pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0088781**
Facility Type	**Industrial**	APS ID	**723504**
Major / Minor	**Major**	Authorization ID	**1434783**

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

Applicant and Facility Information

Applicant Name	**Calpine Mid Merit, LLC**	Facility Name	**York Energy Center**
Applicant Address	6 Hillman Drive, Suite 201	Facility Address	1055 Pikes Peak Road
	Chadds Ford, PA 19317-9713		Delta, PA 17314-9239
Applicant Contact	Cheryl Hess	Facility Contact	Joann Edgar
Applicant Phone	(302) 468-5312	Facility Phone	(717) 456-2446
Client ID	281427	Site ID	543800
SIC Code	4911	Municipality	Peach Bottom Township
SIC Description	Trans. & Utilities - Electric Services	County	York
Date Application Received	March 31, 2023	EPA Waived?	No
Date Application Accepted	April 10, 2023	If No, Reason	DEP Discretion

Purpose of Application: NPDES permit renewal.

Summary of Review

ASA Analysis & Communication, Inc., on behalf of the Calpine Mid Merit, LLC electric generating facility (known as “York Energy Center (YEC)”) (Authority/Permittee), applied to the Pennsylvania Department of Environmental Protection (DEP) for issuance of the NPDES permit. The permit was reissued on September 14, 2018 and became effective on October 1, 2018. The permit expired on September 30, 2023 but the terms and conditions of the permit have been extended since that time.

NPDES Permit No. PA0088781 authorizes discharges, via four outfalls, from the YEC in Peach Bottom Township, York County, Pennsylvania.

The YEC is a two-block, combined cycle electric generation facility. The primary electric generating equipment for Block 1 includes three Siemens V84.2 combustion turbines (CTs), three unfired heat recovery steam generators (HRSGs), and one steam turbine. Electric generating equipment for Block 2 includes two General Electric combustion turbines (CTs), two heat recovery steam generators (HRSGs), and one steam turbine. The facility generates approximately 1,393-megawatt (MW) total (Calpine 2023). The primary fuel for both blocks is natural gas. However, ultra-low sulfur liquid distillate is used as an alternate fuel when natural gas is either not available or economically infeasible to use. Low nitrogen oxides (NOx) combustors and selective catalytic reduction (SCR) are used to minimize NOx emissions. The facility also includes cooling water intake and discharge systems; cooling towers; water treatment systems; and chemical and petroleum vessels and storage tank systems necessary for operation of the turbines and associated equipment.

Outfall 001 receives blowdown from the cooling towers, and discharges to the Conowingo Pool on the Susquehanna River. Outfalls 002, 003 and 004 discharge stormwater runoff from the site (after the runoff has been detained in stormwater basins) to an unnamed tributary to the Susquehanna River. Outfall 100 designates the internal monitoring point on the recycle water line, which conveys effluent from the recycle water treatment plant, reverse osmosis concentrate, and ultrafiltration unit rinse water from the process water treatment plant to the cooling towers.

The YEC utilizes a closed-cycle recirculating system (CCRS) consisting of one 10-cell counterflow mechanical draft cooling tower (MDCT) per power block. Make-up water for the two MDCTs is withdrawn from the Conowingo Pool in the

Approve	Deny	Signatures	Date
X		*Hilaryle* Hilary H. Le / Environmental Engineering Specialist	February 9, 2024
X		*Maria D. Bebenek for* Daniel W. Martin, P.E. / Environmental Engineer Manager	April 11, 2024

Summary of Review

Susquehanna River via the cooling water intake structure (CWIS), which is comprised of six 4-millimeter (mm) slot cylindrical wedgewire screens installed offshore and three pumps installed within the onshore pumphouse. The CWIS is designed and operated to maintain through-slot velocity of no greater than 0.5 fps. The design and operation of the CWIS and MDCTs meet best technology available criteria for both impingement mortality and entrainment.

Changes from the previous permit:

Outfall 001:

- Oil and Grease limits of 15 mg/L average monthly, 20 mg/L daily maximum, and 30 mg/L IMAX will add to the proposed permit.

- Total Dinitrotoluene (2,6-Dinitrotoluene) & Total Copper quarterly monitoring requirement will add to the proposed permit.

Based on the review outlined in this fact sheet, it is recommended that the permit be drafted. A public notice of the draft permit will be published in the *Pennsylvania Bulletin* for public comments for 30 days.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	6.01
Latitude	39º 46' 05"	Longitude	-76º 16' 06"
Quad Name	Holtwood	Quad Code	2035
Wastewater Description:	Noncontact Cooling Water (NCCW)		

Receiving Waters	Susquehanna River (WWF, MF)	Stream Code	06685
NHD Com ID	57473383	RMI	4.25
Drainage Area	26,900 sq. mi.	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	3500	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	99	Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF & MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	PCB		
Source(s) of Impairment	Source Unknown		
TMDL Status	Pending	Name	

Nearest Downstream Public Water Supply Intake	Chester Water Authority		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	Approximate 2.0 miles

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	100	Design Flow (MGD)	0.3
Latitude	39º 46' 05"	Longitude	-76º 16' 06"
Quad Name	Holtwood	Quad Code	2035
Wastewater Description:	Wastewater from recycle water treatment plant, reverse osmosis concentrate, and ultra-filtration unit rinse water.		
Receiving Waters	Susquehanna River (WWF, MF)	Stream Code	06685
NHD Com ID	57473383	RMI	4.25
Drainage Area	26,900	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	3500	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	99	Slope (ft/ft)	
Watershed No.	7-I	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	PCB		
Source(s) of Impairment	Source Unknown		
TMDL Status	Pending	Name	
Nearest Downstream Public Water Supply Intake	Chester Water Authority		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	Approximate 2.0 miles

Changes Since Last Permit Issuance:

Drainage Area
The discharge is to Plum Creek at RMI 4.25 miles. The drainage area upstream of the point of discharge is 26,900 sq.mi, according to USGS PA StreamStats (https://water.usgs.gov/osw/streamstats/pennsylvania.html).

Stream Flow
York Energy Center's discharge is to Conowingo Pond, a 14-mile portion of the Susquehanna River which is bounded upstream by Holtwood Dam and impounded downstream by Conowingo Dam. Considering the abnormal flow processes in this portion of the river, an accurate Q_{7-10} low flow value cannot be obtained. However, for the modeling purposes for this NPDES permit, a Q_{7-10} value will be used as a conservative approach for protecting the Lower Susquehanna River. Various data sources were examined in order to arrive at an appropriate result.

The United States Geologic Survey (USGS) maintains a stream gaging station on the Susquehanna River at Marietta (No. 01576000), which is the Susquehanna River gage that is nearest to the proposed discharge point. Evaluation of the Marietta gage's low flow statistics reveals a Q_{7-10} low flow yield of 0.146 cfs/mi^2 for the post-regulation period of 1972-1996 (derived from a flow of 3800 cfs and a drainage area of 25,990 sq. mi.) (*reference the 2015 fact sheet*).

StreamStats' watershed delineation tool, when used at the discharge point for York Energy Center, produces a Q_{7-10} value of 3,590 cfs, with a drainage area of 26,900 mi^2 (resulting in a low flow yield of 0.13 cfs/mi^2). However, since the flow in the pond is regulated by flow from upstream and downstream dams, the low flow must be examined further. According to SRBC's 2006 Conowingo Pond Management Plan, the release rates from both the Conowingo and Holtwood dams reach a minimum of 3,500 cfs during the lower flow months of July-November. Since it is a close match, the StreamStats Q_{7-10} low flow for modeling purposes will be rounded to 3,500 cfs. This information is used to obtain a chronic or 30-day (Q_{30-10}), and an acute or 1-day (Q_{1-10}) exposure stream flow for the discharge point as follows (Guidance No. 391-2000-023):

Q_{7-10} = 3,590 cfs
Low Flow Yield = 3,590 cfs / 26,900 mi^2 ≈ 0.130 cfs/mi^2
Q_{30-10} = 1.36 * 3,590 cfs ≈ 4,882 cfs
Q_{1-10} = 0.64 * 3,590 cfs ≈ 2,298 cfs

The resulting Q_{7-10} dilution ratio is: Q_{stream} / $Q_{discharge}$ = 3,590 cfs / [6.01 MGD * (1.547 cfs/MGD)] = 386:1

Public Water Supply
The nearest downstream public water supply intake is the Chester Water Authority on Susquehanna River in Lancaster County. It is approximately 2.25 miles. Due to the distance, dilution, and proposed effluent limits the discharge is not expected to impact the water supply.

Compliance History	
Summary of DMRs:	A summary of past 12-month DMRs is presented on next pages.
Summary of Inspections:	**7/13/2021:** Ms. Dock, DEP's WQS, conducted a compliance evaluation inspection. Recommendations were: 1. Calibrate handheld/bench top pH meter daily and record slope, 2. Confirm whether oil/water separator is on a routine maintenance schedule, 3. Confirm calibration on outfall 001 temperature sensor at minimum & annual calibration, 4. Please complete and submit Lab Registration form with 30 days of receipt of report which include the on-site parameters on the Lab Accreditation supplemental form, 5. On quarterly DMRs report flow on supplemental form for day of sample, 6. Ensure that parameters not dependent on flow (pH, free chlorine) are reported on DMRs in a way that is representative of the discharge. The Department will provide additional information on this if it becomes available. There were no violations identified during inspection. The field test results were within permit limits.
Other Comments:	There is one open violation associated with the permittee or the facility. - 2/3/2023: NPDES -Violation of Effluent Limits in Part A of permit.

Compliance History

DMR Data for Outfall 001 (from January 1, 2023 to December 31, 2023)

Parameter	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23	APR-23	MAR-23	FEB-23	JAN-23
Flow (MGD) Average Monthly	1.7311	1.6386	1.0857	1.3089	1.5127	13957	1.4660	1.5556	1.4923	1.3711	1.6710	1.6124
Flow (MGD) Daily Maximum	1.9902	2.0133	1.6065	1.8160	1.021	1.7433	1.7386	1.7662	2.0097	2.0208	1.9354	1.8052
pH (S.U.) Minimum	7.5	7.4	7.0	7.4	7.1	7.3	7.4	7.6	7.1	7.3	7.5	7.1
pH (S.U.) Instantaneous Maximum	8.0	7.7	7.8	7.8	7.8	7.9	8.0	7.8	7.9	7.8	8.0	7.8
Free Available Chlorine (mg/L) Daily Maximum	0.11	0.09	0.18	0.17	0.14	0.17	0.12	0.16	0.16	0.09	0.13	0.13
Temperature (ºF) Daily Maximum	81.6	74.9	85.1	79.9	86.4	89.1	75.4	80.0	79.9	72.2	73.2	77.6
TSS (mg/L) Effluent Net Average Monthly	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TSS (mg/L) Effluent Net Daily Maximum	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Dissolved Solids (mg/L) Daily Maximum	632			874.7			640.0			533.6		
Total Aluminum (lbs/day) Average Quarterly	10.81			5.36			31.79			3.49		
Total Aluminum (lbs/day) Daily Maximum	10.81			5.36			31.79			3.49		
Total Aluminum (mg/L) Average Quarterly	0.87			0.45			2.28			0.25		
Total Aluminum (mg/L) Daily Maximum	0.87			0.45			2.28			0.25		
Sulfate (mg/L) Daily Maximum	269.91			429.32			267.01			222.07		
Chloride (mg/L) Daily Maximum	89.58			136.13			82.28			92.67		

Bromide (mg/L) Daily Maximum	< 2.87			2.72			1.61			1.46		

DMR Data for Outfall 100 (from January 1, 2023 to December 31, 2023)

Parameter	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23	APR-23	MAR-23	FEB-23	JAN-23
Flow (MGD) Average Monthly	0.0874	0.0667	0.0950	0.0467	0.0792	0.0931	0.0758	0.0605	0.0604	0.1161	0.1150	0.1206
Flow (MGD) Daily Maximum	0.3616	0.0822	0.3498	0.1261	0.0988	0.4348	0.1516	0.0927	0.1503	0.2858	0.1669	0.1764
TSS (mg/L) Effluent Net Average Monthly	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TSS (mg/L) Effluent Net Daily Maximum	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Oil and Grease (mg/L) Effluent Net Average Monthly	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Oil and Grease (mg/L) Effluent Net Daily Maximum	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	6.01
Latitude	39º 46' 5.00"	**Longitude**	-76º 16' 6.00"

Wastewater Description: Noncontact Cooling Water (NCCW)

Technology-Based Limitations / Water Quality-Based Limitations / Best Professional Judgment (BPJ) Limitations / Additional Considerations

Effluent Limitations Guidelines:
This facility is regulated by an Effluent Limitation Guideline (ELG) from the Code of Federal Regulations 40 CFR Part 423 Steam Electric Power Generating Point Source Category. Limits have been applied in the permit based on Part 423.15 – New Source Performance Standards (NSPS).

pH:
The effluent discharge pH should remain above 6 and below 9 standard units according to 25 Pa Code § 95.2(1).

Free available Chlorine: (Total Residual Chlorine (TRC):
The ELG Part 423.15(b)(10)(i) requires limits for free available chlorine in cooling tower blowdown. The requirement is a concentration of 0.2 mg/L as an average concentration, and a concentration of 0.5 mg/L as a maximum concentration. DEP's Guidance Document No.362-2183-004 "Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry" states that the average FAC limit from the ELG should be included in the permit as a maximum daily, and the maximum limit should be included as an IMAX. This is consistent with the existing limits, which will remain in the permit. Additionally, the Guidance 362-2183-004 and ELG Part 423 requires the following language to be included in Part C of the NPDES permit:

> "The term maximum daily concentration as it relates to chlorine discharge means the average analyses made over a single period of chlorine release which does not exceed two hours."
>
> "The term 'free available chlorine' shall mean the value obtained using the amperometric titration method for free available chlorine described in "Standard methods for the Examination of Water and Wastewater," page 112 (13th edition)."
>
> "Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

This additional language will be included in Part C of the NPDES permit, which is consistent with the existing permit.

Polychlorinated Biphenyls (PCBs):
The ELG Part 423.15(b)(2) states "There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid." This statement will be included in the Part C conditions of the NPDES permit, which is consistent with the existing permit.

Total Suspended Solids (TSS):
The ELG Part 423.15(b)(3) requires limits for TSS in low volume waste sources. The requirement is an average monthly limit of 30 mg/L, and a daily maximum limit of 100 mg/L. Multipliers of 2.0 and 2.5 will be used for the daily maximum and instantaneous maximum (IMAX) in accordance with DEP's Guidance 362-0400-001. This results in a daily maximum limit of 60 mg/L, and an IMAX limit of 75 mg/L. These limits will be included, which is consistent with the existing permit. The existing permit has a minimum monitoring frequency of 2/month and sample type of "grab" will remain in the proposed permit.

Oil and Grease:
The ELG Part 423.15(b)(3) requires limits for oil and grease in low volume waste sources. The requirement is an average monthly limit of 15 mg/L, and a daily maximum limit of 20 mg/L. Additionally, 25 Pa Code § 95.2(2)(ii) requires an IMAX limit of 30 mg/L for oil and grease. These limits will be included, which is consistent with the existing permit limits. The existing permit has a minimum monitoring frequency of 2/month and sample type of "grab" will remain in the proposed permit.

Total Chromium/Total Zinc:
The ELG Part 423.15(b)(10)(i) requires limits for Total Chromium and Total Zinc. The requirement for Total Chromium is an average monthly limit of 0.2 mg/L and a maximum daily limit of 0.2 mg/L. The requirement for Total Zinc is an average monthly limit of 1.0 mg/L and a maximum daily limit of 1.0 mg/L.

DEP recognizes the intent of the ELG and determines that since Calpine doesn't use chemicals containing Total Chromium or Total Zinc for cooling tower maintenance or otherwise add Zinc or Chromium to the effluent, the ELG (40 CFR § 423.15) may not be applicable. This is also explained in the Federal Registry Volume 47 No. 224 page 52295. Therefore, no Total Chromium and Total Zinc limits monitoring are required in the existing permit and it will remain in the proposed permit.

Priority Pollutants:
The ELG Part 423.15(b)(10)(i) requires that any of the 126 Priority Pollutants contained in chemicals added for cooling tower maintenance should not be detectable, except for Total Zinc and total Chromium. In accordance with DEP's Guidance No. 362-2183-004, it is not always necessary to require monitoring for priority pollutants, and can be handled with a narrative condition instead. Since the chemical additives used at the facility do not contain any of the Priority Pollutants, a narrative condition was included in Part C of the permit. This is consistent with the existing permit. The Part C condition states:

> "Cooling tower blowdown discharges shall contain no detectable amounts of the 126 Priority Pollutants listed in 40 CFR Part 423, Appendix A, with the exception of Total Chromium and Total Zinc. When requested by DEP, the permittee shall conduct monitoring or submit engineering calculations to demonstrate compliance with 40 CFR 423.13(d)(a)."

Total Dissolved Solids (TDS):
Total Dissolved Solids and its major constituents including Bromide, Chloride, and Sulfate have become statewide pollutants of concern and threats to DEP's mission to prevent violations of water quality standards. The requirement to monitor these pollutants must be considered under the criteria specified in 25 Pa. Code § 95.10 and the following January 23, 2014 DEP Central Office Directive:

For point source discharges and upon issuance or reissuance of an individual NPDES permit:

- Where the concentration of TDS in the discharge exceeds 1,000 mg/L, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for TDS, sulfate, chloride, and bromide. Discharges of 0.1 MGD or less should monitor and report for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L.

- Where the concentration of bromide in a discharge exceeds 1 mg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for bromide. Discharges of 0.1 MGD or less should monitor and report for bromide if the concentration of bromide in the discharge exceeds 10 mg/L.

- Where the concentration of 1,4-dioxane (CAS 123-91-1) in a discharge exceeds 10 µg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for 1,4-dioxane. Discharges of 0.1 MGD or less should monitor and report for 1,4-dioxane if the concentration of 1,4-dioxane in the discharge exceeds 100 µg/L.

YEC reported a maximum effluent concentration of 1,340 mg/L for TDS. Based upon the data provided in the application, monitoring of TDS, Bromide, Chloride, and Sulfate will be required. These monitoring requirements were included in the existing permit, and will remain in the renewal. The existing permit has a minimum monitoring frequency of 1/quarter and sample type of "grab" will remain in the proposed permit.

Toxics:

☑ ***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
Total Copper	Report	Report	Report	Report	Report	µg/L	89.8	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Dinitrotoluene	0.25	0.4	5.05	7.89	12.6	µg/L	5.05	CRL	Discharge Conc ≥ 50% WQBEL (RP)

Effluent sample results for toxic pollutants reported on the renewal application were entered into DEP's Toxics Management Spreadsheet Version 1.0 to develop appropriate permit requirements for toxic pollutants of concern. The Toxics Management Spreadsheet combines the functions of PENTOXSD and DEP's Toxics Screening Analysis. Based on effluent sample results reported on the application, the Toxics Management Spreadsheet recommended a limit for Total Dinitrotoluene, and monitoring for Total Copper. A discharge hardness of 418 mg/L and a pH of 8.4 were used in the Spreadsheet, taken from the application.

The TMS output provided specific partial mix factors for each criteria. These partial mix factors were multiplied by 2, to account for the fact that mixing occurs on two sides of the plume. The width and depth of the river at the point of discharge were stated in the previous permit application to be approximately 5,620 ft. and 10 ft., respectively. Additionally, elevations were provided in the previous application for the outfall location and at the PA/MD border. These values were all used in the TMS, and are consistent with how modeling was performed for the existing permit.

Stream pH and hardness inputs for the spreadsheet were based on data acquired from the National Water Quality Monitoring Council website. Data was analyzed from the Water Quality Network (WQN) Station ID 201 on the Susquehanna River from 2010 to 2020. A 90th percentile analysis was performed on the data and resulted in a Stream pH of 8.2 and a Stream Hardness of 159 mg/L.

This data was analyzed based on the guidelines found in DEP's Water Quality Toxics Management Strategy (Document No. 361-0100-003) and DEP's SOP No. BPNPSM-PMT-033. Spreadsheet results are attached to this fact sheet. The Toxics Management Spreadsheet uses the following logic:

a. Establish average monthly and IMAX limits in the draft permit where the maximum reported concentration exceeds 50% of the WQBEL.
b. For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.
c. For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10%-50% of the WQBEL.

Since the reported maximum concentration for Total Dinitrotoluene was greater than or equal 50% of its WQBEL, the TMS produced an effluent limit. However, the maximum concentration reported in the application for Total Dinitrotoluene (2,6-Dinitrotoluene) was based on a non-detect result of 16.8 µg/L. Therefore, these parameters will be included in the permit as monitoring requirements with a sample frequency of 1/quarter. These parameters will be re-evaluated again during the next permit cycle to determine if they will remain or can be removed from the permit.

The reported maximum concentration for Total Copper was greater than 10% of its WQBEL, the TMS produced an effluent limit. However, the maximum concentration reported in the application for Total Copper was based on a non-detect result of 10.0 µg/L. Therefore, these parameters will be included in the permit as monitoring requirements with a sample frequency of 1/quarter. These parameters will be re-evaluated again during the next permit cycle to determine if they will remain or can be removed from the permit.

Total Aluminum monitoring quarterly was required in the existing permit and will remain in the renewal.

Chesapeake Bay Total Maximum Daily Load (TMDL)
The discharge of TN and TP from this facility is consistent with and covered under the Chesapeake Bay TMDL aggregate WLA for non-significant wastewater discharges.

This is a non-significant industrial discharge facility that does not require nitrogen or phosphorus monitoring. The facility discharges non-contact cooling water and stormwater without any chemical additives containing significant amounts of nitrogen or phosphorus. The Supplement to Phase II Watershed Implementation Plan 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."

No TN or TP monitoring requirements are currently needed in the permit.

316(b) Cooling Water Intake Requirements:
The 2023 permit application indicates that the facility withdraws 12.62 MGD from Susquehanna River.

Section 316(b) of the Clean Water Act (CWA) requires that the location, design, construction, and capacity of cooling water intake structures (CWISs) reflect the best technology available (BTA) for minimizing adverse environmental impacts. Under Section 316(b) of the CWA, EPA developed regulations which are divided into three phases: Phase I for

new facilities, Phase II for existing large electric-generating facilities, and Phase III for certain existing facilities and new offshore oil and gas extraction facilities.

York Energy Center's existing permit applied the Phase I 316(b) requirements for new facilities (codified in 40 CFR § 125, Subpart I), since the facility was constructed after January 17, 2002.

Per the application, the facility has closed-cycle cooling, and the intake structure consists of six 4-millimeter slot wedgewire cylinder screens. Additionally, the YECs WWS are designed for a through-slot velocity (TSV) of less than 0.5 ft/s and are located offshore within the Conowingo Pool.

The Part C language included in the existing permit for CWISs will remain in the proposed permit.

Chemical Additives:
The term chemical additive means a chemical product introduced into a waste stream that is used for cleaning, disinfecting, or maintenance and which may be detected in effluent discharged to waters of the Commonwealth. Generally, the term "chemical additive" excludes chemicals used for neutralization of waste streams, the production of goods, and treatment of wastewater. The following chemical additives will be used at the facility and will replace the chemical additives currently used. These chemicals were not identified on the previous permit application.

Chemical Additive	Purpose	Maximum Usage (lb/day)	Usage Frequency
Steamate PAP7000	Steam condensate treatment	200	Daily
Biomate MBC2881	Biocide	6 gallons/day	As required
Gengard GN7004	Dispersant	37	As required
Sodium Bisulfite 42%	Dechlorination	61 gallons/day	As required
Sodium Hypochlorite	pH and TRC control	As required	As required
Sodium Hydroxide	Anti-scalant	As required	As required

These chemicals are included on DEP's Approved List of Chemical Additives. No limits or monitoring requirements will be necessary for these chemicals. The permittee will be required to provide the usage rates of all chemical additives used at the site on a monthly basis, and will report these results on DEP's Chemical Additives Usage Form. The permit will include Part C conditions for chemical additive usage and reporting requirements.

Temperature Limitations:
A reasonable potential (RP) analysis was performed for temperature which is the main pollutant of concern for the NCCW. Effluent limitations for temperature were calculated using DEP's Temperature Spreadsheet Model which uses DEP's Guidance No. 391-2000-017 for Temperature Criteria. In the Temperature Spreadsheet, per the previous fact sheet, a Q_{7-10} multiplier of 1.0 was used for each more in the spreadsheet. This was done to be conservative due to the nature of the low flows in the Conowingo Pond.

The stream Q_{7-10} of 89.3 cfs (calculated acute partial mixing factor (PMF_a) of 0.0253 was multiplied by the Q_{7-10} flow of 3,530 cfs for the entire river to give the Q_{7-10} flow relevant for the temperature model) used in the previous fact sheet was used in the Temperature Spreadsheet to account for the partial mixing of the discharge plume. The design intake flow is 12.62 MGD or 0.04 percent of the Susquehanna River.

The effluent limitations were analyzed using the Case 2 Thermal Worksheet for WWF streams. The worksheet recommended permit limits of 110°F for all months. The existing permit limit for Temperature of 110°F is consistent with this analysis, and will remain in the permit. A printout of the worksheet is attached.

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Instructions | Inputs

Facility: **Calpine Mid Merit, LLC-York Energy Center** Permit No.: **PA0088781**

Stream Name: **Susquehanna River** Analyst/Engineer: **Hilary Le**

Stream Q7-10 (cfs)*: **89.3** Outfall No.: **001** Analysis Type*: **WWF**

Facility Flows

Semi-Monthly Increment	Intake (Stream) (MGD)*	Intake (External) (MGD)*	Consumptive Loss (MGD)*	Discharge Flow (MGD)
Jan 1-31	12.62	0	6.61	6.01
Feb 1-29	12.62	0	6.61	6.01
Mar 1-31	12.62	0	6.61	6.01
Apr 1-15	12.62	0	6.61	6.01
Apr 16-30	12.62	0	6.61	6.01
May 1-15	12.62	0	6.61	6.01
May 16-31	12.62	0	6.61	6.01
Jun 1-15	12.62	0	6.61	6.01
Jun 16-30	12.62	0	6.61	6.01
Jul 1-31	12.62	0	6.61	6.01
Aug 1-15	12.62	0	6.61	6.01
Aug 16-31	12.62	0	6.61	6.01
Sep 1-15	12.62	0	6.61	6.01
Sep 16-30	12.62	0	6.61	6.01
Oct 1-15	12.62	0	6.61	6.01
Oct 16-31	12.62	0	6.61	6.01
Nov 1-15	12.62	0	6.61	6.01
Nov 16-30	12.62	0	6.61	6.01
Dec 1-31	12.62	0	6.61	6.01

Stream Flows

Q7-10 Multipliers (Default Shown)	PMF	Seasonal Stream Flow (cfs)	Downstream Stream Flow (cfs)
3.2	1.00	285.76	275.53
3.5	1.00	312.55	302.32
7	1.00	625.10	614.87
9.3	1.00	830.49	820.26
9.3	1.00	830.49	820.26
5.1	1.00	455.43	445.20
5.1	1.00	455.43	445.20
3	1.00	267.90	257.67
3	1.00	267.90	257.67
1.7	1.00	151.81	141.58
1.4	1.00	125.02	114.79
1.4	1.00	125.02	114.79
1.1	1.00	98.23	88.00
1.1	1.00	98.23	88.00
1.2	1.00	107.16	96.93
1.2	1.00	107.16	96.93
1.6	1.00	142.88	132.65
1.6	1.00	142.88	132.65
2.4	1.00	214.32	204.09

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Thermal Limits Spreadsheet
Version 1.0, Draft, August, 2023

Instructions | WWF Results

Recommended Limits for Case 1 or Case 2

Semi-Monthly Increment	WWF Target Maximum Stream Temp. (°F)	Case 1 Daily WLA (Million BTUs/day)	Case 2 Daily WLA (°F)
Jan 1-31	40	7,426	110.0
Feb 1-29	40	8,148	110.0
Mar 1-31	46	19,885	110.0
Apr 1-15	52	22,106	110.0
Apr 16-30	58	22,106	110.0
May 1-15	64	14,398	110.0
May 16-31	72	23,997	110.0
Jun 1-15	80	18,055	110.0
Jun 16-30	84	18,055	110.0
Jul 1-31	87	9,158	110.0
Aug 1-15	87	8,044	110.0
Aug 16-31	87	8,044	110.0
Sep 1-15	84	6,166	110.0
Sep 16-30	78	6,166	110.0
Oct 1-15	72	6,270	110.0
Oct 16-31	66	6,270	110.0
Nov 1-15	58	7,150	110.0
Nov 16-30	50	5,720	110.0
Dec 1-31	42	5,500	110.0

Additional Considerations

Anti-Degradation
The effluent limits for this discharge have been developed to ensure that existing instream 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
The discharge is located on a stream segment that is designated on the 303(d) list as impaired. There is a fish consumption impairment for polychlorinated biphenyls and pH due to an unknown source. The permit has a condition that states there shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid, and contains a limit for pH.

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

Development of Effluent Limitations

Outfall No.	100	**Design Flow (MGD)**	0.3
Latitude	39º 46' 5.00"	**Longitude**	-76º 16' 6.00"

Wastewater Description: Wastewater from recycle water treatment plant, reverse osmosis concentrate, and ultra-filtration unit rinse water.

Technology-Based Limitations / Water Quality-Based Limitations / Best Professional Judgment (BPJ) Limitations / Additional Considerations

Outfall 100 designates the internal monitoring point on the recycle water line, which conveys effluent from the recycle water treatment plant, reverse osmosis concentrate, and ultrafiltration unit rinse water from the process water treatment plant to the cooling towers.

As described above, the ELG Part 423.15(b)(3) requires limits for TSS and Oil and Grease in low volume waste sources.

Flow monitoring is recommended by DEP's technical guidance and is also required by 25 PA Code §§ 92a.61. It will be included, which is consistent with the existing permit.

The existing TSS limits of 30.0 mg/L average monthly, and 100 mg/L daily maximum monitoring of 2/month requirements will remain in the proposed permit.

The existing Oil and Grease limits of 15 mg/L average monthly, 20 mg/L daily maximum, and 30 mg/L IMAX monitoring of 2/month requirements will remain in the proposed permit.

Development of Effluent Limitations

Outfall No. 002, 003, & 004 **Design Flow (MGD)** 0
Wastewater Description: Stormwater

Technology-Based Limitations / Water Quality-Based Limitations / Best Professional Judgment (BPJ) Limitations / Additional Considerations

The facility contains the following three stormwater outfalls:
Outfall 002
Latitiude 39°44'10", Longitude -76°18'25"
UNT Susquehanna River (07245), RMI: 3.24 + *1.00 (No Stream Code)*

- Discharges via a retention basin for a drainage area of 27.7 acres (1,206,612 sq. ft.). The drainage area is 62% impervious. A fuel oil storage tank is named as a potential pollutant source by the most recent application.

Outfall 003
Latitiude 39°44'30", Longitude -76°18'10"
UNT Susquehanna River (07245), RMI: 3.24 + *0.66 (No Stream Code)*

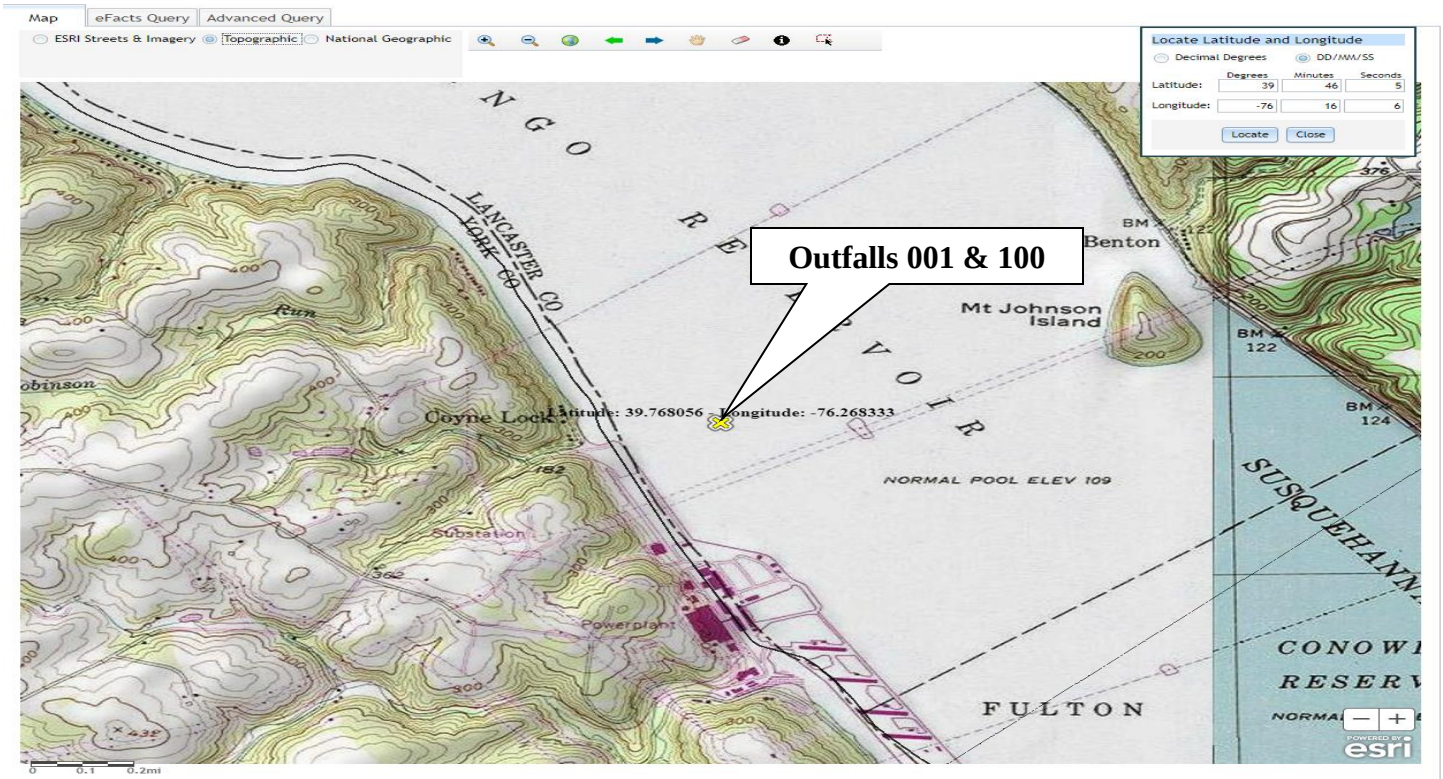
- Discharges via a retention basin for a drainage area of 11.9 acres (518,364 sq. ft.). The drainage area is 92% impervious. No artificial potential pollutant sources are listed.

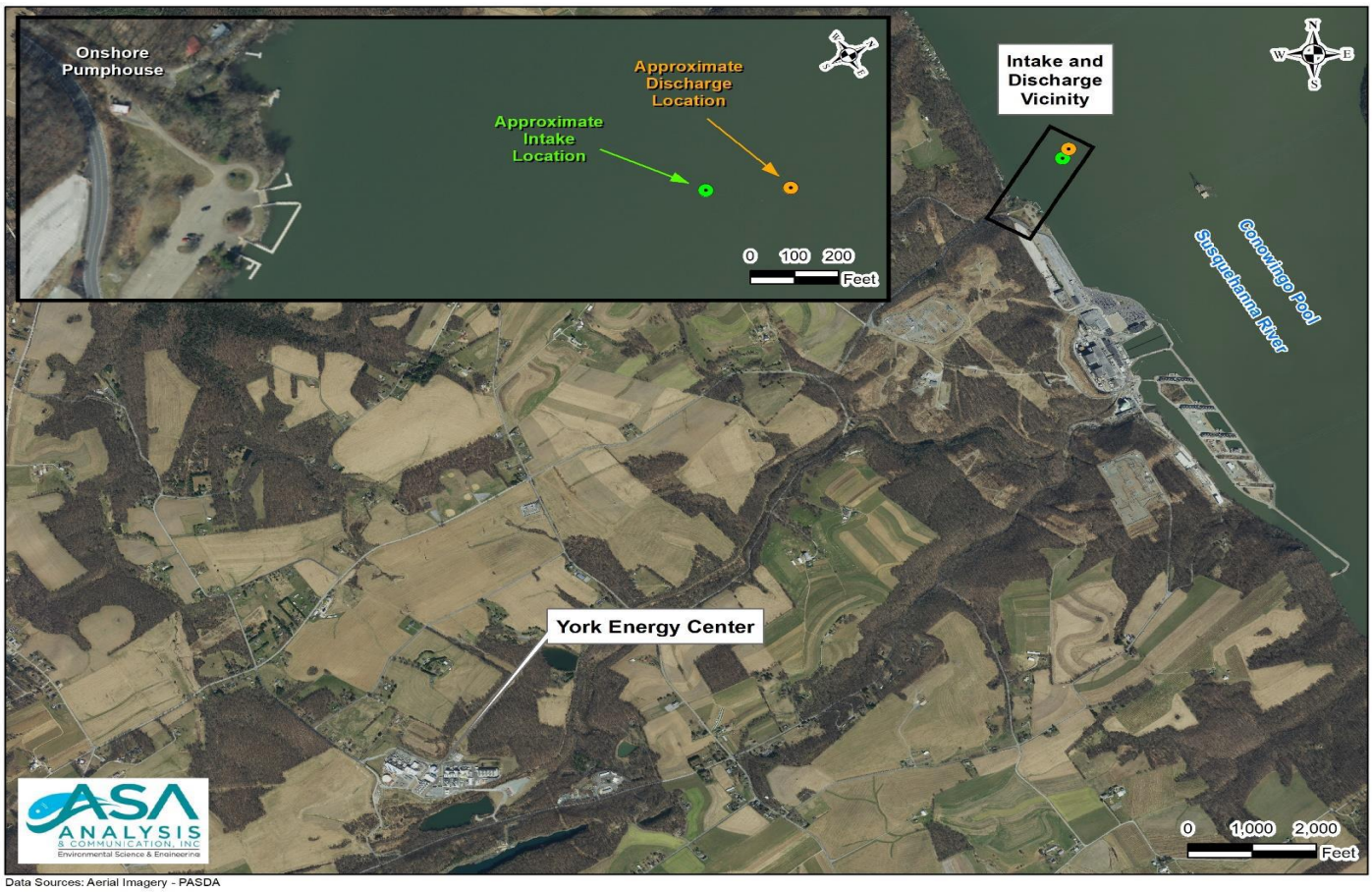
Outfall 004
Latitiude 39°44'15", Longitude -76°18'10"
UNT Susquehanna River (07245), RMI: 3.24 + *0.78 (No Stream Code)*

- Discharges via a retention basin for a drainage area of 31.5 acres (1,372,140 sq. ft.). The drainage area is 20% impervious. No artificial potential pollutant sources are listed.

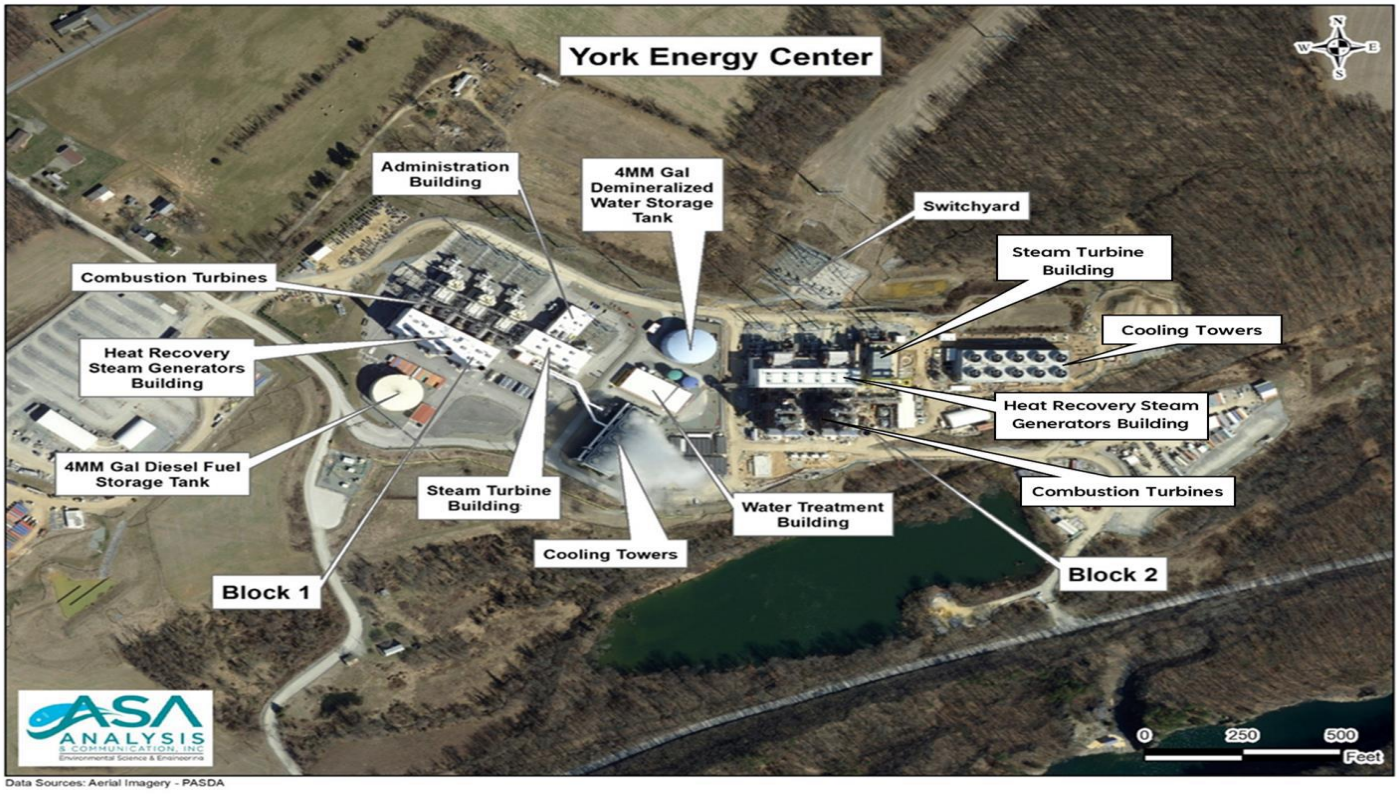
The existing monitoring requirements for Outfall 002 match the current requirements for Steam Electric Power Generating Facilities listed in Appendix H of the PAG-03 permit for industrial stormwater discharges.

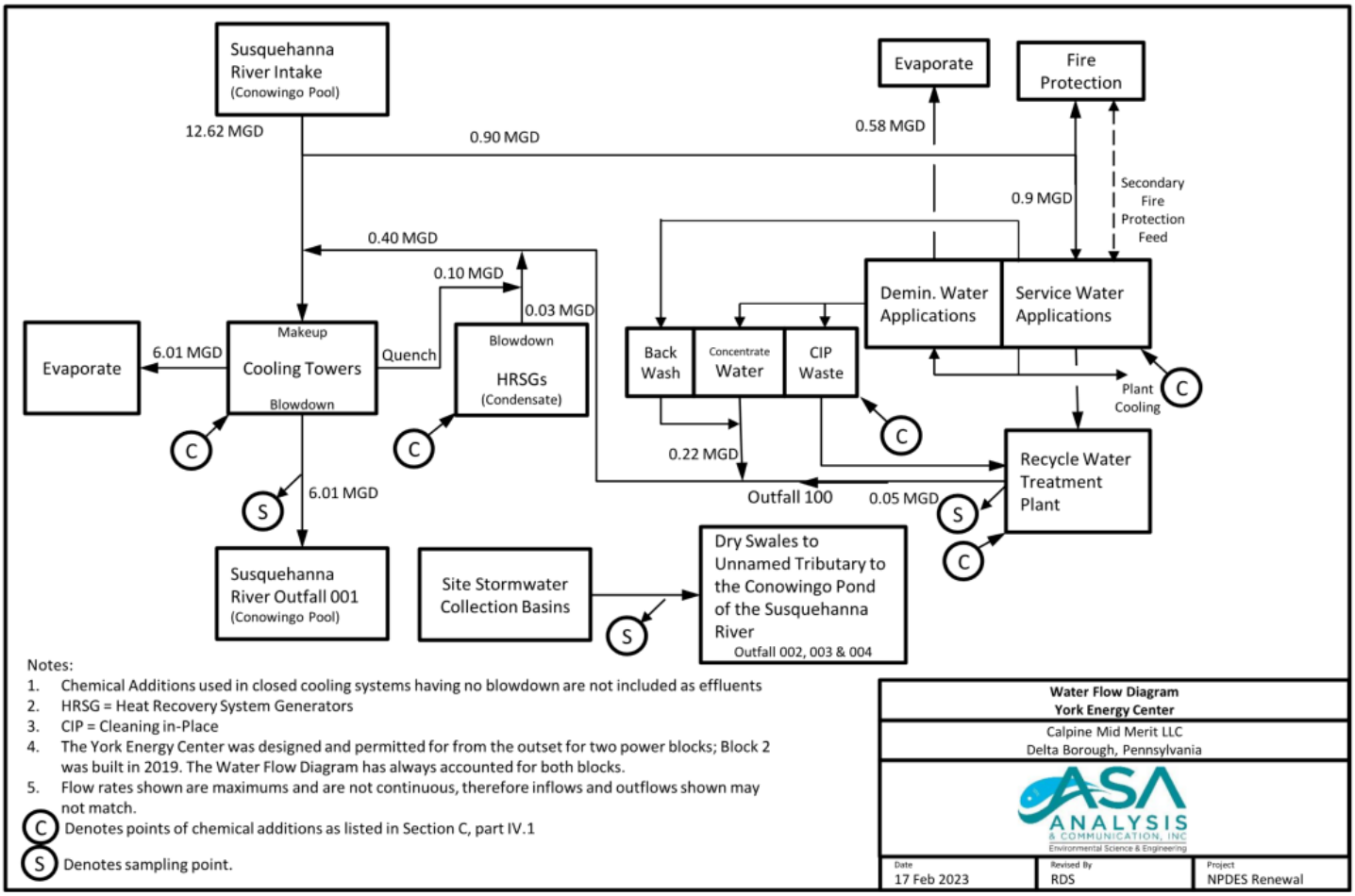
Recent DMR sampling data for the three basins indicate minimal amounts of pollutants. Due to Outfall 002 having the only listed artificial pollutant source (in addition to a relatively high impervious area of 17.2 acres), therefore, the existing yearly monitoring of pH, TSS, Oil & Grease, Total Copper, Total Iron, Total Nickel, and Total Zinc requirements will remain in the proposed permit.

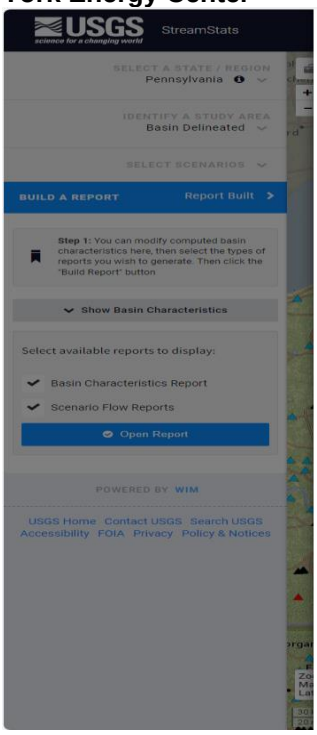




Data Sources: Aerial Imagery - PASDA


York Energy Center
Administration Building
4MM Gal Demineralized Water Storage Tank
Switchyard
Steam Turbine Building
Combustion Turbines
Cooling Towers
Heat Recovery Steam Generators Building
Heat Recovery Steam Generators Building
4MM Gal Diesel Fuel Storage Tank
Steam Turbine Building
Water Treatment Building
Combustion Turbines
Cooling Towers
Block 1
Block 2
0
250
500
Feet
Data Sources: Aerial Imagery - PASDA


Susquehanna River Intake (Conowingo Pool)
12.62 MGD
0.90 MGD
Evaporate
0.58 MGD
Fire Protection
0.9 MGD
Secondary Fire Protection Feed
0.40 MGD
0.10 MGD
0.03 MGD
Demin. Water Applications
Service Water Applications
Evaporate
6.01 MGD
Makeup
Cooling Towers
Blowdown
Quench
Blowdown
HRSGs (Condensate)
Back Wash
Concentrate Water
CIP Waste
Plant Cooling
C
0.22 MGD
Recycle Water Treatment Plant
6.01 MGD
Outfall 100
0.05 MGD
S
Susquehanna River Outfall 001 (Conowingo Pool)
Site Stormwater Collection Basins
Dry Swales to Unnamed Tributary to the Conowingo Pond of the Susquehanna River
Outfall 002, 003 & 004
Notes:
1. Chemical Additions used in closed cooling systems having no blowdown are not included as effluents
2. HRSG = Heat Recovery System Generators
3. CIP = Cleaning in-Place
4. The York Energy Center was designed and permitted for from the outset for two power blocks; Block 2 was built in 2019. The Water Flow Diagram has always accounted for both blocks.
5. Flow rates shown are maximums and are not continuous, therefore inflows and outflows shown may not match.
C Denotes points of chemical additions as listed in Section C, part IV.1
S Denotes sampling point.
Water Flow Diagram
York Energy Center
Calpine Mid Merit LLC
Delta Borough, Pennsylvania
ASA ANALYSIS & COMMUNICATION, INC
Environmental Science & Engineering
Date
17 Feb 2023
Revised By
RDS
Project
NPDES Renewal



Leaflet | Esri

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.0251	degrees
CARBON	Percentage of area of carbonate rock	7.93	percent
DRNAREA	Area that drains to a point on a stream	26900	square miles
ELEV	Mean Basin Elevation	1301	feet
FOREST	Percentage of area covered by forest	66.4085	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	43.8327	percent
PRECIP	Mean Annual Precipitation	40	inches
ROCKDEP	Depth to rock	4.5	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	1.75	miles per square mile
URBAN	Percentage of basin with urban development	3.0316	percent

Low-Flow Statistics

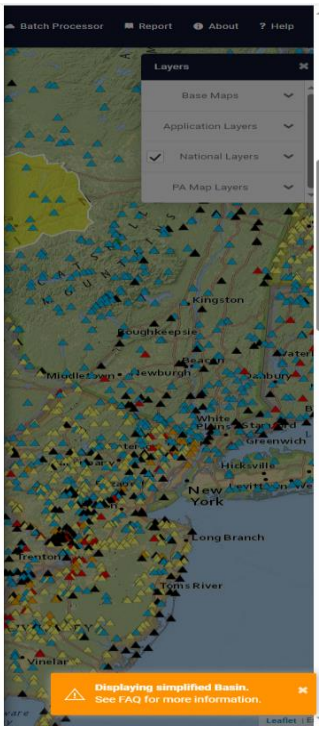
Low-Flow Statistics Parameters [7.0 Percent (1930 square miles) Low Flow Region 1]

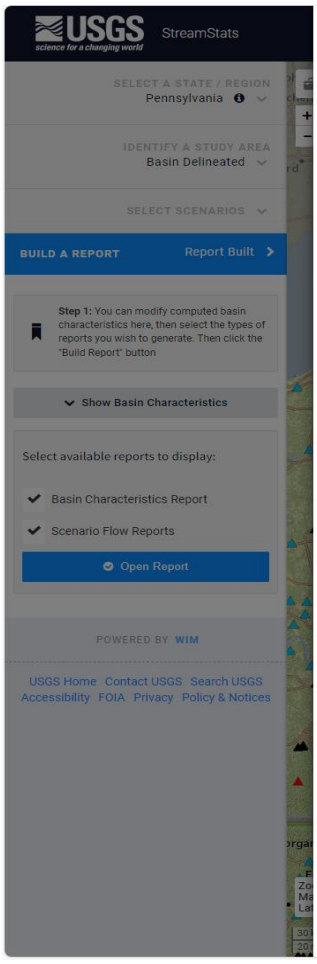
Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26900	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	8.0251	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.5	feet	4.13	5.21
URBAN	Percent Urban	3.0316	percent	0	89

Low-Flow Statistics Parameters [41.0 Percent (11100 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26900	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	40	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	7.93	percent	0	99

Low-Flow Statistics Parameters [6.0 Percent (1610 square miles) Low Flow Region 3]





Low-Flow Statistics Parameters [7.0 Percent (1930 square miles) Low Flow Region 1]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
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Low-Flow Statistics Parameters [41.0 Percent (11100 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
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ROCKDEP	Depth to Rock	4.5	feet	3.32	5.65
CARBON	Percent Carbonate	7.93	percent	0	99

Low-Flow Statistics Parameters [6.0 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26900	square miles	2.33	1720
ELEV	Mean Basin Elevation	1301	feet	898	2700
PRECIP	Mean Annual Precipitation	40	inches	38.7	47.9

Low-Flow Statistics Parameters [46.0 Percent (12300 square miles) Low Flow Region 5]

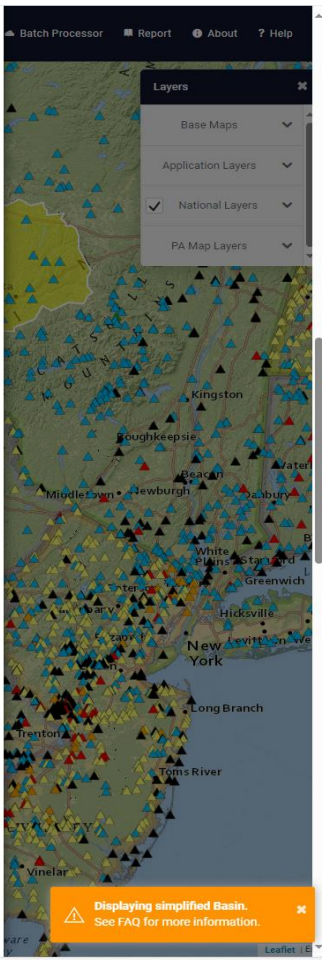
Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26900	square miles	4.84	982
PRECIP	Mean Annual Precipitation	40	inches	33.1	47.1
GLACIATED	Percent of Glaciation	43.8327	percent	0	100
FOREST	Percent Forest	66.4085	percent	41	100

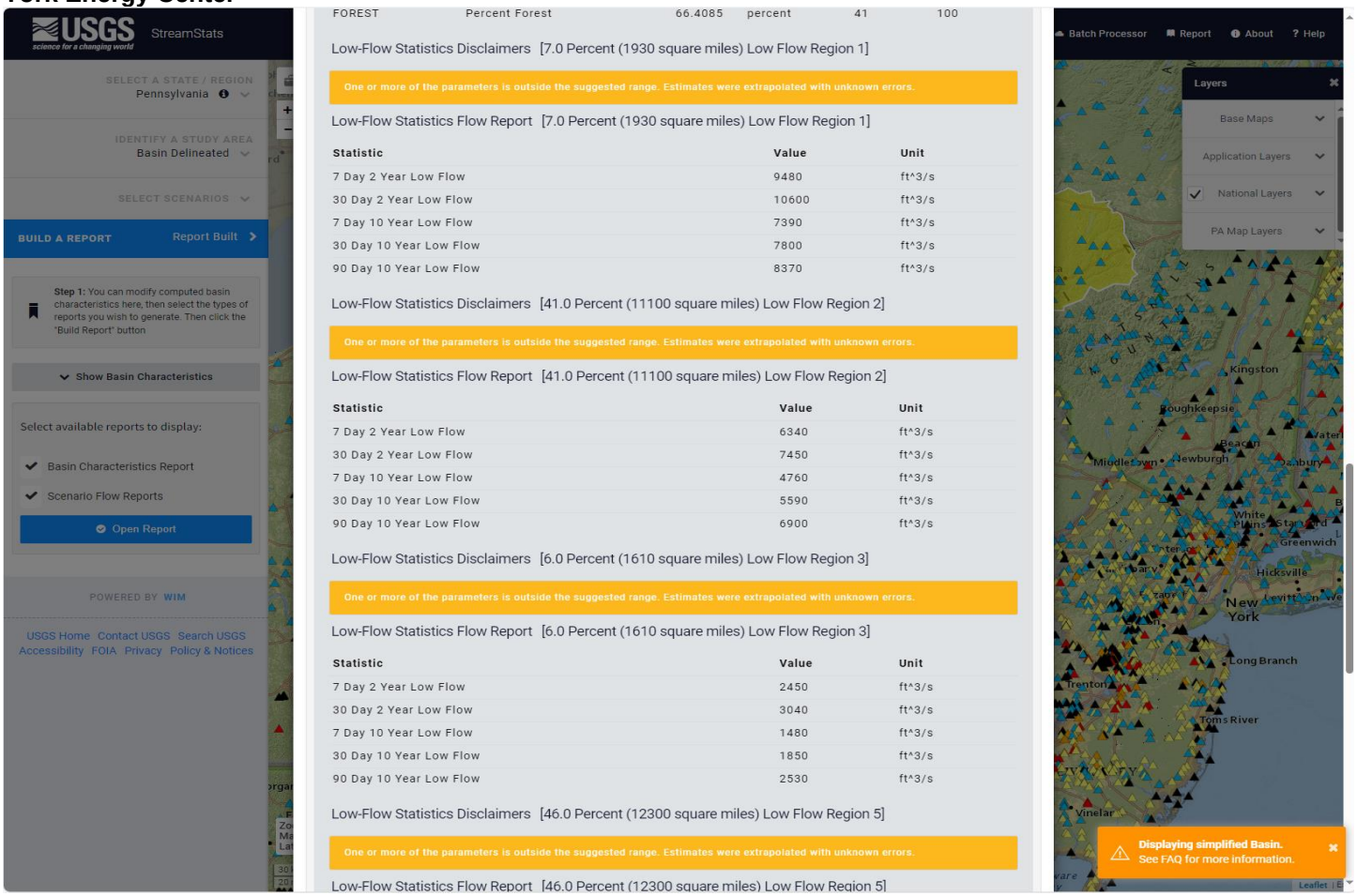
Low-Flow Statistics Disclaimers [7.0 Percent (1930 square miles) Low Flow Region 1]

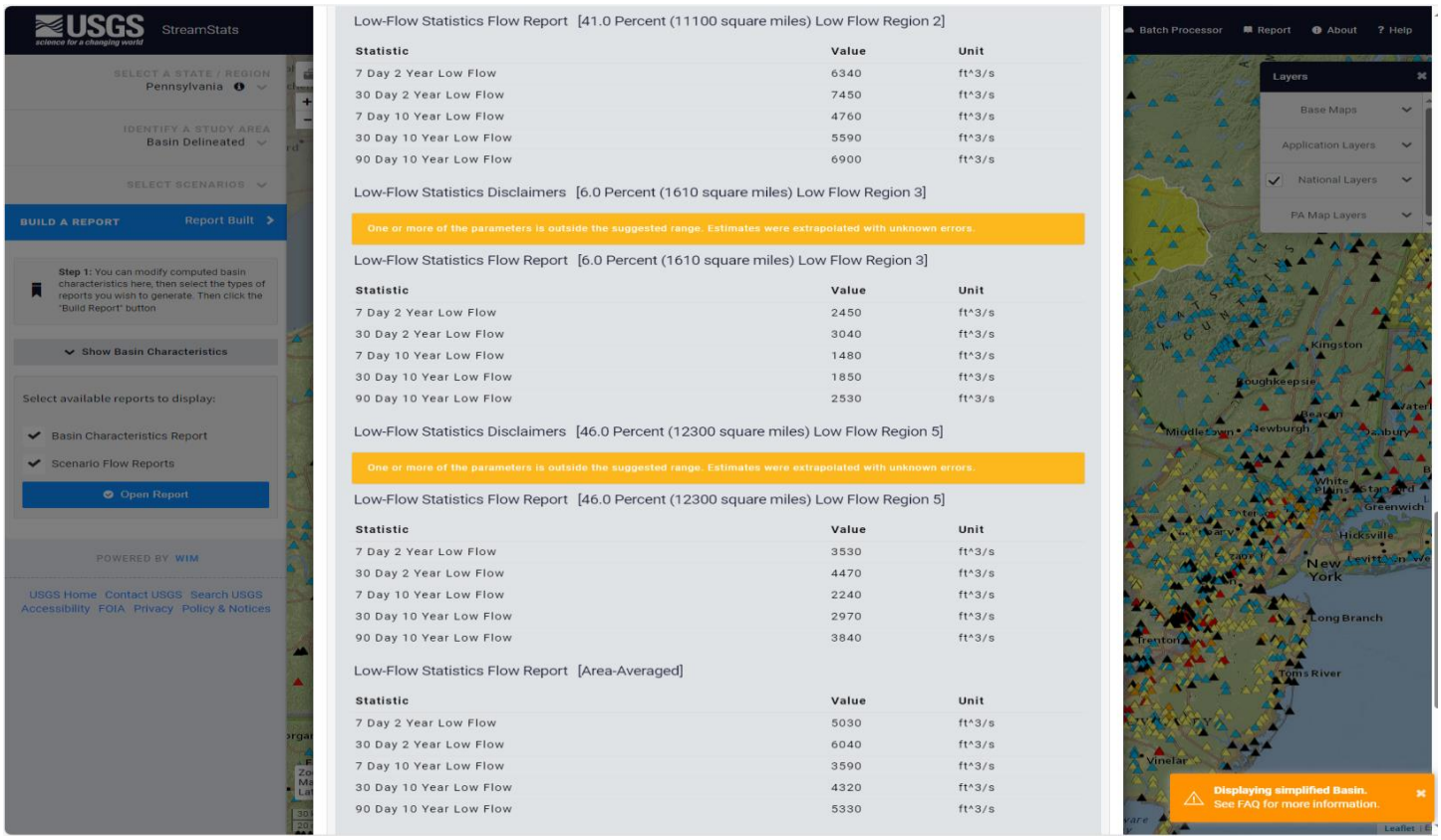
One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [7.0 Percent (1930 square miles) Low Flow Region 1]

Statistic	Value	Unit
7 Day 2 Year Low Flow	9480	ft^3/s
30 Day 2 Year Low Flow	10600	ft^3/s
7 Day 10 Year Low Flow	7390	ft^3/s
30 Day 10 Year Low Flow	7800	ft^3/s
90 Day 10 Year Low Flow	8370	ft^3/s




USGS StreamStats
SELECT A STATE / REGION
Pennsylvania
IDENTIFY A STUDY AREA
Basin Delineated
SELECT SCENARIOS
BUILD A REPORT
Report Built
Step 1: You can modify computed basin characteristics here, then select the types of reports you wish to generate. Then click the "Build Report" button
Show Basin Characteristics
Select available reports to display:
Basin Characteristics Report
Scenario Flow Reports
Open Report
POWERED BY WIM
USGS Home Contact USGS Search USGS
Accessibility FOIA Privacy Policy & Notices
FOREST Percent Forest 66.4085 percent 41 100
Low-Flow Statistics Disclaimers [7.0 Percent (1930 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 [7.0 Percent (1930 square miles) Low Flow Region 1]
Statistic Value Unit
7 Day 2 Year Low Flow 9480 ft^3/s
30 Day 2 Year Low Flow 10600 ft^3/s
7 Day 10 Year Low Flow 7390 ft^3/s
30 Day 10 Year Low Flow 7800 ft^3/s
90 Day 10 Year Low Flow 8370 ft^3/s
Low-Flow Statistics Disclaimers [41.0 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 [41.0 Percent (11100 square miles) Low Flow Region 2]
Statistic Value Unit
7 Day 2 Year Low Flow 6340 ft^3/s
30 Day 2 Year Low Flow 7450 ft^3/s
7 Day 10 Year Low Flow 4760 ft^3/s
30 Day 10 Year Low Flow 5590 ft^3/s
90 Day 10 Year Low Flow 6900 ft^3/s
Low-Flow Statistics Disclaimers [6.0 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 [6.0 Percent (1610 square miles) Low Flow Region 3]
Statistic Value Unit
7 Day 2 Year Low Flow 2450 ft^3/s
30 Day 2 Year Low Flow 3040 ft^3/s
7 Day 10 Year Low Flow 1480 ft^3/s
30 Day 10 Year Low Flow 1850 ft^3/s
90 Day 10 Year Low Flow 2530 ft^3/s
Low-Flow Statistics Disclaimers [46.0 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 [46.0 Percent (12300 square miles) Low Flow Region 5]
Batch Processor Report About Help
Layers
Base Maps
Application Layers
National Layers
PA Map Layers
Kingston
Poughkeepsie
Newburgh
Middletown
White Plains
Greenwich
Hicksville
New York
Long Branch
Trenton
Toms River
Vinelar
Displaying simplified Basin.
See FAQ for more information.
Leaflet


USGS StreamStats
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IDENTIFY A STUDY AREA
Basin Delineated
SELECT SCENARIOS
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Basin Characteristics Report
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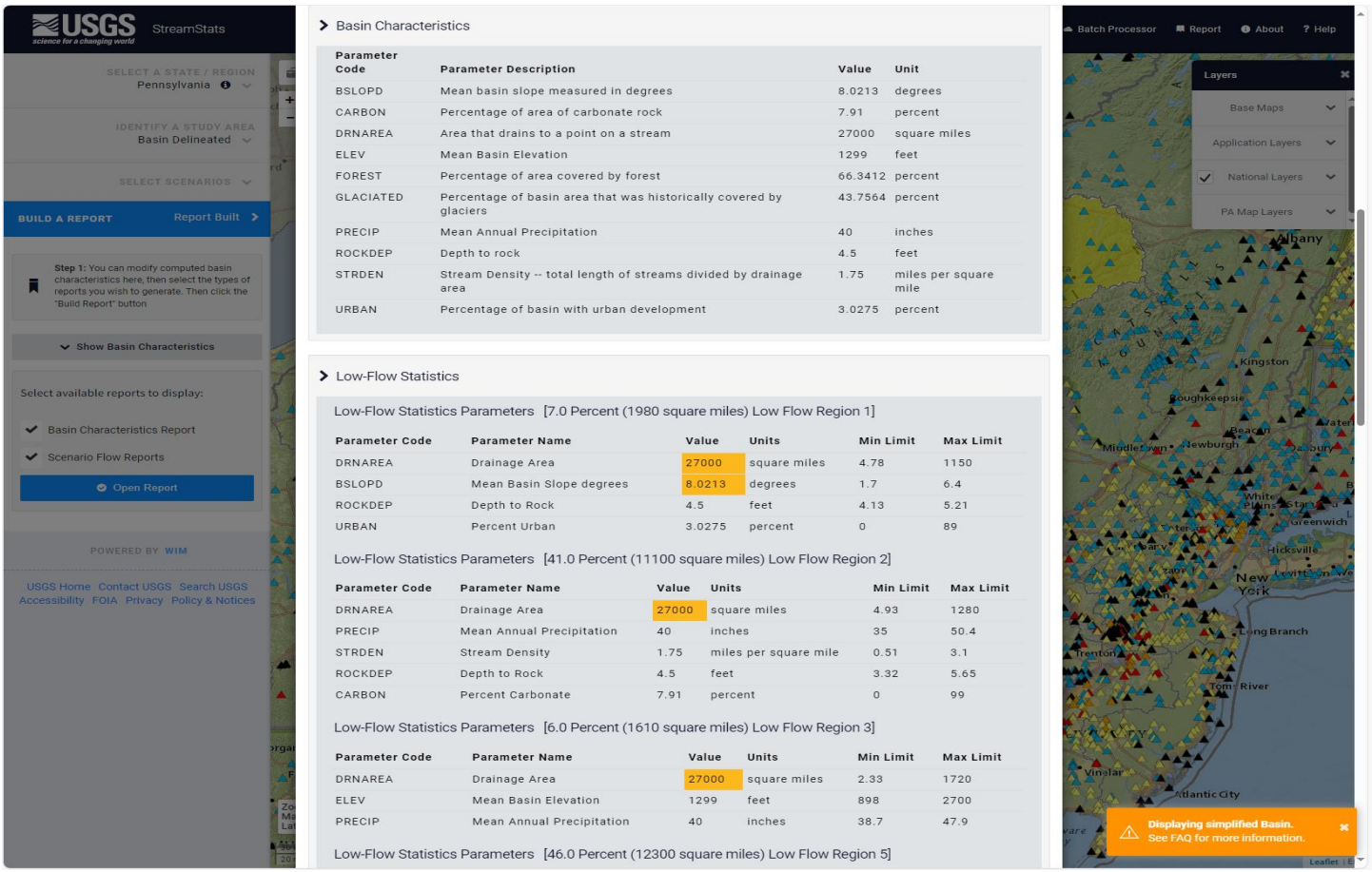
Low-Flow Statistics Flow Report [41.0 Percent (11100 square miles) Low Flow Region 2]
Statistic Value Unit
7 Day 2 Year Low Flow 6340 ft^3/s
30 Day 2 Year Low Flow 7450 ft^3/s
7 Day 10 Year Low Flow 4760 ft^3/s
30 Day 10 Year Low Flow 5590 ft^3/s
90 Day 10 Year Low Flow 6900 ft^3/s
Low-Flow Statistics Disclaimers [6.0 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 [6.0 Percent (1610 square miles) Low Flow Region 3]
Statistic Value Unit
7 Day 2 Year Low Flow 2450 ft^3/s
30 Day 2 Year Low Flow 3040 ft^3/s
7 Day 10 Year Low Flow 1480 ft^3/s
30 Day 10 Year Low Flow 1850 ft^3/s
90 Day 10 Year Low Flow 2530 ft^3/s
Low-Flow Statistics Disclaimers [46.0 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 [46.0 Percent (12300 square miles) Low Flow Region 5]
Statistic Value Unit
7 Day 2 Year Low Flow 3530 ft^3/s
30 Day 2 Year Low Flow 4470 ft^3/s
7 Day 10 Year Low Flow 2240 ft^3/s
30 Day 10 Year Low Flow 2970 ft^3/s
90 Day 10 Year Low Flow 3840 ft^3/s
Low-Flow Statistics Flow Report [Area-Averaged]
Statistic Value Unit
7 Day 2 Year Low Flow 5030 ft^3/s
30 Day 2 Year Low Flow 6040 ft^3/s
7 Day 10 Year Low Flow 3590 ft^3/s
30 Day 10 Year Low Flow 4320 ft^3/s
90 Day 10 Year Low Flow 5330 ft^3/s
Batch Processor Report About Help
Layers
Base Maps
Application Layers
National Layers
PA Map Layers
Kingston
Poughkeepsie
Newburgh
Middletown
White Plains
Greenwich
Hicksville
New York
Long Branch
Trenton
Toms River
Vinelar
Displaying simplified Basin.
See FAQ for more information.
Leaflet



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.0213	degrees
CARBON	Percentage of area of carbonate rock	7.91	percent
DRNAREA	Area that drains to a point on a stream	27000	square miles
ELEV	Mean Basin Elevation	1299	feet
FOREST	Percentage of area covered by forest	66.3412	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	43.7564	percent
PRECIP	Mean Annual Precipitation	40	inches
ROCKDEP	Depth to rock	4.5	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	1.75	miles per square mile
URBAN	Percentage of basin with urban development	3.0275	percent

Low-Flow Statistics

Low-Flow Statistics Parameters [7.0 Percent (1980 square miles) Low Flow Region 1]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	27000	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	8.0213	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.5	feet	4.13	5.21
URBAN	Percent Urban	3.0275	percent	0	89

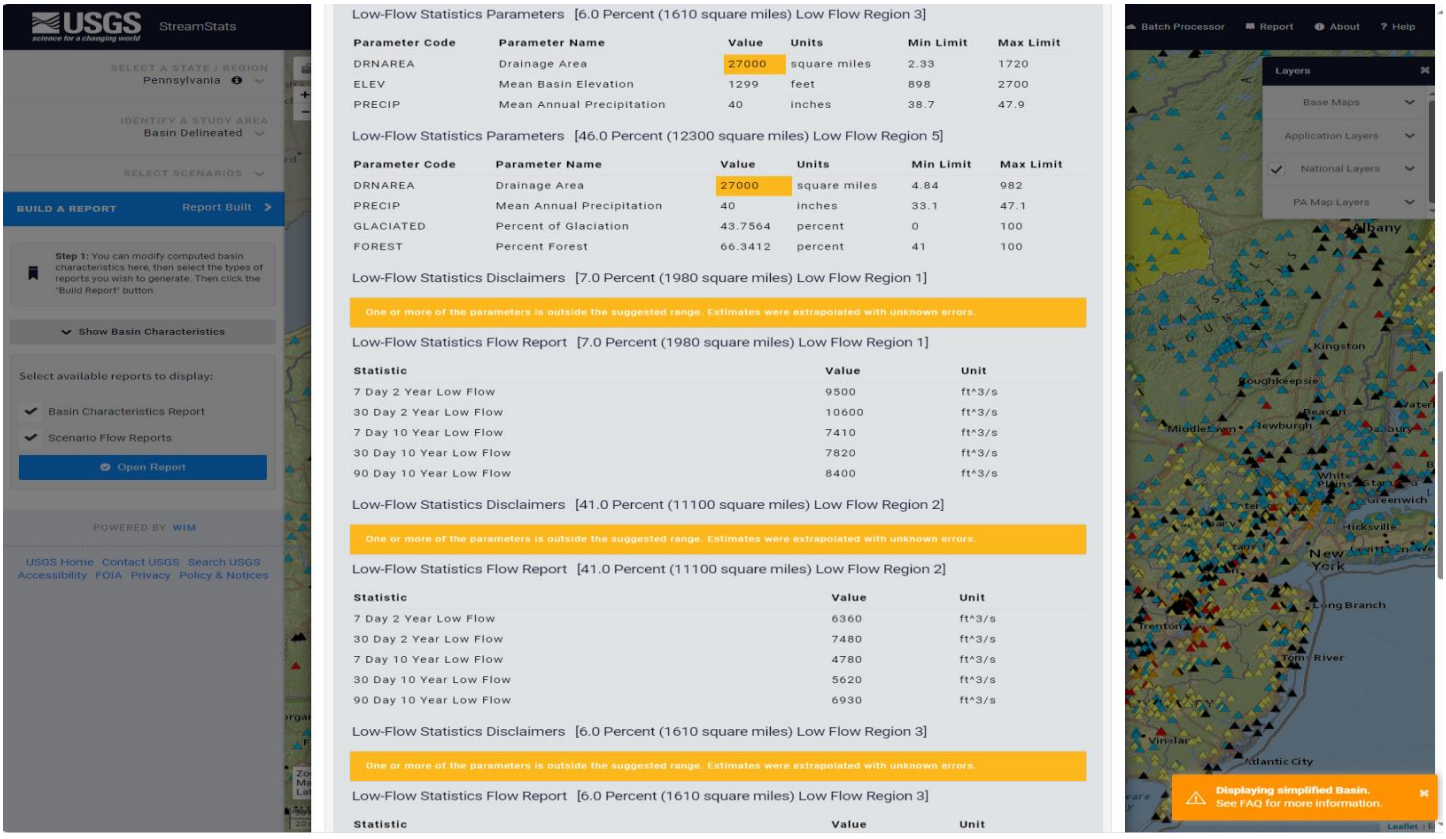
Low-Flow Statistics Parameters [41.0 Percent (11100 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	27000	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	40	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	7.91	percent	0	99

Low-Flow Statistics Parameters [6.0 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	27000	square miles	2.33	1720
ELEV	Mean Basin Elevation	1299	feet	898	2700
PRECIP	Mean Annual Precipitation	40	inches	38.7	47.9

Low-Flow Statistics Parameters [46.0 Percent (12300 square miles) Low Flow Region 5]



Low-Flow Statistics Parameters [6.0 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	27000	square miles	2.33	1720
ELEV	Mean Basin Elevation	1299	feet	898	2700
PRECIP	Mean Annual Precipitation	40	inches	38.7	47.9

Low-Flow Statistics Parameters [46.0 Percent (12300 square miles) Low Flow Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	27000	square miles	4.84	982
PRECIP	Mean Annual Precipitation	40	inches	33.1	47.1
GLACIATED	Percent of Glaciation	43.7564	percent	0	100
FOREST	Percent Forest	66.3412	percent	41	100

Low-Flow Statistics Disclaimers [7.0 Percent (1980 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 [7.0 Percent (1980 square miles) Low Flow Region 1]

Statistic	Value	Unit
7 Day 2 Year Low Flow	9500	ft^3/s
30 Day 2 Year Low Flow	10600	ft^3/s
7 Day 10 Year Low Flow	7410	ft^3/s
30 Day 10 Year Low Flow	7820	ft^3/s
90 Day 10 Year Low Flow	8400	ft^3/s

Low-Flow Statistics Disclaimers [41.0 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 [41.0 Percent (11100 square miles) Low Flow Region 2]

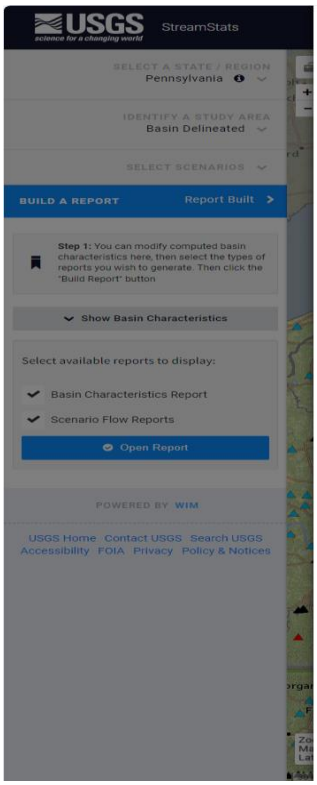
Statistic	Value	Unit
7 Day 2 Year Low Flow	6360	ft^3/s
30 Day 2 Year Low Flow	7480	ft^3/s
7 Day 10 Year Low Flow	4780	ft^3/s
30 Day 10 Year Low Flow	5620	ft^3/s
90 Day 10 Year Low Flow	6930	ft^3/s

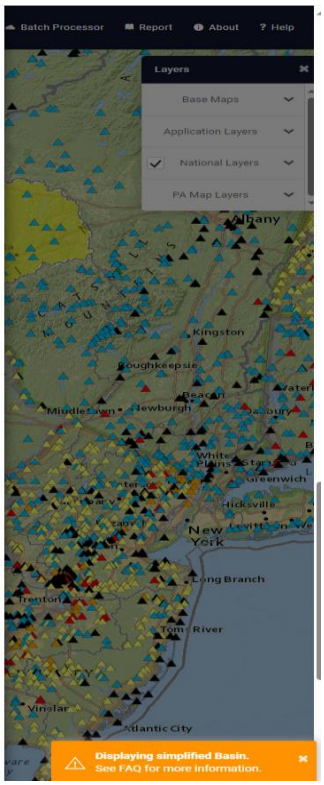
Low-Flow Statistics Disclaimers [6.0 Percent (1610 square miles) Low Flow Region 3]

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

Low-Flow Statistics Flow Report [6.0 Percent (1610 square miles) Low Flow Region 3]

Statistic	Value	Unit





TMS model inputs

Parameter	Value	Source
Discharge pH	7.5	(Recent DMR data) ((6.59 + 8.39) /2 = 7.49)
Discharge Hardness	418 mg/L	(2023 permit application)
Stream pH	8.2	(Water Quality Network data)
Stream Hardness	159 mg/L	(Water Quality Network data)
River Width	5,620 ft	(Previous protection report)
River Depth	10 ft	(Previous protection report)
Slope	0.0001	(Previous protection report / Estimation via BPJ)

Partial Mixing Factors:
AFC = (0.01 x 2) + 0.00534 = 0.0253
CFC = (0.073 x 2) + 0.00534 = 0.151
THH = (0.073 x 2) + 0.00534 = 0.151
CRL = (0.1 x 2) + 0.00534 = 0.205

Using an estimated slope of 0.0001:
Node 2 Elevation = Node 1 Elevation - [(19.25 mi – 15.001 mi) (5,280 ft)](0.0001)= 99 ft – 2.24 ft = 96.76 ft

Node 1: Discharge Point in Susquehanna River (06685)
- Elevation: 99 ft (USGS National Map Viewer / Estimation)
- Drainage Area: 26,900 mi^2 (USGS PA StreamStats)
- River Mile Index: 19.25 *(15 + 4.25)* (PA DEP eMapPA)
- Low Flow Yield: 0.13 cfs/mi^2
- Discharge Flow: 6.01 MGD (NPDES Application)

Node 2: Susquehanna River at Pennsylvania/Maryland Border
- Elevation: 96.76 ft
- Drainage Area: 27,000 mi^2 (USGS PA StreamStats)
- River Mile Index: 15.001 *(15 + 0.001)* (PA DEP eMapPA)
- Low Flow Yield: 0.13 cfs/mi^2
- Discharge Flow: 0.000 MGD

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Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: Calpine Mid Merit, LLC-York Energy Center NPDES Permit No.: PA0088781 Outfall No.: 001

Evaluation Type: Major Sewage / Industrial Waste Wastewater Description: Susquehanna River

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
6.01	418	7.5						

	Discharge Pollutant	Units	Max Discharge Conc		0 if left blank: Trib Conc	Stream Conc	0.6 if left blank: Daily CV	Hourly CV	0 if left blank: Strea m CV	Fate Coeff	FOS	1 if left blank: Criteri a Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		1340									
	Chloride (PWS)	mg/L		130									
	Bromide	mg/L		2.7									
	Sulfate (PWS)	mg/L		412									
	Fluoride (PWS)	mg/L		0.32									
Group 2	Total Aluminum	µg/L		1.9									
	Total Antimony	µg/L		1.2									
	Total Arsenic	µg/L		2.9									
	Total Barium	µg/L		140									
	Total Beryllium	µg/L		0.11									
	Total Boron	µg/L		92									
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L		3.2									
	Hexavalent Chromium	µg/L		0.73									
	Total Cobalt	µg/L		1.1									
	Total Copper	µg/L		10									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		4.3									
	Dissolved Iron	µg/L		300									
	Total Iron	µg/L		1600									
	Total Lead	µg/L		3.6									
	Total Manganese	µg/L		360									
	Total Mercury	µg/L		0.005									
	Total Nickel	µg/L		12									
	Total Phenols (Phenolics) (PWS)	µg/L		2									
	Total Selenium	µg/L		0.74									
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L		42									
	Total Molybdenum	µg/L		3									
	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		2.5									
	Dichlorobromomethane	µg/L		0.27									
	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		1.5									
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L		0.29									
	2,4,6-Trichlorophenol	µg/L		1.4									
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		0.93									
	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		16.8									
	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

Calpine Mid Merit, LLC-York Energy Center, NPDES Permit No. PA0088781, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: Susquehanna River 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	006685	19.25	99	26900			Yes
End of Reach 1	006685	15.001	96.76	27000			Yes

Q_{7-10}

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	19.25	0.13				5620	10					159	8.2		
End of Reach 1	15.001	0.13				5620	10					159	8.2		

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	19.25														
End of Reach 1	15.001														

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Toxics Management Spreadsheet
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Model Results

Calpine Mid Merit, LLC-York Energy Center, NPDES Permit No. PA0088781, Outfall 001

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

☐ *Hydrodynamics*

☑ *Wasteload Allocations*

☑ *AFC* CCT (min): 15 PMF: 0.010 Analysis Hardness (mg/l): 211.37 Analysis pH: 7.94

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	3,710	
Total Antimony	0	0		0	1,100	1,100	5,441	
Total Arsenic	0	0		0	340	340	1,682	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	103,867	
Total Boron	0	0		0	8,100	8,100	40,063	
Total Chromium (III)	0	0		0	1051.712	3,328	16,461	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	80.6	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	470	
Total Copper	0	0		0	27.203	28.3	140	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	144.361	212	1,047	Chem Translator of 0.682 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	8.15	Chem Translator of 0.85 applied
Total Nickel	0	0		0	881.948	884	4,371	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 Zinc	0	0		0	220.931	226	1,117	Chem Translator of 0.978 applied
Chloroform	0	0		0	1,900	1,900	9,397	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	8,000	8,000	39,568	
Phenol	0	0		0	N/A	N/A	N/A	

2,4,6-Trichlorophenol	0	0		0	460	460	2,275	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	22,257	
2,6-Dinitrotoluene	0	0		0	990	990	4,897	

☑ ***CFC*** CCT (min): 720 PMF: 0.073 Analysis Hardness (mg/l): 168.14 Analysis pH: 8.14

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	6,235	
Total Arsenic	0	0		0	150	150	4,251	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	116,190	
Total Boron	0	0		0	1,600	1,600	45,342	
Total Chromium (III)	0	0		0	113.430	132	3,738	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	295	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	538	
Total Copper	0	0		0	13.962	14.5	412	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	565,686	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	4.410	6.16	175	Chem Translator of 0.715 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	25.7	Chem Translator of 0.85 applied
Total Nickel	0	0		0	80.719	81.0	2,294	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	141	Chem Translator of 0.922 applied
Total Zinc	0	0		0	183.486	186	5,274	Chem Translator of 0.986 applied
Chloroform	0	0		0	390	390	11,052	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	1,600	1,600	45,342	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	2,579	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	25,788	
2,6-Dinitrotoluene	0	0		0	200	200	5,668	

☑ ***THH*** CCT (min): 720 PMF: 0.073 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	159	
Total Arsenic	0	0		0	10	10.0	283	
Total Barium	0	0		0	2,400	2,400	68,013	
Total Boron	0	0		0	3,100	3,100	87,851	
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	8,502	
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	28,339	
Total Mercury	0	0		0	0.050	0.05	1.42	
Total Nickel	0	0		0	610	610	17,287	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	162	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	113,356	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 720 PMF: 0.100 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 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 Zinc	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	0.95	0.95	96.0	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	152	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	32.3	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	5.05	

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

No. Samples/Month: 4

Pollutants	*Mass Limits* AML (lbs/day)	*Mass Limits* MDL (lbs/day)	*Concentration Limits* AML	*Concentration Limits* MDL	*Concentration Limits* IMAX	*Concentration Limits* Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	µg/L	89.8	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Dinitrotoluene	0.25	0.4	5.05	7.89	12.6	µg/L	5.05	CRL	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	2,378	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	159	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	283	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	66,574	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	25,679	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	3,738	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	51.7	µg/L	Discharge Conc ≤ 10% WQBEL

Total Cobalt	301	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	8,502	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	565,686	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	175	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	28,339	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	1.42	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	2,294	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	141	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	716	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Chloroform	162	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	96.0	µg/L	Discharge Conc ≤ 25% WQBEL
2-Nitrophenol	25,362	µg/L	Discharge Conc ≤ 25% WQBEL
Phenol	113,356	µg/L	Discharge Conc ≤ 25% WQBEL
2,4,6-Trichlorophenol	152	µg/L	Discharge Conc ≤ 25% WQBEL
Bis(2-Ethylhexyl)Phthalate	32.3	µg/L	Discharge Conc ≤ 25% WQBEL

Existing Effluent Limitations and Monitoring Requirements

Outfall 001

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	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Free Available Chlorine (3)	XXX	XXX	XXX	XXX	0.2	0.5	1/day	Grab
Temperature (ºF)	XXX	XXX	XXX	XXX	Report	110	Continuous	I-S
Total Suspended Solids Effluent Net (4)	XXX	XXX	XXX	30.0	60.0	75	2/month	Grab
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Aluminum, Total	Report Avg Qrtly	Report Daily Max	XXX	Report Avg Qrtly	Report	XXX	1/quarter	Grab
Sulfate, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Chloride	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Bromide	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

(3) The term maximum daily concentration, as it relates to discharges of chlorine, means the average chlorine concentration over a period of chlorine release which does not exceed two hours per power block per day. The term “free available chlorine” shall mean the value obtained using any of the “chlorine-free available” methods in Table IB in 40 CFR 136.3(a) where the method has the capacity of measuring free available chlorine, or other methods approved by the permitting authority.

(4) To determine compliance with the net limitations for TSS and Oil and Grease, perform the following:

a. Measure the influent and effluent concentration(s) from grab samples taken at the same time of day, and record the influent and effluent flow(s) in MGD at the same time when grab samples were collected.
b. For both the influent and effluent, calculate the mass by multiplying the concentration (mg/L) x flow (MGD) x 8.34 lb/gal, and then calculate the net mass by subtracting the influent mass from the effluent mass.
c. Calculate the net concentration by dividing the net mass by the product of the discharge flow (MGD) and 8.34 lb/gal.

Existing Effluent Limitations and Monitoring Requirements

Outfall 100

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	Continuous	Measured
Total Suspended Solids Effluent Net (4)	XXX	XXX	XXX	30	100	XXX	2/month	Grab
Oil and Grease Effluent Net (4)	XXX	XXX	XXX	15	20	30	2/month	Grab

Existing Effluent Limitations and Monitoring Requirements

Outfall 002

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		
pH (S.U.) Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Suspended Solids Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Oil and Grease Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Copper, Total Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Iron, Total Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Nickel, Total Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Zinc, Total Other Stormwater	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab

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 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 Quarterly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report Avg Mo	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	XXX	9.0	1/day	Grab
Free Available Chlorine	XXX	XXX	XXX	XXX	0.2	0.5	1/day	Grab
Temperature (ºF)	XXX	XXX	XXX	XXX	Report	110	Continuous	I-S
TSS Effluent Net	XXX	XXX	XXX	30.0	60.0	75.0	2/month	Grab
Oil and Grease Effluent Net	XXX	XXX	XXX	15.0	20.0	30.0	2/month	Grab
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Total Aluminum	Report	Report	XXX	Report Avg Qrtly	Report	XXX	1/quarter	Grab
Total Copper	Report	Report	XXX	Report Avg Qrtly	Report	XXX	1/quarter	Grab
Sulfate	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Total Dinitrotoluene	Report	Report	XXX	Report Avg Qrtly	Report	XXX	1/quarter	Grab
Chloride	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Bromide	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

Compliance Sampling Location:

Other Comments:

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	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
pH (S.U.)	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
TSS	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Oil and Grease	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Copper	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Iron	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Nickel	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Zinc	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab

Compliance Sampling Location:

Other Comments:

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 100, 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	Continuous	Measured
TSS Effluent Net	XXX	XXX	XXX	30.0	100	XXX	2/month	Grab
Oil and Grease Effluent Net	XXX	XXX	XXX	15.0	20.0	30.0	2/month	Grab

Compliance Sampling Location:

Other Comments:

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: