AR-310

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
BOSTON, MA 02109-3912

November 19, 2015

Louis A. Chiarella
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Re: Reissuance of the NPDES Permit for the Schiller Station Electric Generating Facility, Portsmouth, New Hampshire, Permit No. NH0001473- Essential Fish Habitat Correspondence

Dear Assistant Regional Administrator Chiarella:

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NOAA Fisheries) if EPA's action or proposed action that it funds, permits, or undertakes, may adversely impact any essential fish habitat (EFH). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse impacts may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

The Amendments broadly define essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. §1802 (10)). This letter serves as EPA's notification to NOAA Fisheries of a proposed permit action that meets the criteria described above.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999 and are identified on a NOAA Fisheries website (http://www.nero.noaa.gov/hcd/webintro.html). In some cases, a narrative identifies rivers and other waterways that should be considered EFH due to present or historic use by federally managed species.

Schiller Station Electric Generating Facility (Schiller Station, the Station), located in

Portsmouth, New Hampshire, is a four-unit, 163 megawatt (MW) steam electric generating facility. Schiller Station is a base load plant and generates upwards of 1 million MW-hrs annually, with a third of the power being provided by a renewable energy resource. The Station withdraws water from and discharges wastewater to the lower Piscataqua River.

EPA believes that the conditions and limitations contained within the Draft Permit adequately protects all aquatic life, including those with designated EFH in the receiving water, and that further mitigation is not warranted. If adverse impacts to EFH are detected as a result of this permit action, or if new information is received that changes the basis for EPA's conclusions, NOAA Fisheries will be contacted and an EFH consultation will be initiated.

A full justification to support EPA's finding is included in Attachment 1. Detailed information supporting the permit reissuance is included in the Fact Sheet accompanying the Draft NPDES permit for Schiller Station, Permit No. NH0001473. The Fact Sheet and Draft Permit were placed on public notice on September 30, 2015, and are available for review at: http://www2.epa.gov/aboutepa/public-notice-draft-permit-schiller-station-portsmouth-nh-nh0001473. The comment period was originally scheduled to close on November 28, 2015. However, based on a request by the permittee, the comment period has been extended to January 27, 2016. Please contact Permit Writer Michael Cobb at (617) 918-1369 with any questions related to this letter.

Sincerely,

John H. Nagle

John H. Nagle
Environmental Scientist/Biologist
Office of Ecosystem Protection

cc: Michael Cobb, EPA

ATTACHMENT 1 – EFH ASSESSMENT

Schiller Station Electric Generating Facility
Portsmouth, New Hampshire
Permit No. NH0001473
November 2015

Under the 1996 Amendments (PL 104-297) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Service (NOAA Fisheries) if EPA's actions, or proposed actions that EPA funds, permits, or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. § 1855(b). The Amendments broadly define essential fish habitat (EFH) as, "... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 16 U.S.C. § 1802(10). Adverse effect means any impact which reduces the quality and/or quantity of EFH. 50 C.F.R. § 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH is only designated for species for which federal Fishery Management Plans exist (16 U.S.C. § 1855(b)(1)(A)). EFH designations were approved for New England by the U.S. Department of Commerce on March 3, 1999.

Schiller Station withdraws water from and discharges effluent to the lower Piscataqua River. The Piscataqua River is a high value habitat for a variety of marine and estuarine species, and serves as the only conduit between the Gulf of Maine and Great Bay Estuary. While some fish species permanently reside in the river, most use it to either access spawning or nursery habitats in the Great Bay Estuary and associated rivers, or to migrate from these areas to marine habitats in the Gulf of Maine and beyond. Still others are seasonally present, preying on the concentrated but temporal influx of migrating forage species. The table below lists the 17 EFH fish species located in the vicinity of Schiller Station (NOAA Fisheries Habitat Division).

EFH Species Located in the Vicinity of Schiller Station

Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Atlantic salmon *(Salmo salar)*			F,M		
Atlantic cod *(Gadus morhua)*	S	S			
haddock *(Melanogrammus aeglefinus)*	S	S			
pollock *(Pollachius virens)*	S	S	S		
red hake *(Urophycis chuss)*			S	S	

Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
white hake *(Urophycis tenuis)*	S		S	S	
redfish *(Sebastes fasciatus)*	n/a				
winter flounder *(Pleuronectes americanus)*	M,S	M,S	M,S	M,S	M,S
yellowtail flounder *(Pleuronectes ferruginea)*	S	S			
windowpane flounder *(Scopthalmus aquosus)*	S	S	S	S	S
Atlantic halibut *(Hippoglossus hippoglossus)*	S	S	S	S	S
Atlantic sea herring *(Clupea harengus)*		M,S	M,S		
bluefish *(Pomatomus saltatrix)*			M,S	M,S	
long finned squid *(Loligo pealei)*	n/a	n/a			
short finned squid *(Illex illecebrosus)*	n/a	n/a			
Atlantic mackerel *(Scomber scombrus)*	M,S	M,S	S		
spiny dogfish *(Squalus acanthias)*	n/a	n/a			

S = The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity > or = 25.0%).

M = The EFH designation for this species includes the mixing water/ brackish salinity zone of this bay or estuary (0.5% < salinity < 25.0%).

F = The EFH designation for this species includes the tidal freshwater salinity zone of this bay or estuary (0.0% < or = salinity < or = 0.5%).

n/a = These species do not have this lifestage in its life history (dogfish/ redfish), or has no EFH designation for this lifestage (squids). With regard to the squids, juvenile corresponds with pre-recruits, and adult corresponds with recruits in these species' life histories.

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury et al. 1994; Stone et al. 1994).

Facility Description

Schiller Station, located on the southwestern bank of the Piscataqua River in Portsmouth, New Hampshire, is a four-unit, 163 megawatt (MW) steam electric generating facility. The three main generators are designated as 4, 5, and 6; all rated at 48 MW each. Units 4 and 6 are equipped with dual fuel boilers capable of firing both pulverized bituminous coal and #6 fuel oil. Unit 5 was converted to a dual fuel fluidized bed boiler that is capable of burning both wood and coal, with wood being its primary fuel. The remaining unit, designated CT-1, is a 19 MW combustion turbine fired with #1 fuel oil that is typically operated during periods of highest seasonal peak demand. Schiller Station is a base load plant and generates upwards of 1 million MW-hrs annually, with a third of the power being provided by a renewable energy resource. Schiller Station produces enough energy to supply 65,000 New Hampshire homes. However, operations over the past few years have been significantly reduced in the 2 coal-burning units (Units 4 and 6).

Schiller Station's current National Pollutant Discharge Elimination System (NPDES) Permit allows the withdrawal of cooling water from and the discharge of pollutants to the Piscataqua River. See Attachment A of the Draft Permit's supporting Fact Sheet, showing a map of the facility including outfall locations. The Station is permitted to discharge non-contact cooling water, operational plant wastewater, process water, and runoff. The majority of stormwater runoff on the site is commingled with other non-stormwater waters, so much of the runoff is regulated under the individual permit. For any stormwater that is directly discharged, a Stormwater Prevention Pollution Plan has been drafted and a notice of intent (NOI) will be filed to cover these outfalls under a Multi-Sector General Storm Water Permit.

Schiller Station operates two intake structures that withdraw water directly from the Piscataqua River. Each intake structure has two openings which provide cooling water to the two circulation pumps. Unit 4 has a submerged offshore intake pipe that is 6.5 feet in diameter. The opening is located 32 feet out into the river and is equipped with a course mesh (12 inch by 12 inch grating) stationary bar rack to prevent large debris from entering the intake. In addition, there is another fixed screen at the bottom of the tunnel entrance to divert lobsters from crawling into the intake. PSNH reports that the through-screen velocity is 1.38 fps at mean low water (MLW). However, the intake velocity at the tunnel entrance is 1.97 fps.

The four screen openings used for Units 5 and 6 are approximately 5.5-feet wide each. The openings are protected by bar racks with 4 3/8-inch by 4 inch gratings. Furthermore, the through-screen velocities of these two units is 0.68 feet per second (ft/sec or fps).

Schiller Station still utilizes the same traveling screen design and technology that was originally installed with each unit: Unit 4 in 1952, Unit 5 in 1955, and Unit 6 in 1957. The mesh size of the traveling screens is 3/8-inch square, which is a size commonly used in the industry for CWIS screens. This mesh size should be small enough to prevent the entrainment of adult fish and most juvenile fish through the plant's cooling water system, but not younger and smaller lifestages (*i.e.*, eggs and larvae). In addition, narrow shelves (2–3 inches wide) are attached to the screens which carry debris and fish up as the screen rotates. These shelves are designed primarily for moving debris, not fish. Since there are no buckets or troughs used to carry fish safely to the fish return trough, fish can fall off the screen shelves as the screens emerge from the water. Consequently, fish can suffer injury or exhaustion from being dropped and re-impinged as the screens rotate.

Schiller Station maintains 16 permitted outfalls. A detailed description of each discharge is found in Section 6.3 of the Draft Permit's supporting Fact Sheet.

Potential Impacts to EFH Species From Schiller Station Effluent

The Schiller Station Facility, like all facilities that utilize a natural waterbody for cooling purposes, can impact aquatic resources in three major ways:

- *Entrainment* of small organisms into and through the cooling water system
- *Impingement* of larger organisms on the intake screens
- *Discharge of effluent* creating adverse conditions in receiving waters

The following discusses these three potential impacts.

Entrainment

The potential to impact aquatic organisms by entrainment largely depends on the presence and abundance of organisms that are vulnerable to entrainment, and the flow required for cooling. The EFH resources (including forage species) most vulnerable to entrainment in the vicinity of Schiller Station are species that have positively buoyant eggs, and/or pelagic larvae. Other important considerations include the location and design of the intake structure. According to Section 316(b) of the Clean Water Act, any point source that uses a cooling water intake structure must ensure that its location, design, construction, and capacity reflects the best technology available (BTA) for minimizing adverse environmental impact.

Entrainment monitoring was conducted at Schiller Station for 41 weeks over a 13-month period with the following frequency. Samples were collected 1 day a week from January 2007 to March 2007 and June 2007 to September 2007. From September 2006 to December 2006 and from April to May 2007, samples were collected every other week.

Sorting, species and life stage identification and enumeration were all completed to generate entrainment rates (# of eggs or larvae per volume of water). Entrainment losses were calculated by multiplying the entrainment rate by the weekly plant cooling water flow.

At Schiller Station, entrainment losses of ichthyoplankton peaked in July, with a much smaller peak in the winter (January-March). Cunner eggs accounted for a large percentage of the losses in the July period (Normandeau, 2008). The peak in entrainment losses in the winter was comprised of winter spawners, such as American sand lance and rock gunnel (Normandeau, 2008). Macrocrustacean entrainment losses also peaked in July and were essentially almost non-existent during spring, fall and winter.

The table below presents entrainment losses by species (adjusted raw numbers at design flow);

Estimated Annual Entrainment Losses for Fish from Schiller Station

Common Name	Eggs & Larvae
Alligator fish	134,305
American eel	8,420
American plaice	1,061,867
American sand lance	13,677,174
Atlantic cod*	329,888
Atlantic cod*/haddock*	161,177
Atlantic cod*/haddock*/witch flounder	344,498
Atlantic herring*	1,921,628
Atlantic mackerel*	5,846,389
Atlantic menhaden	633,228
Atlantic seasnail	389,677
Atlantic tomcod	53,043
Cunner	32,539,552
Cunner/yellowtail flounder	72,955,812
Fourbeard rockling	1,723,189
Fourbeard rockling/hake	6,394,256
Goosefish	135,665
Grubby	3,393,233
Gulf snailfish	21,770
Haddock*	7,072
Hake family*	1,397,166
Longhorn sculpin	424,745
Northern pipefish	716,836
Pollock*	661,273
Radiated shanny	201,269
Rainbow smelt	1,752,755
Rock gunnel	7,634,337
Sculpin family	59,139
Sea raven	13,329
Sea robin family	71,494
Shorthorn sculpin	93,113
Silver hake	275,997
Striped killifish	8,420
Summer flounder	11,904
Tautog	56,294
Unidentified	246,244
Windowpane*	547,224
Winter flounder*	372,846
Witch flounder	17,617
Wrymouth	5,790
Total Entrainment	**156,179,633**

*Indicates EFH species

According to entrainment monitoring at Schiller Station, the early life stages (ELS) of eight (8) EFH species were entrained at the facility.

Section 8.2.3 of the Draft Permit's supporting Fact Sheet contains a complete discussion of entrainment mortality impacts from Schiller Station operation.

Finfish Entrainment Mitigation

As part of the proposed permit Best Technology Available (BTA) requirements, EPA has identified the following technology to further mitigate ELS finfish losses, including EFH species, from current expected entrainment mortality levels at the cooling water intake structure (CWIS).

EPA proposes the installation of wedgewire screen intake structures with a mesh or slot size of 0.80 mm, 0.69 mm, or 0.60 mm to maintain an intake through-screen velocity of 0.5 fps or less. These slot sizes are estimated to reduce finfish ELS entrainment by approximately 37%, 44% and 49% from current levels, respectively. The actual screen slot size selected will be subject to EPA approval and based upon the results of the Facility's pilot testing and demonstration report submitted to the agencies.

In addition, EPA proposes that the annual maintenance outage at Unit 5, when no water is withdrawn, take place in June. This is estimated to reduce finfish ELS entrainment mortality by another 4% from current levels.

The proposed BTA will also reduce the entrainment levels of macrocrustacean ELS, which are a food source for EFH species. Section 10 of the Draft Permit's supporting Fact Sheet includes a full discussion of a number of potential mitigation measures and their expected reduction of finfish as well as macrocrustacean ELS entrainment mortality.

In summary, EPA proposes permit requirements that are estimated to reduce finfish ELS entrainment, including the eight EFH species, by approximately 41% to 53%, depending on the wedgewire screen slot size selected.

Impingement

Organisms that have grown to a size too large to pass through intake screens are still vulnerable to being impinged on these screens. Juvenile lifestages are particularly vulnerable to impingement, but adults of certain species are also at risk. As with entrainment, the intake location, design and cooling water flow requirements are major factors in assessing impingement potential.

Fish species that are especially vulnerable to impingement tend to have one or more of the following characteristics:

- pass intake structure in large, dense schools as juveniles or adults;
- are actively pursued as major forage species;

- are attracted to the intake structure as a source of forage or refuge;
- are slow moving or are otherwise unable to escape intake current;
- are structurally delicate, and likely to die if impinged.

Fish for impingement sampling were collected in the fish and debris return sluice coming off of the traveling screens for each unit. Impingement sampling was conducted from August 31, 2006, through September 27, 2007. Impingement samples were collected over a continuous 24 hour period, once a week for 57 consecutive weeks. Each individual sample represented a six hour collection period. Impingement sampling was only conducted when the plant was operational. Operational is defined as having at least 1 circulating pump running at the time of sampling.

Schiller Station conducted an impingement collection efficiency study to determine what percentage of impinged fish on the screens they were able to collect within the fish return sluice as well as an impingement survival study.

Fish impingement losses peaked in April, with secondary peaks in the fall and early winter. White hake, Atlantic herring and cunner were fish exhibiting the highest impingement losses in April. In the fall, rainbow smelt, grubby and white hake were the species with the highest impingement losses.

The table below presents entrainment losses by species (adjusted raw numbers at design flow);

Estimated Annual Fish Impingement Losses from Schiller Station

Common Name	Fish Impinged
Alewife	25
American sand lance	9
Atlantic cod*	38
Atlantic herring*	297
Atlantic menhaden	328
Atlantic silverside	122
Atlantic tomcod	50
Blueback herring	68
Bluegill	64
Cunner	668
Emerald shiner	33
Grubby	491
Herring family*	9
Inland silverside	16
Lumpfish	357
Ninespine stickleback	149
Northern pipefish	621
Pollock*	25

Common Name	Fish Impinged
Pumpkinseed	9
Rainbow smelt	622
Red hake*	9
Rock gunnel	26
Sea raven	16
Shorthorn sculpin	8
Silver hake	9
Skate family	17
Striped bass	25
Tautog	9
Threespine stickleback	53
Unidentifiable	0
White hake*	736
White perch	198
Windowpane*	75
Winter flounder*	573
Total Impingement	**5,557**

*Indicates EFH species

According to impingement monitoring at Schiller Station, adult and juvenile life stages of seven (7) EFH species were impinged at the facility.

Section 8.2.3 of the Draft Permit's supporting Fact Sheet contains a complete discussion of impingement mortality impacts from Schiller Station operation.

Finfish Impingement Mitigation

As part of the proposed permit Best Technology Available (BTA) requirements, EPA has identified the following technology to further mitigate adult and juvenile finfish losses, including EFH species, from current expected impingement mortality levels at the cooling water intake structure (CWIS).

EPA proposes the installation of wedgewire screen intake structures with a mesh or slot size of 0.80 mm, 0.69 mm, or 0.60 mm to maintain an intake through-screen velocity of 0.5 fps or less. These slot sizes are estimated to reduce adult and juvenile finfish impingement by approximately 87% from current levels.

Discharge of Heated Effluent

The discharge of heated effluent may kill or impair organisms outright, or create intolerable conditions in otherwise high value habitats, and interfere with spawning. Thermal impacts associated with the discharge are related primarily to the dilution capacity of the receiving water, the rate of discharge, and the change in temperature (delta-T or ΔT) of the effluent compared to ambient water temperatures. Another important consideration is the presence of temperature-sensitive organisms and vegetated habitats.

As discussed in detail in Section 6.4 of the Draft Permit's supporting Fact Sheet, Schiller Station's existing permit's thermal discharge requirements are based on a CWA § 316(a) variance. The Facility initially requested that its new permit retain the same thermal discharge limits based on a renewal of its CWA § 316(a) variance. Schiller's request maintains, in essence, that the Facility's existing thermal discharge has not caused appreciable harm to the balanced indigenous population (BIP) and, indeed, could not have caused such harm given how small it is relative to the large volume and cold temperatures of the waters of the Piscataqua River estuary.

Based on the analysis of thermal plume monitoring and mapping data collected in the summer and fall of 2010, along with other supporting information (see Section 6.4.4. of the Draft Permit's supporting Fact Sheet), EPA concludes that Schiller Station's existing thermal discharge has not caused appreciable harm to the BIP. Moreover, EPA concludes that the record provides reasonable assurance that with the same thermal discharge limits in place, the Facility's thermal discharge will not cause such harm to the BIP in the future – in other words, will allow for the protection and propagation of the BIP. Indeed, the Facility's declining capacity factors indicate that, if anything, Schiller Station's thermal discharges will decrease overall in the future, though EPA cannot be sure of whether or when such reductions may occur.

Thus, EPA's new Draft Permit for Schiller Station proposes to retain the thermal discharge limits from the existing permit.

- A daily maximum discharge temperature limit (Max-T) of 95°F;
- A daily maximum temperature differential between the intake and discharge temperatures (Delta-T) of 25°F (this limit is increased to 30°F for a two-hour period during condenser maintenance); and
- A prohibition of discharges that cause the receiving water to exceed a maximum temperature of 84°F at any point beyond a distance of 200 feet in any direction from the point of discharge.

Consistent with the Facility's request, EPA is proposing to issue these permit limits pursuant to a variance under CWA § 316(a).

Proposed Limits on Other Pollutants

The Draft Permit also proposes limits on the following pollutants:

Effluent Characteristic	Average Monthly	Maximum Daily
Total Residual Chlorine	---	0.2 mg/L
Oil and Grease	15 mg/L	20 mg/L
Total Suspended Solids (TSS)	30 mg/L	100 mg/L

Total Copper	1.0 mg/L	1.0 mg/L
Total Iron	1.0 mg/L	1.0 mg/L
pH	6.5 – 8.0 S.U. (range)	

These limits are calculated to meet water quality standards and protect all aquatic organisms in the receiving water, including EFH species.

EPA's Finding of all Potential Impacts to EFH Species

- This Draft Permit action does not constitute a new source of pollutants. It is the reissuance of an existing NPDES permit;
- The BTA requirements of the CWIS are estimated to reduce entrainment impacts by 41 to 53% and reduce impingement impacts by 87% from current levels;
- Thermal discharge from the facility is limited to 95°F and satisfies a CWA § 316(a) variance with a limited mixing zone;
- Effluent is discharged into the Piscataqua River, with rapid mixing characteristics from the high energy tidal exchange;
- Chlorine, oil and grease, TSS, total copper, total iron and pH are regulated by the Draft Permit to meet water quality standards;
- The Draft Permit prohibits the discharge of pollutants or combination of pollutants in toxic amounts;
- The effluent limitations and conditions in the Draft Permit were developed to be protective of all aquatic life; and
- The Draft Permit prohibits violations of the state water quality standards.

EPA believes that the conditions and limitations contained within the Schiller Station Draft Permit adequately protects all aquatic life, including those with designated EFH in the receiving water, and that further mitigation is not warranted. Should adverse impacts to EFH be detected as a result of this permit action, or if new information is received that changes the basis for EPA's conclusions, NOAA Fisheries will be contacted and an EFH consultation will be re-initiated.

As part of the renewal of the NPDES permit for this facility, in addition to the cover letter and this attachment, EPA has made the Draft Permit and the Fact Sheet available to NOAA Fisheries at: http://www2.epa.gov/aboutepa/public-notice-draft-permit-schiller-station-portsmouth-nh-nh0001473.