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10 CFR 50.4

4/9/2021

SUSQUEHANNA STEAM ELECTRIC STATION
2020 ANNUAL ENVIRONMENTAL OPERATING REPORT
(NONRADIOLOGICAL)
PLA-7926

Docket No. 50-387
and No. 50-388

The Susquehanna Steam Electric Station (SSES) Annual Environmental Operating Report (Nonradiological) is hereby submitted for the calendar year 2020 in accordance with the SSES Environmental Protection Plan, Section 5.4.1.

There are no new or revised regulatory commitments contained in this submittal.

Should you have any questions regarding this submittal, please contact Ms. Melisa Krick, Manager – Nuclear Regulatory Affairs, at (570) 542-1818.

A handwritten signature in black ink, appearing to be "K. Cimorelli", written in a cursive style.

Kevin Cimorelli

Attachment: 2020 Annual Environmental Operating Report (Nonradiological)

Copy: NRC Region I
Ms. S. Goetz, NRC Project Manager
Mr. Chris Highley, NRC Senior Resident Inspector
Mr. M. Shields, PA DEP/BRP
Mr. Mark Roberts, US Department of Interior, Fish and Wildlife Service

Attachment to PLA-7926

**2020 Annual Environmental Operating Report
(Nonradiological)**

SUSQUEHANNA STEAM ELECTRIC STATION

ANNUAL ENVIRONMENTAL OPERATING REPORT (NONRADIOLOGICAL)

2020

Prepared by:

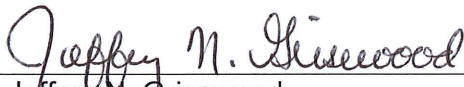


Jerrold L. McCormick
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Date:

2/25/21

Reviewed by:

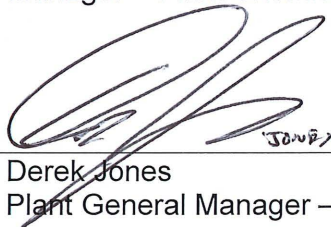


Jeffery N. Grisewood
Manager – Plant Chemistry / Environmental

Date:

3/1/2021

Approved by:


JD Jones

Derek Jones
Plant General Manager – Nuclear

Date:

3/1/21



**Susquehanna Steam Electric Station
Units 1 & 2**

**2020
ANNUAL ENVIRONMENTAL OPERATING REPORT
(NONRADIOLOGICAL)**

**Facility Operating License Nos. NPF-14 & NPF-22
Docket Nos. 50-387 & 50-388**

**Prepared by
Chemistry – Environmental Services
Susquehanna Nuclear, LLC
Berwick, PA
March 2021**

FOREWORD

The Susquehanna Steam Electric Station is a nuclear electrical generating facility with two boiling-water reactors and generators located just west of the Susquehanna River, approximately 5 miles northeast of Berwick, in Luzerne County, Pennsylvania. The station was constructed in the 1970's, with Unit 1 beginning commercial operation on June 8, 1983, and Unit 2 beginning commercial operation on February 12, 1985. Units 1 and 2 each generate a net 1,350 megawatts (MWe), for a total station output of 2,700 MWe.

In total Susquehanna Nuclear, LLC presently owns 2,347 acres of land on both sides of the Susquehanna River. Generally, this land is characterized by open deciduous woodlands interspersed with grasslands and orchards.

On the west side of the river, 1,605 (1670 minus 65 acre Gould Island) acres of land is jointly owned between Susquehanna Nuclear, LLC (90%) and Allegheny Electric Cooperative (10%). The land uses on the west side of the river include generation & associated maintenance facilities, laydown areas, parking lots, roads, a nature preserve (the Susquehanna Riverlands), and agricultural leases to local farmers.

To the north of the station along the river, Susquehanna Nuclear, LLC owns 100% of the 65-acre Gould Island. On the east side of the river, and across the river from the station, Susquehanna Nuclear, LLC is the 100% owner of 677 acres that are maintained as undeveloped land, natural recreational areas, wildlife areas, and leases to local farmers.

This report discusses environmental commitments and impacts from January 1, 2020 through December 31, 2020. In summary, the report documents that Susquehanna Nuclear's environmental commitments were met and that there was no significant adverse environmental impact from station operation.

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1.0 OBJECTIVE

The Licensee has developed procedures and guidelines to ensure that operation of Susquehanna Steam Electric Station (SES) does not adversely affect the environment in the vicinity of the station. Also, these procedures allocate responsibilities and define interfaces necessary to monitor environmental impacts. They include coordination of U.S. Nuclear Regulatory Commission (NRC) requirements with other federal, state, and local requirements for environmental protection.

The objective of this 2020 Annual Environmental Operating Report (Nonradiological) is to provide a summary of both environmental programs and procedures. This report is required by the Final Environmental Statement (FES) for the operation of the Susquehanna SES, Unit 1 and 2, NUREG-0564 June 1981, and Appendix B - Environmental Protection Plan (EPP) to Operating Licenses No. NPF-14 and No. NPF-22. The 2020 report is the 38th Annual Environmental Operating Report (Nonradiological) submitted to meet EPP requirements.

The Licensee submitted an Environmental Report-Operating License Stage for Susquehanna SES to the NRC in May 1978. This report reviewed the results of the preoperational environmental programs and described the preoperational and proposed operational environmental monitoring programs. The NRC and other agencies reviewed this report and made recommendations for operational environmental monitoring programs which were listed in the FES.

2.0 ENVIRONMENTAL ISSUES

2.1 Aquatic Issues

The aquatic monitoring program for operation of the Susquehanna SES is divided into two parts.

Part 1 includes effluent monitoring required by a National Pollutant Discharge Elimination System (NPDES) permit issued by the Pennsylvania Department of Environmental Protection (PaDEP).

The PaDEP is responsible for regulating the water quality permit for the Susquehanna SES. The station's operational NPDES Permit No. PA-0047325 deals with discharge parameters for the Susquehanna SES Sewage Treatment Plant, Cooling Tower blowdown, and miscellaneous low volume waste discharges. The Cooling Tower blowdown also includes in-plant process streams which discharge to the Susquehanna River. Various low volume waste sumps discharge to the station's stormwater system, which flows into Lake Took-a-while, and eventually into the Susquehanna River. The permit requires the station to submit monthly Discharge Monitoring Reports for these outfalls to the PaDEP.

Susquehanna SES's NPDES Permit was reissued on September 1, 2011, and expired on August 31, 2016. The station submitted its NPDES Permit renewal application (PLE-025782) to PaDEP on February 9, 2016. PaDEP has since confirmed that the submitted renewal application was administratively complete, but has not yet provided the station a new NPDES Permit. Until a new permit is issued to the station, the conditions of the most recently expired NPDES Permit will apply.

NOTE: A copy of the NPDES Permit renewal application (PLE-025782) was provided to the NRC in 2016 as part of the submittal process.

Part 2 of the aquatic monitoring program deals with programs listed in the FES, or recommended by the PaDEP or U.S. Fish and Wildlife Service.

American Shad

Environmental lab personnel sampled wash-water from the trash bars and traveling screens at the intake building during August, September, and October to see if American shad were impinged by the Susquehanna SES.

Fish sampling containers, made from aluminum-framed boxes sided with wire mesh, were suspended by jib cranes at the ends of each of the wash-water canals from the trash bars and traveling screens. The sampling containers were deployed from 24 August through 29 September and 12-25 October 2020, and checked daily. No American shad were collected

during this period or during any previous sampling year. However, 59 fish of 10 other species were collected (Table 2.1-1). Most of these fish were juvenile channel catfish, bluegills, and spotfin shiners (*Ictalurus punctatus*, 19 specimens, *Lepomis macrochirus*, 12 specimens, and *Cyprinella spiloptera*, 12 specimens, respectively).

Biofouling Mollusk Monitoring

The biofouling mollusk monitoring program continued at the Susquehanna SES in 2020. The purpose of this monitoring is to survey the Susquehanna River and the Emergency Service Water (ESW) Spray Pond for the presence of live Asian clams (*Corbicula fluminea*) and zebra mussels (*Dreissena polymorpha*) that could affect the operation of Susquehanna Nuclear LLC. This monitoring is generally performed through a combination of scuba diving, wading, and examination of natural or artificial substrates in the river and the ESW Spray Pond.

Asian clams are now abundant in the Susquehanna River near the Susquehanna SES, and zebra mussels are also abundant in Lake Took-a-while, a 24-acre recreational lake owned by Talen Energy. The lake drains to the Susquehanna River through a remnant of the North Branch Canal and presents a pathway for zebra mussel introduction to the river. As a result, this area has been monitored closely since zebra mussels were discovered in Lake Took-a-while in 2016. Three adult mussels were observed in the outfall area of the river in 2017, but no specimens were found in 2020. At this time there is no evidence of a reproductive population of zebra mussels in the Susquehanna River near Susquehanna Nuclear LLC.

Inspections during 2019 of ESSW Spray Pond substrates by scuba and the pond's intake screens during an annual cleaning cycle, revealed the presence of 320 live zebra mussels and 15 Asian clams. As a result, the spray pond was treated with a non-oxidizing biocide on 31 August 2020. A subsequent scuba inspection for biofoulers on 14 September 2020 by divers from the environmental laboratory indicated that there were no living clams or mussels in the pond. No spray pond pump house screens were removed for cleaning or inspection of biofoulers in 2020.

2.2 Terrestrial Issues

2.2.1 Studies Previously Completed

Terrestrial environmental studies, including Cooling Tower Bird Impaction, were completed prior to 1989.

2.2.2 Sound Level Survey

Sound level surveys were conducted during pre-operation and operational periods and are completed. No noise complaints due to station operation received during 2020.

2.2.3 Maintenance of Transmission Line Corridors

Transmission line corridor vegetation maintenance and inspection records are maintained by PPL-Electric Utilities Vegetation Management and are available upon request. PPL-Electric Utilities reported that they did not conduct any herbicide treatments of the SSES bulk transmission corridors during 2020. There were no adverse environmental impacts to transmission corridors reported in 2020. Records will be maintained for five years.

2.3 Cultural Resources Issues

Environmental Protection Plan actions required to satisfy Title 36, Code of Federal Regulations Part 800, relating to archeological sites were completed in 1987. The Advisory Council on Historic Preservation (ACHP), in accordance with 36 CFR 800.6 (a)(1), approved the NRC's determination of "no adverse effect" for archeological sites SES-3 (36LU15), SES-6 (36LU16), SES-8 (36LU49), and SES-11 (36LU51) located on the Licensee's property (NRC letter dated October 28, 1987, to ACHP).

As part of the determination-of-effect process, the Licensee committed to and is taking appropriate measures to mitigate impacts from station maintenance and operation to sites 36LU15, 36LU16, 36LU49, 36LU51, 36LU43, and 36LU105. There was no impact to these sites from station maintenance and operation in 2020. Furthermore, station activities did not impact any previously unknown cultural resources in 2020.

3.0 **CONSISTENCY REQUIREMENTS**

3.1 Plant Design and Operation

In accordance with the Environmental Protection Plan (EPP), the Licensee shall prepare and record an environmental evaluation of proposed changes in plant design, operation, or performance of any test or experiment which may significantly affect the environment. Before initiating such activities, the Licensee shall provide a written evaluation and obtain prior approval from the Director, Office of Nuclear Reactor Regulation.

Criteria for the need to perform an environmental evaluation include:

- (1) A significant increase in any adverse environmental impact previously evaluated by the NRC or Atomic Safety and Licensing Board;
- (2) A significant change in effluent or power level; or
- (3) A matter not previously evaluated which may have a significant adverse environmental impact.

The EPP requires that an environmental evaluation be completed and the NRC be notified if an activity meets any of the criteria. If the change, test, or experiment does not meet any of these criteria, the Licensee will document the evaluation and allow the activity to occur.

During operation of the Susquehanna SES in 2020, there were proposed activities that the Licensee reviewed as part of the Unreviewed Environmental Question program. None of these activities were determined to involve an Unreviewed Environmental Question or require prior NRC notification. The following activities were reviewed:

1. Relocate 12 kV Pole along Main Access Road
2. Excavate & replace HRC 105/102 (EC 1958923)
3. PPL Excavation Activity At 500 kV Yard
4. Excavation & Replacement of U2 ESW Supply and Return (EC 2052409)
5. Replacement of 1X105 & 2X105 Aux Transformers (EC 2313822 and EC 2313823)
6. 2019 Danger Tree Removals
7. Tree Removals at River Intake
8. Excavation, Repair & Replacement of STP Sludge Tank Overflow Lines
9. Replacement of 2D and 8D Construction Transformers
10. Excavate & Repair Well Water Supply Piping
11. Excavation for Concrete Pad for New DCS Vault HVAC Unit
12. Excavations to support Wetland Delineations in OCA
13. Bore Holes to support EC 2380975
14. Excavation & Replacement of Degraded U2 CT Biocide Piping

3.2 Reporting Related to NPDES Permits and State Certifications

On June 24, June 27, July 13, and July 17 SSES exceeded the NPDES Instantaneous Maximum (IMax) Free Available Chlorine (FAC) limit for Outfall 071 (Cooling Tower Blowdown Line) while adding biocide to a Cooling Tower basin. These events did not endanger the public or the environment; therefore, neither an immediate or 24 hour notification to PaDEP was required; therefore, a Significant Environmental Event Evaluation was also not required. PaDEP was notified of all 4 NPDES violations as part of the June and July Discharge Monitoring Reports.

The common cause for all 4 NPDES violations was a blockage discovered in SSES's biocide injection piping, which was causing chlorine to be injected directly into the station's blow down line during basin biocide treatments. Prior to July 17, the initial suspected cause for these violations was an analytical interference thought to be originating from the river and causing erroneously high chlorine results. The actual cause (i.e. the blockage in the biocide injection piping) was definitively identified after the July 17 violation.

There were no other significant non-compliances or special reporting requirements associated with implementation of NPDES Permit No. PA0047325.

Since Susquehanna SES has an NPDES permit, state certification pursuant to Section 401 of the Clean Water Act is not required.

3.3 Changes Required for Compliance with Other Environmental Regulations

The following regulatory changes were incorporated into Susquehanna SES's nonradiological environmental compliance program in 2020:

- On March 2, 2020 PaDEP issued Request For Determination (RFD) #8288 authorizing the operation of temporary non-road engines needed to support the station's repairs to the 1X101 and 1X102 transformers, thereby exempting these gen sets from GP-11 permitting.
- On April 28, 2020 PaDEP issued State Only Operating Permit 40-00027 to Susquehanna SES, which authorizes air emissions associated with emergency generator, cooling tower, and spray pond operations. Specifically, this was a permit renewal, and it expires August 14, 2025.

4.0 ENVIRONMENTAL CONDITIONS

4.1 Unusual or Important Environmental Events

On October 21, 2020 a Significant Environmental Event review was initiated regarding the removal of four “Danger Trees” qualifying as Indiana bat habitat in the vicinity of the PZ1, PZ-2, and PZ-3 Test Wells. These danger trees were removed because they posed a potential safety risk to station personnel. The evaluation ultimately determined that emergency removal of the trees did not harm any Indiana bats; hence, no immediate notification of the danger tree removals was necessary to the US Fish and Wildlife Service.

In summary, there were no significant or adverse environmental effects related to station operation, and there were no EPP noncompliances.

4.2 Environmental Monitoring

4.2.1 General Monitoring

With the exception of ongoing water quality monitoring required for compliance with the NPDES permit, all monitoring of station operational impacts on aquatic and terrestrial biota listed in the FES and Appendix B of the operating license have been completed.

4.2.2 Maintenance of Transmission Line Corridors

In 2020, PPL Electric Utilities Vegetation Management maintained transmission line vegetation maintenance and inspection records. NOTE: PPL-Electric Utilities reported that they did not conduct any herbicide treatments of the SSES bulk transmission corridors during 2020.

5.0 ENVIRONMENTAL PROTECTION PLAN REPORTING REQUIREMENTS

5.1 Review and Audit

The Licensee has established procedures for an independent group to review and audit compliance with the EPP. Audits of EPP compliance are conducted by Nuclear Oversight. The Manager-Nuclear Oversight is responsible for verifying compliance with the EPP. The Site VP – Susquehanna is responsible for environmental monitoring and for providing any related support concerning licensing. The Manager – Plant Chemistry / Environmental is responsible for day-to-day environmental monitoring.

The Auditing Organization Chart (Fig. 5.1-1) lists the groups utilized in reviewing and auditing of the Susquehanna SES environmental programs as well as those responsible for managing these programs.

An audit of compliance with the EPP program was conducted during 2020 as part of a regularly scheduled Chemistry Program Audit. The next Chemistry Program Audit is currently scheduled to be conducted in 2022.

5.2 Records Retention

Records and logs relative to environmental aspects of plant operation and audit activities are retained in the Nuclear Records System. This system provides for review and inspection of environmental documents, which are available to the NRC upon request.

All records concerning modifications of plant structures, systems, and components which are determined to potentially affect the continued protection of the environment are retained for the life of the plant. All other records, data, and logs relating to the environmental programs and monitoring are retained for at least five years or, where applicable, in accordance with the requirements of other agencies. Transmission line corridor vegetation maintenance records are maintained by PPL Electrical Utilities per section 2.2.3 of this report.

5.3 Changes in Environmental Protection Plan

No changes were made to the EPP during 2020.

5.4 Plant Reporting Requirements

5.4.1 Routine Reports

This Annual Environmental Operating Report (Nonradiological) was prepared to meet routine reporting requirements of the EPP for 2020. It provides summaries and analyses of environmental protection activities required in Subsection 4.2 of the EPP for the reporting period.

5.4.2 Non-routine Reports

There were no Unusual or Important Environmental Events as defined by the Environmental Protection Plan that required reporting in 2020.

6.0 ATTACHMENTS

Table 2.1-1

American Shad Impingement Monitoring (2020)

Figure 5.1-1

Auditing Organization Chart (2020)

TABLE 2.1-1

**SUSQUEHANNA STEAM ELECTRIC STATION
2020 AMERICAN SHAD IMPINGEMENT PROGRAM
24 August – 25 October 2020**

Date	Time	Items Found on Trash Bar/Traveling Screen				
2020		Shad	Fish	Crayfish	Other	Comments
Fish baskets were deployed on 24 Aug @ 1215.						
24 Aug	2130	0	1 walleye	0	0	Light leaves/debris
25 Aug	1515	0	1 channel catfish 1 smallmouth bass	1	0	Light leaves/debris
26 Aug	1600	0	0	1	0	Light leaves/debris
27 Aug	1545	0	1 bluegill 1 channel catfish	3	1 snapping turtle	Moderate leaves/debris
28 Aug	2230	0	2 channel catfish	0	0	Moderate leaves/debris
01 Sep	1600	0	3 bluegills	0	0	Light leaves/debris
02 Sep	1600	0	0	2	0	Light leaves Heavy debris
03 Sep	2145	0	1 bluegill	0	0	Light leaves/debris
04 Sep	1700	0	1 smallmouth bass	0	0	Light leaves/debris
08 Sep	1530	0	0	2	0	Light leaves/debris
09 Sep	1415	0	1 margined madtom 1 smallmouth bass	1	0	Light leaves/debris
10 Sep	1645	0	1 channel catfish 1 smallmouth bass	2	0	Light leaves/debris
11 Sep	2000	0	3 spotfin shiners	0	0	Light leaves/debris
14 Sep	2100	0	0	0	0	Light leaves Heavy debris
15 Sep	1645	0	3 channel catfish 1 smallmouth bass 1 spottail shiner	0	0	Light leaves/debris
16 Sep	1600	0	3 channel catfish	2	0	Light leaves/debris
17 Sep	2000	0	4 channel catfish 1 bluegill 1 gizzard shad 1 spotfin shiner	1	0	Light leaves/debris
18 Sep	2045	0	1 channel catfish	1	1 American bullfrog	Light leaves/debris

TABLE 2.1-1 (cont.)

Date	Time	Items Found on Trash Bar/Traveling Screen				
2020		Shad	Fish	Crayfish	Other	Comments
21 Sep	1600	0	2 bluntnose minnows	0	0	Light leaves/debris
22 Sep	1615	0	1 bluegill 1 spottail shiner	2	0	Light leaves/debris
23 Sep	2015	0	2 channel catfish	2	0	Light leaves/debris
24 Sep	2215	0	1 spottail shiner	3	0	Light leaves/debris
25 Sep	1300	0	5 spotfin shiners 1 bluegill	2	0	Light leaves/debris
28 Sep	1345	0	0	0	0	Moderate leaves/debris
29 Sep	2320	0	1 bluegill 1 channel catfish	1	0	Very Heavy leaves/debris
River Intake "muck-out" occurred this week, causing an extreme amount of debris to compromise sampling gear. Gear pulled for repairs and will be deployed once "muck-out" is complete.						
12 Oct	2200	0	3 bluegills	3	0	Moderate
13 Oct	1815	0	0	0	0	Heavy leaves/debris
14 Oct	2015	0	3 spotfin shiners	0	0	Moderate
15 Oct	1530	0	0	0	0	Moderate leaves/debris
16 Oct	1915	0	0	0	0	Moderate
17 Oct	1630	0	0	0	0	Moderate leaves/debris
18 Oct	1515	0	3 rockbass	0	0	Moderate leaves/debris
19 Oct	1330	0	0	0	0	Moderate
20 Oct	1715	0	0	0	0	Moderate
21 Oct	1630	0	0	0	0	Heavy leaves/debris
22 Oct	1700	0	0	3	0	Heavy
23 Oct	1715	0	0	3	1	Heavy
24 Oct	1745	0	0	0	0	Heavy
25 Oct	1900	0	0	0	0	Moderate
12 Oct	2200	0	3 bluegills	3	0	Moderate
TOTALS		0	59 fish - 10 species	35*	3	
			19 channel catfish 12 bluegills 12 spotfin shiners 5 smallmouth bass 3 rockbass 3 spottail shiners 2 bluntnose minnow 1 gizzard shad 1 margined madtom 1 walleye		1 American bullfrog 1 hellgrammite 1 snapping turtle	

*All crayfish collected were *Faxonius obscurus*.

FIGURE 5.1-1 AUDITING ORGANIZATIONAL CHART (2020)

