pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	Renewal	Application No.	PA0008281
Facility Type	Industrial	APS ID	326722
Major / Minor	Major	Authorization ID	872106

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

Applicant and Facility Information

Applicant Name	**Brunner Island LLC**	Facility Name	**Brunner Island Stream Electric Station**
Applicant Address	835 Hamilton Street Suite 150	Facility Address	1400 Wago Road - Brunner Island
	Allentown, PA 18101		York Haven, PA 17370-0221
Applicant Contact	Craig Shamory	Facility Contact	Thomas Hickes
Applicant Phone		Facility Phone	
Client ID	141473	Site ID	447501
SIC Code	4911	Municipality	East Manchester Township
SIC Description	Trans. & Utilities - Electric Services	County	York
Date Application Received	March 18, 2011	EPA Waived?	No
Date Application Accepted	March 23, 2011	If No, Reason	Major Facility

Purpose of Application: Renewal of NPDES permit for discharge of industrial wastewater

Summary of Review

In 2015, Talen Energy Inc. purchased the Brunner Island Steam Electric Station (BISES), formerly operated by Pennsylvania Power & Light (PPL) Generation, LLC. Talen Energy now owns and operates the 1,490-Megawatt coal- and natural gas-fired power plant along the western shore of the Susquehanna River in East Manchester Township, York County, Pennsylvania. BISES uses three boiler units. Unit 1 began operation in 1961 and has a generating capacity of 325 megawatts; Unit 2 began operation in 1965 and has a generating capacity of 384 megawatts; and Unit 3 began operation on 1969 with a generating capacity of 781 megawatts. BISES discharges various wastewater and stormwater flows under NPDES Permit No. PA0008281. The permit was last reissued on September 1, 2006. Two amendments were subsequently issued on April 2, 2007 and September 24, 2008. The facility submitted a timely permit renewal application and has been operating under the administratively extended permit since the permit expiration date of August 31, 2011. BISES operates under SIC Code 49 or NAICS Code 221 and is classified by DEP as a Major Facility greater than or equal to 250 MGD.

The BISES site treats a variety of industrial wastewaters and sewage on-site with sludge residuals landfilled, or hauled off-site for further processing. The BISES site has 6 wastewater outfalls and proposed a new outfall in addition to 22 stormwater outfalls. The wastewater outfalls are listed below with a brief description and location.

Approve	Deny	Signatures	Date
X		J. Pascal Kwedza / Environmental Engineering Specialist	April 5, 2017
X		Maria D. Bebenek, P.E. / Program Manager	April 5, 2017

Summary of Review

Table Wastewater Outfall Location

Outfall No.	Latitude	Longitude	Design Flow (MGD)	Description of Discharge
001	40°05'29"	76°41'15"	795.0	Condenser Cooling Water Discharge
002	40°05'59"	76°41'42"	2.0	Incidental Waste Treatment Basin
003	40°05'58"	76°41'40"	0.032	Sewage Treatment Plant
004	40°04'37"	76°40'40"	4.8	Ash Basin No. 6
005	40°05'41"	76°41'36"	N/A	Emergency Overflow from Equalization Basin
007	40°05'32"	76°41'23"	0.520	Flue Gas Desulfurization IWTP
008	40°05'29"	76°41'15"	5.5	New AWWP discharge

A topographical map showing discharge locations is presented in Attachment A.

Facility Upgrades and Permitting

In an effort to meet State and Federal regulations over the past decade, PPL had spent approximately $860 million on plant upgrades including 34 cell mechanical draft cooling towers (completed in the Spring of 2010), new scrubbers and an industrial wastewater treatment plant designed to treat the scrubber wastewater (completed in the Spring of 2009) and new electrostatic precipitators for Units 2 and 3. As a result of the new scrubber system, the BISES site also generates several thousand tons of synthetic gypsum per year, which is held on-site until it is transported to an off-site processor. The facility is also being upgraded to utilize natural gas.

In response to the receipt of the NPDES permit renewal application in 2011, DEP issued a draft NPDES permit to PPL on March 9, 2012. A second draft was prepared and issued on May 14, 2014. The second draft was DEP's effort to address the comments received from EPA, PPL and third parties on the initial draft permit. DEP received additional comments from EPA, PPL and third parties on the second draft permit during the comment period. DEP has decided to prepare a revised draft permit to address comments and to include effluent limits and permit conditions consistent with EPA's revised Effluent Limitation Guidelines (ELGs) for coal-fired power plants, published on November 3, 2015. The second draft permit established technology-based effluent limitations (TBELs) in the permit, particularly for Outfall 007 (flue gas desulfurization (FGD) wastewater), and bottom ash wastewater using best professional judgment (BPJ) under 40 CFR § 125.3(c). The ELGs will replace the BPJ/TBEL analysis for pollutants considered in the ELGs.

Basis for Effluent Limitations

In general, the federal Clean Water Act (CWA) requires that the effluent limits for a pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

Technology-Based Effluent Limitations

On September 30, 2015, EPA finalized a rule that revises the steam electric ELGs (40 CFR Part 423) for power plants and published it on November 3, 2015. The rule became effective on January 4, 2016. The revised rule established new

Summary of Review

requirements for best available technology economically achievable (BAT), new source performance standards (NSPS), pretreatment standards for existing sources (PSES), and pretreatment standards for new sources (PSNS) for certain wastestreams. The revised rule did not make any changes to the best conventional pollutant control technology (BCT) and best practicable control technology (BPT) requirements. The final rule impacts BISES' discharge of flue gas desulfurization (FGD) wastewater, bottom ash transport water (BATW), and fly ash transport water, discussed further in the report.

Stream Flow

The United States Geologic Survey (USGS) maintains a stream gauging station on the Susquehanna River at Marietta, gauging station no. 01576000. This stream gauging station is the closest station downstream of the BISES site at approximately 8.5 miles. The previous protection report used a Q_{7-10} flow of 3,283 cubic feet per second (cfs), which was reported by the Susquehanna River Basin Commission (SRBC) and the USGS for the period from 1972-2004.

The Q_{7-10} value closely matches the calculated Q_{7-10} value of 3,200 cfs, obtained from the USGS Pennsylvania Stream Stats GIS application on September 14, 2011. The USGS PA Stream Stats Q_{7-10} value of 3,200 cfs is an average value for the entire Susquehanna River up to the Marietta gauging station. Therefore, because the two values are consistent and the USGS PA Stream Stats value is up to date, the USGS PA Stream Stats Q_{7-10} is considered the most appropriate for the BISES NPDES renewal. The USGS PA Stream Stats' watershed delineation tool, used at the BISES site, produces a Q_{7-10} value of 3,100 cfs with a drainage area of 25,500 mi^2.

The Q_{7-10} of 3,100 cfs produces a chronic or 30 day (Q_{30-10}) and an acute or 1 day (Q_{1-10}) exposure stream flows of (Guidance No. 391-2000-023):

$$Q_{7-10} = 3{,}100 \text{ cfs}$$
$$Q_{30-10} = 1.36 * 3{,}100 \text{ cfs} = 4{,}216 \text{ cfs}$$
$$Q_{1-10} = 0.64 * 3{,}100 \text{ cfs} = 1{,}984 \text{ cfs}$$

The fact sheet supporting the second draft permit indicated that the Susquehanna River in the immediate vicinity of Water Quality Network station 201 (Susquehanna River at Marietta) is listed as impaired for metals. This impairment listing is based on monthly sampling results from WQN0201, which show periodic exceedances of numeric water quality criteria for Aluminum, Copper, Iron, Lead, Manganese, and Zinc in the period 2006 to 2013. Based on investigation of these sample results, the exceedances are correlated with high flow events and originate primarily from non-point, precipitation-induced sources. Brunner Island is not a significant source of these metals and DEP does not consider this point source as causing or contributing to the impairment listing at WQN0201. However, at a minimum, monitoring requirements will be established for all of these metals at any outfall where these metals may be present.

Public Water Supply

The closest public water supply intake is owned and operated by the Wrightsville Borough Municipal Authority (WBMA) along the west shore of the Susquehanna River approximately 9.8 miles below the BISES site. The WBMA uses two pumps to pump raw water from the Susquehanna River into Miller Quarry, which provides storage for the WBMA's WTP. The WBMA serves a total of 4076 consumers with water production ranging from 250,000 to 350,000 gpd. The WBMA WTP serves homes in Wrightsville, Hellam Township and several schools in Lower Windsor Township.

Compliance History

DMR Data for Outfall 001 (from January 1, 2016 to December 31, 2016)

Parameter	DEC-16	NOV-16	OCT-16	SEP-16	AUG-16	JUL-16	JUN-16	MAY-16	APR-16	MAR-16	FEB-16	JAN-16
Flow (MGD) Average Monthly	295	384	319	488	678	578	490	204	228	293	294	336
Flow (MGD) Daily Maximum	568	653	585	639	742	673	672	391	335	577	436	512
pH (S.U.) Minimum	7.2	7.4	7.6	7.6	8.2	8.1	7.9	7.4	7.9	7.4	6.8	7.4
pH (S.U.) Maximum	8.5	8.1	7.9	8.2	8.3	8.3	8.5	7.9	8.2	8.0	7.7	8.3
TRO (mg/L) Average Monthly	GG	0.06	0.02	0.07	0.10	0.06	0.07	0.07	0.05	0.06	GG	GG
TRO (mg/L) Instantaneous Maximum	GG	0.13	0.04	0.16	0.29	0.19	0.18	0.13	0.19	0.14	GG	GG
Temperature (°F) Average Monthly	48	49	62	77	83	85	81	63	58	52	53	56
Temperature (°F) Daily Maximum	74	63	70	88	87	93	87	86	74	64	79	77
Temperature (°F) Intake Average Monthly	37	48	61	76	83	83	77	63	56	49	36	35
Temperature (°F) Instantaneous Maximum	79	67	76	94	82	102	99	92	80	69	85	83
Temperature (°F) Intake Daily Maximum	46	54	69	83	87	87	81	79	66	56	41	46
Hourly Temp Change (°F/hr)Instream Monitoring IMAX	2.4	1.1	1.3	1.2	1.5	1.5	1.7	0.5	0.9	0.7	3.8	1.5
Heat Rejection Rate (MBTUs/day) Average Monthly	45642	12379	1876	4328	2458	10391	16099	2421	6565	10499	50168	55963
Heat Rejection Rate (MBTUs/day) Daily Maximum	144339	57558	23655	40307	17048	39903	48318	27601	26160	60501	159189	115470
Clamtrol CT-1 (mg/L) Daily Maximum	GG	GG	GG	GG	GG	GG	GG	GG	GG	GG	GG	GG

Trihalomethanes (mg/L) Average Monthly	GG	< 0.50	< 0.50	< 0.50	< 0.55	< 0.59	< 0.54	< 0.50	< 0.50	< 0.50	GG	GG
Trihalomethanes (mg/L) Daily Maximum	GG	< 0.50	< 0.50	< 0.50	0.75	0.99	0.66	< 0.50	< 0.50	< 0.50	GG	GG

Note – "GG" is a NODI code that can be used when monitoring is not required. For example, Clamtrol CT-1 monitoring is only required when Clamtrol biocide is used.

DMR Data for Outfall 002 (from January 1, 2016 to December 31, 2016)

Parameter	DEC-16	NOV-16	OCT-16	SEP-16	AUG-16	JUL-16	JUN-16	MAY-16	APR-16	MAR-16	FEB-16	JAN-16
Flow (MGD) Average Monthly	1.8	2.0	2.0	2.2	1.5	1.7	1.9	1.9	2.0	2.0	1.7	1.4
Flow (MGD) Daily Maximum	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.3	2.1	2.1	2.1
pH (S.U.) Minimum	6.9	6.8	6.3	6.7	6.8	6.9	6.5	6.3	6.6	7.0	6.4	7.1
pH (S.U.) Maximum	8.0	7.7	7.8	7.3	8.9	8.5	8.0	7.8	8.7	8.4	7.4	8.0
TSS (mg/L) Average Monthly	< 6	7	< 5	10	10	6	14	< 6	< 5	6.6	< 5	< 5
TSS (mg/L) Instantaneous Maximum	7	8	< 5	12	11	9	20	7	< 5	10.3	5	< 5
Oil and Grease (mg/L) Average Monthly	< 2.2	< 1.8	< 1.5	< 1.9	< 1.3	< 2.1	1.6	< 2.1	< 1.22	< 5	< 1.14	< 1.2
Oil and Grease (mg/L) Daily Maximum	2.3	< 2.2	< 1.9	< 2.0	< 1.9	< 2.3	1.7	< 2.1	< 2.0	< 5	< 1.9	< 1.9

DMR Data for Outfall 003 (from January 1, 2016 to December 31, 2016)

Parameter	DEC-16	NOV-16	OCT-16	SEP-16	AUG-16	JUL-16	JUN-16	MAY-16	APR-16	MAR-16	FEB-16	JAN-16
Flow (MGD) Average Monthly	0.010	0.010	0.021	0.020	0.016	0.013	0.012	0.012	0.009	0.010	0.011	0.008
Flow (MGD) Daily Maximum	0.018	0.033	0.035	0.031	0.036	0.027	0.021	0.023	0.022	0.024	0.027	0.019
pH (S.U.) Minimum	7.0	6.9	6.7	6.8	6.7	7.0	7.0	6.4	6.8	7.0	6.6	7.1

pH (S.U.) Maximum	8.3	8.2	8.3	7.9	8.6	8.0	8.3	8.3	8.0	8.2	8.4	8.4
DO (mg/L) Minimum	9.8	7.8	7.2	7.0	6.7	7.0	6.7	5.6	5.6	8.3	5.6	8.2
TRC (mg/L) Average Monthly	0.06	0.02	0.15	0.34	0.33	0.27	0.13	0.02	0.09	0.01	0.08	0.01
TRC (mg/L) Instantaneous Maximum	0.89	0.09	0.91	1.4	1.64	1.4	1.17	0.37	1.17	0.05	0.90	0.14
CBOD5 (mg/L) Average Monthly	2.7	6	1.1	2	< 1.28	3.1	1.5	1.4	5.7	3.2	8.7	5.2
TSS (mg/L) Average Monthly	29	27	12	23	19	66	20	< 6	26	17	26	29
Fecal Coliform (CFU/100 ml) Geometric Mean	12	< 1	197	< 2	< 2	< 1	5	6	61	1	< 3	125
Nitrate-Nitrite (mg/L) Average Monthly	19.4	22.2	17.1	16.2	36.9	19.6	33.1	49.6	29.9	16.5	5.5	14.0
Nitrate-Nitrite (lbs) Total Monthly	60	77.8	84	85	86	72	108	154	52	30	36	14
Total Nitrogen (mg/L) Average Monthly	< 20.4	24.3	< 18.1	< 17.2	< 37.9	< 25	< 34.1	< 50.6	42.6	33.6	18.3	28.1
Total Nitrogen (lbs) Total Monthly	< 63	85.1	< 88.9	< 90	< 88	< 94	< 111	< 157	75	61	120	29
Ammonia (mg/L) Average Monthly	0.050	0.058	0.037	0.044	0.058	1.1	0.188	0.100	20.2	16.6	12.8	13.3
Ammonia (lbs) Total Monthly	0.2	0.2	0.2	0.2	0.1	4	0.6	0.3	35	30	84	14
TKN (mg/L) Average Monthly	< 1.0	2.1	< 1.0	< 1.0	< 1.0	< 5.4	< 1.0	< 1.0	12.7	17.1	12.8	14.1
TKN (lbs) Total Monthly	< 3	7.4	< 4.9	< 5	< 2	< 22	< 3	< 3.0	22	31	84	15
Total Phosphorus (mg/L) Average Monthly	0.85	0.41	0.36	0.5	0.46	3.2	0.53	0.18	0.72	0.48	1.8	0.8
Total Phosphorus (lbs) Total Monthly	3	1.3	2.1	3	1	14	1	0.5	2	1	10	1

DMR Data for Outfall 004 (from January 1, 2016 to December 31, 2016)

Parameter	DEC-16	NOV-16	OCT-16	SEP-16	AUG-16	JUL-16	JUN-16	MAY-16	APR-16	MAR-16	FEB-16	JAN-16

Flow (MGD) Average Monthly	2.91	2.61	3.08	3.59	3.53	3.17	2.71	0.77	1.76	2.26	2.86	3.16
Flow (MGD) Daily Maximum	5.32	4.76	5.90	5.32	4.76	4.22	4.22	2.74	3.21	3.71	5.32	4.76
pH (S.U.) Minimum	6.9	6.6	6.7	6.8	7.0	6.9	6.6	7.0	6.9	6.9	6.8	7.2
pH (S.U.) Maximum	7.3	7.3	7.4	7.3	7.7	7.4	7.4	7.8	7.9	8.4	7.6	7.8
TSS (mg/L) Average Monthly	< 6	< 5	< 5	< 6	< 6	8	7	< 6	< 6	< 6.8	< 15.5	< 8
TSS (mg/L) Daily Maximum	8	< 5	6	7	8	12	12	7	9	11	28	12
Oil and Grease (mg/L) Average Monthly	1.1	< 1.7	< 1.9	< 2.0	< 1.4	< 1.9	0.78	< 1.9	0.61	1.6	0.52	< 1.4
Oil and Grease (mg/L) Daily Maximum	1.7	< 2	< 1.9	< 2.1	< 2.0	< 2.2	0.97	< 1.9	0.82	2.8	0.66	< 1.9

DMR Data for Outfall 005 (from January 1, 2016 to December 31, 2016) (None available – no discharge in past year)

DMR Data for Outfall 007 (from January 1, 2016 to December 31, 2016)

Parameter	DEC-16	NOV-16	OCT-16	SEP-16	AUG-16	JUL-16	JUN-16	MAY-16	APR-16	MAR-16	FEB-16	JAN-16
Flow (MGD) Average Monthly	0.0593	0.0275	0.0261	0.0839	0.1090	0.1603	0.0623	0.0315	0.0100	0.0294	0.1106	0.0796
Flow (MGD) Daily Maximum	0.3058	0.1733	0.1504	0.2337	0.2567	0.2922	0.2475	0.0976	0.0901	0.1944	0.2522	0.2042
pH (S.U.) Minimum	7.53	7.4	7.43	7.4	7.0	7.7	7.76	6.93	7.6	7.70	6.65	7.09
pH (S.U.) Maximum	8.34	8.5	8.30	8.5	8.4	8.4	8.35	8.62	8.5	8.52	8.33	8.48
Temperature (°F) Daily Maximum	80	75	71	96	105	111	93	89	55	59	80	65
TSS (mg/L) Average Monthly	< 14	< 4	< 4.6	< 4	< 5	< 4	< 8	12	< 4	< 4	12.9	< 4
TSS (mg/L) Daily Maximum	37.5	< 4	5.8	< 4	10	< 4	25	15	15.3	< 4	36.2	< 4
Total Dissolved Solids (mg/L) Average Monthly	21480	27150	15567	29975	24340	29375	30320	3195	11975	16200	14015	10828
Total Dissolved Solids (mg/L) Daily Maximum	29900	29600	24300	34500	35900	32100	37600	6350	15400	20400	23200	15500

Oil and Grease (mg/L) Average Monthly	< 1.8	< 1.6	< 1.8	< 1.2	< 1.6	< 1.4	< 1.7	< 1.6	1.19	< 1.6	< 1.6	< 1.5
Oil and Grease (mg/L) Daily Maximum	< 2.2	< 2	< 2.0	< 2.0	< 1.9	< 2.0	1.9	< 2.1	< 1.9	1.9	< 1.9	< 1.9
Nitrate-Nitrite (mg/L) Average Monthly	73.3	91.7	57.7	147.9	91.1	206	114	8.0	41.25	54.2	57.4	67.5
Nitrate-Nitrite (lbs) Total Monthly	909.7	614.6	1654.6	4367	2736	8655	2632	73	561	1187	1618	1636
Total Nitrogen (mg/L) Average Monthly	108.7	129.5	81.9	193.7	121.7	229.2	145	11.5	48.8	66.9	69.81	80.8
Total Nitrogen (mg/L) Intake Average Monthly	< 2.69	1.2	< 1.21	< 1.19	< 1.04	< 1.1	< 1.8	< 2.3	< 2.1	< 2.8	< 3.2	< 3.3
Total Nitrogen (lbs) Effluent Net Total Monthly	1321.6	884	2367.1	5727	3604	9501	3366	106	< 621	1491	1934	1869
Total Nitrogen (lbs) Intake Total Monthly	32.7	< 9	< 45.6	36	< 29	< 47	42	< 20	< 26	< 57	< 101	< 81
Total Nitrogen (lbs) Total Monthly	1346.1	893	2408.9	5763	3633	9548	3408	106	647	1548	2035	1950
TKN (mg/L) Average Monthly	35.5	37.5	25.2	45.8	30.6	23.5	31.2	3.5	7.5	12.8	12.38	13.3
TKN (lbs) Total Monthly	436.3	278.4	754.3	1395	898	893	776	33	86	361	417	314
Total Phosphorus (mg/L) Average Monthly	0.08	0.063	< 0.087	< 0.10	< 0.10	0.061	< 0.089	< 0.10	< 0.10	< 0.065	< 0.026	< 0.054
Total Phosphorus (mg/L)Intake Average Monthly	0.045	< 0.059	< 0.079	< 0.10	< 0.10	< 0.014	< 0.066	< 0.10	< 0.10	0.056	< 0.081	< 0.091
Total Phosphorus (lbs) Effluent Net Total Monthly	00	00	1	00	00	00	00	< 1	00	1	< 3	2
Total Phosphorus (lbs) Intake Total Monthly	0.5	00	2.2	3	< 3	3	2	< 1	< 1	1	< 3	< 2
Total Phosphorus (lbs) Total Monthly	< 1.1	00	< 2.2	3	3	3	< 2	< 1.0	< 1	< 2	< 0.9	< 4
Total Aluminum (mg/L) Daily Maximum	< 0.40	< 0.40	0.13	< 0.40	1.8	< 0.044	< 0.40	0.48	0.40	0.23	< 0.40	0.70
Total Antimony (mg/L) Daily Maximum	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.0010
Total Arsenic (mg/L) Daily Maximum	< 0.015	0.011	0.0078	0.0066	< 0.015	< 0.015	0.0052	0.0064	0.0057	< 0.015	< 0.015	0.00085

Total Boron (mg/L) Daily Maximum	82.3	412	105	276	204	466	425	115	213	312	457	35.9
Total Cadmium (mg/L) Daily Maximum	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0073	0.0030	0.0032	< 0.0050	0.0022	< 0.0050	0.028	0.0019
Total Chromium (mg/L) Daily Maximum	< 0.010	< 0.010	< 0.010	< 0.010	0.014	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.00090
Total Copper (mg/L) Average Monthly	< 0.0175	< 0.019	< 0.025	< 0.019	< 0.025	< 0.025	< 0.020	< 0.008	< 0.025	< 0.025	< 0.021	< 0.018
Total Copper (mg/L) Daily Maximum	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.0031	< 0.025	< 0.025	< 0.025	0.020
Fluoride (mg/L) Daily Maximum	30.0	105	40.0	110	29.0	27.5	77.5	25.0	40.0	50.0	75.0	11.8
Total Iron (mg/L) Daily Maximum	< 1.5	< 1.5	< 1.5	< 1.5	7.3	< 1.5	< 1.5	3.6	< 0.60	< 1.5	< 1.5	1.5
Total Lead (mg/L) Average Monthly	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.008	< 0.010	< 0.010	< 0.010	< 0.008
Total Lead (mg/L) Daily Maximum	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Mercury (ng/L) Daily Maximum	895	313	4.5	44	92.1	181	27.1	107	403	125	763	760
Total Molybdenum (mg/L) Daily Maximum	0.0068	0.072	0.0092	0.061	0.019	0.017	0.058	0.0068	0.013	0.0094	0.045	0.0013
Total Nickel (mg/L) Daily Maximum	0.31	0.82	0.25	0.36	0.59	1.0	1.1	0.27	0.75	0.62	0.71	0.13
Total Selenium (mg/L) Daily Maximum	0.49	3.2	0.38	2.0	2.0	1.6	0.94	0.081	0.20	0.13	0.91	0.057
Total Thallium (mg/L) Daily Maximum	< 0.0050	0.0029	< 0.0050	0.0019	0.0023	0.0044	0.0048	< 0.0050	< 0.0050	< 0.0050	0.0010	0.00078
Total Zinc (mg/L) Daily Maximum	0.020	0.034	0.010	0.012	0.20	0.016	0.017	0.053	0.076	0.023	0.029	0.048
Chloride (mg/L) Daily Maximum	1890	12700	3880	14100	6290	15400	14900	3330	7730	11400	15600	948

Compliance History

Effluent Violations for Outfall 001, from: February 1, 2016 To: December 31, 2016

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TRO	08/31/16	IMAX	0.29	mg/L	0.2	mg/L
Hourly Temp Change	02/29/16	IMAX	3.8	°F/hr	2.0	°F/hr
Hourly Temp Change	12/31/16	IMAX	2.4	°F/hr	2.0	°F/hr

Effluent Violations for Outfall 003, from: February 1, 2016 To: December 31, 2016

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TSS	07/31/16	Avg Mo	66	mg/L	30	mg/L
Total Phosphorus	07/31/16	Avg Mo	3.2	mg/L	2.0	mg/L

Summary of Inspections and DMR

Summary of DMR data from January 1, 2016 to December 31, 2016 for all outfalls are shown above. The data show some exceedances of effluent limitations for Outfalls 001 and 003. The exceedances have been operation and maintenance-related and have been addressed. The facility has been inspected five times in 2015 and 2016. Some operational issues were discovered during these inspection and recommendations were made to address them. The inspection on 11/6/2016 was in response to exceedances of chemical additive usage reported by the permittee. No adverse impact was identified during the inspection. A Notice of Violation ("NOV") was issued on 8/18/ 2016 for excess accumulation of solids in the chlorine contact tank and subsequent discharge of solids from the sewage treatment plant. The NOV also was issued for malfunctioning of the lime feed system of one treatment train of the FDG wastewater treatment plant. The permittee responded to the NOV and could not pinpoint the real cause of the solids accumulation, in the chlorine contact tank. The tank was pumped and a routine inspection and pumping protocol put in place to address recurrence of solids accumulation in the chlorine contact tank. The permittee explained that the automatic lime feed was down but the treatment train could be operated and lime could be fed manually if needed. The permittee indicated in the NOV response that there was no need to run that treatment train because the other train was sufficient to handle the wastewater generated. The permittee concluded that, the automatic lime feed not working at the time of inspection is not in violation of their permit.

The Department executed a Consent Assessment of Civil Penalty (CACP) on 3/31/2016 for fish kills that occurred in the condenser channel of Brunner Island due to the shutdown of one of the treatment units. The shutdown tripped the high alarm and caused cold water to be discharged to the condenser channel, resulting in a13-degree drop in temperature within one hour. The fish kill event occurred on January 30, 2016. An NOV was issued on 2/4/2016 for the unpermitted temperature excursion. A response to the NOV was received on 2/26/2016 that outlined 7 corrective actions to completed by 3/31/2016 to prevent the occurrence of similar violation. The Department assessed a civil penalty of $25,898.00, which was paid by Talen Energy.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	795
Latitude	40° 5' 36.85"	Longitude	-76° 41' 4.55"
Quad Name		Quad Code	
Wastewater Description:	Once-through non-contact Cooling Water		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	57464297	RMI	54.27
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Thermal Discharge History & 316(a) Variance

The facility has been operating under a 316(a) variance since 1981, based on a study conducted in the 1970s. The alternate thermal limits granted in 1981 have been included in all subsequent permit renewals; however, the NPDES renewal in 2002 required the permittee to conduct biological monitoring studies to determine whether the once through cooling water was causing "appreciable harm" to the indigenous aquatic communities within the Susquehanna River. The biological surveys were conducted from 2002 through 2005. The same 2002 NPDES permit required the facility to monitor hourly temperature changes downstream of its discharge. The temperature monitoring was completed in 2003. The biological and temperature data collected during this period showed that the once through cooling water elevated the river temperature above the Department's Chapter 93 criteria for warm water fisheries (WWF). DEP reviewed the data and found there may be

appreciable harm to the aquatic communities up to 3 miles downstream of Outfall 001 along the western shore of the Susquehanna River near the confluence with Codorus Creek.

Additionally, DEP conducted helicopter flyovers of the Susquehanna River with the Pennsylvania State Police in June of 2004 and September of 2005. The infrared images taken from that flyover confirmed a thermal plume along the western shore of the Susquehanna River down to the confluence with the Codorus Creek.

DEP and the permittee entered into a Consent Order and Agreement (COA) on March 27, 2006. This required the permittee to construct a cooling system capable of removing 55% of the total heat load during the worst-case summertime humidity conditions at a 16°F approach temperature or the temperature of the wet bulb or dew point temperature plus 16°F. Also, the COA required that the once through cooling water could not change the receiving stream by 2°F during any one-hour period and that 100% of the plant condenser cooling water was effectively cooled during the non-winter months.

DEP agreed to allow a 5,000 ft mixing zone based on the flyover infrared images, a dynamic model for estimation of mixing, and Department biologist determination that critical habitat exist immediately below the 5,000 ft mixing zone. DEP determined heat rejection rates that provided a 4°F increase above the WWF criteria during April, 2°F increase above the WWF criteria during March and May through November and an 8°F increase above WWF criteria during the winter months. At that time, the limits were determined to be consistent with the 316(a) variance and expected to be protective of the water quality. The permittee submitted a water quality management (WQM) permit on May 29th, 2007 for the construction of 34 cell mechanical draft counter flow cooling towers. DEP approved the WQM permit, No. 6707201, on November 29th, 2007. Construction of the cooling towers was completed on March 31, 2010 and began operation on April 1st, 2010. DEP authorized the facility to turn the cooling towers off from December 1st through February 29th based on the cost to run the towers, concerns over freezing within the towers and because the discharge was not suspected to cause biological harm in the winter; however, DEP required further biological assessments of the Susquehanna River below the cooling tower discharge to confirm or reject the calculated heat rejection rates and the assumptions.

The biological assessments required summer (defined as August) and winter (defined as December 1st through February 29th) assessments for the remainder of the permit following startup of the cooling towers. BISES submitted a series of Biological Studies which DEP reviewed and determined were inconclusive. The Biological Studies did, however, indicate some improvement in the biotic community below the 5,000 ft. compliance point following commencement of cooling tower operation.

The permittee indicates that it has implemented a change of operations since its submission of Biological Studies of the Susquehanna River. The facility now is being used as a "peaking power facility." The facility shuts down during low demand and only comes back online when needed. The previous 316(a) demonstration did not evaluate the impact of sudden shutdowns. Moreover, in recent years there has been a number of large fish kills in the vicinity of BISES' discharge. DEP determined that fish kills which occurred on January 30, 2016 were caused by cold shock to the fish resulting from the sudden shutdown of the facility units. A large fish kill also occurred in late December of 2016. DEP presently is conducting an investigation regarding the cause of this most recent fish kill. The previous 316(a) study did not evaluate the impact of a sudden shut down of the Brunner Island units on temperature of the stream in the channel and the river. The permittee, thus, will need to thoroughly investigate and evaluate the effects of its new operation on the balance of the indigenous biotic community.

The permittee will need to demonstrate that the existing 316(a) variance continues to be applicable to the change in facility operations. The permit will require the submission of a work plan within 120 days of permit issuance for approval to start data collection to demonstrate that the existing 316(a) variance is protective of aquatic life. The following condition will be written in the permit:

"Clean Water Act Section 316(a) Thermal Effluent Limits

The thermal effluent limitations for Outfall 001 in Part A of this permit are based on water temperatures that are less stringent than water quality standards contained in 25 Pa. Code Chapter 93, as allowed under Section 316(a)

of the Clean Water Act. The thermal effluent limitations were developed based on biological studies that demonstrated a balanced indigenous aquatic community below an approved compliance point in the Susquehanna River, when the facility operated as a baseload station.

The permittee shall conduct biological studies to evaluate the continued applicability of the permittee's existing 316(a) variance as a peaking station. Within 120 days after permit issuance, the permittee shall submit a study plan for a Section 316(a) demonstration to the Department for approval. The work plan must include, at a minimum, temperature monitoring, seasonal fish surveys and macroinvertebrate surveys for a period of no less than two years. The work plan must include the permittee's chosen method to evaluate the impact of the sudden shut down of units on fish and other aquatic life. The work plan must be approved by the Department before the work commences. The final Section 316(a) demonstration report shall be submitted to the Department no later than three (3) years following permit issuance."

Cooling Tower Temperature Requirements

The facility operates the mechanical draft cooling towers from March 1st to November 30th per its NPDES permit. The permittee indicated that due to freezing and very cold conditions experienced in March, it was difficult to run the cooling towers in March and requested approval from DEP to cease operation of the towers in March. DEP believes that there could be days in the month of March that the towers could run without difficulty. If the permittee has difficulty on a day in March due to freezing, the permittee should contact DEP to discuss operational adjustments. The permittee is required to meet heat rejection rates as noted below. The heat rejection rates are reported as maximum daily rates. These rates indicate the amount of heated mass that the Susquehanna River can accept and not the amount of heat that the cooling towers must remove from the non-contact cooling water. The table below shows the heat rejection rates that the permittee is required to meet each month currently and under the proposed permit renewal.

Heat Rejection Rates (MBTUs/Day)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
MBTUs/day	167,040		91,870		83,520	75,170				83,520	91,870	167,040

To comply with the Heat Rejection Rate limitations and monitoring requirements for Outfall 001, the permittee shall monitor the following parameters:

Parameter	Units	Monitoring Location
Discharge, Q_d	MGD	End of discharge channel (Average daily flow from all units and cooling structures)
Plant Intake Temperature, T_1	°F	Susquehanna River at intake (Average daily temperature as specified in Footnote 4)
Effluent Temperature, T_d	°F	End of discharge channel (Average daily temperature as specified in Footnote 5)

For reporting purposes, the permittee shall perform the following calculation:

$Q_d \times 8.34 (T_d - T_1)$ = actual Heat Rejection Rate in million BTUs/day (MBTUs/day)

Report the daily Heat Rejection Rate on Supplemental DMRs, and the average monthly and maximum daily Heat Rejection Rates recorded during the month on the DMR.

The permittee was required in the existing permit to develop operating procedures that will be followed to eliminate "heat shock" fish kill incidents that occur near the facility. PPL contracted with the Stroud Water Research Center in 2009 to conduct a temperature change tolerance study.

Based on the 2009 Stroud study, the permittee has requested that the current NPDES permit requirement regarding the 2°F hourly in-stream temperature change be modified to allow an 8°F hourly in-stream temperature change. DEP, however, determined that the Stroud study was insufficient, as the study only examined warm season experiments and did not evaluate temperature extremes that could cause mortality. Therefore, the request cannot be granted. The NPDES permit requirement regarding the 2°F in stream hourly temperature change (previously in Chapter 93 of the Department regulations and now in 25 Pa. Code § 96.6) is meant to protect against cold shock impacts due to sudden shutdowns of heat-producing facilities and to limit the magnitudes of excursions which can occur above allowable temperatures. (*See* PA DEP's Guidance Doc. No. 391-2000-017 *Implementation Guidance for Temperature Critieria*, April 11, 2009).

Polychlorinated Biphenyl Compounds(PCBs)

Under 40 CFR § 423.12 (b)(2) the discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid is prohibited in permit. This requirement will be incorporated in the permit.

Cooling Water Blowdown

Brunner Island is required to meet ELGs contained in 40 CFR § 423.13 (b)(1) for the Steam Electric Power Generating Point Source Category. The ELG (based on best available control technology) for once-through cooling water (at plants generating greater than 25 MW of electricity) applies as follows:

- Total Residual Chlorine - 0.2 mg/l as a maximum (IMAX) concentration.
- Free available chlorine 0.20 mg/l average monthly and 0.50 mg/L daily maximum

The existing permit has Total Residual Oxidants which will remain in the permit due to other biocides being used.

In addition, the following footnote in the permit will be kept in Part A of the permit in accordance with 40 CFR § 423.13(b)(2):

> *Total Residual Chlorine or other approved biocides may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.*

BISES is required to meet the ELGs contained in 40 CFR § 423.13(d)(1) pertaining to cooling water blowdown as follows:

- The 126 priority pollutants contained in chemicals added for cooling tower maintenance - non-detect except Chromium, Total – 0.2 mg/l average monthly and 0.2 mg/l daily maximum; and Zinc, Total – 1 mg/l average monthly and 1 mg/L daily maximum.

The ELG further provides that at the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b), compliance with the limitations for the 126 priority pollutants in paragraphs (d)(1) may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136. The permit will be drafted with the limits for free available chlorine and the following language for the 126 Priority Pollutants

> "Cooling tower blowdown discharges shall contain no detectable amounts of the 126 Priority Pollutants listed in 40 CFR Part 423, Appendix A, that are contained in chemicals added for cooling tower maintenance, except for Total Chromium average monthly and maximum daily of 0.2mg/l and Total Zinc average monthly and maximum daily of 1.0mg/l. When requested by DEP, the permittee shall conduct monitoring or submit engineering calculations to demonstrate compliance with 40 CFR 423.13(d)(1)."

Chemical Additives

The following chemical additives were listed in the 2012 draft permit as approved for the BISES treatment process: Nalco Trasar 3DT190, Nalco Biodispersant 7348, Nalco Acti-Brom 1338, Nalco 73551, Nalco 7468,Naclear 7744, Sodium Hypochlorite. The permittee also submitted a chemical additive notification form for Foamtrol AF 1440 with an acceptable usage rate. The additives are approved to be used at the facility at the rates listed in the application and on the chemical additive notification form. The latest Chemical Additives permit language will be written in the permit, which refers the permittee to DEP's "Approved List" of chemical additives and requires the completion of "Chemical Additives Notification Forms" to DEP prior to usage of additives on the approved list.

Trihalomethanes

With daily addition of biocides during the summer, there is a concern that Trihalomethanes (THMs) may form. THMs are disinfection byproducts formed when bromine and chlorine react with organic precursors. THMs are a group of compounds composed of bromoform, chloroform, bromodichloromethane, and dibromochloromethane. The EPA MCL for THMs is 0.08 mg/l. Considering the presence of a water supply within 10 miles downstream, DEP will require that THMs be monitored weekly when biocides are used.

pH

The pH of the cooling water was in the former (prior to 2002) permit, with a monitoring frequency of "upon request." It was removed from the 2002 permit. Following installation of cooling technology, pH limits of 6.0 – 9.0 S.U. and weekly monitoring are deemed appropriate to determine if cooling system additives have an adverse effect. A footnote will be added to Part A of the permit to indicate, "If effluent pH is outside the range of 6 to 9 S.U., the limitations do not apply if the permittee demonstrates that the pH of the intake water on the same day is also outside the range of 6 to 9 S.U."

Proposed Limits and Monitoring Requirements

See proposed effluent limitations and monitoring requirements sections for Outfall 001for details.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	002	Design Flow (MGD)	2
Latitude	40° 6' 20.48"	Longitude	-76° 41' 34.91"
Quad Name		Quad Code	
Wastewater Description:	Effluent from Incidental Waste Treatment Basin (coal pile runoff and low volume wastes		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	57463865	RMI	55.0
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Outfall 002-Incidental Waste Treatment Basin (IWTB)

The "incidental waste treatment basin" (IWTB) receives wastewaters and storm water from several sources, including reverse osmosis filtrate from the plant's water treatment system, runoff from coal piles stored outdoors, plant and yard drains and sumps from Units 1 and 2, and boiler blowdown from Units 1 and 2. The average discharge from the IWTB to Outfall 002 was 1.7 MGD during calendar year 2016 with a maximum daily discharge rate of 2.3 MGD. The design flow of this discharge is reported to be 2.0 MGD. Brunner Island uses aluminum sulfate to coagulate and settle wastewater constituents in the IWTB. The treatment process in the IWTB operates by pH adjustment using sulfuric acid, sodium carbonate or sodium hydroxide to maintain the pH level between 6.5 and 8.5 S.U. The wastewater enters a control station, which includes a pH probe, prior to entering the first of three treatment cells. Aluminum sulfate is used to aid the precipitation/sedimentation process. The effluent is monitored and adjusted for pH; however, recirculation pumps are automatically activated to recycle

the effluent if the pH does not fall within the maintained range of 6.5 – 8.5 S.U. The IWTB also uses oil booms to control the oil and grease levels in the final effluent.

Existing Outfall 002 Discharge Limits

	Discharge Limitations					Monitoring Requirements	
	Mass Loadings (lbs/d)		Concentrations (mg/L)				
Parameter	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant. Maximum	Minimum Measurement Frequency	Required Sample Type
Flow (MGD)	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	From 6.0 to 9.0 S.U.			1/day	Grab
Oil & Grease	XXX	XXX	15	20	30	2/month	Grab
TSS	XXX	XXX	M&R	XXX	50	2/month	Grab
Total Aluminum	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Arsenic	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Boron	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Cadmium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Chromium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Copper	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Iron	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Lead	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Mercury	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Molybdenum	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Nickel	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Selenium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Zinc	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab

Effluent Limitation Guidelines (ELGs) and Treatment Standards

The wastewater influent to the IWTB is considered low volume waste (non-FGD) as per 40 CFR § 423.11(b) and coal pile runoff. The effluent limitation guidelines (ELGs) established in 40 CFR § 423.12(b)(3) and (b)(9) apply, as follows:

- Total Suspended Solids (TSS) – 30 mg/L average monthly and 50 mg/L instantaneous maximum (IMAX); and

- Oil and Grease – 15 mg/L average monthly and 20 mg/L maximum daily.

For TSS, a maximum daily limit of 50 mg/L has been established for Outfall 002 based on the IMAX limit of 50 mg/L contained in the ELG. For Oil and Grease, an IMAX limit of 30 mg/L has been established in accordance with 25 Pa. Code § 95.2(2)(ii). In addition, pH limitations of 6.0 S.U. (minimum) and 9.0 S.U. (maximum) are proposed, consistent with 25 Pa. Code § 95.2(1).

Best Professional Judgment (BPJ) TBELs

Over the past five years (January 2012 – December 2016), DMR data for toxic parameters have revealed "non-detect" (i.e., not detected above the laboratory quantitation limit) results and very low levels of detection.

DMR Statistics for Outfall 002 from 2012 to 2016

Pollutant	Average Concentration	95th Percentile Concentration	Maximum Concentration	% of Results "Non-Detect"
Total Aluminum	0.286 mg/L	0.648 mg/L	0.648 mg/L	0
Total Arsenic	< 0.0011 mg/L	< 0.0026 mg/L	0.003 mg/L	45
Total Boron	0.07 mg/L	0.256 mg/L	0.26 mg/L	0
Total Cadmium	< 0.00045 mg/L	< 0.00088 mg/L	< 0.001 mg/L	100
Total Chromium	< 0.0013 mg/L	< 0.0049 mg/L	< 0.005 mg/L	55
Total Copper	< 0.007 mg/L	< 0.02 mg/L	< 0.02 mg/L	35
Total Iron	0.54 mg/L	1.00 mg/L	1.00 mg/L	0
Total Lead	< 0.0011 mg/L	< 0.0048 mg/L	< 0.005 mg/L	90
Total Mercury	0.0000027 mg/L	0.000011 mg/L	0.000011 mg/L	0
Total Molybdenum	< 0.0037 mg/L	< 0.02 mg/L	< 0.02 mg/L	40
Total Nickel	< 0.0092 mg/L	< 0.028 mg/L	0.028 mg/L	30
Total Selenium	< 0.0019 mg/L	< 0.004 mg/L	< 0.004 mg/L	75
Total Zinc	< 0.018 mg/L	< 0.032 mg/L	0.036 mg/L	50

BISES' existing treatment for Outfall 002 is considered "best available technology" (BAT). If BPJ TBELs were to be developed for this discharge, they would be based on existing performance and be expressed as average monthly and maximum daily limits, with a corresponding increase in sampling frequency. However, considering the effectiveness of the existing treatment system and the very low levels of pollutants in the discharge, DEP does not believe that an increased sampling frequency is warranted for this discharge. Quarterly monitoring of the discharge for the purpose of verifying continued low levels of pollutants in the discharge will therefore be continued.

WQBELs

Attachment B(a), presents toxics screening analysis for Outfall 002 discharge. The 3 Parameters (Total Lead, Total Copper and Total Cadmium), that were candidates for PENTOXSD modeling were analyzed using PENTOXSD model. The results, presented in **Attachments B(a) and B(b)**, demonstrate that there is no reasonable potential for exceedances of water quality criteria, and therefore WQBELs will not be established for the Outfall 002 discharge.

Proposed Limits and Monitoring Requirements

DEP proposes that the same limits and monitoring requirements in the existing permit be retained in the revised draft permit. See proposed effluent limitations and monitoring requirements sections for Outfall 002 for details.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	.032
Latitude	40° 6' 0.98"	Longitude	-76° 41' 19.42"
Quad Name		Quad Code	
Wastewater Description:	Sewage Effluent		
Receiving Waters	Susquehanna River	Stream Code	
NHD Com ID	57464297	RMI	
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Outfall 003-Sewage Treatment Plant (WWTP)

The WWTP receives sewage, laboratory water and backwash water from the water treatment plant. Based on the BISES NPDES renewal application, dated March 18, 2011, the monthly average discharge rate is 0.017 with a maximum daily average rate is 0.052 MGD. Annual average flow is 0.032.MGD. The STP treatment process is as follows:

Communitor (1) ⇒ Equalization Tank (1) ⇒ Aeration Tank (3) ⇒ Settling Basin (3) ⇒ Chlorine Contact Tank (2) ⇒ Dechlorination ⇒ Discharge to the Susquehanna River

Existing Limits for Outfall 003

	DISCHARGE LIMITATIONS								MONITORING REQUIREMENTS	
		Mass Units (lbs/day)			Concentrations (mg/l)					
Discharge Parameter	Average Monthly	Maximum Daily	Total Monthly (lbs)	Total Annual (lbs)	Inst. Minimum	Average Monthly	Maximum Daily	Inst. Maximum	Monitoring Frequency	Sample Type
Flow (mgd)	Report	Report	XXX	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	XXX	XXX	From 6.0 to 9.0 S.U.				1/day	Grab
D.O.	XXX	XXX	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine	XXX	XXX	XXX	XXX	XXX	1.0	XXX	2.0	1/day	Grab
Total Suspended Solids	XXX	XXX	XXX	XXX	XXX	30	XXX	60	2/month	8-hour comp
$CBOD_5$	XXX	XXX	XXX	XXX	XXX	25	XXX	50	2/month	8-hour comp
Fecal Coliform (5/1 to 9/30)	XXX	XXX	XXX	XXX	XXX	200	XXX	XXX	2/month	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	XXX	XXX	2000	XXX	XXX	2/month	Grab
Total Phosphorus	XXX	XXX	Report	Report	XXX	2.0	XXX	4.0	2/month	8-hour comp
NH_3-N	XXX	XXX	Report	XXX	XXX	Report	XXX		1/month	8-hour comp
Total Nitrogen	XXX	XXX	Report	Report	XXX	Report	XXX	XXX	1/month	Calc
Total Kjeldahl Nitrogen	XXX	XXX	Report	XXX	XXX	Report	XXX	XXX	1/month	8-hour comp
Nitrate-Nitrite	XXX	XXX	Report	XXX	XXX	Report	XXX	XXX	1/month	8-hour comp

$CBOD_5$ & NH_3-N

No detailed water quality evaluation was performed for the discharge to Outfall 003 because the dilution ratio at the discharge point is very high. Secondary treatment is adequate to protect water quality. Discharge to Stream flow ratio is 1:100179. This conclusion is consistent with the existing permit. DMR and Inspection reports indicate the facility is achieving effluent results well below the limitations. Therefore, 25 mg/l as monthly average for CBOD5 and monitoring for NH3-N will be required in the permit for this permit cycle.

Dissolved Oxygen

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l as well, this limit will be continued in the renewed permit with a daily monitoring requirement per DEP guidance.

Total Suspended Solids:

There are no water quality criteria for TSS. A limit of 30 mg/l is the required minimum level of effluent quality required by 25 Pa. Code § 92a.47(a)(1),. The level in the existing permit will remain in this permit.

Fecal Coliform:

In addition to the existing summer and winter limitations (geometric mean) for fecal coliform, instantaneous maximum limitations of 1,000/100 ml and 10,000/100 ml will be added to the permit following 25 Pa. Code § 92a.47(a)(4) and 92a.47(a)(5) for summer and winter, respectively.

Phosphorus

The average monthly limit of 2 mg/l phosphorus in the existing permit was based on the requirement to control phosphorus loading to the Lower Susquehanna River Basin. That requirement has been superseded by the development of the Chesapeake Bay TMDL in 2010; however, due to anti-backsliding restrictions the limit will remain in the permit.

Total Residual Chlorine

The attached computer printout (Attachment D) utilizes the equations and calculations as presented in DEP's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references25 Pa. Code § 92a.48(b) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached printout indicates that a water quality limit of 0.5 mg/l and 1.63 mg/l IMAX would be needed to prevent toxicity concerns. The facility installed de-chlorination unit and can meet this new limitation. It will be applied in the permit.

Chesapeake Bay Strategy

The Department formulated a strategy to comply with the Chesapeake Bay nutrient TMDL requirements for Pennsylvania. Sewage discharges have been prioritized based on their delivered TN loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive annual loading caps based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. Phase 4 (0.2 -0.4 mgd) and Phase 5 (below 0.2 mgd) will be required to monitor and report TN and TP as part of the permit renewal. BISES' sewage treatment plant is considered a Phase 5 facility. BISES monitored Nitrate-Nitrite as N, Total Kjeldahl Nitrogen and Total Nitrogen during the previous permit cycle. Therefore, monitoring of the nitrogen series will not be required in this renewed permit for Outfall 003.

Proposed Limits and Monitoring Requirements for 003

See proposed effluent limitations and monitoring requirements sections for Outfall 003 for details.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	004	Design Flow (MGD)	5
Latitude	40° 4' 31.73"	Longitude	-76° 40' 43.57"
Quad Name		Quad Code	
Wastewater Description:	Sewage treatment plant effluent		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	57464615	RMI	54.76
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-H	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

The Ash Basin No. 6 currently discharges through outfall 004 to the Susquehanna River; however, Brunner Island is in the process of closing Ash Basin No. 6. and has requested in the renewal application that the outfall remain in the permit, until the basin is closed out. Eventually all wastewater flows that normally flow to the Ash Basin No. 6, will flow to a new industrial wastewater treatment plant.

Existing Limits for Outfall 004

Parameter	Discharge Limitations					Monitoring Requirements	
	Mass Loadings (lbs/d)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant. Maximum		
Flow (MGD)	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	From 6.0 to 9.0 S.U.			1/day	Grab
Oil & Grease	XXX	XXX	15	20	30	2/month	Grab
TSS	XXX	XXX	30	60	75	1/week	24-hr comp
Total Aluminum	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Arsenic	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Boron	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Cadmium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Chromium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Copper	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Iron	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Lead	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Mercury	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Molybdenum	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Nickel	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Selenium	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab
Total Zinc	XXX	XXX	XXX	M&R	XXX	1/quarter	Grab

Outfalls 004 and 008 – Bottom Ash Water, Low Volume Wastes, Coal Pile Runoff and Leachate

Outfall 004 receives a variety of low volume wastes, bottom ash transport water, and coal pile runoff. The wastes flow into Ash Basin No. 6, then into a polishing pond where chemical treatment and pH neutralization are performed prior to discharge to Outfall 004. On April 17, 2015, EPA finalized the Coal Combustion Residuals (CCRs) rule to require the safe disposal of CCRs from coal-fired power plants. CCRs in steam electric power plants include materials such as coal ash (fly ash and bottom ash) and FGD wastes. The rule establishes technical requirements for CCR landfills and surface impoundments under the Resource Conservation and Recovery Act (RCRA) subtitle D. These technical requirements relate to corrective

action and/or closure. BISES is in the process of closing Ash Basin No. 6 by clean closure to comply with the finalized CCR rule. BISES is currently removing CCR materials from Basin No. 6 and plans to stop sending all wastestreams to the basin. Prior to the CCR rule publication date, BISES installed a $42 million Auxiliary Waste Water Treatment Plant (AWWP) intended to treat all wastestreams that go to Basin 6 which consists of bottom ash transport water (BATW), leachate, and various low volume wastewaters to be discharged to a new Outfall 008. The AWWP has not been operated since installation about 6 years ago, because there was no permitted outfall. One of the changes in the revised rule is BATW is no longer considered as low volume waste and cannot be commingled with low volume wastes. The two options allowed for handling BATW under the rule are dry ash handling or closed loop system. Due to space constraints, the dry ash handling option is not feasible at the BISES site. BISES proposed to install a closed loop system to recycle the treated effluent. The AWWP will need to be retrofitted to function as a closed cycle system. The AWWP is comprised of two semi-redundant trains, that will be segregated, with one train retrofitted to process the low volume waste water prior to discharge to Outfall 008 and the other train retrofitted to treat the BATW and recycle it back to the plant with no pollutant discharge.

Talen Energy indicated to DEP that it is making a significant investment by adding natural gas-firing capabilities for all three coal-fired units. Based on current permitting and operating plans, coal combustion capabilities will remain unchanged. Boiler modifications will allow the use of coal, gas, or combinations of the two in each unit. Facility operational projections include scenarios using coal, natural gas, or a combination of both coal and natural gas. Talen Energy indicated that the plant will use fuels based on actual market conditions. Talen Energyindicated that it will need at least 2 to 3 years to evaluate and optimize the new natural gas equipment, to adjust operations, and to monitor resulting emissions. If required to make a significant investment in ELG equipment prior to the completion of this evaluation, the plant could be left with a significant number of stranded assets. Talen Energyis also requesting an additional 2 years to plan, design, procure, and install the necessary equipment needed to convert the AWWP to a closed cycle system for the BATW, if the coal firing option is still a viable option at the facility. Talenindicates that to make the recycle system work properly, it must be designed with a proper water balance and sufficient operating flexibility.

The system must also be designed to accommodate normal and emergency maintenance. Given the need for the system to be available 100% of the time, it will require the ability to send a significant portion of this water to a different flow path other than just recycling the treated BATW back to supply makeup to the wet bottom system. The only alternate flow path allowed under the ELG is the use of BATW as FGD scrubber makeup water. Without the ability to use some BATW as scrubber makeup water, the bottom ash recycling system could not properly operate without a discharge. Talen Energy indicated that both the FGD wastewater retrofit and the BATW recycle system need to be designed and constructed to work together for operational purposes and under the requirements of the rule, and therefore requested a compliance date of December 31, 2023 for the BATW.

DEP evaluated the compliance date submitted for the BATW system and concluded that the system can be installed without the FGD system and any scrubber make up water generated prior to the FGD system installation can be discharged with the treated FGD effluent prior to installation of the evaporation technology. DEP requested revision to the BATW compliance date. Talen Energy submitted the compliance date as the end of 2021 as the earliest time the BATW could be in service if coal firing was determined to be a viable option during the site evaluations. The justification given for the proposed timeline was that it needed until 2019 to complete evaluation of using natural gas. During that period, little or no coal will be burned, depending on circumstances. If coal firing will continue beyond 2019, Talen Energy will need two years to design, procure and construct the BATW system. DEP agreed to the proposed 2021 date, to allow time for Talen Energy to explore the possibility of eliminating coal firing at the facility.

DEP intends to draft the permit with the existing limitations for Outfall 004, which includes BATW, pending installation of the closed cycle system at the end of 2021. After installation of the close cycle system, BATW will be recycled back to the plant. If after installation of the closed cycle system BATW is used for FGD scrubber make-up water prior to installation of the FDG evaporation system, the make-up water can be discharged through Outfall 008. When the evaporation system is online in 2023, zero liquid discharge is expected or any discharge from the FDG system will need to meet the most stringent permit limitation requirement under the Voluntary Incentive Program (VIP). See FGD Wastewater section of the report for details on VIP. This approach is consistent with the treatment of legacy wastewater allowed under the ELG. Under the revised rule, legacy wastewater must comply with specific BAT limitations, which EPA has said is equal to the previously promulgated BPT limitations on TSS in the discharge of fly ash transport water, bottom ash transport water, and low volume waste sources. Legacy wastewater is referred to in the rule as FGD wastewater, fly ash transport water, bottom ash transport water, or gasification wastewater generated prior to the date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023.

The wastewater influent to Ash Basin No. 6 and the proposed AWWP is considered low volume waste. Under the new ELG, BATW is no longer considered a low volume waste and BISES chose closed loop cycle to comply with the treatment requirement as discussed in the section above. The existing limitations for Outfall 004 were developed based on the ELGs established in 40 CFR §§ 423.12(b)(3), (b)(4) and (b)(9), as follows:

- Total Suspended Solids (TSS) – 30 mg/L average monthly and 50 mg/L instantaneous maximum (IMAX); and
- Oil and Grease – 15 mg/L average monthly and 20 mg/L maximum daily.

For TSS, a maximum daily limit of 50 mg/L has been established for Outfall 004 based on the IMAX limit of 50 mg/L contained in the ELG. For Oil and Grease, an IMAX limit of 30 mg/L has been established in accordance with 25 Pa. Code § 95.2(2)(ii). The limits for TSS will be adjusted to conform to the ELGs.

In addition, pH limitations of 6.0 S.U. (minimum) and 9.0 S.U. (maximum) are proposed, consistent with 25 Pa. Code § 95.2(1). In accordance with 25 Pa. Code § 95.2(1)(ii), DEP has historically provided an allowance for Outfalls 002 and 004 to exceed pH limitations (i.e., exceed 9.0 maximum) due to biological respiration in the impoundments. This allowance will be continued in the renewed permit. In addition, the existing permit required quarterly monitoring for the following pollutants: Total Aluminum, Total Arsenic, Total Boron, Total Cadmium, Total Chromium, Total Copper, Total Iron, Total Lead, Total Mercury, Total Molybdenum, Total Nickel, Total Selenium, Total Zinc at Outfall 004. These permit requirements will continue in the interim until Outfall 008 is online. BISES indicates it will take about a year to start the AWWP. Outfall 004 will remain and to receive treated storwmwater generated during the closure of the basin. BISES projects it may take up to 15 years to remove all CCR materials and complete the clean closure of Ash Basin 6. See proposed effluent limitations and monitoring requirements sections for Outfall 004 for details.

Outfall 008 will receive effluent from the AWWP, which will process all waste streams that currently go to Ash Basin 6 except for BATW. The proposed effluent limitations for Outfall 008 are discussed under the section for Outfall 008 .

Discharge, Receiving Waters and Water Supply Information

Outfall No.	005	Design Flow (MGD)	
Latitude	40° 5' 41"	Longitude	-76° 41' 36"
Quad Name		Quad Code	
Wastewater Description:	Emergency Overflow		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	57464297	RMI	
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Outfall 005 – Equalization Basin

There is an emergency overflow discharge from the on-site equalization basin that receives Unit 3 sump water, yard drainage, and dry fly ash area drainage. Normally, the equalization basin discharges into Ash Basin No. 6, but during extreme storm events there is the potential for an overflow point source discharge directly into the condenser discharge channel near the Unit 3 cooling water discharge. PPL requested inclusion of this potential discharge in the 2002 permit. As Outfall 005 has never received any discharge, BISES initially requested that the outfall be eliminated during the current permit renewal. It later requested that DEP keep the outfall in the permit. It will remain in the permit with the same limits as Outfall 004 with daily monitoring when discharging.

Parameter	Discharge Limitations					Monitoring Requirements	
	Mass Loadings (lbs/d)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant. Maximum		
Flow (MGD)	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	From 6.0 to 9.0 S.U.			1/day	Grab
Oil & Grease	XXX	XXX	XXX	20	30	1/day *	Grab
TSS	XXX	XXX		50	100	1/day *	grab
Total Aluminum	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Arsenic	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Boron	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Cadmium	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Chromium	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Copper	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Iron	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Lead	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Mercury	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Molybdenum	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Nickel	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Selenium	XXX	XXX	XXX	M&R	XXX	1/day *	Grab
Total Zinc	XXX	XXX	XXX	M&R	XXX	1/day *	Grab

* Samples shall be collected once per day when a discharge occurs.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	006	Design Flow (MGD)	0
Latitude	40° 5' 14.32"	Longitude	-76° 41' 41.06"
Quad Name		Quad Code	
Wastewater Description:	Spring Discharge		

Receiving Waters	Hartman Run	Stream Code	
NHD Com ID	57464851	RMI	
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-H	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Outfall 006 was identified in the existing permit as a spring discharge (seep) to Hartman Run near the railroad tracks, which appears to originate in the area of the retired Ash Basins Nos. 1 and 3. The discharge has been determined to be stormwater driven and the existing monitoring requirements for this outfall will remain in the permit. The following pollutants are monitored for the outfall annually: pH, Total Aluminum, Total Copper, Total Nickel, Total Zinc, Total Iron, Total Arsenic, Total Boron, Total Cadmium, Total Molybdenum, Total Mercury, and Total Selenium. See proposed effluent limitations and monitoring requirements sections for Outfall 006 for details.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	007	Design Flow (MGD)	.52
Latitude	40° 5' 42.60"	Longitude	-76° 41' 8.88"
Quad Name		Quad Code	
Wastewater Description:	Effluent from flue gas desulfurization wastewater treatment plant		
Receiving Waters	Susquehanna River	Stream Code	
NHD Com ID	57464297	RMI	
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance:

Other Comments:

Flue gas desulfurization (FGD) Wastewater Background

FGD wastewater generated at the Brunner Island site is the result of lime slurry, produced by mixing raw water from the Susquehanna River with lime, sprayed in the air scrubber units to remove SO_2. The slurry is then collected at the bottom of each scrubber. The spraying of the lime solution, $Ca(OH)_2$, reacts with the SO_2 to form calcium sulfite,

$CaSO_3$. The calcium sulfite, when oxidized with air, turns into calcium sulfate, $CaSO_4$, or gypsum. On the BISES site, gypsum is produced and stored until the material is transported to processors.

Existing Limits for Outfall 007

	Discharge Limitations					Monitoring Requirements	
	Mass Loadings (lbs/d)		Concentrations (mg/L)				
Parameter	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant. Maximum	Minimum Measurement Frequency	Required Sample Type
Flow (MGD)	XXX	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	From 6.0 to 9.0 S.U.			1/day	Grab
Oil & Grease	XXX	XXX	15	20	30	1/week	Grab
TSS	XXX	XXX	30	100	100	1/week	24-hr comp
Total Aluminum	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Arsenic	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Boron	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Cadmium	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Chromium	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Copper	XXX	XXX	0.45	0.90	1.1	1/week	24-hr comp
Total Iron	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Lead	XXX	XXX	0.4	0.8	1.0	1/week	24-hr comp
Total Mercury	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Molybdenum	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Nickel	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Selenium	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Total Zinc	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Chloride	XXX	XXX	XXX	M&R	XXX	1/month	Grab
Fluoride	XXX	XXX	XXX	M&R	XXX	1/month	Grab

Outfall 007- Flue Gas Desulfurization (FGD) Wastewater

Based on the Department's Water Quality Management permit, 6706201, issued on September 24, 2008, the hydraulic capacity of the FGD wastewater treatment plant (FWTP) is 0.520 MGD. The FWTP, which began operating in 2008, currently receives wastewater from the FGD scrubber units and landfill leachate (the leachate is projected to be diverted to the proposed AWWP with Outfall 008). The FWTP has the following treatment process configuration:

Equalization Tank (2) → Desaturation Tanks (2) → Coagulation-Precipitation Tanks (2) → Flocculation Tanks (2) → Sedimentation Tanks (2) → pH Control (2) → Filtration (2) → 007 to the Susquehanna River

According to the WQM permit application for the facility, influent to the FGD treatment plant enters two equalization tanks and from there wastewater is pumped to two desaturation tanks, which have an average detention time of 2.25 hours. While the wastewater is in the desaturation tanks, lime slurry is added to adjust the pH, desaturate the remaining gypsum ($CaSO_4$) and precipitate some heavy metals. Also, sludge from the clarifier/thickener tanks is recycled into the desaturation tanks. Wastewater then flows by gravity to the coagulation-precipitation units where ferric chloride and TMT-15, an organosulfide, are used to reduce some heavy metals with an average reaction time of 45 minutes. The addition of ferric chloride implements iron coprecipitation which aids in the removal of arsenic and other pollutants. The addition of organosulfides aids in the removal of mercury and other heavy metals. Wastewater flows from the coagulation-precipitation tanks to two clarifier/thickener tanks. Each clarifier/thickener unit has two compartments, reaction and settle. An anionic polymer is added to aid coagulation. Wasted sludge is sent to filter belt press units for dewatering, with the filtrate pumped to the equalization tank and dewatered sludge landfilled. The clarified effluent then flows to two pH adjustment tanks with an average detention time of 2.25 hours. The pH is adjusted with the addition of hydrochloric acid. Effluent exiting the blending tanks then flows by gravity to two effluent filters (64 ft^2) with a designed average loading rate of 1.95 gpm/ft^2. The filter backwash is collected in two additional tanks and then returned to the equalization tank. The filtered effluent then flows to two final effluent tanks with an average detention time of 1.5 hours. The final effluent is then pumped to Outfall 007.

Effluent Limitation Guidelines (ELGs) and Treatment Standards

Brunner Island's FGD wastewater discharge commenced in 2008. The existing permit included monitoring for a suite of potential pollutants that were thought to be present in the discharge. At the time the permit was issued there were no published effluent limitations guidelines (ELGs) specific to FGD wastewaters; FGD wastewaters had historically been considered part of "low volume wastes" regulated under 40 CFR § 423.12(b)(3). On September 30, 2015, EPA finalized a new ELG for steam electric power generating stations. The new ELGs set limits on the levels of toxic contaminants that can be discharged from steam power plants, based on improvements in technology. For wastewater discharged from wet scrubber systems, such as FGD units, the ELG set numerical limits for mercury, selenium, arsenic, and nitrogen. The numeric effluent limitations are based on technological and economic achievability. EPA determined in the revised rule that, the best available technology (BAT) to achieve the ELG for FGD wastewater is physical/chemical precipitation plus biological treatment. EPA requires that all plants come into compliance with the new rule as soon as possible starting from November 1, 2018, through December 31, 2023. The rule offers a voluntary incentive program (VIP) to facilities to implement an evaporation technology and comply with a more stringent limitation for a delayed compliance date of December 31, 2023. The revised rule (at 40 CFR § 423.13(g)(3)(i)) states:

> "(i) For dischargers who voluntarily choose to meet the effluent limitations for FGD wastewater in this paragraph, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in the table below. Dischargers who choose to meet the effluent limitations for FGD wastewater in this paragraph must meet such limitations by December 31, 2023. These effluent limitations apply to the discharge of FGD wastewater generated on and after December 31, 2023.

Pollutants	BAT Effluent limitations	
	Maximum Daily	Monthly Average
Arsenic, total (ug/L)	4	
Mercury, total (ng/L)	39	24
Selenium, total (ug/L)	5	
TDS (mg/L)	50	24

(ii) For discharges of FGD wastewater generated before December 31, 2023, the quantity of pollutants discharged in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed for TSS in §423.12(b)(11)."

BISES conducted a preliminary evaluation of all available technologies and determined that the most effective path forward to comply with the ELG requirements for FGD wastewater is to pursue an evaporation technology to comply with the more stringent limitations under the VIP. By electing the VIP, BISES' compliance date for the FGD wastewater is December 31, 2023. BISES indicates that its units operate in a cyclic manner; the units are shut down during low demand and turned on when needed. BISES Indicated that it chose evaporation technology because biological treatment at the facility will be a challenge since there will be no flow to sustain the bugs when the units are shut down. When the units come online it will take a while to reseed the biological treatment system for effective treatment. The facility will continue operating the existing treatment units until the evaporation technology is installed.

With EPA's promulgation of finalized ELGs for FGD wastewater no further BPJ TBEL determination was undertaken by DEP for the interim period until the ELG-based limits become effective or for additional pollutants not identified in the ELG. DEP believes the promulgated ELGs adequately considered and addressed all pollutants associated with FDG wastewater (i.e., treatment to meet the ELG parameter limitations will result in adequate control for all FGD pollutants). BISES' pursuing of the VIP may lead to either zero liquid discharge (ZLD) or will ensure discharge of very low concentrations of pollutants required under the VIP.

Prior to the ELG-based effluent limits becoming effective, DEP intends to draft the permit with the existing permit requirements for Outfall 007. This approach is consistent with the rule's provision for treating legacy wastewater. Under the revised rule, legacy wastewater must comply with specific BAT limitations, which EPA has said is equal to the previously promulgated BPT limitations on TSS in the discharge of fly ash transport water, bottom ash transport water, and low volume waste sources. Legacy wastewater is referred to in the rule as FGD wastewater, fly ash transport water, bottom ash transport water, or gasification wastewater generated prior to the date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023.

The existing limit were developed based on the applicable ELGs established in 40 CFR§ 423.15 (a) and(c) , as follows:

- Total Suspended Solids (TSS) – 30 mg/L average monthly and 100 mg/L maximum daily;
- Oil and Grease – 15 mg/L average monthly and 20 mg/L maximum daily; and
- pH between 6 – 9 S.U.

Toxic pollutants to be monitored monthly in the interim period are Total Aluminum, Total Antimony, Total Copper, Total Nickel, Total Zinc, Total Iron, Total Arsenic, Total Boron, Total Cadmium, Total Thallium, Total Molybdenum, Total Mercury, Total Lead, Chloride, Total Fluoride, Total Sulfate, Total Chromium, Total Manganese, Bromide, and Total Selenium. DEP added monthly monitoring for Total Manganese due to periodic exceedances of WQ criteria at water quality station WQN0201 below the discharge.

Total Dissolved Solids (TDS)

The permittee has been monitoring Total Dissolved Solids (TDS) and Chloride. The average TDS from 2014 to 2016 is 21,468 mg/l with 37,600 mg/l as the maximum during the same time period. The previous fact sheet indicated the permittee projected a maximum daily concentration up to 70,000 mg/l may be expected in the effluent for TDS to be discharged to the condenser channel. For the purpose of compliance with 25 Pa. Code § 95.10 as it relates to TDS loading, this facility is classified as "Authorized Load/No Increase." Since the Department approved the discharge prior to August 2010, and all discharge data show TDS levels are below the projected concentration, treatment requirement for TDS under 25 Pa. Code § 95.10 is not required in the interim, prior to December 31, 2023. Monitoring of TDS and its constituents will continue in the permit.

WQBELs

Attachments C(b) &C(c) present toxics screening analysis and PENTOXSD results for the combined Outfall 007 and Outfall 008 discharges. Parameters that were candidates for PENTOXSD modeling were analyzed using the input data described in Attachment C(a). The results presented demonstrate that there is no reasonable potential for exceedances of water quality criteria, and therefore WQBELs will not be established for either discharge.

Chesapeake Bay Watershed Implementation Plan

Brunner Island FGD treatment receives wastewater with elevated levels of TN as compared to the influent raw water concentration. Brunner Island will purchase TN and TP credits to meet net zero annual Bay loading limits ("cap loads") established in its previous NPDES permit. No concentration limit for TN is recommended in the proposed draft permit; however, it is required that Brunner Islandcontinue to monitor Nitrate-Nitrite as N, Total Kjeldahl Nitrogen, Ammonia-Nitrogen, Total Nitrogen and Total Phosphorus and purchase credits to offset nutrients discharged.

Proposed Limits and Monitoring Requirements

See proposed effluent limitations and monitoring requirements sections for Outfall 007 for details.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	008	Design Flow (MGD)	5.5
Latitude	40° 5' 35.74"	Longitude	-76° 41' 3.72"
Quad Name		Quad Code	
Wastewater Description:	Low volume wastes and landfill leachate)		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	57464297	RMI	54.27
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status			
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Outfall 008 will receive effluent from the proposed retrofitted AWWP that will process low volume wastes from the BISES. The AWWP is a physical/chemical precipitation treatment system designed to operate using sulfuric acid or sodium hydroxide to adjust pH and ferric chloride as the coagulant. These chemicals will be introduced into the influent mix tanks,

which use variable speed mixers to ensure proper mixing. As wastewater flows from the influent mix tanks to the flocculator/clarifier units, polymer will be added as needed. Following the clarification process the wastewater enters an effluent mix tank to adjust pH. Effluent that is not recycled to maintain wastewater treatment processes will be discharged to Outfall 008. The treatment process is shown below.

Influent Mix Tanks → Sedimentation → Flocculator/Clarifiers → Effluent Mix Tanks → Discharge to Outfall 008

The retrofitted AWWP is expected to produce an effluent with similar pollutants as the existing Outfall 004 discharge. However with BATW separation from low volume wastes, pollutants in the effluent at Outfall 008 may differ slightly from those in Outfall 004 effluent. BISES has projected the following average concentrations, as reported in its application:

- Total Aluminum – 0.29 mg/L
- Total Arsenic – 0.006 mg/L
- Total Boron – 0.2 mg/L
- Total Cadmium – 0.0002 mg/L
- Total Chromium – 0.002 mg/L
- Total Copper – 0.004 mg/L
- Total Iron – 0.27 mg/L
- Total Lead – 0.001 mg/L
- Total Mercury – 0.0000046 mg/L
- Total Molybdenum – 0.01 mg/L
- Total Nickel – 0.01 mg/L
- Total Selenium – 0.002 mg/L
- Total Zinc – 0.015 mg/L

These projected concentrations are less than those reported on DMRs for Outfall 004. According to the Technical Development Document for the ELGs and Standards for the Steam Electric Power Generating Point Source Category, "EPA decided not to establish BAT limitations for legacy wastewater based on a technology other than surface impoundments because it does not have the data to do so. Data are not available because of the way that legacy wastewater is currently handled at plants". BISES has installed a chemical precipitation system to treat legacy wastewater and low volume wastewater which is expected to provide a better treatment than impoundments. DEP intends to draft the permit for Outfall 008 with the same permit limitations as Outfall 004 to collect performance data to establish BAT TBELs at the next renewal. The original AWWP was designed for 5.5 MGD. The treatment system is proposed to be segregated into two trains and one train will discharge to Outfall 008. The discharge rate to Outfall 008 may reduce by 50% after segregation. The earliest the AWWP will start discharging is about 1 year after the permit effective date. In addition, the monthly monitoring requirement for Total Manganese has been established based on the periodic exceedances at WQN0201. TDS in the Outfall 004 discharge generally does not exceed 1,000 mg/L, such that routine monitoring for TDS and its major constituent ions is not warranted for Outfall 008.

IMP 801 – Metal Cleaning Wastes (Chemical and Non-Chemical)

According Brunner Island's project narrative for the AWWP, metal cleaning waste is generated approximately once every two years on-site. Currently, metal cleaning waste is shipped off-site for injection in a deep well and BISES will continue to send the spent cleaner off-site for disposal. BISES indicated that rinse waters will be disposed off-site as well, however, DEP added an internal monitoring point to the permit to allow monitoring of rinse water if BISES chose to discharge it to either the IWTP or the AWWP.

According to 40 CFR §125.3, technology-based treatment requirements cannot be met through the use of flow augmentation. In other words, in the case of metal cleaning waste, the wastewater cannot be comingled with other low volume wastewater sources and compliance measured at the end of the comingled discharge. Therefore, the ELGs for metal cleaning waste in 40 CFR§ 423.12(b)(5) must be met at the point of the discharge prior to comingling with other wastestreams. The following ELGs apply:

- TSS – 30 mg/l 30-day average, 100 mg/L maximum daily;
- Oil and Grease – 15 mg/l 30-day average, 20 mg/L maximum daily;
- Total Copper – 1.0 mg/L 30-day average and maximum daily; and

- Total Iron – 1.0 mg/L 30-day average and maximum daily.

In addition to these, the requirements for pH (6 – 9 S.U.) and Oil and Grease (30 mg/L IMAX) from Chapter 95 will be imposed. Flow monitoring will be established as well. Monitoring is only required if chemical or non-chemical cleaning or rinse water is sent to one of the treatment plants.

Stormwater

The existing NPDES permit has 19 stormwater outfalls; and six are monitored annually as they have been deemed representative of the site. During the construction of the cooling towers and the AWWP, three additional stormwater outfalls 027, 028 and 029 have been established at the site. Outfall 027 will discharge to the condenser discharge channel in the same pipe as Outfall 007. The following pollutants are monitored annually at the representative stormwater outfalls and will continue for this renewed permit: pH, Total Aluminum, Total Copper, Total Nickel, Total Zinc, Total Iron, Total Arsenic, Total Boron, Total Cadmium, Total Molybdenum, Total Mercury, and Total Selenium. In addition Total Suspended Solids and Oil and Grease have been added with Benchmark values to reflect the requirements in the revised general Industrial Stormwater permit. The benchmark values are not permit limits however, if stormwater discharge concentrations for a parameter exceeds the benchmark values for an outfall for two or more consecutive monitoring periods, the permittee shall develop a corrective action plan to reduce the concentrations of the parameters in stormwater discharges. See section C.V.F of the permit for more information. The representative stormwater outfalls to be sampled annually are 013, 014, 015, and 026.

Stormwater Outfalls are described on the table below

Outfall	Latitude	Longitude	Receiving Stream
009	40°05'40"	76°42'08"	Wetlands to Conewago Creek
010	40°05'09"	76°41'04"	Susquehanna River
011	40°05'19"	76°41'37"	Hartman Run
012	40°06'01"	76°41'55"	Combined with Outfall 013
013	40°05'49"	76°41'32"	Susquehanna River
014	40°05'51"	76°41'34"	Combined with Outfall 013
015	40°05'31"	76°41'21"	Susquehanna River
016	40°05'17"	76°41'40"	Hartman Run
017	40°05'06"	76°41'33"	Hartman Run
018	40°05'09"	76°41'26"	Hartman Run
019	40°05'02"	76°41'22"	Hartman Run
020	40°04'57"	76°41'17"	Combined with Outfall 021
021	40°04'53"	76°41'17"	Hartman Run
022	40°04'49"	76°41'12"	Hartman Run
023	40°04'40"	76°40'56"	Hartman Run
024	40°04'34"	76°40'44"	Hartman Run
025	40°04'54"	76°40'50"	Susquehanna River
026	40°05'53"	76°42'07"	Conewago Creek
027	40°05'32"	76°41'23"	Susquehanna River (Combined with Outfall 007)
028	40°05'36.5"	76°41'30.2"	Susquehanna River
029	40°05'34.7"	76°41'27"	Susquehanna River

Section 316(b) Requirements

Under CWA section 316(b), NPDES permits must regulate cooling water intake structures at facilities that have permitted discharges. Section 316(b) requires that "the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact" to protect aquatic organisms from being killed or injured by impingement (being pinned against screens or other parts of a cooling water intake structure) or entrainment (being drawn into cooling water systems and subjected to thermal, physical or chemical stresses).

On May 19, 2014, EPA signed the final 316(b) existing facilities rule. The Existing Facility Rule applies to existing power generating facilities and existing manufacturing and industrial facilities that are point sources and that use one or more Cooling Water Intake Structures (CWISs) to withdraw more than 2 million gallons per day (MGD) of water from waters of the U.S. and use at least twenty-five (25) percent of the water they withdraw exclusively for cooling purposes. BISES is an existing electric generating facility with a Design intake flow (DIF) of 795 MGD, and is required to comply with these requirements. The rule establishes steps for developing BTA requirements for complying with both impingement mortality and entrainment mortality standards. The rule provides seven compliance alternatives from which all existing facilities must select one alternative for reducing impingement mortality described at 40 CFR § 125.94(c). The seven alternatives are: 1. Operate a closed-cycle recirculating cooling system, as defined at 40 CFR§ 125.92; 2. Operate a cooling water intake structure with a design intake velocity of less than 0.5 feet per second through-screen velocity; 3. Operate a cooling water intake structure with an actual intake velocity of less than 0.5 feet per second through-screen velocity; 4. Operate an existing offshore velocity cap, as defined at 40 CFR§ 125.92; 5. Operate modified traveling screens, as defined at 40 CFR§ 125.92; 6. Operate a system of technologies, management practices and operational measures that optimizes impingement mortality; or 7. Achieve a 12-month performance standard of no more than 24% mortality including latent mortality for all non-fragile species.

Under the rule, BTA for entrainment is be developed on a site-specific, best professional judgment (BPJ) basis by the permitting authority. The rule requires that facilities achieve maximum reduction in entrainment after consideration of several relevant factors specified in the rule. Facilities with an actual intake flow greater than 125 million gallons per day (MGD) must submit certain materials as part of its NPDES permit renewal application for the permitting authority to review and develop appropriate permit conditions for impingement mortality and entrainment. The application materials to be submitted are: 1. Description of the source water body (§ 122.21(r)(2)); 2. Description of the cooling water intake structures (§ 122.21(r)(3)); 3. Characterization of the biological community in the vicinity of the cooling water intake structure (§ 122.21(r)(4)); 5. Description of the cooling water system (§ 122.21(r)(5)); 6. Identification of the facility's chosen compliance method for impingement mortality (§ 122.21(r)(6)); 7. Description of any previously conducted entrainment performance studies (§ 122.21(r)(7)); and 8. Description of the facility's operational status (§ 122.21(r)(8)). In addition, facilities such as BISES whose actual intake flow is greater than 125 MGD are required to submit: a. Entrainment characterization study (§ 122.21(r)(9)); b. Comprehensive technical feasibility and cost evaluation study (§ 122.21(r)(10)); c. Benefits valuation study (§ 122.21(r)(11)); d. Non-water quality environmental and other impacts assessment (§ 122.21(r)(12)); and e. Description of the peer review process for studies submitted under § 122.21(r)(10)-(12) ((§ 122.21(r)(13)). .

BISES has two cooling water intake structures (CWIS) subject to Clean Water Act Section 316(b) requirements.
The CWISs at BISES are situated along the shoreline and service Units 1, 2 and 3. The CWIS that services Units 1 and 2 has a DIF of 252,000 gpm (362.88 MGD) and the CWIS that services Unit 3 has a DIF of 552,000 gpm (794.88 MGD). Both CWIS are equipped with stationary vertical bar racks with one-inch spacing and traveling screens with 3/8 inch mesh. A screen spray wash system removes debris from the traveling screens; the debris is eventually disposed of off-site. The CWIS associated with Units 1 and 2 has a calculated maximum approach velocity of 1.85 feet per second (fps) when all cooling water pumps are operating and through-screen velocity of 2 fps at minimum water elevation. The CWIS for Unit 3 has a calculated maximum approach velocity of 2.2 fps, when all cooling water pumps are operating and a through-screen velocity of 2.3 fps at minimum water elevation.

Impingement Characterization Study

BISES was captured under the suspended rule and conducted screening of technologies for compliance as well as an impingement study and report which were submitted to DEP. Impingement monitoring was conducted from May 2005 through April 2006 and consisted of 39 sampling events. Forty species of fish were present in impingement collections, although some species were much more abundant than others. Gizzard shad comprised of more than 94% of impingement collections (53,317 gizzard shad were collected out of the total 56,612 impinged fish). Smallmouth bass were also frequently impinged (2,059 total fish impinged). It is noted in the evaluation that there was wide variability in impingement collections, even when collections occurred in roughly the same time period (seasonally).

The actual impingement sampling numbers were extrapolated to determine a calculation baseline (as required under Phase II rule) and actual annual impingement occurring based on current conditions. Brunner Island estimated 490,258 fish as the annual calculation baseline and 399,491 as an actual annual impingement estimate. Brunner Island estimated an 18.5% reduction from the calculation baseline due to operating at less than capacity and withdrawing cooling water at less than the design intake flow.

BISES evaluated the following technologies for implementation at the site: course-mesh modified traveling screens (Ristroph) with a fish return; coarse mesh wedgewire screens; Geiger multi-disc screens; diversion technologies such as acoustic deterrents, strobe lights, and louvers; and variable frequency drives. Closed-cycle recirculating cooling was not evaluated since BISES recently installed a large array of mechanical draft (helper) cooling towers and believed it was "redundant" to consider closed-cycle cooling. BISES characterized all of the technologies evaluated as unsuitable for its intakes.

The existing traveling screens at BISES CWISs have some, but not all, features of the modified traveling screen technology that is considered as a possible BTA technology for impingement mortality in the rule. To achieve 316(b) compliance with impingement mortality requirements, BISES must select and implement one of seven compliance alternatives.

The permit had expired already and an alternative schedule for submission of the application materials would have been established when the permit was renewed. Rather than wait until the permit is issued with an alternative schedule, DEP entered a Consent Order and Agreement with the permittee on October 20, 2015, to require the permittee to submit the application materials required in (§ 122.21(r)(1-13)) and the alternative analysis for reducing impingement mortality. The due date for submission of the Entrainment Characterization and the Comprehensive Technical and Feasibility and Cost Evaluation study has been extended to the end of May 2018 and the end of December 2018, respectively.

DEP will review the studies, and based on the review, the COA allowed up to 18 months for BISES to submit all applicable permits needed and an additional 270 days to complete construction to install the BTA selected for compliance with entrainment mortality. The permit will reflect the timeline in the COA.

Endangered Species

There is no confirmed existence of endangered species in the area close to the discharge. Therefore the discharge authorized by this permit is not likely to impact any endangered or threatened species or adversely affect its critical habitat.

Ground water Monitoring

The permittee has a series of groundwater monitoring well and submits results to DEP every quarter. No elevated pollutants levels have been detected in the results.

Antidegradation

Per 25 Pa. Code § 93.4c, 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.

Class A Wild Trout Fisheries

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

Proposed Effluent Limitations and Monitoring Requirements

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

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Calculation
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/week	Grab
Total Residual Oxidants	XXX	XXX	XXX	0.2	XXX	0.5	1/day	Grab
Temperature (°F) Intake	XXX	XXX	XXX	Report	Report	XXX	Continuous	I-S
Temperature (°F)	XXX	XXX	Report Avg Mo	Report Daily Max	XXX	110	Continuous	I-S
Hourly Temperature Change (°F) Instream Monitoring	XXX	XXX	XXX	XXX	XXX	2.0	Continuous	I-S
Heat Rejection Rate (MBTUs/day) Dec 1 - Feb 28	XXX	167040	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Mar 1 - Apr 30, Nov 1 - 30	XXX	91870	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) May 1 - 31, Oct 1 - 31	XXX	83520	XXX	XXX	XXX	XXX	1/day	Calculation
Heat Rejection Rate (MBTUs/day) Jun 1 - Sep 30	XXX	75170	XXX	XXX	XXX	XXX	1/day	Calculation
Trihalomethanes, Total	XXX	XXX	XXX	Report	Report	XXX	1/week	Grab

Compliance Sampling Location:): At end of condenser discharge channel prior to confluence with Susquehanna River. Measurements to determine compliance with the Hourly Instream Temperature Change limitation shall be taken at the point of compliance, 5,000 feet downstream of the discharge channel confluence with the River.

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 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	Average Monthly	Daily Maximum	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Min	XXX	XXX	9.0	1/day	Grab
Total Suspended Solids	XXX	XXX	30.0	50.0	XXX	50.0	2/month	Grab
Oil and Grease	XXX	XXX	15.0	20.0	XXX	30.0	2/month	Grab
Aluminum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Arsenic, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Boron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Cadmium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Chromium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Copper, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Iron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) [1]		Concentrations (mg/L)				Minimum [2] Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Average Monthly	Daily Maximum	Daily Maximum	Instant. Maximum		
Lead, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Manganese, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Mercury, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Molybdenum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Nickel, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Selenium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Zinc, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

Compliance Sampling Location: at Outfall 002

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" (362-0400-001), SOPs and/or BPJ.

Outfall 003, 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	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
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.0	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	25	XXX	50	2/month	8-Hr Composite
Total Suspended Solids	XXX	XXX	XXX	30	XXX	60	2/month	8-Hr Composite
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000	XXX	10000	2/month	Grab
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200	XXX	1000	2/month	Grab
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	XXX	2/month	8-Hr Composite

Compliance Sampling Location: at Outfall 003

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" (362-0400-001), SOPs and/or BPJ.

Outfall 004, 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	Average Monthly	Daily Maximum	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Min	XXX	XXX	9.0	1/day	Grab
Total Suspended Solids	XXX	XXX	30.0	50.0	XXX	50.0	2/month	Grab
Oil and Grease	XXX	XXX	15.0	20.0	XXX	30.0	2/month	Grab
Aluminum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Arsenic, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Boron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Cadmium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Chromium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Copper, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Iron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Lead, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Manganese, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Mercury, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Average Monthly	Daily Maximum	Daily Maximum	Instant. Maximum		
Molybdenum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Nickel, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Selenium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab
Zinc, Total	XXX	XXX	XXX	XXX	Report	XXX	1/quarter	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at Outfall 004

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 005, 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
pH (S.U.)	XXX	XXX	6.0 Min	XXX	XXX	9.0	Daily when Discharging	Grab
Total Suspended Solids	XXX	XXX	XXX	XXX	XXX	100.0	Daily when Discharging	Grab
Oil and Grease	XXX	XXX	XXX	XXX	20.0	30.0	Daily when Discharging	Grab
Aluminum, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Arsenic, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Boron, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Cadmium, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Chromium, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Copper, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Iron, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Lead, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Manganese, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Mercury, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab

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		
Molybdenum, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Nickel, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Selenium, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab
Zinc, Total	XXX	XXX	XXX	XXX	Report	XXX	Daily when Discharging	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at Outfall 005

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 007, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Total Suspended Solids	130	434	XXX	30	100	100	2/month	24-Hr Composite
Total Dissolved Solids	XXX	XXX	XXX	Report	Report	XXX	1/month	24-Hr Composite
Oil and Grease	65	86.7	15 Avg Mo	20 Daily Max	XXX	30	2/month	Grab
Aluminum, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Antimony, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Arsenic, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Boron, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Cadmium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Chromium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Copper, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Fluoride, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Iron, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Lead, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite

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		
Manganese, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Mercury, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Molybdenum, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Nickel, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Selenium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Sulfate, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Thallium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Zinc, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Chloride	XXX	XXX	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Bromide	XXX	XXX	XXX	XXX	Report	XXX	1/month	24-Hr Composite

Compliance Sampling Location: at Outfall 007

Other Comments:

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

Outfall 007, Effective date through Permit Expiration Date.

Parameter [1]	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum [2] Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia—N	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Kjeldahl—N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Total Nitrogen	XXX	Report	XXX	XXX	XXX	1/month	Calculation
Total Nitrogen Intake	XXX	Report	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Total Phosphorus Intake	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Net Total Nitrogen	Report	0	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	0	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: at Outfall 007

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 008, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Total Suspended Solids	1376	2294	XXX	30	50	50	2/month	24-Hr Composite
Oil and Grease	688	917	15 Avg Mo	20 Daily Max	XXX	30	2/month	Grab
Aluminum, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Arsenic, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Boron, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Cadmium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Copper, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Iron, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Lead, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Manganese, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Mercury, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Molybdenum, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Nickel, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite

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		
Selenium, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite
Zinc, Total	XXX	Report	XXX	XXX	Report	XXX	1/month	24-Hr Composite

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at Outfall 008 prior to discharge to condenser discharge channel.

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 801, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum 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	Daily when Discharging	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	Daily when Discharging	Grab
Total Suspended Solids	XXX	XXX	XXX	30	100	XXX	Daily when Discharging	Grab
Oil and Grease	XXX	XXX	15 Avg Mo	20 Daily Max	XXX	30	Daily when Discharging	Grab
Copper, Total	XXX	XXX	XXX	1.0	1.0	XXX	Daily when Discharging	Grab
Iron, Total	XXX	XXX	XXX	1.0	1.0	XXX	Daily when Discharging	Grab

Compliance Sampling Location: IMP 801

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" (362-0400-001), SOPs and/or BPJ.

Outfall 006, 013, 014, 015 and 026, 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)	XXX	Report Daily Max	XXX	XXX	XXX	XXX	1/year	Estimate
pH (S.U.)	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Oil and Grease	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Total Suspended Solids	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Aluminum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Arsenic, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Boron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Cadmium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Chromium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Copper, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Iron, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Lead, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Manganese, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Mercury, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Molybdenum, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab

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		
Nickel, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Selenium, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Zinc, Total	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab

Compliance Sampling Location: at Outfalls 006, 013, 014, 015, and 026.

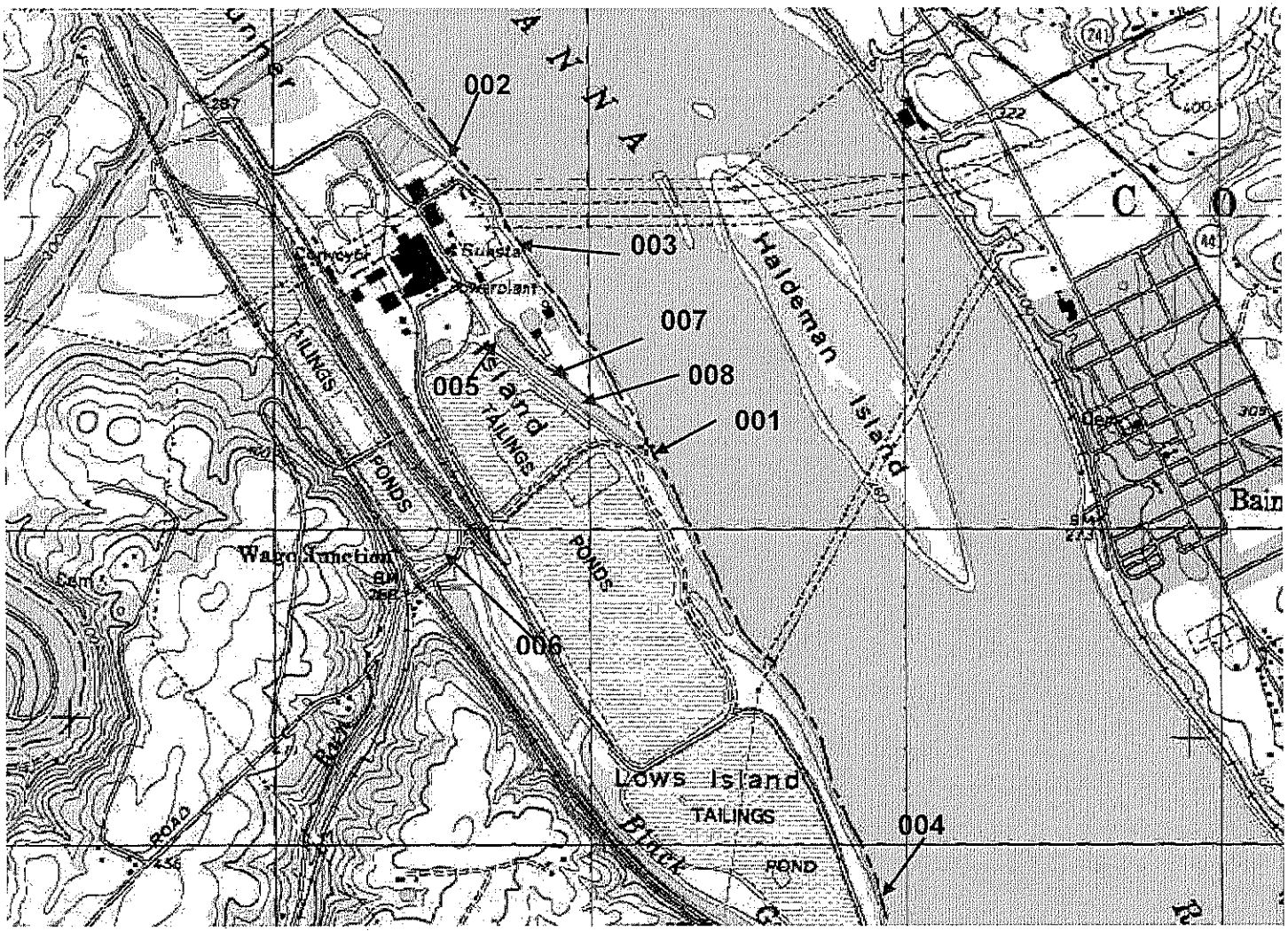
Other Comments:

	Tools and References Used to Develop Permit
☐	WQM for Windows Model (see Attachment)
☒	PENTOXSD for Windows Model (see Attachments **B(b) & C(c)(ii)**)
☒	TRC Model Spreadsheet (see Attachment **D**)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Toxics Screening Analysis Spreadsheet (see Attachments **B(a) & C(b)**)
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☒	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☒	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☒	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☒	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☒	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

1. PADEP. Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids – 25 Pa. Code § 95.10; November 12, 2011. DEP ID: 385-2100-002.

ATTACHMENTS

A. Topographical Map Showing discharge locations excluding Stormwater outfalls



B. Toxic Screening Analysis for outfall 002

(a) Outfall 002 Toxics Screening Analysis and Proposed Effluent Limitations

Facility: **Brunner Island** NPDES Permit No.: **PA0008281** Outfall: **002**
Analysis Hardness (mg/L): **120** Discharge Flow (MGD): **2** Analysis pH (SU): **8**

Parameter	Maximum Concentration in Application or DMRs (µg/L)		Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
Total Dissolved Solids		229000	500000	No		
Bromide	<	6000	N/A	No		
Sulfate		77300	250000	No		
Total Aluminum		648	750	No		
Total Arsenic		4.9	10	No		
Total Boron		180	1600	No		
Total Cadmium	<	1	0.279	**Yes**	310	No Limits/Monitoring
Total Chromium	<	2	N/A	No		
Total Copper	<	20	10.47	**Yes**	3211	No Limits/Monitoring
Total Iron		970	1500	No		
Total Lead	<	5	3.07	**Yes**	4023	No Limits/Monitoring
Total Mercury		0.0094	0.05	No		
Total Molybdenum	<	20	N/A	No		
Total Nickel	<	20	60.7	No		
Total Selenium	<	4	4.6	No		
Total Zinc	<	36	136.8	No		
Total Barium		43	2400	No		
Total Manganese		33	1000	No		

Note – All maximum concentrations are those reported on DMRs from 2012 – 2016 except parameters not routinely monitored. Total Dissolved Solids, Bromide, Sulfate, Total Barium and Total Manganese concentrations are from permit application.

(b) PENNTOX SD Model Results for outfall 002

PENTOXSD determined WQBELs as identified in the "Most Stringent WQBEL" column of the Toxics Screening Analysis for Outfalls 002, Attachment B(b), and as shown below. The "input concentration" was the governing criterion in all cases and are well below the most stringent WQBEL for each parameter. WQBELs are not governing for the Outfalls 002 discharge, therefore no WQBELs will be established in the BISES renewed permit for outfall 002.

PENTOXSD Analysis Results

Recommended Effluent Limitations

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

RMI	Name	Permit Number	Disc Flow (mgd)
55.00	Brunner Islan	PA0008280	2.0000

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent WQBEL (µg/L)	Most Stringent WQBEL Criterion
CADMIUM	1	INPUT	1.56	310.635	CFC
COPPER	20	INPUT	31.203	3211.541	AFC
LEAD	5	INPUT	7.801	4023.694	CFC

RMI	Name	Permit Number	Disc Flow (mgd)
54.27	Brunner Island	PA0008281	6.0200

C. Toxic Screening Analysis for outfall Combined 007/008

(a) Derivation of Maximum Combined 008/007 Effluent Concentrations for Toxics Screening Analysis[1]

Parameter	Max Concentration Outfall 008 (mg/l)	Max Concentration Outfall 007 (mg/l)	Combined Max Concentration (mg/l)
Total Dissolved Solids	198	40,300	3,661.96
Chloride	150	18,500	1,735
Bromide	0.6	303	26.72
Sulfate	58.1	2470	266.4
Total Aluminum	0.417	0.4	0.4155
Total Antimony	0.01	0.1	0.01777
Total Arsenic	0.008	0.29	0.032
Total Boron	0.15	470	40.735
Total Cadmium	0.0005	0.017	0.0019
Total Copper	0.004	0.025	0.0058
Fluoride	0.2	69.1	6.15
Total Iron	0.68	1.5	0.7508
Total Lead	0.001	0.02	0.0026
Total Mercury	0.000006	0.00189	0.0001687
Total Molybdenum	0.004	0.06	0.0088
Total Nickel	0.032	0.78	0.0966
Total Selenium	0.004	1.2	0.107
Total Thallium	0.01	0.005	0.00956
Total Zinc	0.014	0.041	0.016
Total Manganese	0.032	28.3	2.47
Total Phenols (Phenolics)	0.005	0.013	0.00569
Bis(2-Ethylhexyl)Phthalate	0.005	0.054	0.0092

1. Equation used: (5.5 MGD Outfall 008 Flow x Max Outfall 008 Concentration) + (0.52 MGD Outfall 007 Flow x Max Outfall 007 Concentration) / 6.02 MGD Combine

(b) Outfalls 008 and 007 Toxics Screening Analysis, Model Results and Proposed Effluent Limitations

Facility: **Brunner Island** NPDES Permit No.: **PA0008281** Outfalls: **007/008**
Analysis Hardness (mg/L): **2,790** Discharge Flow (MGD): **6.02** Analysis pH (SU): **8**

Parameter	Maximum Concentration in Application or DMRs (µg/L) [1]		Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	WQBEL Screening Recommendation
Total Dissolved Solids		3661960	500000	Yes	N/A (PWS) [2]	Monitor
Chloride		1735050	250000	Yes	N/A (PWS) [2]	Monitor
Bromide	<	26721	N/A	No		Monitor
Sulfate		266437	250000	Yes	N/A (PWS) [2]	Monitor
Fluoride	<	6151	2000	Yes	N/A (PWS) [2]	
Total Aluminum	<	416	750	No		
Total Antimony	<	17.8	5.6	Yes	1869	No Limits/Monitoring
Total Arsenic		32.4	10	Yes	3338	No Limits/Monitoring
Total Boron		40,735	1600	Yes	52364	No Limits/Monitoring
Total Cadmium	<	1.9	2.453	No		
Total Copper	<	5.8	153.95	No		
Total Iron		751	1500	No		
Total Lead	<	2.6	67.39	No		
Total Mercury	<	0.169	0.05	Yes	16.7	No Limits/Monitoring
Total Molybdenum	<	8.8	N/A	No		
Total Nickel	<	97	610	No		
Total Selenium	<	107	4.6	Yes	1665	No Limits/Monitoring
Total Thallium	<	9.6	0.24	Yes	82.3	Monitor
Total Zinc	<	16.3	1966.6	No		
Total Manganese	<	2,473	1000	Yes	284272	No Limits/Monitoring
Total Phenols (Phenolics)	<	5.7	5	Yes	N/A (PWS) [2]	
Bis(2-Ethylhexyl)Phthalate	<	9.2	1.2	Yes	37.7	No Limits/Monitoring

1 Maximum concentrations projected and reported in permit application for Outfalls 008 and 007 were mass balanced to produce a maximum concentration for the combined discharge. See chart on following page. Only those toxic parameters that are monitored in the existing permit and/or were detected in effluent as reported on permiiitte's permit application are shown.

2 A WQBEL is not applicable (a public water supply (PWS) withdrawal was not within the modeled reach).

(c) Combined 007 and 008 PENTOXSD Modeling

Outfall 008 will discharge an average of 5.5 MGD of industrial wastewater to the condenser discharge channel. Outfall 007 currently discharges to the condenser discharge channel at a design flow rate of 0.52 MGD. The design flow of the discharge channel is 795 MGD (Outfall 001 once-through non-contact cooling water); this flow is withdrawn from the Susquehanna River, through the plant, and back into the River, with no expected measurable increase in concentrations of toxic parameters. Based on extensive field studies, the near-field mixing characteristics of the Brunner Island condenser discharge channel are well understood. During the previous permit renewal application review process, DEP had developed empirical mixing relationships between flow in the discharge channel and the Susquehanna River. These mixing relationships were based on field observations and measurements from 2002 through 2006. The chronic (12-hour) partial mix factor (PMF) was estimated to be 100% and the acute (15-minute) PMF was estimated to be 30%. These PMFs have been used to evaluate WQBELs in this revised draft permit, such that WQBEL results vary from the work presented in the previous draft permit which used default mixing relationships. Based on the proximity of the two outfalls and the mixing characteristics observed during field observations, it is appropriate to evaluate potential WQBELs by combining the Outfall 008 and 007 discharges in the channel and modeling this flow as a single discharge to the Susquehanna River.

(i) PENTOXSD Model Inputs

1. Modeled Reach – Susquehanna River, RMI 54.27 (confluence of discharge channel and River) to RMI 50.94 (confluence of Codorus Creek and River).
2. Discharge Flow – 6.02 MGD (Outfall 005: 5.5 MGD + Outfall 007: 0.52 MGD).
3. Q7-10 River Flow – 3,100 cfs (as established in the 2012 permit fact sheet).
4. Discharge Hardness – 2,790 mg/L, determined as follows:
   (5.5MGD)(136 mg/L) + (0.52 MGD)(30,867 mg/L) / 6.02 MGD =2,790 mg/L
5. Background Hardness – 120 mg/L (median hardness 2012-2013 at WQN0202, Harrisburg).
6. Discharge pH – 8.0 S.U. (median pH of Outfalls 004
7. Background pH – 7.9 S.U. (median pH 2012-2013 at WQN0202).
8. Background Concentrations presented on the table below:

Parameter	Background Concentration [1] (mg/L)
Total Dissolved Solids	188 [2]
Chloride	14.4 [3]
Sulfate	37.9 [2]
Total Aluminum	0.543 [3]
Total Antimony	< 0.01 (0) [2]
Total Arsenic	< 0.05 (0) [2]
Total Boron	0.02 [2]
Total Cadmium	< 0.001 (0) [2]
Fluoride	< 0.2 (0.2) [2]

Parameter	Background Concentration [1] (mg/L)
Total Mercury	< 0.0002 (0) [2]
Total Selenium	0.00033 [3]
Total Thallium	< 0.01 (0) [2]
Total Zinc	< 0.016 (0.016) [3]
Total Manganese	0.149 [3]
Total Phenols (Phenolics)	< 0.005 (0) [2]
Bis(2-Ethylhexyl)Phthalate	< 0.005 (0) [2]

NOTES:

1 *For background conditions, non-detect data are assumed to equal zero ("0") where the parameter is not considered to be a "naturally occurring pollutant." Where the parameter is listed in Table 1 of DEP's "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" (DEP ID 391-2000-022), the quantitation limit is used as the background concentration.*

2 *Where data for parameters were not available at WQN0202 (Harrisburg), average River intake values were used as reported in BISES application.*

3 *Median data from WQN0202, October 2012 – December 2013.*

9. Discharge Concentrations – see "Maximum Concentration in Application or DMRs" column of the Toxics Screening Analysis for Outfalls 008 and 007, Attachment
10. PMFs – 0.3 (Acute Aquatic Life Criteria), 1.0 (Chronic Aquatic Life Criteria) and 1.0 (Threshold Human Health Criteria) (based on infrared imaging studies completed for the previous permit).
11. River Slope – 0.0006 ft/ft (examination of the York Haven USGS Quad map determined an elevation of 252.5 at the discharge channel/River confluence and an elevation of 241 at the Codorus Creek/River confluence, for a slope of approximately 0.0006).
12. River Width – 4,500 feet (approximate).
13. River Velocity – 0.72 feet per second (fps) (based on DEP thermal studies completed in 2002 under low flow conditions, in which the condenser discharge channel flow traveled 650 feet in 15 minutes after confluence with the River).

NOTE: River slope, width, velocity do not affect PENTOXSD results where PMF values are entered directly into PENTOXSD, but these parameters are listed here for completeness.

(ii) PENTOXSD Results

PENTOXSD determined WQBELs as identified in the "Most Stringent WQBEL" column of the Toxics Screening Analysis for Outfalls 007 and 008, Attachment C(b), and as shown below. The "input concentration" was the governing criterion in all cases and are well below the most stringent WQBEL for each parameter. WQBELs are not governing for the Outfalls 007 and 008 discharges, therefore and no WQBELs will be established in the BISES renewed permit for outfall 007 and 008.

PENTOXSD Analysis Results

Recommended Effluent Limitations

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

RMI	Name	Permit Number	Disc Flow (mgd)
54.27	Brunner Island	PA0008281	6.0200

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent WQBEL (µg/L)	Most Stringent WQBEL Criterion
ANTIMONY	17.8	INPUT	27.771	1869.673	THH
ARSENIC	32.4	INPUT	50.549	3338.702	THH
BIS(2-ETHYLHEXYL) PHTHALATE	9.2	INPUT	14.353	37.77	CRL
BORON	40735	INPUT	63553.15	523647.7	AFC
CHLORIDE (PWS)	1730000	INPUT	2700000	NA	NA
CYANIDE, FREE	53	INPUT	82.689	1422.253	AFC
FLUORIDE (PWS)	6151	INPUT	9596.549	NA	NA
MANGANESE	2473	INPUT	3858.278	284272.5	THH
MERCURY	0.169	INPUT	0.264	16.694	THH
PHENOLICS (PWS)	5.7	INPUT	8.893	NA	NA
SELENIUM	107	INPUT	166.937	1665.73	CFC
SULFATE (PWS)	266437	INPUT	415684.6	NA	NA
THALLIUM	9.6	INPUT	14.978	80.129	THH
TOTAL DISSOLVED SOLIDS (PWS	3660000	INPUT	5710000	NA	NA

D. TRC Calculations

Copy of TRC_CALC1

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

3100	= Q stream (cfs)	0.6	= CV Daily
0.02	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	0.3	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 9588.578	1.3.2.iii	WLA cfc = #########
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 3572.933	5.1d	LTA_cfc = #########

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.635	

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