pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0035246**
Facility Type	**Industrial**	APS ID	**1098405**
Major / Minor	**Minor**	Authorization ID	**1457573**

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

Applicant and Facility Information

Applicant Name	**Municipal Authority of Westmoreland County**	Facility Name	**Indian Creek Water Filtration Plant**
Applicant Address	PO Box 730	Facility Address	Wheeler Bottom
	Greensburg, PA 15601-0730		Dunbar Township, PA 15425
Applicant Contact	Max Fontaine	Facility Contact	Dave Reese
Applicant Phone	(724) 755-5950	Facility Phone	(724) 755-5979
Client ID	64197	Site ID	257202
SIC Code	4941	Municipality	Dunbar Township
SIC Description	Trans. & Utilities - Water Supply	County	Fayette
Date Application Received	October 6, 2023	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: Renewal of NPDES Permit Coverage

Summary of Review

The Department received a renewal NPDES permit application from the Municipal Authority of Westmoreland County (MAWC) for coverage of their Indian Creek Water Filtration Plant on October 6, 2023. The site is a potable water treatment plant with SIC code of 4941.

The renewal application stated that the plant provides approximately 24.9 MGD of potable water for distribution within the MAWC's service area. However, in communications with MAWC personnel, it was noted that production averages have been higher than 24.9 MGD, with closer to 33 MGD out to distribution. This area includes Westmoreland County, certain municipalities within contiguous counties, and distribution to neighboring water utilities. The existing Indian Creek Water Filtration Plant began production in July 1973.

The site has one outfall, Outfall 001, that discharges to the Youghiogheny River, designated in 25 PA Code Chapter 93 as a High-Quality Cold-Water Fishery. Outfall 001 discharges filter backwash water and clarifier sludge after being treated in either of two settling ponds.

MAWC has a Water Quality Management Part II Permit for a dewatering system for the sludge in the ponds. The system came online in April 2019 and consists of two above-grade sludge transfer tanks and two Volute dewater presses. Flow from the settling ponds is directed via floating dredges to the sludge transfer tanks. Submersible mixers in the tanks keep the solids in suspension and provide a consistent solids concentration to the dewatering presses. Filtrate from the dewatering presses drains back into the settling ponds.

Approve	Deny	Signatures	Date
X		Jamie Ley Jamie Ley / Environmental Engineering Specialist	September 18, 2024
X		Michael E. Fifth Michael E. Fifth, P.E. / Environmental Engineer Manager	September 20, 2024

Summary of Review

Figure 1 – Aerial Image (Google Earth Image Dated September 2020)

Outfall 001 discharges to a segment of the Youghiogheny River designated as high-quality, therefore anti-degradation must be considered to ensure the stream is not being degraded by the discharge. This segment of the Youghiogheny River was designated high-quality on September 8, 1979. The site has been in operation since July 1973, prior to the designation of the stream. However, the site was modified in 1982, changing the effluent quality and quantity, therefore requiring the site's discharge to be evaluated to determine if non-degrading limitations were required. During the time the site was being modified, MAWC submitted a Social-Economical Justification to degrade the stream, which the Department approved.

The renewal NPDES permit application reported an average flow during production/operation of 1.3 MGD. For the last several permit cycles, the design wastewater flow for the facility has been stated as 1.3/1.4 MGD. Review of eDMRs showed the average monthly average discharge flow to be approximately 1.9 MGD. Upon request, MAWC submitted Module 4 – Anti-Degradation. The non-discharge alternatives of land application of wastewater or stormwater, recycle/reuse of wastewater or stormwater, and holding facilities and wastewater hauling were evaluated. MAWC identified land application of wastewater as the non-discharge alternative determined to be cost effective and environmentally sound. MAWC discussed that land application of wastewater is already utilized at the plant with the use of the settling lagoons and will continue to improve and incorporate the settling lagoons to limit flows on HQ waters. However, this non-discharge alternative would not be a viable option since the volume of water handled by the lagoons would not be conducive to infiltration. Therefore, non-degrading limits will be imposed for the expanded flows.

In addition, the cover letter of the renewal NPDES permit application stated that flows are anticipated to increase within the next two years due to the expansion of the facility. Currently, the construction schedule is to be completed by September 1, 2025. However, due to supply chain issues, this date may be adjusted to a later date. Upon completion, the plant will have a 50-MGD capacity. MAWC personnel stated that an increase in flow through the plant is not expected to occur immediately following construction. Increasing the plant flow is an operational decision that has yet to be determined.

Summary of Review

Figure 2 – Aerial Image Depicting Site Construction (Google Earth Image Dated April 2024)

The site was last inspected August 16, 2024 due to an incident that occurred August 14, 2024 at approximately 11:30 AM. One of the sodium permanganate tanks was being cleaned, which involves the removal of settled material and neutralizing the contents with peroxide and vinegar which is then released to the lagoon and eventually to Outfall 001. It was reported that the sodium permanganate was not given sufficient neutralization and turned the lagoon pink. Approximately 100 gallons made it to Outfall 001 and into the Youghiogheny River. MAWC responded by adding carbon to the lagoon which neutralized the water. The compliance inspection report noted that the lagoon, the outfall, and both upstream and downstream looked clear. No known biological impact was detected during the incident or during the inspection. It was recommended that the facility find a method to determine if the sodium permanganate has been neutralized enough prior to discharging to the lagoon. The permittee currently has no open violations.

Draft Permit issuance is recommended.

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

Summary of Review
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)	1.4
Latitude	40º 00' 15.9"	Longitude	-79º 35' 50.9"
Quad Name	South Connellsville	Quad Code	1909
Wastewater Description:	Filter backwash and clarifier sludge		
Receiving Waters	Youghiogheny River	Stream Code	37456
NHD Com ID	69918405	RMI	45.5
Drainage Area	1280 mi^2	Yield (cfs/mi^2)	0.359
Q_{7-10} Flow (cfs)	460	Q_{7-10} Basis	US Army Corp. of Engineers
Elevation (ft)	875	Slope (ft/ft)	0.001
Watershed No.	19-D	Chapter 93 Class.	HQ-CWF
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	Westmoreland County Municipal Authority - McKeesport		
PWS Waters	Youghiogheny River	Flow at Intake (cfs)	510
PWS RMI	1.373	Distance from Outfall (mi)	44.2

Changes Since Last Permit Issuance: No changes have been made to Outfall 001 since last permit issuance.

Other Comments:

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 1.4
Latitude 40º 00' 15.90" **Longitude** -79º 35' 50.90"
Wastewater Description: Filter backwash and clarifier sludge

Technology-Based Limitations

The Indian Creek Water Filtration Plant is not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code is not listed under 40 CFR parts 405 through 471.

Regulatory Effluent Standards and Monitoring Requirements

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

Effluent standards for pH are also imposed on industrial wastes by 25 Pa. Code §§ 95.2(1) which is displayed in Table 1 below.

Pennsylvania regulations at 25 Pa. Code § 92a.48(b) require the imposition of technology-based TRC limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELGs or a facility-specific BPJ evaluation which is displayed in Table 1 below.

Table 1. Regulatory Effluent Standards

Parameter	Monthly Avg	Daily Max	IMAX
Flow	Monitor	Monitor	----
pH	6.0 – 9.0 at all times		----
TRC	0.5 mg/l	----	1.6 mg/l

Best Practicable Control Technology Currently Achievable (BPT)

BPT for wastewater from treatment of WTP sludges and filter backwash is found in DEPs Technology-Based Control Requirements for Water Treatment Plant Wastes Document which falls under Best Professional Judgement under 40 CFR § 125.3 and the limits imposed are displayed in Table 2 below.

Table 2. BPT Limits for WTP Sludge and Filter Backwash Wastewater

Parameter	Monthly Avg (mg/l)	Daily Max (mg/l)
Suspended solids	30.0	60.0
Iron (total)	2.0	4.0
Aluminum (total)	4.0	8.0
Manganese (total)	1.0	2.0
Flow	Monitor	----
pH	6.0 – 9.0 at all times	
Total Residual Chlorine	0.5	1.0

Water Quality-Based Limitations

Toxics Management Spread Sheet

The Department of Environmental Protection (DEP) 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 Toxics Management Spreadsheet 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 Toxics Management Spread Sheet 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 Toxics Management Spread sheet 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 Toxics Management Spread Sheet. The maximum reported value of the parameters from the application form or from previous DMRs is used as the input concentration in the Toxics Management Spread Sheet. 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 Toxics Management Spread Sheet is run with the discharge and receiving stream characteristics shown in Table 3.

Table 3: TMS Inputs for Outfall 001

Parameter	**Value**
River Mile Index	45.5
Discharge Flow (MGD)	1.9
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	1280
Q_{7-10} (cfs)	460
Low-flow yield (cfs/mi^2)	0.359
Elevation (ft)	875
Slope	0.001

For IW discharges, the design flow used in modeling is normally the average flow during production or operation taken from the permit application. In this case, the design flow used was the average monthly average flow reported in the facility's DMRs due to the discrepancy between the average flow during production or operation reported in the permit application and the flows reported in the DMRs. 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. The information described above including the maximum reported discharge concentrations, the most stringent water quality criteria, the pollutant-of-concern (reasonable potential) determinations, the calculated WQBELs, and the WQBEL/monitoring recommendations are displayed in the Toxics Management Spread Sheet in Attachment B of this Fact Sheet.

The Toxics Management Spread Sheet recommended monitoring requirements for total cadmium, total lead, and total thallium for Outfall 001.

Table 4: TMS Recommended Monitoring Requirements for Outfall 001

Parameter	AML	MDL	IMAX	Units	Reported QL	Target QL
Total Cadmium	Report	Report	Report	ug/L	0.20 ug/L	0.2 ug/L
Total Lead	Report	Report	Report	ug/L	1.00 ug/L	1.0 ug/L
Total Thallium	Report	Report	Report	mg/L	0.002 mg/L	2.0 ug/L

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 chlorine demands for the receiving stream and the discharge, 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 imposed in the permit. The results of the modeling, included in Attachment C, indicate that no WQBELs are required for TRC.

Anti-Degradation Analysis

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 6 and established water quality-based effluent limitations which are protective of the existing stream quality. The limits were based on the last 5 years of data collected at reference Water Quality Network (WQN) Station #709 which is located on Youghiogheny River. Youghiogheny River 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.

The Youghiogheny River is a 132-mile tributary to the Monongahela River with the headwaters beginning along the border of Maryland and West Virginia. The discharge location is in Connellsville City, Fayette County, PA. At this location, the Youghiogheny is designated High Quality – Cold Water Fishes (HQ-CWF). Youghiogheny River reference data is shown in Table 5.

Table 5. Anti-Degradation Background Data

Site	Stream	Designated Use	Drainage Area (mi^2)	% Developed	% Forest	% Ag.	Elevation (ft)	Physiographic Province	Distance from Discharge (mi)
Discharge Point	Youghiogheny River	HQ-CWF	1,280	7.6	67.3	19.6	2,280	Appalachian Plateaus Province	
WQN0709	Youghiogheny River	HQ-CWF	432	8	65	19	2435	Appalachian Plateaus Province	27

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 of each parameter is determined by ranking the available concentrations and choosing the middle value. This median value is used to define the ambient instream concentration of a parameter. To meet long-term water quality characterization objectives, 5 years of data for each parameter is preferred; however, less data can be used if DEP is assured that the complete stream hydrograph is represented. A one-tailed confidence limit above the median specifies an upper boundary that, with some degree of certainty, is not exceeded by the median. DEP uses a 95 percent confidence limit to establish this upper boundary. For most parameters, this upper boundary represents the instream water quality objective for defining the total allowable instream concentration of a pollutant after adding in the discharge. Some parameters, such as pH, also have a lower boundary reported to represent the appropriate instream water quality objective.

Table 6 includes water quality data based upon approximately five (5) years of monitoring at the Youghiogheny River. 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. In addition, due to degrading conditions, the total chloride value was removed from the table.

Table 6. WQN0709

Test Description	First Date	Last Date	Period of Record (yr.)	Median	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Units
ALKALINITY (LAB)	2018-12-10	2023-11-29	5	18	21.8	16	MG/L
ALUMINUM TOTAL	2018-12-10	2023-11-29	5	58.9	85.7		UG/L
AMMONIA-N TOTAL	2018-12-10	2023-11-29	5	0.03	0.04		MG/L
BARIUM TOTAL	2018-12-10	2023-11-29	5	35	38		UG/L
BORON TOTAL	2018-12-10	2023-11-29	5	< 200	< 200		UG/L
BROMIDE TOTAL	2018-12-10	2023-11-29	5	< 25	< 25		UG/L
CALCIUM TOTAL	2018-12-10	2023-11-29	5	8.82	9.41		MG/L
COPPER TOTAL	2018-12-10	2023-11-29	5	< 4	< 4		UG/L
DO (FIELD)	2018-12-10	2023-11-29	5	9.87		9.06	MG/L
HARDNESS TOTAL	2018-12-10	2023-11-29	5	29	31		MG/L
IRON TOTAL	2018-12-10	2023-11-29	5	177	252		UG/L
LEAD TOTAL	2018-12-10	2023-11-29	5	< 1	< 1		UG/L
LITHIUM TOTAL	2018-12-10	2023-11-29	5	< 25	< 25		UG/L
MAGNESIUM TOTAL	2018-12-10	2023-11-29	5	1.76	1.87		MG/L
MANGANESE TOTAL	2018-12-10	2023-11-29	5	65	99		UG/L
NICKEL TOTAL	2018-12-10	2023-11-29	5	< 50	< 50		UG/L
NITRATE-N	2018-12-10	2023-11-29	5	0.685	0.76		MG/L
NITRITE-N	2018-12-10	2023-11-29	5	< 0.04	< 0.04		MG/L
NITROGEN TOTAL	2018-12-10	2023-11-29	5	0.82	0.9		MG/L
ORTHOPHOSPHATE TOTAL	2018-12-10	2023-11-29	5	< 0.01	< 0.01		MG/L
OSMO PRES	2018-12-10	2023-11-29	5	< 1	< 1		MOSM/KG

pH	2018-12-10	2023-11-29	5	6.97	7.04	6.84	pH units
PHOSPHORUS TOTAL	2018-12-10	2023-11-29	5	0.011	0.012		MG/L
POTASSIUM TOTAL	2018-12-10	2023-11-29	5	1.18	1.27		MG/L
SELENIUM TOTAL	2018-12-10	2023-11-29	5	< 7	< 7		UG/L
SODIUM TOTAL	2018-12-10	2023-11-29	5	5.95	6.39		MG/L
SPECIFIC CON	2018-12-10	2023-11-29	5	97.75	99.85		umhos/cm
STRONTIUM TOTAL	2018-12-10	2023-11-29	5	30	32		UG/L
SULFATE TOTAL	2018-12-10	2023-11-29	5	9.55	9.75		MG/L
TSS	2018-12-10	2023-11-29	5	< 20	< 20		MG/L
TDS	2018-12-10	2023-11-29	5	64	66		MG/L
WATER TEMP (FIELD)	2018-12-10	2023-11-29	5	8.85	10.9		°C
ZINC TOTAL	2018-12-10	2023-11-29	5	< 30	< 30		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 average monthly average flow reported by 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.

As previously discussed above, the renewal application reported an average flow during production/operation of 1.3 MGD. For the last several permit cycles, the design wastewater flow for the facility has been stated as 1.3/1.4 MGD. Review of eDMRs showed the average monthly average discharge flow to be approximately 1.9 MGD. Upon request, MAWC submitted Module 4 – Anti-Degradation. The non-discharge alternatives land application of wastewater or stormwater, recycle/reuse of wastewater or stormwater, and holding facilities and wastewater hauling were evaluated. MAWC identified land application of wastewater as the non-discharge alternative determined to be cost effective and environmentally sound. MAWC discussed that land application of wastewater is already utilized at the plant with the use of the settling lagoons and will continue to improve and incorporate the settling lagoons to limit flows on HQ waters. However, this non-discharge

alternative would not be a viable option because the volume of water handled by the lagoons would not be conducive to infiltration. Therefore, non-degrading limits will be imposed for the expanded flows.

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

Where:

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

$\mathbf{C_{total}}$: 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)

$\mathbf{Q_{upstream}}$: 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.

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

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

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

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

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

If there is an expanding discharge, the long-term average (LTA) and AML are calculated for only the expanded discharge flow using the same equations described in the Anti-Degradation Policy. A final AML for the blended discharge is determined using the following equation:

Solving for $\mathbf{AML}_{Blended}$: $$\mathbf{AML}_{Blended} = \frac{(\mathbf{Q}_{existing} \times \mathbf{C}_{existing}) + (\mathbf{Q}_{expanded} \times \mathbf{C}_{AML})}{\mathbf{Q}_{existing} + \mathbf{Q}_{expanded}}$$

The $\mathbf{MDL}_{Blended}$ for the expanded discharge is obtained by multiplying the AML by a multiplier; generally 2X.

Based on the above and on the comparison of 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 7. A summary of these calculations can be found in Appendix D.

Table 7. Non-Degrading Effluent Limitations

Parameter	Monthly Average	Daily maximum	Units
Bromide	0.10	0.17	mg/L
Lead, Total	27.9	43.5	µg/L
Total Residual Chlorine	0.26	0.40	mg/L
Total Suspended Solids	42.2	65.9	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.

Anti-Backsliding

The limits below in Table 8 are from the current permit. The parameters listed are from the Department's Technical Support Document (TSD) "Development of Technology-Based Control Requirements for Water Treatment Plant Wastes in Pennsylvania".

Table 8: Current Permit Effluent Limits

Parameters	Mass (lb/day)		Concentration (mg/l)			
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX
Total Suspended Solids	XXX	XXX	XXX	30	60	XXX
Total Residual Chlorine	XXX	XXX	XXX	0.5	1.0	XXX
Total Aluminum	XXX	XXX	XXX	4.0	8.0	XXX
Total Iron	XXX	XXX	XXX	2.0	4.0	XXX
Total Manganese	XXX	XXX	XXX	1.0	2.0	XXX
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX

Proposed Effluent Limitations for Outfall 001

The proposed effluent limitations and monitoring requirements for Outfall 001 are shown below in Table 9. The monitoring frequency will remain the same as the current permit, twice per month.

Table 9: Proposed Effluent Limitation for Outfall 001

Parameters	Mass (lb/day)		Concentration				Monitoring Requirements	
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/Month	Measure
Bromide (mg/L)	XXX	XXX	XXX	0.10	0.17	XXX	2/Month	Grab
Total Suspended Solids (mg/L)	XXX	XXX	XXX	30.0	60.0	XXX	2/Month	Grab
Total Residual Chlorine (mg/L)	XXX	XXX	XXX	0.26	0.40	XXX	2/Month	Grab
Total Aluminum (mg/L)	XXX	XXX	XXX	4.0	8.0	XXX	2/Month	Grab
Total Cadmium (ug/L)	XXX	XXX	XXX	Report	Report	XXX	2/Month	Grab
Total Iron (mg/L)	XXX	XXX	XXX	2.0	4.0	XXX	2/Month	Grab
Total Lead (ug/L)	XXX	XXX	XXX	27.9	43.5	XXX	2/Month	Grab
Total Manganese (mg/L)	XXX	XXX	XXX	1.0	2.0	XXX	2/Month	Grab
Total Thallium (ug/L)	XXX	XXX	XXX	Report	Report	XXX	2/Month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	2/Month	Grab

The permit will include a Schedule of Compliance, in accordance with 25 Pa. Code § 92a.51(a) of DEP's regulations, which grants the permittee three years to come into compliance with the new WQBELs. Because the WQBELs will not be effective upon permit issuance, the permit will be tiered to have interim and final monitoring requirements and effluent limits. For the first three years, a reporting requirement will be imposed. After three years, the WQBELs will take effect. A Part C condition will be included in the Draft NPDES Permit outlining a compliance schedule for these parameters.

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment **B**)
☒	TRC Model Spreadsheet (see Attachment **C**)
☐	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: BCW-PMT-001, BCW-PMT-032, BCW-PMT-033, BCW-PMT-037
☐	Other:

Attachment A – Outfall 001 StreamStats Report

StreamStats Report_Youghiogheny River_Indian Creek WTP Outfall 001

Region ID: PA
Workspace ID: PA20240108163355060000
Clicked Point (Latitude, Longitude): 40.00190, -79.59559
Time: 2024-01-08 11:34:20 -0500

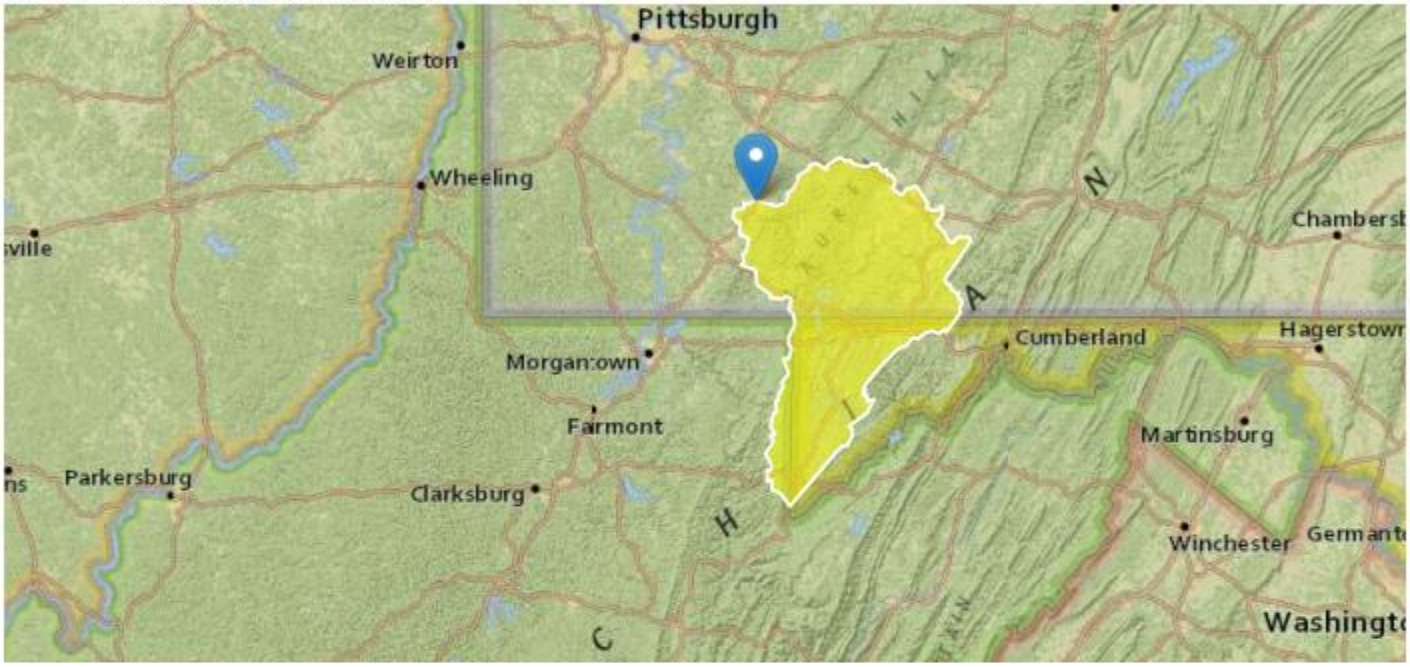
Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	0	percent
DRNAREA	Area that drains to a point on a stream	1280	square miles
ELEV	Mean Basin Elevation	2283	feet
FOREST	Percentage of area covered by forest	72.6282	percent
PRECIP	Mean Annual Precipitation	45	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	1.5	percent
URBAN	Percentage of basin with urban development	1.4477	percent

StreamStats Report_Youghiogheny River_End of Reach 1_2 Miles Downstream Outfall 001

Region ID: PA
Workspace ID: PA20240109161505910000
Clicked Point (Latitude, Longitude): 40.02475, -79.60375
Time: 2024-01-09 11:15:30 -0500



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	0	percent
DRNAREA	Area that drains to a point on a stream	1330	square miles
ELEV	Mean Basin Elevation	2257	feet
FOREST	Percentage of area covered by forest	72.864	percent
PRECIP	Mean Annual Precipitation	45	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	1.44	percent
URBAN	Percentage of basin with urban development	1.7213	percent

Attachment B – TMS Input & Results

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Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Indian Creek Water Filtration Plant** NPDES Permit No.: **PA0035246** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Filter backwash & clarifier sludge**

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
1.9	75	7.5						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Strea m CV	Fate Coeff	FOS	Criteri a Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		120									
	Chloride (PWS)	mg/L		22.5									
	Bromide	mg/L		0.13									
	Sulfate (PWS)	mg/L		40.6									
	Fluoride (PWS)	mg/L	<	0.1									
Group 2	Total Aluminum	µg/L		2650									
	Total Antimony	µg/L	<	2									
	Total Arsenic	µg/L	<	2									
	Total Barium	µg/L		62.5									
	Total Beryllium	µg/L	<	1									
	Total Boron	mg/L	<	0.1									
	Total Cadmium	µg/L		2.98									
	Total Chromium (III)	µg/L	<	2									
	Hexavalent Chromium	µg/L		0.34									
	Total Cobalt	µg/L		1.97									
	Total Copper	mg/L		0.003									
	Free Cyanide	µg/L											
	Total Cyanide	mg/L	<	0.01									
	Dissolved Iron	mg/L	<	0.02									
	Total Iron	mg/L		0.72									
	Total Lead	µg/L		37.2									
	Total Manganese	µg/L		5000									
	Total Mercury	µg/L	<	0.1									
	Total Nickel	µg/L		4.14									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	mg/L	<	0.005									
	Total Silver	µg/L	<	0.4									
	Total Thallium	mg/L		0.005									
	Total Zinc	µg/L		14.7									
	Total Molybdenum	µg/L	<	2									

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Indian Creek Water Filtration Plant , NPDES Permit No. PA0035246, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Youghiogheny 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	037456	45.5	875	1280	0.001		Yes
End of Reach 1	037456	43.5	862	1330	0.001		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	45.5	0.359	460			235	15					33.36	7		
End of Reach 1	43.5	0.346	460			235	15								

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	45.5														
End of Reach 1	43.5														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Indian Creek Water Filtration Plant , NPDES Permit No. PA0035246, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.607 Analysis Hardness (mg/l): 33.794 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	72,023	
Total Antimony	0	0		0	1,100	1,100	105,633	
Total Arsenic	0	0		0	340	340	32,650	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	2,016,638	
Total Boron	0	0		0	8,100	8,100	777,846	
Total Cadmium	0	0		0	0.701	0.71	68.0	Chem Translator of 0.989 applied
Total Chromium (III)	0	0		0	234.320	742	71,208	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	1,565	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	9,123	
Total Copper	0	0		0	4.835	5.04	484	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	19.473	20.5	1,970	Chem Translator of 0.949 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	158	Chem Translator of 0.85 applied
Total Nickel	0	0		0	187.007	187	17,994	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	0.498	0.59	56.2	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	6,242	
Total Zinc	0	0		0	46.734	47.8	4,589	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 40.681 PMF: 1 Analysis Hardness (mg/l): 33.624 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
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	34,650	
Total Arsenic	0	0		0	150	150	23,625	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	645,749	
Total Boron	0	0		0	1,600	1,600	252,000	
Total Cadmium	0	0		0	0.115	0.12	19.0	Chem Translator of 0.955 applied
Total Chromium (III)	0	0		0	30.355	35.3	5,559	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	1,637	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	2,992	
Total Copper	0	0		0	3.529	3.68	579	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	236,250	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	0.755	0.79	125	Chem Translator of 0.95 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	143	Chem Translator of 0.85 applied
Total Nickel	0	0		0	20.683	20.7	3,267	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	786	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	2,047	
Total Zinc	0	0		0	46.917	47.6	7,494	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 40.681 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	882	
Total Arsenic	0	0		0	10	10.0	1,575	
Total Barium	0	0		0	2,400	2,400	378,000	
Total Boron	0	0		0	3,100	3,100	488,250	
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	47,250	
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	157,500	
Total Mercury	0	0		0	0.050	0.05	7.87	
Total Nickel	0	0		0	610	610	96,075	
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	37.8	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 18.247 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 Cadmium	Report	Report	Report	Report	Report	µg/L	19.0	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Lead	Report	Report	Report	Report	Report	µg/L	125	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Thallium	Report	Report	Report	Report	Report	mg/L	0.038	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)	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	Discharge Conc < TQL
Total Aluminum	46,164	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	378,000	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	252	mg/L	Discharge Conc < TQL
Total Chromium (III)	5,559	µg/L	Discharge Conc < TQL
Hexavalent Chromium	1,003	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	2,992	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	0.31	mg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	47.2	mg/L	Discharge Conc < TQL
Total Iron	236	mg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	157,500	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	7.87	µg/L	Discharge Conc < TQL
Total Nickel	3,267	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	0.79	mg/L	Discharge Conc < TQL
Total Silver	36.0	µg/L	Discharge Conc < TQL
Total Zinc	2,941	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Attachment C – TRC Evaluation Model for Outfall 001

TRC EVALUATION

460	= Q stream (cfs)	0.5	= CV Daily
1.9	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.6	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	**1.3.2.iii**	WLA afc = 29.973	**1.3.2.iii**	WLA cfc = 48.682
PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373	**5.1c**	LTAMULT cfc = 0.581
PENTOXSD TRG	**5.1b**	LTA_afc= 11.169	**5.1d**	LTA_cfc = 28.302

Source		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 D – Outfall 001 Non-degrading Effluent Limitation Calculations

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	Parameter
Aluminum, Total		2650	YES	0.7735	85.7	1578.4803	58.9	1579.2538	54776.42	µg/L	1.72	94215.44	µg/L	2.68	146800.80	µg/L	Aluminum, Total
Ammonia as N, Total		0.48	YES	0.7735	0.04	1578.4803	0.03	1579.2538	20.45	mg/L	1.72	35.17	mg/L	2.68	54.80	mg/L	Ammonia as N, Total
Barium, Total		62.5	YES	0.7735	38	1578.4803	35	1579.2538	6160.10	µg/L	1.72	10595.36	µg/L	2.68	16509.06	µg/L	Barium, Total
Boron, Total	<	100	NO	0.7735	200	1578.4803	200	1579.2538	200.00	µg/L	1.72	344.00	µg/L	2.68	536.00	µg/L	Boron, Total
Bromide		130	YES	0.7735	25	1578.4803	25	1579.2538	25.00	µg/L	1.72	43.00	µg/L	2.68	67.00	µg/L	Bromide
Copper, Total		3	NO	0.7735	4	1578.4803	4	1579.2538	4.00	µg/L	1.72	6.88	µg/L	2.68	10.72	µg/L	Copper, Total
Hardness, Total		75	YES	0.7735	31	1578.4803	29	1579.2538	4112.40	mg/L	1.72	7073.32	mg/L	2.68	11021.22	mg/L	Hardness, Total
Iron, Total		720	YES	0.7735	252	1578.4803	177	1579.2538	153304.39	µg/L	1.72	263683.54	µg/L	2.68	410855.75	µg/L	Iron, Total
Lead, Total		37.2	YES	0.7735	1	1578.4803	1	1579.2538	1.00	µg/L	1.72	1.72	µg/L	2.68	2.68	µg/L	Lead, Total
Manganese, Total		5	YES	0.7735	0.099	1578.4803	0.065	1579.2538	69.48	mg/L	1.72	119.51	mg/L	2.68	186.21	mg/L	Magnesium, Total
Magnesium, Total		5.4	YES	0.7735	1.87	1578.4803	1.76	1579.2538	226.35	mg/L	1.72	389.32	mg/L	2.68	606.61	mg/L	Magnesium, Total
Nickel, Total		4.14	NO	0.7735	50	1578.4803	50	1579.2538	50.00	µg/L	1.72	86.00	µg/L	2.68	134.00	µg/L	Nickel, Total
Nitrate-Nitrite as N, Total		0.814	YES	0.7735	0.8	1578.4803	0.725	1579.2538	153.85	mg/L	1.72	264.63	mg/L	2.68	412.32	mg/L	Nitrate-Nitrite as N, Total
Phosphorus, Total		0.25	YES	0.7735	0.012	1578.4803	0.011	1579.2538	2.05	mg/L	1.72	3.53	mg/L	2.68	5.50	mg/L	Phosphorus, Total
Selenium, Total	<	5	NO	0.7735	7	1578.4803	7	1579.2538	7.00	µg/L	1.72	12.04	µg/L	2.68	18.76	µg/L	Selenium, Total
Sulfate		40.6	YES	0.7735	9.75	1578.4803	9.55	1579.2538	417.89	mg/L	1.72	718.77	mg/L	2.68	1119.94	mg/L	Sulfate
Total Dissolved Solids		120	YES	0.7735	66	1578.4803	64	1579.2538	4147.40	mg/L	1.72	7133.52	mg/L	2.68	11115.02	mg/L	Total Dissolved Solids
Total Suspended Solids		45	YES	0.7735	20	1578.4803	20	1579.2538	20.00	mg/L	1.72	34.40	mg/L	2.68	53.60	mg/L	Total Suspended Solids
Zinc, Total		14.7	NO	0.7735	30	1578.4803	30	1579.2538	30.00	µg/L	1.72	51.60	µg/L	2.68	80.40	µg/L	Zinc, Total
TRC		0.34	YES	0.7735	0.02	1578.4803	0.02	1579.2538	0.02	mg/L	1.72	0.03	mg/L	2.68	0.05	mg/L	TRC
			CFS		Q_{hm}-CFS		CFS										

$Q_{Discharge}$	0.5	mgd	=	0.7735	cfs
$Q_{Upstream\ Q7\text{-}10}$	460	cfs	=	1578.48027	Q_{hm} cfs

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

Indian Creek WTP

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	2650	94215.44	µg/L	146800.80	µg/L	9421.5	47107.7	None
Ammonia as N	0.48	35.17	mg/L	54.80	mg/L	3.5	17.6	None
Barium, Total	62.5	10595.36	µg/L	16509.06	µg/L	1059.5	5297.7	None
Bromide	130	43.00	µg/L	67.00	µg/L	4.3	21.5	**Establish Limit**
Hardness, Total	75	7073.32	mg/L	11021.22	mg/L	707.3	3536.7	None
Iron, Total	720	263683.54	µg/L	410855.75	µg/L	26368.4	131841.8	None
Lead, Total	37.2	1.72	µg/L	2.68	µg/L	0.2	0.9	**Establish Limit**
Manganese, Total	5	119.51	mg/L	186.21	mg/L	12.0	59.8	None
Magnesium, Total	5.4	389.32	mg/L	606.61	mg/L	38.9	194.7	None
Nitrate-Nitrite as N, Total	0.814	264.63	mg/L	412.32	mg/L	26.5	132.3	None
Phosphorus, Total	0.25	3.53	mg/L	5.50	mg/L	0.4	1.8	None
Sulfate	40.6	718.77	mg/L	1119.94	mg/L	71.9	359.4	None
Total Dissolved Solids	120	7133.52	mg/L	11115.02	mg/L	713.4	3566.8	None
TRC	0.34	0.03	mg/L	0.05	mg/L	0.0034	0.0172	**Establish Limit**
Total Suspended Solids	45	34.40	mg/L	53.60	mg/L	3.4	17.2	**Establish Limit**

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.

Parameter	Non degrade C AML	Units	C Existing	Units	AML Blended	Units
Bromide	43.000	ug/L	130	ug/L	107	ug/L
Total Lead	1.720	ug/L	37.2	ug/L	27.9	ug/L
TRC	0.030	mg/L	0.34	mg/L	0.26	ug/L
TSS	34.400	mg/L	45	mg/L	42.2	mg/L

Q Existing	1.4	MGD
Q Expanded	0.5	MGD
Q Total	1.9	MGD

Solving for $AML_{Blended}$: $$AML_{Blended} = \frac{(Q_{existing} \times C_{existing}) + (Q_{expanded} \times C_{AML})}{Q_{existing} + Q_{expanded}}$$