pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0255483**
Facility Type	**Industrial**	APS ID	**1108888**
Major / Minor	**Minor**	Authorization ID	**1475764**

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

Applicant and Facility Information

Applicant Name	**Gray Area Water Authority of Jenner Township**	Facility Name	**Gray Area Water Authority WTP**
Applicant Address	PO Box 118	Facility Address	404 Spruce Run Road
	Gray, PA 15544-1439		Boswell, PA 15531
Applicant Contact	Jeff Marker	Facility Contact	Jeff Marker
Applicant Phone	(814) 442-5402	Facility Phone	(814) 442-5402
Client ID	25698	Site ID	4932
SIC Code	4941	Municipality	Jenner Township
SIC Description	Trans. & Utilities - Water Supply	County	Somerset
Date Application Received	March 1, 2024	EPA Waived?	Yes
Date Application Accepted	March 1, 2024	If No, Reason	

Purpose of Application: Renewal of NPDES permit

Summary of Review

The Department received an NPDES permit application from The EADS Group, Inc. on behalf of Grey Area Water Authority of Jenner Township for renewal coverage of the Gray Area Water Authority Water Treatment Plant (WTP) on 3/1/2024. This is a relatively new permit and was first issued on 8/23/2019 with an effective date of 9/1/2019 and an expiration date of 8/24/2024.

This small WTP is rated to produce 0.06575 MGD of potable water. Raw water is pumped from a groundwater well and pre-chlorinated prior to flowing to the ceramic filters. Polyphosphate is added prior to heading to the clear well; the potable water then enters the distribution system. Potable water from the clear well is used to backwash the filters. The backwash water is directed to a lagoon where the suspended solids can settle. The supernatant is then discharged via Outfall 001 to Spruce Run. Spruce Run has a 25 PA Code Chapter 93 High Quality-Cold Water Fishes designation and is not considered impaired at the point of discharge.

Historically, the plant sourced raw water from an impoundment reservoir on a secondary channel constructed adjacent to the main stem of Spruce Run. Supernatant from the filter backwash settling lagoon was recycled back to the filter intake to form a closed loop that didn't require a discharge. This method was in use since at least 1994. Around 1996 DEP requested that this method be discontinued due to concerns of unwanted pollutants from the recycled supernatant entering the system, and that the supernatant be directly discharged to Spruce Run downstream of the plant. An NPDES permit application was received on 12/26/2000 but was returned on 8/8/2013 with no permit issued. The facility has since discontinued use of the reservoir and draws all raw rater from a drilled well. Another NPDES permit application was received on 10/18/2018 which resulted in successful permit issuance as stated above.

Approve	Deny	Signatures	Date
X		Jace William Marsh / Environmental Engineering Specialist	April 19, 2024
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	April 23, 2024

Summary of Review

The permittee has no open violations. A compliance evaluation inspection by the Clean Water program occurred on 12/30/2022 with no violations noted. Several feet of freeboard was observed in the lagoon at the time of inspection. Also noted was that it's unknown if the lagoon was ever cleaned out and the associated sludge drying beds have never been used.

Effluent limits in the draft permit originate from DEP standards for best practicable control technology currently available (BPT) for WTP filter backwash wastewater, the Kiskiminetas-Conemaugh River Watershed TMDL, and an anti-degradation analysis for high quality streams from the previous permit.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final 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)	0.003
Latitude	40º 08' 43"	Longitude	-79º 07' 22"
Quad Name	Boswell	Quad Code	1713
Wastewater Description:	Supernatant water from filter backwash lagoon		

Receiving Waters	Spruce Run (HQ-CWF)	Stream Code	45522
NHD Com ID	123715581	RMI	1.6
Drainage Area	2.07 mi^2	Yield (cfs/mi^2)	0.0739
Q_{7-10} Flow (cfs)	0.153	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	2024	Slope (ft/ft)	0.09 (mean basin slope)
Watershed No.	18-E	Chapter 93 Class.	HQ-CWF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	Potable Water Supply, Recreational	Exceptions to Criteria	n/a
Assessment Status	Attaining Uses		
Cause(s) of Impairment	n/a		
Source(s) of Impairment	n/a		
TMDL Status	Final	Name	Kiskiminetas-Conemaugh River Watersheds TMDL

Nearest Downstream Public Water Supply Intake	Somerset County Quemahoning System		
PWS Waters	Quemahoning Reservoir	Flow at Intake (cfs)	5.99
PWS RMI	1.26	Distance from Outfall (mi)	14.5

Changes Since Last Permit Issuance: no significant changes

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.003
Latitude 40º 08' 43" **Longitude** -79º 07' 22"
Wastewater Description: Supernatant water from filter backwash lagoon

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

Federal Effluent Limitation Guidelines

The Gray Area Water Authority WTP is not subject to Federal Effluent Limitation Guidelines (ELGs).

Regulatory Effluent Standards and Monitoring Requirements

The pH effluent range for all Industrial waste process and non-process discharges pursuant of 25 Pa. Code § 92a.48(a)(2) and 25 Pa. Code § 95.2 is indicated in Table 1 below.

Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(d)(1) as indicated in Table 1 below.

Pursuant to 25 Pa. Code § 95.2(4) effluent standards for industrial wastes may not contain more than 7 mg/L of dissolved iron as indicated in Table 1 below.

Pursuant to 25 Pa. Code § 92a.48(b) the imposition of technology-based Total Residual Chlorine (TRC) limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELG's or a facility specific BPJ evaluation as indicated in Table 1 below.

Table 1. Regulatory Effluent Standards

Parameter	Monthly Avg	Daily Max	Instantaneous Max
Flow (MGD)	Monitor	Monitor	----
Iron, Dissolved	----	----	7.0 mg/L
pH (S.U.)	Wastes must have a pH of not less than 6.0 nor greater than 9.0		
Total Residual Chlorine	0.5 mg/L	----	----

Total Dissolved Solids (TDS)

This facility is exempt from 25 Pa. Code § 95.10 which outlines treatment requirements for new and expanding mass loadings of TDS and clarifies which facilities are exempt. Relevant sections to this facility state:

> *(a) The following are not considered new and expanding mass loadings of TDS and are exempt from the treatment requirements in this section:*
>
> *(1) Maximum daily discharge loads of TDS or specific conductivity levels that were authorized by the Department prior to August 21, 2010. These discharge loads will be considered existing mass loadings by the Department.*
>
> *…*
>
> *(7) New and expanding discharge loadings of TDS equal to or less than 5,000 pounds per day, measured as an average daily discharge over the course of a calendar year, otherwise known as the annual average daily load.*

Even though the facility has held a NPDES permit and is not new in the literal sense, since the TDS loading for this facility was authorized after 8/21/2010 it is still considered new under the legislation. 25 Pa. Code § 95.1(a)(7) provides an exemption. From the NPDES permit application, the TDS concentration was reported as 118 mg/L and with a discharge flowrate of 0.003 MGD:

Loading (lbs) = concentration (mg/L) * flow (MGD) * 8.34 (conversion factor)
118 mg/L * 0.003 MGD * 8.34 = **3 lbs/day < 5,000 lbs/day**

Best Practicable Control Technology Currently Achievable (BPT)

The Department's reference document *Technology-Based Control Requirements for Water Treatment Plant Wastes* (DEP-ID 362-2183-003) established BPT for discharges of WTPs wastewater, which are shown in Table 2 below.

Table 2. BPT Limits for WTP Filter Backwash Wastewater

Parameter	Monthly Avg (mg/L)	Daily Max (mg/L)
Total Suspended solids (TSS)	30.0	60.0
Total Iron	2.0	4.0
Total Aluminum	4.0	8.0
Total Manganese	1.0	2.0
Flow	Monitor	----
pH (S.U.)	6-9 at all times	
Total Residual Chlorine	0.5	1.0

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

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Annual sampling of PFAS, a group of emerging contaminants, is now a minimum requirement for all individual industrial waste discharges regardless of industry. 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. This monitoring is imposed based on 25 Pa. Code § 92a.61(b) which states

> *The Department may impose reasonable monitoring requirements on any discharge, including monitoring of the surface water intake and discharge of a facility or activity, other operational parameters that may affect effluent quality, and of surface waters adjacent to or associated with the intake or discharge flow of a facility or activity. The Department may require submission of data related to the monitoring.*

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are man-made chemicals, are resistant to heat, water and oil, and persist in the environment and the human body. PFAS are not found naturally in the environment, and can be found in air, soil, and water (both groundwater and surface water) They have been used to make cookware, carpets, clothing, fabrics for furniture, paper packaging for food, and other materials that are resistant to water, grease, or stains. They are also used in firefighting foams and in a number of industrial processes.

Total Maximum Daily Load (TMDL)

The wastewater discharge from the Gray Area Water Authority WTP is located within the Kiskiminetas-Conemaugh River Watersheds for which the Department has developed a TMDL. The TMDL was finalized on January 29, 2010 and establishes waste load allocations for the discharge of aluminum, iron and manganese within the Kiskiminetas-Conemaugh River Watersheds. Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's Water Quality Planning and Management Regulations (codified at Title 40 of the Code of Federal Regulations Part 130) require states to develop a TMDL for impaired water bodies. A TMDL establishes the amount of a pollutant that a water body can assimilate without exceeding the water quality criteria for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and non-point sources in order to restore and maintain the quality of the state's water resources (USEPA 1991a). Stream reaches within the Kiskiminetas-Conemaugh River Watersheds are included in the state's 2008 Section 303(d) list because of various impairments, including metals, pH and sediment. The TMDL includes consideration for each river and tributary within the target watershed and its impairment sources. Stream data is then used to calculate minimum pollutant reductions that are necessary to attain water quality criteria levels. Target concentrations published in the TMDL were based on established water quality criteria of 0.750 $^{mg}/_{L}$ total recoverable aluminum, 1.5 $^{mg}/_{L}$ total recoverable iron based on a 30-day average and 1.0 $^{mg}/_{L}$ total recoverable manganese. The reduction needed to meet the minimum water quality standards is then divided between each known point and non-point pollutant source in the form of a watershed allocation. TMDLs prescribe allocations that minimally achieve water quality criteria (i.e., 100 percent use of a stream's assimilative capacity).

Gray Area Water Authority WTP plant's NPDES permit, PA0255483, was issued after the finalization of this TMDL, so does not have a waste load allocation given in Appendix G of the TMDL like other water treatment plants within the watersheds. The draft permit will include effluent limitations for Total Aluminum, Total Iron, and Total Manganese based on the Kiskiminetas-Conemaugh River TMDL that follow the same reasoning as the prior permit:

Aluminum: The specific water quality criterion for aluminum is expressed as an acute or maximum daily in 25 Pa. Code Chapter 93.8(c). Discharges of aluminum may only be authorized to the extent that they will not cause or contribute to any violation of the water quality standards. Therefore, the water quality criterion for aluminum (0.75 mg/L) is imposed as a maximum daily effluent limit (MDL). Whenever the most stringent criterion is selected for the MDL, the Department should also impose an average monthly limit (AML) and instantaneous maximum limit (IMAX) if applicable. The imposition of an AML that is more stringent than the MDL is typically not appropriate because the water quality concerns have already been fully addressed by setting the MDL equal to the most stringent applicable criterion. Therefore, where the MDL is set at the value of the most stringent applicable criterion, the AML should be set equal to the MDL. Accordingly, TMDL aluminum limits are proposed for Outfall 001 at 0.75 mg/L for both the AML and MDL

Iron: The specific water quality criterion for iron is expressed as a 30-day average of 1.5 $^{mg}/_{L}$ in 25 Pa. Code § 93.7(a). The criterion is based on the protection of aquatic life and is associated with chronic exposure. There are no other criteria for total iron. Since the duration of the total iron criterion coincides with the 30-day duration of the AML, the 30-day average criterion for total iron is set equal to the AML. In addition, because the total iron criterion is associated with chronic exposure, the MDL (representing acute exposure) and the IMAX may be made less stringent according to established procedures described in Section III.C.3.h on Page 13 of the Water Quality Toxics Management Strategy (Doc. # 361-0100-003). These procedures state that a MDL and IMAX may be set at 2 times and 2.5 times the AML, respectively, or there is the option to use multipliers from EPA's Technical Support Document for Water Quality-based Toxics Control, if data are available to support the use of alternative multipliers. The 2x multiplier was chosen for the MDL. Accordingly, TMDL iron limits are proposed for Outfall 001 at 1.5 mg/L for the AML and 3.0 mg/L for the MDL.

Manganese: The specific water quality criterion for manganese is expressed as an acute or maximum daily of 1.0 mg/L in 25 Pa. Code § 93.7(a). The criterion is based on the protection of human health and is associated with chronic exposure associated with a potable water supply. Since no duration is given in Chapter 93 for the manganese criterion, a duration of 30 days is used based on the water quality criteria duration for Threshold Human Health (THH) criteria given in Section III.C.3.a., Table 1 on Page 10 of DEP's Water Quality Toxics Management Strategy. The 30-day duration for THH criteria coincides with the 30-day duration of an AML, which is why the manganese criterion is set equal to the AML for a "permitting at criteria" scenario. Because the manganese criterion is interpreted as having chronic exposure, the manganese MDL may be made less stringent according to procedures explained in the "Iron" section above. Accordingly, TMDL manganese limits are proposed for Outfall 001 at 1.0 mg/L for the AML and 2.0 mg/L for the MDL.

Table 3. TMDL Limits for Outfall 001

Parameter	Monthly Avg (mg/L)	Daily Max (mg/L)
Total Aluminum	0.75	0.75
Total Iron	1.5	3.0
Total Manganese	1.0	2.0

Toxics Management Spread Sheet

The Department of Environmental Protection has developed the DEP Toxics Management Spreadsheet ("TMS") to facilitate calculations necessary for completing a reasonable potential (RP) analysis and determining water quality-based effluent limitations for discharges of toxic pollutants. The TMS is a macro-enabled Excel binary file that combines the functions of the PENTOXSD model and the Toxics Screening Analysis spreadsheet to evaluate the reasonable potential for discharges to cause excursions above water quality standards and to determine WQBELs. The TMS is a single discharge, mass-balance water quality calculation spread sheet that includes consideration for mixing, first-order decay and other factors to determine recommended WQBELs for toxic substances and several non-toxic substances. Required input data including stream code, river mile index, elevation, drainage area, discharge name, NPDES permit number, discharge flow rate and the discharge concentrations for parameters in the permit application or in DMRs, which are entered into the spread sheet to establish site-specific discharge conditions. Other data such as low flow yield, reach dimensions and partial mix factors may also be entered to further characterize the conditions of the discharge and receiving water. Discharge concentrations for the parameters are chosen to represent the "worst case" quality of the

discharge (i.e., maximum reported discharge concentrations). The spread sheet then evaluates each parameter by computing a Waste Load Allocation for each applicable criterion, determining a recommended maximum WQBEL and comparing that recommended WQBEL with the input discharge concentration to determine which is more stringent. Based on this evaluation, the TMS recommends average monthly and maximum daily WQBELs.

Reasonable Potential Analysis and WQBEL Development for Outfall 001

Discharges from Outfall 001 are evaluated based on concentrations reported on the application and on DMRs; data from those sources are entered into the TMS. The maximum reported value of the parameters from the application form or from previous DMRs is used as the input concentration in the TMS. All toxic pollutants whose maximum concentrations, as reported in the permit application or on DMRs, are greater than the most stringent applicable water quality criterion are considered to be pollutants of concern. This includes pollutants reported as "Not Detectable" or as "<MDL" where the method detection limit for the analytical method used by the applicant is greater than the most stringent water quality criterion. The TMS is run with the discharge and receiving stream characteristics shown in Table 5. Pollutants for which water quality standards have not been promulgated (e.g., TSS, oil and grease) are excluded from the analysis. All the parameters are evaluated using the model to determine the water quality-based effluent limits applicable to the discharge and the receiving stream. The spreadsheet then compares the reported discharge concentrations to the calculated water quality-based effluent limitations to determine if a reasonable potential exists to exceed the calculated WQBELs. Effluent limitations are established in the draft permit where a pollutant's maximum reported discharge concentration equals or exceeds 50% of the WQBEL. For non-conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 25% - 50% of the WQBEL. For conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 10% - 50% of the WQBEL.

Effluent limitations recommended by the TMS are shown in Table 5. The Output from the TMS is included in Attachment C. The site received these WQBELs due to the Quantitation Limits (QLs) that were used during the sample analysis. **It is not recommended to resample and analyze at the QL for Total Lead. Since monitoring for Total Lead is also required in anti-degradation effluent limits, another sample showing lead concentrations below the QL will not result in removal of monitoring requirements from the final permit.**

Table 4. TMS Inputs for Outfall 001

Discharge Information	
Parameter	**Value**
River Mile Index	1.6
Discharge Flow (MGD)	0.003
Basin/Stream Information	
Parameter	**Value**
Drainage Area (mi^2)	2.07
Q_{7-10} (cfs)	0.153
Low-flow yield (cfs/mi^2)	0.0739
Elevation (ft)	2024
Slope (ft/ft)	n/a

Table 5. WQBELs from TMS

Parameter	Monthly Avg (ug/L)	Daily Max (ug/L)	IMAX (ug/L)
Total Lead	Report	Report	Report

Total Residual Chlorine

To determine if WQBELs are required for discharges containing total residual chlorine (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 (WLAs) through the application of a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the program include flow rates and discharge chlorine demands for the receiving stream, 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 WLAs 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 limitations is then proposed. The results of the modeling, included in Attachment D, indicate that average monthly limits of 0.5 mg/L and daily maximum limits of 1.17 mg/L are required for TRC.

Table 6. TRC limits from TRC_CALC

Parameter	Monthly Avg (mg/L)	Daily Max (mg/L)
Total Residual Chlorine	0.5	1.17

001.C. Anti-Degradation

Since no significant changes have occurred to Q7-10 flow of Spruce Run and the discharge from Outfall 001 is not new or expanding, anti-degradation limits are carried over from the previous permit for the draft permit. The facility has been able to meet previous anti-degradation effluent limits according to the past two years of eDMR data. The anti-degradation analysis from the previous permit is shown verbatim:

Discharges to High Quality and Exceptional Value Waters

In accordance with PA Code Chapter 93.4, the existing in-stream water uses and the level of water quality necessary to protect the existing uses (in regard to waters of the Commonwealth), shall be maintained and protected. The Department evaluated the discharge concentrations for parameters in Table 4 and established water quality based effluent limitations which are protective of the existing stream quality. The limits were based on the last 8 years of data collected at reference Water Quality Network (WQN) Station #0734 which is located on Jones Mill Run. Jones Mill Run was selected as a reference stream based on its similarities and proximity to the receiving stream. When selecting an appropriate reference stream, the Department compares the drainage areas, land use variables, and physiographic properties of a candidate reference stream to the proposed discharge locations. Spruce Run reference data is shown in Table 4.

Table 4: Anti-Degradation Background Data

Site	*Stream*	*Period of Record*	*Designated Use*	*Drainage Area (mi^2)*	*% Urban*	*% Forest*	*% Ag.*	*Elevation (ft)*	*Physiographic Province*	*Distance from Proposed Discharge*
Discharge Point	*Spruce Run*		*HQ-CWF*	*1.63*	*0*	*100*	*0*	*2603*	*Allegheny Mountain Section (Appalachian Plateaus Province)*	
WQN0734	*Jones Mill Run*	*10/10 - Present*	*EV*	*4.9*	*0*	*96*	*0*	*2518*	*Allegheny Mountain Section (Appalachian Plateaus Province)*	*11.5*

The assessment of whether or not a point source discharge together with any nonpoint sources will affect water quality is directly related to the technical and scientific ability to discern whether a change in stream quality will take place as a result of the discharge. The natural quality of surface waters is constantly changing, and the use of long-term data assures that these variations are accounted for in the anti-degradation permit review process. A change is adverse if it results in lower water quality. A change is measurable if the in-stream concentration of a pollutant exceeds the upper 95 percent confidence limit of the median value in the data set used to determine the in-stream water quality objective. The confidence limit and the statistical analysis used for this evaluation are explained below.

The median value is determined by ranking the available data on concentration values and choosing the middle value. This median value is used to define the in-stream concentration of a pollutant upstream from a proposed discharge. The minimum data set that can be used for this purpose is 24 samples collected over a 12-month period. However, data collected over multiple years at a lower sampling frequency can be used if DEP is assured that the complete stream hydrograph is represented and that adequate quality assurance measures were applied to collection and analysis of samples. DEP uses a 95 percent confidence limit to establish this upper boundary which represents a value that captures

the median 95 percent of the time. Except for pH, this upper boundary of the median represents the in-stream water quality objective for defining the total allowable in-stream concentration of a pollutant after adding in the discharge.

Table 5 includes water quality data based upon eight (8) years of monitoring at the Jones Mill Run. The Department was unable to provide background limits for oil & grease, COD, and TKN as data for these parameters are not regularly collected at WQN reference stations.

Table 5: WQN0734

Test Code	Test Description	First Date	Last Date	Period of Record (yr.)	Number of Observations	Min 95% Confidence Limit on Median	Median	Max 95% Confidence Limit on Median	Units
01106	AL DISS 0.1U	07/24/2013	05/01/2018	4.8	60	NA	14.9	17.5	UG/L
F0043	ALK - FIELD	04/30/2015	04/30/2015	0	1	12	NA	NA	MG/L
00410	ALKALINITY	07/24/2013	05/01/2018	4.8	60	14	14.8	NA	MG/L
01106	ALUMINUM D	07/24/2013	05/01/2018	4.8	60	NA	14.9	17.5	UG/L
01105	ALUMINUM T	07/24/2013	05/01/2018	4.8	60	NA	47.75	59.2	UG/L
00610	AMMONIA-N T	07/24/2013	05/01/2018	4.8	60	NA	< 0.02	< 0.02	MG/L
01000	ARSENIC D	07/24/2013	05/01/2018	4.8	60	NA	< 3.00	< 3.00	UG/L
01007	BARIUM T	07/24/2013	05/01/2018	4.8	60	NA	44.2	47	UG/L
01022	BORON TOTAL	07/24/2013	05/01/2018	4.8	60	NA	< 200	< 200	UG/L
99020	BROMIDE	07/24/2013	05/01/2018	4.8	60	NA	< 25.00	< 25.00	UG/L
01025	CADMIUM D	07/24/2013	05/01/2018	4.8	60	NA	< 0.20	< 0.20	UG/L
00915	CALCIUM D	07/24/2013	05/01/2018	4.8	60	NA	10.145	11.51	MG/L
00916	CALCIUM T	07/24/2013	05/01/2018	4.8	60	NA	10.355	11.26	MG/L
00314	CBOD5	07/24/2013	05/01/2018	4.8	59	NA	0.8	0.9	MG/L
00940	CHLORIDE -IC	07/24/2013	05/01/2018	4.8	60	NA	22.845	24.61	MG/L
01040	COPPER D	07/24/2013	05/01/2018	4.8	60	NA	< 4.00	< 4.00	UG/L
01042	COPPER T	07/24/2013	05/01/2018	4.8	60	NA	< 4.00	< 4.00	UG/L
F0030	DO % - FIELD	07/24/2013	05/30/2018	4.9	62	11.69	14.36	NA	%
31616	FECAL COL	07/24/2013	05/30/2018	4.9	49	NA	< 10.00	< 10.00	/100ML
00900	HARDNESS T	07/24/2013	05/01/2018	4.8	60	NA	31.75	34	MG/L
01046	IRON D	07/24/2013	05/01/2018	4.8	60	NA	< 20.00	< 20.00	UG/L
01045	IRON T	07/24/2013	05/01/2018	4.8	60	NA	50	67	UG/L
01049	LEAD D	07/24/2013	05/01/2018	4.8	60	NA	< 1.00	< 1.00	UG/L
01051	LEAD T	07/24/2013	05/01/2018	4.8	60	NA	< 1.00	< 1.00	UG/L
01130	LITHIUM D*	03/17/2016	05/01/2018	2.1	26	NA	< 25.00	< 25.00	UG/L
01132	LITHIUM T	03/17/2016	05/01/2018	2.1	26	NA	< 25.00	< 25.00	UG/L
00925	MAGNESIUM D	07/24/2013	05/01/2018	4.8	60	NA	1.4305	1.555	MG/L
00927	MAGNESIUM T	07/24/2013	05/01/2018	4.8	60	NA	1.4595	1.551	MG/L
01056	MANGANESE D	07/24/2013	05/01/2018	4.8	60	NA	3.965	4.7	UG/L
01055	MANGANESE T	07/24/2013	05/01/2018	4.8	60	NA	11.25	14.4	UG/L
01065	NICKEL D	07/24/2013	05/01/2018	4.8	60	NA	< 4.00	< 4.00	UG/L
01067	NICKEL T	07/24/2013	05/01/2018	4.8	60	NA	< 4.00	< 4.00	UG/L
00620	NITRATE-N	07/24/2013	05/01/2018	4.8	60	NA	0.565	0.58	MG/L
00615	NITRITE-N	07/24/2013	05/01/2018	4.8	60	NA	< 0.04	< 0.04	MG/L
00600	NITROGENTOT	07/24/2013	05/01/2018	4.8	60	NA	0.595	0.62	MG/L
82550	OSMO PRES	07/24/2013	05/01/2018	4.8	57	NA	1	1	MOSM
F0030	OXYGEN - FLD	07/24/2013	05/30/2018	4.9	62	11.69	14.36	NA	MG/L
00403	PH	07/24/2013	05/01/2018	4.8	60	7.3	7.45	7.6	pH units
F0040	PH-FLD	07/24/2013	05/30/2018	4.9	62	7.28	7.365	7.44	pH units
00403	PH-TEMP	07/24/2013	05/01/2018	4.8	60	7.3	7.45	7.6	°C
70507	PHOS T ORTHO	07/24/2013	05/01/2018	4.8	60	NA	< 0.01	< 0.01	MG/L
00665	PHOSPHORUS T	07/24/2013	05/01/2018	4.8	60	NA	< 0.01	< 0.01	MG/L
00937	POTASSIUM T	12/04/2013	05/01/2018	4.4	55	NA	< 1.00	< 1.00	MG/L
01147	SELENIUM T	07/24/2013	05/01/2018	4.8	60	NA	< 7.00	< 7.00	UG/L
00929	SODIUM T	07/24/2013	05/01/2018	4.8	60	NA	10.75	11.4	MG/L
00095	SPC @ 25.0°C	07/24/2013	05/01/2018	4.8	60	NA	132.55	140.7	umhos/cm
F9009	SPCOND-TEMP	04/30/2015	10/19/2016	1.5	12	NA	139.6	164.7	umhos/cm
F0009	SPECIFIC CON	07/24/2013	05/30/2018	4.9	51	NA	129.5	140	umhos/cm
01082	STRONTIUM T	07/24/2013	05/01/2018	4.8	60	NA	24	27	UG/L
00945	SULFATE - IC	07/24/2013	05/01/2018	4.8	60	NA	7.18	7.26	MG/L
00680	T ORG CARBON	07/24/2013	05/01/2018	4.8	60	NA	0.675	0.75	MG/L
00530	T SUSP SOLID	07/24/2013	05/01/2018	4.8	60	NA	< 5.00	< 5.00	MG/L
70300	TDS180 -USGS	07/24/2013	05/01/2018	4.8	60	NA	83	88	MG/L

F0001	*WATER TEMP*	*07/24/2013*	*05/30/2018*	*4.9*	*62*	*NA*	*9.32*	*11.4*	*°C*
01090	*ZINC D*	*07/24/2013*	*05/01/2018*	*4.8*	*60*	*NA*	*6.13*	*7.1*	*UG/L*
01092	*ZINC T*	*07/24/2013*	*05/01/2018*	*4.8*	*60*	*NA*	*7.74*	*8.1*	*UG/L*

As part of an NPDES permit application the discharger must provide DEP with a list of parameters that are known or suspected to be present in the discharge. As part of this list the discharger must also provide the expected influent and effluent concentrations of these pollutants, based on any treatment technology proposed for installation. These effluent values are evaluated through DEP's water quality analysis models to determine if they would degrade the stream. Typically, the harmonic stream flow is used in this analysis. All pollutants are evaluated using water quality objectives derived from: 1) existing site-specific data, 2) a regional DEP reference site, 3) default values or 4) site-specific data collected by the applicant. These water quality objectives are applied as the criteria that must be met in-stream. The discharge flow used for these evaluations is the hydraulic design capacity of the treatment facility. In this case, treatment technology was not proposed and therefore, the effluent concentrations are representative of the existing effluent quality.

Non-Discharge Alternatives

The Department's permitting guidance for the development of effluent limitations for proposed discharges to high quality or exceptional value waters requires the Department to compare the Anti-Degradation Best Available Combination of Technologies (ABACT), Water Quality Based Effluent Limitations and non-degradation limits. The most stringent limitation for each parameter of concern is selected as the proposed effluent limitation. Once the applicant receives preliminary effluent limits, an evaluation of alternatives must be conducted. The application must use a non-discharge alternative, if found to be environmentally sound and cost effective when compared with the cost of the proposed discharge. If a non-discharge alternative is not environmentally sound and cost-effective, a social or economic justification (SEJ) must be conducted to justify relaxing the limits. If the SEJ is approved, the final effluent limits will be the more restrictive of ABACT or WQBEL for each parameter of concern.

The requirement to consider non-discharge alternatives applies to both HQ and EV waters regardless of the degree of degradation or the social or economic benefit associated with a proposed discharge. The requirement to evaluate and use non-discharge alternatives, when they are considered effective and environmentally sound, is a critical test and must be met by any activity or project generating new, additional or increased point source discharges to HQ or EV waters. Discharges in existence prior to the HQ or EV designation are "grandfathered" and considered to be part of the existing quality of the water body. Grandfathered flows are not subject to the non-discharge alternatives requirement.

Non-degrading Discharges

For discharges to HQ waters, if no cost-effective and environmentally sound non-discharge alternatives exist, the permittee must consider discharge treatment processes that will "…maintain and protect the existing quality of receiving surface waters…" including the use of "… the best available combination of cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies

The following mass balance equation illustrates how the data used in the statistical analyses are applied to the water quality modeling process.

Equation: $(Q_{total} \times C_{total}) = (Q_{upstream} \times C_{upstream}) + (Q_{discharge} \times C_{discharge})$

Where:

Q_{total}*: Combined flow of the discharge and the stream below the point of discharge (sum of the discharge flow and upstream flow).*

C_{total}*: Pollutant concentration in the stream below the point of discharge (the water quality objective, which is the concentration represented by the upper bound of the 95 percent confidence of the data set)*

$Q_{upstream}$*: In-stream flow above the point of discharge under harmonic flow conditions, adjusted to reflect any water withdrawal that reduces the stream flow above the point of discharge.*

$C_{upstream}$*: In-stream pollutant concentration above the point of discharge.*

$Q_{discharge}$*: Permitted discharge flow or the maximum hydraulic design capacity of the treatment system.*

$C_{discharge}$***:*** *Pollutant discharge concentration, Long Term Average (LTA).*

Solving for $C_{discharge}$: $$C_{discharge} = \frac{(Q_{total} \times C_{total}) - (Q_{upstream} \times C_{upstream})}{Q_{discharge}}$$

The value obtained from this equation when solved for the discharge concentration represents the long-term allowable water quality limit that must be attained by the discharge. This value must be translated from the long-term average (LTA) value to an average monthly limit (AML) and maximum daily limit (MDL). These values are compared to the anticipated effluent quality to determine if the proposed discharge will meet the existing, long-term, in-stream quality (See DEP Doc#: 391-0300-002 / November 29, 2003 / Page 64).

The LTA value is converted to an AML using the statistical approach found on page 103 of the EPA document "Technical Support Document for Water Quality Based Toxics Control." The reference includes the formula for this conversion along with a table. DEP uses the 95th percentile z value, assumes that the coefficient of variation is equal to 0.5, and the number of samples that would be taken on a monthly basis is 4. This produces a default multiplier of 1.72 that is used in the equation shown below.

AML = LTA * Multiplier

AML: Average Monthly Limit

LTA: Long-Term Average

Multiplier $= e^{(z*\sigma_n - 0.5*\sigma_n^2)} = 1.72$

Where: $\sigma_n^2 = \ln(CV^2/n+1)$

CV = Coefficient of Variation = Standard Deviation/Mean

The LTA value is converted to an MDL using the statistical approach found on page 103 of the EPA document "Technical Support Document for Water Quality Based Toxics Control." The reference includes the formula for this conversion along with a table. DEP uses the 99th percentile z value, assumes that the coefficient of variation is equal to 0.5, and the number of samples that would be taken on a monthly basis is 4. This produces a default multiplier of 2.68 that is used in the equation shown below.

MDL = LTA * Multiplier

MDL: Maximum Daily Limit

LTA: Long-Term Average

Multiplier $= e^{(z*\sigma_n - 0.5*\sigma_n^2)} = 2.68$

Where: $\sigma_n^2 = \ln(CV^2+1)$

CV = Coefficient of Variation = Standard Deviation/Mean

Based upon the equation and on the same procedure that the toxic screening analysis does, comparing the non-degrading limits with the maximum concentration reported on DMRs or the permit application, the proposed non-degrading effluent limitations are shown in Table 6. A summary of these calculations can be found in Appendix E.

Table 6: Non-Degrading Effluent Limitations

Parameter	Monthly Average	Daily maximum	Units
Barium, Total	Monitor/Report	Monitor/Report	µg/L
Boron, Total	Monitor/Report	Monitor/Report	µg/L
Bromide	43.0	67.0	µg/L
Iron Dissolved	34.4	53.6	µg/L
Iron, Total	Monitor/Report	Monitor/Report	µg/L
Lead, Total	Monitor/Report	Monitor/Report	µg/L
Sulfate	Monitor/Report	Monitor/Report	mg/L
Total Suspended Solids	8.60	13.40	mg/L

Social or Economic Justification (SEJ)

The Antidegradation requirements relating to SEJ are very important components of water quality protection for HQ waters. For proposed discharges to HQ water bodies, if it has been determined that there are no cost-effective and environmentally sound non-discharge alternatives, or this alternative can only accommodate a portion of the wastewater, the discharge must either meet a test of non-degradation, or, when it cannot meet the test, demonstrate that the proposed degradation is socially or economically justified. If an applicant seeks an SEJ and submits a request for a degrading discharge, the burden of proof is on the applicant to document and demonstrate that the benefits of the proposal outweigh the environmental impacts of lower water quality.

If a degrading discharge to HQ waters is ultimately approved, the permit will be issued to ensure that the amount of degradation is minimized and specifically limited through enforceable permit condition and the implementation of best available technologies and management practices. The new or expanded discharge will be required to comply with the more stringent of ABACT or water quality-based effluent limits designed to protect applicable water uses.

001.D. Anti-Backsliding

Previous limits can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l), and are displayed below in Table 7.

Table 7. Effluent limitations from current permit

Parameter	Mass (pounds)		Concentration (mg/L)		Samples	
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	—	—	2/month	Measure
pH (S.U.)	—	—	6.0-9.0 at all times		2/month	Grab
Total Residual Chlorine	—	—	0.5	1.0	2/month	Grab
Total Suspended Solids	—	—	8.6	13.4	2/month	Grab
Total Aluminum	—	—	0.75	0.75	2/month	Grab
Total Barium (ug/L)	—	—	Report	Report	2/month	Grab
Total Boron (ug/L)	—	—	Report	Report	2/month	Grab
Total Iron	—	—	1.5	3.0	2/month	Grab
Total Lead (ug/L)	—	—	Report	Report	2/month	Grab
Total Manganese	—	—	1.0	2.0	2/month	Grab
Total Sulfate	—	—	Report	Report	2/month	Grab
Bromide (ug/L)	—	—	43.0	67.0	2/month	Grab
Dissolved Iron (ug/L)	—	—	34.4	53.6	2/month	Grab

001.E. Proposed Effluent Limitations and Monitoring Requirements

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 8.

Table 8. Proposed effluent limits and monitoring requirements for Outfall 001

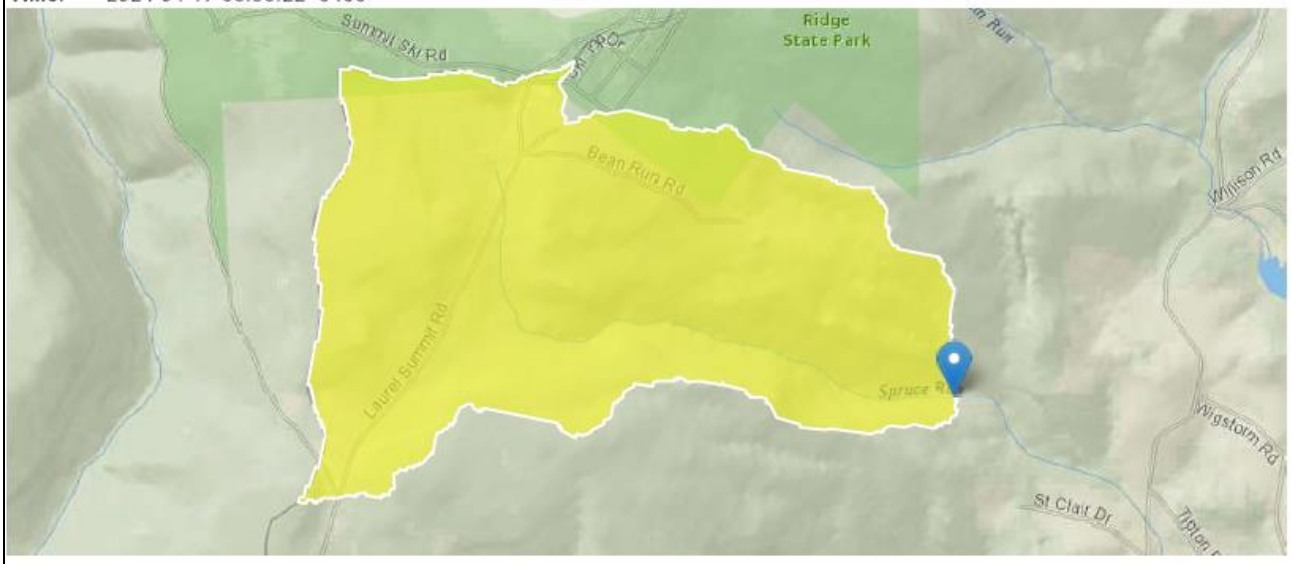
Parameter	Mass (pounds)		Concentration (mg/L)		Samples	
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	—	—	2/month	Measure
pH (S.U.)	—	—	6.0-9.0 at all times		2/month	Grab
Total Residual Chlorine	—	—	0.5	1.0	2/month	Grab
Total Suspended Solids	—	—	8.6	13.4	2/month	Grab
Total Aluminum	—	—	0.75	0.75	2/month	Grab
Total Barium (ug/L)	—	—	Report	Report	2/month	Grab
Total Boron (ug/L)	—	—	Report	Report	2/month	Grab
Total Iron	—	—	1.5	3.0	2/month	Grab
Total Lead (ug/L)	—	—	Report	Report	2/month	Grab
Total Manganese	—	—	1.0	2.0	2/month	Grab
Total Sulfate	—	—	Report	Report	2/month	Grab
Bromide (ug/L)	—	—	43.0	67.0	2/month	Grab
Dissolved Iron (ug/L)	—	—	34.4	53.6	2/month	Grab
PFOA (ng/L)	—	—	—	Report	1/year	Grab
PFOS (ng/L)	—	—	—	Report	1/year	Grab
PFBS (ng/L)	—	—	—	Report	1/year	Grab
HFPO-DA (ng/L)	—	—	—	Report	1/year	Grab

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment C)
☒	TRC Model Spreadsheet (see Attachment D)
☐	Temperature Model Spreadsheet (see Attachment)
☒	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: Establishing Effluent Limits for Individual Industrial Permits (BCW-PMT-032)
☒	Other: USGS StreamStats (see Attachment A, B)

Attachment A:
USGS StreamStats at Point of Discharge

PA0255483 Gray Area Water Authority WTP StreamStats Report

Region ID: PA
Workspace ID: PA20240417123800537000
Clicked Point (Latitude, Longitude): 40.14526, -79.12253
Time: 2024-04-17 08:38:22 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	4.916	degrees
DRNAREA	Area that drains to a point on a stream	2.07	square miles
ELEV	Mean Basin Elevation	2571	feet
PRECIP	Mean Annual Precipitation	45	inches

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.07	square miles	2.33	1720
ELEV	Mean Basin Elevation	2571	feet	898	2700
PRECIP	Mean Annual Precipitation	45	inches	38.7	47.9

Low-Flow Statistics Disclaimers [Low Flow Region 3]

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

Low-Flow Statistics Flow Report [Low Flow Region 3]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.344	ft^3/s
30 Day 2 Year Low Flow	0.491	ft^3/s
7 Day 10 Year Low Flow	0.153	ft^3/s
30 Day 10 Year Low Flow	0.2	ft^3/s
90 Day 10 Year Low Flow	0.294	ft^3/s

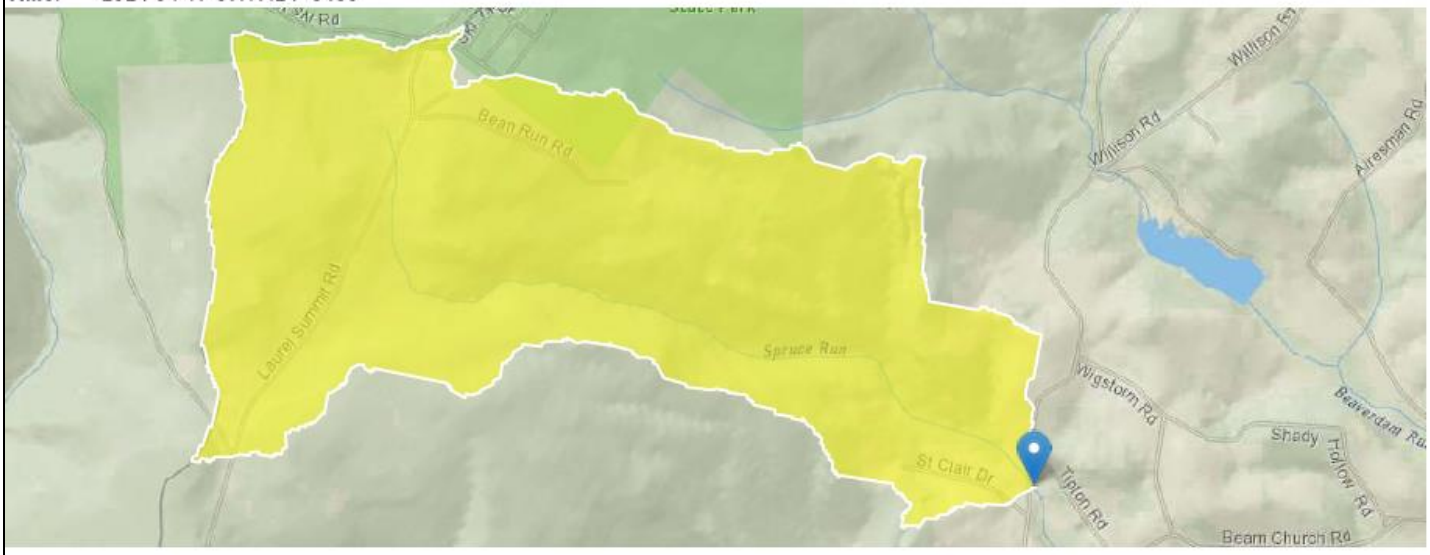
Low-Flow Statistics Citations

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

Attachment B:
USGS StreamStats at End of Reach

End of Reach–PA0255483 Gray Area Water Authority WTP StreamStats Report

Region ID: PA
Workspace ID: PA20240417131702177000
Clicked Point (Latitude, Longitude): 40.13899, -79.10996
Time: 2024-04-17 09:17:24 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	5.1864	degrees
DRNAREA	Area that drains to a point on a stream	2.72	square miles
ELEV	Mean Basin Elevation	2449	feet
PRECIP	Mean Annual Precipitation	44	inches

> Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.72	square miles	2.33	1720
ELEV	Mean Basin Elevation	2449	feet	898	2700
PRECIP	Mean Annual Precipitation	44	inches	38.7	47.9

Low-Flow Statistics Flow Report [Low Flow Region 3]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	0.416	ft^3/s	43	43
30 Day 2 Year Low Flow	0.589	ft^3/s	38	38
7 Day 10 Year Low Flow	0.181	ft^3/s	54	54
30 Day 10 Year Low Flow	0.239	ft^3/s	49	49
90 Day 10 Year Low Flow	0.353	ft^3/s	41	41

Low-Flow Statistics Citations

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

Attachment C:
Toxics Management Spreadsheet

Discharge Information

Instructions | Discharge | Stream

Facility: **Gray Area Water Authority WTP** NPDES Permit No.: **PA0255483** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **IW Process Effluent without ELG**

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
0.003	83.6	8.4						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		118									
	Chloride (PWS)	mg/L		4.29									
	Bromide	mg/L	<	0.2									
	Sulfate (PWS)	mg/L		6.9									
	Fluoride (PWS)	mg/L		0.01									
Group 2	Total Aluminum	µg/L		110									
	Total Antimony	µg/L	<	2									
	Total Arsenic	µg/L	<	3									
	Total Barium	µg/L		301									
	Total Beryllium	µg/L	<	1									
	Total Boron	µg/L	<	50									
	Total Cadmium	µg/L	<	0.2									
	Total Chromium (III)	µg/L	<	4									
	Hexavalent Chromium	µg/L	<	1									
	Total Cobalt	µg/L	<	0.5									
	Total Copper	mg/L	<	0.004									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L	<	10									
	Dissolved Iron	µg/L	<	20									
	Total Iron	µg/L		1520									
	Total Lead	µg/L	<	20									
	Total Manganese	µg/L		274									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L	<	0.5									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L	<	1									
	Total Silver	µg/L	<	0.2									
	Total Thallium	µg/L	<	0.2									
	Total Zinc	mg/L	<	0.005									
	Total Molybdenum	µg/L	<	1									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

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

	2,6-Dinitrotoluene	µg/L	<											
	Di-n-Octyl Phthalate	µg/L	<											
	1,2-Diphenylhydrazine	µg/L	<											
	Fluoranthene	µg/L	<											
	Fluorene	µg/L	<											
	Hexachlorobenzene	µg/L	<											
	Hexachlorobutadiene	µg/L	<											
	Hexachlorocyclopentadiene	µg/L	<											
	Hexachloroethane	µg/L	<											
	Indeno(1,2,3-cd)Pyrene	µg/L	<											
	Isophorone	µg/L	<											
	Naphthalene	µg/L	<											
	Nitrobenzene	µg/L	<											
	n-Nitrosodimethylamine	µg/L	<											
	n-Nitrosodi-n-Propylamine	µg/L	<											
	n-Nitrosodiphenylamine	µg/L	<											
	Phenanthrene	µg/L	<											
	Pyrene	µg/L	<											
	1,2,4-Trichlorobenzene	µg/L	<											
Group 6	Aldrin	µg/L	<											
	alpha-BHC	µg/L	<											
	beta-BHC	µg/L	<											
	gamma-BHC	µg/L	<											
	delta BHC	µg/L	<											
	Chlordane	µg/L	<											
	4,4-DDT	µg/L	<											
	4,4-DDE	µg/L	<											
	4,4-DDD	µg/L	<											
	Dieldrin	µg/L	<											
	alpha-Endosulfan	µg/L	<											
	beta-Endosulfan	µg/L	<											
	Endosulfan Sulfate	µg/L	<											
	Endrin	µg/L	<											
	Endrin Aldehyde	µg/L	<											
	Heptachlor	µg/L	<											
	Heptachlor Epoxide	µg/L	<											
	PCB-1016	µg/L	<											
	PCB-1221	µg/L	<											
	PCB-1232	µg/L	<											
	PCB-1242	µg/L	<											
	PCB-1248	µg/L	<											
	PCB-1254	µg/L	<											
	PCB-1260	µg/L	<											
	PCBs, Total	µg/L	<											
	Toxaphene	µg/L	<											
	2,3,7,8-TCDD	ng/L	<											
Group 7	Gross Alpha	pCi/L												
	Total Beta	pCi/L	<											
	Radium 226/228	pCi/L	<											
	Total Strontium	µg/L	<											
	Total Uranium	µg/L	<											
	Osmotic Pressure	mOs/kg												

Stream / Surface Water Information

Gray Area Water Authority WTP, NPDES Permit No. PA0255483, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: _____ 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	045522	1.6	2024	2.07			Yes
End of Reach 1	045522	0.7	1858	2.72			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	1.6	0.0739	0.153									100	7		
End of Reach 1	0.7	0.0665	0.181												

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	1.6														
End of Reach 1	0.7														

Model Results

Gray Area Water Authority WTP, NPDES Permit No. PA0255483, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 0.811 PMF: 1 Analysis Hardness (mg/l): 99.517 Analysis pH: 7.01

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	25,475	
Total Antimony	0	0		0	1,100	1,100	37,364	
Total Arsenic	0	0		0	340	340	11,549	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	713,308	
Total Boron	0	0		0	8,100	8,100	275,133	
Total Cadmium	0	0		0	2.004	2.12	72.1	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	567.509	1,796	61,002	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	553	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	3,227	
Total Copper	0	0		0	13.378	13.9	473	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	64.242	81.1	2,756	Chem Translator of 0.792 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	55.9	Chem Translator of 0.85 applied
Total Nickel	0	0		0	466.322	467	15,871	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	3.190	3.75	127	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	2,208	
Total Zinc	0	0		0	116.701	119	4,053	Chem Translator of 0.978 applied

☑ *CFC* CCT (min): 0.811 PMF: 1 Analysis Hardness (mg/l): 99.517 Analysis pH: 7.01

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	7,473	
Total Arsenic	0	0		0	150	150	5,095	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	139,265	
Total Boron	0	0		0	1,600	1,600	54,347	
Total Cadmium	0	0		0	0.245	0.27	9.16	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	73.821	85.8	2,916	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	353	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	645	
Total Copper	0	0		0	8.919	9.29	316	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	50,951	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.503	3.16	107	Chem Translator of 0.792 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	30.8	Chem Translator of 0.85 applied
Total Nickel	0	0		0	51.794	51.9	1,765	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	169	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	442	
Total Zinc	0	0		0	117.656	119	4,053	Chem Translator of 0.986 applied

☑ *THH* CCT (min): 0.811 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	2,000	2,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	190	
Total Arsenic	0	0		0	10	10.0	340	
Total Barium	0	0		0	2,400	2,400	81,521	
Total Boron	0	0		0	3,100	3,100	105,298	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	

Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	300	300	10,190	
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	33,967	
Total Mercury	0	0		0	0.050	0.05	1.7	
Total Nickel	0	0		0	610	610	20,720	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	8.15	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ *CRL* CCT (min): 0.198 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***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 Lead	Report	Report	Report	Report	Report	µg/L	107	CFC	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)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Aluminum	16,329	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	81,521	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	54,347	µg/L	Discharge Conc < TQL
Total Cadmium	9.16	µg/L	Discharge Conc < TQL
Total Chromium (III)	2,916	µg/L	Discharge Conc < TQL
Hexavalent Chromium	353	µg/L	Discharge Conc < TQL
Total Cobalt	645	µg/L	Discharge Conc < TQL
Total Copper	0.3	mg/L	Discharge Conc < TQL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	10,190	µg/L	Discharge Conc < TQL
Total Iron	50,951	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	33,967	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	1.7	µg/L	Discharge Conc < TQL
Total Nickel	1,765	µg/L	Discharge Conc < TQL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	169	µg/L	Discharge Conc < TQL
Total Silver	81.7	µg/L	Discharge Conc < TQL
Total Thallium	8.15	µg/L	Discharge Conc < TQL
Total Zinc	2.6	mg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS

Attachment D:
TRC Model Spreadsheet

TRC EVALUATION

0.153	= Q stream (cfs)	0.5	= CV Daily
0.003	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.995	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Strean	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discha	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 =	10.483	1.3.2.iii	WLA cfc =	10.264
PENTOXSD TRI	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRI	5.1b	LTA_afc=	3.906	5.1d	LTA_cfc =	5.967

Source		Effluent Limit Calculations		
PENTOXSD TRI	5.1f	AML MULT =	1.720	
PENTOXSD TRI	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:
Anti-Degradation

Spreadsheet to Evaluate Non-Degradation of Water Quality

Parameter	Discharge Concentration		Candidate for Non-degrad Limits?	Discharge Flow $Q_{discharge}$	WQ Objective C_{total}	Stream Flow $Q_{upstream}$	Mean Concentration $C_{upstream}$	Combined Flow Q_{total}	Concentration C_{LTA}	Units	AML Multiplier	Non Degrade C_{AML}	Units	MDL Multiplier	Non Degrade C_{MDL}	Units
Aluminum, Total	<	50	NO	0.0046	59.2	1.1562	47.75	1.1608	2911.60	µg/L	1.72	5007.96	µg/L	2.68	7803.09	µg/L
Barium, Total		257	YES	0.0046	47	1.1562	44.2	1.1608	744.53	µg/L	1.72	1280.59	µg/L	2.68	1995.34	µg/L
Boron, Total	<	50	NO	0.0046	200	1.1562	200	1.1608	200.00	µg/L	1.72	344.00	µg/L	2.68	536.00	µg/L
Bromide	<	100	YES	0.0046	25	1.1562	25	1.1608	25.00	µg/L	1.72	43.00	µg/L	2.68	67.00	µg/L
Chloride		5	NO	0.0046	24.61	1.1562	22.845	1.1608	464.30	mg/L	1.72	798.60	mg/L	2.68	1244.33	mg/L
Copper, Total	<	0.5	NO	0.0046	4	1.1562	4	1.1608	4.00	µg/L	1.72	6.88	µg/L	2.68	10.72	µg/L
Iron, Dissolved		40	YES	0.0046	20	1.1562	20	1.1608	20.00	µg/L	1.72	34.40	µg/L	2.68	53.60	µg/L
Iron, Total		800	YES	0.0046	67	1.1562	50	1.1608	4302.01	µg/L	1.72	7399.45	µg/L	2.68	11529.38	µg/L
Lead, Total		0.4	NO	0.0046	1	1.1562	1	1.1608	1.00	µg/L	1.72	1.72	µg/L	2.68	2.68	µg/L
Magnesium, Total		0.23	NO	0.0046	1.551	1.1562	1.4595	1.1608	24.35	mg/L	1.72	41.87	mg/L	2.68	65.25	mg/L
Nickel, Total		0.4	NO	0.0046	4	1.1562	4	1.1608	4.00	µg/L	1.72	6.88	µg/L	2.68	10.72	µg/L
Selenium, Total	<	0.5	NO	0.0046	7	1.1562	7	1.1608	7.00	µg/L	1.72	12.04	µg/L	2.68	18.76	µg/L
Sulfate		9	YES	0.0046	7.26	1.1562	7.18	1.1608	27.19	mg/L	1.72	46.77	mg/L	2.68	72.87	mg/L
TDS @105 C		100	YES	0.0046	88	1.1562	83	1.1608	1333.59	mg/L	1.72	2293.78	mg/L	2.68	3574.02	mg/L
Total Suspended Solids		5	NO	0.0046	5	1.1562	5	1.1608	5.00	mg/L	1.72	8.60	mg/L	2.68	13.40	mg/L
Zinc, Total		2.1	NO	0.0046	8.1	1.1562	7.74	1.1608	97.78	µg/L	1.72	168.19	µg/L	2.68	262.06	µg/L
			CFS		Q_{hm}-CFS		CFS									

$Q_{Discharge}$	0.003	mgd	=	0.004641	cfs
$Q_{Upstream\ Q7\text{-}10}$	0.119	cfs	=	1.15615712	Q_{hm} cfs

C total	Values are from WQN Station (Upper 95% confidence limit)
C upstream	Values are from WQN Station Median Concentration

Source of information:
WQ Objective: TABLE 3
Upstream Concentration: TABLE 3
Multiplier from LTA to AMV @CV of 0.5 TABLE on page 64

$$Q_{hm} = 7.43 * (Q7\text{-}10)^{0.874}$$

$$Q_{discharge} = \frac{(Q_{total} * C_{total}) - (Q_{upstream} * C_{upstream})}{Q_{discharge}}$$

$$C_{AML} = C_{LTA} * \text{Multiplier}$$

Preliminary limitations are the more stringent of ABACT, Non-degradation or WQBEL for each parameter of concern.

Establishing Water Quality-Based Effluent Limitations

Parameter	Discharge Concentration		Non degrade C_{AML}	Units	Non degrade C_{MDL}	Units	Monitoring Trigger	Permit Limit Trigger	Reasonable Potential Determination
Aluminum, Total	<	50	5007.96	µg/L	7803.09	µg/L	500.8	2504.0	None
Barium, Total		257	1280.59	µg/L	1995.34	µg/L	128.1	640.3	**Monitor**
Boron, Total	<	50	344.00	µg/L	536.00	µg/L	34.4	172.0	**Monitor**
Bromide	<	100	43.00	µg/L	67.00	µg/L	4.3	21.5	**Establish Limit**
Chloride		5	798.60	mg/L	1244.33	mg/L	79.9	399.3	None
Copper, Total	<	0.5	6.88	µg/L	10.72	µg/L	0.7	3.4	None
Iron, Dissolved		40	34.40	µg/L	53.60	µg/L	3.4	17.2	**Establish Limit**
Iron, Total		800	7399.45	µg/L	11529.38	µg/L	739.9	3699.7	**Monitor**
Lead, Total		0.4	1.72	µg/L	2.68	µg/L	0.2	0.9	**Monitor**
Magnesium, Total		0.23	41.87	mg/L	65.25	mg/L	4.2	20.9	None
Nickel, Total		0.4	6.88	µg/L	10.72	µg/L	0.7	3.4	None
Selenium, Total	<	0.5	12.04	µg/L	18.76	µg/L	1.2	6.0	None
Sulfate		9	46.77	mg/L	72.87	mg/L	4.7	23.4	**Monitor**
TDS @105 C		100	2293.78	mg/L	3574.02	mg/L	229.4	1146.9	None
Total Suspended Solids		5	8.60	mg/L	13.40	mg/L	0.9	4.3	**Establish Limit**
Zinc, Total		2.1	168.19	µg/L	262.06	µg/L	16.8	84.1	None

Notes:

1. Per SOP No. BCW-PMT-037, I. Reasonable Potential and Establishing WQBELs, Section D.
   Monitoring Trigger for Non-Conservative Pollutants is 25% of C_{AML}
   Monitoring Trigger for Conservative Pollutants is 10% of C_{AML}
   Limit Trigger is 50% of C_{AML}

2. Reasonable Potential Determination is made comparing Discharge Concentration (Max Daily value) to Trigger to determine if Monitoring or a Permit Limit is required.