



Application Type  
Facility Type  
Major / Minor

Renewal  
Industrial  
Minor

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

Application No. **PA0218367**  
APS ID **1121455**  
Authorization ID **1499181**

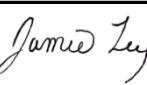
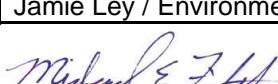
**Applicant and Facility Information**

Applicant Name	<b>Saint Francis University</b>	Facility Name	<b>Saint Francis University Water Treatment Plant</b>
Applicant Address	PO Box 600 111 Juniper Lane	Facility Address	376 Columbia Street
	Loretto, PA 15940-0600		Loretto, PA 15940-9749
Applicant Contact	David Teeter	Facility Contact	Same as applicant
Applicant Phone	(814) 474-3017	Facility Phone	Same as applicant
Client ID	72523	Site ID	246281
SIC Code	4941	Municipality	Loretto Borough
SIC Description	Trans. & Utilities - Water Supply	County	Cambria
Date Application Received	<u>August 29, 2024</u>	EPA Waived?	Yes
Date Application Accepted		If No, Reason	
Purpose of Application	Renewal of NPDES Permit Coverage		

**Summary of Review**

The Department received a NPDES permit renewal application from Saint Francis University on August 29, 2024 for coverage of Saint Francis University Water Treatment Plant.

The Saint Francis University Water Treatment Plant purifies water obtained from two wells. The well water is either pumped to treatment or to raw water storage. Treatment is chemical conditioning followed by a four (4) unit green sand-carbon filter battery. Treated water is stored for distribution and filter backwashing. Filter backwash water is drained through a sampling pit to four (4) filter backwash water storage and settling tanks. The backwash tanks have two (2) 50-gpm pumps discharging to either raw water storage or to an unnamed tributary of Chest Creek via Outfall 001. Settled sludge is removed for off-site disposal.

Approve	Deny	Signatures	Date
X		 Jamie Ley / Environmental Engineering Specialist	December 18, 2024
X		 Michael E. Fifth, P.E. / Environmental Engineer Manager	December 19, 2024

Summary of Review

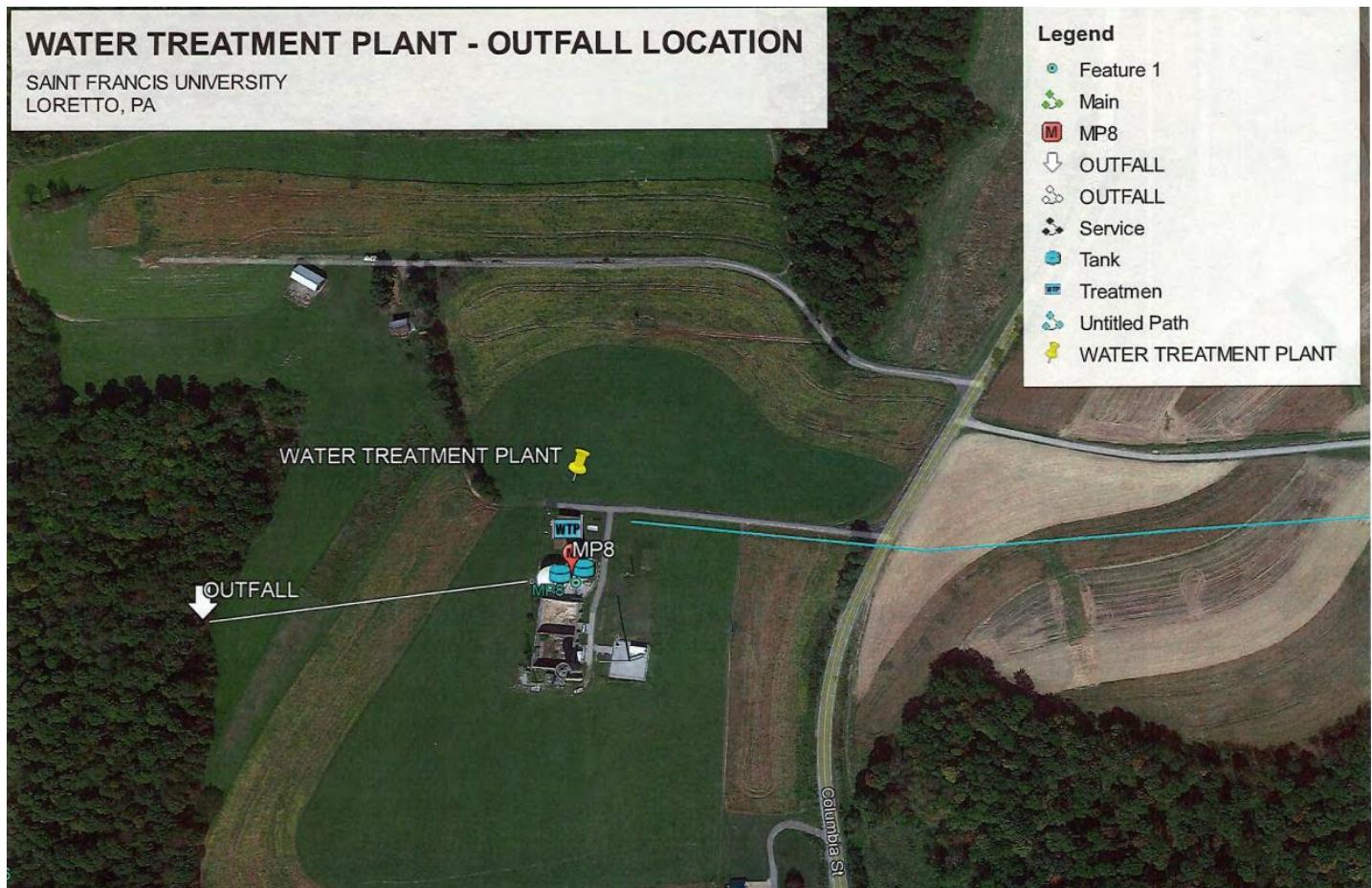


Figure 1 – Site Plan

Summary of Review

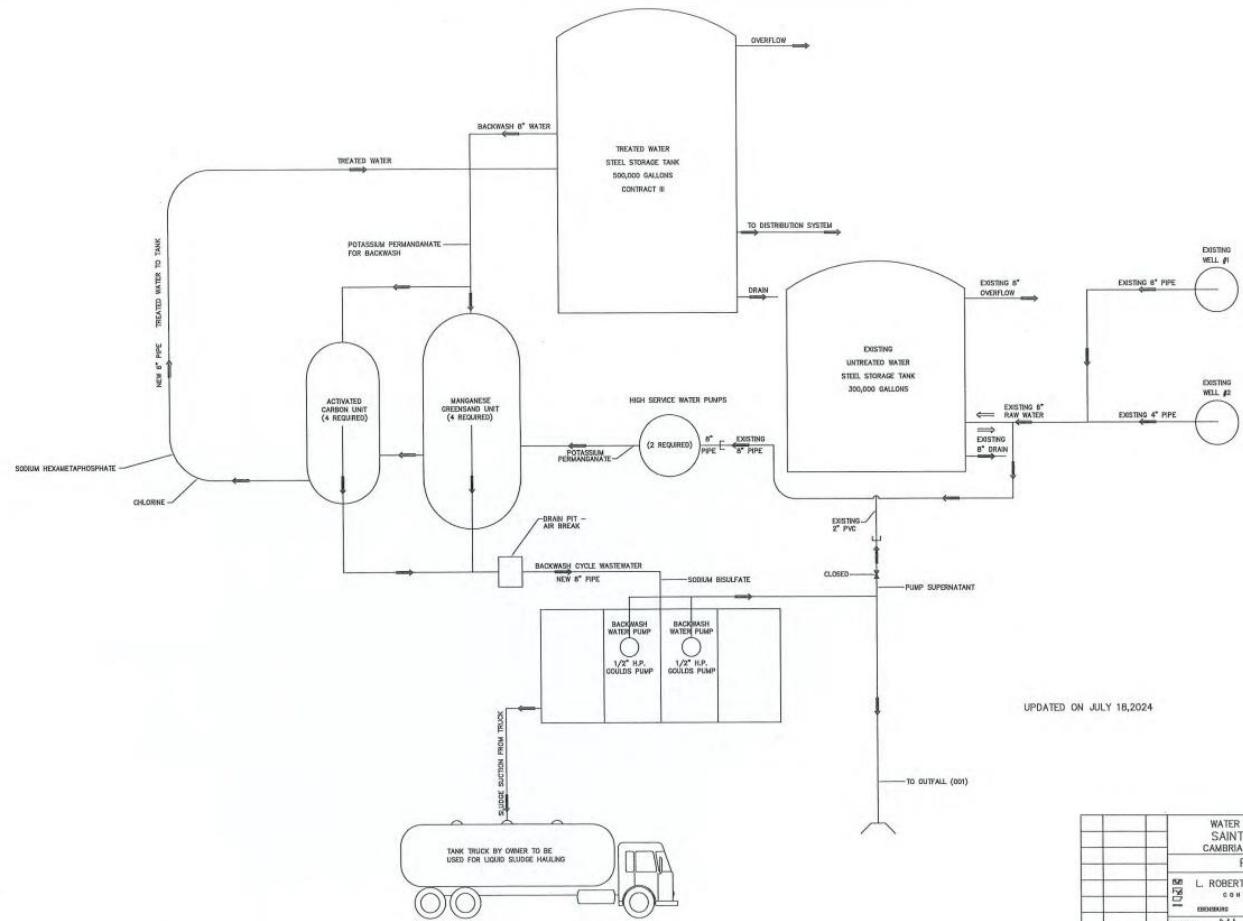


Figure 2 – Flow Diagram

The facility was not inspected during the current permit cycle. 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 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)	0.036
Latitude	40° 31' 10.5"	Longitude	-78° 38' 20.20"
Quad Name	Carrolltown	Quad Code	1416
Wastewater Description:	Backwash water from manganese green sand and activated carbon units		
Receiving Waters	Unnamed Tributary of Chest Creek	Stream Code	26994
NHD Com ID	100471417	RMI	0.3187
Drainage Area	0.0354 mi <sup>2</sup>	Yield (cfs/mi <sup>2</sup> )	0.0452
Q <sub>7-10</sub> Flow (cfs)	0.0016	Q <sub>7-10</sub> Basis	USGS StreamStats
Elevation (ft)	1990	Slope (ft/ft)	0.001
Watershed No.	8-B	Chapter 93 Class.	HQ-CWF, MF
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		Patton Borough Water Department	
PWS Waters	Chest Creek	Flow at Intake (cfs)	2.65
PWS RMI	26.16	Distance from Outfall (mi)	~ 14

Changes Since Last Permit Issuance:

Other Comments:

Primary node is an intermittent (dry) stream. Perennial stream conditions were modelled at the next downstream node:

Unnamed Tributary of Chest Creek, stream code 26993, RMI 0.1528

Drainage Area (mi<sup>2</sup>) – 0.24  
Yield (cfs/mi<sup>2</sup>) – 0.051  
Q<sub>7-10</sub> Flow (cfs) – 0.0122  
Q<sub>7-10</sub> Basis – USGS StreamStats  
Elevation (ft) – 1874  
Slope (ft/ft) – 0.001

Drainage areas and Q<sub>7-10</sub> flows differ from the previous permit renewal due to updates to USGS StreamStats

RMI at the confluence of the unnamed tributaries of Chest Creek has also been updated to reflect eMap

**Development of Effluent Limitations**

Outfall No. 001  
Latitude 40° 31' 10.5"

Design Flow (MGD) 0.036  
Longitude -78° 38' 20.20"

Wastewater Description: Backwash water from manganese green sand and activated carbon units

**Technology-Based Limitations**

The Saint Francis University Water Treatment 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

**Total Dissolved Solids (TDS)**

Integral to the implementation of 25 Pa. Code § 95.10 is the principle that existing, authorized mass loadings of TDS are exempt from any treatment requirements under these provisions. Existing mass loadings of TDS up to and including the maximum daily discharge loading for any existing discharge, provided that the loading was authorized prior to August 21, 2010 are exempt. Discharge loadings of TDS authorized by the Department are typically exempt from the treatment requirements of Chapter 95.10 until the net TDS loading is increased, an existing discharge proposes a hydraulic expansion or a change in the waste stream. If there are existing mass or production-based TDS effluent limits, then these are used as the basis for the existing mass loading. The facility is not new or expanding waste loading of TDS, therefore, the facility is exempt from 25 Pa. Code § 95.10 treatment requirements.

### 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].

Discharge via Outfall 001 is to an intermittent tributary 26994 of Chest Creek. Previous modelling established the point of first use at the downstream confluence with unnamed tributary 26993 of Chest Creek. The Toxics Management Spread Sheet was run with the discharge and receiving stream characteristics shown in Table 3.

**Table 3: TMS Inputs for Point of First Use**

Parameter	Value
River Mile Index	0.1528
Discharge Flow (MGD)	0.004
<b>Basin/Stream Characteristics</b>	
Parameter	Value
Area in Square Miles	0.24
Q <sub>7-10</sub> (cfs)	0.0122
Low-flow yield (cfs/mi <sup>2</sup> )	0.05083
Elevation (ft)	1874
Slope	0.001

For IW discharges, the design flow used in modeling is the average flow during production or operation taken from the permit application or DMRs. During the previous renewal review, the design flow of 0.036 MGD was utilized. For the current

renewal review, the average flow during production or operation stated in the application was 0.004 MGD. The average monthly average flow from September 2022 through August 2024 was approximately 0.004 MGD. Therefore, a flow value of 0.004 MGD was utilized in the TMS.

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 the following for Outfall 001:

**Table 4: TMS Recommended Monitoring Requirements & WQBELs for Outfall 001**

Parameter	AML	MDL	IMAX	Units
Total Manganese	Report	Report	Report	mg/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, recommend the imposition of 0.415 mg/L average monthly and 0.972 mg/L instantaneous maximum limits.

#### Anti-Degradation Considerations

The facility is not proposing any increase to the discharge quantity or quality; therefore, no anti-degradation analysis is required at this time.

#### Chesapeake Bay Strategy

This is a non-significant industrial discharge facility that will not need a phosphorus or nitrogen loading cap.

A total nitrogen and total phosphorus "Monitor & Report" requirement will not be necessary since this facility discharges wastewater without a significant nitrogen or phosphorus component. The Supplement to Phase II Watershed Implementation Plan states the following:

*"For non-significant IW facilities, monitoring and reporting of TN and TP will be required throughout the permit term in renewed or amended permits anytime the facility has the potential to introduce a net TN or TP increase to the load contained within the intake water used in processing. In general, facilities that discharge groundwater and cooling water with no addition of chemicals containing N or P do not require monitoring."*

Anti-Backsliding

Previous limits can be used pursuant to EPA's anti-backsliding regulation 40 CFR 122.44 and are displayed below in Table 5.

**Table 5: Current Effluent Limitations for Outfall 001**

Parameters	Mass (lb/day)		Concentration				Monitoring Requirements	
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/month	Measure
Total Suspended Solids (mg/L)	XXX	XXX	XXX	30.0	XXX	60.0	1/week	Grab
Total Residual Chlorine (mg/L)	XXX	XXX	XXX	0.05	XXX	0.17	1/week	Grab
Total Aluminum (mg/L)	XXX	XXX	XXX	0.75	0.75	0.75	1/week	Grab
Total Iron (mg/L)	XXX	XXX	XXX	2.0	XXX	4	1/week	Grab
Total Manganese (mg/L)	XXX	XXX	XXX	1.0	XXX	2	1/week	Grab
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/week	Grab

Proposed Effluent Limitations for Outfall 001

The proposed effluent limitations and monitoring requirements for Outfall 001 are shown below in Table 6. Note that some values were incorrectly labeled as IMAX values in the previous permit when they should have been labeled as Daily Maximum. This has been changed to reflect existing permitting practices. The limits are the most stringent values from the above limitation analysis. Monitoring frequency will be reduced to twice per month for all parameters to reflect current permitting practices of WTPs.

**Table 6: Proposed Effluent Limitations 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
Total Suspended Solids (mg/L)	XXX	XXX	XXX	30.0	60.0	XXX	2/month	Grab
Total Residual Chlorine (mg/L)	XXX	XXX	XXX	0.05	0.17	XXX	2/month	Grab
Total Aluminum (mg/L)	XXX	XXX	XXX	0.75	0.75	XXX	2/month	Grab
Total Iron (mg/L)	XXX	XXX	XXX	2.0	4.0	XXX	2/month	Grab
Total Manganese (mg/L)	XXX	XXX	XXX	1.0	2.0	XXX	2/month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	2/month	Grab

Tools and References Used to Develop Permit	
<input type="checkbox"/>	WQM for Windows Model (see Attachment [REDACTED])
<input checked="" type="checkbox"/>	Toxics Management Spreadsheet (see Attachment B)
<input checked="" type="checkbox"/>	TRC Model Spreadsheet (see Attachment C)
<input type="checkbox"/>	Temperature Model Spreadsheet (see Attachment [REDACTED])
<input type="checkbox"/>	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
<input type="checkbox"/>	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
<input type="checkbox"/>	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
<input type="checkbox"/>	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
<input type="checkbox"/>	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
<input type="checkbox"/>	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
<input type="checkbox"/>	Pennsylvania CSO Policy, 386-2000-002, 9/08.
<input type="checkbox"/>	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
<input type="checkbox"/>	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
<input type="checkbox"/>	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
<input type="checkbox"/>	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
<input type="checkbox"/>	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
<input type="checkbox"/>	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
<input type="checkbox"/>	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
<input checked="" type="checkbox"/>	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
<input type="checkbox"/>	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
<input type="checkbox"/>	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
<input type="checkbox"/>	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 10/97.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 3/99.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Design Stream Flows, 386-2000-003, 9/98.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
<input type="checkbox"/>	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
<input checked="" type="checkbox"/>	SOP: BCW-PMT-001, BCW-PMT-032, BCW-PMT-033, BCW-PMT-037
<input type="checkbox"/>	Other: [REDACTED]

## Attachment A – StreamStats Reports

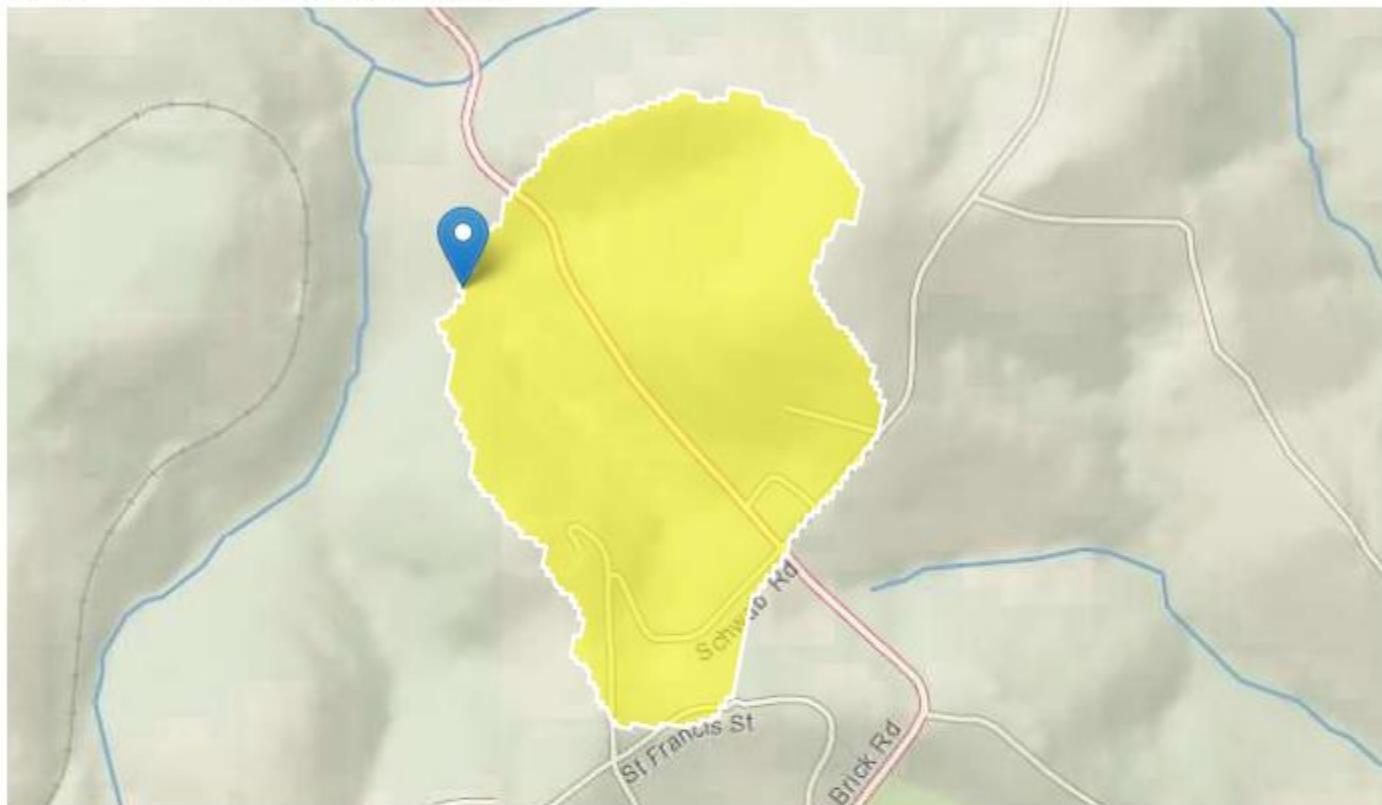
## StreamStats Report\_RMI 0.1528 Trib 26993 of Chest Creek

**Region ID:** PA

**Workspace ID:** PA20240930192136090000

**Clicked Point (Latitude, Longitude):** 40.51784, -78.64434

**Time:** 2024-09-30 15:21:58 -0400



[Collapse All](#)

### ➤ Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.24	square miles
ELEV	Mean Basin Elevation	1994	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	0.24	square miles	2.33	1720
ELEV	Mean Basin Elevation	1994	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	0.0314	ft^3/s
30 Day 2 Year Low Flow	0.0475	ft^3/s
7 Day 10 Year Low Flow	0.0122	ft^3/s
30 Day 10 Year Low Flow	0.0175	ft^3/s
90 Day 10 Year Low Flow	0.0264	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/>)**

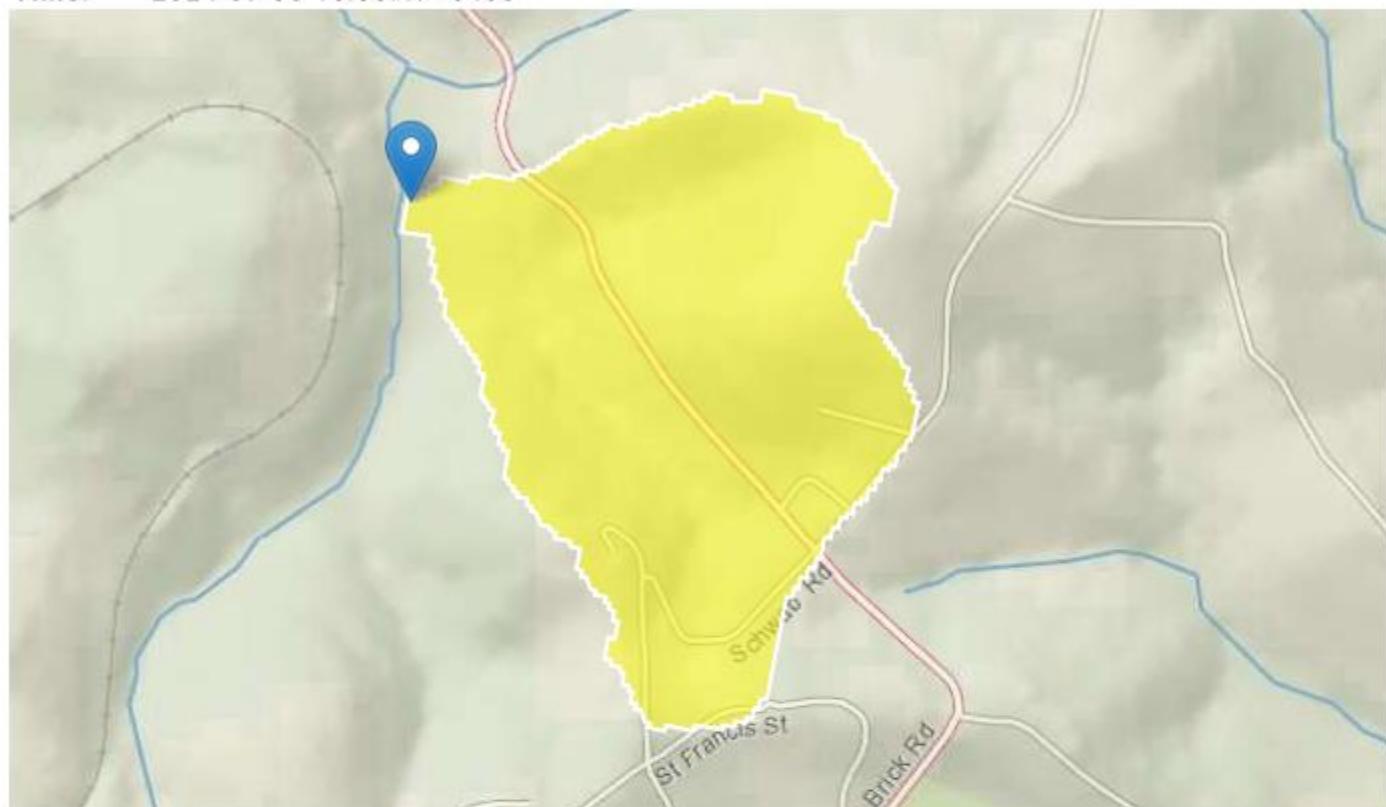
## StreamStats Report\_RMI 0 Trib 26993 of Chest Creek

**Region ID:** PA

**Workspace ID:** PA20240930193323832000

**Clicked Point (Latitude, Longitude):** 40.51927, -78.64617

**Time:** 2024-09-30 15:33:47 -0400



[Collapse All](#)

### ➤ Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.25	square miles
ELEV	Mean Basin Elevation	1986	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	0.25	square miles	2.33	1720
ELEV	Mean Basin Elevation	1986	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	0.0327	ft^3/s
30 Day 2 Year Low Flow	0.0494	ft^3/s
7 Day 10 Year Low Flow	0.0127	ft^3/s
30 Day 10 Year Low Flow	0.0182	ft^3/s
90 Day 10 Year Low Flow	0.0275	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 – TMS Inputs & Results



## Discharge Information

Instructions **Discharge** Stream

Facility: **Saint Francis University WTP**

NPDES Permit No.: **PA0218367**

Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste**

Wastewater Description: **Backwash water**

Discharge Characteristics							
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)			Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q <sub>7-10</sub>
0.004	103	8.4					

			0 if left blank		0.5 if left blank		0 if left blank		1 if left blank		
			Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
<b>Group 1</b>	Total Dissolved Solids (PWS)	mg/L	348								
	Chloride (PWS)	mg/L	15								
	Bromide	mg/L	< 0.021								
	Sulfate (PWS)	mg/L	60.9								
	Fluoride (PWS)	mg/L	0.642								
	Total Aluminum	mg/L	0.1								
<b>Group 2</b>	Total Antimony	µg/L	< 0.07								
	Total Arsenic	µg/L	< 2.5								
	Total Barium	µg/L	367								
	Total Beryllium	µg/L	< 0.135								
	Total Boron	mg/L	< 0.0565								
	Total Cadmium	µg/L	< 0.025								
	Total Chromium (III)	mg/L	< 0.00199								
	Hexavalent Chromium	µg/L	< 1								
	Total Cobalt	µg/L	0.04								
	Total Copper	µg/L	1.51								
	Free Cyanide	µg/L									
	Total Cyanide	mg/L	0.08								
	Dissolved Iron	µg/L	< 20								
	Total Iron	mg/L	0.36								
	Total Lead	µg/L	0.045								
	Total Manganese	mg/L	0.89								
	Total Mercury	mg/L	< 0.0000932								
	Total Nickel	µg/L	0.752								
	Total Phenols (Phenolics) (PWS)	mg/L	0.003								
	Total Selenium	µg/L	< 2.5								
	Total Silver	µg/L	< 0.274								
	Total Thallium	µg/L	< 0.014								
	Total Zinc	µg/L	1.62								
	Total Molybdenum	µg/L	0.407								
	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	<											
Group 5	2,4,6-Trichlorophenol	µg/L	<											
	Acenaphthene	µg/L	<											
	Acenaphthylene	µg/L	<											
	Anthracene	µg/L	<											
	Benzidine	µg/L	<											
	Benzo(a)Anthracene	µg/L	<											
	Benzo(a)Pyrene	µg/L	<											
	3,4-Benzofluoranthene	µg/L	<											
	Benzo(ghi)Perylene	µg/L	<											
	Benzo(k)Fluoranthene	µg/L	<											
	Bis(2-Chloroethoxy)Methane	µg/L	<											
	Bis(2-Chloroethyl)Ether	µg/L	<											
	Bis(2-Chloroisopropyl)Ether	µg/L	<											
	Bis(2-Ethylhexyl)Phthalate	µg/L	<											
	4-Bromophenyl Phenyl Ether	µg/L	<											
	Butyl Benzyl Phthalate	µg/L	<											
	2-Chloronaphthalene	µg/L	<											
	4-Chlorophenyl Phenyl Ether	µg/L	<											
	Chrysene	µg/L	<											
	Dibenzo(a,h)Anthracene	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	<											





## Stream / Surface Water Information

Saint Francis University WTP, NPDES Permit No. PA0218367, Outfall 001

Instructions **Discharge** Stream

Receiving Surface Water Name: **Tributary 26993 of Chest Creek**

No. Reaches to Model: **1**

- Statewide Criteria  
 Great Lakes Criteria  
 ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi <sup>2</sup> )*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	026993	0.1528	1874	0.24	0.001		Yes
End of Reach 1	026993	0	1856	0.25	0.001		Yes

**Q<sub>7-10</sub>**

Location	RMI	LFY (cfs/mi <sup>2</sup> )*	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	0.1528	0.05083	0.0122									100	7		
End of Reach 1	0	0.0508	0.0127												

**Q<sub>h</sub>**

Location	RMI	LFY (cfs/mi <sup>2</sup> )*	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	0.1528														
End of Reach 1	0														



## Model Results

Saint Francis University WTP, NPDES Permit No. PA0218367, Outfall 001

All  Inputs  Results  Limits

**Hydrodynamics**

**Wasteload Allocations**

**AFC** CCT (min):  PMF:  Analysis Hardness (mg/l):  Analysis pH:

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	2,229	
Total Antimony	0	0		0	1,100	1,100	3,269	
Total Arsenic	0	0		0	340	340	1,010	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	62,403	
Total Boron	0	0		0	8,100	8,100	24,070	
Total Cadmium	0	0		0	2,033	2.16	6.4	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	574,470	1,818	5,402	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	48.4	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	282	
Total Copper	0	0		0	13,567	14.1	42.0	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	65,291	82.7	246	Chem Translator of 0.79 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1,400	1.65	4.89	Chem Translator of 0.85 applied
Total Nickel	0	0		0	472,232	473	1,406	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	3,273	3.85	11.4	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	193	
Total Zinc	0	0		0	118,182	121	359	Chem Translator of 0.978 applied

**CFC** CCT (min): **0.666** PMF: **1** Analysis Hardness (mg/l): **101.01** Analysis pH: **7.17**

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	654	
Total Arsenic	0	0		0	150	150	446	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	12,183	
Total Boron	0	0		0	1,600	1,600	4,754	
Total Cadmium	0	0		0	0.248	0.27	0.81	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.727	86.9	258	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	30.9	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	56.5	
Total Copper	0	0		0	9.033	9.41	28.0	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	4,457	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.544	3.22	9.58	Chem Translator of 0.79 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	2.69	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.450	52.6	156	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	14.8	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	38.6	
Total Zinc	0	0		0	119.149	121	359	Chem Translator of 0.986 applied

**THH** CCT (min): **0.666** 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	16.6	
Total Arsenic	0	0		0	10	10.0	29.7	
Total Barium	0	0		0	2,400	2,400	7,132	
Total Boron	0	0		0	3,100	3,100	9,212	
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	891
Total Iron	0	0		0	N/A	N/A	N/A
Total Lead	0	0		0	N/A	N/A	N/A
Total Manganese	0	0		0	1,000	1,000	2,972
Total Mercury	0	0		0	0.050	0.05	0.15
Total Nickel	0	0		0	610	610	1,813
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A
Total Selenium	0	0		0	N/A	N/A	N/A
Total Silver	0	0		0	N/A	N/A	N/A
Total Thallium	0	0		0	0.24	0.24	0.71
Total Zinc	0	0		0	N/A	N/A	N/A

CRL

CCT (min): 0.330

PMF: 1

Analysis Hardness (mg/l):

N/A

Analysis pH: N/A

Pollutants	Stream Conc (ug/L)	Stream CV	Trib Conc (ug/L)	Fate Coef	WQC (ug/L)	WQ Obj (ug/L)	WLA (ug/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

**Other Pollutants without Limits or Monitoring**

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Aluminum	1.43	mg/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	7,132	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	4.75	mg/L	Discharge Conc < TQL
Total Cadmium	0.81	µg/L	Discharge Conc < TQL
Total Chromium (III)	0.26	mg/L	Discharge Conc < TQL
Hexavalent Chromium	30.9	µg/L	Discharge Conc < TQL
Total Cobalt	56.5	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	26.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	891	µg/L	Discharge Conc < TQL
Total Iron	4.46	mg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	9.58	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.0001	mg/L	Discharge Conc < TQL
Total Nickel	156	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		mg/L	PWS Not Applicable
Total Selenium	14.8	µg/L	Discharge Conc < TQL
Total Silver	7.33	µg/L	Discharge Conc < TQL
Total Thallium	0.71	µg/L	Discharge Conc < TQL
Total Zinc	230	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

## Attachment C – TRC Evaluation Model Input & Results

## TRC EVALUATION

0.0122	= Q stream (cfs)	0.5	= CV Daily
0.004	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)
Source	Reference	AFC Calculations	Reference
TRC	1.3.2.iii	WLA_afc = 0.648	1.3.2.iii
PENTOXSD TRG	5.1a	LTAMULT_afc = 0.373	5.1c
PENTOXSD TRG	5.1b	LTA_afc= 0.241	5.1d
Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.720	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.415	AFC
		INST MAX LIMIT (mg/l) = 0.972	
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)	