pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0097497**
Facility Type	**Industrial**	APS ID	**275248**
Major / Minor	**Minor**	Authorization ID	**1212128**

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

Applicant and Facility Information

Applicant Name	**Cowanshannock Township Municipal Authority**	Facility Name	**Sagamore Water Treatment Plant**
Applicant Address	P.O. Box 127 NuMine, PA 16244-0127	Facility Address	T718 Sagamore, PA 16244
Applicant Contact	Peter Catanese	Facility Contact	Justin Lamison
Applicant Phone	724-783-7609	Facility Phone	724-783-7609
Client ID	28690	Site ID	249468
SIC Code	4952	Municipality	Cowanshannock Township
SIC Description	Trans. & Utilities - Sewerage Systems	County	Armstrong
Date Application Received	December 1, 2017	EPA Waived?	Yes
Date Application Accepted	October 9, 2019	If No, Reason	

Purpose of Application: Renewal of NPDES permit for the discharge of process wastewater from the water treatment plant.

Summary of Review

The Department received an NPDES permit renewal application from Cowanshannock Township Municipal Authority on December 1, 2017 for coverage of the discharge from its Sagamore Water Treatment Plant (WTP) in Cowanshannock Township of Armstrong County. The facility is a municipal water treatment plant with an SIC Code 4941 (Water Supply). The current NPDES permit was renewed on June 1, 2013 and expired on May 31, 2018. Water Quality Management (WQM) permit 0373203 was approved in 1973 and transferred to the current owner in 1995.

Sagamore WTP operates as a municipal water treatment plant that treats groundwater to produce potable water for community use. Sagamore WTP's treatment system consists of chemical feed equipment, two greensand pressure filters, and metering equipment. Raw groundwater from wells is treated for iron and manganese removal then disinfected and filtered prior to distribution.

Chemical treatment includes sodium hypochlorite for pre-chlorination and iron/ manganese oxidation, potassium permanganate for oxidation, caustic soda for pH adjustment, and alum for coagulation. The water is then conveyed to two covered concrete reservoirs. Backwash waste from pressure filters flow to a lagoon for sedimentation of total solids. The overflow from the lagoon discharges to Outfall 001.

The facility has one outfall, Outfall 001, which discharges to an Unnamed Tributary to North Branch of Plum Creek, designated in 25 PA Code Chapter 93 as a Cold Water Fishery (CWF). Outfall 001 discharges filter backwash water at a design flow of 0.0036 MGD and maximum flow of 0.005 MGD from the lagoon.

The facility's laboratory did not meet the Department's Target quantification limits (QLs) in its sample analyses. The maximum reported values for Total Antimony, Total Cadmium, Hexavalent Chromium, Total Copper, Total Lead, and Total Silver were each reported as "non-detect" using a QL that failed to achieve the Department's minimum Target QL. Sagamore WTP will be collecting additional samples for the parameters Total Antimony, Total Cadmium, Hexavalent Chromium, Total

Approve	Deny	Signatures	Date
X		/s/ Lauren Nolfi, E.I.T. / Environmental Engineering Specialist	November 18, 2019
X		/s/ Michael E. Fifth, P.E. / Environmental Engineer Manager	November 18, 2019

Summary of Review

Copper, Total Lead, and Total Silver and having them analyzed using the Target QLs. If the additional samples indicate that these parameters are not pollutants of concern, those effluent limits may be removed from the final permit.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.0035
Latitude	40º 46' 53"	Longitude	-79º 14' 01"
Quad Name	1212	Quad Code	Plumville
Wastewater Description:	Filter backwash water overflow from lagoon.		
Receiving Waters	Unnamed Tributary to North Branch Plum Creek (CWF)	Stream Code	46550
NHD Com ID	123851663	RMI	0.38
Drainage Area	0.0802 mi2	Yield (cfs/mi^2)	0.02731
Q_{7-10} Flow (cfs)	0.00219	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	1171	Slope (ft/ft)	0.0369
Watershed No.	17-E	Chapter 93 Class.	CWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	Organic Enrichment		
Source(s) of Impairment	On-site treatment systems (septic systems and similar decentralized systems)		
TMDL Status	Final – 8/15/2015	Name	Crooked Creek Watershed
Nearest Downstream Public Water Supply Intake	Penelec Keystone Station		
PWS Waters	Plum Creek	Flow at Intake (cfs)	2.476
PWS RMI	0.05	Distance from Outfall (mi)	12.30

Other Comments:

No changes have been made to Outfall 001 since last permit issuance.

The USGS Stream Stats Data for the drainage area is displayed in Attachment A.

Compliance History

DMR Data for Outfall 001 (from September 1, 2018 to August 31, 2019)

Parameter	AUG-19	JUL-19	JUN-19	MAY-19	APR-19	MAR-19	FEB-19	JAN-19	DEC-18	NOV-18	OCT-18	SEP-18
Flow (MGD) Average Monthly	0.216	0.216	0.216	0.216	0.216	0.216	0.216	0.216	0.216	0.216	0.216	0.216
Flow (MGD) Daily Maximum	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288
pH (S.U.) Minimum	8.0	8.0	8.0	8.0	7.0	7.5	7.00	7.60	7.0	7.50	7.20	6.90
pH (S.U.) Maximum	8.0	8.0	8.0	8.0	8.0	7.6	7.50	8.00	7.7	7.60	7.90	7.50
TRC (mg/L) Average Monthly	0.01	0.01	0.10	0.05	0.58	0.06	0.56	0.12	0.085	0.06	0.015	0.01
TRC (mg/L) Instantaneous Maximum	0.01	0.01	0.10	0.10	2.20	0.11	2.20	0.35	0.09	0.09	0.02	0.02
TSS (mg/L) Average Monthly	3	3	3	3	12	3	11	10	3	3	3	4
TSS (mg/L) Instantaneous Maximum	3	3	3	3	21	3	15	17	3	3	3	4
Total Aluminum (mg/L) Average Monthly	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Total Aluminum (mg/L) Instantaneous Maximum	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Total Iron (mg/L) Average Monthly	0.69	0.59	0.92	0.55	0.97	0.31	3.89	0.79	0.49	0.49	0.26	0.26
Total Iron (mg/L) Instantaneous Maximum	1.14	1.13	1.65	0.79	1.34	0.53	6.35	1.47	0.53	0.73	0.35	0.33
Total Manganese (mg/L) Average Monthly	1.42	0.20	0.29	0.22	0.20	0.35	0.90	0.40	0.31	0.25	0.15	0.07
Total Manganese (mg/L) Instantaneous Maximum	2.68	0.31	0.54	0.31	0.21	0.59	1.20	0.46	0.35	0.36	0.16	0.08

Compliance History

Effluent Violations for Outfall 001, from: October 1, 2018 To: August 31, 2019

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TRC	04/30/19	Avg Mo	0.58	mg/L	0.5	mg/L
TRC	02/28/19	Avg Mo	0.56	mg/L	0.5	mg/L
TRC	04/30/19	IMAX	2.20	mg/L	1.0	mg/L
TRC	02/28/19	IMAX	2.20	mg/L	1.0	mg/L
Total Iron	02/28/19	Avg Mo	3.89	mg/L	2.0	mg/L
Total Iron	02/28/19	IMAX	6.35	mg/L	4.0	mg/L
Total Manganese	08/31/19	Avg Mo	1.42	mg/L	1.0	mg/L
Total Manganese	08/31/19	IMAX	2.68	mg/L	2.0	mg/L

Summary of Inspections: The last inspection conducted by the Department was on May 6, 2015 by Shana Wivell of the NWRO as a compliance evaluation. No violations were noted.

Other Comments:

Monitoring data from the past three years shows 12 effluent violations for the parameters pH, iron, manganese, and total residual chlorine (TRC). Sagamore WTP reported a maximum pH of 9.64 during December 2017, a maximum iron concentration of 23.2 mg/L and a maximum manganese concentration of 2.72 mg/L during January 2018, and a maximum TRC concentration of 2.20 mg/L during August 2019.

The client has no open violations.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.0035
Latitude 40º 46' 53" **Longitude** -79º 14' 01"
Wastewater Description: Filter backwash water overflow from lagoon.

Technology-Based Limitations (TBELs)

Sagamore WTP 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) as indicated in Table 1.

Effluent standards for pH pursuant to 25 Pa. Code §§ 95.2(1), as indicated in Table 1, are also imposed on all industrial wastes.

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 as indicated in Table 6.

Table 1: Regulatory Effluent Standards

Parameter	Monthly Average	Daily Maximum	IMAX
Flow (MGD)	Monitor	Monitor	----
pH (S.U.)	Not less than 6.0 nor greater than 9.0 at all times		----
TRC	0.5 mg/l	1.0 mg/l	1.6 mg/l

Best Practicable Control Technology Currently Achievable (BPT)

BPT for wastewater from treatment of water treatment plant (WTP) sludges and filter backwash is found in DEPs Technology-Based Control Requirements for Water Treatment Plant Wastes Document which recommends effluent limitations be imposed under Best Professional Judgement in accordance with 40 CFR § 125.3, and detailed in Table 2.

Table 2: BPT Limits for WTP sludge and filter backwash wastewater

Parameter	Monthly Average (mg/L)	Daily Maximum (mg/L)
Total Suspended solids	30.0	60.0
Total Iron	2.0	4.0
Total Aluminum	4.0	8.0
Total Manganese	1.0	2.0
Flow (MGD)	Monitor and Report	
pH (S.U.)	Not less than 6.0 nor greater than 9.0 at all times	
Total Residual Chlorine	0.5	1.0

Water Quality-Based Effluent Limitations (WQBELs)

Toxics Screening Analysis – Procedures for Evaluating Reasonable Potential and Developing WQBELs

DEP's procedures for evaluating reasonable potential are as follows:

1. For IW discharges, the design flow to use in modeling is the average flow during production or operation, and may be taken from the permit application.

2. Perform a Toxics Screening Analysis to identify toxic pollutants of concern. All toxic pollutants whose maximum concentrations, as reported in the permit application or on past DMRs, that are greater than the most stringent applicable water quality criterion are evaluated as 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]. List all toxic pollutants of concern in a Toxics Screening Analysis section of the Fact Sheet (see Attachment C).

3. For any outfall with an applicable design flow, perform PENTOXSD modeling for all pollutants of concern. Use the maximum reported value from the application form or from DMRs as the input concentration for the PENTOXSD model run.

4. Compare the actual WQBEL from PENTOXSD with the maximum concentration reported on DMRs or the permit application. Use WQN data or another source to establish the existing or background concentration for naturally occurring pollutants, but generally assume zero background concentration for non-naturally occurring pollutants.

    - Establish limits in the draft permit where the maximum reported concentration equals or exceeds 50% of the WQBEL. Use the average monthly and maximum daily limits for the permit as recommended by PENTOXSD. Establish an IMAX limit at 2.5 times the average monthly limit.

    - For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.

    - For conservative pollutants, establish monitoring requirements 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 collected on a spreadsheet titled "Toxics Screening Analysis." (Attachment C).

PENTOXSD Water Quality Modeling Program

PENTOXSD Version 2.0 for Windows is a single discharge, mass-balance water quality modeling program 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 and discharge flow rate are entered into PENTOXSD 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. Pollutants are then selected for analysis based on those present or likely to be present in a discharge at levels that may cause, have the reasonable potential to cause, or contribute to excursions above state water quality standards (i.e., a reasonable potential analysis). Discharge concentrations for the selected pollutants are chosen to represent the "worst case" quality of the discharge (i.e., maximum reported discharge concentrations). PENTOXSD then evaluates each pollutant 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, PENTOXSD 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 used for toxics screening as described above. The PENTOXSD model is run with the discharge and receiving stream characteristics shown in Table 4. Since the nearest downstream public water supply intake is 12.30 miles downstream of Outfall 001, the intake flow was not included in the PENTOXSD model run.

The pollutants selected for analysis include those identified as candidates for modeling by the Toxics Screening Analysis spreadsheet (in accordance with Step 2 of the Toxics Screening Analysis procedure discussed above). Pollutants for which water quality standards have not been promulgated (e.g., TSS, oil and grease) are excluded from the analysis.

Based on the recommendations of the Toxics Screening Analysis, shown in Attachment C, Antimony, Barium, Cadmium, Hexavalent Chromium, Copper, Iron, Dissolved Iron, Lead, Manganese, Nickel, Phenols and Silver were candidates for PENTOXSD modeling. The maximum reported values for Antimony, Cadmium, Hexavalent Chromium, Copper, Lead, Phenols and Silver were each reported as “non-detect” using a quantitation limit (QL) that exceeds the Department’s Target QL.

Table 4: PENTOXSD Inputs	
Parameter	**Value**
River Mile Index	0.38
Discharge Flow (MGD)	0.0035
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	0.0802
$Q_{7\text{-}10}$ (cfs)	0.00219
Low-flow yield (cfs/mi^2)	0.02731
Elevation (ft)	1171
Slope	0.0369

The WQBELs calculated using PENTOXSD are compared to the maximum reported effluent concentrations as described in the Toxics Screening Analysis section above to evaluate the need to impose WQBELs or monitoring requirements in the permit. Output from the PENTOXSD model runs is included in Attachment D.

Based on PENTOXSD modeling and the Toxics Screening Analysis, WQBELs were to be imposed for the parameter of Antimony, Cadmium, Hexavalent Chromium, Copper, Iron, Dissolved Iron, Lead, Manganese and Silver. Monitoring is to be imposed for the parameters of Barium and Nickel. The recommended effluent limits from PENTOXSD are shown below in Table 5. Sagamore WTP will be collecting additional samples for the parameters of Antimony, Cadmium, Hexavalent Chromium, Copper, Lead and Silver using the Target QLs. If the additional samples indicate that these parameters are not pollutants of concern, those effluent limits may be removed from the final permit.

Total Maximum Daily Load (TMDL)

Wastewater discharges from Sagamore WTP are located in the Crooked Creek Watershed, for which the Department has developed a suspended solids TMDL. A TMDL establishes the amount of a pollutant that a water body can assimilate without exceeding the water quality criteria for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and non-point sources in order to restore and maintain the quality of the state's water resources (USEPA 1991a). The TMDL was finalized on August 15, 2015 and addresses the impairments caused by suspended solids by establishing waste load allocations (WLAs).

The WLA portion of the TMDL equation is the total loading of a pollutant that is assigned to point sources. Reviewing the Department's permitting files identified 13 mining related NPDES permits and 33 non-mining NPDES permits (stormwater, public and private Sewage Treatment Plants (STP), and industrial discharges) point sources of suspended solids located in the Crooked Creek Watershed.

The Crooked Creek Watershed TMDL identifies Sagamore WTP as a non-mining permit within the Crooked Creed Watershed. The Crooked Creek Watershed TMDL's non-mining WLAs are included in Attachment B. Sagamore WTP is given a suspended solids WLA of 913 lbs/year, as shown below in Table 3. The concentration-based WLA was back-calculated using the equation below:

$$Flow\ (MGD) \times Concentration\ \left(\frac{mg}{L}\right) \times 8.34 \left(\frac{{}^{lbs}/_{day}}{MGD \times {}^{mg}/_{L}}\right) = WLA\ \left(\frac{lbs}{day}\right)$$

$$[\because 10^6\ {}^{gal}/_{day} \times 10^{-3}\ {}^{gm}/_{L} \times 3.79\ {}^{L}/_{gal} \times 0.0022\ {}^{lbs}/_{gm} = 8.34\ lbs/day]$$

The concentration-based suspended solids WLA for Sagamore WTP is listed below in Table 3. Since the TSS TBEL is more stringent than the calculated concentration-based WLA, the WLA will not be applied.

Table 3: TMDL WLA		
Parameter	**Mass Units (lbs/yr)**	**Concentrations (mg/L)**
	Total Annual	**Monthly Average**
Total Suspended Solids	913	85.9

Table 5: Outfall 001 Water Quality Based Effluent Limits			
Parameter	**Mass Units (lbs/yr)**	**Concentrations (µg/L)**	
	Total Annual	**Monthly Average**	**Daily Maximum**
Antimony, total	XXX	7.87	12.3
Barium, total	XXX	Report	Report
Cadmium, total	XXX	0.511	0.797
Hexavalent Chromium	XXX	14.6	22.8
Copper, total	XXX	18.4	28.7
Iron, total	XXX	2107	3287
Dissolved Iron	XXX	421	657
Lead, total	XXX	7.43	11.6
Manganese, total	XXX	1404	2191
Nickel, total	XXX	Report	Report
Silver, total	XXX	6.77	10.6
Total Suspended Solids	913	85.9 mg/L	XXX

Total Residual Chlorine (TRC)

To determine if WQBELs are required for discharges containing total residual chlorine, 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 E, indicate that WQBELs will be imposed for TRC. The recommended effluent limits for TRC are shown below in Table 6.

Table 6: TRC WQBELs			
Parameter	**Monthly Average (mg/L)**	**Daily Maximum**	**IMAX (mg/L)**
Total Residual Chlorine	0.095	----	0.223

Total Dissolved Solids (TDS)

Per *Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) – 25 Pa. Code §95.10 (DEP-ID: 385-2100-002)*, a monitoring requirement for TDS for any discharge that exceeds 2,000 mg/L TDS should be applied at minimum. The maximum reported TDS concentration at Outfall 001 is 487 mg/L. Since the TDS discharge concentration is below 2,000 mg/L, no monitoring/limit requirements will be applied for TDS or its constituent parameters.

Anti-Backsliding

The effluent limitations and monitoring requirements in Table 7 below are from the current permit, issued on June 1, 2013. The draft permit does not propose any effluent limits that are less stringent than those imposed in the previous permit.

Table 7: Current Permit Effluent Limitations – Outfall 001			
Parameter	**Average Monthly**	**Maximum Daily**	**Units**
Flow	Monitor & Report		MGD
Total Residual Chlorine	0.5	1.0	$^{mg}/_{L}$
Total Suspended Solids	30	60	$^{mg}/_{L}$
Aluminum, total	4.0	8.0	$^{mg}/_{L}$
Iron, total	2.0	4.0	$^{mg}/_{L}$
Manganese, total	1.0	2.0	$^{mg}/_{L}$
pH	Not less than 6.0 nor greater than 9.0		S.U.

Compliance Schedule

Whenever the Department proposes the imposition of water quality based effluent limitations on existing sources, the NPDES permit may include a schedule of compliance to achieve the WQBELs. Any compliance schedule contained in an NPDES permit must be an enforceable sequence of actions or operations leading to compliance with the water quality-based effluent limitations (WQBELs). It is the best professional judgement of the permit writer that Sagamore WTP should be allowed a compliance schedule (i.e., as expeditiously as possible), instead of immediate compliance after the permit is issued. The Department has decided to allow a one-year compliance schedule for Total Residual Chlorine and a three-year compliance schedule for the parameters of Dissolved Iron and Total Iron, which is included in Part C of the permit.

One-Year Effluent Limitation Compliance Schedule – TRC Only

A. The permittee shall achieve compliance with the final Total Residual Chlorine effluent limitations for Outfall 001, as presented in Page 4 of the permit, in accordance with the following schedule.

1. Within 30-days following the Permit Effective Date (“PED”), the permittee shall notify the Department how it intends to comply with the final effluent limitations. If operational changes will be employed, the permittee shall implement the changes as soon as possible in order to meet the final effluent limitations. If wastewater treatment is proposed, the permittee shall proceed to Step 2; otherwise, proceed to Step 3.

2. If a wastewater treatment system will be installed, the permittee shall submit a Water Quality Management (WQM) permit application within 90-days following the PED. Also, within 180 days following the PED (pending Department approval of the WQM permit application), the permittee shall commence construction of the approved treatment system.

3. Within one year following the PED, the permittee shall achieve compliance with the final effluent limitations for Outfall 001.

II. No later than 14 calendar days following a date identified in the above compliance schedule, the permittee shall submit to DEP a written notice of compliance or non-compliance with the specific schedule requirement. Each notice of non-compliance shall include the following information:

A. A short description of the non-compliance.

B. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement.

C. A description of any factors which tend to explain or mitigate the non-compliance.

D. An estimate of the date that compliance with the elapsed schedule requirement will be achieved and an assessment of the probability that the next scheduled requirement will be met on time.”

Three-Year Effluent Limitation Compliance Schedule – Dissolved Iron and Total Iron

In accordance with 40 CFR 122.47(a)(3) and PA Code Chapter 92a.51, compliance schedules that are longer than one year in duration must set forth interim requirements and dates for their achievement. In order to grant a compliance schedule in an NPDES Permit, the permitting authority has to make a reasonable finding, adequately

supported by the administrative record and described in the Fact Sheet, that a compliance schedule is "appropriate" and that compliance with the final WQBEL is required "as soon as possible".

Sagamore WTP may be unable to meet the proposed effluent limitations at Outfall 001 for the parameters of Dissolved Iron and Total Iron based on the current lack of installed treatment technologies and the known discharge concentrations of these pollutants. As such, the Department will allow Sagamore WTP to conduct a Toxics Reduction Evaluation (TRE), and if necessary, design and install supplemental treatment solutions. Monitoring for pollutants will be imposed for the first three years of coverage. After three years following the permit effective date, the final permit limits will take effect. The complete requirements imposed under the compliance schedule and the TRE are included in Part C of the NPDES permit.

Permit Language:

I. Schedule of Compliance – Dissolved Iron and Total Iron

A. The permittee shall achieve compliance with final effluent limitations or terminate this discharge in accordance with the following schedule:

1.	Provide preliminary source assessment and compliance options	3 months following permit effective date (PED)
2.	Final plan completion and WQM application submission	1 year following PED
3.	Start construction	1.5 years following PED
4.	Construction progress report(s)	2 years following PED
5.	End construction	2.5 following PED
6.	Compliance with effluent limitations	3 years following PED

B. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit to DEP a written notice of compliance or non-compliance with the specific schedule requirement. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance.

2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement.

3. A description of any factors which tend to explain or mitigate the non-compliance.

4. An estimate of the date that compliance with the elapsed schedule requirement will be achieved and an assessment of the probability that the next scheduled requirement will be met on time.

Proposed Effluent Limitations and Monitoring Requirements for Outfall 001

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements, as summarized in Table 8. The applicable limits and monitoring requirements provided below are based on those in Tables 1-7 of this Fact Sheet.

Table 8: Proposed Effluent Limits for Outfall 001								
Parameters	**Mass (lb/day)**		**Concentration**				**Monitoring Requirements**	
	Average Monthly	**Daily Maximum**	**Daily Minimum**	**Average Monthly**	**Daily Maximum**	**Instant. Maximum**	**Frequency**	**Sample Type**
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/Month	Measure
Total Residual Chlorine (mg/L) Interim(1) Final(2)	 XXX XXX	 XXX XXX	 XXX XXX	 0.5 0.095	 1.0 XXX	 XXX 0.223	2/Month	Grab
Total Suspended Solids (mg/L)	XXX	XXX	XXX	30.0	60.0	XXX	2/Month	Grab
Total Suspended Solids (mg/L)	Report Total Annual (lbs/year)		XXX	XXX	XXX	XXX	1/Year	Grab
Aluminum, total (mg/L)	XXX	XXX	XXX	4.0	8.0	XXX	2/Month	Grab
Antimony, total* (µg/L)	XXX	XXX	XXX	7.87	12.3	XXX	2/Month	Grab
Barium, total (µg/L)	XXX	XXX	XXX	Report	Report	XXX	2/Month	Grab
Cadmium, total* (µg/L)	XXX	XXX	XXX	0.511	0.797	XXX	2/Month	Grab
Hexavalent Chromium* (µg/L)	XXX	XXX	XXX	14.6	22.8	XXX	2/Month	Grab
Copper, total* (µg/L)	XXX	XXX	XXX	18.4	28.7	XXX	2/Month	Grab
Iron, total (mg/L) Interim(3) Final(4)	 XXX XXX	 XXX XXX	 XXX XXX	 2.0 2.0	 4.0 3.29	 XXX XXX	2/Month	Grab
Dissolved Iron (µg/L) Interim(3) Final(4)	 XXX XXX	 XXX XXX	 XXX XXX	 Report 421.4	 Report 657.4	 XXX XXX	2/Month	Grab
Lead, total* (µg/L)	XXX	XXX	XXX	7.43	11.6	XXX	2/Month	Grab
Manganese, total (mg/L)	XXX	XXX	XXX	1.0	2.0	XXX	2/Month	Grab
Nickel, total (µg/L)	XXX	XXX	XXX	Report	Report	XXX	2/Month	Grab
Silver, total* (µg/L)	XXX	XXX	XXX	6.77	10.6	XXX	2/Month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	2/Month	Grab

*New samples are being collected using Target QLs. Parameters will potentially be removed from the final permit.
(1) PED through 1 year following PED
(2) 1 year following PED through permit expiration date
(3) PED through 3 years following PED
(4) 3 years following PED through permit expiration date

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	PENTOXSD for Windows Model (see Attachment D)
☒	TRC Model Spreadsheet (see Attachment E)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Toxics Screening Analysis Spreadsheet (see Attachment C)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☒	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 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, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 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, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

Attachments

Attachment A: StreamStats Report

Attachment B: Crooked Creek Watershed Suspended Solids TMDL

Attachment C: Toxics Screening Analysis Results for Outfall 001

Attachment D: PENTOXSD Modeling Results for Outfall 001

Attachment E: TRC Modeling Results for Outfall 001

ATTACHMENT A:
StreamStats Report

StreamStats Report

Region ID:	PA
Workspace ID:	PA20191025134932392000
Clicked Point (Latitude, Longitude):	40.78237, -79.23185
Time:	2019-10-25 09:49:49 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0802	square miles
ELEV	Mean Basin Elevation	1267	feet
PRECIP	Mean Annual Precipitation	43	inches

Low Flow Statistics Parameters[Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0802	square miles	2.33	1720
ELEV	Mean Basin Elevation	1267	feet	898	2700
PRECIP	Mean Annual Precipitation	43	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	0.00654	ft^3/s
30 Day 2 Year Low Flow	0.0103	ft^3/s
7 Day 10 Year Low Flow	0.00219	ft^3/s
30 Day 10 Year Low Flow	0.0035	ft^3/s
90 Day 10 Year Low Flow	0.00545	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:
Crooked Creek Watershed Suspended Solids TMDL

Crooked Creek Watershed Suspended Solids TMDL
Non-Mining NPDES Permit Waste Load Allocations for Suspended Solids

Non-Mining Waste Load Allocations:

Site	Permit #	Municipality	County	Outfall	Type	WLA (lbs/year)
KEYSTONE GENERATING STATION	PA0026981	Plumcreek	Armstrong	020	Stormwater- Industrial	31,415
				003	Industrial Waste	1,461,168
				005	Stormwater- Industrial	327,241
				007	Stormwater- Industrial and Industrial Waste	39,726
				011	Industrial Waste	1,196,331
				012	Industrial Waste	1,196,331
				013	Industrial Waste- Underdrains	59,817
				015	Stormwater- Industrial	26,788
				016	Stormwater- Industrial	21,430
				018	Stormwater- Industrial	9,985
				019	Stormwater- Industrial	18,021
				010	Stormwater- Industrial	1,196,331
				014	Industrial Waste- Underdrains	59,817
				017	Stormwater- Industrial	502,277
				008	Stormwater- Industrial	180,820
				009	Stormwater- Industrial	146,421
				006	Stormwater- Industrial	12,785
				002	Industrial Waste- Backwash	7,610
				107	Industrial Waste	3,409
				021	Stormwater-Industrial	13,546
				022	Stormwater-Industrial	270,925
				004	Stormwater- Industrial	27,397
FRS CREEKSIDE	PA0095443	Washington	Indiana	003	Industrial Waste	6,488
				001	Stormwater-Industrial	21,918
				002	Stormwater-Industrial	21,918
KEYSTONE CLEANING PLT	PA0002275	Plumcreek	Armstrong	001	Sewage Non-Publicly Owned (Non-Muni)	274
NORTHVIEW ESTATES MHP STP	PA0033871	White	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	10,502
ELDERTON STP	PA0093033	Elderton	Armstrong	001	Sewage Publicly Owned (Muni)	8,828
SYLVAN ACRES MHP STP	PA0096989	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	1,790
SHARP PAVING STP	PA0097489	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	9
SAGAMORE WTP	PA0097497	Cowanshannock	Armstrong	001	Industrial Waste	913
RAYNE TWP ELEM SCH	PA0204498	Rayne	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	1,279
CRYSTAL WATERS PERSONAL CARE FAC STP	PA0205559	Rayne	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	530
PLUMVILLE STP	PA0217123	South Mahoning	Indiana	001	Sewage Publicly Owned (Muni)	8,219
SHELOCTA STP	PA0217140	Armstrong	Indiana	001	Sewage Publicly Owned (Muni)	10,192
CREEKSIDE WASHINGTON ELEM SCH STP	PA0217247	Washington	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	365
MAPLE VALLEY PCH STP	PA0217565	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	731
URLING MINE 3 PORTAL/BATHHOUSE STP	PA0217921	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	457
CREEKSIDE STP	PA0218162	Washington	Indiana	001	Sewage Publicly Owned (Muni)	82,191
MARION CENTER STP	PA0218642	East Mahoning	Indiana	001	Sewage Publicly Owned (Muni)	9,680
MARION CTR SUPPLY SHELOCTA PLT	PA0218669	Armstrong	Indiana	001	Industrial Waste	547,938
				002	Industrial Waste	15,221
MARION CENTER PLANT	PA0219070	Marion Center	Indiana	001	Industrial Waste	15,221
Jesse Patterson SR SFTF	PA0254631	Plumcreek	Armstrong	001	Sewage Non-Publicly Owned (Non-Muni)	24
CLAWSON SR STP	PAG046164	White	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	91
SEMONE SR STP	PAG046258	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	30
IMMEKUS SR STP	PAG046264	Rayne	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	24
COFFMAN SR STP	PAG046281	Rayne	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	24
CHRIST OUR SAVIOR ORTHODOX CHURCH STP	PAG046289	Rayne	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	61
PAUL PRICE SR STP	PAG046337	Armstrong	Indiana	001	Sewage Non-Publicly Owned (Non-Muni)	37
KEYSTONE GENERATING STA	PAG106112	Plumcreek	Armstrong	603	Hydrostatic Testing Discharges (Occasional)	182,646
WEST SALISBURY FOUNDRY & MACH CO INC	PAR206162	Elk Lick	Somerset	001	Stormwater-Industrial	304,410
MARION CENTER SUPPLY INC SHELOCTA PLT	PAR216159	Armstrong	Indiana	001	Stormwater-Industrial	304,410
MARION CENTER SUPPLY INC SHELOCTA PLT	PAR216159	Armstrong	Indiana	001	Stormwater-Industrial	304,410
RANKIN AUTO WRECKING INC	PAR606133	Rural Valley	Armstrong	001	Stormwater-Industrial	304,410
				002	Stormwater-Industrial	304,410
				003	Stormwater-Industrial	304,410
				004	Stormwater-Industrial	304,410
				005	Stormwater-Industrial	304,410
KAY ARENA	PAS316101	Rayne	Indiana	001	Stormwater-Industrial	304,410
				003	Stormwater-Industrial	304,410
				002	Stormwater-Industrial	304,410
EINFALT RECYCLING & SALVAGE INC.	PAS602203	Stockertown	Northampton	001	Stormwater-Industrial	304,410
						11,410,109

ATTACHMENT C:

Toxics Screening Analysis Results for Outfall 001

TOXICS SCREENING ANALYSIS
WATER QUALITY POLLUTANTS OF CONCERN
VERSION 2.7

CLEAR FORM

Facility: **Sagamore WTP**
NPDES Permit No.: **PA0097497**
Outfall: **001**
Analysis Hardness (mg/L): **169**
Discharge Flow (MGD): **0.0035**
Analysis pH (SU): **7.87**
Stream Flow, Q_{7-10} (cfs): **0.0022**

	Parameter	Maximum Concentration in Application or DMRs (µg/L)		Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
Group 1	Total Dissolved Solids		487	500000	No		
	Chloride		265	250000	No		
	Bromide		0.56	N/A	No		
	Sulfate		32.1	250000	No		
	Fluoride		0.3	2000	No		
Group 2	Total Aluminum	<	100	750	No		
	Total Antimony	<	5	5.6	Yes	7.865	Establish Limits
	Total Arsenic	<	5	10	No		
	Total Barium		1400	2400	Yes	3370.843	Monitor
	Total Beryllium	<	2	N/A	No		
	Total Boron	<	100	1600	No (Value < QL)		
	Total Cadmium	<	2	0.271	Yes	0.511	Establish Limits
	Total Chromium	<	20	N/A	No		
	Hexavalent Chromium	<	10	10.4	Yes	14.6	Establish Limits
	Total Cobalt	<	5	19	No		
	Total Copper	<	30	9.3	Yes	18.365	Establish Limits
	Total Cyanide	<	10	N/A	No		
	Total Iron		4500	1500	Yes	2106.777	Establish Limits
	Dissolved Iron		6970	300	Yes	421.355	Establish Limits
	Total Lead	<	5	3.2	Yes	7.432	Establish Limits
	Total Manganese		1640	1000	Yes	1404.518	Establish Limits
	Total Mercury	<	0.001	0.05	No (Value < QL)		
	Total Molybdenum		7	N/A	No		
	Total Nickel		40	52.2	Yes	102.735	Monitor
	Total Phenols (Phenolics)	<	10	5	Yes	14606.99	No Limits/Monitoring
	Total Selenium	<	5	5.0	No (Value < QL)		
	Total Silver	<	5	3.8	Yes	6.774	Establish Limits
	Total Thallium	<	2	0.24	No (Value < QL)		
	Total Zinc	<	20	119.8	No		

ATTACHMENT D:

PENTOXSD Modeling Results for Outfall 001

PENTOXSD

Modeling Input Data

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
46550	0.38	1171.00	0.08	0.00000	0.00	☑

Stream Data

	LFY	Trib Flow	Stream Flow	WD Ratio	Rch Width	Rch Depth	Rch Velocity	Rch Trav Time	Tributary Hard	Tributary pH	Stream Hard	Stream pH	Analysis Hard	Analysis pH
	(cfsm)	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	(mg/L)		(mg/L)		(mg/L)	
Q7-10	0.02731	0	0	0	0	0	0	0	100	7	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data

Name	Permit Number	Existing Disc Flow	Permitted Disc Flow	Design Disc Flow	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard	Disc pH
		(mgd)	(mgd)	(mgd)						(mg/L)	
Sagamore WTP	PA0097497	0.0035	0	0	0	0	0	0	0	169	7.87

Parameter Data

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
ANTIMONY	50	0	0.5	0.5	0	0	0	0	1	0
BARIUM	14000	0	0.5	0.5	0	0	0	0	1	0
CADMIUM	2	0	0.5	0.5	0	0	0	0	1	0
CHROMIUM, VI	100	0	0.5	0.5	0	0	0	0	1	0
COPPER	30	0	0.5	0.5	0	0	0	0	1	0
DISSOLVED IRON	6970	0	0.5	0.5	0	0	0	0	1	0
LEAD	50	0	0.5	0.5	0	0	0	0	1	0
MANGANESE	1640	0	0.5	0.5	0	0	0	0	1	0
NICKEL	400	0	0.5	0.5	0	0	0	0	1	0
PHENOL	100000	0	0.5	0.5	0	0	0	0	1	0
SILVER	50	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	4500	0	0.5	0.5	0	0	0	0	1	0

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
46550	0.00	1097.00	0.13	0.00000	0.00	☑

Stream Data

	LFY	Trib Flow	Stream Flow	WD Ratio	Rch Width	Rch Depth	Rch Velocity	Rch Trav Time	Tributary Hard	Tributary pH	Stream Hard	Stream pH	Analysis Hard	Analysis pH
	(cfsm)	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	(mg/L)		(mg/L)		(mg/L)	
Q7-10	0.02769	0	0	0	0	0	0	0	100	7	0	0	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH
		0	0	0	0	0	0	0	0	100	7

Parameter Data

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
ANTIMONY	0	0	0.5	0.5	0	0	0	0	1	0
BARIUM	0	0	0.5	0.5	0	0	0	0	1	0
CADMIUM	0	0	0.5	0.5	0	0	0	0	1	0
CHROMIUM, VI	0	0	0.5	0.5	0	0	0	0	1	0
COPPER	0	0	0.5	0.5	0	0	0	0	1	0
DISSOLVED IRON	0	0	0.5	0.5	0	0	0	0	1	0
LEAD	0	0	0.5	0.5	0	0	0	0	1	0
MANGANESE	0	0	0.5	0.5	0	0	0	0	1	0
NICKEL	0	0	0.5	0.5	0	0	0	0	1	0
PHENOL	0	0	0.5	0.5	0	0	0	0	1	0
SILVER	0	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	0	0	0.5	0.5	0	0	0	0	1	0

PENTOXSD Analysis Results

Hydrodynamics

SWP Basin	Stream Code:	Stream Name:
17E	46550	Trib 46550 to North Branch Plum Cr

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope	Depth (ft)	Width (ft)	WD Ratio	Velocity (fps)	Reach Trav Time (days)	CMT (min)
Q7-10 Hydrodynamics											
0.380	0.0022	0	0.0022	0.00541	0.0369	0.2434	1.1111	4.5639	0.0281	0.826	.006
0.000	0.0036	0	0.0036	NA	0	0	0	0	0	0	NA
Qh Hydrodynamics											
0.380	0.0352	0	0.0352	0.00541	0.0369	0.5088	1.1111	2.1836	0.0718	0.3232	.018
0.000	0.0539	0	0.0539	NA	0	0	0	0	0	0	NA

PENTOXSD Analysis Results

Wasteload Allocations

RMI	Name	Permit Number
0.38	Sagamore WTP	PA0097497

AFC

Q7-10: CCT (min) 0.006 PMF 1 Analysis pH 7.415 Analysis Hardness 149.127

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
ANTIMONY	0	0	0	0	1100	1100	1544.97
CADMIUM	0	0	0	0	2.969	3.202	4.498
	Dissolved WQC. Chemical translator of 0.927 applied.						
CHROMIUM, VI	0	0	0	0	16	16.293	22.884
	Dissolved WQC. Chemical translator of 0.982 applied.						
COPPER	0	0	0	0	19.584	20.4	28.652
	Dissolved WQC. Chemical translator of 0.96 applied.						
LEAD	0	0	0	0	99.503	135.79	190.72
	Dissolved WQC. Chemical translator of 0.733 applied.						
NICKEL	0	0	0	0	656.589	657.905	924.039
	Dissolved WQC. Chemical translator of 0.998 applied.						
SILVER	0	0	0	0	6.396	7.525	10.569
	Dissolved WQC. Chemical translator of 0.85 applied.						
PHENOL	0	0	0	0	NA	NA	NA
TOTAL IRON	0	0	0	0	NA	NA	NA
DISSOLVED IRON	0	0	0	0	NA	NA	NA
MANGANESE	0	0	0	0	NA	NA	NA
BARIUM	0	0	0	0	21000	21000	29494.88

CFC

Q7-10: CCT (min) 0.006 PMF 1 Analysis pH 7.415 Analysis Hardness 149.127

Parameter	Stream Conc. (µg/L)	Stream CV	Trib Conc. (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
ANTIMONY	0	0	0	0	220	220	308.994
CADMIUM	0	0	0	0	0.325	0.364	0.511
	Dissolved WQC. Chemical translator of 0.892 applied.						
CHROMIUM, VI	0	0	0	0	10	10.395	14.6
	Dissolved WQC. Chemical translator of 0.962 applied.						
COPPER	0	0	0	0	12.601	13.126	18.436
	Dissolved WQC. Chemical translator of 0.96 applied.						
LEAD	0	0	0	0	3.877	5.292	7.432
	Dissolved WQC. Chemical translator of 0.733 applied.						

PENTOXSD Analysis Results

Wasteload Allocations

RMI	Name	Permit Number						
0.38	**Sagamore WTP**	**PA0097497**						
	NICKEL	0	0	0	0	72.927	73.146	102.735
		Dissolved WQC. Chemical translator of 0.997 applied.						
	SILVER	0	0	0	0	NA	NA	NA
	PHENOL	0	0	0	0	NA	NA	NA
	TOTAL IRON	0	0	0	0	1500	1500	2106.777
		WQC = 30 day average. PMF = 1.						
	DISSOLVED IRON	0	0	0	0	NA	NA	NA
	MANGANESE	0	0	0	0	NA	NA	NA
	BARIUM	0	0	0	0	4100	4100	5758.523

THH

Q7-10: **CCT (min)** 0.006 **PMF** 1 **Analysis pH** NA **Analysis Hardness** NA

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
ANTIMONY	0	0	0	0	5.6	5.6	7.865
CADMIUM	0	0	0	0	NA	NA	NA
CHROMIUM, VI	0	0	0	0	NA	NA	NA
COPPER	0	0	0	0	NA	NA	NA
LEAD	0	0	0	0	NA	NA	NA
NICKEL	0	0	0	0	610	610	856.756
SILVER	0	0	0	0	NA	NA	NA
PHENOL	0	0	0	0	10400	10400	14606.99
TOTAL IRON	0	0	0	0	NA	NA	NA
DISSOLVED IRON	0	0	0	0	300	300	421.355
MANGANESE	0	0	0	0	1000	1000	1404.518
BARIUM	0	0	0	0	2400	2400	3370.843

PENTOXSD Analysis Results

Wasteload Allocations

RMI	Name	Permit Number
0.38	Sagamore WTP	PA0097497

CRL

Qh: **CCT (min)** 0.018 **PMF** 1

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
ANTIMONY	0	0	0	0	NA	NA	NA
CADMIUM	0	0	0	0	NA	NA	NA
CHROMIUM, VI	0	0	0	0	NA	NA	NA
COPPER	0	0	0	0	NA	NA	NA
LEAD	0	0	0	0	NA	NA	NA
NICKEL	0	0	0	0	NA	NA	NA
SILVER	0	0	0	0	NA	NA	NA
PHENOL	0	0	0	0	NA	NA	NA
TOTAL IRON	0	0	0	0	NA	NA	NA
DISSOLVED IRON	0	0	0	0	NA	NA	NA
MANGANESE	0	0	0	0	NA	NA	NA
BARIUM	0	0	0	0	NA	NA	NA

PENTOXSD Analysis Results

Recommended Effluent Limitations

SWP Basin	Stream Code:	Stream Name:
17E	46550	Trib 46550 to North Branch Plum Cr

RMI	Name	Permit Number	Disc Flow (mgd)
0.38	Sagamore WTP	PA0097497	0.0035

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent WQBEL (µg/L)	Most Stringent WQBEL Criterion
ANTIMONY	7.865	THH	12.271	7.865	THH
BARIUM	3370.843	THH	5259.057	3370.843	THH
CADMIUM	0.511	CFC	0.797	0.511	CFC
CHROMIUM, VI	14.6	CFC	22.778	14.6	CFC
COPPER	18.365	AFC	28.652	18.365	AFC
DISSOLVED IRON	421.355	THH	657.382	421.355	THH
LEAD	7.432	CFC	11.595	7.432	CFC
MANGANESE	1404.518	THH	2191.274	1404.518	THH
NICKEL	102.735	CFC	160.283	102.735	CFC
PHENOL	14606.99	THH	22789.25	14606.99	THH
SILVER	6.774	AFC	10.569	6.774	AFC
TOTAL IRON	2106.777	CFC	3286.911	2106.777	CFC

ATTACHMENT E:
TRC Modeling Results for Outfall 001

TRC EVALUATION

0.0022	= Q stream (cfs)	0.5	= CV Daily
0.0035	= 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	0	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	0	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	1.3.2.iii	WLA afc =	0.149	1.3.2.iii	WLA cfc =	0.137
PENTOXSD TRG	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRG	5.1b	LTA_afc=	0.055	5.1d	LTA_cfc =	0.080

Source		Effluent Limit Calculations		
PENTOXSD TRG	5.1f	AML MULT =	1.720	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) =	0.095	AFC
		INST MAX LIMIT (mg/l) =	0.223	

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)**