pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Amendment, Major**	Application No.	**PA0002062 A-2**
Facility Type	**Industrial**	APS ID	**1002478**
Major / Minor	**Major**	Authorization ID	**1289755**

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

Applicant and Facility Information

Applicant Name	**Keystone-Conemaugh Projects, LLC**	Facility Name	**Keystone Generating Station**
Applicant Address	175 Cornell Road, Suite 1	Facility Address	313 Keystone Drive
	Blairsville, PA 15717-8076		Shelocta, PA 15774-7625
Applicant Contact	Georgianna Stenger	Facility Contact	Nathan Rozic
Applicant Phone	(724) 357-1713	Facility Phone	(724) 354-5475
Client ID	350861	Site ID	243270
SIC Code	4911	Municipality	Plumcreek Township
SIC Description	Trans. & Utilities - Electric Services	County	Armstrong
Date Application Received	September 6, 2019	EPA Waived?	No
Date Application Accepted	September 30, 2019	If No, Reason	Major Facility

Purpose of Application: Amend NPDES Permit to revise thermal effluent limits at Outfall 003

Summary of Review

It was discovered during the Toxic Reduction Evaluation (TRE) for the heat rejection rate effluent limit for January at Outfall 003 that there was a technical error in the setup of the thermal discharge analysis spreadsheet, which resulted in inaccurate effluent limits being calculated. As a result, the permittee is requesting a revision of all final heat rejection rate effluent limits at Outfall 003 as part of this permit amendment based on the revised spreadsheet. The permittee also requests a six-month extension to Part C, Section XI.A.2. of the current NPDES Permit, which would extend the timeframe to submit a WQM Permit Amendment Application to DEP, if necessary, to 24 months after the permit effective date. No other changes are being proposed as part of this permit amendment.

The Department has reviewed the permittees amendment application and supporting documents and concurs that a technical error was made in the setup of the thermal discharge analysis spreadsheet which resulted in faulty heat rejection rate effluent limits being placed in the permit at Outfall 003. The permit will be revised to include corrected heat rejection rate limits at Outfall 003 as well as modify Part C, Section XI.A.2. of the permit to require a WQM Permit be submitted 24 months after the permit effective date, if necessary, based on the permittee's arguments made in the amendment application.

Please note that this Fact Sheet only addresses changes to the permit being proposed as part of this permit amendment. Unless noted herein, all other effluent limits and conditions of the permit will remain unchanged.

There are currently one open violation listed in EFACTS for this permittee (4/21/2020). This violation is for this facility from the SWRO Radiation Protection NARM Program.

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*,

Approve	Deny	Signatures	Date
X		Adam Pesek Adam J. Pesek, E.I.T. / Environmental Engineering Specialist	April 21, 2020
X		Justin Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	April 30, 2020

Summary of Review
DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	7.96 (avg.); 10.7 (max)
Latitude	40º 39' 19.00"	Longitude	-79º 21' 6.00"
Quad Name	Elderton	Quad Code	1311
Wastewater Description:	Sources monitored at IMPs 103 through 903		
Receiving Waters	Crooked Creek	Stream Code	46218
NHD Com ID	123858486	RMI	28.76
Drainage Area	191	Yield (cfs/mi^2)	0.1
Q_{7-10} Flow (cfs)	30.0	Q_{7-10} Basis	Minimum release per Limited Power Permit*
Elevation (ft)	968	Slope (ft/ft)	0.0001
Watershed No.	17-E	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Crooked Creek Watershed

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°C)	See Analysis Spreadsheet	USGS Gage No. 03038000 (2013-2017)
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake		Buffalo Twp. Municipal Authority – Freeport	
PWS Waters	Allegheny River	Flow at Intake (cfs)	2,250
PWS RMI	29.4	Distance from Outfall (mi)	

* -- The permittee must maintain a daily average flow of 30 cfs in Crooked Creek below the Facility's Crooked Creek intake dam (D03-028) at USGS Gaging Station 03038000 in accordance with the Permittee's Limited Power Permit (LP03-028). The gage station is located approximately 2,100 feet downstream of the intake dame and about 900 feet upstream of Outfall 003. Note that the Limited Power Permit allows minimum hourly flow rates as low as 20 cfs, but Q_{7-10} is a seven-consecutive-day average flow, so the 30 cfs daily average flow required by the Limited Power Permit would be representative of Q_{7-10} conditions at Outfall 003

Development of Effluent Limitations

Outfall No.	003	**Design Flow (MGD)**	7.96 (avg.); 10.7 (max)
Latitude	40º 39' 19.00"	**Longitude**	-79º 21' 6.00"

Wastewater Description: Combined discharge of sources regulated at IMPs 103 – 903

Outfall 003 consists of sources previously limited and/or monitored at IMPs 103 – 903. All wastewaters are collected in a final settling pond that ultimately discharges to Crooked Creek. There is an unnamed tributary that is diverted around the final settling pond and conveyed to Crooked Creek through an underground pipe. The diversion was designed only to capture and transport the base flow of the tributary, so a portion of the tributary is conveyed to the settling pond when stream flow is elevated. The average discharge flow rate from the pond, based on the last five years of monitoring data (October 2012 – September 2017), is 7.96 MGD or 12.32 cfs.

Technology-Based Effluent Limitations (TBELs)

There are no Technology-based effluent limitations that apply to heat rejection rate at this outfall.

Water Quality-Based Effluent Limitations (WQBELs)

Q_{7-10} Steam Flow of Crooked Creek

The permittee must maintain a daily average flow of 30 cfs in Crooked Creek below the Station's Crooked Creek intake dam (D03-028) in accordance with the permittee's Limited Power Permit (LP03-028). A Limited Power Permit is a type of permit issued by DEP's Division of Dam Safety pursuant to the Limited Power Act of June 14, 1923, P.L. 704 (as amended) to all power projects consisting of dams or changes in streams to develop water power (i.e., hydroelectric power plants) or dams or changes in streams to supply water for steam power (i.e., steam electric power plants such as the Keystone Generating Station). The USGS Gaging Station (03038000), where the 30 cfs daily average flow must be achieved, is located approximately 2,100 feet downstream of the intake dam (about 900 feet upstream of Outfall 003 (See Figure 1). Therefore, 30 cfs must be achieved upstream of Outfall 003 and the Q_{7-10} flow used to develop WQBELs at Outfall 003 would be 30 cfs.

Figure 1. Aerial Image of Crooked Creek Downstream of Keystone's Intake Dam

Image Source: Google Earth; notations added

Thermal Limits

Thermal WQBELs are evaluated using a DEP program called "Thermal Discharge Limit Calculation Spreadsheet" created with Microsoft Excel for Windows. The program calculates temperature wasteload allocations (WLAs) through the application of a heat transfer equation, which takes two forms in the program depending on the source of the facility's cooling water. In Case 1, intake water to a facility is from the receiving stream upstream of the discharge location. In Case 2, intake water is from a source other than the receiving stream (e.g., municipal water supply). The determination of which case applies to a given discharge is made based on the input data which include the receiving stream flow rate (Q_{7-10}), the stream intake flow rate, external source intake flow rates, consumptive flow rates, and site-specific ambient stream temperatures. Case 1 limits are usually expressed as heat rejection rates while Case 2 limits are usually expressed as temperatures.

DEP's *Implementation Guidance for Temperature Criteria* directs permit writers to assume instantaneous complete mixing of the discharge with the receiving stream when calculating thermal effluent limits unless adverse factors exist. No adverse factors exist for the Station's discharges at Outfall 003, so complete mixing is assumed.

The permittee obtains its cooling water from Crooked Creek upstream of Outfall 003, so the discharge is analyzed as Case 1 and is conservatively modeled using a 'maximum' discharge flow rate at Outfall 003 (including wastewaters that may not contain waste heat). Use of maximum flow is directed by the *Implementation Guidance for Temperature Criteria* for Case 1 scenarios with the caveat that maximum flows may result in effluent limits that are too restrictive whenever the facility flow rate is less than the assumed value. Therefore, the flow used for modeling is 10.706 MGD (reported in February 2016), which is the maximum of the average monthly flows reported on Outfall 003's DMRs within the last five years.

The spreadsheet adjusts the stream flow at a discharge point (assuming the discharge is downstream of the intake) by subtracting the stream intake flow from the entered Q_{7-10} flow. Consequently, the model calculates some monthly/semi-monthly adjusted stream flows for Crooked Creek that are much lower than the allowable 30 cfs minimum flow per the Limited Power Permit; as a result, the calculated heat rejection rate limits will be more conservative for those periods.

Also, discharge flow in the spreadsheet is calculated by subtracting consumptive losses from the stream intake flow. Therefore, the intake flow rate is set equal to the Station's actual intake flow rate from Crooked Creek (18.76 MGD) and the consumptive loss is entered as 8.054 MGD, which is the value necessary for the spreadsheet to calculate a discharge flow of 10.706 MGD.

DEP's *Implementation Guidance for Temperature Criteria* also recommends using site-specific ambient stream temperatures for modeling. Where site-specific data are unavailable, information from USGS gaging stations, Water Quality Network stations, or other relevant stream monitoring sources can be used. For Outfall 003, DEP is using temperature data from 2013 – 2017 collected at USGS Gaging Station 03038000 – Crooked Creek at Idaho, PA. The median temperatures of the mean daily stream temperatures for each monthly and semi-monthly period are used as the site-specific ambient stream temperatures.

Modifications / Corrections to the Thermal Discharge Limit Calculation Spreadsheet

As mentioned above, the spreadsheet functions by using the Q7-10 flow as the receiving stream flow above the facility, subtracts the facility's intake flow to determine the 'adjusted stream flow', and then adds the facility's discharge flow to determine the downstream flow. This downstream flow is used to calculate the heat rejection rate effluent limits.

The original modeling for the NPDES Permit renewal used the minimum daily average flow of 30 cfm at USGS Station 03038000, found in the facility's Limited Power Permit, as the receiving stream flow input above the facility before the intake. Because of this, the specified input into the spreadsheet resulted in an adjusted stream flow of 1 cfs below the intake, which is technically inaccurate of actual conditions because USGS Station 0303800 is below the intake, but above Outfall 003, where 30 cfs as a minimum daily average flow must be maintained. This resulted in much more stringent heat rejection rate effluent limits being calculated for the current permit then were necessary.

To correct this inaccuracy, the spreadsheet was revised to use an inputed receiving stream flow (Q_{7-10}) flow) of 59 cfs, which was derived by taking the minimum daily average flow allowed at USGS Station 0303800 and adding the facility's intake flow (30 cfs + 29 cfs). 18.76 MGD converted to cubic feet per second is 29 cfs. The spreadsheet, in this scenario, would obtain an adjusted streamflow of 30 cfs below the intake at the USGS gage. This modeling was used to refine the heat rejection rate effluent limits in the proposed amended permit (See Fact Sheet Attachment A).

The following limitations were determined through the revised Thermal Discharge Limit Calculation Spreadsheet (Attachment A):

Parameter	Limit (MBTUs/Day)	SBC	Model
Heat Rejection Rate Jan 1 - 31	7341	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Feb 1 - 29	6673	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Mar 1 - 31	11960	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Apr 1 - 15	10983	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet

Heat Rejection Rate Apr 16 - 30	7515	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate May 1 - 15	9033	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate May 16 - 31	14754	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Jun 1 - 15	13516	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Jun 16 - 30	15946	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Jul 1 - 31	8740	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Aug 1 - 15	7796	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Aug 16 - 31	7217	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Sep 1 - 15	4828	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Sep 16 - 30	3717	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Oct 1 - 15	3805	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Oct 16 - 31	3814	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Nov 1 - 15	4487	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Nov 16 - 30	4015	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet
Heat Rejection Rate Dec 1 - 31	1698	Daily Maximum	Thermal Discharge Limit Calculation Spreadsheet

Comments: A three-year compliance schedule (Part C, Section XI) is still in effect for meeting the December heat rejection rate effluent limit. Part C, Section XI.A.2. of the permit was modified to change the milestone compliance date from 18 months after Permit Effective Date to 24 months after the Permit Effective Date at the request of the permittee. The Department does not see any issues with extending this milestone compliance date since the final limit compliance date remains unchanged.

Best Professional Judgment (BPJ) Limitations

There are no BPJ Effluent limits that apply to heat rejection rate.

Anti-Backsliding

The proposed heat rejection rate limits are being made less stringent as a result of this permit amendment. This is permissible for these water quality-based effluent limits under 40 CFR § 122.44, which states "A permit with respect to which paragraph (I)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant if the administrator (PADEP) determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b)."

The modifications to the heat rejection rates are a result of a technical mistake in setup of the model, and therefore a valid reason for backsliding of effluent limits.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 003, Effective Period: January 1, 2019 through December 31, 2021.

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	Recorded
Total Flow (M Gal)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Flow (M Gal)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0	XXX	1/week	Grab
TRC	XXX	XXX	XXX	0.18	XXX	0.33	1/week	Grab
Heat Rejection Rate (MBTUs/day) Jan 1 - 31	XXX	7347	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Feb 1 - 29	XXX	6673	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Mar 1 - 31	XXX	11960	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Apr 1 - 15	XXX	10983	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Apr 16 - 30	XXX	7515	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) May 1 - 15	XXX	9033	XXX	XXX	XXX	XXX	1/day	Calculation

Outfall 003, Continued (from January 1, 2019 through December 31, 2021)

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		
Heat Rejection Rate (MBTUs/day) May 16 - 31	XXX	14754	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jun 1 - 15	XXX	13516	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jun 16 - 30	XXX	15946	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jul 1 - 31	XXX	8740	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Aug 1 - 15	XXX	7796	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Aug 16 - 31	XXX	7217	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Sep 1 - 15	XXX	4828	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Sep 16 - 30	XXX	3717	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Oct 1 - 15	XXX	3805	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Oct 16 - 31	XXX	3814	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Nov 1 - 15	XXX	4487	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Nov 16 - 30	XXX	4015	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Dec 1 - 31	XXX	Report	XXX	XXX	XXX	XXX	1/day	Calculation

Outfall 003, Continued (from January 1, 2019 through December 31, 2021)

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		
TSS	XXX	XXX	XXX	30	100	XXX	1/week	24-Hr Composite
Total Suspended Solids (lbs)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Suspended Solids (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Oil and Grease	XXX	XXX	XXX	15	20	30	1/week	Grab
Total Mercury (ug/L)	XXX	XXX	XXX	0.098	0.2	XXX	1/week	Grab
Sulfate	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Total Thallium (ug/L)	XXX	XXX	XXX	3.0	6.0	XXX	1/week	24-Hr Composite
Chloride	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Bromide	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab

Compliance Sampling Location: Outfall 003, except for flow (see Footnote 11 in the permit).

Other Comments: Only changes to the permit effluent limits is the heat rejection rates at Outfall 003.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 003, Effective Period: December 31, 2021 through December 31, 2023.

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	Recorded
Total Flow (M Gal)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Flow (M Gal)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0	XXX	1/week	Grab
TRC	XXX	XXX	XXX	0.18	XXX	0.33	1/week	Grab
Heat Rejection Rate (MBTUs/day) Jan 1 - 31	XXX	7347	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Feb 1 - 29	XXX	6673	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Mar 1 - 31	XXX	11960	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Apr 1 - 15	XXX	10983	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Apr 16 - 30	XXX	7515	XXX	XXX	XXX	XXX	1/day	Calculation

Outfall 003, Continued (from December 31, 2021 through December 31, 2023)

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		
Heat Rejection Rate (MBTUs/day) May 1 - 15	XXX	9033	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) May 16 - 31	XXX	14754	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jun 1 - 15	XXX	13516	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jun 16 - 30	XXX	15946	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jul 1 - 31	XXX	8740	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Aug 1 - 15	XXX	7796	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Aug 16 - 31	XXX	7217	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Sep 1 - 15	XXX	4828	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Sep 16 - 30	XXX	3717	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Oct 1 - 15	XXX	3805	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Oct 16 - 31	XXX	3814	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Nov 1 - 15	XXX	4487	XXX	XXX	XXX	XXX	1/day	Calculation

Outfall 003, Continued (from December 31, 2021 through December 31, 2023)

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		
Heat Rejection Rate (MBTUs/day) Nov 16 - 30	XXX	4015	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Dec 1 - 31	XXX	1698	XXX	XXX	XXX	XXX	1/day	Calculation
TSS	XXX	XXX	XXX	30	100	XXX	1/week	24-Hr Composite
Total Suspended Solids (lbs)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Suspended Solids (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Dissolved Solids	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Oil and Grease	XXX	XXX	XXX	15	20	30	1/week	Grab
Total Mercury (ug/L)	XXX	XXX	XXX	0.098	0.2	XXX	1/week	Grab
Sulfate	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Total Thallium (ug/L)	XXX	XXX	XXX	0.532	0.831	1.33	1/week	24-Hr Composite
Chloride	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab
Bromide	XXX	XXX	XXX	XXX	Report	XXX	1/month	Grab

Compliance Sampling Location: Outfall 003, except for flow (see Footnote 11 in the permit).

Other Comments: Only changes to the permit effluent limits is the heat rejection rates at Outfall 003.

FACT SHEET ATTACHMENT A

Flow Data for Thermal Discharge Analysis

Facility: Keystone Generating Station
Permit Number: PA0002062
Stream Name: Crooked Creek
Analyst/Engineer: Adam Pesek
Stream Q7-10 (cfs): 59

	Facility Flows				Stream Flows			
	Intake (Stream) (MGD)	Intake (External) (MGD)	Consumptive Loss (MGD)	Discharge Flow (MGD)	PMF	Upstream Stream Flow (cfs)	Adjusted Stream Flow (cfs)	Downstream Stream Flow (cfs)
Jan 1-31	18.76	0	8.054	10.706	1.00	188.80	159.78	176.34
Feb 1-29	18.76	0	8.054	10.706	1.00	206.50	177.48	194.04
Mar 1-31	18.76	0	8.054	10.706	1.00	413.00	383.98	400.54
Apr 1-15	18.76	0	8.054	10.706	1.00	548.70	519.68	536.24
Apr 16-30	18.76	0	8.054	10.706	1.00	548.70	519.68	536.24
May 1-15	18.76	0	8.054	10.706	1.00	300.90	271.88	288.44
May 16-31	18.76	0	8.054	10.706	1.00	300.90	271.88	288.44
Jun 1-15	18.76	0	8.054	10.706	1.00	177.00	147.98	164.54
Jun 16-30	18.76	0	8.054	10.706	1.00	177.00	147.98	164.54
Jul 1-31	18.76	0	8.054	10.706	1.00	100.30	71.28	87.84
Aug 1-15	18.76	0	8.054	10.706	1.00	82.60	53.58	70.14
Aug 16-31	18.76	0	8.054	10.706	1.00	82.60	53.58	70.14
Sep 1-15	18.76	0	8.054	10.706	1.00	64.90	35.88	52.44
Sep 16-30	18.76	0	8.054	10.706	1.00	64.90	35.88	52.44
Oct 1-15	18.76	0	8.054	10.706	1.00	70.80	41.78	58.34
Oct 16-31	18.76	0	8.054	10.706	1.00	70.80	41.78	58.34
Nov 1-15	18.76	0	8.054	10.706	1.00	94.40	65.38	81.94
Nov 16-30	18.76	0	8.054	10.706	1.00	94.40	65.38	81.94
Dec 1-31	18.76	0	8.054	10.706	1.00	141.60	112.58	129.14

Please forward all comments to Tom Starosta at 717-787-4317, tstarosta@state.pa.us.
Version 2.0 – 07/01/2005 Reference: Implementation Guidance for Temperature Criteria, DEP-ID: 391-2000-017
NOTE: The user can only edit fields that are blue.
NOTE: MGD x 1.547 = cfs.

PA Temperature Criteria and Stream Flow Multipliers

Facility: **Keystone Generating Station**
Permit Number: PA0002062
Stream: Crooked Creek

	WWF Criteria (ºF)	CWF Criteria (ºF)	TSF Criteria (ºF)	316 Criteria (ºF)	Q7-10 Multipliers (Used in Analysis)	Q7-10 Multipliers (Default - Info Only)
Jan 1-31	40	38	40		3.2	3.2
Feb 1-29	40	38	40		3.5	3.5
Mar 1-31	46	42	46		7	7
Apr 1-15	52	48	52		9.3	9.3
Apr 16-30	58	52	58		9.3	9.3
May 1-15	64	54	64		5.1	5.1
May 16-31	72	58	68		5.1	5.1
Jun 1-15	80	60	70		3	3
Jun 16-30	84	64	72		3	3
Jul 1-31	87	66	74		1.7	1.7
Aug 1-15	87	66	80		1.4	1.4
Aug 16-31	87	66	87		1.4	1.4
Sep 1-15	84	64	84		1.1	1.1
Sep 16-30	78	60	78		1.1	1.1
Oct 1-15	72	54	72		1.2	1.2
Oct 16-31	66	50	66		1.2	1.2
Nov 1-15	58	46	58		1.6	1.6
Nov 16-30	50	42	50		1.6	1.6
Dec 1-31	42	40	42		2.4	2.4

NOTES:
WWF= Warm water fishes
CWF= Cold water fishes
TSF= Trout stocking

Thermal Discharge Recommended Permit Limits

Warm Water Fishes (WWF) Stream

Facility: **Keystone Generating Station**
Permit Number: PA0002062
Stream: Crooked Creek

	WWF Ambient Stream Temperature (°F) (Default)	Ambient Stream Temperature (°F) (Site-specific data)	Target Maximum Stream Temp.[1] (°F)	WWF Daily WLA[2] (Million BTUs/day)	WWF Daily WLA[3] (°F)	at Discharge Flow (MGD)	PMF
Jan 1-31	35	32.27	40	7,347	110.0	10.706	1.00
Feb 1-29	35	33.62	40	6,673	108.4	10.706	1.00
Mar 1-31	40	40.46	46	11,960	110.0	10.706	1.00
Apr 1-15	47	48.2	52	10,983	110.0	10.706	1.00
Apr 16-30	53	55.4	58	7,515	110.0	10.706	1.00
May 1-15	58	58.19	64	9,033	110.0	10.706	1.00
May 16-31	62	62.51	72	14,754	110.0	10.706	1.00
Jun 1-15	67	64.76	80	13,516	110.0	10.706	1.00
Jun 16-30	71	66.02	84	15,946	110.0	10.706	1.00
Jul 1-31	75	68.54	87	8,740	110.0	10.706	1.00
Aug 1-15	74	66.38	87	7,796	110.0	10.706	1.00
Aug 16-31	74	67.91	87	7,217	110.0	10.706	1.00
Sep 1-15	71	66.92	84	4,828	110.0	10.706	1.00
Sep 16-30	65	64.85	78	3,717	106.5	10.706	1.00
Oct 1-15	60	59.9	72	3,805	102.5	10.706	1.00
Oct 16-31	54	53.87	66	3,814	96.6	10.706	1.00
Nov 1-15	48	47.84	58	4,487	98.1	10.706	1.00
Nov 16-30	42	40.91	50	4,015	85.9	10.706	1.00
Dec 1-31	37	39.56	42	1,698	58.6	10.706	1.00

[1] This is the maximum of the WWF WQ criterion or the ambient temperature. The ambient temperature may be either the design (median) temperature for WWF, or the ambient stream temperature based on site-specific data entered by the user. A minimum of 1°F above ambient stream temperature is allocated.
[2] The WLA expressed in Million BTUs/day is valid for Case 1 scenarios, and disabled for Case 2 scenarios.
[3] The WLA expressed in °F is valid only if the limit is tied to a daily discharge flow limit (may be used for Case 1 or Case 2). WLAs greater than 110°F are displayed as 110°F.

KeystoneGen-Thermal Discharge Limit Calc

4/21/2020