pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0010251**
Facility Type	**Industrial**	APS ID	**65**
Major / Minor	**Minor**	Authorization ID	**1346210**

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

Applicant and Facility Information

Applicant Name	**US Army Garrison Carlisle Barracks**	Facility Name	**Headquarters Carlisle Barracks**
Applicant Address	United States Army Carlisle Barracks 330 Engineer Avenue	Facility Address	330 Engineer Avenue
	Carlisle, PA 17013-5020		Carlisle, PA 17013-5020
Applicant Contact	Tom Kelly	Facility Contact	Paul Herzer
Applicant Phone	(717) 245-4040	Facility Phone	(717) 245-4811
Client ID	83303	Site ID	444416
SIC Code	9199	Municipality	North Middleton Township
SIC Description	Public Admin. - Genral Government, Nec	County	Cumberland
Date Application Received	March 16, 2021	EPA Waived?	Yes
Date Application Accepted	March 29, 2021	If No, Reason	
Purpose of Application	NPDES Permit Renewal.		

Summary of Review

US Army Garrison Carlisle Barracks (Carlisle Barracks) has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its NPDES permit. The permit was last reissued on August 30, 2016 and became effective on September 1, 2016. The permit will expire on August 31, 2021.

Based on the review, it is recommended that the permit be drafted.

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.

Approve	Deny	Signatures	Date
X		*Jinsu Kim* Jinsu Kim / Environmental Engineering Specialist	August 17, 2021
X		Daniel W. Martin Daniel W. Martin, P.E. / Environmental Engineer Manager	August 23, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.036
Latitude	40° 12’ 42.00”	Longitude	77° 10’ 3.00”
Quad Name	Carlisle	Quad Code	1728
Wastewater Description:	Filter Backwash		
Receiving Waters	UNT to Letort Spring Run	Stream Code	10263
NHD Com ID	56406201	RMI	0.417
Drainage Area	see comments	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	see comments	Q_{7-10} Basis	see comments
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-B	Chapter 93 Class.	CWF, MF
Existing Use	HQ-CWF	Existing Use Qualifier	Designated Class A Wild Trout
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation		
Source(s) of Impairment	Urban Runoff/Storm Sewer		
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	PA American Water Company		
PWS Waters	Conodoguinet Creek	Flow at Intake (cfs)	72.82
PWS RMI	18.38	Distance from Outfall (mi)	16.6

Comments:
The source of water for the Carlisle Barracks water treatment plant is a spring tributary of the Letort Spring Run and the discharge is to the headwaters of the unnamed tributary of Letort Spring Run. As a result, a drainage area is estimated to be very low (0.0795 sq.mi) according to USGS StreamStats available at https://streamstats.usgs.gov/ss/. USGS StreamStats also produced a Q7-10 flow of 0.0189 cfs. This value may not be accurate as USGS StreamStats indicates that because the drainage area is lower than the minimum value required to be used in regression equations, errors have occurred in calculating low flow statistics. Also, USGS StreamStats does not consider the fact that it is the headwater of the stream which is fed by spring water. The previous fact sheet addressed that the spring flow measurement for Letort Spring taken by DEP and USGS was 1,400 gpm or 3.12 cfs (or 2.016 MGD). The measurement was taken after the water intake. During a site visit dated April 11, 2016, it was determined that the estimated historical flow of the spring prior to the intake is about 3.0 MGD (or 4.64 cfs). This value will be used in developing permit requirements for this renewal.

Under 25 Pa Code §93.90, Letort Spring Run (basin, T-710 Bridge to Mouth) is designated as cold water fishes. The receiving water as well as this entire segment of Letort Spring Run has a protected existing use of high-quality water fishes (HQ-CWF). According to DEP’s latest integrated water quality report finalized in 2020, the Letort Spring Run near the discharge point is impaired for siltation as a result of urban runoff and storm sewer. No TMDL has yet been developed to address this impairment. As shown below, the receiving water is a tributary of Letort Spring Run which is determined as Class A Wild Trout Water by PA Fish and Boat Commission (PFBC).

County	Water	Sec	Trout Fishery	Section Limits	Length (miles)	% Public Open	% Public Closed	% Private Open	% Private Closed	USGS Quad Name	T_AIK
Cumberland	Letort Spring Run	4	Brown	Post Road Bridge downstream to mouth	3.00	55	0	45	0	Carlisle	170

Considering the distance and dilution, the discharge is not expected to affect the nearest downstream water supply. The discharge is located in a stream segment listed as attaining uses.

Treatment Facility Summary

The facility currently utilizes the ion-exchange softener water treatment system. Raw water pumps (4) are available to pump the spring water from the spring containment structure into ion-exchange units (4) at a rate of 500 to 530 GPM. A site visit dated April 11, 2016 revealed that the estimated historical flow of the spring prior to the intake is about 3.0 MGD and the facility treats about 0.3 MGD of that water for water supply (10%). These ion-exchange softener units are zeolite filters in which a regeneration of the media occurs periodically by backwashing the media with addition of sodium chloride solution. According to the water treatment plant operator, about 600 lbs of this solution product is used during each backwash which consists of four (4) phases: drawdown, injection, slow rinse, and fast rinse. According to the email dated August 11, 2021 from the plant operator, the water usage has dropped from 0.3 MGD to 0.15 MGD recently due to lower staffing from teleworking and finding and repairing multiple leaks throughout the distribution system.

Compliance History

Summary of DMRs:	A summary of past 12-month DMR data is presented on the next page.
Summary of Inspections:	4/20/2016: Patrick Bowen, former DEP Water Quality Specialist, conducted a routine inspection and noted that the immediate area of the discharge appeared clear.
Other Comments:	A Notice of Violation letter was sent on November 3, 2020 and an Administrative Order was issued on December 2, 2020 for failure to make a timely annual fee payment. DEP's database revealed that there are a number of open violations identified by DEP SCRO Storage Tank Program on November 19, 2020 (see below). A draft permit cover letter will indicate that the permit may not be finalized until all open violations are resolved or closed.

Open Violations:

INSP ID	VIOLATION ID	VIOLATION DATE	VIOLATION CODE	VIOLATION
3121488	902077	11/19/2020	245.435	Failure to comply with underground storage tank system reporting and record keeping requirements
3121488	902078	11/19/2020	245.441	Failure to comply with underground storage tank system release detection requirements
3121488	902079	11/19/2020	245.438(A)	Failure to comply with UST system monthly operation and maintenance walkthrough inspections
3121488	902080	11/19/2020	245.436	Emergency Procedures
3121488	902081	11/19/2020	245.436(A)	Failure to have trained and designated operators

Effluent Data

DMR Data for Outfall 001 (from July 1, 2020 to June 30, 2021)

Parameter	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20
Flow (MGD) Average Monthly	0.00075	0.00031	0.00045	0.00077	0.00073	0.00054	0.00045	0.0004	0.00031	0.00032	0.00039	0.00048
Flow (MGD) Daily Maximum	0.0012	0.0018	0.0012	0.0012	0.0018	0.0012	0.0012	0.0012	0.0012	0.0012	0.0018	0.0012
pH (S.U.) Minimum	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
pH (S.U.) Instantaneous Maximum	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Total Dissolved Solids (mg/L) Daily Maximum	41800	16400	8720	5200	11000	9540	13600	17100	22600	18400	16700	27300
Total Dissolved Solids (mg/L) Intake Daily Maximum	594	540	600	530	536	550	509	982	510	529	520	501
Osmotic Pressure (mOs/kg) Daily Maximum	679	249	33	87	226	182	310	381	434	396	279	574

Existing Effluent Limits and Monitoring Requirements

A table below summarizes effluent limits and monitoring requirements specified in the existing permit.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Estimate
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	2/month	Composite
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/month	Composite
Total Dissolved Solids Intake	XXX	XXX	XXX	XXX	Report	XXX	1/month	Composite
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	XXX	2000	3000	2/month	Composite

Development of Effluent Limitations and Monitoring Requirements

Outfall No. 001 **Design Flow (MGD)** .036
Latitude 40º 12' 42.00" **Longitude** -77º 10' 3.00"
Wastewater Description: Water Treatment Effluent

Technology-Based Limitations

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

Parameter	Limit (mg/l)	SBC	Federal Regulation	State Regulation
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Comments: During the last permit renewal, DEP determined that the effluent standard for Total Residual Chlorine (TRC) is not applicable as gas chlorination occurs following the softening and therefore, TRC is not expected to be present in the effluent. However, the sample results provided for this permit renewal show detectable levels of TRC (maximum of 0.64 mg/L). Furthermore, based a conversation with the plant operator, finished water is used to backwash the softener. It is apparent that effluent would consistently have detectable levels of chlorine; therefore, the state effluent standard for TRC is applicable per 25 Pa Code §92a.48(b). The Antidegradation Best Available Combination of Technologies (ABACT) developed under DEP's technical guidance no. 391-0300-002 requires non-detectable levels of TRC but this rule applies only to new or additional discharges to HQ or EV waters. The facility has been in operation for years and it is likely that finished water has been consistently used to backwash since then.

Water Quality-Based Limitations

As explained, a previous site visit revealed that a spring tributary at the water treatment plant is estimated to be 3.0 MGD rather than 2.016 MGD. This is confirmed by the plant operator once again via email dated August 11, 2021. This 3.0 MGD (or 4.64 cfs) will be used as a Q7-10 flow at the point of discharge in a water quality analysis. For the second node, 4.64 cfs will be added to the value produced by USGS StreamStats.

No biological process occurs at this facility and effluent levels of CBOD5 and NH3-N are expected to be insignificant. Sample results reported on the application (i.e., BOD of 4.1 mg/L, COD of 23 mg/L, NH3-N of 0.176 mg/L). WQM 7.0 modeling is therefore not necessary given the nature of discharge.

TRC_CALC worksheet was utilized to determine appropriate permit requirements for TRC. Using the spring flow measurement previously recorded by DEP and USGS (i.e., 3.12 cfs, 1,400 GPM or 2.016 MGD) as the Q7-10, the worksheet indicates that the BAT effluent limit of 0.5 mg/L would be adequate for water quality protection. Carlisle Barracks reported 0.69 mg/L, 0.54 mg/L, and 0.04 mg/L as part of the application analysis results. Carlisle Barracks would not have a problem meeting this limit. The worksheet also produced an instantaneous maximum limit of 1.6 mg/L.

Osmotic pressure limits of 2,000 milliosmoles per kilogram (m)s/kg) (daily maximum) and 3,000 mOs/kg (IMAX) were developed using a mass balance method. DEP has revisited this method for this permit renewal as follows:

Combined (3.036 MGD * 50 mOs/kg) – Stream (3.0 MGD * 14 mOs/kg) = Discharge (0.036 MGD * X)
X = 3,050 mOs/kg.
Where 50 mOs/kg is DEP's water quality criterion listed on 25 Pa Code §93.7(a) and 14 mOs/kg is the background osmotic pressure obtained from a previous report.

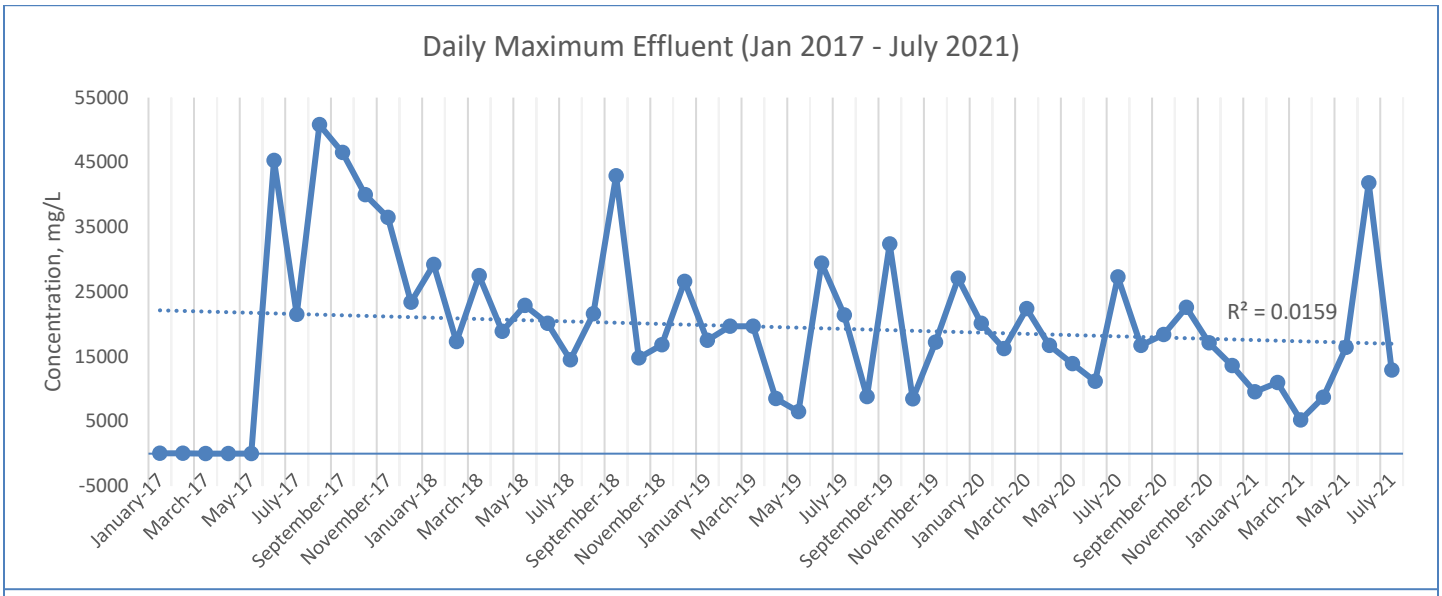
This value is significantly higher than those existing effluent limits. For any special protection water discharges, the relaxation or removal of effluent limits is not warranted as per 25 Pa Code §93.4a(b) to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses be maintained and protected. Therefore, the existing effluent limits will remain unchanged in the permit. DEP's Toxics Management Spreadsheet also confirmed that more stringent WQBELs are not needed for water quality protection.

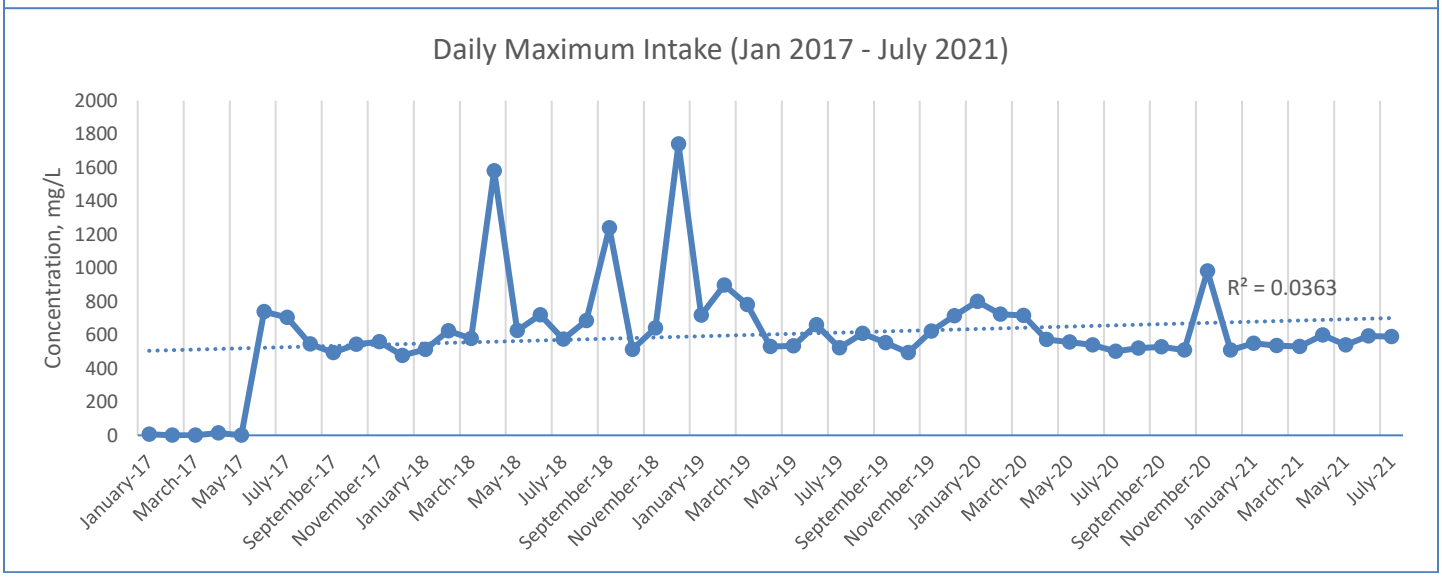
In general, no toxic pollutants are expected from wastewater generated from a water treatment plant unless they are heavy metals or source water already contains detectable levels of those pollutants. The analytical sample results provided with the application show most of pollutants in Group 2 (metals) were not detected, except for Total Barium, Hexavalent

Chromium, Total Mercury and Total Molybdenum. DEP's Toxics Management Spreadsheet was utilized for these pollutants and shows that no effluents are needed for these pollutants.

Additional Considerations

DEP's technical guidance no. 362-2183-003 identified TDS and its major constituents to be pollutants of concern for ion exchange regenerant waste and states that disposal of ion-exchange waste is generally accomplished by discharge into a municipal sewer system or discharged at a controlled rate to a receiving stream if the municipal sewer system is not available. During the April 11, 2016 site visit, DEP noticed that there is a pump station immediately across Post Road from the discharge point. This is Parker Springs pump station that is part of the North Middleton Township collection system tributary to the Carlisle Area Water Pollution Control Facility (NPDES Permit no. PA0026077). This Carlisle Area Water Pollution Control Facility currently serves sanitary wastewater generated from the entire Carlisle Barracks but not this backwash wastewater. It is unknown as to why initially this backwash wastewater was not part of the service area but the facility has been in operation for years and the permit was originally issued in 1997. During the last permit renewal, an effluent TDS monitoring requirement was placed in the permit along with an influent TDS monitoring requirement. This was to obtain ample data for the next permit renewal to assess potential cumulative impacts and to determine additional actions necessary to ensure that the existing stream water quality be maintained and protected. According to the plant operator (8/11/2021 email), the TDS variability is high that TDS level was observed as low as 200 mg/L and as high as 2,500 mg/L. Past DMR results (from January 2017 through July 2021) confirmed such variability in effluent and some in influent (see below).





DEP's technical guidance no. 362-2183-003 indicates that the only approach which appears possible for handling and disposing of ion-exchange regenerant waste is to rely upon dilution in which the guidance recommends the connection to a public sewer system, if available. If a stream discharge is an only option, the guidance indicates that the discharge to a stream is not allowed unless:

1) The discharger has no other acceptable disposal options available within his financial capabilities.
2) The discharge will be to a perennial, free flowing stream.
3) The discharge will be controlled to a maximum rate based upon relevant water quality standards.
4) The facilities for regulating the discharge rate must have built in, self-limiting control features (such as a fixed orifice or other fixed metering device).

It seems Carlisle Barracks has met items no. 2, 3, and 4 but it is unclear whether Carlisle Barracks has formally performed a feasibility study when a stream discharge was proposed years ago and there is no record available to verify this. At this time, it is recommended that Carlisle Barracks to perform a feasibility study while continuing influent and effluent monitoring for TDS. The following condition will be included in Part C of the permit:

"The permittee shall develop and submit a written report with the subsequent permit renewal application. This report shall include cost and environmental benefit analysis for non-discharge alternatives and alternate backwash techniques."

Anti-Degradation Requirements

Pursuant to 25 Pa Code §93.4(b), all permit requirements for this permit renewal have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses be maintained and protected.

Anti-Backsliding Requirements

All permit requirements have been developed as stringent as those specified in the current permit renewal in accordance with 40 CFR §122.44(l)(1).

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. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

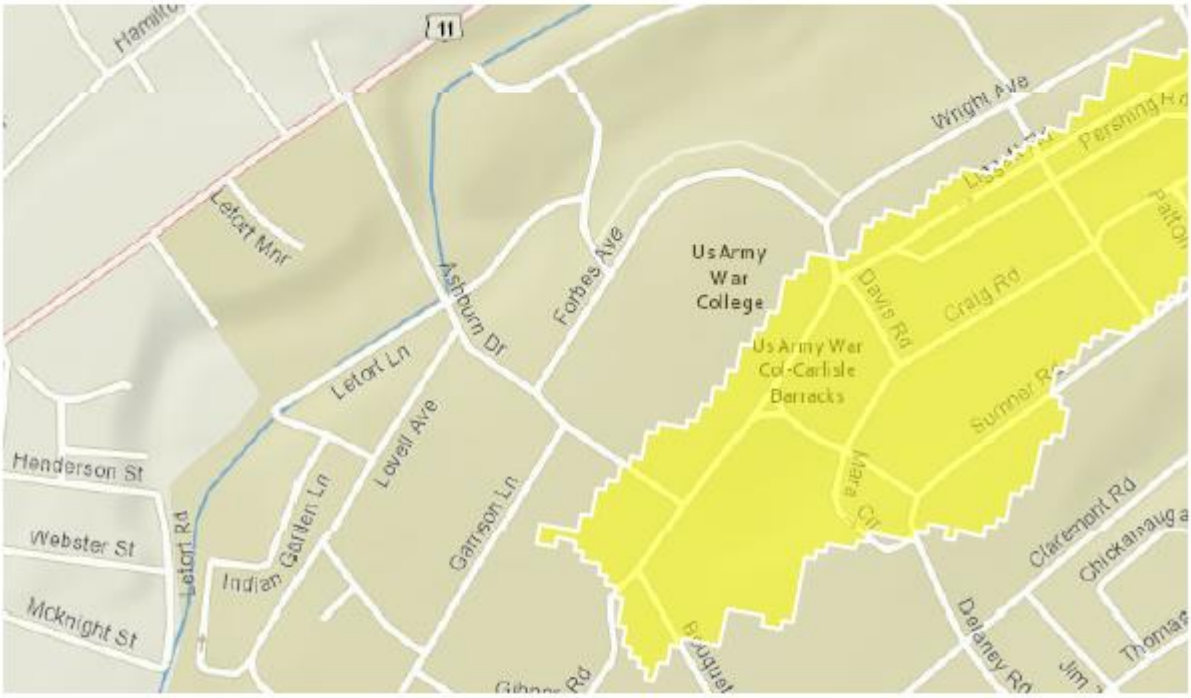
Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Estimate
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	2/month	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/month	Composite
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	XXX	2000	3000	2/month	Composite

Attachments

StreamStats Report

Region ID: PA
Workspace ID: PA20210812131039964000
Clicked Point (Latitude, Longitude): 40.21187, -77.16750
Time: 2021-08-12 09:10:58 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0795	square miles
PRECIP	Mean Annual Precipitation	39	inches
STRDEN	Stream Density -- total length of streams divided by drainage area	0.62	miles per square mile
ROCKDEP	Depth to rock	5	feet
CARBON	Percentage of area of carbonate rock	100	percent

Low-Flow Statistics Parameters [Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0795	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39	inches	35	50.4
STRDEN	Stream Density	0.62	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	5	feet	3.32	5.65
CARBON	Percent Carbonate	100	percent	0	99

Low-Flow Statistics Disclaimers [Low Flow Region 2]

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 2]

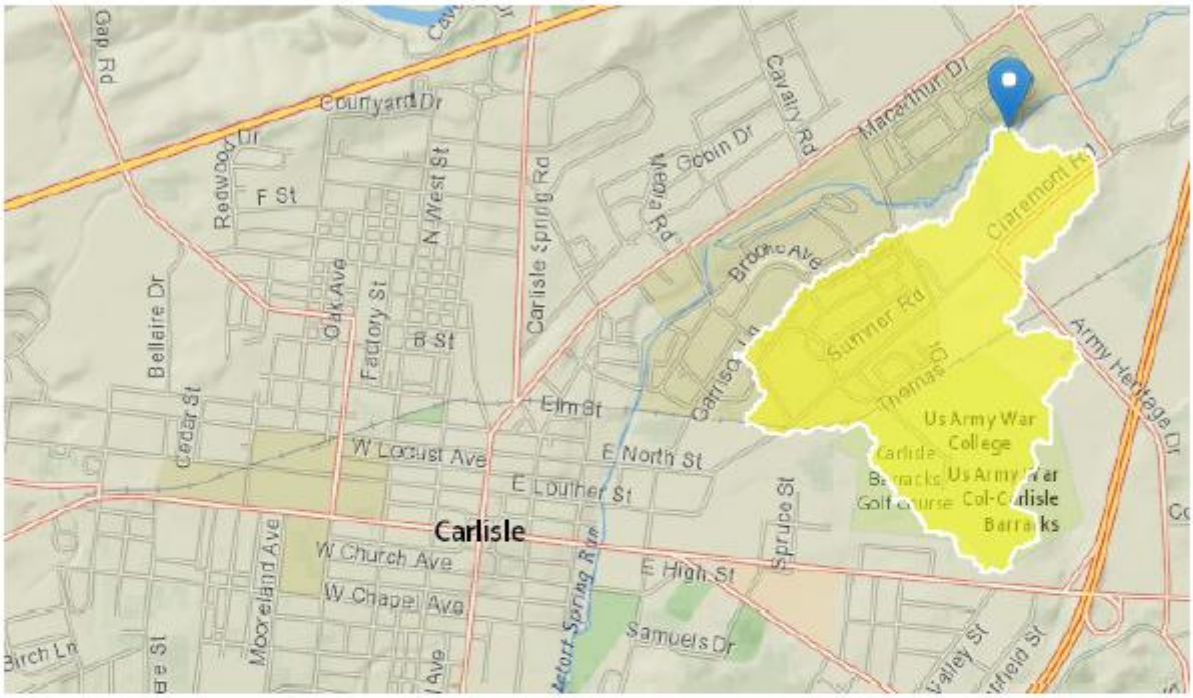
Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0354	ft^3/s
30 Day 2 Year Low Flow	0.0406	ft^3/s
7 Day 10 Year Low Flow	0.0189	ft^3/s
30 Day 10 Year Low Flow	0.022	ft^3/s
90 Day 10 Year Low Flow	0.028	ft^3/s

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

Region ID: PA
Workspace ID: PA20210812170650363000
Clicked Point (Latitude, Longitude): 40.21682, -77.16273
Time: 2021-08-12 13:07:09 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.54	square miles
PRECIP	Mean Annual Precipitation	39	inches
STRDEN	Stream Density -- total length of streams divided by drainage area	0.95	miles per square mile
ROCKDEP	Depth to rock	5	feet
CARBON	Percentage of area of carbonate rock	100	percent

Low-Flow Statistics Parameters [Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.54	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39	inches	35	50.4
STRDEN	Stream Density	0.95	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	5	feet	3.32	5.65
CARBON	Percent Carbonate	100	percent	0	99

Low-Flow Statistics Disclaimers [Low Flow Region 2]

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 2]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.198	ft^3/s
30 Day 2 Year Low Flow	0.225	ft^3/s
7 Day 10 Year Low Flow	0.114	ft^3/s
30 Day 10 Year Low Flow	0.13	ft^3/s
90 Day 10 Year Low Flow	0.157	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/)

TRC_CALC

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	4.64	= Q stream (cfs)		0.5	= CV Daily	
5	0.036	= Q discharge (MGD)		0.5	= CV Hourly	
6	30	= no. samples		1	= AFC_Partial Mix Factor	
7	0.3	= Chlorine Demand of Stream		1	= CFC_Partial Mix Factor	
8	0	= Chlorine Demand of Discharge		15	= AFC_Criteria Compliance Time (min)	
9	0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)	
	0	= % Factor of Safety (FOS)			=Decay Coefficient (K)	
10	Source	Reference	AFC Calculations		Reference	CFC Calculations
11	TRC	1.3.2.iii	WLA afc = 26.597		1.3.2.iii	WLA cfc = 25.922
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
13	PENTOXSD TRG	5.1b	LTA_afc= 9.911		5.1d	LTA_cfc = 15.070
14						
15	Source		Effluent Limit Calculations			
16	PENTOXSD TRG	5.1f	AML MULT = 1.231			
17	PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
18			INST MAX LIMIT (mg/l) = 1.635			

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)

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Carlisle Barracks** NPDES Permit No.: **PA0010251** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Water Treatment Plant Backwash**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.036	646	7						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L	<	10									
	Total Antimony	µg/L	<	1									
	Total Arsenic	µg/L	<	1.5									
	Total Barium	µg/L		150									
	Total Beryllium	µg/L	<	0.5									
	Total Boron	µg/L	<	50									
	Total Cadmium	µg/L	<	0.02									
	Total Chromium (III)	µg/L	<	1									
	Hexavalent Chromium	µg/L		0.791									
	Total Cobalt	µg/L	<	2.5									
	Total Copper	µg/L	<	2.5									
	Free Cyanide	µg/L	<	2									
	Total Cyanide	µg/L	<	2									
	Dissolved Iron	µg/L	<	60									
	Total Iron	µg/L	<	30									
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L	<	2.5									
	Total Mercury	µg/L		0.00074									
	Total Nickel	µg/L	<	2.5									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L	<	2									
	Total Silver	µg/L	<	0.5									
	Total Thallium	µg/L	<	0.5									
	Total Zinc	µg/L	<	2.5									
	Total Molybdenum	µg/L		0.4									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

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

	2,6-Dinitrotoluene	µg/L	<											
	Di-n-Octyl Phthalate	µg/L	<											
	1,2-Diphenylhydrazine	µg/L	<											
	Fluoranthene	µg/L	<											
	Fluorene	µg/L	<											
	Hexachlorobenzene	µg/L	<											
	Hexachlorobutadiene	µg/L	<											
	Hexachlorocyclopentadiene	µg/L	<											
	Hexachloroethane	µg/L	<											
	Indeno(1,2,3-cd)Pyrene	µg/L	<											
	Isophorone	µg/L	<											
	Naphthalene	µg/L	<											
	Nitrobenzene	µg/L	<											
	n-Nitrosodimethylamine	µg/L	<											
	n-Nitrosodi-n-Propylamine	µg/L	<											
	n-Nitrosodiphenylamine	µg/L	<											
	Phenanthrene	µg/L	<											
	Pyrene	µg/L	<											
	1,2,4-Trichlorobenzene	µg/L	<											
Group 6	Aldrin	µg/L	<											
	alpha-BHC	µg/L	<											
	beta-BHC	µg/L	<											
	gamma-BHC	µg/L	<											
	delta BHC	µg/L	<											
	Chlordane	µg/L	<											
	4,4-DDT	µg/L	<											
	4,4-DDE	µg/L	<											
	4,4-DDD	µg/L	<											
	Dieldrin	µg/L	<											
	alpha-Endosulfan	µg/L	<											
	beta-Endosulfan	µg/L	<											
	Endosulfan Sulfate	µg/L	<											
	Endrin	µg/L	<											
	Endrin Aldehyde	µg/L	<											
	Heptachlor	µg/L	<											
	Heptachlor Epoxide	µg/L	<											
	PCB-1016	µg/L	<											
	PCB-1221	µg/L	<											
	PCB-1232	µg/L	<											
	PCB-1242	µg/L	<											
	PCB-1248	µg/L	<											
	PCB-1254	µg/L	<											
	PCB-1260	µg/L	<											
	PCBs, Total	µg/L	<											
	Toxaphene	µg/L	<											
	2,3,7,8-TCDD	ng/L	<											
Group 7	Gross Alpha	pCi/L												
	Total Beta	pCi/L	<											
	Radium 226/228	pCi/L	<											
	Total Strontium	µg/L	<											
	Total Uranium	µg/L	<											
	Osmotic Pressure	mOs/kg		2000										

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

Carlisle Barracks, NPDES Permit No. PA0010251, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Letort Spring Run**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	010263	0.417	430	0.0795			Yes
End of Reach 1	010263	0	427	0.54			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	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	0.417	0.1	4.64									100	7		
End of Reach 1	0	0.1	4.754												

Q_h

Location	RMI	LFY (cfs/mi^2)	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	0.417														
End of Reach 1	0														

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

Carlisle Barracks, NPDES Permit No. PA0010251, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ *AFC* CCT (min): 2.053 PMF: 1 Analysis Hardness (mg/l): 106.48 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	750	750	63,237	
Total Antimony	0	0		0	1,100	1,100	92,747	
Total Arsenic	0	0		0	340	340	28,667	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	1,770,623	
Total Boron	0	0		0	8,100	8,100	682,955	
Total Cadmium	0	0		0	2.140	2.27	192	Chem Translator of 0.941 applied
Total Chromium (III)	0	0		0	599.809	1,898	160,041	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	1,374	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	8,010	
Total Copper	0	0		0	14.258	14.9	1,252	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	1,855	
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	69.143	88.4	7,456	Chem Translator of 0.782 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	139	Chem Translator of 0.85 applied
Total Nickel	0	0		0	493.763	495	41,715	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	3.583	4.22	355	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	5,480	
Total Zinc	0	0		0	123.579	126	10,654	Chem Translator of 0.978 applied
Osmotic Pressure	0	0		0	50	50.0	4,216	

☑ *CFC* CCT (min): 2.053 PMF: 1 Analysis Hardness (mg/l): 106.48 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	18,549	
Total Arsenic	0	0		0	150	150	12,647	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	345,693	
Total Boron	0	0		0	1,600	1,600	134,905	
Total Cadmium	0	0		0	0.257	0.28	23.9	Chem Translator of 0.906 applied
Total Chromium (III)	0	0		0	78.023	90.7	7,649	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	876	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	1,602	
Total Copper	0	0		0	9.449	9.84	830	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	438	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	126,473	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.694	3.45	291	Chem Translator of 0.782 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	76.4	Chem Translator of 0.85 applied
Total Nickel	0	0		0	54.842	55.0	4,638	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	421	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	1,096	
Total Zinc	0	0		0	124.590	126	10,654	Chem Translator of 0.986 applied
Osmotic Pressure	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): 2.053 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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	472	
Total Arsenic	0	0		0	10	10.0	843	
Total Barium	0	0		0	2,400	2,400	202,357	
Total Boron	0	0		0	3,100	3,100	261,378	
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	
Free Cyanide	0	0		0	4	4.0	337	
Dissolved Iron	0	0		0	300	300	25,295	
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	84,315	

Total Mercury	0	0		0	0.050	0.05	4.22	
Total Nickel	0	0		0	610	610	51,432	
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	20.2	
Total Zinc	0	0		0	N/A	N/A	N/A	
Osmotic Pressure	0	0		0	N/A	N/A	N/A	

☑ *CRL* CCT (min): 0.637 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 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	
Free Cyanide	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	
Osmotic Pressure	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Osmotic Pressure	XXX	XXX	2,702	4,216	6,755	mOs/kg	2,702	AFC	Discharge Conc ≥ 50% WQBEL (RP)

☑ ***Other Pollutants without Limits or Monitoring***

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

Pollutants	Governing WQBEL	Units	Comments
Total Aluminum	N/A	N/A	Discharge Conc < TQL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	202,357	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	N/A	N/A	Discharge Conc < TQL
Total Cadmium	N/A	N/A	Discharge Conc < TQL
Total Chromium (III)	N/A	N/A	Discharge Conc < TQL
Hexavalent Chromium	876	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	1,602	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	803	µg/L	Discharge Conc < TQL
Free Cyanide	337	µg/L	Discharge Conc ≤ 25% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	25,295	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	126,473	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	291	µg/L	Discharge Conc < TQL
Total Manganese	84,315	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	4.22	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	4,638	µg/L	Discharge Conc < TQL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	421	µg/L	Discharge Conc < TQL
Total Silver	228	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	20.2	µg/L	Discharge Conc < TQL
Total Zinc	6,829	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS

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. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Estimate
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	2/month	See Permit
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/day	See Permit
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/month	See Permit
Total Dissolved Solids Intake	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Osmotic Pressure (mOs/kg)	XXX	XXX	XXX	XXX	2000	3000	2/month	See Permit

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☐	Toxics Management Spreadsheet (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 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: