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Summary of Operations at the Conowingo Dam East Fish Passage Facility Spring 2020

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Table of Contents

Page

List of Tables

Executive Summary

The 2020 Conowingo East fish lift (EFL) passage season was delayed and shortened due to a series of events stemming from the COVID-19 pandemic and the passage of Northern Snakeheads (*Channa argus*) into Conowingo Pond. Exelon and its consultants developed protocols that would allow the operation of the EFL and still provide a safe, heathy and efficient workplace for all employees. However, mandated state and federal closures due to the pandemic prevented EFL operations from beginning on April 1, 2020. Appendix 1 contains communications between Exelon, the Resource Agencies, and the FERC documenting delays and cancellations to EFL operations in 2020 based on COVID-19 mandates and Resource Agency requests.

After several discussions, and the easement of some COVID-19 restrictions, a decision to start the EFL was made, and on May 12, 2020 at 1500 hours, the first lift of the season commenced. Unfortunately, the next lift day, May 13, 2020, the EFL crew reported the passage of the first Northern Snakehead into Conowingo Pond. Subsequent days reported a total of 35 Northern Snakeheads (21 passed into Conowingo Pond, and 14 netted out of the hopper prior to release). Due to the concern over increased invasive species passage and the lateness of the season for successful American Shad passage, the Susquehanna River Anadromous Fish Restoration Cooperative's (SRAFRC) Policy Committee determined that shutting down the Susquehanna fish lifts was necessary to reduce the spread of invasive species in 2020. The EFL was shut down after operations ended on May 15, 2020.

The EFL passed 49,469 fish of 16 species and 1 hybrid. Gizzard Shad (48,765), American Shad (485) and Smallmouth Bass (141) dominated the catch, and comprised 99.8% of the total fish collected and passed. Gizzard Shad alone accounted for 98.6% of the total fish collected and passed. The Northern Snakehead was the only observed invasive species passed during operation of the EFL this spring.

A total of 485 American Shad passed Conowingo Dam in four days of operation. The highest daily passage of American Shad occurred on May 14, when 360 shad passed upstream. On a daily basis, overall American Shad passage was strongest through the fishway between 1500 and 1859 hours with nearly 84.0% (406) of the total American Shad passed during that period. The highest number of American Shad passed in one hour (135) occurred from 1800 to 1859 hours on May 14, 2020.

Fishway operations were conducted at water temperatures ranging from 54°F to 57°F and river flows between 40,700 and 49,600 cfs (USGS Gage Marietta). All 2020 EFL operations utilized weir gate C, as the mixed-flow turbines were utilized each of the four days of EFL operation. Due to the delayed start and COVID-19 restrictions, the Maryland Department of Natural Resources American Shad Floy tagging program was not conducted this year. The 2020 fish passage season marks the thirtieth season of overall operation and the twenty-fourth year of volitional fish passage at the Conowingo EFL.

1.0 Introduction

Exelon Generation Company, LLC, formerly the Susquehanna Electric Company (SECO), has operated a fish passage facility (West Fish Lift) at its Conowingo Hydroelectric Station since 1972. Lift operations are part of a cooperative private, state, and federal effort to restore American Shad (*Alosa sapidissima*) and other migratory fishes to the Susquehanna River. In accordance with the restoration plan, the operational goal had been to monitor fish populations below Conowingo Dam and transport pre-spawned migratory fishes upriver.

According to the 1988 negotiated agreement with state and federal resource agencies and private organizations to enhance restoration of American Shad and other anadromous species to the Susquehanna River, a major element of the agreement was construction of the East Fish Lift Passage Facility (EFL) at Conowingo Dam (Settlement Agreement 1988). Construction of the EFL commenced in April 1990 and it was operational by spring 1991.

Upon completion of the fishways at the Holtwood, Safe Harbor, and York Haven Dams, the EFL has been operated as a volitional fish passage facility since the spring 1997.

Objectives of 2020 operation were: (1) work safely while wearing appropriate and approved personal protective equipment (PPE) and following both Exelon and Normandeau Covid-19 procedures; (2) monitor passage of migratory and resident fishes through the fishway; (3) assess fishway and trough effectiveness and make modifications as feasible; and (4) deter passage of Northern Snakehead and Blue Catfish (invasive species) upstream into Conowingo Pond.

2.0 Conowingo Operation

2.1 Project Operation

The Conowingo Hydroelectric Station, operational in 1928, is located at river mile 10 on the Susquehanna River (RMC 1992). The powerhouse has a peaking generating capacity of 573 MW and a hydraulic capacity of approximately 86,000 cfs. Flows in excess of station draft are spilled through two regulating and 50 crest gates. The powerhouse contains seven vertical Francis (numbered 1 through 7) and four Mixed-Flow (numbered 8 through 11) turbines. The seven Francis units have been equipped with aeration systems that permit a unit to draw air into the unit (vented mode) or operate conventionally (unvented mode). The four original Kaplan turbines installed in 1964 were replaced over a period of four years (1992 to 1996), with more efficient mixed-flow Kaplan type turbines.

Minimum flow releases from the station during the spring spawning and fishway-operating season follow the schedule outlined in the 1988 settlement agreement. Minimum flows of 10,000 cubic feet per second (cfs) or natural river flow, whichever is less, as measured at the United States Geological Survey (USGS) gauge at Marietta, PA are maintained for the period 1 to 30 April. A minimum flow of 7,500 cfs or natural river flow (as previously noted) are maintained for the period 1 to 31 May. A minimum flow of 5,000 cfs or natural river flow (as previously noted) is maintained when fish lift operations occur in June.

2.2 Fishway Operation

The initial start of operation for the EFL in 2020 was slated to begin on April 1, 2020 or with a water temperature of 50°F, but was delayed due to the COVID-19 pandemic and mandated state and federal closures of non-essential businesses and programs. Exelon and Normandeau developed protocols to include daily temperature checks, availability of instant hand sanitizers, approved masks, and modified access points designed to protect all essential workers at the Conowingo Dam Hydroelectric facility. After a long delay and the easement of some COVID-19 restrictions, a decision was made on the morning of May 12 to begin EFL operations under these new guidelines/protocols. After some setup, the first lift of the 2020 season was made at 1500 hours. The passage of the first American Shad occurred the following day on May 13, 2020 (Tables 1 and 2). At the request of the Resource Agencies, operations at all Susquehanna fish lifts were terminated at day's end on May 15 due to the passage of Northern Snakeheads into Conowingo Pond. Twenty one (21) Northern Snakeheads were passed into Conowingo Pond, with 14 being netted out of the hopper prior to release over a span of three days. The EFL only operated on four consecutive days (May 12 through May 15) in 2020. Many facets of the 2020 lift season were cancelled due to precautions to prevent the spread of Covid-19; all work associated with Conowingo West fish lift operations, the Muddy Run and Holtwood American Shad tagging/telemetry studies, and the MDNR American Shad Floy tagging study were all put on hold.

A staff of three personnel conducted EFL operation: a lift operator, a supervising biologist, and a biological technician. With added Covid-19 protocols, all three Normandeau personnel worked utilizing social distancing safety protocols, regularly washed hands, and wore appropriate protective PPE, which included facemasks and gloves to minimize potential virus spread.

The mechanical aspects of EFL operation in 2020 were similar to those described in RMC (1992) and Normandeau Associates, Inc. (1999). Fishing time and/or lift frequency was determined by fish abundance, but the hopper was generally cycled twice per hour throughout the day. The method of lift operation was also influenced by fish abundance. When a large number of fish, (namely Gizzard Shad) were in the fishing channel, the crowder was not operated; instead the crowder screen was raised and then lowered, trapping fish over the hopper. This mode of operation, called "fast fish", involved leaving the crowder in the normal fishing position and raising the hopper frequently to remove fish that accumulated in the holding channel.

The specific entrance(s) used to attract fishes was dictated by the station discharge and which turbine units were operating. For example, when mixed-flow turbine units 8, 9, 10, and 11 or any combination of these turbines were operating, entrance C was the primary entrance used to attract fishes. Under these conditions, the attraction flow through the other entrances is negated or disrupted. Depending on river flow and/or generation, either entrance A or C is utilized to attract fishes. During the abbreviated 2020 season, only Entrance Gate C was used, due to at least one or a combination of the mixed-flow turbines in use during each of the four days of EFL operation (Table 2).

2.3 Fish Counts

Fish that were lifted and sluiced into the trough were guided by a series of fixed screens. The fixed screens directed the fish to swim up and through a 3-ft-wide channel and past a 4-ft-by-10-ft counting window located on the west wall of the trough. Fish passing the counting window were

identified to species and enumerated by a biologist and/or technician. Passage of fish by the window and out of the trough system was controlled by a set of gates located downstream of the counting window. During periods of peak passage, the biologist and technician identified and counted the fish.

At the end of each hour, fish passage data were recorded on data sheets and entered into a Microsoft Excel worksheet on a Personal Computer (PC). Data processing and reporting were PC- based and accomplished by program scripts, or macros, created within Microsoft Excel software. After the technician verified the correctness of the raw data, a daily summary of fish passage was produced and distributed electronically to plant personnel. Each day's data were backed up and stored off site. Daily reports and weekly summaries of fish passage were electronically distributed to plant personnel and the Resource Agencies.

3.0 Results

3.1 Relative Abundance

The number of fishes collected and passed by the Conowingo Dam EFL is presented in Table 1. A total of 49,469 fish of 16 Species and 1 hybrid passed upstream into Conowingo Pond. Over the four days of operation, Gizzard Shad (48,765), American Shad (485), and Smallmouth Bass (141), dominated the catch, and comprised 99.8% % of the total fish collected and passed. Gizzard Shad alone accounted for 98.6% of the total fish collected and passed. Peak passage occurred on May 14 when 19,569 fish, (97.7% Gizzard Shad along with 360 American Shad), were passed. Due to the shortness of the EFL season, and the lack of data, it is unfair to justify trends compared to other full EFL seasons.

3.2 Invasive Species

Invasive species such as Flathead Catfish have been observed in past years at Conowingo Dam. Flathead Catfish have been established in the lower Susquehanna River for nearly twenty years, thus Exelon has not been required to report them except for in the annual summary report. However, due to increased sightings and reports of Northern Snakehead and Blue Catfish downstream of Conowingo Dam, the Resource Agencies requested that Exelon implement voluntary measures for the 2020 season to decrease the risk that invasive species, specifically Northern Snakehead and Blue Catfish, would pass through the Conowingo EFL. Normandeau and Exelon developed a strategy to both try to limit passage of invasive species, and to report any observations of them to the appropriate agencies in a timely matter (Appendix 2).

On May 13, 2020 (second day of EFL operations), lift operators reported seeing a Northern Snakehead in the hopper while it was rising. Normandeau personnel removed this fish. However, due to the inability to view the entire catch of fish in the hopper, one snakehead passed into Conowingo Pond that day. On May 14, three Northern snakeheads were removed from the hopper, and three passed the viewing window. On May 15, ten Northern snakeheads were removed from the hopper, while seventeen passed upstream. A total of thirty-five snakeheads were observed during EFL operations in 2020, with twenty-one passing into Conowingo Pond. The Resource Agencies notified Exelon and the other fish lift operators on the lower Susquehanna River to

suspend fish lift operations at day's end on May 15, 2020 due to the increased occurrence and passage of Northern Snakeheads into Conowingo Pond.

3.3 American Shad Passage

The EFL collected and passed 485 American Shad (Table 1). The first American Shad passed on May 13, 2020 during the 1000 hour. The highest daily passage of American Shad occurred on May 14, when 360 shad passed upstream. On a daily basis, overall American Shad passage was strongest through the fishway between 1500 and 1859 hours during which nearly 84.0% (406) of the total American Shad passage occurred. The highest number of American Shad passed in one hour (135) occurred from 1800 to 1859 hours on May 14, 2020. American Shad passage exceeded 100 fish on only one of the four days of operation. This year marks the fourth year since 2015 in which the EFL passed less than 10,000 American Shad, but the low passage value in 2020 is most likely due to the shortness of the EFL season (Table 3).

American Shad were collected and passed at water temperatures ranging from 54.0°F to 57.0°F and river flows between 40,700 and 49,600 cfs. The average daily river flow on May 14, 2020 when American Shad passage exceeded 100 fish was 43,600 cfs. The average daily river flow for the entire period (May 12 through May 15) was 45,050 cfs.

3.4 Gizzard Shad Passage

The EFL collected and passed 48,765 Gizzard Shad in 2020 (Tables 1 and 4). Gizzard Shad passage was consistently strong throughout the daily operations from 0800 hours to 1759 hours. Gizzard Shad accounted for 98.6% of the total fish collected and passed. Gizzard Shad passage exceeded 10,000 on 3 out of four days of operation. Table 4 provides the ratio of American Shad to Gizzard Shad for the years of volitional passage (1997-2020). In years when American Shad passage exceeds 50,000 fish, the ratio ranges from 1:2 – 1:14 (American Shad/Gizzard Shad). For those years when American Shad passage is less than 50,000 fish, the ratio ranges from 1:16 – 1:171. This year is an exception to this due to the delayed start and the agency requested shutdown on May 15, 2020, which ended EFL operations earlier than most previous years.

3.5 Alosids

Only one Alewife was observed passing the EFL window in 2020 (Table 1).

3.6 Maryland Tag-Recapture

In usual years, American Shad are captured, Floy-tagged and released downstream of Conowingo dam by the Maryland DNR. This year, due to the pandemic, the Maryland DNR did not operate as normal, and did not commence with normal operations, thus no American Shad were caught and Floy-tagged as part of the American Shad tailrace population estimate.

3.7 Fish Mortality in EFL

Modifications made to the fish trough, particularly the valve grating and hopper trough chute since 1999 have diminished the potential for the valve grating to clog with various types of debris and have decreased the number of American Shad lift mortalities observed throughout the last several fish passage seasons. In this shortened season, only five Gizzard Shad lift mortalities, (0.01% of the total Gizzard Shad passed), was observed in 2020. Normandeau and Exelon staff work closely prior

to, during, and after the season to assess areas of concern that may cause injury or mortality. Close attention is directed towards hopper alignment at the trough/sluice area as well as the function of the hopper door during the sluicing operation.

4.0 Summary

Due to the COVID-19 pandemic, EFL operations were delayed until May 12, 2020. The first American Shad passed on the second day of operations (May 13, 2020). However, due to an increasing number of invasive Northern Snakehead fish passing into Conowingo Pond (21), and another 14 removed from the hopper, a decision was made by the Susquehanna River Anadromous Fish Restoration Cooperative's Policy Committee to suspend operations at the end of fish lift operations on May 15, 2020. In 2020, the East Fish Lift season lasted four days. The EFL passed 485 American Shad from May 13, 2020 through May 15, 2020. The total number of American Shad passed during the 2020 season was the lowest number of American Shad collected or passed at the EFL since operations commenced in 1991. However, due to the delayed start and abrupt end to the EFL operating season, use of the 2020 data is not recommended for comparing long term annual catch rates or operational trends.

5.0 Recommendations

1. Work with Resource Agencies regarding Invasive Species such as the Northern Snakehead and Blue Catfish for the 2021 season.

2. Continue to implement Minimum Standard Health Protocols and guidelines for COVID-19, and other global and regional viruses to ensure a safe and continual work environment.

3. Continue to operate the EFL at Conowingo Dam per annual guidelines developed and approved by the Susquehanna River Technical Committee. Lift operation should adhere to the guidelines; however, flexibility must remain with operating personnel to make “on the spot” decisions for maximizing fishway performance and fish passage (Modified Prescription. 2016.)

4. Continue the use of two fish counters during periods of increased fish passage to accurately reflect the number of fish that pass through the EFL.

5. Continue to inspect cables, limit switches, lift components to enhance season operability, and continue to evaluate effectiveness of any modifications to the EFL.

6.0 Literature Cited

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Settlement Agreement. 1988. Philadelphia Electric Power Company and the Susquehanna Power Company, AND the United States Department of Interior, Fish and Wildlife Service; Pennsylvania Fish Commission; Susquehanna River Basin Commission; Maryland Department of Natural Resources; the Commonwealth of Pennsylvania, Department of Environmental Resources; the Upper Chesapeake Watershed Association; and the Pennsylvania Federation of Sportsmen's Clubs. August 26, 1988.

Modified Prescription. 2016. U. S. Department of the Interior's Modified Prescription for Fishways Pursuant to Section 18 of the Federal Power Act (Modified Prescription) for the Federal Energy Regulatory commission Project No. 405 Conowingo Hydroelectric Project.

Tables

Table 1. Fish species and number collected/passed during the 4-day operation at the Conowingo EFL (May 12-15, 2020).

Species	# Collected/Passed
American Shad *(Alosa sapidissima)*	485
Alewife (*Alosa pseudoharengus*)	1
Gizzard Shad *(Dorosoma cepedianum)*	48,765
Rainbow Trout *(Oncorhynchus mykiss)*	6
Brown Trout *(Salmo trutta)*	1
Muskellunge *(Esox masquinongy)*	2
Tiger Musky (hybrid)	2
Quillback (Carpiodes cyprinus)	2
Shorthead Redhorse *(Moxostoma macrolepidotum)*	14
Channel Catfish *(Ictalurus punctatus)*	1
White Perch *(Morone americana)*	1
Striped Bass *(Morone saxatilis)*	1
Smallmouth Bass *(Micropterus dolomieui)*	141
Largemouth Bass *(Micropterus salmoides)*	7
White Crappie *(Pomoxis annularis)*	1
Walleye *(Stizostedion vitreum)*	4
Northern Snakehead *(Channa argus)*	35
TOTAL FISH (16 Species/1 hybrid)	**49,469**

Table 2. Conowingo EFL Daily fish catch by hour for May 12-15, 2020.

Date: 5/12/2020					
Water Temperature	54.0°F	Secchi (in)	N/A	Forebay Elevation	107.1
Entrance Gate (s)	C	Average River Flow	49,600 cfs	Tailrace Elevation	21.9
Viewing Time	1500 – 1800 hrs	# Lifts	6	# Units Operating	2,3,6,7,9,10,11
Fishing Time	1500 – 1745 hrs				

Time Period:	0800-0859	0900-0959	1000-1059	1100-1159	1200-1259	1300-1359	1400-1459	1500-1559	1600-1659	1700-1759	Daily Total
SPECIES											
American Shad								0			0
Gizzard Shad								2,274	1,540	477	4,291
White Perch								1			1
Smallmouth Bass								2			2
Totals								**2,277**	**1,540**	**477**	**4,294**

Table 2. (Continued)

Date: 5/13/2020					
Water Temperature	54.0°F	Secchi (in)	26”	Forebay Elevation	108.1
Entrance Gate (s)	C	Average River Flow	46,300 cfs	Tailrace Elevation	22.3
Viewing Time	0830 – 1830 hrs	# Lifts	18	# Units Operating	2,5,6,7,8,9,10
Fishing Time	0830 – 1815 hrs				

Time Period:	0800-0859	0900-0959	1000-1059	1100-1159	1200-1259	1300-1359	1400-1459	1500-1559	1600-1659	1700-1759	1800-1859	Daily Total
SPECIES												
American Shad	0	0	1	0	0	0	0	10	19	16	8	54
Gizzard Shad	3	1,227	1,436	2,033	508	271	1,384	1,638	1,579	1,424	690	12,193
Brown Trout	0	0	0	0	0	0	0	0	0	1	0	1
Muskellunge	0	1	0	0	0	0	0	0	0	0	0	1
Tiger Musky	0	0	0	0	0	0	0	0	1	1	0	2
Striped Bass	0	0	0	0	0	0	1	0	0	0	0	1
Smallmouth Bass	0	1	0	2	0	0	0	1	1	0	5	10
Largemouth Bass	0	0	0	0	0	1	0	0	0	0	0	1
Walleye	0	0	0	0	0	0	0	0	0	1	0	1
Northern Snakehead	0	0	0	1	0	0	0	0	0	0	0	1
Totals	**3**	**1,229**	**1,437**	**2,036**	**508**	**272**	**1,385**	**1,649**	**1,600**	**1,443**	**703**	**12,265**

Table 2. (Continued)

Date: 5/14/2020					
Water Temperature	57.0°F	Secchi (in)	30”	Forebay Elevation	107.8
Entrance Gate (s)	C	Average River Flow	43,600 cfs	Tailrace Elevation	22.1
Viewing Time	0830 – 1900 hrs	# Lifts	21	# Units Operating	2,4,5,7,8,9,10
Fishing Time	0830 – 1845 hrs				

Time Period:	**0800-0859**	**0900-0959**	**1000-1059**	**1100-1159**	**1200-1259**	**1300-1359**	**1400-1459**	**1500-1559**	**1600-1659**	**1700-1759**	**1800-1859**	**Daily Total**
SPECIES												
American Shad	2	3	3	5	4	8	12	40	77	71	135	360
Alewife	1	0	0	0	0	0	0	0	0	0	0	1
Gizzard Shad	2,000	2,800	2,400	2,700	2,100	2,000	300	700	1,700	1,400	1,025	19,125
Rainbow Trout	0	0	0	0	1	1	1	1	0	0	2	6
Quillback	0	0	0	0	0	1	1	0	0	0	0	2
Shorthead Redhorse	0	0	1	0	2	3	0	0	0	1	2	9
Channel Catfish	0	0	0	1	0	0	0	0	0	0	0	1
Smallmouth Bass	2	4	5	9	9	7	2	6	9	6	2	61
Walleye	0	0	0	0	0	0	0	0	0	1	0	1
Northern Snakehead	0	0	0	0	0	0	0	1	0	2	0	3
Totals	**2,005**	**2,807**	**2,409**	**2,715**	**2,116**	**2,020**	**316**	**748**	**1,786**	**1,481**	**1,166**	**19,569**

Table 2. (Continued)

Date: 5/15/2020					
Water Temperature	57.0°F	Secchi (in)	30”	Forebay Elevation	106.6
Entrance Gate (s)	C	Average River Flow	40,700 cfs	Tailrace Elevation	22.7
Viewing Time	0800 – 1800 hrs	# Lifts	19	# Units Operating	4,5,6,7,8,10, 11
Fishing Time	0800 – 1730 hrs				

Time Period:	**0800-0859**	**0900-0959**	**1000-1059**	**1100-1159**	**1200-1259**	**1300-1359**	**1400-1459**	**1500-1559**	**1600-1659**	**1700-1759**	**Daily Total**
SPECIES											
American Shad	2	10	4	10	11	2	2	2	0	28	71
Gizzard Shad	1,450	2,460	1,280	690	717	1,668	290	1,650	1,564	1,387	13,156
Muskellunge	0	0	0	0	0	1	0	0	0	0	1
Shorthead Redhorse	0	0	0	0	1	0	0	0	1	3	5
Smallmouth Bass	1	3	8	12	11	5	6	13	6	3	68
Largemouth Bass	0	1	0	0	1	0	0	2	2	0	6
White Crappie	0	0	0	0	0	0	0	0	1	0	1
Walleye	0	0	0	0	0	0	0	0	1	1	2
Northern Snakehead	0	0	3	2	1	0	2	6	3	0	17
Totals	**1,453**	**2,474**	**1,295**	**714**	**742**	**1,676**	**300**	**1,673**	**1,578**	**1,422**	**13,327**

Table 3. Summary of American Shad passage counts and percent passage values at Susquehanna River dams, 1997-2020.

	Conowingo East	Holtwood		Safe Harbor		York Haven	
		Number	% of C.E.L.	Number	% of Holt.	Number	% of S.H.
1997	90,971	28,063	30.8%	20,828	74.2%	-	-
1998	39,904	8,235	20.6%	6,054	73.5%	-	-
1999	69,712	34,702	49.8%	34,150	98.4%	-	-
2000	153,546	29,421	19.2%	21,079	71.6%	4,687	22.2%
2001	193,574	109,976	56.8%	89,816	81.7%	16,200	18.0%
2002	108,001	17,522	16.2%	11,705	66.8%	1,555	13.3%
2003	125,135	25,254	20.2%	16,646	65.9%	2,536	15.2%
2004	109,360	3,428	3.1%	2,109	61.5%	219	10.4%
2005	68,926	34,189	49.6%	25,425	74.4%	1,772	7.0%
2006	56,899	35,968	63.2%	24,929	69.3%	1,913	7.7%
2007	25,464	10,338	40.6%	7,215	69.8%	192	2.7%
2008	19,914	2,795	14.0%	1,252	44.8%	21	1.7%
2009	29,272	10,896	37.2%	7,994	73.4%	402	5.0%
2010	37,757	16,472	43.6%	12,706	77.1%	907	7.1%
2011	20,571	21	0.1%	8	38.1%	0	0.0%
2012	22,143	4,238	19.1%	3,089	72.9%	224	7.3%
2013	12,733	2,503	19.7%	1,927	77.0%	202	10.5%
2014	10,425	2,589	24.8%	1,336	51.6%	8	0.6%
2015	8,341	5,286	63.4%	3,896	73.7%	43	1.1%
2016	14,276	6,718	47.1%	4,242	63.1%	178	4.2%
2017	16,265	3,170	19.5%	2,007	63.3%	62	3.1%
2018	6,992	1,458	20.9%	661	45.3%	NA	NA
2019	4,787	571	11.9%	316	55.3%	NA	NA
2020	**485**	**28**	**5.8%**	**1**	**3.6%**	**NA**	**NA**

Table 4. Summary Information for Conowingo EFL Volitional Passage, 1997 through 2020.

Year	#Days of Ops	#Hrs of Ops	Total # of Lifts	# Fish passed	# Am. shad	# Gizzard shad	# Herring	Avg.#fish/lift	Ratio A.S./Gizz
1997	64	640	652	719,297	90,971	344,332	242,815	1,103	1/4
1998	50	433	460	712,993	39,904	654,575	706	1,550	1/16
1999	52	467	610	1,184,101	69,712	950,500	130,639	1,941	1/14
2000	45	368	570	493,955	153,546	317,753	14,965	866	1/2
2001	43	360	559	921,916	193,574	429,461	292,379	1,649	1/2
2002	49	440	560	656,894	108,001	513,794	2,111	1,173	1/5
2003	44	416	645	589,177	125,135	459,634	551	913	1/4
2004	44	390	590	715,664	109,360	602,677	190	1,212	1/6
2005	52	434	541	377,762	68,926	305,378	4	698	1/4
2006	61	430	619	714,918	56,899	655,990	0	1,154	1/12
2007	39	335	479	539,203	25,464	508,627	889	1,125	1/20
2008	51	409	483	943,838	19,914	919,975	5	1,954	1/46
2009	57	495	618	915,417	29,272	876,412	231	1,481	1/30
2010	59	526	685	857,263	37,757	813,429	5	1,251	1/22
2011	15	142	259	289,453	20,571	257,522	19	1,117	1/13
2012	62	633	1,230	1,109,911	22,143	1,070,672	52	902	1/48
2013	60	575.6	925	1,094,526	12,733	1,076,048	7	1,183	1/85
2014	54	509	988	1,192,750	10,425	1,170,200	136	1,207	1/112
2015	46	433	674	754,057	8,341	742,661	13	1,119	1/89
2016	55	536	860	865,179	14,276	833,681	34	1,006	1/58
2017	46	463	849	844,917	16,265	813,687	65	995	1/50
2018	48	416	714	1,040,789	6,992	1,022,819	60	1,458	1/146
2019	46	415	788	832,534	4,787	820,901	15	1,057	1/171
2020	**4**	**34.6**	**64**	**49,455**	**485**	**48,765**	**1**	**773**	**1/100**

Table 5: Summary of selected operation and fish catch statistics at the Conowingo Dam East Fish Passage Facility, 1991 to 2020.

Year	Number of Days Operated	Number of Lifts	Operating Time (hrs)	Number of Species	American shad	Blueback herring	Alewife	Hickory shad
1991	60	1168	647.2	42	13,897	13,149	323	0
1992	49	599	454.1	35	26,040	261	3	0
1993	42	848	463.5	29	8,203	4,574	0	0
1994	55	955	574.8	36	26,715	248	5	1
1995	68	986	706.2	36	46,062	4,004	170	1
1996	49	599	454.1	35	26,040	261	3	0
1997	64	652	640.0	36	90,971	242,815	63	0
1998	50	652	640.0	33	39,904	700	6	0
1999	52	610	467.0	31	69,712	130,625	14	0
2000	45	570	367.8	30	153,546	14,963	2	0
2001	43	559	359.8	30	193,574	284,921	7,458	0
2002	49	560	440.7	31	108,001	2,037	74	6
2003	44	645	416.6	25	125,135	530	21	0
2004	44	590	390.3	30	109,360	101	89	0
2005	52	541	434.3	30	68,926	4	0	0
2006	61	619	429.8	32	56,899	0	0	4
2007	39	479	335.3	31	25,464	460	429	0
2008	51	483	407.0	29	19,914	1	4	0
2009	57	618	495.6	30	29,272	71	160	0
2010	59	685	526.2	38	37,757	4	1	0
2011	15	259	142.4	24	20,571	17	2	20
2012	62	1230	633.7	35	22,143	25	27	0
2013	60	925	575.6	27	12,733	7	0	1
2014	54	988	509	34	10,425	25	111	2

Year	Number of Days Operated	Number of Lifts	Operating Time (hrs)	Number of Species	American shad	Blueback herring	Alewife	Hickory shad
2015	46	674	433	28	8,341	3	10	8
2016	55	860	536	27	14276	34	0	0
2017	46	849	463	32	16,265	59	6	0
2018	48	714	416	25	6992	2	58	0
2019	46	788	415	22	4,787	15	0	0
2020	4	64	34.6	16	485	0	1	0

Appendix 1

Andrea Danucalov
FERC License Compliance Manager
(267) 533-1125
andrea.danucalov@exeloncorp.com

March 30, 2020

VIA ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Conowingo Project (P-405) COVID-19 Update

Dear Secretary Bose:

Consistent with the State of Emergency announced in Maryland Governor Hogan's March 23, 2020 Executive Order, the State of Emergency announced in Pennsylvania Governor Wolf's March 19, 2020 Executive Order, Center For Disease Control guidelines, and per my discussion with TJ Lovullo on Friday, March 20, 2020, Exelon Generation Company, LLC (Exelon) is limiting access to the Conowingo Hydroelectric Project (Project). Only employees and contractors essential to ensure the safe and reliable operation of the Project will be allowed access. These measures are being taken to limit access to the Project and help prevent the transmission of COVID-19.

As a result, Exelon is providing the following notice:

> East Fish Lift: Exelon operates the East Fish Lift from approximately April 1 through early June to provide volitional passage for several target species including American Shad, Alewife, Blueback Herring, and Hickory Shad. As a result of Executive Orders and CDC guidelines referenced above, East Fish Lift operations will be suspended. Exelon will continue to monitor the status of the COVID-19 pandemic and will evaluate return to service of the East Fish Lift based on updated guidance issued by the State of Maryland, the Commonwealth of Pennsylvania, the CDC, and other state and federal agencies.

Exelon has also communicated this information to the Maryland Department of Natural Resources, Maryland Department of the Environment, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Susquehanna River Basin

1

Commission, and U.S. Fish and Wildlife Service (USFWS). USFWS has also cancelled the planned inspection of the East Fish Lift that was scheduled for May 7, 2020.

If you have any questions, please contact me.

Sincerely,

Andrea Danucalov
FERC License Compliance Manager

cc: TJ Lovullo, FERC, Aquatic Resources Branch
Dusty McKeown, Exelon Plant Manager
Sheila Eyler, USFWS
Scott Williamson, PADEP
Denise Keehner, MDE
Shawn Seaman, MDNR

2

FEDERAL ENERGY REGULATORY COMMISSION
Washington D.C. 20426

Office of Energy Projects

Project No. 405-118—Maryland, Pennsylvania
Conowingo Hydroelectric Project
Exelon Generation Company, LLC

May 4, 2020

VIA FERC Service

Christopher Wilson, Director
Exelon Generation Company, LLC
101 Constitution Avenue NW
Suite 400 East
Washington, DC 20001

Subject: Project operation under the COVID-19 pandemic

Dear Mr. Wilson:

This letter is in reference to your letter dated March 30, 2020 in which you state that Exelon Generation Company, LLC (Exelon) is limiting access to the Conowingo Hydroelectric Project during the COVID-19 pandemic. You indicate that only employees and contractors essential to ensure the safe and reliable operation of the project will be allowed access to the facility. You state that these measures are being taken to help prevent the transmission of COVID-19. You also note that the East Fish Lift operations will be suspended and that Exelon will continue to monitor the status of the COVID-19 pandemic and evaluate the return to service of the East Fish Lift based on updated guidance issued by the State of Maryland, the Commonwealth of Pennsylvania, the Centers for Disease Control, and other state and federal agencies.

Please be advised that licensees are expected to comply with their licenses, including fish passage, species monitoring, and fish counting, to the best of their ability. To the extent that you think individual state emergency declarations, staffing issues, and health concerns may impact your ability to comply with additional license requirements, you should e-file notification of a deviation from a license requirement, clearly stating why it is necessary to deviate from the requirement. Commission staff will consider issues caused by the current emergency and your good faith efforts to

Project No. 405-118 -2-

balance operations, safety, and license compliance, when making violation determinations and the need for any mitigation, after the fact.

Also, please note that failure to comply with an Endangered Species Act (ESA) requirement could expose a licensee to liability, and there is no distinction in the ESA between essential and non-essential requirements. You may wish to consult with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, as appropriate, regarding these matters. If you do not intend to comply with a license requirement related to endangered species, you should e-file notification with the Commission, clearly stating why you think it is not possible to comply with the requirement. Further, once compliance is re-achieved, you should e-file notification with the Commission indicating such and identify the duration of the deviation and any observed or reported adverse effects due to your deviation.

Thank you for your cooperation. If you have any questions concerning this letter please contact Alicia Burtner at (202) 502-8038 or alicia.burtner@ferc.gov.

Sincerely,

Thomas LoVullo
Chief, Aquatic Resources Branch
Division of Hydropower Administration
and Compliance

Andrea Danucalov
FERC License Compliance Manager
(267) 533-1125
(610) 765-5805 (Fax)
andrea.danucalov@exeloncorp.com

June 5, 2020

VIA ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Conowingo Hydroelectric Project (P-405) COVID-19 Update

Dear Secretary Bose:

On March 30, 2020, Exelon Generation Company, LLC (Exelon) filed a notice regarding the suspension of operation of the East Fish Lift (EFL) at the Conowingo Hydroelectric Project (P-405 (Project) due to the State of Emergency declared in Maryland Governor Hogan's March 23, 2020 Executive Order, the State of Emergency declared in Pennsylvania Governor Wolf's March 19, 2020 Executive Order, the Center For Disease Control guidelines, and the Department of Homeland Security (DHS) Memo on Essential Critical Infrastructure during COVID-19 Response.

At that time, only employees and contractors essential to ensure the safe and reliable operation of the Project were allowed on-site. These measures were taken to limit access to the Project to prevent the transmission of COVID-19.

In the March 30, 2020 filing, Exelon provided the following notice:

> East Fish Lift: Exelon operates the East Fish Lift from approximately April 1 through early June to provide volitional passage for several target species including American Shad, Alewife, Blueback Herring, and Hickory Shad. As a result of Executive Orders and CDC guidelines referenced above, East Fish Lift operations will be suspended. Exelon will continue to monitor the status of the COVID-19 pandemic and will evaluate return to service of the East Fish Lift based on updated guidance issued by the State of Maryland, the Commonwealth of Pennsylvania, the CDC, and other state and federal agencies.

In early May, Exelon was able to modify its procedures to enable maintenance and other contractors on-site to complete EFL maintenance activities while still minimizing the potential of

1

transmission of COVID-19 due to the increased availability of personal protective equipment (PPE), namely face coverings and cleaning supplies such as hand sanitizer. Exelon also instituted on-site screening of individuals coming on-site and employee and contractor social distancing requirements. Working with our contractor who operates the EFL, Exelon implemented other safeguards, included segregating fish lift personnel from the station, reducing the number of contractors on site and working in close proximity, and ensuring COVID-19 protocols were in place.

On May 8, 2020, Exelon contacted the Maryland Department of the Environmental (MDE) and the Office of the Maryland Attorney General to review our plan to return the EFL to operation to ensure consistency with the State of Maryland and Governor Hogan's Executive Order. Exelon also consulted with the United States Fish and Wildlife Service (USFWS). On May 12, 2020, Maryland provided approval to proceed with EFL operations. After the USFWS coordinated with upstream licensees regarding their ability to operate their respective fish lifts as well as other Resource Agencies including Pennsylvania Fish and Boat Commission, Pennsylvania Department of Environmental Protection, Maryland Department of Natural Resources, and the Susquehanna River Basin Commission, Exelon began operation of the EFL on May 12, 2020.

In its annual meeting with state and federal resource agencies in December 2019, Exelon committed to a voluntary Best Management Practice (BMP) for invasive species that was requested by the USFWS and other Resource Agencies. A copy of this document dated February 20, 2020 is attached. As part of this voluntary commitment, Exelon and its contractors view the hopper dumping into the fish exit trough. If Northern Snakeheads or Blue Catfish are observed in the hopper or chute, the gate at the viewing window is closed immediately, and a draw-down is instituted to remove the invasive species from the trough before releasing the remaining fish to the Conowingo Pond. However, it can be difficult to spot the invasive species due to the abundance of Gizzard Shad in the hopper and chute and invasive species could pass through by the viewing window with little time to close the gate at the viewing window.

As part of the voluntary BMP, Exelon reports invasive species to Resource Agencies in addition to volitional fish counts. Table No. 1 provides a daily tally of Northern Snakeheads for the period May 12-15, 2020 that were removed or that could not be removed and passed volitionally at the EFL. This information was communicated to the resource agencies daily. As shown in Table No. 1, Exelon's contractor was able to remove fourteen (14) Northern Snakeheads and twenty one (21) passed into the Conowingo Pond. Daily and total American shad numbers are also shown in Table No. 1.

Table No. 1 - 2020 Conowingo EFL Northern Snakeheads and American Shad

Date	Number of Northern Snakeheads Removed	Number of Northern Snakeheads Passed Volitionally	Number of American Shad Passed Volitionally
May 12, 2020	0	0	0
May 13, 2020	1	1	54
May 14, 2020	3	3	360
May 15, 2020	10	17	71
Total	14	21	485

2

On May 15, 2020, Exelon received notice from the USFWS that the Susquehanna River Anadromous Fish Restoration Cooperative's (SRAFRC) Policy Committee met and advised Exelon to terminate fish passage operations at the end of the day. In prior years, SRFRAC has recommended cessation of fish passage operations due to factors such as water temperature and declining passage numbers late in the season. This year, however, the USFWS stated that, due to concerns over increased invasive species passage (coupled with the lateness of the season for successful American shad passage) SRAFRC determined that shutting down the lifts was necessary to mitigate the adverse invasive species in the Susquehanna River.

USFWS has indicated that additional discussions concerning invasive species are needed for the 2021 fish passage season and has requested a COVID-19 Contingency Plan for the 2021 season. Exelon is currently preparing a plan to address COVID-19 for the 2021 fish passage season and will file that plan with the Commission when finalized. If you have any questions, please contact me.

Sincerely,

Andrea Danucalov
FERC License Compliance Manager

cc: TJ Lovullo, FERC, Aquatic Resources Branch
Dusty McKeown, Exelon Plant Manager
Sheila Eyler, USFWS
Scott Williamson, PADEP
Denise Keehner, MDE

3

FEDERAL ENERGY REGULATORY COMMISSION
Washington D.C. 20426

Office of Energy Projects

Project No. 405-118—Maryland, Pennsylvania
Conowingo Hydroelectric Project
Exelon Generation Company, LLC

July 9, 2020

VIA FERC Service

Christopher Wilson, Director
Exelon Generation Company, LLC
101 Constitution Avenue NW
Suite 400 East
Washington, DC 20001

Subject: Project operation under the COVID-19 pandemic

Dear Mr. Wilson:

This letter is in reference to your June 5, 2020 filing with the Federal Energy Regulatory Commission (Commission) regarding modified operations of the East Fish Lift as a result of the COVID-19 pandemic. You initially notified the Commission that operations would be temporarily suspended by letter dated March 30, 2020. Typically you would operate the lift from April 1 through early June.

The Commission's May 4, 2020 response advised you that licensees are expected to comply with their licenses, including fish passage, species monitoring, and fish counting, to the best of their ability while implementing appropriate safety precautions for their personnel. The letter additionally indicated that you should e-file notification of any deviation from a license requirement, clearly stating why it was necessary to deviate from the requirement, the duration, and any observed or reported adverse effects. The letter also requested that you include consultation with the U.S. Fish and Wildlife Service (FWS) or National Marine Fisheries Service, as appropriate, regarding any potential effects to threatened or endangered species.

Your June 5, 2020 filing indicates that you were able to modify your procedures in order to resume East Fish Lift operations on May 12, 2020, after consultation with various state and federal agencies including the FWS. Your filing also provides a

Project No. 405-118 -2-

summary of invasive fish observations and removal related to the fish lift operations. Based on your observations, the FWS requested that you cease fish lift operations to limit spread of invasive species on May 15, 2020. The FWS also indicated that additional modifications may be necessary prior to the 2021 fish passage season, which you indicate that you have already begun to plan.

Thank you for the update on operations of the East Fish Lift. It appears that you reopened the lift as soon as it was practical to do so; however, as a result of the increasing numbers of invasive fish being passed, the FWS requested that it be shut down again, limiting operations to 4 days. Please remember that any proposed modifications to the approved operational schedule should be filed with the Commission and approved prior to implementation.

Thank you for your cooperation. If you have any questions concerning this letter please contact me at (202) 502-8038 or alicia.burtner@ferc.gov.

Sincerely,

Alicia Burtner
Aquatic Resources Branch
Division of Hydropower Administration
and Compliance

Appendix 2

2020 Susquehanna River Fish Passage Voluntary Best Management Practices to Mitigate Spread of Aquatic Invasive Species

Date: February 20, 2020

Goal: Optimize American shad passage in 2020, including completing telemetry study objectives while utilizing voluntary best management practices to minimize the introduction and spread of aquatic invasive species (AIS) into the Susquehanna River through the fish lifts at Conowingo, Holtwood and Safe Harbor Dams.

Conowingo:

1. Begin migratory fish passage operations on April 1, 2020.
2. Prioritize operations to complete tagging for telemetry studies early in the fish passage season to reduce likelihood of invasive species passage.
3. Notify Resource Agencies (Agencies) if an invasive species is observed at Conowingo Dam (see Agency Notification Protocol below) under any of the following circumstances:
    a. Collected in the Conowingo West Fish Lift (WFL)
    b. Collected in the Conowingo East Fish Lift (EFL)
    c. Passed in the EFL into Conowingo Pond
4. EFL Operations
    a. View the hopper dumping into the fish exit trough. If an invasive species is viewed in the hopper or chute, close the gate at the viewing window immediately, and institute a draw-down to remove the invasive species from the trough before releasing the remaining fish into Conowingo Pond.
    b. Remove any invasive species that are observed while conducting tagging operations in the East Fish Lift trough.
5. WFL Operations
    a. Remove any invasive species that are collected in the West Fish Lift.
6. For all invasive species collected at Conowingo Dam, kill or dispatch the fish and place it in the freezer (used for shad heads during the tank spawning studies) and the Agencies will dispose of the fish.
    a. If freezer space becomes limited during the fish passage season, please notify Resource Agency staff, (sheila_eyler@fws.gov, jtryninews@pa.gov, and robert.bourdon @maryland.gov) and we will arrange for pick-up.
    b. If freezer space is not limited, at the end of the season, send the frozen invasive species with the shad heads to the Van Dyke Hatchery.
7. The Agencies will consult with Normandeau, Exelon, and Brookfield on closure of volitional fish passage in 2020 to occur at, or near, the end of the American shad

upstream migration period. Expected proportion of fish passage by date based on environmental conditions (see Appendix 1) will be considered in making a final closure decision.

Holtwood:

1. Begin resident fish passage operations April 1, 2020 and September 1, 2020.
2. Notify Agencies (see Agency Notification Protocol) if an invasive species is passed at Holtwood Dam.

Safe Harbor:

1. Begin migratory fish passage operations when the American shad passage at Holtwood Dam trigger is met.
2. Notify Agencies (see Agency Notification Protocol) if an invasive species is passed at Safe Harbor Dam.

Agency Notification Protocol:

1. If an invasive species (Northern Snakehead, Blue Catfish, or other invasive species as identified by the Resource Agencies) is captured and removed or passed in a fish lift, notify the Agencies within 24 hours.
2. Notification should be sent by email to Sheila Eyler (Sheila_Eyler@fws.gov) with a copy to station management. If email is not accessible during that time period, call 717-387-2117.
3. Notification should include:
    a. Species name and number observed/collected
    b. Disposition of the fish (collected or passed)
    c. Approximate size of fish
    d. Date and time of passage
    e. Estimated flow thru the dam at time of passage
4. The SRAFRC Policy Board will convene as needed to address the invasive species incident.