pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	Renewal	Application No.	PA0209236
Facility Type	Municipal	APS ID	998570
Major / Minor	Minor	Authorization ID	1282446

Applicant and Facility Information

Applicant Name	Tioga Borough	Facility Name	Tioga Borough WWTF
Applicant Address	P.O. Box 158	Facility Address	Krieger Lane
	Tioga, PA 16946-0158		Tioga, PA 16946
Applicant Contact	Doreen Burnside	Facility Contact	Donald J. Warriner
Applicant Phone	570-835-5226	Facility Phone	570-835-4231
Client ID	44851	Site ID	257615
Ch 94 Load Status	Not Overloaded	Municipality	Tioga Township
Connection Status	No Limitations	County	Tioga
Date Application Received	July 29, 2019	EPA Waived?	Yes
Date Application Accepted	August 09, 2019	If No, Reason	N/A
Purpose of Application	Renewal of NPDES permit		

Summary of Review

INTRODUCTION

Donald Warriner, Borough Manager, applied to renew the existing NPDES permit which authorizes the discharge from the Tioga Borough wastewater treatment facility (WWTF) in Tioga Borough, Tioga County.

APPLICATION

Warriner submitted the NPDES Application for Individual Permit to Discharge Sewage Effluent from Minor Sewage Facilities (DEP #3800-PM-BCW0342b). This application was received by the Department on July 29, 2019 and considered administratively complete on August 09, 2019.

Doreen Burnside, Borough Council President, is now the client contact. Her additional contact information is (email) tiogapa@hotmail.com and (fax) 570-835-5608. Warriner, as the licensed plant operator, remains the site contact. His additional contact information is (phone) 570-418-3008 and (email) warrinerdaniel@yahoo.com.

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.

The case file, permit application package and draft permit will be available for public review at Department's Northcentral Regional Office. The address for this office is 208 West Third Street, Suite 101, Williamsport, PA 17701. An appointment can be made to review these materials during the comment period by calling the file coordinator at 570-327-3636.

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Approve	Deny	Signatures		Date
X		Jeffrey J. Gocek, EIT	Project Manager	04/23/2021
X		Nicholas W. Hartranft, PE	Environmental Engineer Manager	04/23/2021

DISCHARGE, RECEIVING WATERS AND WATER SUPPLY INFORMATION

Outfall No.	001	Design Flow (MGD)	0.06
Latitude	41° 54' 49.74"	Longitude	-77° 7' 50.72"
Quad Name	Jackson Summit, PA	Quad Code	0329
Wastewater Description:	Sewage Effluent		
Receiving Waters	Tioga River (CWF)	Stream Code	30990
NHD Com ID	57350483	RMI	21.0
Drainage Area (mi^2)	280	Yield (cfs/mi^2)	0.0858
Q_{7-10} Flow (cfs)	24.3	Q_{7-10} Basis	USGS Gage #01518000
Elevation (ft)	1022	Slope (ft/ft)	N/A
Watershed No.	4-A	Chapter 93 Class.	CWF
Existing Use	None	Existing Use Qualifier	N/A
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation		
Source(s) of Impairment	Upstream Impoundment		
TMDL Status	Final	Name	Tioga River
Nearest Downstream Public Water Supply Intake	PA-NY State Line		
PWS Waters	Tioga River	Flow at Intake (cfs)	N/A
PWS RMI	13.0	Distance from Outfall (mi)	8.0

$Q_{7,10}$ DETERMINATION

The $Q_{7,10}$ is the lowest seven consecutive days of flow in a 10-year period and is used for modeling wastewater treatment plant discharges. 25 PA § 96.1 defines $Q_{7,10}$ as "*the actual or estimated lowest 7 consecutive day average flow that occurs once in 10 years for a stream with unregulated flow, or the estimated minimum flow for a stream with regulated flow*".

A stream gage upstream of the existing discharge, "Tioga River at Tioga, PA" (USGS #01518000) was selected as a reference gage. A $Q_{7,10}$ flow for that gage (24.2 CFS) was obtained from *Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania* (USGS Open Files Report 2011-1070). The drainage area at the point of discharge (282 mi^2) was calculated by the *USGS Pennsylvania StreamStats* application. Knowing the drainage area (282 mi^2) at the discharge and both the drainage area (280 mi^2) and $Q_{7,10}$ (24.2 CFS) at the reference gage, the $Q_{7,10}$ at the discharge was calculated to be 24.3 CFS.

See Attachment 01 for the $Q_{7,10}$ determination.

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TREATMENT FACILITY

The Authority operates a wastewater treatment facility (WWTF) serving the Borough of Tioga (99% of flow) and the Tioga County Welcome Center (1%).

The WWTF receives flow from 3 pump stations in the collection system. The WWTF consists of a grinder pump, (2) sequencing batch reactors (SBRs), sodium hypochlorite disinfection, chlorine contact tank and a submerged outfall. Sludge from the SBRs is wasted into one of two digesters. Digested sludge is dried in two sludge drying beds and disposed of at the Northern Tier Landfill when dried.

See Attachment 02 for a MAP of the WWTF location.

The WWTF characteristics are as follows.

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Sequencing Batch Reactor	Sodium Hypochlorite	0.06
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.06	110	Not Overloaded	Drying	Landfill

The annual average flows of the three years prior to application submission were 0.0262 MGD (2018), 0.0257 MGD (2017) and 0.0249 MGD (2016). The highest monthly average flow for the year prior to submission was 0.0312 MGD, which occurred in September 2018.

The WWTF was authorized by Water Quality Management (WQM) permit #5995405, issued November 20, 1995.

COMPLIANCE HISTORY

The WMS Query *Open Violations for Client by Permit Number* revealed no open violations for Tioga Borough.

The most recent onsite Department inspection, a Compliance Evaluation Inspection (CEI), was conducted March 04, 2020. At the time of the inspection, all required treatment units were operational. The plant effluent was clear with a Total Residual Chlorine (TRC) of 0.63 mg/L. No violations were identified or noted during the inspection. An administrative inspection was performed March 25, 2020

Recent Discharge Monitoring Report (DMR) data, from April 2020 to March 2021, is presented in the table below.

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Parameter	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20
Flow (MGD) Average Monthly	0.0202	0.0203	0.0208	0.0200	0.0208	0.0204	0.0216	0.0210	0.0220	0.0287	0.0245	0.0245
Flow (MGD) Daily Maximum	0.0278	0.0284	0.0350	0.0300	0.0301	0.0265	0.0306	0.0268	0.0291	0.0422	0.0352	0.0318
pH (S.U.) Minimum	7.38	7.24	7.23	7.19	7.08	7.12	7.15	7.19	7.15	7.32	7.41	7.20
pH (S.U.) Maximum	7.62	7.63	7.53	7.43	7.56	7.31	7.43	7.45	7.43	7.54	7.62	7.45
Dissolved Oxygen (mg/L) (Minimum)	4.0	4.8	5.3	4.6	3.6	3.9	3.9	4.1	4.8	4.7	4.7	6.7
TRC (mg/L) Average Monthly	0.45	0.38	0.47	0.34	0.40	0.43	0.46	0.41	0.33	0.36	0.40	0.35
TRC (mg/L) Instantaneous Maximum	1.17	0.88	0.82	0.65	0.64	0.75	0.79	0.87	0.66	0.97	0.91	1.10
CBOD5 (lbs/day) Average Monthly	2.4	3.0	2.1	1.7	1.4	1.7	1.2	2.2	2.0	2.9	3.0	2.1
CBOD5 (lbs/day) Weekly Average	2.8	3.2	2.5	1.8	1.5	1.7	1.2	2.7	2.2	3.2	5.5	2.3
CBOD5 (mg/L) Average Monthly	16	18	11	11	9.0	110	7.0	12	10	14	17	12
CBOD5 (mg/L) Weekly Average	18	20	12	11	10	10	7.0	15	11	15	30	12
BOD5 (lb/day) RAW INF Average Monthly	55	65	62	55	44	52	43	48	45	9.0	40	61
BOD5 (lb/day) RAW INF Daily Maximum	66	68	67	60	46	54	50	54	45	13	64	63
BOD5 (mg/L) RAW INF Average Monthly	355	397	341	339	272	289	250	267	250	40	221	334
TSS (lbs/day) Average Monthly	1.6	2.8	2.7	2.6	1.1	1.4	1.5	2.9	1.6	2.6	3.1	2.3
TSS (lbs/day) Weekly Average	1.8	3.0	4.1	2.7	1.1	2.0	1.9	3.1	1.8	2.7	3.3	2.6
TSS (mg/L) Average Monthly	11	17	14	16	7.0	8.0	9.0	16	9.0	12	17	13
TSS (mg/L) Weekly Average	12	18	20	17	7.0	12	12	17	11	13	18	15
TSS (lb/day) RAW INF Average Monthly	33	41	35	59	34	52	40	38	41	37	61	52
TSS (lb/day) RAW INF Daily Maximum	34	46	38	62	37	64	47	50	46	46	73	53
TSS (mg/L) RAW INF Average Monthly	213	246	188	364	211	296	233	208	225	174	337	286
Fecal Coliform (No./100 ml) Geometric Mean	8.0	200	7.0	22	4.0	122	22	129	17	7	220	826
Ammonia (lb/day) Average Monthly	6.4	6.5	3.6	2.5	2.0	1.3	3.7	4.6	2.7	6.6	0.02	3.7
Ammonia (mg/L) Average Monthly	42	39	20	16	13	7.0	22	26	16	31	0.1	21

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EXISTING LIMITATIONS

Discharge Parameter	Mass Limits (lb/day)		Concentration Limits (mg/L)				Monitoring Requirements	
	Monthly Average	Weekly Average	Minimum	Monthly Average	Weekly Average	IMAX	Minimum Measurement Frequency	Required Sample Type
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	Continuous	Metered
pH (SU)	XXX	XXX	6.0	XXX	XXX	9.0	1/Day	Grab
Dissolved Oxygen	XXX	XXX	Report	XXX	XXX	XXX	1/Day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/Day	Grab
$CBOD_5$	13	20	XXX	25	40	50	2/Month	8 Hour Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Total Suspended Solids	15	23	XXX	30	45	60	2/Month	8 Hour Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Fecal Coliform (CFU/100mL) (05/01-09/30)	XXX	XXX	XXX	200 Geometric Mean	XXX	1,000	2/Month	Grab
Fecal Coliform (CFU /100mL) (10/01-04/30)	XXX	XXX	XXX	2,000 Geometric Mean	XXX	10,000	2/Month	Grab
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/Year	8 Hour Composite
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/Year	8 Hour Composite

DEVELOPMENT OF EFFLUENT LIMITATIONS

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Total Residual Chlorine

Due to the ample dilution in the receiving stream, no modeling of the Total Residual Chlorine (TRC) was performed. With such a high $Q_{7,10}$ (24 CFS), the technology-based effluent limit (TBEL) of 0.5 mg/L TRC will always be more stringent than the water quality based effluent limit (WQBEL).

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Water Quality-Based Limitations

$CBOD_5$, NH_3-N and DO

WQM 7.0 for Windows is a DEP computer model used to determine wasteload allocations and effluent limitations for $CBOD_5$, NH_3-N and DO for single and multiple point source discharge scenarios. This model simulates two basic processes. The NH_3-N module simulates the mixing and degradation of NH_3-N in the stream and compares calculated instream NH_3-N concentrations to the water quality criteria. The DO module simulates the mixing and consumption of DO in the stream due to degradation of $CBOD_5$ and NH_3-N and compares the calculated instream DO concentrations to the water quality criteria. The model then determines the highest pollutant loading the stream can assimilate and still meet water quality under design conditions.

This model recommended the following limitations.

Parameter	Effluent Limitations (mg/L)		
	30 Day Average	Maximum	Minimum
$CBOD_5$	25		
NH_3-N	25	50	
DO			3.0

The Department only incorporates a DO limitation when the model recommends a limitation which exceeds that of the in-stream target criteria. As an existing discharge to a cold water stream, with a target in-stream criteria of 6.0 mg/L DO, the model did not recommend a DO effluent limit higher than the target in-stream criteria.

See Attachment 03 for the WQM model output.

Reasonable Potential Analysis for Toxics

Since the Tioga Borough WWTF is a minor sewage facility with no industrial users, there is no reasonable potential for toxics in the effluent. Toxics modeling is not performed for minor sewage facilities with no industrial users.

Best Professional Judgment (BPJ) Limitations

In the absence of applicable effluent guidelines for the discharge or pollutant, permit writers must identify and/or develop needed technology-based effluent limitations (TBELs) TBELs on a case-by-case basis, in accordance with the statutory factors specified in the Clean Water Act. No BPJ limitations have been proposed for this draft.

Anti-Backsliding

In order to comply with 40 CFR § 122.44(l) (anti-backsliding requirements), the Department must issue a renewed permit with limitations as stringent as that the of the previous permit. No less stringent limitations have been proposed for this draft.

DEVELOPMENT OF EFFLUENT MONITORING

Influent Monitoring

To adequately characterize the influent wastewater, monitoring of influent Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) will be required at the current frequency of 2/Month.

Dissolved Oxygen

In order to comply with in-stream criteria defined in 25 PA § 93.7, this permit will monitor Dissolved Oxygen (DO (as a minimum) in the effluent. This will allow the Department to check if the effluent is well oxygenated at the point of discharge, will not degrade the required in-stream criteria concentration and will protect the aquatic life in the receiving stream.

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Tioga River TMDL

Since there is an approved Total Maximum Daily Load (TMDL) for the receiving stream, the annual monitoring of the TMDL parameters of concern (Aluminum, Iron and Manganese) will be required to ensure that the discharge is not contributing to the impairment of the receiving stream or watershed. See below for more information on the receiving stream and the TMDL.

Ammonia Nitrogen

Since modeling demonstrates that the effluent is meeting the technology-based limitation (monthly average) of 25 mg/L as an existing discharge, a monitoring requirement is being introduced to confirm. This parameter is being introduced per policy.

REMOVAL OF EFFLUENT MONITORING

Chesapeake Bay TMDL

Despite 25 years of extensive restoration efforts, the Chesapeake Bay Total Maximum Daily Load (TMDL) was prompted by insufficient progress and continued poor water quality in the Chesapeake Bay and its tidal tributaries. This TMDL, required by the Clean Water Act, is the largest ever developed by the Environmental Protection Agency (EPA). This document identifies the necessary pollution reductions of nitrogen, phosphorus and sediment across Delaware, Maryland, New York, Virginia, West Virginia, District of Columbia and Pennsylvania. It also sets pollution limits necessary to meet applicable water quality standards in the Bay, tidal rivers and embayments.

Pennsylvania explains how and when it will meet its pollution allocations in its Watershed Implementation Plan (WIP), which is incorporated into the TMDL. Pennsylvania's permitting strategy for significant dischargers has been outlined in the Phase I WIP and incorporated in the Phase III WIP by reference, and imposes Total Nitrogen (TN) and Total Phosphorus (TP) cap loads on the significant dischargers.

Because the design of this facility is less than 0.2 MGD, the Department considers this an existing Phase 5 sewage facility for the purposes of implementing the Chesapeake Bay TMDL. This system has a design flow of 0.06 MGD. According to the Department's Wastewater Supplement to Phase III WIP (last revised December 17, 2019), renewed Phase 5 facilities are required to contain monitoring and reporting for TN and TP throughout the permit term at a frequency of no less than annually, unless two years of data has been collected. Four years of nutrient sampling is included in the table below. Because nutrient data has previously been collected, the draft permit will no longer require nutrient monitoring.

Nutrient Data	2017	2018	2019	2020
Total Nitrogen (lb/day) Average Monthly	7.4	2.8	3.0	3.8
Total Nitrogen (mg/L) Average Monthly	34	14.9	16.7	23
Total Phosphorus (lb/day) Average Monthly	0.53	0.15	0.3	0.3
Total Phosphorus (mg/L) Average Monthly	2.4	0.8	1.9	1.5

RECEIVING STREAM

Stream Characteristics

The receiving stream is Tioga River, a tributary to the Chemung River in New York state. The Tioga River, according to 25 PA § 93.9H, is protected for *Cold Water Fishes (WWF)* and *Migratory Fishes (MF)*. These are the streams *Designated Uses*, which is defined in 25 PA § 93.1 as "those uses specified in §§ 93.9a – 93.9z for each waterbody or segment whether or not the use is being attained". Designated uses are regulations promulgated by the Environmental Quality Board (EQB) throughout the rulemaking process. This stream currently has no *Existing Use*, which is defined in 25 PA § 93.1 as "those uses actually attained in the waterbody on or after November 28, 1975 whether or not they are included in the water quality standards". Tioga River is identified by stream code 30990. This stream is located in (Chapter 93) drainage list H and State Water Plan watershed 4A (Tioga and Cowanesque Rivers).

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Impairment/TMDL

According to Department water quality data, the Tioga River is not attaining its designated uses with respect to aquatic life. The stream is impaired by siltation from an upstream impoundment.

A Total Maximum Daily Load (TMDL) was developed for the Tioga River watershed in 2002. This TMDL was approved by EPA in 2005. The TMDL recommends the reduction in the discharge of metals in excess of the Department's water quality standards. The TMDL set allowable loadings at specified points in the Tioga River watershed for Aluminum, Iron, Manganese and Acidity from both point and nonpoint sources.

ADDITIONAL CONSIDERATIONS

Hauled-In Wastes

According to the application materials, Tioga Borough has not received hauled-in wastes during the past three years and does not anticipate receiving hauled-in wastes during the next permit term.

Mass Limitations

Existing mass limitations for $CBOD_5$ and TSS are calculated by multiplying the concentration (mg/L) by the flow (MGD) by the conversion (8.34). See above section on anti-backsliding of mass limitations.

Rounding of Limitations

Limitations have been rounded in accordance with the Department's *Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits* (#362-0400-001).

Limit Multipliers

The instantaneous maximum limitations have been calculated using multipliers of 2.0 (for sewage discharges) and 2.5 (for toxic industrial discharges) for determining the monthly average. This practice is in accordance with the Department's *Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits* (#362-0400-001).

Sample Frequencies and Types

The minimum measurement frequencies are in accordance with the Department's *Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits* (#362-0400-001). Guidance recommends Grab samples for this size WWTF, but the draft will contain the existing requirement for 8-Hour Composite samples.

Standard Operating Procedures (SOPs)

The review of this permit application was performed in accordance with the Department's *SOP for New and Reissuance Sewage Individual NPDES Permit Applications* and *SOP for Establishing Effluent Limitations for Individual Sewage Permits* (SOP #BPNPSM-PMT-033).

Special Permit Conditions

Stormwater Prohibition
Approval Contingencies
Proper Waste Disposal
Chlorine Optimization
Solids Management for Non-Lagoon Treatment Systems

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Supplemental Discharge Monitoring Reports

Daily Effluent Monitoring
Non-Compliance Reporting
Biosolids Production and Disposal
Hauled-in Municipal Waste
Influent and Process Control
Lab Accreditation

PROPOSED EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The limitations and monitoring requirements specified below are proposed for the draft permit and reflect the most stringent limitations amongst technology, water quality and BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date

Discharge Parameter	Mass Limits (lb/day)		Concentration Limits (mg/L)				Monitoring Requirements	
	Monthly Average	Weekly Average	Minimum	Monthly Average	Weekly Average	IMAX	Minimum Measurement Frequency	Required Sample Type
Flow (MGD)	Report	Report Daily Maximum	XXX	XXX	XXX	XXX	Continuous	Metered
pH (SU)	XXX	XXX	6.0 Instantaneous Minimum	XXX	XXX	9.0	1/Day	Grab
Dissolved Oxygen	XXX	XXX	Report Instantaneous Minimum	XXX	XXX	XXX	1/Day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/Day	Grab
$CBOD_5$	13	20	XXX	25	40	50	2/Month	8 Hour Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Total Suspended Solids	15	23	XXX	30	45	60	2/Month	8 Hour Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Fecal Coliform (No./100mL) (05/01-09/30)	XXX	XXX	XXX	200 Geometric Mean	XXX	1,000	2/Month	Grab
Fecal Coliform (No./100mL) (10/01-04/30)	XXX	XXX	XXX	2,000 Geometric Mean	XXX	10,000	2/Month	Grab
Ammonia Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/Month	8 Hour Composite
Total Aluminum	Report	XXX	XXX	Report	XXX	XXX	1/Year	Grab
Total Iron	Report	XXX	XXX	Report	XXX	XXX	1/Year	Grab
Total Manganese	Report	XXX	XXX	Report	XXX	XXX	1/Year	Grab

END of Fact Sheet.