to control storm water pollution; and benchmark monitoring to evaluate whether those minimum BMPs and any additional BMPs implemented by a discharger at their discretion effectively control pollutants in storm water. Generally, the minimum BMPs and benchmark monitoring requirements for industrial storm water discharges at industrial facilities in Pennsylvania that are authorized by individual NPDES permits are adopted from DEP's PAG-03 "General Permit for Discharges of Stormwater Associated with Industrial Activity".

DEP's current benchmark monitoring requirements in the PAG-03 employ a graduated response to pollutant levels in storm water that are persistently elevated. The graduated response gives dischargers an opportunity to implement additional controls (structural and/or non-structural) before DEP considers the need for effluent limits. Currently, Shell's permit requires the development and implementation of a corrective action plan for two or more consecutive exceedances of a benchmark value. Shell is only subject to benchmark values for TSS and COD under the current permit consistent with the requirements of Appendix F of the PAG-03 (the appendix of the PAG-03 that would apply to Shell if Shell only discharged storm water) that was in effect at the time of Shell's last permit renewal.

The PAG-03 does not identify benchmark values for metals that could be used as a basis of comparison to determine whether metals concentrations in Shell's storm water effluent are elevated. However, EPA's 2021 Multi-Sector General Permit (the federal equivalent of DEP's PAG-03) does identify benchmark values for some of the metals monitored at Shell's storm water outfalls. The more stringent of DEP's and EPA's benchmark values are shown in the table below.

Table 27. PAG-03 or MSGP Benchmark

Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
1.1	120	—	0.082	0.0014	0.68	9	0.0031	—	2	100	0.12

Benchmark values are not effluent limitations. They represent target concentrations for facilities to achieve through the implementation of BMPs. Exceeding a benchmark value does not mean the discharge exhibits a reasonable potential to

[10] "United States Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (MSGP) for Stormwater Discharges Associated with Industrial Activity Fact Sheet", Part 4.2.2: "The benchmark thresholds are the pollutant concentrations above which represent a level of concern. The level of concern is a concentration at which a stormwater discharge could potentially impair or contribute to impairing water quality or affect human health from ingestion of water or fish. The benchmarks are also set at a level, that if below, a facility's discharges pose less potential for a water quality concern."

cause or contribute to excursions above water quality criteria (*i.e.*, does not mean the discharge represents a dangerous level of pollution). As stated above, Shell currently is only subject to benchmark values for TSS and COD.

The tables below compare Shell's reported effluent results for the outfalls identified by the Requesters to the above benchmark values. Highlighted values in the tables below exceed the benchmark values listed in **Table 27**.

Table 28. Outfall 002 Effluent Concentrations (January 2022 – December 2025)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate -Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	0.054	< 9.1	< 0.073	< 0.0023	0.000018	< 0.065	8.61	< 0.004	< 0.0032	< 0.017	2.5	0.014
2nd Half 2022	0.28	25	0.3	0.003	0.000037	< 0.065	8.75	< 0.006	< 0.0027	0.089	15	0.025
1st Half 2023	0.4	12	< 0.083	< 0.0028	0.0000092	0.13	8.89	< 0.006	< 0.0027	< 0.078	3.9	0.21
2nd Half 2023	0.31	11	0.47	0.0024	0.00002	0.25	8.42	< 0.004	< 0.0032	< 0.04	35	0.051
1st Half 2024	2.1	15	1	0.0039	0.000068	0.39	8.71	< 0.004	< 0.0032	< 0.04	15	0.16
2nd Half 2024	0.16	<9.1	0.18	< 0.0028	0.000022	0.13	8.83	< 0.006	< 0.0027	< 0.04	8.4	0.027
1st Half 2025	0.15	18	0.28	< 0.0071	0.000026	<0.65	8.09	< 0.016	< 0.012	0.067	13	0.11
2nd Half 2025	0.14	20	0.37	< 0.0071	0.000032	0.12	8.38	< 0.016	< 0.012	<0.04	7.8	0.025

Outfall 002 has not exhibited a pattern of elevated aluminum or zinc concentrations that warrant the development of case-by-case TBELs. If aluminum and zinc had been subject to benchmark monitoring requirements under the current permit, then the reported aluminum and zinc concentrations would not have even warranted the submission of a corrective action plan. Since the magnitudes and effluent concentration trends for aluminum and zinc at Outfall 002 do not rise to the thresholds at which corrective actions would be required for storm water associated with industrial activities, there is no justification for being even more stringent and imposing numeric effluent limits. Additional BMPs and a graduated response to consistently elevated pollutants concentrations would be appropriate before numeric effluent limits are considered and, to the extent the numeric case-by-case TBELs would be considered, such limits would only apply if supported by an evaluation of the factors in 40 CFR § 125.3(c). The non-numeric BMPs in the permit satisfy the control level requirements of the Clean Water Act (BAT/BPT/BCT) for Shell's storm water discharges.

Table 29. Outfall 006 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	0.29	< 9.1	0.16	0.0023	0.000011	0.57	7.45	< 0.0043	0.0034	< 0.076	5.8	0.05
2nd Half 2022	1.8	< 9.1	1.8	0.0035	0.000063	0.37	8.29	< 0.006	< 0.0027	0.15	33	0.065
1st Half 2023	2.5	42	3	0.0056	0.000096	0.41	8.83	< 0.006	0.0027	0.27	35	0.098
2nd Half 2023	0.18	9.9	0.16	< 0.0028	0.0000075	0.16	7.84	< 0.006	< 0.0027	< 0.04	5.1	< 0.023
1st Half 2024	3.7	9.1	3.4	0.0059	0.000094	0.51	7.93	0.004	0.0032	0.13	63	0.11
2nd Half 2024	7.7	18	15	0.01	0.000017	0.27	6.43	< 0.006	0.61	0.61	610	0.16
1st Half 2025	0.2	< 9.1	0.27	< 0.0028	0.000012	0.42	7.41	0.0061	< 0.04	< 0.04	21	0.062
2nd Half 2025	1.1	10	0.82	< 0.0071	0.000021	0.34	8.28	< 0.016	< 0.012	0.081	16	0.052
1st Half 2026	0.16	31	0.27	< 0.0071	0.000013	0.5	7.0	0.016	0.012	0.21	12	0.073

Aluminum concentrations at Outfall 006 would have exceeded EPA's benchmark value for aluminum and would have triggered corrective action plans for that pollutant if EPA's benchmark value was in effect. However, there is a positive correlation between aluminum and TSS concentrations at Outfall 006 (consistent with the natural prevalence of aluminum in the inorganic component of soils) where the highest aluminum concentrations correlate with the highest TSS concentrations. This correlation is not limited to Outfall 006. Consequently, controlling TSS should control aluminum. As with Outfall 002, there is no pattern of elevated aluminum and zinc concentrations that warrant the development of case-by-case TBELs. Non-numeric BMPs are the appropriate method for controlling pollutants in Outfall 006's storm water.

Table 30. Outfall 007 Effluent Concentrations (March 2021 – December 2025)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
No discharge from March 2021 through July 2023												
Aug. 2023	4.4	22	4.5	0.011	0.00014	0.27	7.81	<0.006	0.0045	0.15	140	0.12
No discharge from September 2023 through December 2025												

Shell has reported only one discharge from Outfall 007 since production operations began. While the TSS concentration exceeded the benchmark value for TSS, discharges from Outfall 007 have not occurred frequently enough to allow for a meaningful evaluation of the effectiveness of employed BMPs, the need for additional BMPs, or the feasibility of case-by-case numeric TBELs.

Table 31. Outfall 008 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	0.42	14	0.82	0.0046	0.000044	< 0.065	8.96	< 0.004	< 0.0032	0.022	20	0.054
2nd Half 2022	0.95	14	0.96	0.0031	0.000025	0.11	8.76	< 0.006	< 0.0027	0.083	10	0.041
1st Half 2023	0.4	12	< 0.083	< 0.0028	0.00000092	0.13	8.78	< 0.006	< 0.0027	< 0.078	3.9	0.21
2nd Half 2023	0.096	< 9.1	0.15	< 0.0028	0.000021	< 0.065	8.58	< 0.006	< 0.0027	< 0.04	31	< 0.023
1st Half 2024	1.3	< 9.1	0.69	< 0.0023	0.000038	0.47	8.49	< 0.004	0.0032	0.055	17	0.054
2nd Half 2024	0.27	28	1.2	0.0073	0.000029	0.079	7.76	< 0.006	0.0097	0.18	68	0.092
1st Half 2025	0.87	20	1.5	0.007	0.000061	0.16	7.91	0.0071	< 0.0027	0.084	55	0.11
2nd Half 2025	< 0.1	21	0.08	< 0.0071	0.0000083	< 0.065	7.96	< 0.016	< 0.012	0.11	8.6	0.027
1st Half 2026	< 0.1	17	0.11	< 0.0071	0.000019	0.36	8.12	< 0.016	< 0.012	< 0.03	9.3	0.044

DEP's explanation of Outfall 002's effluent results, above, also applies to aluminum and zinc at Outfall 008. Case-by-case numeric TBELs are not warranted for aluminum and zinc at Outfall 008.

Table 32. Outfall 013 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	0.63	< 9.1	0.25	0.0044	0.000029	0.98	7.69	< 0.004	< 0.0032	0.12	7.5	0.12
2nd Half 2022	0.58	20	0.43	< 0.0028	0.000024	0.8	8.26	< 0.006	< 0.0027	0.36	7.2	0.068
1st Half 2023	1	41	1.3	0.0097	0.000099	< 0.065	8.82	0.0061	< 0.0027	0.48	25	0.096
2nd Half 2023	0.16	13	0.19	< 0.0028	0.000024	0.82	8.28	< 0.006	< 0.0027	0.16	11	< 0.023
1st Half 2024	1.4	< 9.1	0.83	0.0026	0.000052	0.52	8.66	< 0.004	< 0.0032	< 0.04	19	0.095
2nd Half 2024	0.74	16	0.58	< 0.0028	0.00001	0.34	6.58	< 0.006	< 0.0027	< 0.4	15	< 0.023
1st Half 2025	0.092	13	0.23	< 0.0028	0.0000091	0.18	8.82	< 0.006	< 0.0027	< 0.04	6.8	0.054
2nd Half 2025	0.46	10	1.1	< 0.0071	0.000041	0.89	7.6	< 0.016	< 0.012	0.12	38	0.085
1st Half 2026	0.1	10	0.082	< 0.0071	0.0000082	0.67	7.38	< 0.016	< 0.012	< 0.03	5.4	0.19

DEP's explanation of Outfall 002's effluent results, above, also applies to aluminum at Outfall 013. Case-by-case numeric TBELs are not warranted for aluminum at Outfall 013.

Table 33. Outfall 014 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
Feb. 2022	0.45	< 9.1	0.5	0.0035	0.000047	0.62	7.85	0.005	< 0.0032	< 0.076	34	0.13
Aug. 2023	5.8	30	6	0.19	0.00025	0.25	7.2	< 0.006	0.0041	0.21	120	0.25
Apr. 2024	3.5	< 9.1	3	0.03	0.00022	0.29	8.28	< 0.004	< 0.0032	0.12	94	0.17

Shell has reported three overflow events from Outfall 014 since production operations began. Like other storm water outfalls, TSS concentrations positively correlate with the concentrations of naturally occurring metals (aluminum, iron, lead, zinc), so controlling TSS should control those metals. Separately, DEP observes that lead is not consistently elevated, so case-by-case numeric TBELs would not be supported for lead. Additional BMPs and a graduated response to consistently elevated pollutants concentrations are appropriate before numeric effluent limits are considered.

Table 34. Outfall 016 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	36	63	92	0.23	0.0027	0.39	8.17	< 0.04	< 0.032	1.9	3100	4
2nd Half 2022	2.8	27	10	0.059	0.00047	0.59	8.62	0.0089	< 0.0032	0.98	1400	0.85
1st Half 2023	4.4	< 9.1	9.2	0.1	0.00041	0.44	8.26	0.012	< 0.0032	1.2	1100	1.5
2nd Half 2023	5.2	20	9.1	0.04	0.00033	0.67	7.66	0.0044	< 0.0032	0.51	990	0.48
1st Half 2024	13	< 9.1	20	0.04	0.00053	1.2	8.2	< 0.006	< 0.0027	0.94	1500	0.74
2nd Half 2024	3.3	24	4.2	0.0085	0.00024	0.86	7.51	0.013	0.0029	0.25	110	0.22
1st Half 2025	< 0.1	13	< 0.08	< 0.0071	0.0000094	0.76	7.86	< 0.016	< 0.012	< 0.03	3.1	0.027
2nd Half 2025	0.603	16	1.78	0.0074	0.000035	2.97	7.76	0.017	< 0.012	0.21	88.33	0.19
1st Half 2026	0.55	18.5	2.5	< 0.0071	0.000027	1.9	7.46	< 0.016	< 0.012	0.13	110	0.22

TSS and naturally occurring metals (aluminum, lead, zinc) were consistently or intermittently present in elevated concentrations at Outfall 016. On November 21, 2024, Shell submitted a corrective action plan for Outfall 016, which identified additional BMPs for erosion control to reduce the accumulation and discharge of TSS from Outfall 016. No pollutants were present above benchmark values in the first semi-annual results post-dating Shell's corrective action plan. The results support the conclusion that benchmark monitoring and conditions requiring the development and implementation of corrective action plans work to address elevated pollutant concentrations in storm water without resorting to numeric TBELs as the first response to elevated pollutant concentrations in storm water. The results also support the conclusion that controlling TSS reduces other pollutants including naturally occurring metals for which Requesters requested numeric TBELs, but which were nonetheless addressed by the implementation of additional BMPs.

Table 35. Outfall 017 Effluent Concentrations (January 2022 – December 2025)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	7.3	< 9.1	18	0.15	0.000032	0.57	8.16	< 0.004	< 0.0032	0.45	510	0.12
2nd Half 2022	2.4	14	2.6	< 0.0028	0.0000074	0.14	7.88	< 0.006	< 0.0027	< 0.017	35	0.014
1st Half 2023	6.6	27	11	0.0083	0.000011	0.2	7.2	< 0.006	< 0.0027	0.26	86	0.25
2nd Half 2023	2.4	35	3.6	0.0033	0.000012	< 0.065	8.17	< 0.006	< 0.0027	0.15	130	0.1
1st Half 2024	4.9	13	6.4	0.34	0.000024	< 0.65	8.11	< 0.004	< 0.0032	0.23	150	0.059
2nd Half 2024	0.061	21	0.089	< 0.0028	0.00001	0.67	6.88	< 0.006	0.0041	< 0.04	7.8	0.031
1st Half 2025	0.12	16	0.19	< 0.0071	0.0000029	< 0.065	8.07	< 0.016	< 0.012	< 0.03	3.6	0.0059
2nd Half 2025	0.37	33	0.36	< 0.0071	0.0000064	0.48	7.29	< 0.016	< 0.012	0.21	14	0.048

Aluminum concentrations at Outfall 017 would have exceeded EPA's benchmark value for aluminum and would have triggered corrective action plans for that pollutant if EPA's benchmark value was in effect. TSS concentrations in the second half of 2023 and the first half of 2024 should have resulted in the submission of a correction action plan for TSS, but Shell did not submit a corrective action plan at that time. Recent data indicate that the concentrations of monitored pollutants are trending lower. Based on the effluent results, case-by-case numeric TBELs are not warranted for aluminum at Outfall 017.

Table 36. Outfall 019 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	7	< 9.1	24	0.019	0.000038	0.48	8.1	< 0.004	< 0.0032	0.76	680	0.14
2nd Half 2022	1.8	< 9.1	1.9	< 0.0028	0.0000041	0.33	6.77	< 0.006	< 0.0027	0.13	22	< 0.0097
1st Half 2023	8.5	25	16	0.014	0.0000048	< 0.065	7.45	< 0.006	< 0.0027	< 0.076	81	0.25
2nd Half 2023	3.5	< 9.1	5.2	0.0031	0.0000081	0.22	8.26	< 0.006	< 0.0027	0.17	180	0.04
1st Half 2024	4.5	< 9.1	5.5	0.03	0.000012	0.19	7.95	< 0.004	< 0.0032	0.17	150	0.037
2nd Half 2024	7.7	11	13	0.0088	0.000023	0.31	6.22	< 0.006	0.0039	0.49	560	0.25
1st Half 2025	<0.1	12	0.091	< 0.0071	0.0000014	0.074	8.73	< 0.016	< 0.012	< 0.04	3.2	0.0047
2nd Half 2025	0.22	19.5	0.25	< 0.0071	0.000028	0.7	7.65	< 0.016	< 0.012	0.104	6.15	0.0248
1st Half 2026	<0.1	12	0.21	< 0.0071	0.000002	0.25	7.7	< 0.016	< 0.012	0.06	16	0.22

TSS and naturally occurring metals (aluminum, lead, zinc) were consistently or intermittently present in elevated concentrations at Outfall 016. On January 31, 2025, Shell submitted a corrective action plan for Outfall 019, which identified additional BMPs for erosion control to reduce the accumulation and discharge of TSS from Outfall 019. No pollutants were present above benchmark values in the first semi-annual results post-dating Shell's corrective action plan. Based on the results, non-numeric BMPs are adequately controlling storm water pollutants. Case-by-case numeric TBELs are not warranted for aluminum at Outfall 019.

Table 37. Outfall 021 Effluent Concentrations (January 2022 – June 2026)

Monitoring Period	Aluminum	COD	Iron	Lead	Mercury	Nitrate-Nitrite	pH	Selenium	Thallium	Tot. Phos.	TSS	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L
1st Half 2022	1.2	16	2.4	0.0072	0.00005	0.64	7.66	< 0.004	< 0.0032	0.05	77	0.12
2nd Half 2022	0.5	< 9.1	0.45	0.0026	0.00003	0.48	8.23	< 0.004	< 0.0032	0.11	15	0.04
1st Half 2023	0.078	< 9.1	0.097	< 0.0023	0.0000047	1	8.26	< 0.004	< 0.0032	< 0.017	7.4	0.043
2nd Half 2023	2.2	< 9.1	3.3	0.019	0.000079	< 0.065	8.31	< 0.004	< 0.0032	< 0.04	81	0.19
1st Half 2024	0.22	< 9.1	0.27	0.0028	0.0000051	0.15	8.32	< 0.006	< 0.0027	0.55	13	0.036
2nd Half 2024	0.29	9.5	0.27	< 0.0028	0.000013	< 0.065	8.22	< 0.006	0.008	0.093	9.2	0.035
1st Half 2025	0.13	< 9.1	0.11	< 0.0028	0.0000027	0.92	8.73	< 0.006	< 0.0027	< 0.04	2.9	0.065
2nd Half 2025	0.11	30	0.1	< 0.0071	0.000046	0.36	7.09	< 0.016	< 0.012	0.3	4.3	0.006
1st Half 2026	< 0.1	5.4	< 0.08	< 0.0071	0.0000019	2.1	7.53	< 0.016	< 0.012	< 0.03	2.2	0.068

Outfall 021 has not exhibited a pattern of elevated aluminum and zinc concentrations that warrant the development of case-by-case TBELs. If aluminum and zinc had been subject to benchmark monitoring requirements under the current permit, then the reported aluminum and zinc concentrations would not have even warranted the submission of a corrective action plan. Since the magnitudes and effluent concentration trends for aluminum and zinc at Outfall 021 do not rise to the thresholds at which corrective actions would be required for storm water associated with industrial activities, there is no justification for being even more stringent and imposing numeric effluent limits.

In summation, based on Shell's effluent data, DEP does not find cause to develop and impose case-by-case numeric TBELs requested by Requesters. The non-numeric BMPs in the permit (which are being expanded with this permit renewal) satisfy the control level requirements of the Clean Water Act (BAT/BPT/BCT) for Shell's storm water discharges and are controlling storm water pollutants. However, the benchmark values in **Table 27** will be imposed in the permit and will apply to all storm water outfalls identified in this section.

SWO.D. Effluent Limitations and Monitoring Requirements for Storm Water Outfalls

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges from Outfalls 002, 003, 006-010, 012-014, 016-023 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 38. Effluent limits and monitoring requirements for Outfalls 002, 003, 006–010, 012–014, 016–023

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	—	Report	—	—	—	25 Pa. Code § 92a.61(h)
pH	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Biochemical Oxygen Demand (5-day) †	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Chemical Oxygen Demand	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Total Suspended Solids	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Nitrate + Nitrite-Nitrogen	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Phosphorus, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Aluminum, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Iron, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Lead, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F
Mercury, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h)
Selenium, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h)
Thallium, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h)
Zinc, Total	—	—	—	Report	—	25 Pa. Code § 92a.61(h); PAG-03, Appendix F

† Outfalls 006 and 007 only.

Based on the measurement frequency and sample types given in Appendix F of the PAG-03 General Permit, all parameters will require grab sampling 1/6 months. Overflow outfalls will require 1/discharge grab sampling. Flow should be estimated at the time of sampling.

Benchmark monitoring requirements including benchmark values and corrective action plan requirements will be specified in Part C of the permit. Shell is responsible for monitoring consecutive exceedances of benchmark values and the need to submit corrective action plans.

Development of Effluent Limitations

IMP No. 108 **Design Flow (MGD)** Variable
Latitude N/A **Longitude** N/A
Wastewater Description: Hydrostatic test water

Internal Monitoring Point 108 is a monitoring point for water that may be discharged from hydrostatic testing of tanks and/or pipes through either Outfall 008 or Outfall 013 depending on where at the site the hydrostatic testing occurs. Wastewaters regulated at IMP 108 are currently subject to the following effluent limits and monitoring requirements.

Table 39. IMP 108: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	2/discharge	Estimate
pH (S.U.)	—	—	6.0 (Daily Min.)	9.0	—	2/discharge	Grab
Total Residual Chlorine (TRC)	—	—	—	—	0.05	1/discharge	Grab
Total Suspended Solids	—	—	30.0	—	60.0	2/discharge	Grab
Oil and Grease	—	—	15.0	—	30.0	2/discharge	Grab
Iron, Dissolved	—	—	—	—	7.0	1/discharge	Grab
Benzene	—	—	—	—	0.0025	1/discharge	Grab
BTEX, Total	—	—	—	—	0.25	1/discharge	Grab

The effluent limits and monitoring requirements in **Table 39** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

108.A. Technology-Based Effluent Limitations (TBELs)

Hydrostatic test water is subject to the discharge requirements for existing tanks and pipelines specified in Part A.I.B of DEP's PAG-10 General Permit for Discharges from Hydrostatic Testing of Tanks—excluding requirements for Dissolved Oxygen and PCBs. The dissolved oxygen limit in the PAG-10 is geared toward compliance with water quality standards, but IMP 108 does not discharge directly to waters of the Commonwealth. Under Shell's NPDES permit, hydrostatic testing waters monitored at IMP 108 are directed to either the CR Pond (Outfall 008) or the North Pond (Outfall 013) and therefore do not represent direct discharges to waters of the Commonwealth that necessitate compliance with water quality standards at IMP 108. The PCB requirement applies to existing tanks and pipelines to ensure there is no PCB contamination of hydrostatic testing waters. However, the SPMS was constructed after bans on the manufacture and use of PCBs, so no PCB contamination is expected. One addition to the IMP 108 parameter list from the PAG-10 is the Total Volume Discharged in gallons.

108.B. Water Quality-Based Effluent Limitations (WQBELs)

WQBELs are designed to protect water quality by ensuring that water quality standards are met in the receiving water and IMP 108 does not discharge directly to waters of the Commonwealth. Therefore, WQBELs are not developed for this monitoring location. Regardless of whether Outfall 008 or 013 receives the effluent, intermittent hydrostatic test water discharges to the Ohio River are not expected to cause or contribute to water quality criteria violations.

108.C. Effluent Limitations and Monitoring Requirements for IMP 108

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges monitored at IMP 108 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 40. Effluent Limits and Monitoring Requirements for IMP 108

Pollutant	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	PAG-10; 25 Pa. Code § 92a.61(b)
Total Flow (Volume, gallons)	Report (Total Mo.)	—	—	—	—	
Benzene	—	—	—	—	0.0025	
Total BTEX	—	—	—	—	0.25	
Oil and Grease	—	—	15.0	—	30.0	
Total Suspended Solids	—	—	30.0	—	60.0	
Dissolved Iron	—	—	—	—	7.0	
Total Residual Chlorine	—	—	—	—	0.05	
pH	—	—	6.0 (Min)	—	9.0 (Max)	

The monitoring frequencies for oil and grease, TSS, and pH will be set at 2/discharge with grab sampling. All other parameters will require 1/ discharge grab sampling. Flow should be estimated at the time of sampling. Total Flow (Volume) must be calculated 1/month.

Development of Effluent Limitations

Outfall No. 004 **Design Flow (MGD)** Variable
Latitude 40° 39' 57.4943" **Longitude** -80° 20' 40.5531"
Wastewater Description: Overflows of storm water from the Accidentally Contaminated (AC) Pond

The Accidentally Contaminated ("AC") Pond is an in-ground, 342,375 ft^3 reinforced concrete tank that collects excess wastewaters from a diversion box that routes wastewaters to the WWTP. Wastewaters collected in the AC Pond include process wastewaters, various non-process wastewaters that are treated as process wastewaters (*e.g.*, HRSG blowdown, wash waters, etc.), process area storm water, and off-spec effluent.

Table 41. Outfall 004: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	2/discharge	Measured
pH (S.U.)	XXX	XXX	6.0 Dail Min	9.0	XXX	2/discharge	Grab
BOD5	287	766	27.0	72.0	90	2/discharge	Grab-Comp.
Total Suspended Solids	458	1487	43.0	139.0	174	2/discharge	Grab-Comp.
Oil and Grease	XXX	XXX	15.0	XXX	30.0	2/discharge	Grab-Comp.
2-Chlorophenol	0.331	1.05	0.031	0.098	0.122	2/discharge	Grab-Comp.
2,4-Dichlorophenol	0.416	1.20	0.039	0.112	0.14	2/discharge	Grab-Comp.
2,4-Dimethylphenol	0.192	0.384	0.018	0.036	0.045	2/discharge	Grab-Comp.
Fluorene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
2,4-Dinitrophenol	0.758	1.31	0.071	0.123	0.153	2/discharge	Grab-Comp.
2,4-Dinitrotoluene	1.21	3.04	0.113	0.285	0.356	2/discharge	Grab-Comp.
2,6-Dinitrotoluene	2.72	6.85	0.255	0.641	0.801	2/discharge	Grab-Comp.
4,6-dinitro-o-cresol	0.833	2.96	0.078	0.277	0.346	2/discharge	Grab-Comp.
2-Nitrophenol	0.437	0.737	0.041	0.069	0.086	2/discharge	Grab-Comp.
4-Nitrophenol	0.769	1.32	0.072	0.124	0.155	2/discharge	Grab-Comp.
Phenol	0.16	0.28	0.015	0.026	0.032	2/discharge	Grab-Comp.
Acenaphthene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Acenaphthylene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Acrylonitrile	1.03	2.59	0.096	0.242	0.302	2/discharge	Grab-Comp.
Anthracene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Chlorobenzene	0.160	0.299	0.015	0.028	0.035	2/discharge	Grab-Comp.
1,2-Dichlorobenzene	0.822	1.74	0.077	0.163	0.203	2/discharge	Grab-Comp.
1,3-Dichlorobenzene	0.331	0.470	0.031	0.044	0.055	2/discharge	Grab-Comp.
1,4-Dichlorobenzene	0.160	0.299	0.015	0.028	0.035	2/discharge	Grab-Comp.
1,3-Dichloropropylene	0.309	0.470	0.029	0.044	0.055	2/discharge	Grab-Comp.
1,2,4-Trichlorobenzene	11.9	29.6	0.068	0.140	0.175	2/discharge	Grab-Comp.
Ethylbenzene	0.341	1.15	0.032	0.108	0.135	2/discharge	Grab-Comp.
Hexachlorobenzene	0.160	0.299	0.015	0.028	0.035	2/discharge	Grab-Comp.
Nitrobenzene	0.288	0.726	0.027	0.068	0.085	2/discharge	Grab-Comp.
Benzene	0.395	1.45	0.037	0.136	0.17	2/discharge	Grab-Comp.
Benzo(a)Anthracene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Benzo(a)Pyrene	0.245	0.651	0.023	0.061	0.076	2/discharge	Grab-Comp.
Benzo(k)Fluoranthene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
3,4-Benzofluoranthene	0.245	0.651	0.023	0.061	0.076	2/discharge	Grab-Comp.
Carbon Tetrachloride	0.192	0.405	0.018	0.038	0.047	2/discharge	Grab-Comp.
Chloroethane	1.11	2.86	0.104	0.268	0.335	2/discharge	Grab-Comp.
1,1,1-Trichloroethane	15.5	36.1	0.021	0.054	0.067	2/discharge	Grab-Comp.
1,1,2-Trichloroethane	4.49	12.8	0.021	0.054	0.067	2/discharge	Grab-Comp.

Table 41 (cont'd). Outfall 004: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum		
1,1-Dichloroethane	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
1,2-Dichloroethane	0.726	2.25	0.068	0.211	0.263	2/discharge	Grab-Comp.
1,2-Dichloropropane	1.63	2.46	0.153	0.230	0.287	2/discharge	Grab-Comp.
Bis(2-Ethylhexyl)Phthalate	1.10	2.98	0.103	0.279	0.348	2/discharge	Grab-Comp.
Chloroform	0.224	0.491	0.021	0.046	0.057	2/discharge	Grab-Comp.
Chrysene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Diethyl Phthalate	0.865	2.17	0.081	0.203	0.253	2/discharge	Grab-Comp.
Dimethyl Phthalate	0.202	0.502	0.019	0.047	0.058	2/discharge	Grab-Comp.
Di-n-Butyl Phthalate	0.288	0.608	0.027	0.057	0.071	2/discharge	Grab-Comp.
Fluoranthene	0.267	0.726	0.025	0.068	0.085	2/discharge	Grab-Comp.
Hexachlorobutadiene	0.213	0.523	0.020	0.049	0.061	2/discharge	Grab-Comp.
Hexachloroethane	0.224	0.576	0.021	0.054	0.067	2/discharge	Grab-Comp.
Methyl Chloride	0.918	2.03	0.086	0.190	0.237	2/discharge	Grab-Comp.
Methylene Chloride	0.427	0.950	0.040	0.089	0.111	2/discharge	Grab-Comp.
Naphthalene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Phenanthrene	0.235	0.630	0.022	0.059	0.073	2/discharge	Grab-Comp.
Pyrene	0.267	0.715	0.025	0.067	0.083	2/discharge	Grab-Comp.
1,1-Dichloroethylene	0.170	0.267	0.016	0.025	0.031	2/discharge	Grab-Comp.
trans-1,2-Dichloroethylene	0.224	0.576	0.021	0.054	0.067	2/discharge	Grab-Comp.
Tetrachloroethylene	0.235	0.598	0.022	0.056	0.07	2/discharge	Grab-Comp.
Toluene	0.277	0.854	0.026	0.080	0.1	2/discharge	Grab-Comp.
Trichloroethylene	3.42	7.37	0.021	0.054	0.067	2/discharge	Grab-Comp.
Vinyl Chloride	18.1	42.5	0.104	0.268	0.335	2/discharge	Grab-Comp.

The effluent limits and monitoring requirements in **Table 41** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

004.A. Technology-Based Effluent Limitations (TBELs)

Under normal operating conditions, storm water runoff from process areas of the SPMS collects in the AC Pond, is treated by the industrial wastewater treatment plant along with process wastewaters, and discharges through Outfall 001. During significant rainfall events, the AC Pond may overflow and discharge through Outfall 004. Since production operations began, Shell has reported three overflow discharges through Outfall 004 in November 2022, August 2023, and April 2024.

Since wastewaters collected in the AC Pond are normally treated as process wastewaters, it is appropriate that any bypass of the treatment system—such as an emergency overflow discharge from the AC Pond—be subject to the same effluent limits that are imposed on the treated wastewater pursuant to allowable bypass conditions under 40 CFR § 122.41(m)(2), which states:

> *Bypass not exceeding limitations.* The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation.

Therefore, the TBELs imposed at IMP 101 will be imposed on overflows from the AC Pond at Outfall 004 (see **Table 9**). This will help to ensure proper operation and maintenance of the treatment system and encourage Shell to prevent unnecessary discharges from the AC Pond by effectively managing its wastewater flows. DEP notes that the Oil and Grease limits from Outfall 001 are imposed at Outfall 004 because Outfall 004 is a final discharge location and, unlike IMP 101, there aren't any other potentially oil-bearing wastewaters that combine with Outfall 004's effluent prior to discharge.

004.B. Water Quality-Based Effluent Limitations (WQBELs)

As a structure primarily used to collect storm water, the AC Pond should not discharge at Q_{7-10} low-flow design conditions. Any rainfall event that is sufficiently large to cause an overflow from the AC Pond also would result in increased flow in Poorhouse Run. On that basis, the discharge flow at Outfall 004 during Q_{7-10} design conditions should be zero. Shell also may send blowdown from the cooling tower to the AC Pond for later treatment by the industrial wastewater treatment system if there are hydrocarbons present in the blowdown; however, the routing of blowdown to the AC Pond is not expected to be a normal occurrence.

004.C. Modification Requests

In October 2024, DEP received requests from several Non-Governmental Organizations and numerous individuals (hereafter "Requesters") to modify various aspects of Shell's NPDES permit. With respect to Outfall 015, the requests included the following:

- add monitoring for 1,2,4,5-tetrachlorobenzene and pentachlorobenzene based on "high levels" reported at Outfall 001 (Outfall 001 discharges treated wastewaters from the AC Pond, among other sources)
- add monthly PFAS monitoring
- require more frequent storm water inspections (monthly instead of semi-annually)

As explained in Section 001.B of this Fact Sheet, 1,2,4,5-tetrachlorobenzene and pentachlorobenzene have never been detected at Outfall 001. Shell reported one non-detect result for pentachlorobenzene using a Reporting Limit 3.2 µg/L, which is higher than DEP's Target QL of 2.5 µg/L, but that does not mean that pentachlorobenzene was present in the effluent. Nevertheless, DEP agrees that monitoring for 1,2,4,5-tetrachlorobenzene and pentachlorobenzene at Outfall 004 is reasonable.

With respect to PFAS: based on the rationale described in Section 004.A, above, monitoring requirements for PFOA, PFOS, PFBS, and HFPO-DA at IMP 101 (see **Table 9**) also will be imposed at Outfall 004.

With respect to more frequent storm water inspections, Shell already voluntarily conducts inspections once per week. The permit will be modified to require Shell to conduct weekly inspections, which will simply memorialize Shell's existing inspection frequency.

004.D. Effluent Limitations and Monitoring Requirements for Outfall 004

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges from Outfall 004 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 42. Effluent Limits and Monitoring Requirements for Outfall 004

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	40 CFR §§ 414.44 and 414.64
BOD-5	309.0	824.0	27.0	72.0	90.0	40 CFR §§ 414.44 and 414.64
Total Suspended Solids	492.0	1599.0	43.0	139.0	174.0	40 CFR §§ 414.44 and 414.64
Oil and Grease	—	—	15.0	—	30.0	25 Pa. Code § 92a.61(b)
Acenaphthene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Acenaphthylene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Acrylonitrile	1.10	2.78	0.096	0.242	0.302	40 CFR § 414.91
Anthracene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Benzene	0.424	1.56	0.037	0.136	0.170	40 CFR § 414.91
Benzo(a)anthracene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
3,4-Benzofluoranthene	0.263	0.699	0.023	0.061	0.076	40 CFR § 414.91

Table 42 (cont'd). Effluent Limits and Monitoring Requirements for Outfall 004

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Benzo(k)fluoranthene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Benzo(a)pyrene	0.263	0.699	0.023	0.061	0.076	40 CFR § 414.91
Bis(2-ethylhexyl) phthalate	1.18	3.20	0.103	0.279	0.348	40 CFR § 414.91
Carbon Tetrachloride	0.206	0.436	0.018	0.038	0.047	40 CFR § 414.91
Chlorobenzene	0.172	0.321	0.015	0.028	0.035	40 CFR § 414.91
Chloroethane	1.19	3.08	0.104	0.268	0.335	40 CFR § 414.91
Chloroform	0.240	0.527	0.021	0.046	0.057	40 CFR § 414.91
2-Chlorophenol	0.355	1.12	0.031	0.098	0.122	40 CFR § 414.91
Chrysene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Di-n-butyl phthalate	0.309	0.654	0.027	0.057	0.071	40 CFR § 414.91
1,2-Dichlorobenzene	0.883	1.87	0.077	0.163	0.203	40 CFR § 414.91
1,3-Dichlorobenzene	0.355	0.504	0.031	0.044	0.055	40 CFR § 414.91
1,4-Dichlorobenzene	0.172	0.321	0.015	0.028	0.035	40 CFR § 414.91
1,1-Dichloroethane	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
1,2-Dichloroethane	0.780	2.42	0.068	0.211	0.263	40 CFR § 414.91
1,1-Dichloroethylene	0.183	0.286	0.016	0.025	0.031	40 CFR § 414.91
1,2-trans-Dichloroethylene	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
2,4-Dichlorophenol	0.447	1.29	0.039	0.112	0.140	40 CFR § 414.91
1,2-Dichloropropane	1.76	2.64	0.153	0.230	0.287	40 CFR § 414.91
1,3-Dichloropropylene	0.332	0.504	0.029	0.044	0.055	40 CFR § 414.91
Diethyl phthalate	0.929	2.33	0.081	0.203	0.253	40 CFR § 414.91
2,4-Dimethylphenol	0.206	0.413	0.018	0.036	0.045	40 CFR § 414.91
Dimethyl phthalate	0.218	0.539	0.019	0.047	0.058	40 CFR § 414.91
4,6-Dinitro-o-cresol	0.895	3.18	0.078	0.277	0.346	40 CFR § 414.91
2,4-Dinitrophenol	0.814	1.41	0.071	0.123	0.153	40 CFR § 414.91
2,4-Dinitrotoluene	1.30	3.27	0.113	0.285	0.356	40 CFR § 414.91
2,6-Dinitrotoluene	2.93	7.36	0.255	0.641	0.801	40 CFR § 414.91
Ethylbenzene	0.367	1.24	0.032	0.108	0.135	40 CFR § 414.91
Fluoranthene	0.286	0.780	0.025	0.068	0.085	40 CFR § 414.91
Fluorene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Hexachlorobenzene	0.172	0.321	0.010	0.020	0.025	40 CFR § 414.91
Hexachlorobutadiene	0.229	0.562	0.020	0.049	0.061	40 CFR § 414.91
Hexachloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
Methyl Chloride	0.986	2.18	0.086	0.190	0.237	40 CFR § 414.91
Methylene Chloride	0.458	1.02	0.040	0.089	0.111	40 CFR § 414.91
Naphthalene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Nitrobenzene	0.309	0.780	0.027	0.068	0.085	40 CFR § 414.91
2-Nitrophenol	0.470	0.791	0.041	0.069	0.086	40 CFR § 414.91
4-Nitrophenol	0.826	1.42	0.072	0.124	0.155	40 CFR § 414.91
Phenanthrene	0.252	0.677	0.022	0.059	0.073	40 CFR § 414.91
Phenol	0.172	0.298	0.015	0.026	0.032	40 CFR § 414.91
Pyrene	0.286	0.768	0.025	0.067	0.083	40 CFR § 414.91
Tetrachloroethylene	0.252	0.642	0.022	0.056	0.070	40 CFR § 414.91
Toluene	0.298	0.917	0.026	0.080	0.100	40 CFR § 414.91
1,2,4-Trichlorobenzene	0.780	1.61	0.068	0.140	0.175	40 CFR § 414.91
1,1,1-Trichloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
1,1,2-Trichloroethane	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91
Trichloroethylene	0.240	0.619	0.021	0.054	0.067	40 CFR § 414.91

Table 42 (cont'd). Effluent Limits and Monitoring Requirements for Outfall 004

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Vinyl Chloride	1.19	3.08	0.104	0.268	0.335	40 CFR § 414.91
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)

Since discharges from Outfall 004 are rainfall-dependent and should not occur regularly, all pollutants will require 2/discharge grab-composite sampling except PFOA, PFOS, PFBS, and HFPO-DA, which will require 1/discharge grab sampling. Flow should be estimated concurrently.

Development of Effluent Limitations

Outfall No. 005 **Design Flow (MGD)** 0.047
Latitude 40° 40’ 50.29” **Longitude** -80° 19’ 11.14”
Wastewater Description: Groundwater discharges from Mall Lot 2

Wastewaters regulated at Outfall 005 are currently subject to the following effluent limits and monitoring requirements.

Table 43. Outfall 005: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Quarterly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	2/quarter	Estimate
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	2/quarter	Grab
Total Suspended Solids	—	—	30.0	100.0	—	2/quarter	Grab
Nitrate-Nitrite as N	—	—	Report	Report	—	2/quarter	Grab
Arsenic, Total	—	—	Report	Report	—	2/quarter	Grab
Cadmium, Total	—	—	0.2	0.5	—	2/quarter	Grab
Chromium, Hexavalent	—	—	0.2	0.5	—	2/quarter	Grab
Lead, Total	—	—	0.2	0.5	—	2/quarter	Grab
Mercury, Total	—	—	Report	Report	—	2/quarter	Grab
Selenium, Total	—	—	0.2	0.5	—	2/quarter	Grab

The effluent limits and monitoring requirements in **Table 43** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

005.A. Technology-Based Effluent Limitations (TBELs)

The drainage area for Mall Lot 2 includes a small portion of an old, closed fly ash/slag landfill. Groundwater discharges from Outfall 005 are not subject to any federal Effluent Limitations Guidelines (ELGs). The OCPSF ELGs that apply to other discharges from the SPMS do not apply to the groundwater seep. There is an ELG for the Landfills Point Source Category: 40 CFR part 445. However, pursuant to 40 CFR § 445.1(e), part 445 does not apply to this facility. As 40 CFR § 445.1(e) states, "[part 445] does not apply to discharges of landfill wastewater from landfills operated in conjunction with other industrial or commercial operations when the landfill only receives wastes generated by the industrial or commercial operation directly associated with the landfill". Since the landfill was not operated as a standalone facility, part 445 does not apply.

Leachate from fly ash landfills is regulated by 40 CFR part 423 – Steam Electric Power Generating Point Source Category ELGs (“Steam Electric ELGs”). However, the Steam Electric ELGs do not apply to this facility based on the applicability description in 40 CFR § 423.10, which ties applicability of the Steam Electric ELGs to electricity generation as the principal source of revenue or principal reason for operation. Shell’s generation of electricity at the SPMS is not the principal reason for operation of the generating unit. Shell’s power generation is used to support its manufacturing activities. Similarly, operation of the George F. Weaton coal-fired power station formerly located at the site that was owned by Horsehead Corporation and was the source of the fly ash disposed in the landfill was principally operated to support Horsehead Corporation’s zinc smelting activities. EPA also stated in the Federal Register notice for its 2024 rulemaking for the Steam Electric ELGs that CRL generated at retired landfills (pre-2015) is not covered by the 2015 revisions to part 423. Consequently, even if the Steam Electric ELGs applied, TBELs for the discharge would be established on a case-by-case basis using BPJ.

Outfall 005 is currently subject to case-by-case TBELs for various metals based on BPJ. The existing limits were maintained from when Horsehead Corporation owned the site. To confirm pollutants of concern (POCs) for Outfall 005 for this permit renewal, DEP applied EPA’s initial screening criterion whereby POCs are those detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples. The quantitation limit preferentially is the sample-specific quantitation limits, but DEP does not have that information for all samples, so DEP’s target quantitation limits are used. This test ensures that pollutants have been quantified at sufficient frequency at treatable concentrations. The identification of a pollutant as a POC does not necessarily mean that TBELs must be imposed for that pollutant.

Table 44. Characteristics of Outfall 005 and Treated and Untreated CRL

Analyte	Units	Outfall 005 LTA Conc.	††
Classicals			
Chloride	mg/L	104.7	
Sulfate	mg/L	120	
TDS	mg/L	475	
TSS	mg/L	<1.1	
Metals, Metalloids, and other Nonmetals			
Aluminum	µg/L	62	✓
Antimony	µg/L	<1.7	✓
Arsenic	µg/L	<9.05 †	✓
Barium	µg/L	58	
Beryllium	µg/L	<0.25	✓
Boron	µg/L	145	✓
Cadmium	µg/L	7.92 †	
Calcium	mg/L	75.5	
Chromium VI	µg/L	<10.9 †	✓
Cobalt	µg/L	0.18	✓
Copper	µg/L	25	
Iron	µg/L	70	✓
Lead	µg/L	<1.08 †	✓
Magnesium	mg/L	17.5	
Manganese	µg/L	15	✓
Mercury	ng/L	4.3 †	✓
Molybdenum	µg/L	1.4	
Nickel	µg/L	75	
Selenium	µg/L	3.07 †	✓
Silver	µg/L	<0.79	✓
Thallium	µg/L	<0.54	✓
Zinc	µg/L	3,100	

† Concentration is the average of a delta-lognormal distribution of the quarterly concentrations reported on Outfall 015 DMRs from 4th Qt. 2017 through 2nd Qt. 2026. The average arsenic and mercury concentrations are based on quarter concentrations reported on Outfall 005 DMRs from the 1st Qt. 2021 through 2nd Qt. 2026 because those pollutants were not sampled prior to that time.

†† Pollutant not detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples or LTA is not detectable

Available effluent data indicate that, among pollutants currently subject to TBELs, cadmium is the only pollutant detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples. Other pollutants not currently subject to TBELs were detected at greater than ten times the quantitation limit in at least 10% of all samples, but application samples for Outfall 005 are limited to only two samples, so any one sample represents 50% of available data. A dataset consisting of two samples is not statistically significant and is not an appropriate dataset from which to draw conclusions about the need for treatment systems given that TBELs are developed based on long-term average concentrations. Therefore, no additional TBELs are developed for Outfall 005 for this permit renewal. To develop a long-term dataset to enable a future evaluation of the need for additional TBELs, 2/quarter reporting will be required for the toxic metals that would theoretically be identified as POCs based on limited available data including total copper, total nickel, and total zinc.

DEP notes that, to the extent that treatment is necessary to comply with TBELs at Outfall 005, any collection and treatment systems employed to treat Outfall 015 could be extended to collect and treat Outfall 005.

<u>Regulatory Effluent Standards and Monitoring Requirements</u>

Flow monitoring is required in accordance with 25 Pa. Code § 92a.61(d)(1). Effluent standards for pH (6.0 minimum and 9.0 maximum) is imposed at Outfall 015 based on 25 Pa. Code § 95.2(1).

Per- and Polyfluoroalkyl Substances (PFAS)

As discussed in Section 101.A of this Fact Sheet, DEP implemented a new monitoring initiative for PFAS in February 2024. In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] 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. Shell submitted storm water results for Outfall 005 using Module 1 of the application, which does not prompt applicants to report results for PFOA, PFOS, PFBS, and HFPO-DA. Therefore, it is unknown whether Outfall 005 discharges PFAS. However, consistent with Section II.I.a of SOP No. BCW-PMT-032, DEP requires monitoring for PFOA, PFOS, PFBS, and HFPO-DA regardless of whether those compounds are present in a discharge. The only difference is monitoring frequency: quarterly for any detections among application samples and yearly if there are no detections among application samples. Current and historical operations performed near Outfall 005 are not known or suspected of containing PFAS, so yearly monitoring for PFOA, PFOS, PFBS, and HFPO-DA will be required at Outfall 005. As stated in Section II.I.c of the SOP, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (*i.e.*, four consecutive quarterly results), then the monitoring may be discontinued.

005.B. Water Quality-Based Effluent Limitations (WQBELs)

Reasonable Potential Analysis and WQBEL Development for Outfall 005

Discharges from Outfall 005 are evaluated based on concentrations reported on the application and DMRs. The TMS model is run with the modeled discharge and receiving stream characteristics shown in **Table 45**. The pollutants selected for analysis are those identified as candidates for modeling by the Toxics Screening Analysis. Pollutants for which water quality standards have not been promulgated (*e.g.*, TSS, oil and grease, etc.) are excluded from the modeling.

Table 45. TMS Inputs for Outfall 005

Discharge Characteristics		
Parameter		**Value**
Discharge Flow (MGD)		0.047
Discharge Hardness (mg/L)		280
Discharge pH (S.U.)		7.33
Receiving Stream Characteristics		
Parameter	**Outfall 001**	**End of Segment**
Stream Code	32317	32317
River Mile Index	953.78	951.71
Drainage Area (mi^2)	22,771.5	22772.85
Q_{7-10} (cfs)	4,730	see results
Elevation (ft)	681.95	861.67
Slope (ft/ft)	0.0001	0.0001
Average Width (ft)	240	240
Average Depth (ft)	15	15
PWS Withdrawal (MGD)	—	216

Stream hardness (90.8 mg/L) and pH (7.6 S.U.) are based on water quality data from Water Quality Network Station 702 – Ohio River at Sewickley, PA. The Q_{7-10} and harmonic mean flows of the Ohio River are given in ORSANCO's Pollution Control Standards (2019) as 4,730 cfs, and 16,200 cfs, respectively. The nearest downstream potable water supply intake (BVPV Styrenics) is included as the downstream point in the TMS.[11] Additionally, a partial mix factor of 0.2 is applied to the minimum regulated flow of the Ohio River for chronic criteria based on DEP's best professional judgment. DEP uses partial mix factors (PMFs) in the TMS to represent the fractional portion of the receiving stream that mixes with a discharge. A PMF of 0.2 provides the permittee with 20% of the receiving stream's Q_{7-10} flow for mixing and dilution. The PMF is manually applied because, as a single discharge model, the TMS allocates high percentages of stream flow to individual discharges, which often results in those discharges being modeled with most or all of a stream's assimilative capacity. This would leave little or no assimilative capacity for other dischargers to the same receiving stream.

Output from the TMS model is included in **Attachment F** to this Fact Sheet. As explained previously, the TMS compares the input discharge concentrations to the calculated WQBELs using DEP's reasonable potential thresholds to evaluate the need to impose WQBELs or monitoring requirements in the permit. The results of the modeling indicate that the water quality-based reporting requirements are required for total mercury. Total mercury is already subject to reporting requirements.

[11] The cogeneration plant previously located at BVPV Styrenics' facility that made substantial use of the 216 MGD design flow of BVPV's intake was permanently shut down in 2015, which reduced withdrawals from BVPV's intake to about 33 MGD. Also, BVPV Styrenics and its intake are currently idled. Therefore, the inclusion of a 216 MGD withdrawal at the end of the modeled segment is conservative.

005.C. Effluent Limitations and Monitoring Requirements for Outfall 005

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges from Outfall 005 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 46. Effluent Limits and Monitoring Requirements for Outfall 005

Parameter	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Quarterly	Maximum Daily	Average Quarterly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(h)
pH (S.U.)	—	—	6.0 (Inst. Min)	—	9.0	40 CFR §§ 122.44(l) & 125.3
Total Suspended Solids	—	—	30.0	100.0	—	40 CFR §§ 122.44(l) & 125.3
Arsenic, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Cadmium, Total	—	—	0.2	0.5	—	40 CFR §§ 122.44(l) & 125.3
Chromium, Hexavalent	—	—	0.2	0.5	—	40 CFR §§ 122.44(l) & 125.3
Copper, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Lead, Total	—	—	0.2	0.5	—	40 CFR §§ 122.44(l) & 125.3
Mercury, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Nickel, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Nitrate-Nitrite as Nitrogen	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Selenium, Total	—	—	0.2	0.5	—	40 CFR §§ 122.44(l) & 125.3
Zinc, Total	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)

TSS, pH, arsenic, cadmium, hexavalent chromium, copper, lead, mercury, nickel, nitrate-nitrite nitrogen, selenium, and zinc will require 2/quarter grab sampling. PFOA, PFOS, PFBS, and HFPO-DA will require 1/year grab sampling. Flow must be estimated 2/quarter at the time of sampling.

Development of Effluent Limitations

Outfall No.	011	**Design Flow (MGD)**	0.69
Latitude	40° 40' 4.00"	**Longitude**	-80° 20' 48.00"
Wastewater Description:	Intake screen backwash		

011.A. Technology-Based Effluent Limitations (TBELs)

The backwash water from the intake screen consists solely of water from the Ohio River. No pollutants are expected to be introduced to the effluent other than materials collected on the intake screen, which Shell is not permitted to return to the river (discussed below in Section 011.B). There are no federal ELGs applicable to discharges of intake screen backwash water and no other TBELs are developed for discharges from this outfall. Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(b).

Clean Water Act § 316(b) – Cooling Water Intake Structures (“CWIS”)

On August 15, 2014, EPA promulgated Clean Water Act Section 316(b) regulations that apply to cooling water intake structures. The regulations established best technology available (BTA) standards to reduce impingement mortality and entrainment of all life stages of fish and shellfish at existing power-generating and manufacturing facilities. The Final Rule took effect on October 14, 2014. Regulations implementing the 2014 Final Rule (and the previously promulgated Phase I Rule) are provided in 40 CFR part 125, Subparts I and J for new facilities and existing facilities, respectively. Associated NPDES permit application requirements for facilities with cooling water intake structures are provided in 40 CFR part 122, Subpart B – Permit Application and Special NPDES Program Requirements (§ 122.21(r)).

SPMS’s Cooling Water Intake Structure Characteristics and Flows

Shell described its cooling water intake structure (“CWIS”) in Section 3.0 of its § 122.21(r) application report as follows:

The SPMS’s CWIS is situated slightly upstream of the Montgomery Locks and Dam. The CWIS withdraws cooling water via two partially submerged shoreline intake bays and channels. Water depth in the intake will normally be about 12 feet with a high water depth of 38 feet and a low water depth of 8 feet. The design intake flow of the CWIS is 21.12 million gallons per day (MGD).

Each of the two intake bays include the following:

- One (1) 20-foot high × 8-foot 2-inch-wide bar trash rack comprised of three sections of equal height with ½-inch × 2½-inch vertical stainless-steel bars spaced two inches on center yielding 1½-inch openings between bars (Evoqua 2017a).
- One (1) 24-foot long manually operated aluminum trash rack rake (Evoqua 2017a).
- One (1) 20-foot high × 8-foot 2-inch-wide stop log gate comprised of three sections of equal height. A lifting beam and equalizing valve are provided to allow for stop log removal (Evoqua 2017a).
- One (1) dual-flow Evoqua traveling water screen with 4-foot basket widths × 43” centers. In the dual flow system, the screen is oriented perpendicular to the direction of the intake. Influent flow is directed into both the upward and downward-moving sides of the traveling screen by wing walls. Screened flow recombines as a common effluent that leads to the intake pumps.

The Evoqua traveling screen is composed of 316 stainless steel with 0.072” diameter wire and 0.25” square openings. The design through screen velocity is 0.38 feet per second at normal pool elevations. There is one spray wash system leading into a common trough to a collection point for offsite disposal (debris basket). There is no fish return.

Three pumps are located downstream of the traveling screens. Only two pumps are in operation at any given time and one extra is an installed standby pump. The pumps are each rated for 0.44 MG/hr (10.56 MGD). The Design Intake Flow (“DIF”) of the CWIS is 21.12 MGD, which excludes the capacity of the redundant pump based on the definition of DIF in 40 CFR § 125.92(g).[12]

[12] *Design intake flow* (DIF) means the value assigned during the cooling water intake structure design to the maximum instantaneous rate of flow of water the cooling water intake system is capable of withdrawing from a source waterbody. The facility's DIF may be adjusted to reflect permanent changes to the maximum capabilities of the cooling water intake system to withdraw cooling water, including pumps permanently removed from service, flow limit devices, and physical limitations of the piping. DIF does not include values associated with emergency and fire suppression capacity or redundant pumps (i.e., back-up pumps).

<u>*Applicability Criteria of 40 CFR part 125, Subpart J*</u>

The SPMS is an "existing facility" as defined in 40 CFR § 125.92(k).[13] Shell modified the CWIS that remained at the site from the previous owner, Horsehead Corporation. Shell's modifications included the replacement of the following: the building overlaying the intake structure, the sluice gate, the intake pumps, the bar trash racks, the traveling screens, and other related components. The concrete foundation was repaired but otherwise remained intact. Despite the extensive changes, the new facility requirements under 40 CFR part 125, Subpart I only apply to an existing modified cooling water intake structure when the DIF is increased. Shell decreased the DIF of the CWIS from 80 MGD to 21.12 MGD, so Subpart I requirements do not apply.

Existing facilities are subject to 40 CFR part 125, Subpart J – Requirements Applicable to Cooling Water Intake Structures for Existing Facilities Under Section 316(b) of the Clean Water Act if they meet the applicability criteria given by § 125.91(a), as follows:

(a) The owner or operator of an existing facility, as defined in §125.92(k), is subject to the requirements at §§125.94 through 125.99 if:

(1) The facility is a point source;

(2) The facility uses or proposes to use one or more cooling water intake structures with a cumulative design intake flow (DIF) of greater than 2 million gallons per day (mgd) to withdraw water from waters of the United States; and

(3) Twenty-five percent or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes.

The SPMS is a point source and uses a cooling water intake structure with a design intake flow of 21.12 MGD, which is greater than the 2 MGD threshold. Shell reported that 87% of the water withdrawn by SPMS is used for cooling purposes, which exceeds the 25% applicability threshold. Since the SPMS meets all applicability criteria under § 125.91(a), the SPMS's CWIS is subject to the requirements of §§ 125.94 through 125.99.

The 2021 NPDES Permit for the SPMS identified Shell's operation of a closed-cycle recirculating system as the BTA to minimize adverse environmental impact from impingement mortality and entrainment (I&E). Based on comments received from the U.S. Fish and Wildlife Service ("USFWS") on the draft 2021 NPDES Permit, DEP communicated to Shell that a requirement to conduct I&E sampling was being considered for the 2021 NPDES Permit pursuant to 40 CFR §125.94(g). In a November 12, 2020 response, Shell proposed to voluntarily conduct monthly I&E sampling for one year after startup of all production units. The 2021 NPDES Permit incorporated I&E sampling requirements in Part C, Condition XI.E of that permit.

On October 14, 2023, Shell submitted an I&E Sampling Plan to DEP. By letter dated January 10, 2024, DEP provided comments on Shell's I&E Sampling Plan. In response to DEP's comments, Shell submitted a revised I&E Sampling Plan to DEP on February 8, 2024. DEP approved Shell's Revised I&E Sampling Plan by letter dated June 21, 2024. Shell conducted sampling from August 2024 through July 2025 and submitted a final report ("Impingement and Entrainment Characterization Study Analysis Report") to DEP on December 19, 2025.

Pursuant to 40 CFR § 125.98(h) and DEP's internal procedures, DEP transmitted the permit renewal application and Shell's Impingement and Entrainment Characterization Study Analysis Report to the USFWS, the National Marine Fisheries Service (NFMS), and the Pennsylvania Fish and Boat Commission (PFBC) on January 6, 2026 for a 60-day review. USFWS responded on February 26, 2026 indicating that, based on the Information for Planning and Consultation (IPaC) results and Pennsylvania Natural Diversity Index (PNDI) results included with Shell's application, no further coordination with USFWS is required. The NMFS responded on April 10, 2026 indicating that species under the NMFS's jurisdiction do not occur in the waters associated with the SPMS, which is why NMFS did not comment previously. PFBC responded with the following comments on March 5, 2026:

[13] *Existing facility* means any facility that commenced construction as described in 40 CFR 122.29(b)(4) on or before January 17, 2002 (or July 17, 2006 for an offshore oil and gas extraction facility) and any modification of, or any addition of a unit at such a facility. A facility built adjacent to another facility would be a new facility while the original facility would remain as an existing facility for purposes of this subpart. A facility cannot both be an existing facility and a new facility as defined at §125.83.

"The Pennsylvania Fish and Boat Commission (PFBC) has reviewed the application for renewal of the Shell Chemical Appalachia, Shell Polymers Monaca Site (SPMS) National Pollutant Discharge Elimination System (NPDES) permit and subsequent section 316(b) information pursuant to the Clean Water Act of 1972, as amended.

"The PFBC strongly encourages the Pennsylvania Department of Environmental Protection to consider having the applicant repeat or update the existing study to more accurately reflect what the potential impingement and entrainment impacts are. As well the report in several locations concludes that no fish entrained during the study were a threatened or endangered (T&E) fish. Given that 89.17% of the sample was indeterminate and larger aggregate taxa groups were used to describe the entrained samples; we strongly disagree with any assertion or assumption claiming no T&E fishes were captured during the study.

"The estimations of fish entrainment potentially inaccurately reallocated fishes with indeterminate identifications in the total annual entrainment. The majority of indeterminate fishes estimated were allocated to the "Spiny-rayed Fishes" group which consisted exclusively of eggs. This reallocation may have negatively influenced estimates of entrained age-1 equivalents. Section 3.2.2 of the report describes "indeterminate" fish as being severely damaged and unable to be identified, along with being difficult to measure. The report then claims all indeterminate fish had an estimated length between 5.0 to 8.0 mm long. The report also categorized that egg diameter varied from 1 mrn to 2 mm. This then presents a potential error in sections 3.4 and 3.5 of the report. The reallocation of indeterminate fish to the Spiny-rayed Fishes group consisting wholly of "eggs" would be incorrect as their estimated length would exclude this group from being eggs. Incorrectly placing indeterminate fish as eggs in the Spiny-ray Fishes group in Table 9 and Table 10 of the report further degrades the accuracy of equivalent loss since those fishes had moved past the egg stage and should have been assigned an appropriate survival rate. The missed categorization of the indeterminate group does not allow for accurate representation of the estimated annual entrainment of age-1 equivalents.

"Furthermore, the report claims in section 3.1.2, 3.4, and section 4.0 that either no T&E fish were impinged or entrained during sampling, or that all species captured are considered common and not listed as T&E. We disagree with these statements as 89.17% of the total number of fish entrained during sampling were categorized as indeterminate. Additionally, individuals categorized into the "minnow" (9.9% of fish entrained) and "carpsucker/buffalo" (10.1% of fish entrained) groups were not identified to species level. Within the Ohio River there are listed threatened and endangered fishes that would be lumped into a "minnow" or "carpsucker/buffalo" group. Given the lack of further identification and large number of unidentified specimens during the entrainment sampling it cannot be conclusively stated that listed fish were not present in the entrainment sample, or are taken during the facilities cooling water withdrawal operations.

"We recommend that another entrainment and impingement study may be needed, or that the previously conducted study should be updated. Updating the study should include species level identification of entrained fishes not included in the indeterminate group, and indeterminate categorized fishes are provided the appropriate life stage for survival estimation to ensure an accurate estimation for adult equivalent loss. Additionally, claims that T&E species are not being affected by the withdrawal should not be included in the report as it is presently written since the data presented is not conclusive."

DEP reviewed Shell's "Impingement and Entrainment Characterization Study Analysis Report" and agrees with PFBC's comments with respect to entrainment. Impingement results were not at issue and did not show impacts to threatened and endangered species (federal or state), so DEP does not consider additional impingement studies to be necessary.

Operation of a closed cycle recirculating system, as defined at 40 CFR § 125.92(c), will continue to be identified as BTA for impingement and entrainment in the renewed permit. However, pursuant to 40 CFR § 122.21(r)(1)(ii)(C) and 40 CFR § 125.98(i) regarding the submission of additional information, the renewed permit will require Shell to perform entrainment sampling to better characterize entrainment impacts to state-listed endangered species (Bigmouth Buffalo and Ghost Shiner) and, as applicable, species of special concern (Fragile Papershell, Threehorn Wartyback, and Mapleleaf) due to the substantial number of indeterminate results from Shell's 2024-2025 sampling.

Shell must conduct daily monitoring of intake flows as required by 40 CFR 125.94(c)(1). The CWIS requirements imposed in the permit pursuant to Section 316(b) of the Clean Water Act and 40 CFR part 125, Subpart J are as follows:

COOLING WATER INTAKE STRUCTURE(S)

A. Nothing in this permit authorizes a take of endangered or threatened species under the Endangered Species Act.

B. Technology and operational measures employed at the cooling water intake structures must be operated in a way that minimizes impingement mortality and entrainment to the fullest extent possible.

C. The permittee shall not alter the location, design, construction or capacity of the intake structure(s) without prior approval of DEP.

D. Best Technology Available (BTA) Requirements

To meet BTA requirements to minimize adverse impacts from impingement and entrainment, the permittee shall utilize a closed-cycle recirculating cooling system. To comply with these BTA requirements the permittee shall:

1. Operate a closed cycle recirculating system as defined at 40 CFR §125.92(c).

2. Monitor the actual intake flows at a minimum frequency of daily, including measurements of cooling water withdrawals, make-up water and blow down volume or alternatively monitor cycles of concentration at a minimum frequency of daily.

3. Submit the results of monitoring in paragraph D.2 above on the Cooling Water Intake Monitoring Supplemental Report (3800-FM-BCW0010) as an attachment to monthly DMRs.

E. The permittee shall complete entrainment sampling during the permit term. The permittee shall submit an entrainment sampling study plan within one (1) year of the Permit Effective Date for approval by DEP. The study plan shall include the following, at a minimum:

1. Sampling

   a. The sampling shall be inclusive of one (1) peak season of entrainment, with a minimum of April through August in the same calendar year.

      The sampling frequency must be a minimum of bi-weekly during the period of peak abundance (April through August). The sampling frequency must be a minimum of monthly samples are collected outside the period of peak abundance.

   b. Four samples must be spread out across a 24-hour period (one event per six-hour window)

2. Results

   a. Samples should be enumerated by life stage and taxon.

   b. There should be an estimation of total entrainment.

3. Quality Assurance/Quality Control (QA/QC)

   A QA/QC plan must be submitted with the study plan and include the following, at a minimum:

   a. There must be one sequential replication, taken in the same six-hour window, for every twenty (20) samples. For example, if 10 events are performed with four samples per event (40 samples total), then two sequential replicates are necessary. Sequential replicates should be rotated to different 6-hour windows (day vs. night).

   b. The results of the QC steps shall be provided to the Department upon request.

   DEP shall review and approve the entrainment sampling study plan within 180 days of submission. DEP will consider reasonable requests to extend deadlines contingent on DEP's approval of the entrainment sampling study plan if DEP has not approved the entrainment sampling study plan within 180 days of submission.

   The results of the entrainment sampling shall be summarized in a report accompanying the permit renewal application.

F. If DEP determines the methods to meet impingement and entrainment BTA requirements are not sufficient the permittee will employ additional controls to reduce adverse impacts from impingement and entrainment.

G. The permittee shall, on an annual basis, submit a report describing any modifications to the operation of any unit at the facility that impacts cooling water withdrawals or operation of the cooling water intake structure(s) during a calendar year. If not applicable, the permittee shall submit a statement certifying that no modifications have occurred in lieu of a report. The annual report or statement is due by January 28 of each year.

H. If the permittee wishes to submit a request for a reduction in permit application requirements as specified in 40 CFR § 125.95(c), the request must be submitted to DEP at least two years and six months before the permit expiration date.

I. The permittee shall retain data and other records for any information developed pursuant to Section 316(b) of the Clean Water Act for a minimum of ten years.

J. New Units.

The permittee must submit applicable information in 40 CFR §122.21(r) at least 180 days prior to the planned commencement of cooling water withdrawals associated with the operation of a new unit (as defined in 40 CFR §125.92(u)).

011.B. Water Quality-Based Effluent Limitations (WQBELs)

As stated above, other than materials that collect on intake screen, no other pollutants are expected to be introduced to Outfall 011's effluent. Therefore, no reasonable potential to cause or contribute to excursions above water quality standards is presumed to exist.

Notwithstanding a lack of reasonable potential for backwash discharges to cause or contribute to excursions above numerical water quality standards, any discharges containing debris from the intake screen would violate narrative water quality criteria and corresponding prohibitions under 25 Pa. Code §§ 93.6 and 92a.41(c), respectively, which state:

§ 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) In addition to other substances listed within or addressed by this chapter, specific substances to be controlled include, but are not limited to, floating materials, oil, grease, scum and substances that produce color, tastes, odors, turbidity or settle to form deposits.

§ 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.

Based on those requirements, the following permit condition (in addition to the § 92a.41(c) condition cited above, which is included in all NPDES permits) applicable to Outfall 011 will be imposed in the permit to ensure compliance with narrative water quality criteria:

" Debris collected on the intake trash racks shall not be returned to the waterway."

011.C. Effluent Limitations and Monitoring Requirements for Outfall 011

There are no TBELs or WQBELs applicable to discharges from Outfalls 011. Therefore, the narrative condition regarding collected materials will be imposed along with flow monitoring.

Table 47. Effluent limits and monitoring requirements for Outfall 011

Pollutant	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(b)
Debris collected on the intake trash racks shall not be returned to the waterway.						25 Pa. Code §§ 92a.41(c) & 93.6

The monitoring frequency and sample type for discharge flow will remain unchanged from the previous permit: 1/week, estimates.

Development of Effluent Limitations

Outfall No. 015 **Design Flow (MGD)** 0.00164
Latitude 40° 40’ 47.53” **Longitude** -80° 19’ 19.32”
Wastewater Description: Groundwater seep

Wastewaters regulated at Outfall 015 are currently subject to the following effluent limits and monitoring requirements.

Table 48. Outfall 015: Current Effluent Limits and Monitoring Requirements

Parameter	Mass (pounds/day)		Concentration (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Quarterly	Maximum Daily	Instant Maximum		
Flow (MGD)	Report	Report	—	—	—	2/quarter	Estimate
pH (S.U.)	—	—	6.0 (Inst. Min.)	—	9.0	2/quarter	Grab
Total Suspended Solids	—	—	30.0	100.0	—	2/quarter	Grab
Oil and Grease	—	—	15.0	20.0	—	2/quarter	Grab
Antimony, Total	—	—	—	Report	—	1/quarter	Grab
Arsenic, Total	—	—	—	Report	—	1/quarter	Grab
Boron, Total	—	—	—	Report	—	1/quarter	Grab
Cadmium, Total	—	—	—	Report	—	1/quarter	Grab
Iron, Total	—	—	—	Report	—	1/quarter	Grab
Lead, Total	—	—	—	Report	—	1/quarter	Grab
Manganese, Total	—	—	—	Report	—	1/quarter	Grab
Mercury, Total	—	—	—	Report	—	1/quarter	Grab
Nickel, Total	—	—	—	Report	—	1/quarter	Grab
Selenium, Total	—	—	—	Report	—	1/quarter	Grab
Zinc, Total	—	—	—	Report	—	1/quarter	Grab

The effluent limits and monitoring requirements in **Table 48** will remain in effect in the renewed permit pursuant to anti-backsliding requirements under Section 402(o) of the Clean Water Act (33 U.S.C. §1342(o)) and/or 40 CFR § 122.44(l) (incorporated by reference at 25 Pa. Code § 92a.44) unless the limits are superseded by more stringent limits developed for this renewal or are relaxed pursuant to the anti-backsliding exceptions listed in 33 U.S.C. §1342(o) or 40 CFR § 122.44(l).

015.A. <u>Technology-Based Effluent Limitations (TBELs)</u>

The groundwater seep at Outfall 015 is near the base on an old fly ash landfill. The seep is not subject to any federal Effluent Limitations Guidelines (ELGs). The OCPSF ELGs that apply to other discharges from the SPMS do not apply to the groundwater seep. There is an ELG for the Landfills Point Source Category: 40 CFR part 445. However, pursuant to 40 CFR § 445.1(e), part 445 does not apply to this facility. As 40 CFR § 445.1(e) states, "[part 445] does not apply to discharges of landfill wastewater from landfills operated in conjunction with other industrial or commercial operations when the landfill only receives wastes generated by the industrial or commercial operation directly associated with the landfill". Since the landfill was not operated as a standalone facility, part 445 does not apply.

Leachate from fly ash landfills is regulated by 40 CFR part 423 – Steam Electric Power Generating Point Source Category ELGs (“Steam Electric ELGs”). However, the Steam Electric ELGs do not apply to this facility based on the applicability description in 40 CFR § 423.10, which ties applicability of the Steam Electric ELGs to electricity generation as the principal source of revenue or principal reason for operation. Shell’s generation of electricity at the SPMS is not the principal reason for operation of the generating unit. Shell’s power generation is used to support its manufacturing activities. Similarly, operation of the George F. Weaton coal-fired power station formerly located at the site that was owned by Horsehead Corporation and was the source of the fly ash disposed in the landfill was principally operated to support Horsehead Corporation’s zinc smelting activities. EPA also stated in the Federal Register notice for its 2024 rulemaking for the Steam Electric ELGs that CRL generated at retired landfills (pre-2015) is not covered by the 2015 revisions to part 423. Consequently, even if the Steam Electric ELGs applied, TBELs for the discharge would be established on a case-by-case basis using BPJ.

Regulatory Requirements for Case-by-Case Effluent Limitations Using Best Professional Judgment

Sections 304(b)(2)(B), 304(b)(4)(B), and 402(a)(1) of the Clean Water Act allow for the establishment of effluent limits on a case-by-case basis using Best Professional Judgment (BPJ). Regulations under 40 CFR 125.3(d) require that certain factors be considered when developing case-by-case effluent limitations using BPJ for the levels of technology-based control described in the Clean Water Act (as amended) including: Best Practicable Control Technology Currently Available (BPT), Best Conventional Pollutant Control Technology (BCT) and Best Available Control Technology Economically Achievable (BAT). There is no BPJ for New Source Performance Standards. The required factors are listed below.

General Considerations; 40 CFR § 125.3(c):

(i) The appropriate technology for the category or class of point sources of which the applicant is a member, based upon all available information; and
(ii) Any unique factors relating to the applicant

Best Practicable Control Technology Currently Available (BPT); 40 CFR § 125.3(d)(1):

(i) The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application;
(ii) The age of equipment and facilities involved;
(iii) The process employed;
(iv) The engineering aspects of the application of various types of control techniques;
(v) Process changes; and
(vi) Non-water quality environmental impact (including energy requirements)

Best Conventional Pollution Control Technology (BCT); 40 CFR § 125.3(d)(2):

(i) The reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived;
(ii) The comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources;
(iii) The age of equipment and facilities involved;
(iv) The process employed;
(v) The engineering aspects of the application of various types of control techniques;
(vi) Process changes; and
(vii) Non-water quality environmental impact (including energy requirements).

Best Available Technology Economically Achievable (BAT); 40 CFR § 125.3(d)(3):

(i) The age of equipment and facilities involved;
(ii) The process employed;
(iii) The engineering aspects of the application of various types of control techniques;
(iv) Process changes;
(v) The cost of achieving such effluent reduction; and
(vi) Non-water quality environmental impact (including energy requirements)

Appropriate Technology for Effluent Class, Wastewater Characterization, and Pollutants of Concern

Notwithstanding its proximity to the fly ash landfill, the characteristics of the seep are distinct from “combustion residual leachate” as that term is defined in 40 CFR § 423.11(r). As shown in **Table 49**, the concentrations of many pollutants at Outfall 015 are less than the average concentrations of pollutants in untreated CRL. The long-term average concentration of zinc at Outfall 015 is eleven times higher than the average concentration of zinc in untreated CRL. Antimony and lead concentrations are slightly higher than concentrations in untreated CRL but are still low in terms of treatability. The differences between the seep and CRL may be attributable to the localized influence of smelter slag, which was used by Horsehead as a road base for the access road uphill from the seep, or a general increase in metals concentrations in site soils from the long history of smelting at the site. Impacts from the fly ash landfill on the seep are probably minimal given that the groundwater table is four-to-five feet below the minimum elevation of disposed fly ash and below the elevation of the seep.

Table 49. Characteristics of Outfall 015 and Treated and Untreated CRL

Analyte	Units	Outfall 015 LTA Conc.	Avg. Conc. of Untreated CRL ‡	Chem. Precipitation Avg. Conc. ‡	Biological Treatment Avg. Conc. ‡	††
Classicals						
Chloride	mg/L	99.4	566	413	413	
Sulfate	mg/L	192	1,630	1,240	1,240	
TDS	mg/L	610	3,570	3,500	3,500	
TSS	mg/L	18.7	33.9	8.59	8.59	
Metals, Metalloids, and other Nonmetals						
Aluminum	µg/L	120	3,190	120	120	
Antimony	µg/L	8.75†	3.82	3.75	3.75	✓
Arsenic	µg/L	22.0†	32.2	5.83	5.83	
Barium	µg/L	50	148	53.2	53.2	
Beryllium	µg/L	<0.25	1.33	1.34	1.34	✓
Boron	µg/L	3,594†	22,000	22,000	22,000	
Cadmium	µg/L	3.55†	8.17	4.21	4.21	
Calcium	mg/L	96.5	490	408	408	
Chromium	µg/L	<0.9	1,700	6.45	6.45	✓
Cobalt	µg/L	0.43	63.4	9.30	9.30	✓
Copper	µg/L	2.8	9.44	3.78	3.78	✓
Iron	µg/L	680†	23,000	110	110	
Lead	µg/L	4.90†	2.37	2.37	—	✓
Magnesium	mg/L	13.5	99.8	99.8	99.8	
Manganese	µg/L	666†	2,840	2,720	2,720	
Mercury	ng/L	4.83†	940	139	50.7	
Molybdenum	µg/L	12	1,480	125	125	
Nickel	µg/L	15.0†	46.5	9.11	6.30	
Selenium	µg/L	7.2†	93.8	93.8	5.72	✓
Silver	µg/L	<0.79	1.63	0.925	0.925	✓
Thallium	µg/L	<0.54	1.55	1.16	1.16	✓
Zinc	µg/L	1,430†	133	20.0	20.0	

† Concentration is either the average of a lognormal distribution or the average of a delta-lognormal distribution of the quarterly concentrations reported on Outfall 015 DMRs from 4th Qt. 2017 through 1st Qt. 2026. The average mercury concentration excludes DMR values pre-dating the 2nd quarter of 2021 because a less sensitive analytical method was used prior to that time.

‡ Concentrations of untreated and treated leachate are based on values reported in Table 20 of EPA's "Technical Development Document for Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category", Doc. No. EPA-821-R-24-004, April 2024, and Table 6-9 in EPA's "Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category", Doc. No. EPA-821-R-15-007, September 2015. Treatment is based on the use of chemical precipitation.

†† Pollutant not detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples or LTA is not detectable

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While the effluent characteristics of the seep are distinct from the characteristics of CRL and the seep may not be influenced substantially by the fly ash landfill, the seep and CRL are both influenced by disposed waste materials, both contain heavy metals, and both may be treatable by similar technologies. CRL under the 2024 Steam Electric ELGs is regulated based on various BAT selections depending on the status of the associated electric generating unit (EGUs). Technologies considered by EPA for the treatment of CRL include chemical precipitation, biological treatment, membrane filtration, spray dryer evaporation (SDE), and thermal evaporation. Under the 2024 Steam Electric ELGs, BAT for unmanaged CRL is based on chemical precipitation including hydroxide precipitation, organosulfide precipitation, and iron coprecipitation. Alternatively, BAT for CRL from operating EGUs is "no discharge", which is predicated on the continued operation of an EGU or some other on-site water demand to provide a place to reuse permeate or distillate from membrane filtration, spray dryer evaporation (SDE), or thermal evaporation.

Chemical precipitation is the most common technology used to treat heavy metals and, even if not the primary technology, it is generally used as pretreatment for the more sophisticated treatment options. Biological treatment is used in combination with chemical precipitation to enhance the removal of certain metals including arsenic, cadmium, nickel, mercury, and selenium. Membrane filtration includes one of the following: microfiltration, ultrafiltration, nanofiltration, reverse osmosis (RO), forward osmosis (FO), and electrodialysis reversal (EDR) membrane systems. Like biological treatment, membrane filtration systems also require some type of pretreatment (*e.g.,* surface impoundment, chemical precipitation, microfiltration) to reduce TSS and/or soften the wastewater before it enters the membrane system to prevent fouling. SDE also requires pre-treatment to maximize efficiency.

For the treatment of Outfall 015, DEP is considering the technologies EPA considered for CRL excluding biological treatment. Biological treatment is excluded because it would enhance the removal of pollutants that are already present in low concentrations (nickel and selenium) or concentrations less than what is achievable by chemical precipitation and biological treatment (mercury). DEP also is considering ion exchange because it can target specific metals for removal and zinc is the only toxic priority pollutant present in the seep in elevated concentrations.

To identify pollutants of concern (POCs) in wastestreams regulated by the Steam Electric ELGs, EPA performed an initial screening test to identify pollutants detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples. The quantitation limit preferentially is the sample-specific quantitation limit, but DEP does not have that information for all samples, so DEP's target quantitation limits are used. This test ensures that pollutants have been quantified at sufficient frequency at treatable concentrations. Applying EPA's initial screening test to quarterly DMR data collected at Outfall 015 from the fourth quarter of 2017 through the first quarter of 2026 eliminates antimony, beryllium, chromium, cobalt, copper, selenium, silver, and thallium from further consideration. DEP also is eliminating lead because, while lead is treatable using chemical precipitation, lead is not consistently present in Outfall 015's effluent at treatable concentrations.[14] The remaining pollutants include aluminum, arsenic, barium, boron, cadmium, calcium, chloride, iron, magnesium, manganese, mercury, molybdenum, nickel, sulfate, zinc, TSS, and TDS. Only pollutants identified as POCs are considered in the pollutant loadings and removals evaluations.

Among the list of POCs, EPA ultimately did not select pollutants for regulation that are 1) conventional pollutants; 2) pollutants that are introduced as treatment chemicals; 3) pollutants that are not effectively treated by the technology basis for the effluent standards; and 4) pollutants that are directly regulated or controlled by regulation of other pollutants. DEP has not determined the technology basis for Outfall 015, so POCs eliminated from regulation for one of those reasons will be determined later.

<u>Evaluation of Factors for Case-by-Case TBELs using Best Professional Judgement</u>

DEP's evaluation of the regulatory factors for developing site-specific BAT are described in the sections below.

1. <u>Equipment and Facility Age</u>

Figure 2. Paved access road and stabilized landfill slope.

Source: Act 2 Final Report, Section 4.3, Photo 21 (looking west).

The fly ash landfill was operated between the late 1970s and early 1990s and was used to dispose of fly ash from the coal-fired power station operated in conjunction with Horsehead Corporation's former zinc smelting facilities. **Figure 3** shows the fly ash landfill in 1982 during active use. Fly ash from the power station was reportedly trucked from the fly ash ponds on the western side of the smelter property near Poorhouse Run to the landfill, typically twice per year. Based on discussions with former Horsehead personnel, the landfill was reportedly closed between 1991 and 1992 by covering the fly ash with two feet of soil. A report for the landfill closure was not required or prepared, and soil sampling before and after closure of the landfill was reportedly not conducted since sampling was not required by the regulations in force at that time.[15] Shell has redeveloped the landfill and surrounding area into a rail yard as shown in **Figure 4**.

The main rail yard area is flat with vegetated areas on the northern slope. The northern slope drops to an access road that runs parallel to the Ohio River followed by a forested slope down to the river. As part of site cleanup under Pennsylvania's Land Recycling Program (Act 2), much of the landfill

[14] As part of the 2015 revisions to part 423, EPA eliminated lead as a pollutant of concern because it was not detected at greater than or equal to ten times the quantitation limit in at least 10% percent of all samples. Lead was detected in nine of the thirty-four samples collected at Outfall 015 (about 26%). However, the LTA concentration of lead at Outfall 015 is influenced by four outliers from 2nd Qt. 2018, 1st and 2nd Qt. 2019, and 2nd Qt. 2024.

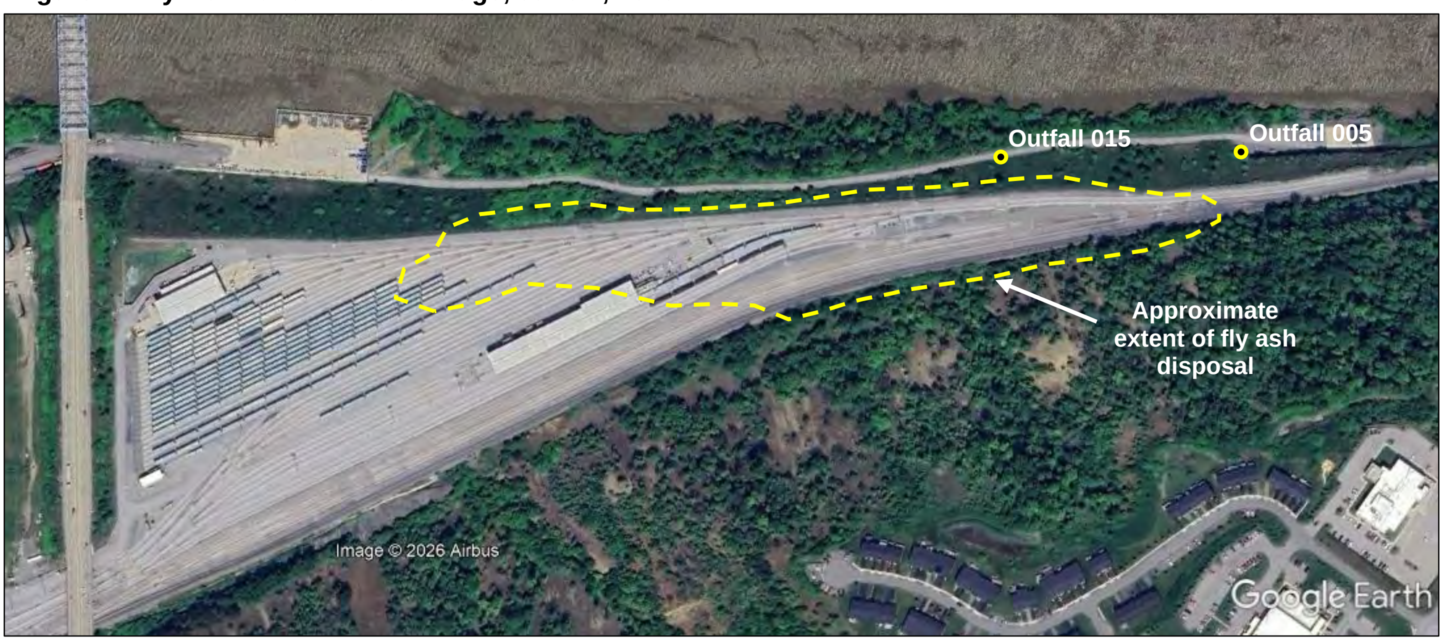
[15] Final Site Investigation Report Fly Ash Landfill Mall Lot #2 by Michael Baker Jr., Inc. for Pennsylvania Department of Environmental Protection. September 2013.

surface was graded to achieve necessary sub-grade elevations to construct the rail yard. Impacted slag/soil taken from the PEU and Cogen areas of the SPMS was consolidated in the landfill area. After grading, a layer of geotextile was placed over the landfill and covered with imported structural gravel. An additional 12-inches of compacted stone ballast and railroad ties and tracks were placed on top of the base gravel layer to complete rail yard construction. In addition, the slope between the rail yard area and the access road was covered with additional soil fill on top of the existing soil cap and the slope was revegetated. The slag making up the base of the access road was covered with a gravel road base and an asphalt-paved surface (see **Figure 2**). These measures were implemented to mitigate exposure pathways consistent with Act 2.

Figure 3. Fly Ash Landfill Aerial Image, November 7, 1982

Source: https://maps.psiee.psu.edu/ImageryNavigator/. Annotations by DEP.

Figure 4. Fly Ash Landfill Aerial Image, June 1, 2025



Source: Google Earth Pro. Annotations by DEP.

Other than redevelopment at the surface level, a stairway to access the outfall, and a collection box and weir to facilitate sampling, there is no "equipment" associated with the landfill or the seep. Site investigations suggest that a berm was present on the western and northern sides of the landfill—assumed to represent the walls of an excavation prior to the original placement of fly ash. However, fly ash was placed beyond the limits of the berm. The age of the landfill itself may have helped the long-term attenuation of pollutants with the depth to groundwater and resulting additional capacity for vertical attenuation of metals prior to reaching the water table likely contributing to the overall low metals concentrations. Redevelopment at the surface and the completion of Act 2 cleanup limits collection and treatment options with final cover already in place and the rail yard reducing available space. However, pumping the seep to a higher elevation and treating it with a compact system could be feasible since the seep's flow rates are low.

Figure 5. Outfall 015

2. *Processes Employed*

Consistent with the lack of equipment at the fly ash landfill, there are no processes employed. Processes generating impacted seepage are inherent to the current disposition of the landfill. At its minimum depth, the water table is four-to-five feet below the base of the fly ash landfill, so the seep may originate from a preferential flow pathway that intercepts storm water percolating through unsaturated fly ash. The seep flows an average of 1.1 gallons per minute. As explained previously, the slag nearest to the seep is covered by gravel and an asphalt access road.

Under Act 2 cleanup, Shell identified one area where soils brought over to the landfill from other areas of the site for grading exceeded site-specific soil-to-groundwater standards. The soils in that area (which is not near the seep) were covered with a low-permeability (1×10^{-7} cm/sec) geomembrane liner to prevent future leaching of metals to groundwater from those soils. A storm water collection system in the rail yard directs storm water runoff to the East RR Pond (Outfall 002).

3. *Engineering Aspects of Control Techniques*

Outfall 015 is in the floodplain of the Ohio River and appears to be in the immediate periphery of the floodway. Flooding risks introduce design complications for the use of engineered treatment facilities with additional requirements/restrictions applying to any facilities located in the regulatory floodway. Land availability near Outfall 015 is limited and slopes in that area are steep. Treatment units reasonably would not be constructed in the floodplain, which means that effluent would need to be pumped out of the floodplain for treatment. To the extent the area is ever inundated by the Ohio River, pumps would need to be anchored to counteract buoyant forces from the river and protected to prevent damage from high velocity flow and debris in the river depending on their location. Collection facilities and their operating parameters would need to be designed to avoid pumping water from the Ohio River and inundation of those facilities by the river could cause impacts on water quality misattributed to the seep (*e.g.*, treating residuals deposited in the pumping system from the river). Based on DMR data, there has been no interruption in data collection activities at Outfall 015, which suggests that inundation by the river generally is not a problem.

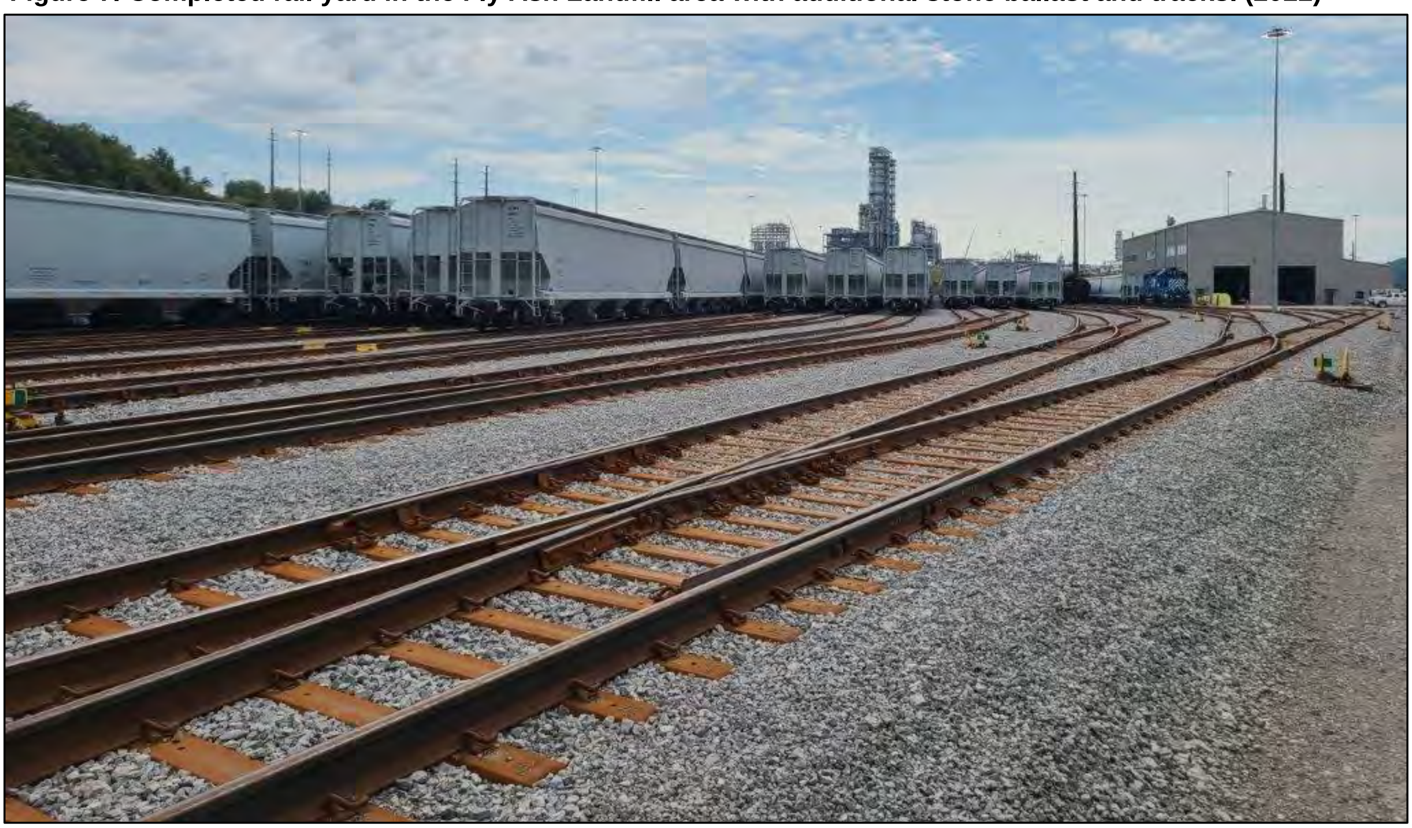
4. *Process Changes*

Consideration of process changes relates to the feasibility of modifying the processes that generate a wastewater with the goal of reducing the volume or pollutant load of the wastewater at the source. As stated previously, there are no processes employed other than the circumstantial leaching of metals to groundwater. For any engineered waste management unit, leachate generation is controlled by limiting storm water infiltration with a cap and limiting contact with groundwater with a liner. The fly ash/slag landfill at the SMPS is not capped or lined except for 1) the area where soil exceeding site-specific soil-to-groundwater standards was covered with an impermeable liner and 2) the paved access road that covers old slag road base. The rail yard surface has a compacted subbase of structural gravel, which has a moderately high level of runoff (generally more than 50%), and a storm water collection system that routes runoff to the East RR Pond and Outfall 002. The existing cover materials do not eliminate storm water infiltration, but they do reduce infiltration and leachate generation. Installing an impermeable cap would substantially reduce or eliminate storm water infiltration. However, redevelopment of the landfill area is already complete, so the installation of an impermeable cap is considered infeasible (and ostensibly was unnecessary as part of Act 2 cleanup). Installation of a liner to control impacts to groundwater also is infeasible. As stated previously, groundwater elevations are located below the minimum elevation of disposed fly ash, so base groundwater flow is not through the fly ash, and vertical separation between disposed waste and groundwater enables partial attenuation of compounds leached by the percolation of storm water through the waste.

Figure 6. Fly Ash Landfill area after re-grading and placement of geotextile and structural stone. (2018)

Source: Act 2 Final Report, Section 4.3, Photo 19, 2018.

Figure 7. Completed rail yard in the Fly Ash Landfill area with additional stone ballast and tracks. (2022)



Source: Act 2 Final Report, Section 4.3, Photo 20, August 2022.

5. Costs

Cost considerations vary between the BPT, BCT, and BAT levels of control. The BPT cost analysis is a cost-benefit analysis that compares the total cost of application of a technology to the effluent reduction benefits to be achieved from such application. The intent of the BPT cost-benefit requirement is to avoid requiring wastewater treatment when the amount of effluent reduction is disproportionate to the cost of the reduction. In balancing costs in relation to effluent reduction benefits, factors to consider include the volume and nature of existing discharges, the volume and nature of discharges expected after application of BPT, the general environmental effects of the pollutants, and the cost and economic impact of the required pollution control. The BCT cost test is a two-part cost-reasonableness test that includes a POTW Test and Industry-Cost Effectiveness Test. The cost analysis for BAT is an evaluation of the economic achievability of implementing pollution control technologies. Generally, the intent of the BAT economic achievability determination is to evaluate whether a technology can be implemented without forcing the facility to close due to the increased financial burden of operating and maintaining treatment systems (*i.e.*, can the facility maintain profitability and remain in business while operating the pollution control technologies). BAT cost analyses place less emphasis on cost versus benefit and greater emphasis on affordability.

5.1 Pollutant Removals and Cost Effectiveness of End-of-Pipe Pump-and-Treat with Chemical Precipitation ("CP")

For the 2015 revisions to the Steam Electric ELGs, EPA estimated effluent reductions by calculating baseline pollutant loadings (untreated effluent concentrations multiplied by the discharge flow rate) in pounds of pollutant discharged per year, and post-compliance pollutant loadings (treated effluent concentrations multiplied by the discharge flow rate) in pounds of pollutant discharged per year. In addition, EPA used toxic weighting factors (TWFs) to account for differences in toxicity across pollutants. A list of the TWFs used for the 2015 rulemaking can be found in EPA's memorandum "Review of Toxic Weighting Factors in Support of the Final Steam Electric Effluent Limitations Guidelines and Standards". EPA calculated a toxic-weighted pound-equivalent (TWPE) value for each pollutant discharged to compare mass loadings of different pollutants based on their toxicity. To perform this comparison, EPA multiplied the mass loadings of pollutant in pounds/year by the pollutant-specific TWF to derive a "toxic-equivalent" loading (lb-equivalent/year), or "TWPE".

DEP replicated EPA's TWPE evaluation using the LTA pollutant concentrations of POCs at Outfall 015 and a discharge flow rate of 0.00164 MGD (the average of the maximum daily flows reported from the 1^{st} Quarter of 2023 through the 1^{st} Quarter of 2026). Consistent with EPA's methodology, TSS and TDS also were excluded from the calculations to 1) avoid double counting the loadings for other specific pollutants; and 2) because TSS and TDS do not have TWFs. **Table 50** summarizes these calculations. TSS and TDS loads are shown for informational purposes.

Table 50. Baseline and Post-Treatment Pollutant Loads for End-of-Pipe Pump and Treat System Using CP

Parameter	Baseline Conc. (µg/L)	Baseline Loads (lb/yr)	% Removal Achievable by Chemical Precipitation	Post-Treatment Loads (lb/yr)	TWF	Pollutant Load Removed by Chem. Prec. (lb/yr)	Baseline Loads (TWPE/yr)	Post-Treatment Loads (TWPE/yr)
Aluminum	120	0.599	96.2%	0.023	0.0646	0.576	0.039	0.001
Arsenic	22	0.11	81.9%	0.020	3.47	0.090	0.382	0.069
Barium	50	0.25	64.1%	0.090	0.002	0.160	0.000	0.000
Boron	3,594	18.0	0.00%	18.0	0.00834	0.000	0.150	0.150
Cadmium	3.55	0.018	48.5%	0.009	22.8	0.009	0.410	0.211
Calcium	96,500	482	16.7%	401	0.000028	80.673	0.013	0.011
Chloride	99,400	497	27.0%	362	0.000024	134.229	0.012	0.009
Iron	680	3.40	99.5%	0.016	0.0056	3.381	0.019	0.000
Magnesium	13,500	67.4	0.00%	67.4	0.000865	0.000	0.058	0.058
Manganese	666	3.33	4.2%	3.19	0.103	0.141	0.342	0.327
Mercury	0.00483	0.0000241	85.2%	0.000	110.0	0.000	0.003	0.000
Molybdenum	12	0.0599	91.6%	0.005	0.201	0.055	0.012	0.001
Nickel	15	0.0749	80.0%	0.015	0.109	0.060	0.008	0.002
Sulfate	192,000	959	23.9%	729	0.0000056	229.489	0.005	0.004
TDS	610,000	~~3,047~~	2.0%	~~2,988~~	—	~~59.751~~	0	0
TSS	18,700	~~93.4~~	74.7%	~~23.7~~	—	~~69.746~~	0	0
Zinc	1,430	7.1	85.0%	1.07	0.0469	6.069	0.335	0.050
Totals	—	**2,038**	—	**1,583**	—	**454.9**	**1.788**	**0.895**

The percent removals achievable by chemical precipitation were calculated using the concentrations of untreated and treated CRL from **Table 49**. The calculated percent removals were then applied to Outfall 015's LTA concentrations. This procedure overestimates the removals that would theoretically be achieved using chemical precipitation at Outfall 015 because it does not consider whether similar removals can be achieved at Outfall 015's LTA concentrations. For example, based on the average untreated and average treated concentrations of iron in CRL for the national rulemaking (23,000 µg/L and 110 µg/L, respectively), 99.5% of influent iron is removable by chemical precipitation. However, the LTA concentration of iron at Outfall 015 is 680 µg/L, which may not be removable at the same level because incremental pollutant removals become more difficult at lower influent concentrations.

As shown in **Table 50**, the total pollutant load that would be removed by chemical precipitation is primarily made up of calcium, chloride, and sulfate representing 97.7% of the total pollutant load that would be removed. Those parameters have the lowest TWFs. Iron and zinc removals would represent 2.1% of the total pollutant load removed with the remaining pollutants representing 0.2%. On a TWPE-basis, treatment using chemical precipitation would remove about 0.9 TWPE/year.

Section 5.3.2 of the 2024 TDD for the Steam Electric ELGs includes cost curves to estimate the capital and operation and maintenance ("O&M") costs of using chemical precipitation to treat CRL. Assuming on-site disposal of treatment wastes is not an option for Shell—consistent with the retirement and closure of all waste management units at the site—the following cost curves for off-site disposal are used to estimate the cost of using chemical precipitation to treat the groundwater seep.

CP capital costs with off-site transport/disposal (2023$) = (50.40 × CRL flow (in gpd)) + 10,906,369

CP O&M costs with off-site transport/disposal (2023$/year) = (8.116 × CRL flow (in gpd)) + 321,529

At a discharge flow rate of 0.00164 MGD (1,640 gpd), the capital and O&M costs for a chemical precipitation system are:

CP capital costs with off-site transport/disposal (2023$) = (50.40 × 1,640 gpd) + 10,906,369 = $10,989,025

CP O&M costs with off-site transport/disposal (2023$/year) = (8.116 × 1,640 gpd) + 321,529 = $334,839

Assuming a maximum expected performance life of 20 years and a 7% discount rate[16], the equivalent annual cost ("EAC") of a capital investment of $10,989,025 is:

$$\mathrm{EAC} = \frac{\text{Capital Cost} \times \text{Discount Rate}}{1-(1+\text{Discount Rate})^{-\mathrm{n}}} = \frac{\$10{,}989{,}025 \times 0.07}{1-(1+0.07)^{-20}} = \$1{,}037{,}286$$

The total annual cost of a chemical precipitation system used to treat Outfall 015's effluent is estimated as the sum of the annualized capital costs (*i.e.*, the EAC) and the annual O&M costs: $1,037,286 + $334,839 = $1,372,125 per year. The cost effectiveness of implementing chemical precipitation is the total annualized cost divided by the pollutant load removed per year. The calculations below show the cost effectiveness in terms of raw pollutant load removed and TWPE removed.

$$\frac{\$1{,}372{,}125/\text{year}}{454.9 \text{ pounds removed/year}} = \frac{\$3{,}016}{\text{pound removed}} \text{ (in 2023 Dollars)}$$

$$\frac{\$1{,}372{,}125/\text{year}}{0.9 \text{ TWPE removed/year}} = \frac{\$1{,}524{,}583}{\text{TWPE removed}} \text{ (in 2023 Dollars)}$$

Based on the cost effectiveness of chemical precipitation, the amount of effluent reduction is disproportionate to the cost of the reduction.

5.2 <u>Pollutant Removals and Cost Effectiveness of End-of-Pipe Pump-and-Treat with Ion Exchange ("IX")</u>

Ion exchange is the process of removing undesirable anions and cations from a wastewater by bringing the wastewater in contact with a resin that exchanges the ions in the wastewater with a set of substitute ions. This is classified as an adsorption process because the exchange occurs on the surface of the resin, and the exchanging ion must undergo a phase transfer from solution phase to solid phase. The process has four operations carried out in a complete cycle: service, backwash, regeneration, and rinse. The wastewater generally requires pretreatment to remove suspended solids prior to the ion exchange process. Target influent TSS concentrations are less than 1 mg/L.

[16] See "Regulatory Impact Analysis for Steam Electric Power Generating ELGs", Section 3.1.1, US EPA, September 29, 2015.

The wastewater then passes through a cation and/or anion exchanger containing its associated resin that removes the undesirable ions. The wastewater passes through the resin until the available exchange sites are filled and the contaminant appears in the effluent. This event is defined as the breakthrough point. When this point is reached, the treatment or service cycle is stopped and the bed is backwashed. Washing with water in reverse direction to the service cycle expands and resettles the resin bed. This eliminates channeling that might have occurred during service and removes fines or other materials that may be clogging the bed. Next, the exchanger is regenerated by contacting the resin with a sufficiently concentrated solution of the substitute ion. This converts the resin back to the original form. Finally, the bed is rinsed to remove excess regeneration solution prior to the next service step.

There are a variety of different cation and anion exchangers that form salts of more or less different stabilities with a particular ion. Thus, the choice of a particular ion exchange material will often allow selective separative removal of an ion in solution from another, and afford selective removal of an undesirable ion from a number of innocuous ones. As a general rule, ions with a higher charge will form more stable salts with the exchanger than those with a lower charge, and hence polyvalent species can frequently be selectively removed from a solution containing both polyvalent and monovalent species.[17]

Calcium and magnesium are slightly elevated in the seepage, which could complicate heavy metal removal depending on the type of resin used. A heavy-metal selective weak acid or chelating cation resin would be necessary to selectively remove zinc, and a pre-softening step could be used to remove calcium and magnesium before removing zinc in a successive treatment step. Chloride and sulfate concentrations also are moderately high in the seepage, which could require treatment via anion exchange using a strong base. As part of pre-filtration to reduce influent TSS concentrations, iron and manganese could be removed using greensand filtration, which is commonly used to treat dissolved iron and manganese in groundwater.[18]

Table 51 summarizes the estimated pollutant removals based on the following assumptions:

- pretreatment would be used to reduce calcium, magnesium, chloride, and sulfate concentrations by 75% to reduce concentrations of those pollutants to within an acceptable range for efficient ion exchange
- pre-filtration would reduce TSS concentrations to 1 mg/L and reduce iron and manganese to 20 µg/L
- cation exchange using a zinc-selective resin would remove 99% of zinc
- other pollutants would be unaffected

Table 51. Baseline and Post-Treatment Pollutant Loads for End-of-Pipe Pump and Treat System Using IX

Parameter	Baseline Conc. (µg/L)	Baseline Loads (lb/yr)	% Removal Achievable by IX	Post-Treatment Loads (lb/yr)	TWF	Pollutant Load Removed by IX (lb/yr)	Baseline Loads (TWPE/yr)	Post-Treatment Loads (TWPE/yr)
Calcium	96,500	482	75.0%	121	0.000028	361.553	0.013	0.011
Chloride	99,400	497	75.0%	124	0.000024	372.419	0.012	0.009
Iron	680	3.40	97.0%	0.102	0.0056	3.295	0.019	0.000
Magnesium	13,500	67.4	75.0%	16.9	0.000865	50.580	0.058	0.058
Manganese	666	3.33	97.0%	3.19	0.103	3.227	0.342	0.327
Sulfate	192,000	959	75.0%	240	0.0000056	719.360	0.005	0.004
TSS	18,700	~~93.4~~	74.7%	~~23.7~~	—	~~69.782~~	0	0
Zinc	1,430	7.1	99.0%	1.07	0.0469	7.072	0.335	0.050
Totals †	—	**2,038**	—	**521**	—	**1,518**	**1.788**	**1.04**

† Totals for baseline and post-treatment loads include loads for pollutants that would be unaffected by IX and are not shown.

The total pollutant load that would be removed by IX is primarily made up of calcium, chloride, and sulfate representing 99.1% of the total pollutant load that would be removed. Those parameters have the lowest TWFs. Iron, manganese, and zinc removals would represent less than 1% of the total pollutant load removed. On a TWPE-basis, treatment using IX would remove about 0.748 TWPE/year.

17 "Treatability Manual – Volume III. Technologies for Control/Removal of Pollutants", Section III.3.1.12. U.S EPA Office of Research and Development. September 1981.

18 "Summary Report - Control and Treatment Technology for the Metal Finishing Industry - Ion Exchange". U.S. EPA Industrial Environmental Research Laboratory. June 1981.

An ion exchange system with pretreatment serving a flow of 0.00164 MGD (about 1.1 gpm) is estimated to have a capital cost on the order of $300,000 with annual O&M costs of $50,000.[19] Assuming a maximum expected performance life of 20 years and a 7% discount rate, the EAC of a capital investment of $300,000 is:

$$\text{EAC} = \frac{\text{Capital Cost} \times \text{Discount Rate}}{1 - (1 + \text{Discount Rate})^{-n}} = \frac{\$300{,}000 \times 0.07}{1 - (1 + 0.07)^{-20}} = \$28{,}318$$

The total annual cost of an ion exchange system used to treat Outfall 015's effluent is estimated as the sum of the EAC and the annual O&M costs: $28,318 + $50,000 = $78,318 per year. The cost effectiveness of such a system would be:

$$\frac{\$78{,}318/\text{year}}{1{,}518 \text{ pounds removed/year}} = \frac{\$52}{\text{pound removed}} \text{ (in 2023 Dollars)}$$

$$\frac{\$78{,}318/\text{year}}{0.748 \text{ TWPE removed/year}} = \frac{\$104{,}703}{\text{TWPE removed}} \text{ (in 2023 Dollars)}$$

Based on the cost effectiveness of ion exchange, DEP does not consider the amount of effluent reduction to be disproportionate to the cost of the reduction. However, pollutants removed are predominantly non-toxic cations and anions.

5.3 Pollutant Removals and Cost Effectiveness of End-of-Pipe Pump-and-Treat with Membrane Filtration ("MF")

As explained previously, membrane filtration includes one of the following: microfiltration, ultrafiltration, nanofiltration, reverse osmosis (RO), forward osmosis (FO), and electrodialysis reversal (EDR) membrane systems. To evaluate cost effectiveness, DEP calculated load reductions assuming 99% removal of most pollutants using RO—except for boron, which is less amenable to RO removal at the normal pH of the seep (8.1 S.U.), and cadmium, mercury, molybdenum, and nickel, which are less removable because the concentrations of those metals are already low.

Table 52. Baseline and Post-Treatment Pollutant Loads for End-of-Pipe Pump and Treat System Using MF

Parameter	Baseline Conc. (µg/L)	Baseline Loads (lb/yr)	% Removal Achievable by MF	Post-Treatment Loads (lb/yr)	TWF	Pollutant Load Removed by MF (lb/yr)	Baseline Loads (TWPE/yr)	Post-Treatment Loads (TWPE/yr)
Aluminum	120	0.599	99.0%	0.006	0.0646	0.593	0.039	0.001
Arsenic	22	0.11	99.0%	0.001	3.47	0.109	0.382	0.069
Barium	50	0.25	99.0%	0.003	0.002	0.248	0.000	0.000
Boron	3,594	18.0	40.0%	10.772	0.00834	3.591	0.150	0.150
Cadmium	3.55	0.018	30.0%	0.013	22.8	0.005	0.410	0.211
Calcium	96,500	482	99.0%	4.821	0.000028	477.250	0.013	0.011
Chloride	99,400	497	99.0%	4.966	0.000024	491.593	0.012	0.009
Iron	680	3.40	99.0%	0.034	0.0056	3.363	0.019	0.000
Magnesium	13,500	67.4	99.0%	0.674	0.000865	66.766	0.058	0.058
Manganese	666	3.33	99.0%	0.033	0.103	3.294	0.342	0.327
Mercury	0.00483	0.0000241	0.0%	0.000	110.0	0.000	0.003	0.000
Molybdenum	12	0.0599	50.0%	0.001	0.201	0.059	0.012	0.001
Nickel	15	0.0749	50.0%	0.037	0.109	0.037	0.008	0.002
Sulfate	192,000	959	99.0%	9.591	0.0000056	949.555	0.005	0.004
TDS	610,000	~~3,047~~	99.0%	~~30.5~~	—	~~59.751~~	0	0
TSS	18,700	~~93.4~~	99.0%	0.934	—	~~69.746~~	0	0
Zinc	1,430	7.1	99.0%	0.071	0.0469	6.069	0.335	0.050
Totals	—	**2,038**	—	**31**	—	**2,007**	**1.788**	**0.396**

Permeate streams from membrane filtration systems can be reused within the plant or discharged, while concentrate streams (*i.e.*, concentrated brine) would be disposed of in a landfill using encapsulation/solidification; in a commercial injection well; or through another process, such as thermal system treatment (*e.g.*, SDE).

[19] Samco Technologies, Inc.: https://samcotech.com/how-much-ion-exchange-system-cost/;
U.S. EPA Drinking Water Treatment Technology Unit Cost Models: Drinking Water Treatment Technology Unit Cost Models | US EPA

Sections 5.1.3 and 5.3.3 of the 2024 TDD for the Steam Electric ELGs include cost curves to estimate the capital and operation and maintenance ("O&M") costs of using membrane filtration to treat CRL with chemical precipitation used for pretreatment. Assuming on-site disposal of treatment wastes is not an option for Shell, the following cost curves for off-site disposal are used to estimate the cost of using membrane filtration to treat the groundwater seep.

CP pretreatment capital costs with off-site transport/disposal (2023$) = 52.79 × CRL flow + 10,727,925

CP pretreatment O&M costs with off-site transport/disposal (2023$/year) = 8.200 × CRL flow + 213,413

membrane filtration capital cost with off-site transport/disposal (2023$) = 52.8 × CRL flow (GPD) + 2,438,706

membrane filtration O&M cost with off-site transport/disposal (2023$/year) = 16.9 × CRL flow (GPD) + 681,825

At a discharge flow rate of 0.00164 MGD (1,640 gpd), the capital and O&M costs for a membrane filtration system are:

CP pretreatment capital costs with off-site transport/disposal (2023$) = (52.79 × 1,640 gpd) + 10,727,925 = $10,814,501

CP pretreatment O&M costs with off-site transport/disposal (2023$/year) = (8.200 × 1,640 gpd) + 213,413 = $226,861

membrane filtration capital cost with off-site transport/disposal (2023$) = (52.8 × 1,640 gpd) + 2,438,706 = $2,525,298

membrane filtration O&M cost with off-site transport/disposal (2023$/year) = (16.9 × 1,640 gpd) + 681,825 = $709,541

The capital cost of a membrane filtration system with chemical precipitation pretreatment would be the sum of the constituent capitals costs: $10,814,501 + $2,525,298 = $13,339,799. Assuming a maximum expected performance life of 20 years and a 7% discount rate, the EAC of a capital investment of $13,339,799 is:

$$\text{EAC} = \frac{\text{Capital Cost} \times \text{Discount Rate}}{1 - (1 + \text{Discount Rate})^{-n}} = \frac{\$13{,}339{,}799 \times 0.07}{1 - (1 + 0.07)^{-20}} = \$1{,}259{,}183$$

The total annual cost of a membrane filtration system with chemical precipitation pretreatment used to treat Outfall 015's effluent is estimated as the sum of the EAC and the annual O&M costs: $1,259,183 + $226,861 + $709,541 = $2,195,585 per year. The cost effectiveness of such a system would be:

$$\frac{\$2{,}195{,}585/\text{year}}{2{,}007 \text{ pounds removed/year}} = \frac{\$1{,}094}{\text{pound removed}} \text{ (in 2023 Dollars)}$$

$$\frac{\$2{,}195{,}585/\text{year}}{1.392 \text{ TWPE removed/year}} = \frac{\$1{,}577{,}288}{\text{TWPE removed}} \text{ (in 2023 Dollars)}$$

5.4 Pollutant Removals and Cost Effectiveness of End-of-Pipe Pump-and-Treat with SDE

EPA explained in Section 5.1.4 of the 2024 TDD that, based on feedback from SDE vendors, it is generally more cost effective to implement volume reduction (*i.e.*, MF pretreatment) on wastewater streams above 200 gpm before using SDE. Also, some vendors noted that some costs were only valid up to 150 gpm. Therefore, EPA estimated costs for SDE only for wastewater flows ≤ 150 gpm and separate costs for SDE with MF pretreatment. Costs curves for CRL flows of up to 150 gpm with offsite solids disposal are summarized below:

SDE capital costs with off-site transport/disposal (2023$) = (124 × CRL flow (in gpd)) + 14,717,560

SDE O&M costs with off-site transport/disposal (2023$/year) = (18.1 × CRL flow (in gpd)) + 144,207

At a discharge flow rate of 0.00164 MGD (1,640 gpd), the capital and O&M costs for SDE at the SPMS's fly ash landfill are:

SDE capital costs with off-site transport/disposal (2023$) = (124 × 1,640 gpd) + 14,717,560 = $14,920,920

SDE O&M costs with off-site transport/disposal (2023$/year) = (18.1 × 1,640 gpd) + 144,207 = $173,891

Assuming a maximum expected performance life of 20 years and a 7% discount rate, the EAC of a capital investment of $14,920,920 is:

$$\text{EAC} = \frac{\text{Capital Cost} \times \text{Discount Rate}}{1-(1+\text{Discount Rate})^{-n}} = \frac{\$14{,}920{,}920 \times 0.07}{1-(1+0.07)^{-20}} = \$1{,}408{,}429$$

The total annual cost of an SDE system used to treat Outfall 015's effluent is estimated as the sum of the EAC and the annual O&M costs: $1,408,429 + $173,891 = $1,582,320 per year. The cost effectiveness of such a system would be:

$$\frac{\$1{,}582{,}320/\text{year}}{2{,}038\ \text{pounds removed/year}} = \frac{\$776}{\text{pound removed}}\ (\text{in 2023 Dollars})$$

$$\frac{\$1{,}582{,}320/\text{year}}{1.788\ \text{TWPE removed/year}} = \frac{\$884{,}966}{\text{TWPE removed}}\ (\text{in 2023 Dollars})$$

Cost effectiveness values for the various collection and treatment options are summarized in **Table 53**.

Table 53. Baseline and Post-Treatment Pollutant Loads and Cost Effectiveness or Collection/Treatment Options

Treatment Option	Baseline Load		Post-Treatment Load		Load Removed		Cost Effectiveness	
	lb/year	TWPE/year	lb/year	TWPE/year	lb/year	TWPE/year	2023$/lb removed	2023$/TWPE removed
CP	2,038	1.788	1,583	0.895	454.9	0.893	3,016	1,524,583
IX	2,038	1.788	521	1.04	1,518	0.748	52	104,703
MF	2,038	1.788	31	0.396	2,007	1.392	1,094	1,577,288
SDE	2,038	1.788	0	0	2,038	1.788	776	884,966

5.5 *Economic Achievability*

As discussed, the cost analysis for BAT is an evaluation of the economic achievability of implementing pollution control technologies. EPA's "Work Book for Determining Economic Achievability for National Pollutant Discharge Elimination System Permits", (August 1982) and accompanying "Protocol for Determining Economic Achievability for NPDES Permits" (August 1982) describe procedures to evaluate the economic achievability of implementing water pollution control technologies. Based on EPA's guidance, the economic achievability analysis is a two-part cost test. First, a firm-level analysis is performed that makes use of publicly available information (*e.g.*, Form 10-K SEC filings for publicly traded companies) to evaluate the financial health of a company and its ability to afford treatment systems. Second, if the permittee contests the decision made at the firm level, the permittee can supply plant level data to show that a treatment option that is economical at the firm level is not economical at the plant level. The firm-level methodology has two components: financial statement analysis and market value analysis. The financial statement components analyze a firm's reported values by calculating ratios representing liquidity, solvency, and leverage metrics from publicly available data. This provides a historical perspective of the company's operating performance and asset values. The second component of the firm-level methodology uses stock market data to evaluate a firm's ability to pay for pollution control. Since stock prices reflect investors' expectations of a firm's profitability, they can be used as a proxy for the future performance of a firm.

Shell plc is a vertically integrated multinational oil and gas corporation based out of London, England. The SPMS is operated by Shell Chemical Appalachia LLC, a subsidiary of Shell plc. Shell publishes its Consolidated Financial Statements on its website in yearly reports for each calendar year ("Annual Report and Accounts"). Statements from those reports for 2025, 2024, and 2023 were reviewed to evaluate Shell plc's ability to afford pollution controls (sufficient data for Shell Chemical Appalachia LLC are not available). **Tables 54** and **55** summarize the relevant financial data and firm-level financial ratios calculated for Shell plc for 2025, 2024, and 2023.

Table 54. Select Financial Statement Information for Shell plc

	2025	2024	2023
Non-Current Assets	263,177	259,683	272,155
Current Assets	106,143	118,069	133,164
Inventories	22,216	23,426	26,019
Total Assets	370,350	387,609	406,270
Non-Current (Long-Term) Liabilities	112,616	112,407	122,411
Non-current Debt	66,515	65,448	71,610
Current Liabilities	81,595	88,831	95,160
Current Debt	9,128	11,630	9,931
Total Debt	75,643	77,078	81,541
Total Liabilities	195,031	207,441	217,908

Table 54 (cont'd). Select Financial Statement Information for Shell plc

	2025	2024	2023
Total Revenue and Other Income	273,731	289,029	323,183
Depreciation, Depletion & Amortization	25,299	26,872	31,290
Interest Expense	4,671	4,787	4,673
Total Expenditure	243,975	259,107	290,556
Income before taxation	29,756	29,922	32,627
Taxation charge	11,637	13,401	12,991
Net income	18,119	16,521	19,636
EBIT	34,427	34,709	37,300
EBITDA	59,726	61,581	68,590
Equity Attributable to Shell plc shareholders	174,392	178,307	186,607
Cash flow from operating activities	42,863	54,687	54,191
Pollution Control Capital Cost	11.579	11.280	10.989
Annual O&M Expenditures	0.353	0.344	0.335

All values reported in millions of dollars. Not all financial statement figures are reported in this table. The presented totals are not necessarily the sum of any sub-totals shown. Refer to Shell's Consolidated Financial Statements for complete info.

† Pollution control costs for 2025 and 2024 were estimated by escalating 2023 costs by 2.65% per year.

Table 55. Firm-Level Financial Ratios for Shell plc

Ratio and Formula	2025	2024	2023
Liquidity Ratios – reflect a firm's ability to meets its short-term financial obligations			
Current Ratio = Current Assets ÷ Current Labilities	1.30	1.33	1.40
Quick Ratio = (Current Assets – Inventory) ÷ Current Liabilities	1.03	1.07	1.13
Solvency Ratios – measure a firm's ability to meet long-term financial obligations and indicate the likelihood of bankruptcy			
Interest Coverage Ratio = EBIT ÷ Interest Expense	7.37	7.25	7.98
Debt/Cash Flow Ratio = Total Debt ÷ Operating Cash Flow	1.76	1.41	1.50
Leverage Ratio – measure the proportion of a company's value that is financed by debt relative to the proportion that is financed by stockholders			
Debt/Equity Ratio = Total Liabilities ÷ Total Shareholders' Equity	1.12	1.16	1.17

A review of Shell plc's financial ratios in **Table 55** compared to industry norms indicate that, at the firm level, the company can meet its short and long-term financial obligations and that it maintains a manageable debt profile.

To adjust the ratios for the cost of control equipment, it is conservatively assumed that the cost will be financed partly with debt (in amounts proportional to Shell plc's Debt/Equity Ratio). Generally, any additional expenditure serves to decrease operating cash flow and, with an increase in debt, the Debt/Cash Flow Ratio and the Debt/Equity Ratio both would increase. Adjusting the ratios in **Table 55** to account for the estimated pollution control cost results in no change to any of the ratios within the number of significant figures presented. At the firm level, based on the financial statement analysis, all technologies are affordable.

The Market Value Analysis is described in EPA's "Work Book for Determining Economic Achievability for National Pollutant Discharge Elimination System Permits" as follows:

> Stock prices are based on the opinions of many analysts evaluating the discounted net present value (NPV) of the firm's future cash flows. As such, they reflect investor's expectations of the future profitability of the firm and constitute a single-number surrogate for a series of projected future financial statements. Since there are many security analysts paid to conduct these evaluations for investors who value such profit opportunity information very highly, we can expect that the stock's market price is a very good synthesis of exactly the analysis which could be done rigorously for EPA.
>
> Since any EPA-imposed pollution control expense will have only negative value as investments for the permit applicant, those costs will flow straight through to reductions in net income and, hence, to equity value (net of tax effects). The stock price thus provides an upper bound on the NPV of the expense which may be borne without inducing bankruptcy. […]
>
> A necessary step for calculating the impact on stock value is the estimation of the NPV of the control device. This may be approximated as the cost of the device plus the present value of the device's operating expenses discounted

at the cost of equity. This is because the cash flows to an investment in pollution control are correlated with the level of production of the firm: the determinants of cash flows to equity shareholders. Since the stock price reflects the net present value of expected future cash flows, subtracting the after-tax NPV of pollution control costs from the market value provides an estimate of the impact of the device on the present value of future cash flows. In essence, the difference between market value and the NPV of control is what the firm's market value would be if the control were required.

DEP calculated the after-tax present value of the four treatment options in 2025 dollars using the following formula from EPA's guidance:

$$PV = MTR\left[C + \sum_{t=0}^{L-1}\left[\frac{OM \times (1-g)^t}{\left(1 + (r_f + \beta(r_m - r_f))\right)^t}\right]\right]$$

where:

- C = Capital cost of equipment
- OM = Annual operating and maintenance cost
- L = Estimated life of equipment (20 years)
- g = Expected rate of growth in operating cost (0.1)
- β = Company beta (stock price volatility vs. market) (0.82)
- r_f = Risk free rate (4.42%)
- r_m = Market rate (8.6%)
- MTR = Marginal tax rate (28.49%)

"[$r_m - r_f$]" also is known as the Equity Risk Premium, which is the excess return investors expect to earn from investing in the stock market over a risk-free asset

Table 55 summarizes the present value, the after-tax present value, and the percentage of Shell plc's 52-week high and low market value for each treatment option.

Table 56. Market Value Analysis Results

Treatment Option	Present Value ($ million)	After Tax Present Value ($ million)	Present Value Cost of Control After Tax as a Percentage of Market Value (52-Week High)	Present Value Cost of Control After Tax as a Percentage of Market Value (52-Week Low)
CP	19.121	13.674	0.00518%	0.00746%
IX	1.514	1.083	0.00041%	0.00059%
MF	36.082	25.802	0.00978%	0.01408%
SDE	19.144	13.690	0.00519%	0.00747%

Based on the market value analysis, all evaluated treatment options are affordable. Plant-level data are not available to evaluate affordability at that level.

6. *Non-Water Quality Environmental Impacts (Including Energy Requirements) ("NWQEIs")*

In EPA's "Methodology for Estimating NWQEI for the 2024 Final Steam Electric ELGs – DCN SE11782", EPA estimated annual energy consumption for the treatment of CRL using chemical precipitation (CP), membrane filtration (MF) with encapsulation, crystallization, and deep well injection, and SDE using power requirement curves based on the flow rate of CRL. Annual energy requirements for each of those options are shown below. Per EPA, the annual energy consumption for MF with deep well injection is based on MF alone because EPA expects that plants will dispose of brine at existing off-site injection wells. Ion exchange was not evaluated by EPA as part of the Steam Electric ELGs, but the energy use for ion exchange is expected to be comparable to MF.

CP Annual Energy Consumption (MWh) = $((3\times10^{-7} \times \text{CRL Flow (gpd)}) + 0.0145) \times 24$ hours per day × 365 days per year

$= ((3\times10^{-7} \times 1{,}640 \text{ gpd}) + 0.0145) \times 24 \times 365 = 131$ MWh

MF with Encapsulation (MWh) = CP Annual Energy Consumption (MWh) + ((0.01 × CRL Flow (GPD)) + 442)

= 131 + ((0.01 × 1,640 gpd) + 442) = 589.4 MWh

MF with Crystallization (MWh) = CP Annual Energy Consumption (MWh) + ((0.175 × CRL Flow (GPD)) + 38,384)

= 131 + ((0.175 × 1,640 gpd) + 38,384) = 38,802 MWh

MF with Deep Well Injection (MWh) = CP Annual Energy Consumption (MWh) + (0.006 × CRL Flow (GPD) + 360)

= 131 + ((0.006 × 1,640 gpd) + 360) = 370 MWh

SDE Annual Energy Consumption (MWh) = (0.0404 × CRL Flow (GPD)) + 13.2

= (0.0404 × 1,640 gpd)) + 13.2 = 79 MWh

EPA's NWQEI methodology includes formulas and/or descriptions for estimating fuel consumption, air emissions, and solid waste generation. However, some of the information used in those formulas (*e.g.*, flow-normalized solids generation rates, number of trips taken by offsite waste disposal trucks, etc.) that would enable their use for a site-specific evaluation is confidential business information or otherwise is not available in the rulemaking record. The rulemaking record does include unit-by-unit summaries of the fuel consumption, air emissions, and solids generated for each of the technology options EPA considered. DEP selected a surrogate unit (Plant 270, SE Unit-1) to estimate NWQEIs for two treatment options as shown in **Table 57**. NWQEIs for membrane filtration (other than energy use) are expected to be closer to the estimates for SDE with NWQEIs for ion exchange falling somewhere in between CP and MF.

Table 57. Estimated NWQEIs for Outfall 015 (CP & SDE)

Treatment Option	Energy (MWh)	Fuel (gallons/year)	Solids Generation (tons/year)	Air Emissions Associated with Transportation			
				NOx (ton/mi)	SO_2 (ton/mi)	CO_2 (ton/mi)	CH_4 (ton/mi)
CP	131	2.2	50	0.000042	0.00000006	0.0183	0.000000208
SDE	79	5.5	125	0.000105	0.00000015	0.0046	0.000000520

7. *Conclusions*

Based on DEP's evaluation of the factors required to develop case-by-case TBELs using BPJ, DEP identifies IX as BPT and BAT. With respect to cost-benefit, IX is the most cost-effective treatment option. IX is typically used to treat groundwater for drinking water purposes and it would be employed in a similar manner for Outfall 015 by removing common groundwater constituents (*e.g.*, calcium and magnesium) to facilitate effective removal of toxic zinc and nonconventional iron and manganese. IX units are compact and easy to automate compared to conventional precipitation systems that require pH control systems, flocculant feed systems, clarifiers, and sludge dewatering facilities.

Chemical precipitation was not selected due to its more extensive space requirements and solids generation that primarily reflects the removal of non-toxic pollutants and less effective treatment for toxic zinc compared to IX. Membrane filtration was not selected due to high rejection rates compared to IX for similar treatment effectiveness for target pollutants. SDE was not selected due to its substantial solids generation—also primarily reflecting the removal of non-toxic pollutants.

Among the POCs previously identified, DEP is selecting zinc for regulation. Zinc is the toxic priority pollutant present in the highest concentrations in the seep and will act as an indicator for the removal of other constituents to the extent that pretreatment is necessary to ensure zinc is effectively removed. Effluent limits for zinc are calculated by first determining the long-term average effluent concentration that represents the performance of IX ("$LTA_{Zn\text{-}IX}$"). Consistent with **Table 51**, this value is calculated assuming 99% removal of the long-term average concentration of zinc in the untreated seep.

$$LTA_{Zn\text{-}IX} = C_{SEEP} - (C_{SEEP} \times 0.99) = 1{,}430\ \mu g/L - (1{,}430\ \mu g/L \times 0.99) = 14.3\ \mu g/L$$

Based on EPA's procedures for deriving effluent limits, monthly average and maximum daily limits are calculated based on the 95^{th} and 99^{th} percentile of a lognormal distribution of effluent data, respectively. A dataset representing the quality of seepage treated by IX is not available, so the coefficient of variation (CV) of a lognormal distribution of untreated zinc concentrations is used in combination with $LTA_{Zn\text{-}IX}$ to derive monthly average and maximum daily limits. The calculations take the following form:

Maximum Daily Limit = $LTA_{Zn\text{-}IX} \times e^{\wedge}[z\sigma - 0.5\sigma^2]$

where: $\sigma^2 = \ln[CV^2 + 1]$
z = 2.326 for the 99^{th} percentile occurrence probability

Average Monthly Limit = $LTA_{Zn\text{-}IX} \times e^{\wedge}[z\sigma_n - 0.5\sigma_n^2]$

where: $\sigma_n^2 = \ln[CV^2/n + 1]$
z = 1.645 for the 95^{th} percentile occurrence probability
n = number of samples per month

The CV of a lognormal distribution of untreated zinc concentrations is about 1.8. Assuming samples are collected 1/month, TBELs for zinc are calculated as follows:

Maximum Daily Limit = 14.3 µg/L × 7.95 = 114 µg/L

Average Monthly Limit = 14.3 µg/L × 3.51 = 50 µg/L

Regulatory Effluent Standards and Monitoring Requirements

Flow monitoring is required in accordance with 25 Pa. Code § 92a.61(d)(1). Effluent standards for pH (6.0 minimum and 9.0 maximum) is imposed at Outfall 015 based on 25 Pa. Code § 95.2(1).

Per- and Polyfluoroalkyl Substances (PFAS)

As discussed in Section 101.A of this Fact Sheet, DEP implemented a new monitoring initiative for PFAS in February 2024. In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] 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. Shell submitted storm water results for Outfall 015 using Module 1 of the application, which does not prompt applicants to report results for PFOA, PFOS, PFBS, and HFPO-DA. Therefore, it is unknown whether Outfall 015 discharges PFAS.

Consistent with Section II.I.a of SOP No. BCW-PMT-032, DEP requires monitoring for PFOA, PFOS, PFBS, and HFPO-DA regardless of whether those compounds are present in a discharge. The only difference is monitoring frequency: quarterly for any detections among application samples and yearly if there are not detections among application samples. Current and historical operations performed near Outfall 015 are not known or suspected of containing PFAS, so yearly monitoring for PFOA, PFOS, PFBS, and HFPO-DA will be required at Outfall 015. As stated in Section II.I.c of the SOP, if non-detect values at or below DEP's Target QLs are reported for four consecutive monitoring periods (*i.e.*, four consecutive quarterly results), then the monitoring may be discontinued.

015.B. Water Quality-Based Effluent Limitations (WQBELs)

Reasonable Potential Analysis and WQBEL Development for Outfall 015

Discharges from Outfall 015 are evaluated based on concentrations reported on the application. The TMS model is run with the modeled discharge and receiving stream characteristics shown in **Table 58**. Pollutants for which specific water quality criteria have not been promulgated (*e.g.*, TSS, Oil and Grease, etc.) are excluded from the modeling. Modeling is performed using the most stringent of DEP's water quality criteria in Chapter 93 and ORSANCO's water quality criteria from ORSANCO's Pollution Control Standards (2019 Revision).

Table 58. TMS Inputs for Outfall 015

Discharge Characteristics		
Parameter		**Value**
Discharge Flow (MGD)		0.00164
Discharge Hardness (mg/L)		260
Discharge pH (S.U.)		8.1
Receiving Stream Characteristics		
Parameter	**Outfall 001**	**End of**
Stream Code	32317	32317
River Mile Index	953.7	951.71
Drainage Area (mi^2)	22,771.5	22772.85
Q_{7-10} (cfs)	4,730	see results
Elevation (ft)	681.9	681.67
Slope (ft/ft)	0.0001	0.0001
Average Width (ft)	240	240
Average Depth (ft)	15	15
PWS Withdrawal (MGD)	—	216

Stream hardness (90.8 mg/L) and pH (7.6 S.U.) are based on water quality data from Water Quality Network Station 702 – Ohio River at Sewickley, PA. The Q_{7-10} and harmonic mean flows of the Ohio River are given in ORSANCO's Pollution Control Standards (2019) as 4,730 cfs, and 16,200 cfs, respectively. The nearest downstream potable water supply intake (BVPV Styrenics) is included as the downstream point in the TMS. Additionally, a partial mix factor of 0.2 is applied to the minimum regulated flow of the Ohio River for chronic criteria based on DEP's best professional judgment. DEP uses partial mix factors (PMFs) in the TMS to represent the fractional portion of the receiving stream that mixes with a discharge. A PMF of 0.2 provides the permittee with 20% of the receiving stream's Q_{7-10} flow for mixing and dilution. The PMF is manually applied because, as a single discharge model, the TMS allocates high percentages of stream flow to individual discharges, which often results in those discharges being modeled with most or all a stream's assimilative capacity. This would leave little or no assimilative capacity for other dischargers to the same receiving stream.

Output from the TMS model is included in **Attachment G** to this Fact Sheet. As explained previously, the TMS compares the input discharge concentrations to the calculated WQBELs using DEP's reasonable potential thresholds to evaluate the need to impose WQBELs or monitoring requirements in the permit. The results of the modeling indicate that the water quality-based reporting requirements are required for total mercury. Mercury is already subject to reporting requirements

Table 59. Water Quality-Based Effluent Limits and Monitoring Requirements for Outfall 015

Parameter	Permit Limits			Discharge Conc. (µg/L)	Target QL (µg/L)	Governing WQBEL	Governing WQBEL Basis†
	Avg Mo. (µg/L)	Max Daily (µg/L)	IMAX (µg/L)				
Total Aluminum	Report	Report	Report	190	0.2	750	AFC
Mercury, Total (ng/L)	Report	Report	Report	4.83 ††	0.2	12.0	THH

† AFC = Acute Fish Criterion; CFC = Chronic Fish Criterion; THH = Threshold Human Health; CRL = Cancer Risk Level

†† The discharge concentration for Total Mercury is based on the average of a lognormal distribution of quarterly results reported through eDMR and Shell's supplemental analytical results reported in its pre-draft survey response.

Outfall 015 is already subject to a reporting requirement for Total Mercury, so that requirement will be maintained. Reporting for Total Aluminum will be added to the quarterly monitoring requirements.

015.C. Modification Requests

In October 2024, DEP received requests from several Non-Governmental Organizations and numerous individuals (hereafter "Requesters") to modify various aspects of Shell's NPDES permit. With respect to Outfall 015, the requests included the following:

- add case-by-case technology-based zinc
- add monthly PFAS monitoring

DEP has imposed case-by-case BAT TBELs for zinc and yearly monitoring for PFOA, PFOS, PFBS, and HFPO-DA at Outfall 015.

015.D. Effluent Limitations and Monitoring Requirements for Outfall 015

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61 and anti-backsliding requirements under Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l), requirements for discharges from Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements developed for this permit renewal; and effluent limits and monitoring requirements from the previous permit, subject to any exceptions to anti-backsliding discussed previously in this Fact Sheet. Applicable requirements are summarized in the following table.

Table 60. Effluent Limits and Monitoring Requirements for Outfall 015

Pollutant	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(b)
Total Suspended Solids	—	—	30.0	100.0	—	40 CFR 122.44(l)
Oil and Grease	—	—	15.0	20.0	—	40 CFR 122.44(l)
pH	—	—	6.0 (Inst. Min)	—	9.0	25 Pa. Code § 95.2(1)
Aluminum, Total						
Antimony, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Arsenic, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Boron, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Cadmium, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Iron, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Lead, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Manganese, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Mercury, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Nickel, Total	—	—	—	Report	—	25 Pa. Code § 92a.61

Table 60 (cont'd). Effluent Limits and Monitoring Requirements for Outfall 015

Pollutant	Mass (pounds/day)		Concentration (mg/L)			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant Maximum	
Selenium, Total	—	—	—	Report	—	25 Pa. Code § 92a.61
Zinc, Total	—	—	0.05	0.114	—	25 Pa. Code § 92a.48(a)(3)
Perfluorooctanoic acid (PFOA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorooctanesulfonic acid (PFOS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Perfluorobutanesulfonic acid (PFBS) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)
Hexafluoropropylene oxide dimer acid (HFPO-DA) (ng/L)	—	—	—	Report	—	25 Pa. Code § 92a.61(b)

The monitoring frequency for TSS, oil and grease, and pH will be 2/quarter using grab sampling. Metals will require 1/quarter grab sampling except for zinc, which must be sampled 1/month using grab sampling. Flow must be estimated 1/month at the time of sampling.

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachments B, F, and G)
☒	TRC Model Spreadsheet (see Attachment D)
☒	Temperature Model Spreadsheet (see Attachment C)
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☒	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: Standard Operating Procedure (SOP) for Clean Water Program – Establishing Water Quality-Based Effluent Limitations (WQBELs) and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers, SOP No. BCW-PMT-037, May 20 2021.
☒	SOP: Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits, SOP No. BCW-PMT-032, February 5, 2024.
☒	SOP: Standard Operating Procedure (SOP)1 for Clean Water Program – New and Reissuance Industrial Waste and Industrial Stormwater Individual NPDES Permit Applications, SOP No. BCW-PMT-001, December 9, 2025.
☐	Other:

ATTACHMENT A

OCPSF Development Document – Non-Process Wastewaters Regulated as Process Wastewaters

TABLE VII-50.
CONTAMINATED AND UNCONTAMINATED MISCELLANEOUS "NONPROCESS" WASTEWATERS REPORTED IN THE 1983 SECTION 308 QUESTIONNAIRE

Contaminated "Nonprocess" Wastewaters (therefore designated as process wastewater)	Uncontaminated Nonprocess Wastewaters
Air Pollution Control Wastewater (B5)	Non-Contact Cooling Water (B1)
Sanitary (receiving biological treatment) (B4)	Sanitary (no biological treatment, direct discharge) (B4)
Boiler Blowdown	Cooling Tower Blowdown (B2)
Sanitary (indirect discharge)	Stormwater Site Runoff (B3)
Steam Condensate	Deionized Water Regeneration
Vacuum Pump Seal Water	Miscellaneous Wastewater (conditional)
Wastewater Stripper Discharge	Softening Regeneration
Bi from Vertac	Ion Exchange Regeneration
Boiler Feedwater Lime	River Water intake
Softener Blowdown	Make-up Water
Contaminated Water Offsite	Fire Water Make-up
Condensate	Tank Dike Water
Storage, Lans, Shops	Demineralizer Regenerant
Laboratory Waste	Dilution Water
Steam Jet Condensate	Condensate Losses
Water Softener Backwashing	Shipping Drains
Miscellaneous Lab Wastewater	Water Treatment Blowdown
Raw Water Clarification	Cooling Tower Overflow
Landfill Leachate	Chilled Water Sump Overflow
Water Treatment	Air Compressor and Conditioning Blow
Technical Center	Firewall Drainings
Scrubber Water	Other Non-contact Cooling
Utility Streams	Miscellaneous Leaks and Drains
Washdown N-P Equipment	Boiler House Softeners
Contact Cooling Water	Fire Pond Overflow
Vacuum Steam Jet Blowdown	Boiler Regeneration Backwash
Densator Blowdown	Groundwater (Purge)
Bottom Ash-Quench Water	Firewater Discharge
Demineralizer Washwater	Freeze Protection Water

TABLE VII-50.
CONTAMINATED AND UNCONTAMINATED MISCELLANEOUS "NONPROCESS" WASTEWATERS
REPORTED IN THE 1983 SECTION 308 QUESTIONNAIRE
(Continued)

Contaminated "Nonprocess" Wastewaters (therefore designated as process wastewater)	Uncontaminated Nonprocess Wastewaters
Water Softening Backwash	H_2 and CO Generation
Lab Drains	Demineralizer Spent Regenerants
Closed Loop Equipment Overflow	Lime Softening of Process
Filter Backwash	Miscellaneous Service Water
Demineralizer Wastewater	Recirculating Cooling System
Laboratory Offices	HVAC Blowdown Lab Utility
Demineralizer Blowdown	Condenser Water Backwash
Utility Clarifier Blowdown	Deonfler Regenerant
Steam Generation	Raw Water Filter Backwash
RO Rejection Water	Distribution
Power House Blowdown	
Inert Gas Gen. Blowdown	
Contaminated Groundwater	
Potable Water Treatment	
Unit Washes	
Non-Contact Floor Cleaning	
Slop Water from Dist. Facilities	
Laboratory and Vacuum Truck	
Ion Bed Regeneration	
Tankcar Washing (HCN)	
Film Wastewater	
Generator Blowdown	
Air Sluice Water	
Research and Development	
Quality Control	
Steam Desuperheating	
Pilot Plant	
Other Company Off-site Waste	
Ion Exchange Resin Rinse	

TABLE VII-50.
CONTAMINATED AND UNCONTAMINATED MISCELLANEOUS "NONPROCESS" WASTEWATERS
REPORTED IN THE 1983 SECTION 308 QUESTIONNAIRE
(Continued)

Contaminated "Nonprocess" Wastewaters (therefore designated as process wastewater)	Uncontaminated Nonprocess Wastewaters
Iron Filter Backwash	
Area Washdown	
Vacuum Pump Wastewater	
Garment Laundry	
Hydraulic Leaks	
Grinder Lubricant	
Utility Area Process	
Contact Rainwater	
Alum Water Treatment	
Incinerator H_2O	
Product Wash	
Backflush from Demineralizer	
Water Clarifier Blowdown	
Water Treatment Filter Wash	
Equipment Cooling H_2O	
Belt Filter Wash	
Ejector	
OCPSF Flow from Another Plant	

ATTACHMENT B

Toxics Management Spreadsheet Results for Outfall 001

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Toxics Management Spreadsheet
Version 1.4, May 2025

Discharge Information

Instructions | Discharge | Stream

Facility: **Shell Polymers Monaca Plant** NPDES Permit No.: **PA0002208** Outfall No.: **001**

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

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
2.7	343	7.47	0.067	0.2	0.2	0.2		

	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
Group 1	Total Dissolved Solids (PWS)	mg/L		4400		183.69			0.25				
	Chloride (PWS)	mg/L		720		25.372			0.3315				
	Bromide	mg/L		6.7									
	Sulfate (PWS)	mg/L		1757.5		53.875	0.5088		0.308				
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		1.4		492.49	0.97		1.1196				
	Total Antimony	µg/L		1.8									
	Total Arsenic	µg/L		2.2									
	Total Barium	µg/L		160		42.946			0.1895				
	Total Beryllium	µg/L	<	0.27									
	Total Boron	µg/L		230									
	Total Cadmium	µg/L		0.34									
	Total Chromium (III)	µg/L		1.8									
	Hexavalent Chromium	µg/L		6			1.6863						
	Total Cobalt	µg/L		1.4									
	Total Copper	µg/L		10		2.881	0.4499		0.602				
	Free Cyanide	µg/L		11									
	Total Cyanide	µg/L		11									
	Dissolved Iron	µg/L		0.11									
	Total Iron	µg/L		1200		1187.6			1.1379				
	Total Lead	µg/L		0.89		1.6109			0.8542				
	Total Manganese	µg/L		470									
	Total Mercury	ng/L		18.8		2.2421	1.0443		0.6508				
	Total Nickel	µg/L		15									
	Total Phenols (Phenolics) (PWS)	µg/L		30									
	Total Selenium	µg/L		2.5									
	Total Silver	µg/L	<	0.79									
	Total Thallium	µg/L		0.69									
	Total Zinc	µg/L		110		25.73			0.3321				
	Total Molybdenum	µg/L		20									
	Acrolein	µg/L	<	3									
	Acrylamide	µg/L	<	210									
	Acrylonitrile	µg/L	<	1.1									
	Benzene	µg/L		3									
	Bromoform	µg/L	<	10									

Group 3	Carbon Tetrachloride	µg/L	<	3									
	Chlorobenzene	µg/L	<	3									
	Chlorodibromomethane	µg/L	<	2									
	Chloroethane	µg/L	<	3									
	2-Chloroethyl Vinyl Ether	µg/L	<	3									
	Chloroform	µg/L		6.6									
	Dichlorobromomethane	µg/L		2									
	1,1-Dichloroethane	µg/L	<	3									
	1,2-Dichloroethane	µg/L	<	3									
	1,1-Dichloroethylene	µg/L	<	3									
	1,2-Dichloropropane	µg/L	<	3									
	1,3-Dichloropropylene	µg/L	<	2									
	1,4-Dioxane	µg/L	<	43									
	Ethylbenzene	µg/L	<	4									
	Methyl Bromide	µg/L	<	3									
	Methyl Chloride	µg/L	<	5.5									
	Methylene Chloride	µg/L	<	3									
	1,1,2,2-Tetrachloroethane	µg/L	<	3									
	Tetrachloroethylene	µg/L	<	3									
	Toluene	µg/L	<	3									
	1,2-trans-Dichloroethylene	µg/L	<	7									
	1,1,1-Trichloroethane	µg/L	<	3									
	1,1,2-Trichloroethane	µg/L	<	3									
	Trichloroethylene	µg/L	<	3									
	Vinyl Chloride	µg/L	<	3									
Group 4	2-Chlorophenol	µg/L	<	2.3									
	2,4-Dichlorophenol	µg/L	<	0.53									
	2,4-Dimethylphenol	µg/L	<	6.1									
	4,6-Dinitro-o-Cresol	µg/L	<	15									
	2,4-Dinitrophenol	µg/L	<	34									
	2-Nitrophenol	µg/L	<	2									
	4-Nitrophenol	µg/L	<	9.8									
	p-Chloro-m-Cresol	µg/L	<	4.5									
	Pentachlorophenol	µg/L	<	8.8									
	Phenol	µg/L	<	5.1									
	2,4,6-Trichlorophenol	µg/L	<	2.3									
Group 5	Acenaphthene	µg/L	<	0.68									
	Acenaphthylene	µg/L		0.68									
	Anthracene	µg/L	<	0.51									
	Benzidine	µg/L	<	9									
	Benzo(a)Anthracene	µg/L	<	0.78									
	Benzo(a)Pyrene	µg/L	<	0.55									
	3,4-Benzofluoranthene	µg/L	<	1									
	Benzo(ghi)Perylene	µg/L	<	0.72									
	Benzo(k)Fluoranthene	µg/L	<	0.92									
	Bis(2-Chloroethoxy)Methane	µg/L	<	1.6									
	Bis(2-Chloroethyl)Ether	µg/L	<	0.42									
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.058									
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	6.1									
	4-Bromophenyl Phenyl Ether	µg/L	<	3.3									
	Butyl Benzyl Phthalate	µg/L	<	0.92									
	2-Chloronaphthalene	µg/L	<	0.61									
	4-Chlorophenyl Phenyl Ether	µg/L	<	2.3									
	Chrysene	µg/L	<	0.84									
	Dibenzo(a,h)Anthrancene	µg/L	<	0.75									
	1,2-Dichlorobenzene	µg/L	<	2.2									
	1,3-Dichlorobenzene	µg/L	<	2.2									
	1,4-Dichlorobenzene	µg/L	<	2.5									
	3,3-Dichlorobenzidine	µg/L	<	0.57									
	Diethyl Phthalate	µg/L	<	5.9									
	Dimethyl Phthalate	µg/L		3.4									
	Di-n-Butyl Phthalate	µg/L	<	51									
	2,4-Dinitrotoluene	µg/L	<	3.7									

	2,6-Dinitrotoluene	µg/L	<	1.8
	Di-n-Octyl Phthalate	µg/L	<	7.1
	1,2-Diphenylhydrazine	µg/L	<	2
	Fluoranthene	µg/L	<	0.63
	Fluorene	µg/L	<	0.72
	Hexachlorobenzene	µg/L	<	0.58
	Hexachlorobutadiene	µg/L	<	0.068
	Hexachlorocyclopentadiene	µg/L	<	5.2
	Hexachloroethane	µg/L	<	1.4
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.89
	Isophorone	µg/L	<	2
	Naphthalene	µg/L		0.61
	Nitrobenzene	µg/L	<	5.2
	n-Nitrosodimethylamine	µg/L	<	2.7
	n-Nitrosodi-n-Propylamine	µg/L	<	0.74
	n-Nitrosodiphenylamine	µg/L	<	1.2
	Phenanthrene	µg/L	<	1.6
	Pyrene	µg/L	<	0.56
	1,2,4-Trichlorobenzene	µg/L	<	3
Group 6	Aldrin	µg/L	<	0.014
	alpha-BHC	µg/L	<	0.0095
	beta-BHC	µg/L	<	0.015
	gamma-BHC	µg/L	<	0.012
	delta BHC	µg/L	<	0.026
	Chlordane	µg/L	<	0.29
	4,4-DDT	µg/L	<	0.028
	4,4-DDE	µg/L	<	0.029
	4,4-DDD	µg/L	<	0.021
	Dieldrin	µg/L	<	0.011
	alpha-Endosulfan	µg/L	<	0.6
	beta-Endosulfan	µg/L	<	0.038
	Endosulfan Sulfate	µg/L	<	0.026
	Endrin	µg/L	<	0.0091
	Endrin Aldehyde	µg/L	<	0.021
	Heptachlor	µg/L	<	0.018
	Heptachlor Epoxide	µg/L	<	0.014
	PCB-1016	µg/L	<	0.19
	PCB-1221	µg/L	<	0.23
	PCB-1232	µg/L	<	0.21
	PCB-1242	µg/L	<	0.14
	PCB-1248	µg/L	<	0.32
	PCB-1254	µg/L	<	0.18
	PCB-1260	µg/L	<	0.16
	PCBs, Total	µg/L	<	1.43
	Toxaphene	µg/L	<	0.047
	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		
	1,2,4,5-Tetrachlorobenzene	µg/L	<	0.49
	Pentachlorobenzene	µg/L	<	1.596

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Toxics Management Spreadsheet
Version 1.4, May 2025

Stream / Surface Water Information

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: **Ohio River**

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	032317	952.7	681.85	22771.8	0.0001		Yes
End of Reach 1	032317	951.71	681.67	22772.85	0.0001	216	Yes

Q_{7-10}

Location	RMI	LFY	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
		(cfs/mi²)*	Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	952.7	0.1	4730			240	15					97.55	7.6		
End of Reach 1	951.71	0.1													

Q_h

Location	RMI	LFY	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
		(cfs/mi²)	Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	952.7		16200												
End of Reach 1	951.71														

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Toxics Management Spreadsheet
Version 1.4, May 2025

Model Results

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 001

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

☑ ***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)
952.7	4,730		4,730	4.177	0.0001	15.	240.	16.	1.315	0.046	135.658
951.71	4730.105	334.152	4395.953								

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)
952.7	16,200		16,200	4.177	0.0001	25.776	240.	9.311	2.619	0.023	60.297
951.71	12101.129	334.152	11766.98								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.067 Analysis Hardness (mg/l): 100.74 Analysis pH: 7.60

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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		0	750	750	-5.20E+04	
Total Antimony	0	0		0	1,100	1,100	84,559	
Total Arsenic	0	0		0	340	340	26,136	Chem Translator of 1 applied
Total Barium	42.94629	0.1895		0	21,000	21,000	1,609,953	
Total Boron	0	0		0	8,100	8,100	622,664	
Total Cadmium	0	0		0	2.028	2.15	165	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	573.228	1,814	139,447	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	1,252	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	7,303	
Total Copper	2.881	0.602		0	13.533	14.1	616	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	1,691	

Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	65.104	82.4	6,022	Chem Translator of 0.79 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		0	1.400	1.65	126	Chem Translator of 0.85 applied
Total Nickel	0	0		0	471.177	472	36,293	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	3.258	3.83	295	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	4,997	
Total Zinc	25.72979	0.3321		0	117.918	121	6,114	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	231	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	650	650	49,967	
Benzene	0	0		0	640	640	49,198	
Bromoform	0	0		0	1,800	1,800	138,370	
Carbon Tetrachloride	0	0		0	2,800	2,800	215,242	
Chlorobenzene	0	0		0	1,200	1,200	92,246	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	1,383,697	
Chloroform	0	0		0	1,900	1,900	146,057	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	1,153,081	
1,1-Dichloroethylene	0	0		0	7,500	7,500	576,540	
1,2-Dichloropropane	0	0		0	11,000	11,000	845,593	
1,3-Dichloropropylene	0	0		0	310	310	23,830	
Ethylbenzene	0	0		0	2,900	2,900	222,929	
Methyl Bromide	0	0		0	550	550	42,280	
Methyl Chloride	0	0		0	28,000	28,000	2,152,418	
Methylene Chloride	0	0		0	12,000	12,000	922,465	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	76,872	
Tetrachloroethylene	0	0		0	700	700	53,810	
Toluene	0	0		0	1,700	1,700	130,682	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	522,730	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	230,616	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	261,365	
Trichloroethylene	0	0		0	2,300	2,300	176,806	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	43,048	
2,4-Dichlorophenol	0	0		0	1,700	1,700	130,682	
2,4-Dimethylphenol	0	0		0	660	660	50,736	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	6,150	
2,4-Dinitrophenol	0	0		0	660	660	50,736	
2-Nitrophenol	0	0		0	8,000	8,000	614,976	
4-Nitrophenol	0	0		0	2,300	2,300	176,806	
p-Chloro-m-Cresol	0	0		0	160	160	12,300	
Pentachlorophenol	0	0		0	15.911	15.9	1,223	
Phenol	0	0		0	N/A	N/A	N/A	

2,4,6-Trichlorophenol	0	0		0	460	460	35,361	
Acenaphthene	0	0		0	83	83.0	6,380	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	23,062	
Benzo(a)Anthracene	0	0		0	0.5	0.5	38.4	
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	30,000	30,000	2,306,162	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	345,924	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	20,755	
Butyl Benzyl Phthalate	0	0		0	140	140	10,762	
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	63,035	
1,3-Dichlorobenzene	0	0		0	350	350	26,905	
1,4-Dichlorobenzene	0	0		0	730	730	56,117	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	307,488	
Dimethyl Phthalate	0	0		0	2,500	2,500	192,180	
Di-n-Butyl Phthalate	0	0		0	110	110	8,456	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	122,995	
2,6-Dinitrotoluene	0	0		0	990	990	76,103	
1,2-Diphenylhydrazine	0	0		0	15	15.0	1,153	
Fluoranthene	0	0		0	200	200	15,374	
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	769	
Hexachlorocyclopentadiene	0	0		0	5	5.0	384	
Hexachloroethane	0	0		0	60	60.0	4,612	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	768,721	
Naphthalene	0	0		0	140	140	10,762	
Nitrobenzene	0	0		0	4,000	4,000	307,488	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	1,306,825	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	23,062	
Phenanthrene	0	0		0	5	5.0	384	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	9,993	
Aldrin	0	0		0	3	3.0	231	
alpha-BHC	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	0.95	0.95	73.0	
Chlordane	0	0		0	2.4	2.4	184	
4,4-DDT	0	0		0	1.1	1.1	84.6	

4,4-DDE	0	0		0	1.1	1.1	84.6	
4,4-DDD	0	0		0	1.1	1.1	84.6	
Dieldrin	0	0		0	0.24	0.24	18.4	
alpha-Endosulfan	0	0		0	0.22	0.22	16.9	
beta-Endosulfan	0	0		0	0.22	0.22	16.9	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.086	0.086	6.61	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	40.0	
Heptachlor Epoxide	0	0		0	0.5	0.5	38.4	
PCBs, Total	0	0		0	N/A	N/A	N/A	
Toxaphene	0	0		0	0.73	0.73	56.1	
1,2,4,5-Tetrachlorobenzene	0	0		0	N/A	N/A	N/A	
Pentachlorobenzene	0	0		0	N/A	N/A	N/A	

☑ ***CFC*** CCT (min): ###### PMF: 0.200 Analysis Hardness (mg/l): 98.629 Analysis pH: 7.60

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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	50,046	
Total Arsenic	0	0		0	150	150	34,123	Chem Translator of 1 applied
Total Barium	42.94629	0.1895		0	4,100	4,100	921,371	
Total Boron	0	0		0	1,600	1,600	363,974	
Total Cadmium	0	0		0	0.244	0.27	60.9	Chem Translator of 0.91 applied
Total Chromium (III)	0	0		0	73.281	85.2	19,384	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	2,365	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	4,322	
Total Copper	2.881	0.602		0	8.851	9.22	1,083	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	1,183	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1187.5765	1.1379		0	1,500	1,500	-1.09E+06	WQC = 30 day average; PMF = 1
Total Lead	1.61087	0.8542		0	2.479	3.13	53.3	Chem Translator of 0.793 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		0	0.770	0.91	205	Chem Translator of 0.85 applied
Total Nickel	0	0		0	51.403	51.6	11,728	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	1,135	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	2,957	
Total Zinc	25.72979	0.3321		0	116.765	118	19,399	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	682	
Acrylamide	0	0		0	N/A	N/A	N/A	

Acrylonitrile	0	0		0	130	130	29,573	
Benzene	0	0		0	130	130	29,573	
Bromoform	0	0		0	370	370	84,169	
Carbon Tetrachloride	0	0		0	560	560	127,391	
Chlorobenzene	0	0		0	240	240	54,596	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	796,193	
Chloroform	0	0		0	390	390	88,719	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	705,200	
1,1-Dichloroethylene	0	0		0	1,500	1,500	341,226	
1,2-Dichloropropane	0	0		0	2,200	2,200	500,464	
1,3-Dichloropropylene	0	0		0	61	61.0	13,877	
Ethylbenzene	0	0		0	580	580	131,941	
Methyl Bromide	0	0		0	110	110	25,023	
Methyl Chloride	0	0		0	5,500	5,500	1,251,161	
Methylene Chloride	0	0		0	2,400	2,400	545,961	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	47,772	
Tetrachloroethylene	0	0		0	140	140	31,848	
Toluene	0	0		0	330	330	75,070	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	318,477	
1,1,1-Trichloroethane	0	0		0	610	610	138,765	
1,1,2-Trichloroethane	0	0		0	680	680	154,689	
Trichloroethylene	0	0		0	450	450	102,368	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	25,023	
2,4-Dichlorophenol	0	0		0	340	340	77,344	
2,4-Dimethylphenol	0	0		0	130	130	29,573	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	3,640	
2,4-Dinitrophenol	0	0		0	130	130	29,573	
2-Nitrophenol	0	0		0	1,600	1,600	363,974	
4-Nitrophenol	0	0		0	470	470	106,917	
p-Chloro-m-Cresol	0	0		0	500	500	113,742	
Pentachlorophenol	0	0		0	12.207	12.2	2,777	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	20,701	
Acenaphthene	0	0		0	17	17.0	3,867	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	13,422	
Benzo(a)Anthracene	0	0		0	0.1	0.1	22.7	
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	1,364,903	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	

Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	207,010	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	12,284	
Butyl Benzyl Phthalate	0	0		0	35	35.0	7,962	
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	36,397	
1,3-Dichlorobenzene	0	0		0	69	69.0	15,696	
1,4-Dichlorobenzene	0	0		0	150	150	34,123	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	181,987	
Dimethyl Phthalate	0	0		0	500	500	113,742	
Di-n-Butyl Phthalate	0	0		0	21	21.0	4,777	
2,4-Dinitrotoluene	0	0		0	320	320	72,795	
2,6-Dinitrotoluene	0	0		0	200	200	45,497	
1,2-Diphenylhydrazine	0	0		0	3	3.0	682	
Fluoranthene	0	0		0	40	40.0	9,099	
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	455	
Hexachlorocyclopentadiene	0	0		0	1	1.0	227	
Hexachloroethane	0	0		0	12	12.0	2,730	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	477,716	
Naphthalene	0	0		0	43	43.0	9,782	
Nitrobenzene	0	0		0	810	810	184,262	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	773,445	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	13,422	
Phenanthrene	0	0		0	1	1.0	227	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	5,915	
Aldrin	0	0		0	0.1	0.1	22.7	
alpha-BHC	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	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	0.98	
4,4-DDT	0	0		0	0.001	0.001	0.23	
4,4-DDE	0	0		0	0.001	0.001	0.23	
4,4-DDD	0	0		0	0.001	0.001	0.23	
Dieldrin	0	0		0	0.056	0.056	12.7	
alpha-Endosulfan	0	0		0	0.056	0.056	12.7	
beta-Endosulfan	0	0		0	0.056	0.056	12.7	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.036	0.036	8.19	

Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.0038	0.004	0.86	
Heptachlor Epoxide	0	0		0	0.0038	0.004	0.86	
PCBs, Total	0	0		0	0.014	0.014	3.18	
Toxaphene	0	0		0	0.0002	0.0002	0.045	
1,2,4,5-Tetrachlorobenzene	0	0		0	N/A	N/A	N/A	
Pentachlorobenzene	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): 66.248 THH PMF: 0.200 Analysis Hardness (mg/l): N/A Analysis pH: N/A PWS PMF: 0.2

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)	183685.12	0.25		0	500,000	500,000	72,141,772	WQC applied at RMI 951.71 with a design stream flow of 4730.105 cfs
Chloride (PWS)	25372.03	0.3315		0	250,000	250,000	51,125,716	WQC applied at RMI 951.71 with a design stream flow of 4730.105 cfs
Sulfate (PWS)	53875.03	0.308		0	250,000	250,000	44,670,106	WQC applied at RMI 951.71 with a design stream flow of 4730.105 cfs
Total Aluminum	492.48613	1.1196		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	1,274	
Total Arsenic	0	0		0	10	10.0	2,275	
Total Barium	42.94629	0.1895		0	1,000	1,000	217,757	
Total Boron	0	0		0	3,100	3,100	705,200	
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	2.881	0.602		0	1,300	1,300	295,076	
Free Cyanide	0	0		0	4	4.0	910	
Dissolved Iron	0	0		0	300	300	68,245	
Total Iron	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	227,484	
Total Mercury	0.0022421	0.6508		0	0.012	0.012	2.22	
Total Nickel	0	0		0	610	610	138,765	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	1,137	WQC applied at RMI 951.71 with a design stream flow of 4730.105 cfs
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	54.6	
Total Zinc	25.72979	0.3321		0	7,400	7,400	1,677,552	
Acrolein	0	0		0	3	3.0	682	
Acrylamide	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	
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	22,748	
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	1,297	
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	7,507	
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	15,469	
Methyl Bromide	0	0		0	47	47.0	10,692	
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	12,967	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	22,748	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	2,274,838	
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	6,825	
2,4-Dichlorophenol	0	0		0	10	10.0	2,275	
2,4-Dimethylphenol	0	0		0	100	100.0	22,748	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	455	
2,4-Dinitrophenol	0	0		0	10	10.0	2,275	
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	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	909,935	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	15,924	
Anthracene	0	0		0	300	300	68,245	
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	45,497	
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	22.7	
2-Chloronaphthalene	0	0		0	800	800	181,987	
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	420	420	95,543	
1,3-Dichlorobenzene	0	0		0	7	7.0	1,592	
1,4-Dichlorobenzene	0	0		0	63	63.0	14,331	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	136,490	
Dimethyl Phthalate	0	0		0	2,000	2,000	454,968	
Di-n-Butyl Phthalate	0	0		0	20	20.0	4,550	
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	4,550	
Fluorene	0	0		0	50	50.0	11,374	
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	910	
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	7,734	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	2,275	
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	4,550	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	15.9	
Aldrin	0	0		0	N/A	N/A	N/A	
alpha-BHC	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	0.98	0.98	223	
Chlordane	0	0		0	N/A	N/A	N/A	
4,4-DDT	0	0		0	N/A	N/A	N/A	
4,4-DDE	0	0		0	N/A	N/A	N/A	
4,4-DDD	0	0		0	N/A	N/A	N/A	
Dieldrin	0	0		0	N/A	N/A	N/A	
alpha-Endosulfan	0	0		0	20	20.0	4,550	
beta-Endosulfan	0	0		0	20	20.0	4,550	
Endosulfan Sulfate	0	0		0	20	20.0	4,550	
Endrin	0	0		0	0.03	0.03	6.82	
Endrin Aldehyde	0	0		0	0.29	0.29	66.0	
Heptachlor	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	
PCBs, Total	0	0		0	N/A	N/A	N/A	
Toxaphene	0	0		0	N/A	N/A	N/A	
1,2,4,5-Tetrachlorobenzene	0	0		0	0.03	0.03	6.82	

Pentachlorobenzene	0	0		0	0.1	0.1	22.7	

☑ ***CRL*** CCT (min): 60.297 PMF: 0.200 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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		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	42.94629	0.1895		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	2.881	0.602		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	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		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	50	50.0	38,835	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	25.72979	0.3321		0	N/A	N/A	N/A	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylamide	0	0		0	0.07	0.07	54.4	
Acrylonitrile	0	0		0	0.051	0.051	39.6	
Benzene	0	0		0	0.58	0.58	450	
Bromoform	0	0		0	4.3	4.3	3,340	
Carbon Tetrachloride	0	0		0	0.4	0.4	311	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.4	0.4	311	
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	0.55	0.55	427	
1,2-Dichloroethane	0	0		0	0.38	0.38	295	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.5	0.5	388	

1,3-Dichloropropylene	0	0		0	0.27	0.27	210	
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	4.6	4.6	3,573	
1,1,2,2-Tetrachloroethane	0	0		0	0.17	0.17	132	
Tetrachloroethylene	0	0		0	0.69	0.69	536	
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	427	
Trichloroethylene	0	0		0	0.6	0.6	466	
Vinyl Chloride	0	0		0	0.02	0.02	15.5	
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	
4,6-Dinitro-o-Cresol	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	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	23.3	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.4	1.4	1,087	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.000086	0.00009	0.067	
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.78	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.078	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.78	
Benzo(k)Fluoranthene	0	0		0	0.0038	0.004	2.95	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	23.3	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	249	
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	0.0038	0.004	2.95	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.078	
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	0.021	0.021	16.3	
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	38.8	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	38.8	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	23.3	
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	0.062	
Hexachlorobutadiene	0	0		0	0.01	0.01	7.77	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	77.7	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.78	
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	0.00069	0.0007	0.54	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	3.88	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	2,563	
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	
Aldrin	0	0		0	0.0000008	8.00E-07	0.0006	
alpha-BHC	0	0		0	0.0004	0.0004	0.31	
beta-BHC	0	0		0	0.008	0.008	6.21	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0003	0.0003	0.23	
4,4-DDT	0	0		0	0.00003	0.00003	0.023	
4,4-DDE	0	0		0	0.00002	0.00002	0.016	
4,4-DDD	0	0		0	0.0001	0.0001	0.078	
Dieldrin	0	0		0	0.000001	0.000001	0.0008	
alpha-Endosulfan	0	0		0	N/A	N/A	N/A	
beta-Endosulfan	0	0		0	N/A	N/A	N/A	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	N/A	N/A	N/A	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.000006	0.000006	0.005	
Heptachlor Epoxide	0	0		0	0.00003	0.00003	0.023	
PCBs, Total	0	0		0	0.000064	0.00006	0.05	
Toxaphene	0	0		0	0.00028	0.0003	0.22	
1,2,4,5-Tetrachlorobenzene	0	0		0	N/A	N/A	N/A	
Pentachlorobenzene	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 Mercury	0.0003	0.0005	12.0	22.0	30.0	ng/L	12.0		Discharge Conc ≥ 50% WQBEL (RP)
Acrylamide	1.22	1.91	54.4	84.8	136	µg/L	54.4	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
Total Dissolved Solids (PWS)	72,142	mg/L	Discharge Conc ≤ 10% WQBEL
Chloride (PWS)	51,126	mg/L	Discharge Conc ≤ 10% WQBEL
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	44,670	mg/L	Discharge Conc ≤ 10% WQBEL
Total Aluminum	750	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	1,274	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	2,275	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	217,757	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	363,974	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	60.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	19,384	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	1,962	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	4,322	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	376	µg/L	Discharge Conc ≤ 10% WQBEL
Free Cyanide	910	µg/L	Discharge Conc ≤ 25% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	68,245	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	-1.09E+06	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	53.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	227,484	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	11,728	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)	1,137	µg/L	Discharge Conc ≤ 10% WQBEL

Total Selenium	1,135	µg/L	Discharge Conc ≤ 10% WQBEL
Total Silver	189	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	54.6	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	3,919	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	148	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylonitrile	39.6	µg/L	Discharge Conc < TQL
Benzene	450	µg/L	Discharge Conc ≤ 25% WQBEL
Bromoform	3,340	µg/L	Discharge Conc ≤ 25% WQBEL
Carbon Tetrachloride	311	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorobenzene	22,748	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorodibromomethane	311	µg/L	Discharge Conc ≤ 25% WQBEL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	796,193	µg/L	Discharge Conc < TQL
Chloroform	1,297	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	427	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	295	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethylene	7,507	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-Dichloropropane	388	µg/L	Discharge Conc ≤ 25% WQBEL
1,3-Dichloropropylene	210	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	15,469	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Bromide	10,692	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Chloride	1,251,161	µg/L	Discharge Conc ≤ 25% WQBEL
Methylene Chloride	3,573	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2,2-Tetrachloroethane	132	µg/L	Discharge Conc ≤ 25% WQBEL
Tetrachloroethylene	536	µg/L	Discharge Conc ≤ 25% WQBEL
Toluene	12,967	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-trans-Dichloroethylene	22,748	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,1-Trichloroethane	138,765	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2-Trichloroethane	427	µg/L	Discharge Conc ≤ 25% WQBEL
Trichloroethylene	466	µg/L	Discharge Conc ≤ 25% WQBEL
Vinyl Chloride	15.5	µg/L	Discharge Conc ≤ 25% WQBEL
2-Chlorophenol	6,825	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	2,275	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	22,748	µg/L	Discharge Conc < TQL
4,6-Dinitro-o-Cresol	455	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dinitrophenol	2,275	µg/L	Discharge Conc ≤ 25% WQBEL
2-Nitrophenol	363,974	µg/L	Discharge Conc < TQL
4-Nitrophenol	106,917	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	7,884	µg/L	Discharge Conc < TQL
Pentachlorophenol	23.3	µg/L	Discharge Conc < TQL
Phenol	909,935	µg/L	Discharge Conc < TQL
2,4,6-Trichlorophenol	1,087	µg/L	Discharge Conc < TQL

Acenaphthene	3,867	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	68,245	µg/L	Discharge Conc < TQL
Benzidine	0.067	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	0.78	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	0.078	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	0.78	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	2.95	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	23.3	µg/L	Discharge Conc < TQL
Bis(2-Chloroisopropyl)Ether	45,497	µg/L	Discharge Conc < TQL
Bis(2-Ethylhexyl)Phthalate	249	µg/L	Discharge Conc ≤ 25% WQBEL
4-Bromophenyl Phenyl Ether	12,284	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	22.7	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	181,987	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	2.95	µg/L	Discharge Conc < TQL
Dibenzo(a,h)Anthrancene	0.078	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	36,397	µg/L	Discharge Conc ≤ 25% WQBEL
1,3-Dichlorobenzene	1,592	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dichlorobenzene	14,331	µg/L	Discharge Conc ≤ 25% WQBEL
3,3-Dichlorobenzidine	16.3	µg/L	Discharge Conc < TQL
Diethyl Phthalate	136,490	µg/L	Discharge Conc ≤ 25% WQBEL
Dimethyl Phthalate	113,742	µg/L	Discharge Conc ≤ 25% WQBEL
Di-n-Butyl Phthalate	4,550	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dinitrotoluene	38.8	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	38.8	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	23.3	µg/L	Discharge Conc < TQL
Fluoranthene	4,550	µg/L	Discharge Conc < TQL
Fluorene	11,374	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.00008	µg/L	Discharge Conc < TQL
Hexachlorobutadiene	0.01	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	227	µg/L	Discharge Conc ≤ 25% WQBEL
Hexachloroethane	77.7	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	0.78	µg/L	Discharge Conc < TQL
Isophorone	7,734	µg/L	Discharge Conc < TQL
Naphthalene	6,898	µg/L	Discharge Conc ≤ 25% WQBEL
Nitrobenzene	2,275	µg/L	Discharge Conc ≤ 25% WQBEL
n-Nitrosodimethylamine	0.54	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	3.88	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	2,563	µg/L	Discharge Conc < TQL
Phenanthrene	227	µg/L	Discharge Conc < TQL
Pyrene	4,550	µg/L	Discharge Conc < TQL

1,2,4-Trichlorobenzene	15.9	µg/L	Discharge Conc ≤ 25% WQBEL
Aldrin	0.0006	µg/L	Discharge Conc < TQL
alpha-BHC	0.31	µg/L	Discharge Conc < TQL
beta-BHC	6.21	µg/L	Discharge Conc < TQL
gamma-BHC	0.95	µg/L	Discharge Conc < TQL
delta BHC	N/A	N/A	No WQS
Chlordane	0.0003	µg/L	Discharge Conc < TQL
4,4-DDT	0.00003	µg/L	Discharge Conc < TQL
4,4-DDE	0.00002	µg/L	Discharge Conc < TQL
4,4-DDD	0.0001	µg/L	Discharge Conc < TQL
Dieldrin	0.000001	µg/L	Discharge Conc < TQL
alpha-Endosulfan	10.8	µg/L	Discharge Conc ≤ 25% WQBEL
beta-Endosulfan	10.8	µg/L	Discharge Conc < TQL
Endosulfan Sulfate	4,550	µg/L	Discharge Conc < TQL
Endrin	4.24	µg/L	Discharge Conc < TQL
Endrin Aldehyde	66.0	µg/L	Discharge Conc < TQL
Heptachlor	0.005	µg/L	Discharge Conc < TQL
Heptachlor Epoxide	0.023	µg/L	Discharge Conc < TQL
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
PCBs, Total	0.00006	µg/L	Discharge Conc < TQL
Toxaphene	0.0002	µg/L	Discharge Conc < TQL
1,2,4,5-Tetrachlorobenzene	0.03	µg/L	Discharge Conc < TQL
Pentachlorobenzene	0.1	µg/L	Discharge Conc < TQL

ATTACHMENT C

Thermal Limits Spreadsheet for Outfall 001

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Thermal Limits Spreadsheet
Version 1.0, April 2024

Instructions | Inputs

Facility: **Shell Polymers Monaca Site**
Permit No.: **PA0002208**
Stream Name: **Ohio River**
Analyst/Engineer: **Ryan Decker**
Stream Q7-10 (cfs)*: **946.0**
Outfall No.: **001**
Analysis Type*: **ORSANCO**

	Facility Flows				Stream Flows				Temperature
Semi-Monthly Increment	Intake (Stream) (MGD)*	Intake (External) (MGD)*	Consumptive Loss (MGD)*	Discharge Flow (MGD)	Q7-10 Multipliers (Default Shown)	PMF	Seasonal Stream Flow (cfs)	Downstream Stream Flow (cfs)	Ambient Stream Temperature (°F)*
Jan 1-31		4.4	1.7	2.7	3.2	1.00	3027.20	3031.38	36.5
Feb 1-29		4.4	1.7	2.7	3.5	1.00	3311.00	3315.18	36.5
Mar 1-31		4.4	1.7	2.7	7	1.00	6622.00	6626.18	40.01
Apr 1-15		4.4	1.7	2.7	9.3	1.00	8797.80	8801.98	44.6
Apr 16-30		4.4	1.7	2.7	9.3	1.00	8797.80	8801.98	54.68
May 1-15		4.4	1.7	2.7	5.1	1.00	4824.60	4828.78	58.28
May 16-31		4.4	1.7	2.7	5.1	1.00	4824.60	4828.78	63.59
Jun 1-15		4.4	1.7	2.7	3	1.00	2838.00	2842.18	71.051
Jun 16-30		4.4	1.7	2.7	3	1.00	2838.00	2842.18	74.678
Jul 1-31		4.4	1.7	2.7	1.7	1.00	1608.20	1612.38	79.979
Aug 1-15		4.4	1.7	2.7	1.4	1.00	1324.40	1328.58	82.4
Aug 16-31		4.4	1.7	2.7	1.4	1.00	1324.40	1328.58	78.44
Sep 1-15		4.4	1.7	2.7	1.1	1.00	1040.60	1044.78	74.39
Sep 16-30		4.4	1.7	2.7	1.1	1.00	1040.60	1044.78	70.7
Oct 1-15		4.4	1.7	2.7	1.2	1.00	1135.20	1139.38	63.392
Oct 16-31		4.4	1.7	2.7	1.2	1.00	1135.20	1139.38	53.6
Nov 1-15		4.4	1.7	2.7	1.6	1.00	1513.60	1517.78	52.916
Nov 16-30		4.4	1.7	2.7	1.6	1.00	1513.60	1517.78	46.58
Dec 1-31		4.4	1.7	2.7	2.4	1.00	2270.40	2274.58	38.831

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Thermal Limits Spreadsheet
Version 1.0, April 2024

Instructions | ***ORSANCO Results***

Recommended Limits for Case 1 or Case 2

Semi-Monthly Increment	**ORSANCO** Target Maximum Stream Temp. (ºF)	**Case 1** Daily WLA (Million BTUs/day)	**Case 2** Daily WLA (ºF)
Jan 1-31	40	N/A -- Case 2	110.0
Feb 1-29	40	N/A -- Case 2	110.0
Mar 1-31	46	N/A -- Case 2	110.0
Apr 1-15	52	N/A -- Case 2	110.0
Apr 16-30	58	N/A -- Case 2	110.0
May 1-15	64	N/A -- Case 2	110.0
May 16-31	71.2	N/A -- Case 2	110.0
Jun 1-15	78.8	N/A -- Case 2	110.0
Jun 16-30	84	N/A -- Case 2	110.0
Jul 1-31	87	N/A -- Case 2	110.0
Aug 1-15	87	N/A -- Case 2	110.0
Aug 16-31	87	N/A -- Case 2	110.0
Sep 1-15	84	N/A -- Case 2	110.0
Sep 16-30	78	N/A -- Case 2	110.0
Oct 1-15	72	N/A -- Case 2	110.0
Oct 16-31	66	N/A -- Case 2	110.0
Nov 1-15	58	N/A -- Case 2	110.0
Nov 16-30	50	N/A -- Case 2	110.0
Dec 1-31	42	N/A -- Case 2	110.0

ATTACHMENT D

TRC Spreadsheet Results for Outfall 001

TRC EVALUATION

4730	= Q stream (cfs)	0.5	= CV Daily
2.7	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.067	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	0.2	= 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)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	**1.3.2.iii**	WLA afc =	24.222	**1.3.2.iii**	WLA cfc =	70.447
PENTOXSD TRG	**5.1a**	LTAMULT afc =	0.373	**5.1c**	LTAMULT cfc =	0.581
PENTOXSD TRG	**5.1b**	LTA_afc=	9.026	**5.1d**	LTA_cfc =	40.955

Source	Reference	Effluent Limit Calculations		
PENTOXSD TRG	**5.1f**	AML MULT =	1.720	
PENTOXSD TRG	**5.1g**	AVG MON LIMIT (mg/l) =	0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) =	1.170	

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)**

ATTACHMENT E

U.S. Environmental Protection Agency Industrial Stormwater Fact Sheet Series – Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries

INDUSTRIAL STORMWATER

FACT SHEET SERIES

Sector Y: Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries

U.S. EPA Office of Water
EPA-833-F-06-040
February 2021

What is the NPDES stormwater permitting program for industrial activity?

Activities, such as material handling and storage, equipment maintenance and cleaning, industrial processing or other operations that occur at industrial facilities are often exposed to stormwater. The runoff from these areas may discharge pollutants directly into nearby waterbodies or indirectly via storm sewer systems, thereby degrading water quality.

In 1990, the U.S. Environmental Protection Agency (EPA) developed permitting regulations under the National Pollutant Discharge Elimination System (NPDES) to control stormwater discharges associated with eleven categories of industrial activity. As a result, NPDES permitting authorities, which may be either EPA or a state environmental agency, issue stormwater permits to control runoff from these industrial facilities.

What types of industrial facilities are required to obtain permit coverage?

This fact sheet specifically discusses stormwater discharges from rubber, miscellaneous plastic products, and manufacturing facilities as described by Standard Industrial Classification (SIC) Major Group 30. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Tires and inner tubes (SIC 3011)
- Rubber and plastic footwear (SIC 3021)
- Rubber and plastic hose and belting (SIC 3052)
- Gaskets, packaging, and sealing devices (SIC 3053)
- Fabricated rubber products, not elsewhere classified (SIC 3061 and 3069)
- Miscellaneous plastic products (SIC 3081 and 3089)
- Miscellaneous manufacturing industries (SIC 3991-3999)

Also discussed are stormwater discharges from miscellaneous manufacturing industries (except jewelry, silverware, and plateware) commonly identified by SIC Major Group 39 (except for 391). Miscellaneous manufacturing industries specifically include manufacturers of:

- Musical instruments (SIC 3931)
- Games, toys, and athletic goods (SIC 3942-3949)
- Pens, pencils, and artists' supplies (SIC 3951-3955, except 3952)
- Buttons, pins, and needles (SIC 3961 and 3965)

What does an industrial stormwater permit require?

Common requirements for coverage under an industrial stormwater permit include development of a written stormwater pollution prevention plan (SWPPP), implementation of control measures, and submittal of a request for permit coverage, usually referred to as the Notice of Intent or NOI. The SWPPP is a written assessment of potential sources of pollutants in stormwater runoff and control measures that will be implemented at your facility to minimize the discharge of these pollutants in runoff from the site. These control measures include site-specific best management practices (BMPs), maintenance plans, inspections, employee training, and reporting. The procedures detailed in the SWPPP must be implemented by the facility and updated as necessary, with a copy of the SWPPP kept on-site. The industrial stormwater permit also requires collection of visual, analytical, and/or compliance monitoring data to determine the effectiveness of implemented BMPs. For more information on EPA's industrial storm- water permit and links to State stormwater permits, go to www.epa.gov/npdes/stormwater and click on "Industrial Activity."

What pollutants are associated with activities at my facility?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of rubber, miscellaneous plastic, and other products will vary. There are a number of factors that influence to what extent industrial activities and significant materials can affect water quality.

- Geographic location
- Topography
- Hydrogeology
- Extent of impervious surfaces (e.g., concrete or asphalt)
- Type of ground cover (e.g., vegetation, crushed stone, or dirt)
- Outdoor activities (e.g., material storage, loading/unloading, vehicle maintenance)
- Size of the operation
- Type, duration, and intensity of precipitation events

Most of the actual manufacturing and processing activities associated with this industry normally occur indoors. However, there is a wide variety of materials used at these facilities which may include:

- Solvents
- Acids and caustic
- Carbon black
- Plasticizers
- Paint
- Processing oils
- Resins
- Rubber compounds and solutions
- Scrap plastic and rubber
- Fuels such as diesel or gasoline
- Adhesives
- Zinc
- Miscellaneous chemicals

Tanks, drums, or bags of these materials (including raw materials, by-products, final products, or waste products) may be exposed to stormwater during loading/unloading operations or through out-door storage or handling at some facilities. Other items which may be exposed to stormwater include surplus processing machinery, scrap metal, PVC pipe, and rags.

The activities, pollutant sources, and pollutants detailed in Table 1 are commonly found at Rubber, miscellaneous plastic product, and miscellaneous manufacturing facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Facilities

Activity	Pollutant Source	Pollutant
Outdoor material loading/unloading	Wooden pallets, spills/leaks from material handling equipment, solvents, resins	Total suspended solids (TSS), oil and grease, organics
Outdoor material and equipment storage	Solvents, acids and caustic, plasticizers, paint, lubricating oils, processing oils, resins, rubber compounds, mineral spirits, zinc, scrap metal, scrap plastic and rubber, plastic pellets, PVC pipe, and rags	Organics, zinc, hydrocarbons, oil and grease, acids, alkalinity

Note: Activities may have additional pollutant sources that contain PFAS and can come into contact with stormwater discharges. Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that include PFOA, PFOS, GenX, and many other chemicals.

What BMPs can be used to minimize contact between stormwater and potential pollutants at my facility?

A variety of BMP options may be applicable to eliminate or minimize the presence of pollutants in stormwater discharges from rubber, miscellaneous plastic products, and miscellaneous manufacturing facilities. You will likely need to implement a combination or suite of BMPs to address stormwater runoff at your facility. Your first consideration should be for pollution prevention BMPs, which are designed to prevent or minimize pollutants from entering stormwater runoff and/or reduce the volume of stormwater requiring management. Prevention BMPs can include regular cleanup, collection and containment of debris in storage areas, and other housekeeping practices, spill control, and employee training. It may also be necessary to implement treatment BMPs, which are engineered structures intended to treat stormwater runoff and/or mitigate the effects of increased stormwater runoff peak rate, volume, and velocity. Treatment BMPs are generally more expensive to install and maintain and include oil-water separators, wet ponds, and proprietary filter devices.

BMPs must be selected and implemented to address the following:

Good Housekeeping Practices

Good housekeeping is a practical, cost-effective way to maintain a clean and orderly facility to prevent potential pollution sources from coming into contact with stormwater. It includes establishing protocols to reduce the possibility of mishandling materials or equipment and training employees in good housekeeping techniques. Common areas where good housekeeping practices should be followed include trash containers and adjacent areas, material storage areas, vehicle and equipment maintenance areas, and loading docks. Good housekeeping practices must include a schedule for regular pickup and disposal of garbage and waste materials and routine inspections of drums, tanks, and containers for leaks and structural conditions. Practices also include containing and covering garbage, waste materials, and debris. Involving employees in routine monitoring of housekeeping practices has proven to be an effective means of ensuring the continued implementation of these measures. Industrial facilities can conduct activities that use, store, manufacture, transfer, and/or dispose of PFAS containing materials. Successful good housekeeping practices to minimize PFAS exposure to stormwater could include inventorying the location, quantity, and method of storage; using properly designed storage and transfer techniques; providing secondary containment around chemical storage areas; and using proper techniques for cleaning or replacement of production systems or equipment.

Minimizing Exposure

Where feasible, minimizing exposure of potential pollutant sources to precipitation is an important control option. Minimizing exposure prevents pollutants, including debris, from coming into contact with precipitation and can reduce the need for BMPs to treat contaminated stormwater runoff. It can also prevent debris from being picked up by stormwater and carried into drains and surface waters.

Examples of BMPs for exposure minimization include covering materials or activities with temporary structures (e.g., tarps) when wet weather is expected or moving materials or activities to existing or new permanent structures (e.g., buildings, silos, sheds). Even the simple practice of keeping a dumpster lid closed can be a very effective pollution prevention measure. Another example could include locating PFAS-containing materials and residues away from drainage pathways and surface waters.

Erosion and Sediment Control

BMPs must be selected and implemented to limit erosion on areas of your site that, due to topography, activities, soils, cover, materials, or other factors are likely to experience erosion. Erosion control BMPs such as seeding, mulching, and sodding prevent soil from becoming dislodged and should be considered first. Sediment control BMPs such as silt fences, sediment ponds, and stabilized entrances trap sediment after it has eroded. Sediment control BMPs should be used to back-up erosion control BMPs.

Management of Runoff

Your SWPPP must contain a narrative evaluation of the appropriateness of stormwater management practices that divert, infiltrate, reuse, or otherwise manage stormwater runoff so as to reduce the discharge of pollutants. Appropriate measures are highly site-specific, but may include, among others, vegetative swales, collection and reuse of stormwater, inlet controls, snow management, infiltration devices, and wet retention measures. Incorporating treatment like granular activated carbon may be helpful to remove certain pollutants like PFAS.

Additionally, identifying weaknesses in current facility practices will aid the permittee in determining appropriate BMPs that will achieve a reduction in pollutant loadings.

A combination of preventive and treatment BMPs will yield the most effective stormwater management for minimizing the offsite discharge of pollutants via stormwater runoff. Though not specifically outlined in this fact sheet, BMPs must also address preventive maintenance records or logbooks, regular facility inspections, spill prevention and response, and employee training.

All BMPs require regular maintenance to function as intended. Some management measures have simple maintenance requirements, others are quite involved. You must regularly inspect all BMPs to ensure they are operating properly, including during runoff events. As soon as a problem is found, action to resolve it should be initiated immediately.

Implement BMPs, such as those listed below in Table 2 for the control of pollutants at rubber, miscellaneous plastic products and miscellaneous manufacturing facilities, to minimize and prevent the discharge of pollutants in stormwater. Identifying weaknesses in current facility practices will aid the permittee in determining appropriate BMPs that will achieve a reduction in pollutant loadings. BMPs listed in Table 2 are broadly applicable to rubber, miscellaneous plastic products and miscellaneous manufacturing facilities; however, this is not a complete list and you are recommended to consult with regulatory agencies or a stormwater engineer/consultant to identify appropriate BMPs for your facility.

Table 2. BMPs for Potential Pollutant Sources at Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Facilities

Pollutant Sources	BMPs
Outdoor material unloading/loading	❑ Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters. ❑ Close storm drains during loading/unloading activities in surrounding areas. ❑ Use a dead-end sump where materials could be directed. ❑ Inspect containers for leaks or damage prior to loading/unloading. ❑ Avoid loading/unloading materials in the rain or provide cover or other protection for loading docks. ❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials. ❑ Slope the impervious concrete floor or pad to collect spills and leaks and convey them to proper containment and treatment. ❑ Provide overhangs or door skirts to enclose trailer ends at truck loading/unloading docks. ❑ For rail transfer, a drip pan shall be installed within the rails to collect spillage from the tank. ❑ Where liquid or powdered materials are transferred in bulk to/from truck or rail cars, ensure hose connection points at storage containers are inside containment areas, or drip pans are used in areas where spillage may occur which are not in a containment area. ❑ Place catch trays between the dock and trailer at shipping and receiving bays to capture solids. ❑ Enclose material handling systems. ❑ Cover materials entering and leaving areas. ❑ Use dry cleanup methods instead of washing the areas down. ❑ Regularly sweep area to minimize debris on the ground and dispose of materials properly. ❑ Provide dust control if necessary. When controlling dust, sweep and/or apply water or materials that will not impact surface or ground water. ❑ Develop and implement spill prevention, containment, and countermeasure (SPCC) plans. ❑ Train employees in spill prevention, control, cleanup, and proper materials management techniques. ❑ Inspect pallets for protruding nails or broken boards.
Outdoor material storage	❑ Cover storage areas with roofs or tarps. ❑ Confine storage of raw materials, parts, and equipment to designated areas away from high traffic, outside drainage pathways and away from surface waters. ❑ Provide secondary containment around chemical storage areas. ❑ If containment structures have drains, ensure that the drains have valves, and that valves are maintained in the closed position. Institute protocols for checking/testing stormwater in containment areas prior to discharge. ❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Direct stormwater runoff to an on-site retention pond. ❑ Ensure that all containers are properly sealed and valves closed. ❑ Conduct container integrity testing and provide leak detection.

Table 2. BMPs for Potential Pollutant Sources at Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Facilities (continued)

Pollutant Sources	BMPs
Outdoor material storage (continued)	❏ Inspect storage tanks and piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks and perform preventive maintenance. ❏ Plainly label all containers. ❏ Maintain an inventory of fluids to identify leakage. ❏ Wash and rinse containers indoors before storing them outdoors. ❏ Provide transfer of PFAS containing materials and their proper collection and disposal methods in the event of a release from their container. ❏ Train employees on proper spill prevention and response techniques. ❏ Train employees on proper waste control and disposal.
Waste management	❏ Store waste in enclosed and/or covered areas. ❏ Store wastes in covered, leak proof containers (e.g., dumpsters, drums). ❏ Cover the dumpsters or move them indoors. ❏ Use linked dumpsters that do not leak. ❏ Provide a lining for the dumpsters. ❏ Dispose or recycle packaging properly. ❏ Ensure hazardous and solid waste disposal practices are performed in accordance with applicable federal, state, and local requirements. ❏ Ship all wastes to offsite licensed landfills or treatment facilities.
Particulate emission management	❏ Clean around vents and stacks. ❏ Place tubs around vents and stacks to collect particulates. ❏ Inspect air emission control systems regularly and repair or replace when necessary.
Rubber Manufacturers - Zinc material management	
Material storage	❏ Store zinc bags indoors. ❏ Use of special large volume sacks (2,500 pound sacks rather than 50- to 100-pound sacs) with less potential for releases of zinc. ❏ Store materials in use in sealable container. ❏ Provide an airspace between the container and the cover to minimize "puffing" losses when the container is opened. ❏ Use automatic dispensing and weighing equipment. ❏ Use pre-weighed bags that can be thrown directly into the mixer to reduce spillage. ❏ Clean up spills without washing zinc into storm drains. ❏ Train employees on proper handling and emptying of zinc bags.
Dumpsters	❏ Cover the dumpsters or move them indoors. ❏ Use linked dumpsters that do not leak. ❏ Provide a lining for the dumpsters.
Dust collectors or baghouses	❏ Repair or replace improperly operating baghouses. ❏ Provide regular maintenance.

Table 2. BMPs for Potential Pollutant Sources at Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Facilities (continued)

Pollutant Sources	BMPs
Grinding operations from which zinc dust may be released	❑ Use dust collection system or reduce the amount of dust generated.
Zinc stearate coating operations	❑ Develop a spill prevention/response plan.
	❑ Use dry cleanup methods for spills.
	❑ Use alternate compounds to zinc stearate.
Plastics Manufacturers - Plastic Pellet Management	
Management	❑ Conduct regularly scheduled self evaluations to identify problem areas.
	❑ Encourage information sharing between companies.
	❑ Develop educational materials for employees, including those involved in transporting pellets.
Education and training	❑ Educate key officials and company managers regarding the fate and effects and the economic disadvantages of pellet loss.
	❑ Educate company employees regarding environmental hazards of pellet loss and employee responsibility for corrective actions.
	❑ Train pellet handlers to operate equipment, particularly fork lifts, in a manner that minimizes the potential for pellet loss.
Equipment and facilities	❑ Install a containment system to capture stormwater runoff.
	❑ Implement dry cleanup procedures.
	❑ Install connecting hoses equipped with valves that will close automatically when the connection is broken.
	❑ Direct the water flow from rail hopper cars and bulk trucks through a screen to capture the pellets rather than spilling them onto the ground.
	❑ Seal expansion joints in concrete floors with a flexible material to facilitate cleanup.
	❑ Install alarms in the pellet conveying system.
	❑ Pave all pellet handling areas, including loading docks and rail sidings.
	❑ Place screening in storm drains.
	❑ Place control devices where they can be serviced without losing pellets.
	❑ Equip bag-handling stations with vacuum hoses to facilitate spill cleanup.
	❑ Use tarps or containment devices to collect pellets as they are spilled.
	❑ Install grating at doorways for wiping feet.
	❑ Modify loading systems so that transfer lines can be completely emptied, with any residual resin being contained when loading ceases.
	❑ Ensure equipment is secured and stored properly.

Table 2. BMPs for Potential Pollutant Sources at Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Facilities (continued)

Pollutant Sources	BMPs
Operations	❑ Place portable screens underneath connection points when making and breaking all connections. ❑ Secure outlet caps and seals before moving full or empty rail hopper cars and trucks. ❑ Implement handling procedures that minimize punctures and pellet spillage. ❑ Inspect pellet packaging before offloading. ❑ Repair punctured bags immediately.
Good housekeeping	❑ Implement daily and routine housekeeping and spill response procedures. ❑ Develop standard operating procedures for containing and cleaning up spills. ❑ Conduct routine inspections for the presence of loose pellets on the facility grounds, including parking lots, drainage areas, driveways, etc.
Packaging	❑ Use reinforced bags and containers lined with puncture-resistant material. ❑ Minimize the use of valved bags or seal valved bags immediately after filling. ❑ Use sealed containers instead of break bulk packaging.
Shipping	❑ Use containers for cargo shipping rather than individual pallets. ❑ Identify the person responsible for sealing the ports on rail hopper cars and bulk trucks, and document sealing. ❑ Close and secure the rail hopper car valve with strong wire or aircraft cable in addition to the normal sealing mechanism. ❑ Visually confirm that each compartment and tube of shipping vehicles is empty. ❑ Inspect interiors of trailers and sea containers for defects that may puncture pellet packaging. Consider vandalism exposure when selecting leased track sites. ❑ Avoid on-deck pellet storage. ❑ Seal empty rail hopper cars and bulk trucks before returning them to shipper.
Recycling and waste disposal	❑ Store waste pellets in properly labeled containers. ❑ Recycle or resell waste pellets. ❑ Check broken and discarded packaging for residual pellets. ❑ Inspect handling and storage procedures. ❑ If an outside vendor is used for waste removal, train in material handling, spill prevention and control.

What if activities and materials at my facility are not exposed to precipitation?

The industrial stormwater program requires permit coverage for a number of specified types of industrial activities. However, when a facility is able to prevent the exposure of ALL relevant activities and materials to precipitation, it may be eligible to claim no exposure and qualify for a waiver from permit coverage.

If you are regulated under the industrial permitting program, you must either obtain permit coverage or submit a no exposure certification form, if available. Check with your permitting authority for additional information as not every permitting authority program provides no exposure exemptions.

Where do I get more information?

For additional information on the industrial stormwater program see www.epa.gov/npdes/stormwater/msgp.

A list of names and telephone numbers for each EPA Region or state NPDES permitting authority can be found at www.epa.gov/npdes/stormwatercontacts.

References

Information contained in this Fact Sheet was compiled from EPA's past and current Multi-Sector General Permits and from the following sources:

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- U.S. EPA, Office of Air and Water Programs - Effluent Guidelines Division.1974. Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Tire and Synthetic Segment of the Rubber Processing Point Source Category. EPA-820-B-80-100.
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- U.S. EPA, Office of Water. 1992. Plastic Pellets in the Aquatic Environment: Sources and Recommendations. EPA 842/B-92/010.
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ATTACHMENT F

Toxics Management Spreadsheet Results for Outfall 005

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Shell Polymers Monaca Plant** NPDES Permit No.: **PA0002208** Outfall No.: **005**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Groundwater from Mall Lot 2**

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
0.047	280	7.33		0.2	0.2	0.2		

	Discharge Pollutant	Units		Max Discharge Conc	Trib Conc (0 if left blank)	Stream Conc (0 if left blank)	Daily CV (0.5 if left blank)	Hourly CV (0.5 if left blank)	Stream CV (0 if left blank)	Fate Coeff (0 if left blank)	FOS (0 if left blank)	Criteria Mod (1 if left blank)	Chem Transl (1 if left blank)
Group 1	Total Dissolved Solids (PWS)	mg/L		500									
	Chloride (PWS)	mg/L		136									
	Bromide	mg/L	<	0.053									
	Sulfate (PWS)	mg/L		120									
	Fluoride (PWS)	mg/L		0.235									
Group 2	Total Aluminum	µg/L		89									
	Total Antimony	µg/L	<	1.7									
	Total Arsenic	µg/L	<	9.05									
	Total Barium	µg/L		62									
	Total Beryllium	µg/L	<	0.25									
	Total Boron	µg/L		170									
	Total Cadmium	µg/L		7.92									
	Total Chromium (III)	µg/L	<	1.2									
	Hexavalent Chromium	µg/L	<	10.9									
	Total Cobalt	µg/L		0.21									
	Total Copper	µg/L		26									
	Free Cyanide	µg/L	<	8									
	Total Cyanide	µg/L	<	8									
	Dissolved Iron	µg/L		120									
	Total Iron	µg/L		120									
	Total Lead	µg/L	<	1.08									
	Total Manganese	µg/L		15									
	Total Mercury	µg/L		0.0043									
	Total Nickel	µg/L		81									
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L		3.07									
	Total Silver	µg/L	<	0.79									
	Total Thallium	µg/L	<	0.69									
	Total Zinc	µg/L		3600									
	Total Molybdenum	µg/L		1.5									
	Acrolein	µg/L	<	16									
	Acrylamide	µg/L	<	21									
	Acrylonitrile	µg/L	<	7.8									
	Benzene	µg/L	<	0.6									
	Bromoform	µg/L	<	0.98									

Group 3	Carbon Tetrachloride	µg/L	<	0.88									
	Chlorobenzene	µg/L	<	0.5									
	Chlorodibromomethane	µg/L	<	0.84									
	Chloroethane	µg/L	<	0.9									
	2-Chloroethyl Vinyl Ether	µg/L	<	1.7									
	Chloroform	µg/L	<	0.6									
	Dichlorobromomethane	µg/L	<	0.64									
	1,1-Dichloroethane	µg/L	<	0.63									
	1,2-Dichloroethane	µg/L	<	0.57									
	1,1-Dichloroethylene	µg/L	<	0.55									
	1,2-Dichloropropane	µg/L	<	0.66									
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<	43									
	Ethylbenzene	µg/L	<	0.51									
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<	0.89									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.6									
	Tetrachloroethylene	µg/L	<	0.47									
	Toluene	µg/L	<	0.46									
	1,2-trans-Dichloroethylene	µg/L	<	0.67									
	1,1,1-Trichloroethane	µg/L	<	0.6									
	1,1,2-Trichloroethane	µg/L	<	0.45									
	Trichloroethylene	µg/L	<	0.69									
	Vinyl Chloride	µg/L	<	0.41									
Group 4	2-Chlorophenol	µg/L	<	0.23									
	2,4-Dichlorophenol	µg/L	<	0.061									
	2,4-Dimethylphenol	µg/L	<	0.61									
	4,6-Dinitro-o-Cresol	µg/L	<	1.8									
	2,4-Dinitrophenol	µg/L	<	3.4									
	2-Nitrophenol	µg/L	<	0.23									
	4-Nitrophenol	µg/L	<	1.1									
	p-Chloro-m-Cresol	µg/L	<	0.45									
	Pentachlorophenol	µg/L	<	1									
	Phenol	µg/L	<	0.58									
	2,4,6-Trichlorophenol	µg/L	<	0.27									
Group 5	Acenaphthene	µg/L	<	0.077									
	Acenaphthylene	µg/L	<	0.077									
	Anthracene	µg/L	<	0.058									
	Benzidine	µg/L	<	11									
	Benzo(a)Anthracene	µg/L	<	0.089									
	Benzo(a)Pyrene	µg/L	<	0.063									
	3,4-Benzofluoranthene	µg/L	<	0.12									
	Benzo(ghi)Perylene	µg/L	<	0.082									
	Benzo(k)Fluoranthene	µg/L	<	0.1									
	Bis(2-Chloroethoxy)Methane	µg/L	<	0.18									
	Bis(2-Chloroethyl)Ether	µg/L	<	0.048									
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	7.4									
	4-Bromophenyl Phenyl Ether	µg/L	<	0.38									
	Butyl Benzyl Phthalate	µg/L	<	0.98									
	2-Chloronaphthalene	µg/L	<	0.07									
	4-Chlorophenyl Phenyl Ether	µg/L	<	0.26									
	Chrysene	µg/L	<	0.096									
	Dibenzo(a,h)Anthrancene	µg/L	<	0.086									
	1,2-Dichlorobenzene	µg/L	<	0.22									
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<	0.25									
	3,3-Dichlorobenzidine	µg/L	<	0.69									
	Diethyl Phthalate	µg/L	<	0.68									
	Dimethyl Phthalate	µg/L	<	0.24									
	Di-n-Butyl Phthalate	µg/L		5.1									
	2,4-Dinitrotoluene	µg/L	<	0.42									

	2,6-Dinitrotoluene	µg/L	<	0.21
	Di-n-Octyl Phthalate	µg/L	<	0.82
	1,2-Diphenylhydrazine	µg/L	<	0.23
	Fluoranthene	µg/L	<	0.071
	Fluorene	µg/L	<	0.082
	Hexachlorobenzene	µg/L	<	0.067
	Hexachlorobutadiene	µg/L	<	0.082
	Hexachlorocyclopentadiene	µg/L	<	0.59
	Hexachloroethane	µg/L	<	0.16
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.1
	Isophorone	µg/L	<	0.22
	Naphthalene	µg/L	<	0.07
	Nitrobenzene	µg/L	<	0.6
	n-Nitrosodimethylamine	µg/L	<	0.27
	n-Nitrosodi-n-Propylamine	µg/L	<	0.085
	n-Nitrosodiphenylamine	µg/L	<	0.14
	Phenanthrene	µg/L	<	0.16
	Pyrene	µg/L	<	0.064
	1,2,4-Trichlorobenzene	µg/L	<	0.25
Group 6	Aldrin	µg/L	<	0.00034
	alpha-BHC	µg/L	<	0.00023
	beta-BHC	µg/L	<	0.00035
	gamma-BHC	µg/L	<	0.00028
	delta BHC	µg/L	<	0.00061
	Chlordane	µg/L	<	0.0069
	4,4-DDT	µg/L	<	0.00066
	4,4-DDE	µg/L	<	0.00028
	4,4-DDD	µg/L	<	0.00051
	Dieldrin	µg/L	<	0.00026
	alpha-Endosulfan	µg/L	<	
	beta-Endosulfan	µg/L	<	
	Endosulfan Sulfate	µg/L	<	0.00061
	Endrin	µg/L	<	0.00022
	Endrin Aldehyde	µg/L	<	0.00049
	Heptachlor	µg/L	<	0.00043
	Heptachlor Epoxide	µg/L	<	0.00032
	PCB-1016	µg/L	<	0.0045
	PCB-1221	µg/L	<	0.00054
	PCB-1232	µg/L	<	0.005
	PCB-1242	µg/L	<	0.0087
	PCB-1248	µg/L	<	0.0028
	PCB-1254	µg/L	<	0.0091
	PCB-1260	µg/L	<	0.0037
	PCBs, Total	µg/L	<	
	Toxaphene	µg/L	<	0.047
	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		

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 005

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Ohio River**

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	032317	952.7	681.85	22771.5	0.0001		Yes
End of Reach 1	032317	951.71	681.67	22772.85	0.001	216	Yes

Q 7-10

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	952.7	0.1	4730			240	15					90.8	7.6		
End of Reach 1	951.71	0.1													

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	952.7														
End of Reach 1	951.71														

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 005

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.332 Analysis Hardness (mg/l): 90.809 Analysis pH: 7.60

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	16,210,635	
Total Antimony	0	0		0	1,100	1,100	23,775,599	
Total Arsenic	0	0		0	340	340	7,348,821	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	#########	
Total Boron	0	0		0	8,100	8,100	#########	
Total Cadmium	0	0		0	1.834	1.93	41,802	Chem Translator of 0.948 applied
Total Chromium (III)	0	0		0	526.503	1,666	36,012,469	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	352,166	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	2,053,347	
Total Copper	0	0		0	12.272	12.8	276,303	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	475,512	
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	58.137	72.2	1,560,865	Chem Translator of 0.805 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	35,600	Chem Translator of 0.85 applied
Total Nickel	0	0		0	431.559	432	9,346,497	Chem Translator of 0.998 applied
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	2.725	3.21	69,298	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	1,404,922	
Total Zinc	0	0		0	107.988	110	2,386,584	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	64,843	

Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	650	650	14,049,217	
Benzene	0	0		0	640	640	13,833,075	
Bromoform	0	0		0	1,800	1,800	38,905,525	
Carbon Tetrachloride	0	0		0	2,800	2,800	60,519,705	
Chlorobenzene	0	0		0	1,200	1,200	25,937,017	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	#########	
Chloroform	0	0		0	1,900	1,900	41,066,943	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	#########	
1,1-Dichloroethylene	0	0		0	7,500	7,500	#########	
1,2-Dichloropropane	0	0		0	11,000	11,000	#########	
Ethylbenzene	0	0		0	2,900	2,900	62,681,123	
Methylene Chloride	0	0		0	12,000	12,000	#########	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	21,614,180	
Tetrachloroethylene	0	0		0	700	700	15,129,926	
Toluene	0	0		0	1,700	1,700	36,744,107	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	#########	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	64,842,541	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	73,488,214	
Trichloroethylene	0	0		0	2,300	2,300	49,712,615	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	12,103,941	
2,4-Dichlorophenol	0	0		0	1,700	1,700	36,744,107	
2,4-Dimethylphenol	0	0		0	660	660	14,265,359	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	1,729,134	
2,4-Dinitrophenol	0	0		0	660	660	14,265,359	
2-Nitrophenol	0	0		0	8,000	8,000	#########	
4-Nitrophenol	0	0		0	2,300	2,300	49,712,615	
p-Chloro-m-Cresol	0	0		0	160	160	3,458,269	
Pentachlorophenol	0	0		0	15.942	15.9	344,582	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	9,942,523	
Acenaphthene	0	0		0	83	83.0	1,793,977	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	6,484,254	
Benzo(a)Anthracene	0	0		0	0.5	0.5	10,807	
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	#########	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	97,263,812	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	5,835,829	
Butyl Benzyl Phthalate	0	0		0	140	140	3,025,985	
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	17,723,628	
1,4-Dichlorobenzene	0	0		0	730	730	15,778,352	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	86,456,722	
Dimethyl Phthalate	0	0		0	2,500	2,500	54,035,451	
Di-n-Butyl Phthalate	0	0		0	110	110	2,377,560	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	34,582,689	
2,6-Dinitrotoluene	0	0		0	990	990	21,398,039	
1,2-Diphenylhydrazine	0	0		0	15	15.0	324,213	
Fluoranthene	0	0		0	200	200	4,322,836	
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	216,142	
Hexachlorocyclopentadiene	0	0		0	5	5.0	108,071	
Hexachloroethane	0	0		0	60	60.0	1,296,851	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	#########	
Naphthalene	0	0		0	140	140	3,025,985	
Nitrobenzene	0	0		0	4,000	4,000	86,456,722	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	#########	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	6,484,254	
Phenanthrene	0	0		0	5	5.0	108,071	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	2,809,843	
Aldrin	0	0		0	3	3.0	64,843	
alpha-BHC	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	0.95	0.95	20,533	
Chlordane	0	0		0	2.4	2.4	51,874	
4,4-DDT	0	0		0	1.1	1.1	23,776	
4,4-DDE	0	0		0	1.1	1.1	23,776	
4,4-DDD	0	0		0	1.1	1.1	23,776	
Dieldrin	0	0		0	0.24	0.24	5,187	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.086	0.086	1,859	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	11,239	
Heptachlor Epoxide	0	0		0	0.5	0.5	10,807	
Toxaphene	0	0		0	0.73	0.73	15,778	

☑ ***CFC*** CCT (min): ###### PMF: 0.200 Analysis Hardness (mg/l): 90.815 Analysis pH: 7.60

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	2,862,589	
Total Arsenic	0	0		0	150	150	1,951,765	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	53,348,253	
Total Boron	0	0		0	1,600	1,600	20,818,830	
Total Cadmium	0	0		0	0.230	0.25	3,279	Chem Translator of 0.913 applied
Total Chromium (III)	0	0		0	68.491	79.6	1,036,264	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	135,257	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	247,224	
Total Copper	0	0		0	8.248	8.59	111,792	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	67,661	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	97,582,267	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.266	2.81	36,620	Chem Translator of 0.805 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	11,787	Chem Translator of 0.85 applied
Total Nickel	0	0		0	47.936	48.1	625,603	Chem Translator of 0.997 applied
Total Selenium	0	0		0	4.600	4.99	64,918	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	169,153	
Total Zinc	0	0		0	108.878	110	1,436,805	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	39,035	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	130	130	1,691,530	
Benzene	0	0		0	130	130	1,691,530	
Bromoform	0	0		0	370	370	4,814,355	
Carbon Tetrachloride	0	0		0	560	560	7,286,591	
Chlorobenzene	0	0		0	240	240	3,122,825	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	45,541,191	
Chloroform	0	0		0	390	390	5,074,590	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	40,336,484	
1,1-Dichloroethylene	0	0		0	1,500	1,500	19,517,653	
1,2-Dichloropropane	0	0		0	2,200	2,200	28,625,892	
Ethylbenzene	0	0		0	580	580	7,546,826	
Methylene Chloride	0	0		0	2,400	2,400	31,228,245	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	2,732,471	
Tetrachloroethylene	0	0		0	140	140	1,821,648	
Toluene	0	0		0	330	330	4,293,884	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	18,216,477	
1,1,1-Trichloroethane	0	0		0	610	610	7,937,179	
1,1,2-Trichloroethane	0	0		0	680	680	8,848,003	

Trichloroethylene	0	0		0	450	450	5,855,296	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	1,431,295	
2,4-Dichlorophenol	0	0		0	340	340	4,424,001	
2,4-Dimethylphenol	0	0		0	130	130	1,691,530	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	208,188	
2,4-Dinitrophenol	0	0		0	130	130	1,691,530	
2-Nitrophenol	0	0		0	1,600	1,600	20,818,830	
4-Nitrophenol	0	0		0	470	470	6,115,531	
p-Chloro-m-Cresol	0	0		0	500	500	6,505,884	
Pentachlorophenol	0	0		0	12.231	12.2	159,148	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	1,184,071	
Acenaphthene	0	0		0	17	17.0	221,200	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	767,694	
Benzo(a)Anthracene	0	0		0	0.1	0.1	1,301	
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	78,070,614	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	11,840,710	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	702,636	
Butyl Benzyl Phthalate	0	0		0	35	35.0	455,412	
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	2,081,883	
1,4-Dichlorobenzene	0	0		0	150	150	1,951,765	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	10,409,415	
Dimethyl Phthalate	0	0		0	500	500	6,505,884	
Di-n-Butyl Phthalate	0	0		0	21	21.0	273,247	
2,4-Dinitrotoluene	0	0		0	320	320	4,163,766	
2,6-Dinitrotoluene	0	0		0	200	200	2,602,354	
1,2-Diphenylhydrazine	0	0		0	3	3.0	39,035	
Fluoranthene	0	0		0	40	40.0	520,471	
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	26,024	
Hexachlorocyclopentadiene	0	0		0	1	1.0	13,012	
Hexachloroethane	0	0		0	12	12.0	156,141	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	27,324,715	
Naphthalene	0	0		0	43	43.0	559,506	

Nitrobenzene	0	0		0	810	810	10,539,533	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	44,240,014	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	767,694	
Phenanthrene	0	0		0	1	1.0	13,012	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	338,306	
Aldrin	0	0		0	0.1	0.1	1,301	
alpha-BHC	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	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	56.0	
4,4-DDT	0	0		0	0.001	0.001	13.0	
4,4-DDE	0	0		0	0.001	0.001	13.0	
4,4-DDD	0	0		0	0.001	0.001	13.0	
Dieldrin	0	0		0	0.056	0.056	729	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.036	0.036	468	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.0038	0.004	49.4	
Heptachlor Epoxide	0	0		0	0.0038	0.004	49.4	
Toxaphene	0	0		0	0.0002	0.0002	2.6	

☑ ***THH*** CCT (min): 66.306 THH PMF: 0.200 Analysis Hardness (mg/l): N/A Analysis pH: N/A PWS PMF: 0.2

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	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.135 cfs
Chloride (PWS)	0	0		0	250,000	250,000	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.135 cfs
Sulfate (PWS)	0	0		0	250,000	250,000	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.135 cfs
Fluoride (PWS)	0	0		0	1,000	1,000	45,442,151	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	254,476	
Total Arsenic	0	0		0	10	10.0	454,422	
Total Barium	0	0		0	1,000	1,000	45,442,151	
Total Boron	0	0		0	3,100	3,100	#########	
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	1,300	1,300	59,074,797	
Free Cyanide	0	0		0	4	4.0	181,769	
Dissolved Iron	0	0		0	300	300	13,632,645	
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	45,442,151	
Total Mercury	0	0		0	0.012	0.012	545	
Total Nickel	0	0		0	610	610	27,719,712	
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	10,906	
Total Zinc	0	0		0	7,400	7,400	#########	
Acrolein	0	0		0	3	3.0	136,326	
Acrylamide	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	
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	4,544,215	
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	259,020	
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	1,499,591	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	3,090,066	
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	2,590,203	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	4,544,215	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	#########	
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	1,363,265	
2,4-Dichlorophenol	0	0		0	10	10.0	454,422	
2,4-Dimethylphenol	0	0		0	100	100.0	4,544,215	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	90,884	
2,4-Dinitrophenol	0	0		0	10	10.0	454,422	
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	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	#########	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	3,180,951	
Anthracene	0	0		0	300	300	13,632,645	
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-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	4,544	
2-Chloronaphthalene	0	0		0	800	800	36,353,721	
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	420	420	19,085,704	
1,4-Dichlorobenzene	0	0		0	63	63.0	2,862,856	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	27,265,291	
Dimethyl Phthalate	0	0		0	2,000	2,000	90,884,302	
Di-n-Butyl Phthalate	0	0		0	20	20.0	908,843	
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	908,843	
Fluorene	0	0		0	50	50.0	2,272,108	
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	181,769	
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	1,545,033	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	454,422	
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	908,843	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	3,181	
Aldrin	0	0		0	N/A	N/A	N/A	
alpha-BHC	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	0.98	0.98	44,533	
Chlordane	0	0		0	N/A	N/A	N/A	
4,4-DDT	0	0		0	N/A	N/A	N/A	
4,4-DDE	0	0		0	N/A	N/A	N/A	
4,4-DDD	0	0		0	N/A	N/A	N/A	
Dieldrin	0	0		0	N/A	N/A	N/A	

Endosulfan Sulfate	0	0		0	20	20.0	908,843	
Endrin	0	0		0	0.03	0.03	1,363	
Endrin Aldehyde	0	0		0	0.29	0.29	13,178	
Heptachlor	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	
Toxaphene	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 73.107 PMF: 0.200 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	
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 Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	50	50.0	1,664,341	
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	
Acrylamide	0	0		0	0.07	0.07	2,330	
Acrylonitrile	0	0		0	0.051	0.051	1,698	
Benzene	0	0		0	0.58	0.58	19,306	
Bromoform	0	0		0	4.3	4.3	143,133	
Carbon Tetrachloride	0	0		0	0.4	0.4	13,315	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.4	0.4	13,315	
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	0.55	0.55	18,308	
1,2-Dichloroethane	0	0		0	0.38	0.38	12,649	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.5	0.5	16,643	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	4.6	4.6	153,119	
1,1,2,2-Tetrachloroethane	0	0		0	0.17	0.17	5,659	
Tetrachloroethylene	0	0		0	0.69	0.69	22,968	
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	18,308	
Trichloroethylene	0	0		0	0.6	0.6	19,972	
Vinyl Chloride	0	0		0	0.02	0.02	666	
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	
4,6-Dinitro-o-Cresol	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	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	999	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.4	1.4	46,602	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.000086	0.00009	2.86	
Benzo(a)Anthracene	0	0		0	0.001	0.001	33.3	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	3.33	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	33.3	
Benzo(k)Fluoranthene	0	0		0	0.0038	0.004	126	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	999	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	10,652	
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	0.0038	0.004	126	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	3.33	
1,2-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	0.021	0.021	699	
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	1,664	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	1,664	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	999	
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	2.66	
Hexachlorobutadiene	0	0		0	0.01	0.01	333	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	3,329	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	33.3	
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	0.00069	0.0007	23.0	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	166	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	109,847	
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	
Aldrin	0	0		0	0.0000008	8.00E-07	0.027	
alpha-BHC	0	0		0	0.0004	0.0004	13.3	
beta-BHC	0	0		0	0.008	0.008	266	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0003	0.0003	9.99	
4,4-DDT	0	0		0	0.00003	0.00003	1.	
4,4-DDE	0	0		0	0.00002	0.00002	0.67	
4,4-DDD	0	0		0	0.0001	0.0001	3.33	
Dieldrin	0	0		0	0.000001	0.000001	0.033	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	N/A	N/A	N/A	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.000006	0.000006	0.2	
Heptachlor Epoxide	0	0		0	0.00003	0.00003	1.	
Toxaphene	0	0		0	0.00028	0.0003	9.32	

☑ ***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 Mercury	Report	Report	Report	Report	Report	µg/L	0.012	THH	Discharge Conc > 10% WQBEL (no 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)	6,506,070	mg/L	Discharge Conc ≤ 10% WQBEL
Chloride (PWS)	3,253,035	mg/L	Discharge Conc ≤ 10% WQBEL
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	3,253,035	mg/L	Discharge Conc ≤ 10% WQBEL
Fluoride (PWS)	45,442	mg/L	Discharge Conc ≤ 10% WQBEL
Total Aluminum	10,390,363	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	454,422	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	45,442,151	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	20,818,830	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	3,279	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	1,036,264	µg/L	Discharge Conc < TQL
Hexavalent Chromium	135,257	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	247,224	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	111,792	µg/L	Discharge Conc ≤ 10% WQBEL
Free Cyanide	67,661	µg/L	Discharge Conc ≤ 25% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	13,632,645	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	97,582,267	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	36,620	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	45,442,151	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	625,603	µg/L	Discharge Conc ≤ 10% WQBEL
Total Selenium	64,918	µg/L	Discharge Conc ≤ 10% WQBEL
Total Silver	44,417	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	10,906	µg/L	Discharge Conc < TQL
Total Zinc	1,436,805	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	39,035	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylamide	2,330	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylonitrile	1,698	µg/L	Discharge Conc ≤ 25% WQBEL
Benzene	19,306	µg/L	Discharge Conc ≤ 25% WQBEL
Bromoform	143,133	µg/L	Discharge Conc ≤ 25% WQBEL
Carbon Tetrachloride	13,315	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorobenzene	3,122,825	µg/L	Discharge Conc < TQL
Chlorodibromomethane	13,315	µg/L	Discharge Conc ≤ 25% WQBEL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	45,541,191	µg/L	Discharge Conc < TQL
Chloroform	259,020	µg/L	Discharge Conc ≤ 25% WQBEL

Dichlorobromomethane	18,308	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	12,649	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethylene	1,499,591	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-Dichloropropane	16,643	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	3,090,066	µg/L	Discharge Conc ≤ 25% WQBEL
Methylene Chloride	153,119	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2,2-Tetrachloroethane	5,659	µg/L	Discharge Conc ≤ 25% WQBEL
Tetrachloroethylene	22,968	µg/L	Discharge Conc < TQL
Toluene	2,590,203	µg/L	Discharge Conc < TQL
1,2-trans-Dichloroethylene	4,544,215	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,1-Trichloroethane	7,937,179	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2-Trichloroethane	18,308	µg/L	Discharge Conc < TQL
Trichloroethylene	19,972	µg/L	Discharge Conc ≤ 25% WQBEL
Vinyl Chloride	666	µg/L	Discharge Conc < TQL
2-Chlorophenol	1,363,265	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	454,422	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	1,691,530	µg/L	Discharge Conc < TQL
4,6-Dinitro-o-Cresol	90,884	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	454,422	µg/L	Discharge Conc < TQL
2-Nitrophenol	20,818,830	µg/L	Discharge Conc < TQL
4-Nitrophenol	6,115,531	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	2,216,611	µg/L	Discharge Conc < TQL
Pentachlorophenol	999	µg/L	Discharge Conc < TQL
Phenol	#########	µg/L	Discharge Conc < TQL
2,4,6-Trichlorophenol	46,602	µg/L	Discharge Conc < TQL
Acenaphthene	221,200	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	13,632,645	µg/L	Discharge Conc < TQL
Benzidine	2.86	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	33.3	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	3.33	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	33.3	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	126	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	999	µg/L	Discharge Conc < TQL
Bis(2-Ethylhexyl)Phthalate	10,652	µg/L	Discharge Conc ≤ 25% WQBEL
4-Bromophenyl Phenyl Ether	702,636	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	4,544	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	36,353,721	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	126	µg/L	Discharge Conc < TQL
Dibenzo(a,h)Anthrancene	3.33	µg/L	Discharge Conc < TQL

1,2-Dichlorobenzene	2,081,883	µg/L	Discharge Conc < TQL
1,4-Dichlorobenzene	1,951,765	µg/L	Discharge Conc < TQL
3,3-Dichlorobenzidine	699	µg/L	Discharge Conc < TQL
Diethyl Phthalate	10,409,415	µg/L	Discharge Conc < TQL
Dimethyl Phthalate	6,505,884	µg/L	Discharge Conc < TQL
Di-n-Butyl Phthalate	273,247	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dinitrotoluene	1,664	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	1,664	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	999	µg/L	Discharge Conc < TQL
Fluoranthene	520,471	µg/L	Discharge Conc < TQL
Fluorene	2,272,108	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.00008	µg/L	Discharge Conc < TQL
Hexachlorobutadiene	0.01	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	13,012	µg/L	Discharge Conc < TQL
Hexachloroethane	3,329	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	33.3	µg/L	Discharge Conc < TQL
Isophorone	1,545,033	µg/L	Discharge Conc < TQL
Naphthalene	559,506	µg/L	Discharge Conc < TQL
Nitrobenzene	454,422	µg/L	Discharge Conc < TQL
n-Nitrosodimethylamine	23.0	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	166	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	109,847	µg/L	Discharge Conc < TQL
Phenanthrene	13,012	µg/L	Discharge Conc < TQL
Pyrene	908,843	µg/L	Discharge Conc < TQL
1,2,4-Trichlorobenzene	3,181	µg/L	Discharge Conc < TQL
Aldrin	0.027	µg/L	Discharge Conc < TQL
alpha-BHC	13.3	µg/L	Discharge Conc < TQL
beta-BHC	266	µg/L	Discharge Conc < TQL
gamma-BHC	0.95	µg/L	Discharge Conc < TQL
delta BHC	N/A	N/A	No WQS
Chlordane	0.0003	µg/L	Discharge Conc < TQL
4,4-DDT	0.00003	µg/L	Discharge Conc < TQL
4,4-DDE	0.00002	µg/L	Discharge Conc < TQL
4,4-DDD	0.0001	µg/L	Discharge Conc < TQL
Dieldrin	0.000001	µg/L	Discharge Conc < TQL
Endosulfan Sulfate	908,843	µg/L	Discharge Conc < TQL
Endrin	468	µg/L	Discharge Conc < TQL
Endrin Aldehyde	13,178	µg/L	Discharge Conc < TQL
Heptachlor	0.2	µg/L	Discharge Conc < TQL
Heptachlor Epoxide	1.	µg/L	Discharge Conc < TQL
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
Toxaphene	0.0002	µg/L	Discharge Conc < TQL

ATTACHMENT G

Toxics Management Spreadsheet Results for Outfall 015

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Toxics Management Spreadsheet
Version 1.4, May 2025

Discharge Information

Instructions | Discharge | Stream

Facility: **Shell Polymers Monaca Plant** NPDES Permit No.: **PA0002208** Outfall No.: **015**

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

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
0.00164	260	8.1		0.2	0.2	0.2		

	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc (0 if left blank)	Stream Conc (0 if left blank)	Daily CV (0.5 if left blank)	Hourly CV (0.5 if left blank)	Stream CV (0 if left blank)	Fate Coeff (0 if left blank)	FOS (0 if left blank)	Criteria Mod (1 if left blank)	Chem Transl (1 if left blank)
Group 1	Total Dissolved Solids (PWS)	mg/L		610		183.69			0.25				
Group 1	Chloride (PWS)	mg/L		99.4		25.372			0.3315				
Group 1	Bromide	mg/L	<	0.053									
Group 1	Sulfate (PWS)	mg/L		192		53.875			0.308				
Group 1	Fluoride (PWS)	mg/L		0.271									
Group 2	Total Aluminum	µg/L		190		492.49			1.1196				
Group 2	Total Antimony	µg/L		8.75			1.29						
Group 2	Total Arsenic	µg/L		22			0.663						
Group 2	Total Barium	µg/L		50		42.946			0.1895				
Group 2	Total Beryllium	µg/L	<	0.25									
Group 2	Total Boron	µg/L		4810			0.3383						
Group 2	Total Cadmium	µg/L		3.55			1.9744						
Group 2	Total Chromium (III)	µg/L	<	1.2									
Group 2	Hexavalent Chromium	µg/L	<	6									
Group 2	Total Cobalt	µg/L		0.53									
Group 2	Total Copper	µg/L		3		2.881			0.602				
Group 2	Free Cyanide	µg/L	<	8									
Group 2	Total Cyanide	µg/L	<	8									
Group 2	Dissolved Iron	µg/L		250									
Group 2	Total Iron	µg/L		680		1187.6	3.4829		1.1379				
Group 2	Total Lead	µg/L		4.9		1.6109	2.0982		0.8542				
Group 2	Total Manganese	µg/L		1240			0.8954						
Group 2	Total Mercury	ng/L		4.83		2.2421	1.5598		0.6508				
Group 2	Total Nickel	µg/L		15			1.5322						
Group 2	Total Phenols (Phenolics) (PWS)	µg/L											
Group 2	Total Selenium	µg/L		7.2			0.3819						
Group 2	Total Silver	µg/L	<	0.79									
Group 2	Total Thallium	µg/L	<	0.69									
Group 2	Total Zinc	µg/L		2800		25.73	1.8072		0.3321				
Group 2	Total Molybdenum	µg/L		14									
	Acrolein	µg/L	<	16									
	Acrylamide	µg/L	<	21									
	Acrylonitrile	µg/L	<	7.8									
	Benzene	µg/L	<	0.6									
	Bromoform	µg/L	<	0.98									

Group 3	Carbon Tetrachloride	µg/L	<	0.88								
	Chlorobenzene	µg/L	<	0.5								
	Chlorodibromomethane	µg/L	<	0.84								
	Chloroethane	µg/L	<	0.9								
	2-Chloroethyl Vinyl Ether	µg/L	<	1.7								
	Chloroform	µg/L	<	0.6								
	Dichlorobromomethane	µg/L	<	0.64								
	1,1-Dichloroethane	µg/L	<	0.63								
	1,2-Dichloroethane	µg/L	<	0.57								
	1,1-Dichloroethylene	µg/L	<	0.55								
	1,2-Dichloropropane	µg/L	<	0.66								
	1,3-Dichloropropylene	µg/L	<	0.59								
	1,4-Dioxane	µg/L	<	43								
	Ethylbenzene	µg/L	<	0.51								
	Methyl Bromide	µg/L	<	0.89								
	Methyl Chloride	µg/L	<	0.9								
	Methylene Chloride	µg/L	<	0.89								
	1,1,2,2-Tetrachloroethane	µg/L	<	0.6								
	Tetrachloroethylene	µg/L	<	0.47								
	Toluene	µg/L	<	0.46								
	1,2-trans-Dichloroethylene	µg/L	<	0.67								
	1,1,1-Trichloroethane	µg/L	<	0.6								
	1,1,2-Trichloroethane	µg/L	<	0.45								
	Trichloroethylene	µg/L	<	0.47								
	Vinyl Chloride	µg/L	<	0.41								
Group 4	2-Chlorophenol	µg/L	<	0.23								
	2,4-Dichlorophenol	µg/L	<	0.058								
	2,4-Dimethylphenol	µg/L	<	0.59								
	4,6-Dinitro-o-Cresol	µg/L	<	1.7								
	2,4-Dinitrophenol	µg/L	<	3.3								
	2-Nitrophenol	µg/L	<	0.22								
	4-Nitrophenol	µg/L	<	1.1								
	p-Chloro-m-Cresol	µg/L	<	0.44								
	Pentachlorophenol	µg/L	<	0.96								
	Phenol	µg/L	<	0.55								
	2,4,6-Trichlorophenol	µg/L	<	0.25								
Group 5	Acenaphthene	µg/L	<	0.074								
	Acenaphthylene	µg/L	<	0.074								
	Anthracene	µg/L	<	0.056								
	Benzidine	µg/L	<	10								
	Benzo(a)Anthracene	µg/L	<	0.085								
	Benzo(a)Pyrene	µg/L	<	0.06								
	3,4-Benzofluoranthene	µg/L	<	0.11								
	Benzo(ghi)Perylene	µg/L	<	0.078								
	Benzo(k)Fluoranthene	µg/L	<	0.1								
	Bis(2-Chloroethoxy)Methane	µg/L	<	0.17								
	Bis(2-Chloroethyl)Ether	µg/L	<	0.045								
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.066								
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	7.1								
	4-Bromophenyl Phenyl Ether	µg/L	<	0.36								
	Butyl Benzyl Phthalate	µg/L	<	0.94								
	2-Chloronaphthalene	µg/L	<	0.063								
	4-Chlorophenyl Phenyl Ether	µg/L	<	0.25								
	Chrysene	µg/L	<	0.092								
	Dibenzo(a,h)Anthrancene	µg/L	<	0.082								
	1,2-Dichlorobenzene	µg/L	<	0.21								
	1,3-Dichlorobenzene	µg/L	<									
	1,4-Dichlorobenzene	µg/L	<	0.24								
	3,3-Dichlorobenzidine	µg/L	<	0.66								
	Diethyl Phthalate	µg/L	<	0.64								
	Dimethyl Phthalate	µg/L		0.23								
	Di-n-Butyl Phthalate	µg/L	<	4.9								
	2,4-Dinitrotoluene	µg/L	<	0.4								

	2,6-Dinitrotoluene	µg/L	<	0.2										
	Di-n-Octyl Phthalate	µg/L	<	0.78										
	1,2-Diphenylhydrazine	µg/L	<	0.22										
	Fluoranthene	µg/L	<	0.068										
	Fluorene	µg/L	<	0.078										
	Hexachlorobenzene	µg/L	<	0.064										
	Hexachlorobutadiene	µg/L	<	0.078										
	Hexachlorocyclopentadiene	µg/L	<	0.56										
	Hexachloroethane	µg/L	<	0.15										
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.097										
	Isophorone	µg/L	<	0.21										
	Naphthalene	µg/L		0.15										
	Nitrobenzene	µg/L	<	0.57										
	n-Nitrosodimethylamine	µg/L	<	0.26										
	n-Nitrosodi-n-Propylamine	µg/L	<	0.081										
	n-Nitrosodiphenylamine	µg/L	<	0.14										
	Phenanthrene	µg/L	<	0.16										
	Pyrene	µg/L	<	0.061										
	1,2,4-Trichlorobenzene	µg/L	<	0.24										
Group 6	Aldrin	µg/L	<	0.00034										
	alpha-BHC	µg/L	<	0.00023										
	beta-BHC	µg/L	<	0.00035										
	gamma-BHC	µg/L	<	0.00028										
	delta BHC	µg/L	<	0.00061										
	Chlordane	µg/L	<	0.0069										
	4,4-DDT	µg/L	<	0.00066										
	4,4-DDE	µg/L	<	0.00028										
	4,4-DDD	µg/L	<	0.00051										
	Dieldrin	µg/L	<	0.00026										
	alpha-Endosulfan	µg/L	<	0.00065										
	beta-Endosulfan	µg/L	<	0.0003										
	Endosulfan Sulfate	µg/L	<	0.00061										
	Endrin	µg/L	<	0.00022										
	Endrin Aldehyde	µg/L	<	0.00049										
	Heptachlor	µg/L	<	0.00043										
	Heptachlor Epoxide	µg/L	<	0.00032										
	PCB-1016	µg/L	<	0.0045										
	PCB-1221	µg/L	<	0.0054										
	PCB-1232	µg/L	<	0.005										
	PCB-1242	µg/L	<	0.0087										
	PCB-1248	µg/L	<	0.0028										
	PCB-1254	µg/L	<	0.0091										
	PCB-1260	µg/L	<	0.0037										
	PCBs, Total	µg/L	<	0.0392										
	Toxaphene	µg/L	<	0.047										
	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												
	1,2,4,5-Tetrachlorobenzene	µg/L	<											
	Pentachlorobenzene	µg/L	<											

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Toxics Management Spreadsheet
Version 1.4, May 2025

Stream / Surface Water Information

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 015

Instructions | Discharge | Stream

Receiving Surface Water Name: **Ohio River**

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	032317	953.7	681.9	22771.5	0.0001		Yes
End of Reach 1	032317	951.71	681.67	22771.85	0.0001	216	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	953.7	0.1	4730			240	15					97.55	7.6		
End of Reach 1	951.71	0.1													

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	953.7		16200												
End of Reach 1	951.71														

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Toxics Management Spreadsheet
Version 1.4, May 2025

Model Results

Shell Polymers Monaca Plant, NPDES Permit No. PA0002208, Outfall 015

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

☑ ***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)
953.7	4,730		4,730	0.003	0.0001	15.	240.	16.	1.314	0.093	135.898
951.71	4730.035	334.152	4395.883								

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)
953.7	16,200		16,200	0.003	0.0001	25.783	240.	9.308	2.618	0.046	60.303
951.71	12100.972	334.152	11766.82								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.332 Analysis Hardness (mg/l): 97.55 Analysis pH: 7.60

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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		0	750	750	-4.31E+08	
Total Antimony	0	0		0	1,100	1,100	#########	
Total Arsenic	0	0		0	340	340	#########	Chem Translator of 1 applied
Total Barium	42.94629	0.1895		0	21,000	21,000	#########	
Total Boron	0	0		0	8,100	8,100	#########	
Total Cadmium	0	0		0	1.966	2.08	1,288,383	Chem Translator of 0.945 applied
Total Chromium (III)	0	0		0	558.307	1,767	#########	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	10,091,958	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	58,842,424	
Total Copper	2.881	0.602		0	13.129	13.7	4,654,419	Chem Translator of 0.96 applied

Free Cyanide	0	0		0	22	22.0	13,626,667	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	62.860	79.1	46,435,000	Chem Translator of 0.795 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		0	1.400	1.65	1,017,085	Chem Translator of 0.85 applied
Total Nickel	0	0		0	458.513	459	#########	Chem Translator of 0.998 applied
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.082	3.63	2,246,152	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	40,260,606	
Total Zinc	25.72979	0.3321		0	114.744	117	46,920,396	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	1,858,182	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	650	650	#########	
Benzene	0	0		0	640	640	#########	
Bromoform	0	0		0	1,800	1,800	#########	
Carbon Tetrachloride	0	0		0	2,800	2,800	#########	
Chlorobenzene	0	0		0	1,200	1,200	#########	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	#########	
Chloroform	0	0		0	1,900	1,900	#########	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	#########	
1,1-Dichloroethylene	0	0		0	7,500	7,500	#########	
1,2-Dichloropropane	0	0		0	11,000	11,000	#########	
1,3-Dichloropropylene	0	0		0	310	310	#########	
Ethylbenzene	0	0		0	2,900	2,900	#########	
Methyl Bromide	0	0		0	550	550	#########	
Methyl Chloride	0	0		0	28,000	28,000	#########	
Methylene Chloride	0	0		0	12,000	12,000	#########	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	#########	
Tetrachloroethylene	0	0		0	700	700	#########	
Toluene	0	0		0	1,700	1,700	#########	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	#########	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	#########	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	#########	
Trichloroethylene	0	0		0	2,300	2,300	#########	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	#########	
2,4-Dichlorophenol	0	0		0	1,700	1,700	#########	
2,4-Dimethylphenol	0	0		0	660	660	#########	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	49,551,515	
2,4-Dinitrophenol	0	0		0	660	660	#########	
2-Nitrophenol	0	0		0	8,000	8,000	#########	
4-Nitrophenol	0	0		0	2,300	2,300	#########	
p-Chloro-m-Cresol	0	0		0	160	160	99,103,029	
Pentachlorophenol	0	0		0	15.943	15.9	9,874,806	
Phenol	0	0		0	N/A	N/A	N/A	

2,4,6-Trichlorophenol	0	0		0	460	460	#########	
Acenaphthene	0	0		0	83	83.0	51,409,697	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	#########	
Benzo(a)Anthracene	0	0		0	0.5	0.5	309,697	
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	#########	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	#########	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	#########	
Butyl Benzyl Phthalate	0	0		0	140	140	86,715,151	
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	#########	
1,4-Dichlorobenzene	0	0		0	730	730	#########	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	#########	
Dimethyl Phthalate	0	0		0	2,500	2,500	#########	
Di-n-Butyl Phthalate	0	0		0	110	110	68,133,333	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	#########	
2,6-Dinitrotoluene	0	0		0	990	990	#########	
1,2-Diphenylhydrazine	0	0		0	15	15.0	9,290,909	
Fluoranthene	0	0		0	200	200	#########	
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	6,193,939	
Hexachlorocyclopentadiene	0	0		0	5	5.0	3,096,970	
Hexachloroethane	0	0		0	60	60.0	37,163,636	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	#########	
Naphthalene	0	0		0	140	140	86,715,151	
Nitrobenzene	0	0		0	4,000	4,000	#########	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	#########	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	#########	
Phenanthrene	0	0		0	5	5.0	3,096,970	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	80,521,211	
Aldrin	0	0		0	3	3.0	1,858,182	
alpha-BHC	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	0.95	0.95	588,424	
Chlordane	0	0		0	2.4	2.4	1,486,545	
4,4-DDT	0	0		0	1.1	1.1	681,333	
4,4-DDE	0	0		0	1.1	1.1	681,333	

4,4-DDD	0	0		0	1.1	1.1	681,333	
Dieldrin	0	0		0	0.24	0.24	148,655	
alpha-Endosulfan	0	0		0	0.22	0.22	136,267	
beta-Endosulfan	0	0		0	0.22	0.22	136,267	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.086	0.086	53,268	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	322,085	
Heptachlor Epoxide	0	0		0	0.5	0.5	309,697	
PCBs, Total	0	0		0	N/A	N/A	N/A	
Toxaphene	0	0		0	0.73	0.73	452,158	

☑ ***CFC*** CCT (min): ###### PMF: 0.200 Analysis Hardness (mg/l): 97.55 Analysis pH: 7.60

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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	82,031,532	
Total Arsenic	0	0		0	150	150	55,930,590	Chem Translator of 1 applied
Total Barium	42.94629	0.1895		0	4,100	4,100	#########	
Total Boron	0	0		0	1,600	1,600	#########	
Total Cadmium	0	0		0	0.242	0.27	99,070	Chem Translator of 0.91 applied
Total Chromium (III)	0	0		0	72.624	84.4	31,487,757	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	3,875,994	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	7,084,541	
Total Copper	2.881	0.602		0	8.768	9.13	1,735,773	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	1,938,927	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1187.5765	1.1379		0	1,500	1,500	-1.80E+09	WQC = 30 day average; PMF = 1
Total Lead	1.61087	0.8542		0	2.450	3.08	66,343	Chem Translator of 0.795 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		0	0.770	0.91	336,437	Chem Translator of 0.85 applied
Total Nickel	0	0		0	50.927	51.1	19,046,222	Chem Translator of 0.997 applied
Total Selenium	0	0		0	4.600	4.99	1,860,309	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	4,847,318	
Total Zinc	25.72979	0.3321		0	115.682	117	31,332,881	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	1,118,612	
Acrylamide	0	0		0	N/A	N/A	N/A	

Acrylonitrile	0	0		0	130	130	48,473,178	
Benzene	0	0		0	130	130	48,473,178	
Bromoform	0	0		0	370	370	#########	
Carbon Tetrachloride	0	0		0	560	560	#########	
Chlorobenzene	0	0		0	240	240	89,488,944	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	#########	
Chloroform	0	0		0	390	390	#########	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	#########	
1,1-Dichloroethylene	0	0		0	1,500	1,500	#########	
1,2-Dichloropropane	0	0		0	2,200	2,200	#########	
1,3-Dichloropropylene	0	0		0	61	61.0	22,745,106	
Ethylbenzene	0	0		0	580	580	#########	
Methyl Bromide	0	0		0	110	110	41,015,766	
Methyl Chloride	0	0		0	5,500	5,500	#########	
Methylene Chloride	0	0		0	2,400	2,400	#########	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	78,302,826	
Tetrachloroethylene	0	0		0	140	140	52,201,884	
Toluene	0	0		0	330	330	#########	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	#########	
1,1,1-Trichloroethane	0	0		0	610	610	#########	
1,1,2-Trichloroethane	0	0		0	680	680	#########	
Trichloroethylene	0	0		0	450	450	#########	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	41,015,766	
2,4-Dichlorophenol	0	0		0	340	340	#########	
2,4-Dimethylphenol	0	0		0	130	130	48,473,178	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	5,965,930	
2,4-Dinitrophenol	0	0		0	130	130	48,473,178	
2-Nitrophenol	0	0		0	1,600	1,600	#########	
4-Nitrophenol	0	0		0	470	470	#########	
p-Chloro-m-Cresol	0	0		0	500	500	#########	
Pentachlorophenol	0	0		0	12.231	12.2	4,560,702	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	33,931,224	
Acenaphthene	0	0		0	17	17.0	6,338,800	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	21,999,365	
Benzo(a)Anthracene	0	0		0	0.1	0.1	37,287	
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	#########	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	

Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	#########	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	20,135,012	
Butyl Benzyl Phthalate	0	0		0	35	35.0	13,050,471	
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	59,659,296	
1,4-Dichlorobenzene	0	0		0	150	150	55,930,590	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	#########	
Dimethyl Phthalate	0	0		0	500	500	#########	
Di-n-Butyl Phthalate	0	0		0	21	21.0	7,830,283	
2,4-Dinitrotoluene	0	0		0	320	320	#########	
2,6-Dinitrotoluene	0	0		0	200	200	74,574,120	
1,2-Diphenylhydrazine	0	0		0	3	3.0	1,118,612	
Fluoranthene	0	0		0	40	40.0	14,914,824	
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	745,741	
Hexachlorocyclopentadiene	0	0		0	1	1.0	372,871	
Hexachloroethane	0	0		0	12	12.0	4,474,447	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	#########	
Naphthalene	0	0		0	43	43.0	16,033,436	
Nitrobenzene	0	0		0	810	810	#########	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	#########	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	21,999,365	
Phenanthrene	0	0		0	1	1.0	372,871	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	9,694,636	
Aldrin	0	0		0	0.1	0.1	37,287	
alpha-BHC	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	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	1,603	
4,4-DDT	0	0		0	0.001	0.001	373	
4,4-DDE	0	0		0	0.001	0.001	373	
4,4-DDD	0	0		0	0.001	0.001	373	
Dieldrin	0	0		0	0.056	0.056	20,881	
alpha-Endosulfan	0	0		0	0.056	0.056	20,881	
beta-Endosulfan	0	0		0	0.056	0.056	20,881	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.036	0.036	13,423	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	

Heptachlor	0	0		0	0.0038	0.004	1,417	
Heptachlor Epoxide	0	0		0	0.0038	0.004	1,417	
PCBs, Total	0	0		0	0.014	0.014	5,220	
Toxaphene	0	0		0	0.0002	0.0002	74.6	

☑ ***THH*** CCT (min): ###### THH PMF: 0.200 Analysis Hardness (mg/l): N/A Analysis pH: N/A PWS PMF: 0.2

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)	183685.12	0.25		0	500,000	500,000	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.035 cfs
Chloride (PWS)	25372.03	0.3315		0	250,000	250,000	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.035 cfs
Sulfate (PWS)	53875.03	0.308		0	250,000	250,000	#########	WQC applied at RMI 951.71 with a design stream flow of 4730.035 cfs
Fluoride (PWS)	0	0		0	1,000	1,000	#########	
Total Aluminum	492.48613	1.1196		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	2,088,075	
Total Arsenic	0	0		0	10	10.0	3,728,706	
Total Barium	42.94629	0.1895		0	1,000	1,000	#########	
Total Boron	0	0		0	3,100	3,100	#########	
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	2.881	0.602		0	1,300	1,300	#########	
Free Cyanide	0	0		0	4	4.0	1,491,482	
Dissolved Iron	0	0		0	300	300	#########	
Total Iron	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	#########	
Total Mercury	0.0022421	0.6508		0	0.012	0.012	3,638	
Total Nickel	0	0		0	610	610	#########	
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	89,489	
Total Zinc	25.72979	0.3321		0	7,400	7,400	#########	
Acrolein	0	0		0	3	3.0	1,118,612	
Acrylamide	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	
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	37,287,060	
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	2,125,362	
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	12,304,730	
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	25,355,201	
Methyl Bromide	0	0		0	47	47.0	17,524,918	
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	21,253,624	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	37,287,060	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	#########	
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	11,186,118	
2,4-Dichlorophenol	0	0		0	10	10.0	3,728,706	
2,4-Dimethylphenol	0	0		0	100	100.0	37,287,060	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	745,741	
2,4-Dinitrophenol	0	0		0	10	10.0	3,728,706	
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	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	#########	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	26,100,942	
Anthracene	0	0		0	300	300	#########	
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	74,574,120	
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	37,287	
2-Chloronaphthalene	0	0		0	800	800	#########	
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	420	420	#########	
1,4-Dichlorobenzene	0	0		0	63	63.0	23,490,848	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	#########	
Dimethyl Phthalate	0	0		0	2,000	2,000	#########	
Di-n-Butyl Phthalate	0	0		0	20	20.0	7,457,412	
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	7,457,412	
Fluorene	0	0		0	50	50.0	18,643,530	
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	1,491,482	
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	12,677,600	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	3,728,706	
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	7,457,412	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	26,101	
Aldrin	0	0		0	N/A	N/A	N/A	
alpha-BHC	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	0.98	0.98	365,413	
Chlordane	0	0		0	N/A	N/A	N/A	
4,4-DDT	0	0		0	N/A	N/A	N/A	
4,4-DDE	0	0		0	N/A	N/A	N/A	
4,4-DDD	0	0		0	N/A	N/A	N/A	
Dieldrin	0	0		0	N/A	N/A	N/A	
alpha-Endosulfan	0	0		0	20	20.0	7,457,412	
beta-Endosulfan	0	0		0	20	20.0	7,457,412	
Endosulfan Sulfate	0	0		0	20	20.0	7,457,412	
Endrin	0	0		0	0.03	0.03	11,186	
Endrin Aldehyde	0	0		0	0.29	0.29	108,132	
Heptachlor	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	
PCBs, Total	0	0		0	N/A	N/A	N/A	
Toxaphene	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 60.303 PMF: 0.200 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)	183685.12	0.25		0	N/A	N/A	N/A	
Chloride (PWS)	25372.03	0.3315		0	N/A	N/A	N/A	
Sulfate (PWS)	53875.03	0.308		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	492.48613	1.1196		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	42.94629	0.1895		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	2.881	0.602		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	1187.5765	1.1379		0	N/A	N/A	N/A	
Total Lead	1.61087	0.8542		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0.0022421	0.6508		0	N/A	N/A	N/A	
Total Nickel	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	50	50.0	63,852,983	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	25.72979	0.3321		0	N/A	N/A	N/A	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylamide	0	0		0	0.07	0.07	89,394	
Acrylonitrile	0	0		0	0.051	0.051	65,130	
Benzene	0	0		0	0.58	0.58	740,695	
Bromoform	0	0		0	4.3	4.3	5,491,357	
Carbon Tetrachloride	0	0		0	0.4	0.4	510,824	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.4	0.4	510,824	
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	0.55	0.55	702,383	
1,2-Dichloroethane	0	0		0	0.38	0.38	485,283	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.5	0.5	638,530	

1,3-Dichloropropylene	0	0		0	0.27	0.27	344,806	
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	4.6	4.6	5,874,474	
1,1,2,2-Tetrachloroethane	0	0		0	0.17	0.17	217,100	
Tetrachloroethylene	0	0		0	0.69	0.69	881,171	
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	702,383	
Trichloroethylene	0	0		0	0.6	0.6	766,236	
Vinyl Chloride	0	0		0	0.02	0.02	25,541	
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	
4,6-Dinitro-o-Cresol	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	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	38,312	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.4	1.4	1,787,884	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.000086	0.00009	110	
Benzo(a)Anthracene	0	0		0	0.001	0.001	1,277	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	128	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	1,277	
Benzo(k)Fluoranthene	0	0		0	0.0038	0.004	4,853	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	38,312	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	408,659	
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	0.0038	0.004	4,853	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	128	
1,2-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	0.021	0.021	26,818	
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	63,853	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	63,853	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	38,312	
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	102	
Hexachlorobutadiene	0	0		0	0.01	0.01	12,771	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	127,706	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	1,277	
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	0.00069	0.0007	881	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	6,385	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	4,214,297	
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	
Aldrin	0	0		0	0.0000008	8.00E-07	1.02	
alpha-BHC	0	0		0	0.0004	0.0004	511	
beta-BHC	0	0		0	0.008	0.008	10,216	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0003	0.0003	383	
4,4-DDT	0	0		0	0.00003	0.00003	38.3	
4,4-DDE	0	0		0	0.00002	0.00002	25.5	
4,4-DDD	0	0		0	0.0001	0.0001	128	
Dieldrin	0	0		0	0.000001	0.000001	1.28	
alpha-Endosulfan	0	0		0	N/A	N/A	N/A	
beta-Endosulfan	0	0		0	N/A	N/A	N/A	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	N/A	N/A	N/A	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.000006	0.000006	7.66	
Heptachlor Epoxide	0	0		0	0.00003	0.00003	38.3	
PCBs, Total	0	0		0	0.000064	0.00006	81.7	
Toxaphene	0	0		0	0.00028	0.0003	358	

☑ ***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 Aluminum	Report	Report	Report	Report	Report	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Mercury	Report	Report	Report	Report	Report	ng/L	12.0		Discharge Conc > 10% WQBEL (no 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)	#########	mg/L	Discharge Conc ≤ 10% WQBEL
Chloride (PWS)	83,757,811	mg/L	Discharge Conc ≤ 10% WQBEL
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	73,129,830	mg/L	Discharge Conc ≤ 10% WQBEL
Fluoride (PWS)	372,871	mg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	2,088,075	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	3,728,706	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	#########	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	#########	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	99,070	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	31,487,757	µg/L	Discharge Conc < TQL
Hexavalent Chromium	3,875,994	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	7,084,541	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	1,735,773	µg/L	Discharge Conc ≤ 10% WQBEL
Free Cyanide	1,491,482	µg/L	Discharge Conc ≤ 25% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	#########	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	-1.80E+09	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	66,343	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	#########	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	19,046,222	µg/L	Discharge Conc ≤ 10% WQBEL
Total Selenium	1,860,309	µg/L	Discharge Conc ≤ 10% WQBEL
Total Silver	1,439,693	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	89,489	µg/L	Discharge Conc < TQL
Total Zinc	31,332,881	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	1,118,612	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylamide	89,394	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylonitrile	65,130	µg/L	Discharge Conc ≤ 25% WQBEL
Benzene	740,695	µg/L	Discharge Conc ≤ 25% WQBEL
Bromoform	5,491,357	µg/L	Discharge Conc ≤ 25% WQBEL
Carbon Tetrachloride	510,824	µg/L	Discharge Conc ≤ 25% WQBEL

Chlorobenzene	37,287,060	µg/L	Discharge Conc < TQL
Chlorodibromomethane	510,824	µg/L	Discharge Conc ≤ 25% WQBEL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	#########	µg/L	Discharge Conc < TQL
Chloroform	2,125,362	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	702,383	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	485,283	µg/L	Discharge Conc ≤ 25% WQBEL
1,1-Dichloroethylene	12,304,730	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-Dichloropropane	638,530	µg/L	Discharge Conc ≤ 25% WQBEL
1,3-Dichloropropylene	344,806	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	25,355,201	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Bromide	17,524,918	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Chloride	#########	µg/L	Discharge Conc ≤ 25% WQBEL
Methylene Chloride	5,874,474	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2,2-Tetrachloroethane	217,100	µg/L	Discharge Conc ≤ 25% WQBEL
Tetrachloroethylene	881,171	µg/L	Discharge Conc < TQL
Toluene	21,253,624	µg/L	Discharge Conc < TQL
1,2-trans-Dichloroethylene	37,287,060	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,1-Trichloroethane	#########	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,2-Trichloroethane	702,383	µg/L	Discharge Conc < TQL
Trichloroethylene	766,236	µg/L	Discharge Conc < TQL
Vinyl Chloride	25,541	µg/L	Discharge Conc < TQL
2-Chlorophenol	11,186,118	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	3,728,706	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	37,287,060	µg/L	Discharge Conc < TQL
4,6-Dinitro-o-Cresol	745,741	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	3,728,706	µg/L	Discharge Conc < TQL
2-Nitrophenol	#########	µg/L	Discharge Conc < TQL
4-Nitrophenol	#########	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	63,521,041	µg/L	Discharge Conc < TQL
Pentachlorophenol	38,312	µg/L	Discharge Conc < TQL
Phenol	#########	µg/L	Discharge Conc < TQL
2,4,6-Trichlorophenol	1,787,884	µg/L	Discharge Conc < TQL
Acenaphthene	6,338,800	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	#########	µg/L	Discharge Conc < TQL
Benzidine	110	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	1,277	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	128	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	1,277	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	4,853	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS

Bis(2-Chloroethyl)Ether	38,312	µg/L	Discharge Conc < TQL
Bis(2-Chloroisopropyl)Ether	74,574,120	µg/L	Discharge Conc < TQL
Bis(2-Ethylhexyl)Phthalate	408,659	µg/L	Discharge Conc ≤ 25% WQBEL
4-Bromophenyl Phenyl Ether	20,135,012	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	37,287	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	#########	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	4,853	µg/L	Discharge Conc < TQL
Dibenzo(a,h)Anthrancene	128	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	59,659,296	µg/L	Discharge Conc < TQL
1,4-Dichlorobenzene	23,490,848	µg/L	Discharge Conc < TQL
3,3-Dichlorobenzidine	26,818	µg/L	Discharge Conc < TQL
Diethyl Phthalate	#########	µg/L	Discharge Conc < TQL
Dimethyl Phthalate	#########	µg/L	Discharge Conc ≤ 25% WQBEL
Di-n-Butyl Phthalate	7,457,412	µg/L	Discharge Conc < TQL
2,4-Dinitrotoluene	63,853	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	63,853	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	38,312	µg/L	Discharge Conc < TQL
Fluoranthene	7,457,412	µg/L	Discharge Conc < TQL
Fluorene	18,643,530	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.00008	µg/L	Discharge Conc < TQL
Hexachlorobutadiene	0.01	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	372,871	µg/L	Discharge Conc < TQL
Hexachloroethane	127,706	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	1,277	µg/L	Discharge Conc < TQL
Isophorone	12,677,600	µg/L	Discharge Conc < TQL
Naphthalene	16,033,436	µg/L	Discharge Conc ≤ 25% WQBEL
Nitrobenzene	3,728,706	µg/L	Discharge Conc < TQL
n-Nitrosodimethylamine	881	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	6,385	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	4,214,297	µg/L	Discharge Conc < TQL
Phenanthrene	372,871	µg/L	Discharge Conc < TQL
Pyrene	7,457,412	µg/L	Discharge Conc < TQL
1,2,4-Trichlorobenzene	26,101	µg/L	Discharge Conc < TQL
Aldrin	1.02	µg/L	Discharge Conc < TQL
alpha-BHC	511	µg/L	Discharge Conc < TQL
beta-BHC	10,216	µg/L	Discharge Conc < TQL
gamma-BHC	0.95	µg/L	Discharge Conc < TQL
delta BHC	N/A	N/A	No WQS
Chlordane	0.0003	µg/L	Discharge Conc < TQL
4,4-DDT	0.00003	µg/L	Discharge Conc < TQL
4,4-DDE	0.00002	µg/L	Discharge Conc < TQL
4,4-DDD	0.0001	µg/L	Discharge Conc < TQL
Dieldrin	0.000001	µg/L	Discharge Conc < TQL

alpha-Endosulfan	20,881	µg/L	Discharge Conc < TQL
beta-Endosulfan	20,881	µg/L	Discharge Conc < TQL
Endosulfan Sulfate	7,457,412	µg/L	Discharge Conc < TQL
Endrin	11,186	µg/L	Discharge Conc < TQL
Endrin Aldehyde	108,132	µg/L	Discharge Conc < TQL
Heptachlor	7.66	µg/L	Discharge Conc < TQL
Heptachlor Epoxide	38.3	µg/L	Discharge Conc < TQL
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
PCBs, Total	0.00006	µg/L	Discharge Conc < TQL
Toxaphene	0.0002	µg/L	Discharge Conc < TQL