pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0010201**
Facility Type	**Industrial**	APS ID	**23560**
Major / Minor	**Minor**	Authorization ID	**1274698**

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

Applicant and Facility Information

Applicant Name	**Columbia Water Co.**	Facility Name	**Columbia Water System**
Applicant Address	PO Box 350 220 Locust Street	Facility Address	20 Walnut Street
	Columbia, PA 17512-0350		Columbia, PA 17512-1198
Applicant Contact	David Lewis	Facility Contact	David Lewis
Applicant Phone	(717) 684-2188	Facility Phone	(717) 684-2712
Client ID	74974	Site ID	788969
SIC Code	4941	Municipality	Columbia Borough
SIC Description	Trans. & Utilities - Water Supply	County	Lancaster
Date Application Received	May 22, 2019	EPA Waived?	Yes
Date Application Accepted	June 7, 2019	If No, Reason	

Purpose of Application: NPDES RENEWAL.

Summary of Review

Columbia Water Company has applied for the renewal of individual Industrial Wastewater NPDES permit #PA0010201 for discharges from their Chestnut Street treatment plant to the Susquehanna River. The plant is located in Columbia Borough, Lancaster County, and discharges directly to the Susquehanna River.

The treatment plant has a permitted capacity of 4 MGD, and consists of a surface water intake, conventional water treatment process, finished water pumping station, and wastewater settling basin. The settling basin, or lagoon, receives wastewater from the raw water well drain, sedimentation basin drains, and filter backwash and rinse holding tank, and discharges to the Susquehanna River through Outfall 001. Supernatant from the washwater holding tank is recycled back to the headworks, and only settled sludge is sent to the settling basin. Manual grab samples are taken from the basin outfall structure for all monitoring requirements. Settled solids are hauled off site and land applied by Commonwealth Disposal, Inc. out of Harrisburg. A site visit was conducted on 10/30/2019 to verify conditions and meet with facility representatives (see pictures Attachment F).

Pollutants of concern were analyzed using the PENTOXSD model (Attachment A) and the Department's Toxics Screening Analysis (Attachment B) and Total Residual Chlorine (Attachment C) spreadsheets.

At this time, no changes are being proposed from the previous permit conditions.

Approve	Deny	Signatures	Date
X		/s/ Zachary Steckler, EIT / Project Manager	October 22, 2019
X		/s/ Sean Furjanic, PE / Environmental Program Manager	January 9, 2020

Summary of Review

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)	0.550
Latitude	40º 1' 24.11"	Longitude	-76º 30' 39.01"
Quad Name		Quad Code	
Wastewater Description:	Water Treatment Effluent		
Receiving Waters	Susquehanna River (WWF, MF)	Stream Code	06685
NHD Com ID	57465419	RMI	27.87
Drainage Area	26,000	Yield (cfs/mi^2)	0.12
Q_{7-10} Flow (cfs)	3,210	Q_{7-10} Basis	StreamStats
Elevation (ft)	227	Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	METALS, PATHOGENS, PH, POLYCHLORINATED BIPHENYLS (PCBS)		
Source(s) of Impairment	SOURCE UNKNOWN		
TMDL Status	None	Name	
Nearest Downstream Public Water Supply Intake	Lancaster City Water Bureau		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI	27.32	Distance from Outfall (mi)	0.55

Treatment Facility Summary

Treatment Facility Name: Columbia Water Co.

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Industrial	Physical (Industrial Waste)	Sedimentation	No Disinfection	0.091

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.550	N/A	Not Overloaded	Lagoon Settling	Applied Off-Site

Changes Since Last Permit Issuance: No changes have occurred to the facility or treated flows since the last permit issuance.

Other Comments:

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.091
Latitude 40° 01' 45.9" **Longitude** 76° 30' 27.0"
Wastewater Description: Filter backwash, flocculation basin cleaning, raw water well cleaning.

Existing Effluent Limitations

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)					
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Minimum Measurement Frequency	Required Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	1/day	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.50	XXX	1.0	1/day	Grab
Total Suspended Solids	Report	Report	XXX	30	60	75	2/month	8-Hr Composite
Total Aluminum	Report	Report	XXX	4.0	8.0	10.0	2/month	8-Hr Composite
Total Iron	Report	Report	XXX	2.0	4.0	5.0	2/month	8-Hr Composite
Total Manganese	Report	Report	XXX	1.0	2.0	2.5	2/month	8-Hr Composite

Drainage Area

The facility discharges to the Susquehanna River at RMI 27.87. The approximate drainage area upstream of the discharge was determined to be 26,000 square miles according to USGS PA StreamStats available at https://streamstats.usgs.gov/ss/.

Stream Flow

For the Q_{7-10} calculation, a StreamStats analysis was performed for a point (40° 01' 45.9", -76° 30' 27.0") on the Susquehanna River at the outfall location (see Attachment D). The delineated watershed has a Q_{7-10} flow of 3,210 cfs and a drainage area of 26,000 mi^2, which results in a Low Flow Yield (LFY) of 0.12 cfs/mi^2.

Q_{7-10} = 3,210 cfs
LFY = 3,210 cfs / 26,000 mi^2 = 0.12 cfs/mi^2

Public Water Supply:

The nearest downstream public water supply intake is for Lancaster City Water Bureau on Susquehanna River, approximately 0.55 miles downstream of this discharge. This distance was determined as follows:

+	RMI of Outfall 001 on Susquehanna River	27.87 mi
-	RMI of Lancaster City intake on Susquehanna River	27.32 mi
		0.55 mi

Considering the distance and available dilution, the discharge is not expected to impact the water supply.

Effluent Limitations Evaluation:

Guidance document 362-2183-003 (*Technology-Based Control Requirements for Water Treatment Plant Wastes*) defines Best Practicable Control Technology Currently Available (BPT) effluent control requirements as follows:

Parameter	Monthly Average (mg/L)	Daily Maximum (mg/L)
Total Suspended Solids	30	60
Total Iron	2	4
Total Aluminum	4	8
Total Manganese	1	2
Flow	Monitor	
pH	6 to 9 at all times	
Total Residual Chlorine	0.5	1.0

PENTOXSD was run for total iron, total aluminum, and total manganese (see Attachment A). The model results indicate limits that are less stringent than the defined technology based limits for all three parameters. Therefore, the existing technology-based limits will remain in the permit.

The technology limits for TSS, pH, and TRC will also remain in the permit.

In addition to the above BPT parameters, PENTOXSD was also run for total antimony, total cadmium, total lead, total selenium, total thallium, and total phenols, per the results of the attached Toxics Screening Analysis spreadsheet (Attachment B). Due to the high amount of dilution offered by Susquehanna River, the resulting WQBELS are much greater than the maximum concentrations listed in the permit application. Therefore, no additional toxics monitoring requirements are needed in the permit.

The current monitoring frequencies are less stringent than those listed in Table 6-4 of DEP's Permit Writer's Manual (362-0400-001). Because the permit demonstrated no history of non-compliance within the last two years of eDMR data, the monitoring frequency requirements will remain unchanged for the permit reissuance.

Total Residual Chlorine (TRC):

Based on the attached TRC Spreadsheet output (Attachment C), which uses the equations and calculations from the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (ID No. 391-2000-015), the facility's discharge must meet a monthly average limit of 0.50 mg/L and an instantaneous maximum limit of 1.63 mg/L. The technology limits provided by 362-2183-003 are more stringent and will therefore be applied in the permit.

Chesapeake Bay Phase II Watershed Implementation Plan (WIP) Supplement:

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

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

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

Stormwater:

According to 40 CFR 122.26(b)(14), facilities having SIC Code 4941 are not required by EPA to have its stormwater covered by an NPDES permit. According to the previous protection report, roof drains are connected to the water treatment system and the runoff is processed as raw water. No stormwater is directly connected to the settling basin.

Antidegradation:

The effluent limits for this discharge have been developed to ensure that existing in-stream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

303(d) Listed Streams:

This discharge is located on a 303(d) listed stream segment that is impaired for pathogens, PCBs, and metals due to an unknown source. A TMDL has not yet been developed for these impairments.

Class A Wild Trout Fisheries:

No Class A Wild Trout Fisheries are impacted by this discharge.

Compliance History

Summary of Inspections:

The facility was inspected four times during the current permit cycle, with no violations noted.

Summary of Non-Compliance:

A search of eDMR data for the past two years returned no history of non-compliance for any of the effluent monitoring parameters.

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	0.0835	0.060366	0.082227	0.090891	0.0854431024	0.095728	0.086763	0.0846435	0.090493	0.0876	0.093149	0.10697
Flow (MGD) Daily Maximum	0.1132	0.108032	0.1022	0.141744	0.109782	0.314856	0.119928	0.134072	0.121336	0.1163	0.19828	0.23847
pH (S.U.) Minimum	7.7	7.4	7.4	7.4	7.4	7.4	7.3	7.2	7.3	7.3	7.3	7.3
pH (S.U.) Maximum	8.0	7.7	7.6	7.6	7.8	7.9	7.7	7.8	7.6	7.6	7.8	7.7
TRC (mg/L) Average Monthly	0.14	0.13	0.10	0.13	0.14	0.12	0.18	0.10	0.19	0.15	0.13	0.12
TRC (mg/L) Instantaneous Maximum	0.33	0.33	0.19	0.26	0.24	0.25	0.31	0.3	0.27	0.24	0.21	0.22
TSS (lbs/day) Average Monthly	< 3	8	8	< 5	< 3	< 3	5	< 3	4	< 4	8	6
TSS (lbs/day) Daily Maximum	< 3	9	9	6	< 3	< 3	7	< 3	4	4	10	2
TSS (mg/L) Average Monthly	< 4	12.8	11.5	< 7	< 5	< 4	7.3	< 5	5	< 5	10	6
TSS (mg/L) Daily Maximum	< 4	14	12.4	9	< 5	< 4	10.5	< 5	5	< 5	10	6
Total Aluminum (lbs/day) Average Monthly	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.08	0.08	0.1	0.3	0.2
Total Aluminum (lbs/day) Daily Maximum	0.3	0.2	0.1	0.3	0.2	0.2	0.3	0.1	0.09	0.1	0.5	0.2
Total Aluminum (mg/L) Average Monthly	0.44	0.35	0.14	0.28	0.24	0.21	0.281	0.13	0.11	0.17	0.35	0.18
Total Aluminum (mg/L) Daily Maximum	0.55	0.39	0.18	0.38	0.25	0.23	0.406	0.15	0.12	0.18	0.52	0.23

Total Iron (lbs/day) Average Monthly	0.04	0.09	0.08	0.2	0.09	0.1	0.3	0.09	0.09	0.1	0.4	0.1
Total Iron (lbs/day) Daily Maximum	0.05	0.09	0.1	0.2	0.1	0.1	0.5	0.09	0.1	0.1	0.6	0.2
Total Iron (mg/L) Average Monthly	0.07	0.15	0.11	0.23	0.15	0.18	0.41	0.14	0.12	0.13	0.42	0.1
Total Iron (mg/L) Daily Maximum	0.08	0.15	0.17	0.31	0.16	0.21	0.654	0.14	0.13	0.17	0.55	0.16
Total Manganese (lbs/day) Average Monthly	0.1	0.6	0.6	0.7	0.3	0.1	0.09	0.1	0.1	0.2	0.4	0.8
Total Manganese (lbs/day) Daily Maximum	0.2	0.8	0.7	0.8	0.3	0.1	0.09	0.1	0.2	0.3	0.5	1
Total Manganese (mg/L) Average Monthly	0.24	0.92	0.84	1.0	0.44	0.15	0.139	0.17	0.2	0.21	0.52	0.8
Total Manganese (mg/L) Daily Maximum	0.33	1.21	1.03	1.17	0.47	0.16	0.159	0.21	0.25	0.29	0.53	1.1

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	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	1/day	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
TRC	XXX	XXX	XXX	0.50	XXX	1.0	1/day	Grab
TSS	Report	Report	XXX	30	60	75	2/month	8-Hr Composite
Total Aluminum	Report	Report	XXX	4.0	8.0	10	2/month	8-Hr Composite
Total Iron	Report	Report	XXX	2.0	4.0	5	2/month	8-Hr Composite
Total Manganese	Report	Report	XXX	1.0	2.0	2.5	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

Other Comments:

	Tools and References Used to Develop Permit
☐	WQM for Windows Model (see Attachment)
☒	PENTOXSD for Windows Model (see Attachment **A**)
☒	TRC Model Spreadsheet (see Attachment **B**)
☐	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: New and Reissuance Individual IW NPDES Permits, Establishing ELs for Individual Industrial Permits
☒	Other: StreamStats Report (see Attachment **D**), Topographic Map (see Attachment **E**), Site Visit Pictures (see Attachment F)

ATTACHMENT A

PENTOXSD

Modeling Input Data

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
6685	27.87	227.00	26000.00	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	0.12	0	3210	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)	
Columbia Water	pa0010201	0.091	0.091	0.1128	0	0	0	0	0	82	7.5

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)
ALUMINUM	520	0	0.5	0.5	0	0	0	0	1	0
CHLORIDE (PWS)	24.1	0	0.5	0.5	0	0	0	0	1	0
MANGANESE	1800	0	0.5	0.5	0	0	0	0	1	0
MERCURY	0.06	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	19.6	0	0.5	0.5	0	0	0	0	1	0
THALLIUM	0.29	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	0	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	654	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
6685	27.32	225.00	26500.00	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	0.12	0	3210	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)
ALUMINUM	0	0	0.5	0.5	0	0	0	0	1	0
CHLORIDE (PWS)	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
MERCURY	0	0	0.5	0.5	0	0	0	0	1	0
SULFATE (PWS)	0	0	0.5	0.5	0	0	0	0	1	0
THALLIUM	0	0	0.5	0.5	0	0	0	0	1	0
TOTAL DISSOLVED SOLIDS (PWS)	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:
07K	6685	SUSQUEHANNA RIVER

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											
27.870	3210	0	3210	0.1745	0.0007	0.7164	2080.5	2904.0	2.1538	0.0156	1000+
27.320	3210	0	3210	NA	0	0	0	0	0	0	NA
Qh Hydrodynamics											
27.870	8623.3	0	8623.3	0.1745	0.0007	1.1066	2080.5	1880.1	3.7457	0.009	1000+
27.320	8623.3	0	8623.3	NA	0	0	0	0	0	0	NA

PENTOXSD Analysis Results

Recommended Effluent Limitations

SWP Basin	Stream Code:	Stream Name:
07K	6685	SUSQUEHANNA RIVER

RMI	Name	Permit Number	Disc Flow (mgd)
27.87	Columbia Water	pa0010201	0.1128

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent WQBEL (µg/L)	Most Stringent WQBEL Criterion
ALUMINUM	520	INPUT	811.284	56575.31	AFC
CHLORIDE (PWS)	24.1	INPUT	37.6	NA	NA
MANGANESE	1800	INPUT	2808.289	809443.6	THH
MERCURY	0.06	INPUT	0.094	40.472	THH
SULFATE (PWS)	19.6	INPUT	30.579	NA	NA
THALLIUM	0.29	INPUT	0.452	194.266	THH
TOTAL DISSOLVED SOLIDS (PWS	NA	NA	NA	NA	NA
TOTAL IRON	654	INPUT	1020.345	2.759E+07	CFC

ATTACHMENT B

	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	3210	= Q stream (cfs)		0.5	= CV Daily	
5	0.091	= Q discharge (MGD)		0.5	= CV Hourly	
6	357	= 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)		0	=Decay Coefficient (K)	
10	Source	Reference	AFC Calculations		Reference	CFC Calculations
11	TRC	1.3.2.iii	WLA afc = 7273.863		1.3.2.iii	WLA cfc = 7091.439
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
13	PENTOXSD TRG	5.1b	LTA_afc= 2710.415		5.1d	LTA_cfc = 4122.630
14						
15	Source		Effluent Limit Calculations			
16	PENTOXSD TRG	5.1f	AML MULT = 1.063			
17	PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
18			INST MAX LIMIT (mg/l) = 1.893			

WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...
	...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...
	...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)

ATTACHMENT C

TOXICS SCREENING ANALYSIS
WATER QUALITY POLLUTANTS OF CONCERN
VERSION 2.7

Facility: Columbia Water Company
Analysis Hardness (mg/L): 82
Stream Flow, Q_{7-10} (cfs): 3210

NPDES Permit No.: PA0010201
Discharge Flow (MGD): 0.091

Outfall: 001
Analysis pH (SU): 7.5

	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		111	500000	No		
	Chloride		24.1	250000	No	NA	
	Bromide			N/A			
	Sulfate		19.6	250000	No	NA	
	Fluoride			2000			
Group 2	Total Aluminum		520	750	No	56575.31	
	Total Antimony			5.6			
	Total Arsenic		0.5	10	No		
	Total Barium		30	2400	No		
	Total Beryllium			N/A			
	Total Boron		22	1600	No		
	Total Cadmium			0.234			
	Total Chromium		0.3	N/A	No		
	Hexavalent Chromium			10.4			
	Total Cobalt		0.4	19	No		
	Total Copper		2	7.9	No		
	Total Cyanide			N/A			
	Total Iron		654	1500	No	27590000	
	Dissolved Iron		81	300	No		
	Total Lead			2.5			
	Total Manganese		1800	1000	Yes	809443.6	No Limits/Monitoring
	Total Mercury		0.06	0.05	Yes	40.472	No Limits/Monitoring
	Total Molybdenum			N/A			
	Total Nickel		2	44.1	No		
	Total Phenols (Phenolics)			5			
	Total Selenium			5.0			
	Total Silver		0.1	2.7	No		
	Total Thallium		0.29	0.24	Yes	194.266	No Limits/Monitoring
	Total Zinc		6.7	101.3	No		
Group 3	Acrolein	<		3			
	Acrylamide	<		0.07			
	Acrylonitrile	<		0.051			
	Benzene	<		1.2			
	Bromoform	<		4.3			
	Carbon Tetrachloride	<		0.23			
	Chlorobenzene	<		130			
	Chlorodibromomethane	<		0.4			
	Chloroethane	<		N/A			
	2-Chloroethyl Vinyl Ether	<		3500			
	Chloroform	<		5.7			
	Dichlorobromomethane	<		0.55			
	1,1-Dichloroethane	<		N/A			
	1,2-Dichloroethane	<		0.38			
	1,1-Dichloroethylene	<		33			
	1,2-Dichloropropane	<		2200			
	1,3-Dichloropropylene	<		0.34			
	Ethylbenzene	<		530			
	Methyl Bromide	<		47			
	Methyl Chloride	<		5500			
	Methylene Chloride	<		4.6			
	1,1,2,2-Tetrachloroethane	<		0.17			
	Tetrachloroethylene	<		0.69			
	Toluene	<		330			
	1,2-trans-Dichloroethylene	<		140			
	1,1,1-Trichloroethane	<		610			
	1,1,2-Trichloroethane	<		0.59			
	Trichloroethylene	<		2.5			
	Vinyl Chloride	<		0.025			
Group 4	2-Chlorophenol	<		81			
	2,4-Dichlorophenol	<		77			
	2,4-Dimethylphenol	<		130			
	4,6-Dinitro-o-Cresol	<		13			
	2,4-Dinitrophenol	<		69			
	2-Nitrophenol	<		1600			
	4-Nitrophenol	<		470			
	p-Chloro-m-Cresol	<		30			
	Pentachlorophenol	<		0.27			
	Phenol	<		10400			
	2,4,6-Trichlorophenol	<		1.4			

ATTACHMENT D

StreamStats Report

Region ID: PA
Workspace ID: PA20191022174124206000
Clicked Point (Latitude, Longitude): 40.02267, -76.50958
Time: 2019-10-22 13:41:51 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	26000	square miles
BSLOPD	Mean basin slope measured in degrees	8.2	degrees
ROCKDEP	Depth to rock	4.5	feet
URBAN	Percentage of basin with urban development	2.9	percent
PRECIP	Mean Annual Precipitation	39.6	inches

Parameter Code	Parameter Description	Value	Unit
STRDEN	Stream Density -- total length of streams divided by drainage area	1.75	miles per square mile
CARBON	Percentage of area of carbonate rock	6.4	percent
ELEV	Mean Basin Elevation	1329.4	feet
GLACIATED	Percentage of basin area that was historically covered by glaciers	45.5	percent
FOREST	Percentage of area covered by forest	67.8	percent

Low-Flow Statistics Parameters[4 Percent (983 square miles) Low Flow Region 1]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26000	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	8.2	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.5	feet	4.13	5.21
URBAN	Percent Urban	2.9	percent	0	89

Low-Flow Statistics Parameters[43 Percent (11100 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26000	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39.6	inches	35	50.4
STRDEN	Stream Density	1.75	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.5	feet	3.32	5.65
CARBON	Percent Carbonate	6.4	percent	0	99

Low-Flow Statistics Parameters[6 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26000	square miles	2.33	1720
ELEV	Mean Basin Elevation	1329.4	feet	898	2700
PRECIP	Mean Annual Precipitation	39.6	inches	38.7	47.9

Low-Flow Statistics Parameters[47 Percent (12300 square miles) Low Flow Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26000	square miles	4.84	982
PRECIP	Mean Annual Precipitation	39.6	inches	33.1	47.1
GLACIATED	Percent of Glaciation	45.5	percent	0	100
FOREST	Percent Forest	67.8	percent	41	100

Low-Flow Statistics Disclaimers[4 Percent (983 square miles) Low Flow Region 1]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[4 Percent (983 square miles) Low Flow Region 1]

Statistic	Value	Unit
7 Day 2 Year Low Flow	9390	ft^3/s
30 Day 2 Year Low Flow	10400	ft^3/s
7 Day 10 Year Low Flow	7360	ft^3/s
30 Day 10 Year Low Flow	7730	ft^3/s
90 Day 10 Year Low Flow	8220	ft^3/s

Low-Flow Statistics Disclaimers[43 Percent (11100 square miles) 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[43 Percent (11100 square miles) Low Flow Region 2]

Statistic	Value	Unit
7 Day 2 Year Low Flow	5760	ft^3/s
30 Day 2 Year Low Flow	6810	ft^3/s
7 Day 10 Year Low Flow	4290	ft^3/s
30 Day 10 Year Low Flow	5070	ft^3/s
90 Day 10 Year Low Flow	6340	ft^3/s

Low-Flow Statistics Disclaimers[6 Percent (1610 square miles) 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[6 Percent (1610 square miles) Low Flow Region 3]

Statistic	Value	Unit
7 Day 2 Year Low Flow	2350	ft^3/s
30 Day 2 Year Low Flow	2900	ft^3/s
7 Day 10 Year Low Flow	1400	ft^3/s
30 Day 10 Year Low Flow	1750	ft^3/s
90 Day 10 Year Low Flow	2400	ft^3/s

Low-Flow Statistics Disclaimers[47 Percent (12300 square miles) Low Flow Region 5]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[47 Percent (12300 square miles) Low Flow Region 5]

Statistic	Value	Unit
7 Day 2 Year Low Flow	3380	ft^3/s
30 Day 2 Year Low Flow	4280	ft^3/s

Statistic	Value	Unit
7 Day 10 Year Low Flow	2150	ft^3/s
30 Day 10 Year Low Flow	2830	ft^3/s
90 Day 10 Year Low Flow	3660	ft^3/s

Low-Flow Statistics Flow Report[Area-Averaged]

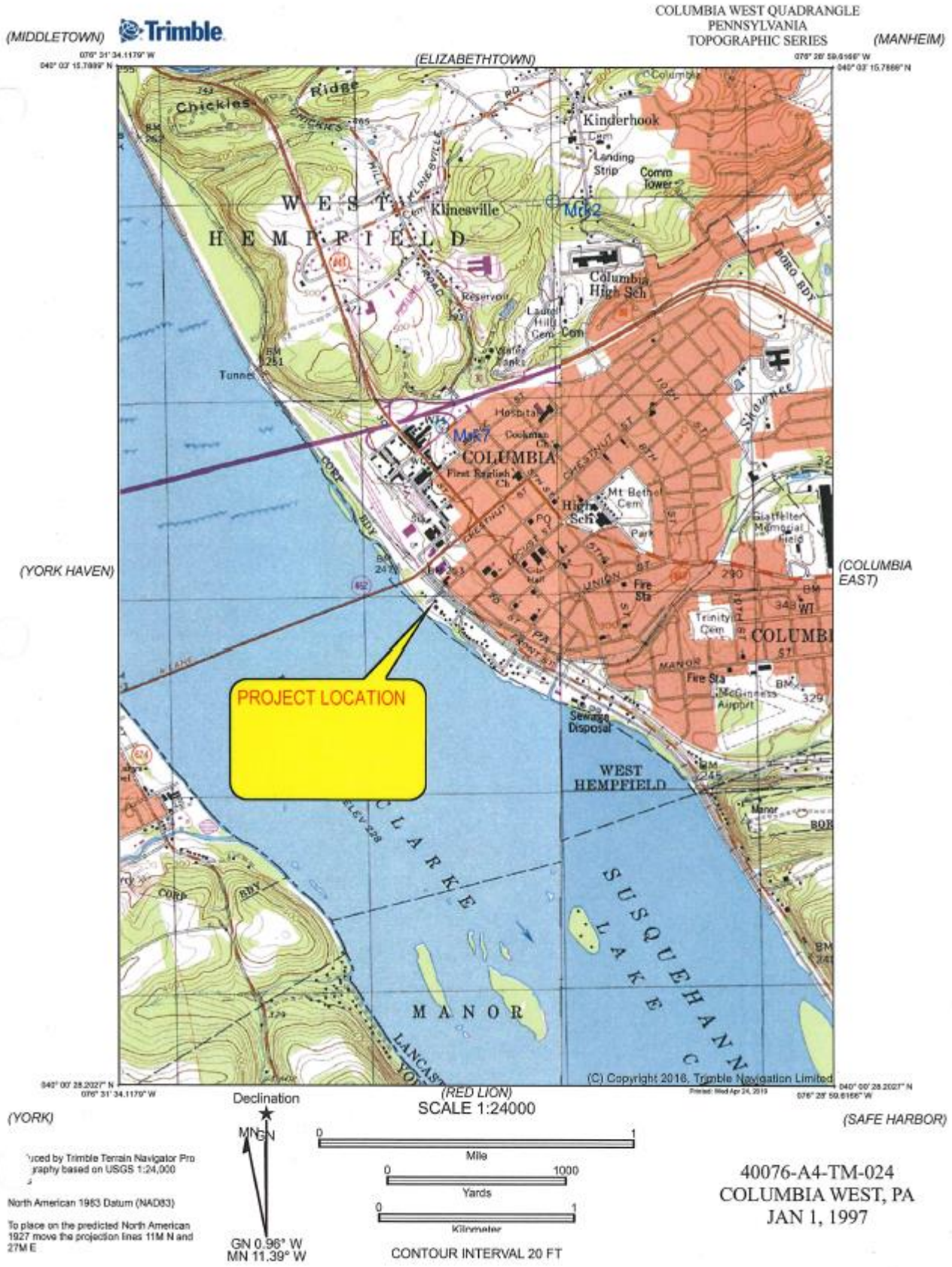
Statistic	Value	Unit
7 Day 2 Year Low Flow	4550	ft^3/s
30 Day 2 Year Low Flow	5500	ft^3/s
7 Day 10 Year Low Flow	3210	ft^3/s
30 Day 10 Year Low Flow	3900	ft^3/s
90 Day 10 Year Low Flow	4890	ft^3/s

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/)

Application Version: 4.3.8

ATTACHMENT E



ATTACHMENT F

1 *- Settling Basin*

2 *- Basin Outfall Structure & Sampling Point*

3 *- Location of Outfall 001 to Susquehanna River*