Pennsylvania Department of Environmental Protection

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0009440**
Facility Type	**Industrial**	APS ID	**276676**
Major / Minor	**Minor**	Authorization ID	**1463933**

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

Applicant and Facility Information

Applicant Name	**PA American**	Facility Name	**Silver Springs Water Treatment Plant**
Applicant Address	852 Wesley Drive	Facility Address	109 Sample Bridge Road
	Mechanicsburg, PA 17055-4436		Mechanicsburg, PA 17055
Applicant Contact	Jon Prawdzik	Facility Contact	Adam Rebar
Applicant Phone	(717) 550-1521	Facility Phone	(717) 434-3045
Client ID	87712	Site ID	453746
SIC Code	4941	Municipality	Silver Spring Township
SIC Description	Trans. & Utilities - Water Supply	County	Cumberland
Date Application Received	November 30, 2023	EPA Waived?	Yes
Date Application Accepted	December 27, 2023	If No, Reason	
Purpose of Application	NPDES Renewal.		

Summary of Review

PA American Water (PAAW) has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its NPDES permit. The permit was last reissued on May 30, 2019 and became effective on June 1, 2019. The permit expired on May 31, 2024 but the terms and conditions of the permit have been extended since that time.

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

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.

Approve	Deny	Signatures	Date
X		*Jinsu Kim* Jinsu Kim / Environmental Engineering Specialist	September 11, 2024
X		Maria D. Bebenek for Daniel W. Martin, P.E. / Environmental Engineer Manager	September 17, 2024
X		Maria D. Bebenek Maria D. Bebenek, P.E. / Program Manager	September 17, 2024

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	N/A
Latitude	40º 15' 8.00”	Longitude	-77º 1' 15.00"
Quad Name	Wertzville	Quad Code	1629
Wastewater Description:	Emergency Outfall		

Outfall No.	002	Design Flow (MGD)	.391
Latitude	40º 15' 8.00"	Longitude	-77º 1' 16.00"
Quad Name	Wertzville	Quad Code	1629
Wastewater Description:	Treated Industrial Waste (Backwash & Filter to Waste)		
Receiving Waters	Conodoguinet Creek	Stream Code	10194
NHD Com ID	56404061	RMI	19.23 (001); 19.24 (002)
Drainage Area	470	Yield (cfs/mi^2)	0.147
Q_{7-10} Flow (cfs)	69.3	Q_{7-10} Basis	USGS gage no. 01570000
Elevation (ft)	353	Slope (ft/ft)	
Watershed No.	7-B	Chapter 93 Class.	WWF, MF
Existing Use	None	Existing Use Qualifier	None
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	Organic Enrichment		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final	Name	Conodoguinet Creek Watershed
Nearest Downstream Public Water Supply Intake	Steelton Borough		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	2441
PWS RMI	68.36	Distance from Outfall (mi)	23.3

Drainage Area
The discharge is to Conodoguinet Creek at RMI 19.23 for Outfall 001 and 19.24 for Outfall 002. Outfall 001, according to the application, is an old outfall used previously prior to Lagoon 3 and 4 installation for all process water discharge. It is operational but only used during emergency situations. Outfall 002 is the main discharge outfall. There is an USGS gage station no. 01570000 located in the very close vicinity of Outfall 002. USGS estimated the drainage area to be 470 sq.mi. at this gage station.

Streamflow
USGS’s latest streamflow report provides the Q7-10 flow of 69.3 cfs, Q1-10 flow of 63.1 cfs and Q30-10 flow of 78.3 cfs at the gage station no. 01570000.

Conodoguinet Creek
Under 25 Pa Code §93.9o, Conodoguinet Creek from PA997 at Roxbury to Mouth is designated as warm water fishes and supports migratory fishes. No special protection water is therefore impacted by this discharge. No Class A Wild Trout fishery is impacted by this discharge as well. DEP’s 2024 integrated water quality shows that the discharge is located in a stream segment listed impaired for organic enrichment due to unknown source(s). While a TMDL was developed in 2000 to address impairments identified in 18 sub-watersheds in the Conodoguinet Creek basin, no wasteload allocation has been considered for this discharge.

Public Water Supply Intake
The fact sheet prepared for the last permit renewal indicates that the nearest downstream public water supply intake the Steelton Borough located on the Susquehanna River approximately 23 miles from the discharge. Given the distance, the discharge is not expected to impact the water supply.

Treatment Facility Summary				
Treatment Facility Name: Silver Springs Water Treatment Plant				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Industrial	Primary	Sedimentation	No Disinfection	See Comments
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
See Comments	N/A	Not Overloaded	N/A	N/A

PAAW owns and operates a water treatment plant located in Silver Springs Township, Cumberland County. The plant withdraws water from Conodoguinet Creek for potable public consumption serving the areas nearby. The water treatment plant includes chemical mixing process, flocculation/sedimentation/filtration process, and finished water clearwells. The facility utilizes four (4) lagoons and one wastewater clarifier. Lagoon no. 1 is connected to Outfall 001 and Lagoon no. 3 and no. 4 as well as the wastewater clarifier are connected to Outfall 002. A filter backwash and sludge (clarifier) blowdown are discharged into one of Lagoon no. 3/no. 4. Wastewater from the lab (about 300 gallons per day) is discharged into the wastewater clarifier and then pumped to one of Lagoon no.3/no. 4. Rinse water (filter to waste) is discharged directly to Conodoguinet Creek via Outfall 002 without flowing through Lagoon no.3 or no. 4 according to the inspection report. Any solids generated from these units will be land applied at local farms approximately twice per year.

Polymer and Ferric Chloride are used for coagulant/flocculant. Fluoride and Zinc Orthophosphate are used for corrosion control, respectively but are injected after the filtration process; therefore, the presence of these chemicals in the effluent discharged from Outfall 002 is not expected. Power Activated Carbon (seasonal) and Potassium Permanganate are used for taste/order/color control. Chlorine (sodium hypochlorite) is used for disinfection prior to (or during) the filtration process. Lime and sodium hydroxide are used for pH adjustment.

Compliance History	
Summary of DMRs:	A summary of past 12-month DMR data is presented on the next page.
Summary of Inspections:	11/7/2022: DEP conducted a routine inspection and noted that there is no violation identified at the time of inspection.
Other Comments:	The facility had a number of permit violations; these violations are shown below. Date | NON_COMPL_TYPE_DESC | NON_COMPL_CATEGORY_DESC | PARAMETER 11/1/2020 | | Unauthorized Discharges | 7/1/2022 | Other | Other Violations | 4/1/2023 | Violation of permit condition | Other Violations | 11/1/2023 | Late DMR Submission | Other Violations | There are a number of open violations associated with this permittee; all of them are identified by different regions. A draft permit cover letter will indicate that the permit may not be finalized.

Effluent Data

DMR Data for Outfall 002 (from August 1, 2023 to July 31, 2024)

Parameter	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23
Flow (MGD) Average Monthly	0.276	0.3177	0.1765	0.154	0.163	0.177	0.189	0.152	0.261	0.276	0.251	0.315
Flow (MGD) Daily Maximum	0.428	0.823	0.593	0.557	0.627	0.836	0.627	0.529	0.765	0.833	0.525	0.617
pH (S.U.) Instantaneous Minimum	7.79	7.71	7.65	7.26	7.42	7.38	7.12	7.48	7.71	7.5	7.61	7.75
pH (S.U.) Instantaneous Maximum	8.33	8.51	8.38	8.81	7.96	7.82	7.79	7.88	8.34	8.25	8.07	8.46
TRC (mg/L) Average Monthly	< 0.05	< 0.05	< 0.07	< 0.06	0.07	0.08	0.17	0.16	0.13	0.07	0.05	0.07
TRC (mg/L) Instantaneous Maximum	0.05	0.11	0.32	0.11	0.17	0.16	0.27	0.28	0.4	0.27	0.20	0.28
TSS (lbs/day) Average Monthly	< 23	12.0	28	< 23	< 19	< 15	< 14	< 12	< 10	< 14	< 9.0	< 15
TSS (lbs/day) Daily Maximum	71	23.0	31	30	< 21	30	< 19	< 17	< 19	22	< 10.0	23
TSS (mg/L) Average Monthly	< 8.0	6.0	7.0	< 7.0	< 4.0	< 5.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TSS (mg/L) Daily Maximum	23.0	7.4	7.6	11.2	< 4.0	5.5	< 4.0	< 4.0	< 4.0	4.4	< 4.0	4.8
Total Aluminum (lbs/day) Average Monthly	< 0.3	< 0.2	< 0.4	< 0.4	< 0.5	< 0.3	< 0.3	< 0.3	< 0.2	< 0.3	< 0.20	< 0.3
Total Aluminum (lbs/day) Daily Maximum	< 0.3	< 0.4	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.4	< 0.5	< 0.5	< 0.30	< 0.5
Total Aluminum (mg/L) Average Monthly	< 0.1	< 0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Aluminum (mg/L) Daily Maximum	< 0.1	< 0.10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Iron (lbs/day) Average Monthly	0.8	0.8	3.0	3	2	3	2	0.8	0.9	2	1.0	1
Total Iron (lbs/day) Daily Maximum	2	2.0	4.0	4	3	6	2	1	2	4	2.0	2

Parameter	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23
Total Iron (mg/L) Average Monthly	0.3	0.5	0.7	0.8	0.5	0.9	0.5	0.3	0.3	0.6	0.5	0.4
Total Iron (mg/L) Daily Maximum	0.468	0.622	0.899	0.987	0.702	1.39	0.651	0.293	0.447	0.909	0.67	0.472
Total Manganese (lbs/day) Average Monthly	0.3	0.2	0.8	0.5	0.6	0.4	0.3	0.2	0.3	0.7	0.3	0.6
Total Manganese (lbs/day) Daily Maximum	0.4	0.3	1.0	0.7	0.7	0.8	0.6	0.3	0.8	2	0.4	1
Total Manganese (mg/L) Average Monthly	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2
Total Manganese (mg/L) Daily Maximum	0.171	0.22	0.381	0.186	0.15	0.15	0.129	0.068	0.189	0.413	0.145	0.289

Existing Effluent Limits and Monitoring Requirements

The table below summarizes effluent limits and monitoring requirements specified in the current permit.

Parameter (both Outfalls 001 and 002 are identical)	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	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Total Suspended Solids	Report	Report	XXX	30.0	60.0	75	1/week	8-Hr Composite
Aluminum, Total	Report	Report	XXX	4.0	8.0	10	1/week	8-Hr Composite
Iron, Total	Report	Report	XXX	2.0	4.0	5	1/week	8-Hr Composite
Manganese, Total	Report	Report	XXX	1.0	2.0	2.5	1/week	8-Hr Composite

Development of Effluent Limitations and Monitoring Requirements

Outfall No. 001 **Design Flow (MGD)** N/A
Latitude 40º 15' 8.00" **Longitude** -77º 1' 15.00"
Wastewater Description: Emergency Outfall

Outfall No. 002 **Design Flow (MGD)** .391
Latitude 40º 15' 8.00" **Longitude** -77º 1' 16.00"
Wastewater Description: Treated Industrial Wastewater (Backwash / Filter to Waste)

The application reported 0.292 MGD and 0.782 MGD as average discharge flow and maximum discharge flow, respectively, during production. The last permit renewal was developed based on 0.391 MGD. it is still reasonable to use 0.391 MGD as the design flow to develop permit requirements for the upcoming permit renewal.

Technology-Based Limitations

DEP's technical guidance no. 362-2183-003 addresses technology-based control requirements along with the following recommended Best Practicable Control Technology Currently Available (BPT) effluent requirements for water treatment plant sludge and filter backwash:

Parameter	Limit (mg/l)	SBC
Suspended Solids	30	Average Monthly
	60	Daily Maximum
Iron, Total	2.0	Average Monthly
	4.0	Daily Maximum
Aluminum, Total	4.0	Average Monthly
	8.0	Daily Maximum
Manganese, Total	1.0	Average Monthly
	2.0	Daily Maximum
Flow	Monitor	Average Monthly
pH	6.0	Minimum
	9.0	Maximum
Total Residual Chlorine	0.5	Average Monthly
	1.0	Daily Maximum

These requirements apply, subject to water quality analysis and/or BPJ.

Water Quality-Based Limitations

WQM 7.0
CBOD5 and NH3-N are not pollutants of concern for the water treatment waste as the discharge of these pollutants is not resulting from the water treatment process. Therefore, WQM 7.0 modeling is not necessary and permit requirements for these pollutants are not recommended.

Toxics
DEP conducted a reasonable potential analysis using Toxics Management Spreadsheet (TMS). The TMS output shows no WQBELs are required for all pollutants, except for Total Zinc. However, based on the review, it is noteworthy that influent Total Zinc which is raw water is actually greater (62 ug/L) than the effluent Total Zinc (15.0 ug/L). Therefore, effluent Total Zinc is originated from the source water which is also a stream that the facility discharges to. In the opinion of DEP, WQBELs are not needed for Total Zinc. No WQBELs are therefore recommended for this permit renewal.

Total Residual Chlorine
The application reported the TRC effluent level of 0.40 mg/L (maximum) and 0.23 mg/L (average). PAAW currently uses sodium hypochlorite during the flocculation/sedimentation/filtration water treatment process. As a result, the presence of chlorine is expected in a filter backwash as well as filter to waste. The TRC effluent levels must therefore be regulated in accordance with 25 Pa Code §92a.48(b). DEP's TRC_CALC worksheet has been utilized to determine if the BAT standard found in 25 Pa Code §92a.48(b)(3) is appropriate for water quality protection. The worksheet showed that the BAT TBEL of 0.5 mg/L is adequate. The filter backwash would have the TRC levels lower than 0.5 mg/L as chlorine contact time is available within lagoons. While a filter-to-waste is directly discharged into Conodoguinet Creek, additional samples collected in August 2018 showed that the TRC levels of the effluent that is only composed of the filter-to-waste are consistently below 0.10 mg/L. This is mainly due to the fact that PAAW is adding dechlor tablets to the filter-to-waste. The existing effluent limits will therefore remain unchanged in the permit.

Additional Considerations

Flow Monitoring
Flow monitoring will remain in the permit and is required by 40 CFR § 122.44(i)(1)(ii).

Chesapeake Bay TMDL
DEP's Supplement to Phase II Watershed Implementation Plan (WIP) indicates that monitoring and reporting of TN and TP are necessary for non-significant IW facilities throughout the permit term 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. The facility does not use any chemical products prior to filtration that contain nitrogen or phosphorus and no nutrients are expected to be generated from the water treatment process. Therefore, nutrient monitoring is not necessary for this facility.

Mass Loading Effluent Limitations
The current permit requires no monitoring of mass loadings for those pollutants that have technology-based concentration limits. DEP's technical guidance no. 362-0400-001 recommends monitoring requirements for those that have technology-based concentration limits. Accordingly, mass loading monitoring requirements are recommended for Total Suspended Solids, Total Iron, Total Manganese and Total Aluminum.

Outfall 001
The permit requirements for Outfall 001 will be the same as those developed for Outfall 002 since the same waste stream type would be discharged from Outfall 001, if discharge occurs.

Instantaneous Maximum Effluent Limitations

In general, instantaneous maximum effluent limitations (IMAX) are not necessary for any parameters that are required to be measured through the collection of composite samples. NPDES permits include IMAX limits for compliance purpose(s) only, allowing DEP to collect a grab sample at the time of inspection to determine compliance. Accordingly, these limits will remain unchanged in the draft permit.

Anti-Degradation Requirements
The effluent limits for this discharge have been developed to ensure the existing in-stream 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.

Anti-Backsliding Requirements
Unless stated otherwise in this fact sheet, permit requirements proposed in this fact sheet are at least as stringent as existing permit requirements.

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" (386-0400-001), SOPs and/or BPJ.

Outfall 002, 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	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
TSS	Report	Report	XXX	30.0	60.0	75	1/week	8-Hr Composite
Total Aluminum	Report	Report	XXX	4.0	8.0	10	1/week	8-Hr Composite
Total Iron	Report	Report	XXX	2.0	4.0	5	1/week	8-Hr Composite
Total Manganese	Report	Report	XXX	1.0	2.0	2.5	1/week	8-Hr Composite

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, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Silver Springs Water Treatment Plant** NPDES Permit No.: **PA0009440** Outfall No.: **002**

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
0.391	242	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		365									
	Chloride (PWS)	mg/L		101									
	Bromide	mg/L	<	0.2									
	Sulfate (PWS)	mg/L		24.7									
	Fluoride (PWS)	mg/L		0.48									
Group 2	Total Aluminum	µg/L	<	100									
	Total Antimony	µg/L	<	0.3									
	Total Arsenic	µg/L	<	0.4									
	Total Barium	µg/L		36									
	Total Beryllium	µg/L	<	0.1									
	Total Boron	µg/L		31									
	Total Cadmium	µg/L	<	0.1									
	Total Chromium (III)	µg/L		1									
	Hexavalent Chromium	µg/L		0.5									
	Total Cobalt	µg/L	<	0.2									
	Total Copper	µg/L	<	2									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		8									
	Dissolved Iron	µg/L		45									
	Total Iron	µg/L		916									
	Total Lead	µg/L	<	0.3									
	Total Manganese	µg/L		0.655									
	Total Mercury	µg/L	<	0.09									
	Total Nickel	µg/L		2									
	Total Phenols (Phenolics) (PWS)	µg/L	<	0.5									
	Total Selenium	µg/L	<	0.5									
	Total Silver	µg/L	<	0.2									
	Total Thallium	µg/L	<	0.05									
	Total Zinc	mg/L		15									
	Total Molybdenum	µg/L		3									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										
	Carbon Tetrachloride	µg/L	<										

Group 3	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											

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Silver Springs Water Treatment Plant, NPDES Permit No. PA0009440, Outfall 002

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Conodoguinet Creek**

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	010194	19.24	353	470			Yes
End of Reach 1	010194	15.01	340	488			Yes

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

Location	RMI	LFY (cfs/mi²)*	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	19.24	0.147										250	7		
End of Reach 1	15.01	0.147													

Q_h

Location	RMI	LFY (cfs/mi²)	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	19.24														
End of Reach 1	15.01														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Silver Springs Water Treatment Plant, NPDES Permit No. PA0009440, Outfall 002

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | All | Inputs | Results | Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.123 Analysis Hardness (mg/l): 249.47 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 Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	11,325	
Total Antimony	0	0		0	1,100	1,100	16,610	
Total Arsenic	0	0		0	340	340	5,134	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	317,095	
Total Boron	0	0		0	8,100	8,100	122,308	
Total Cadmium	0	0		0	4.894	5.4	81.6	Chem Translator of 0.906 applied
Total Chromium (III)	0	0		0	1204.628	3,812	57,562	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	246	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	1,434	
Total Copper	0	0		0	31.801	33.1	500	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	171.959	261	3,947	Chem Translator of 0.658 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	24.9	Chem Translator of 0.85 applied
Total Nickel	0	0		0	1014.711	1,017	15,353	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	15.499	18.2	275	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	981	
Total Zinc	0	0		0	254.243	260	3,925	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 720 PMF: 0.855 Analysis Hardness (mg/l): 249.92 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 Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	21,711	
Total Arsenic	0	0		0	150	150	14,803	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	404,612	
Total Boron	0	0		0	1,600	1,600	157,898	
Total Cadmium	0	0		0	0.464	0.53	52.6	Chem Translator of 0.871 applied
Total Chromium (III)	0	0		0	156.928	182	18,008	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	1,026	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	1,875	
Total Copper	0	0		0	19.589	20.4	2,014	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	172,832	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	6.714	10.2	1,008	Chem Translator of 0.658 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	89.4	Chem Translator of 0.85 applied
Total Nickel	0	0		0	112.875	113	11,173	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	492	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	1,283	
Total Zinc	0	0		0	256.713	260	25,694	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.855 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	2,000	2,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	553	
Total Arsenic	0	0		0	10	10.0	987	
Total Barium	0	0		0	2,400	2,400	236,846	
Total Boron	0	0		0	3,100	3,100	305,926	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	300	300	29,606	

Model Results 9/11/2024

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	98,686	
Total Mercury	0	0		0	0.050	0.05	4.93	
Total Nickel	0	0		0	610	610	60,198	
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	23.7	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

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

No. Samples/Month: 4

		Mass Limits		Concentration Limits						
Model Results	Pollutants	AML	MDL	AML	MDL	9/11/2024	Units	Governing	WQBEL	Comments

Pollutants	(lbs/day)	(lbs/day)	AML	MDL	MAX	Units	WQBEL	Basis	Comments
Total Zinc	8.2	12.8	2.52	3.93	6.29	mg/L	2.52	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 Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Aluminum	7,259	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	203,245	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	78,394	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	52.3	µg/L	Discharge Conc < TQL
Total Chromium (III)	18,008	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	158	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	919	µg/L	Discharge Conc < TQL
Total Copper	321	µg/L	Discharge Conc < TQL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	29,606	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	172,832	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	1,008	µg/L	Discharge Conc < TQL
Total Manganese	98,686	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	4.93	µg/L	Discharge Conc < TQL
Total Nickel	9,840	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	492	µg/L	Discharge Conc < TQL
Total Silver	176	µg/L	Discharge Conc < TQL
Total Thallium	23.7	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS

TRC_CALC

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	69.3	= Q stream (cfs)		0.5	= CV Daily	
5	0.391	= 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 = 36.566		1.3.2.iii	WLA cfc = 35.642
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
13	PENTOXSD TRG	5.1b	LTA_afc= 13.626		5.1d	LTA_cfc = 20.721
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)**