UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 20, 2012

Ms. Patricia A. Kurkul
Northeast Regional Administrator
National Marine Fisheries Service
55 Great Republic Dr
Gloucester, MA 01930-2276

SUBJECT: REQUEST TO INITIATE INFORMAL SECTION 7 CONSULATION FOR ATLANTIC STURGEON AT SURRY POWER STATION, UNITS 1 AND 2

Dear Ms. Kurkul:

The U.S. Nuclear Regulatory Commission (NRC, the staff) is writing you to request initiation of informal section 7 consultation under the Endangered Species Act of 1973, as amended (ESA), for the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) at Surry Power Station, Units 1 and 2 (Surry).

On February 6, 2012, the National Marine Fisheries Service (NMFS) listed five distinct population segments of the Atlantic sturgeon under the ESA (77 FR 5880; 77 FR 5914). As a result of the Atlantic sturgeon's listing, the NRC staff has reviewed the potential for each NRC-licensed operating reactor to adversely affect the Atlantic sturgeon. The NRC staff identified Surry as a facility that has the potential to adversely affect the species. Atlantic sturgeon in the vicinity of Surry are part of the Chesapeake Bay distinct population segment, which is endangered.

Surry lies on Gravel Neck Peninsula in southeastern Virginia on the James River across from Jamestown and Williamsburg, Virginia. The facility uses a once-through heat dissipation system that withdraws brackish water from the James River and returns heated water to the river about six miles upriver from the withdrawal point.

Atlantic sturgeon larvae and migrating adults are likely to occur in the James River in the vicinity of Surry. The NRC staff assessed the impacts of continued operation of Surry on all life stages of the Atlantic sturgeon in the enclosed biological assessment, in which the NRC concludes that the continued operation of Surry is **not likely to adversely affect** the Atlantic sturgeon.

The NRC requests your written concurrence on the NRC's determination within 30 days per 50 CFR 402.12(j). Please contact Ms. Briana Balsam, biologist, of my staff with any additional information you might need to assess the potential impacts to the Atlantic sturgeon at Surry. You can reach her at 301-415-1042 or by e-mail at Briana.Balsam@nrc.gov.

I have also forwarded a copy of this letter to Ms. Julie Crocker of your office. Ms. Crocker has been NRC's main point of contact for section 7 consultations related to operating nuclear power plants within the NMFS's northeast region.

Sincerely,

J Susco for

Andrew S. Imboden, Chief
Environmental Review and
Guidance Update Branch
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosure:
As stated

cc w/encl: Listserv

Biological Assessment

Surry Power Station, Units 1 and 2
Continued Operation

March 2012

Docket Numbers 50-280, 50-281

U.S. Nuclear Regulatory Commission
Rockville, Maryland

Prepared by:

Briana Balsam
Division of License Renewal
Office of Nuclear Reactor Regulation

ENCLOSURE

Table of Contents

Figures

Abbreviations, Acronyms, and Symbols

°C	degrees Celsius
°F	degrees Fahrenheit
ac	acre
ASMFC	Atlantic States Marine Fisheries Commission
Btu/hr	British thermal units per hour
cm	centimeter
DPS	distinct population segment
ESA	Endangered Species Act of 1973, as amended
FR	Federal Register
ft	foot
gpm	gallons per minute
ha	hectare
in.	inch
kg	kilogram
km	kilometer
lb	pound
m	meter
m^3/s	cubic meters per second
mi	mile
mt/yr	metric tons per year
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
ppt	parts per thousand
SEIS	Supplemental Environmental Impact Statement
Surry	Surry Power Station, Units 1 and 2
VEPCo	Virginia Electric and Power Company

Biological Assessment of the Potential Effects on the Atlantic Sturgeon from Continued Operation of Surry Power Station

1.0 Introduction

On February 6, 2012, the National Marine Fisheries Service (NMFS) listed five distinct population segments (DPSs) of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) under the Endangered Species Act of 1973, as amended (ESA) (77 FR 5880; 77 FR 5914). As a result of the Atlantic sturgeon's listing, the NRC staff has reviewed the potential for each NRC-licensed operating reactor to adversely affect the Atlantic sturgeon. The NRC staff identified Surry Power Station, Units 1 and 2 (Surry), as a facility that has the potential to adversely affect the species. Atlantic sturgeon in the vicinity of Surry are part of the Chesapeake Bay DPS, which is endangered.

2.0 Description of the Action

The action that this biological assessment considers is Surry's continued operation through the end of the facility's renewed license terms. Virginia Electric and Power Company (VEPCo) owns and operates Surry. Surry is a two-unit pressurized-water reactor that began operating on December 22, 1972 (Unit 1) and May 1, 1973 (Unit 2). The NRC issued renewed operating licenses for both units on March 20, 2003, which authorize Surry to operate through May 25, 2032, and January 29, 2033, for Units 1 and 2, respectively.

2.1 Site Location and Description

Surry lies on Gravel Neck Peninsula along the James River approximately 25 mi (40 km) upstream of the river's confluence with the Chesapeake Bay. The James River in the vicinity of Surry is brackish; upstream is tidal river, and downstream is an estuary. The 840-ac (340-ha) site extends as a band across the peninsula. Steep bluffs drop to the river on either side and to the tip of the peninsula. Hog Island Wildlife Management Area, a Commonwealth-owned and operated wildlife management area, is located on the tip of the peninsula. The site is 7 mi (10 km) south of Williamsburg and 8 mi (13 km) east-northeast of the town of Surry. Figure 1 shows the site and surrounding 6-mi (10-km) vicinity, and Figure 2 shows the site and surrounding 50-mi (80-km) vicinity.

2.2 Cooling Water System Description and Operation

Surry's cooling system is a once-through heat dissipation system that withdraws brackish water from the James River, pumps the water through the condenser, and returns heated water to the river about 10 km (6 mi) upriver from the withdrawal point.

Cooling water travels through a channel dredged in the bottom of the river between the main river channel and the eastern shore of Gravel Neck Peninsula and then into a low-level intake structure with eight reinforced-concrete bays. The low-level intake structure is equipped with continuously rotating Ristroph traveling screens. A low-pressure spray washes impinged fish from the screens into a return sluice, through which fish return to the river.

When both units are operating at full power, eight pumps (one for each bay) pump a total of 106 m^3/s (1.68 million gpm) into the 2-mi (3-km) intake canal, which transports water by gravity flow from the low-level intake structure to the high-level intake structure. Cooling water then moves into two high-level structures (each of which has four bays) and passes through the turbine steam condensers. After passing through the condensers, the cooling water flows through a tunnel into the head of an 800-m (2900-ft) discharge canal, and from the canal,

returns back into the James River. A rock-filled jetty extends from the discharge canal about 340 m (1100 ft) into the river.

Surry's National Pollutant Discharge Elimination System (NPDES) Permit limits the discharge heat load to 11.9 x 10^9 Btu/hr. Temperatures higher than 90°F (32°C) typically occur from June through September when Surry is operating at or near full power. In a 5-year combined pre- and post-operational study, the highest recorded temperature in the Surry discharge canal was 99.9°F (37.7°C) on August 21, 1975. The period of highest temperatures during the study period was from August 6 to September 10, 1975, during which time temperatures ranged from 92.8 to 99.9°F (33.8 to 37.7°C). Heated effluent loses 1 to 2°F (0.6 to 1.2°C) with every 1,000 ft (300 m) from the mouth of the discharge canal, and temperatures in the James River (outside of the discharge canal) are lower (VEPCo 2001).

3.0 Action Area: James River

Around Gravel Neck Peninsula, the James River is approximately 2.5 mi (4 km) wide. The river's flow in the vicinity of the site is complex and includes (1) tidal flows, (2) upstream flow of saline water along the river bottom and downstream flow of less-saline water at the river surface, and (3) the outflow of freshwater from the James River Watershed (VEPCo 2001). Gravel Neck Peninsula is considered the upstream limit of saltwater incursion into the James River, but this may shift several miles upstream or downstream, depending on river flow conditions. In general, salinities in the vicinity of the cooling water discharge canal are between 0.0 and 9.2 parts per thousand (ppt), while salinities near the Surry cooling water intake (6 river miles [10 river kilometers] downstream of the discharge canal) can be as high as 17 ppt (VEPCo 2001).

Approximately 80 fish species are known to inhabit the brackish portion of the river downstream of Surry, and approximately 40 species have been recorded in the freshwater portion of the river upstream (VEPCo 1977 *in* NRC 2002). Important commercial and recreational species in the area include striped bass (*Morone saxatilis*), Atlantic croaker (*Micropogonias undulatus*), weakfish (*Cynoscion regalis),* spot (*Leiostomus xanthurus*), American eel (*Anguilla rostrata*), and white perch (*Morone americana*) (VEPCo 2001). Primarily recreational fish include the silver perch (*Bairdiella chrysoura*), American shad (*Alosa sapidissima*), Atlantic menhaden (*Brevoortia tyrannus*), blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), common carp (*Cyprinus carpio*), and inland silverside (*Menidia beryllina*). This diverse mixture of fishes is typical for upper estuarine habitat due to the seasonal salinity changes. In addition to finfish, numerous aquatic invertebrate species are found in the vicinity of Surry, which include zooplankton (primarily copepods), amphipods (dominated by the scud, *Gammerus* sp.), and benthic organisms (e.g., polychaetes and shellfish) (VEPCo 1977 *in* NRC 2002). Shellfish near Surry include *Rangia cuneata*, a brackish water clam capable of tolerating a wide range of salinities, and larval stages of *Crassostrea virginica*, the American oyster (NRC 2002). Trawl surveys conducted between 1996 and 2000 collected oysters, blue crabs (*Callinectes sapidus*), spider crabs (*Libinia emarginata*), eight shrimp species, and five species of clams (NRC 2002).

Figure 1. Surry Site and Surrounding 6-Mile Vicinity

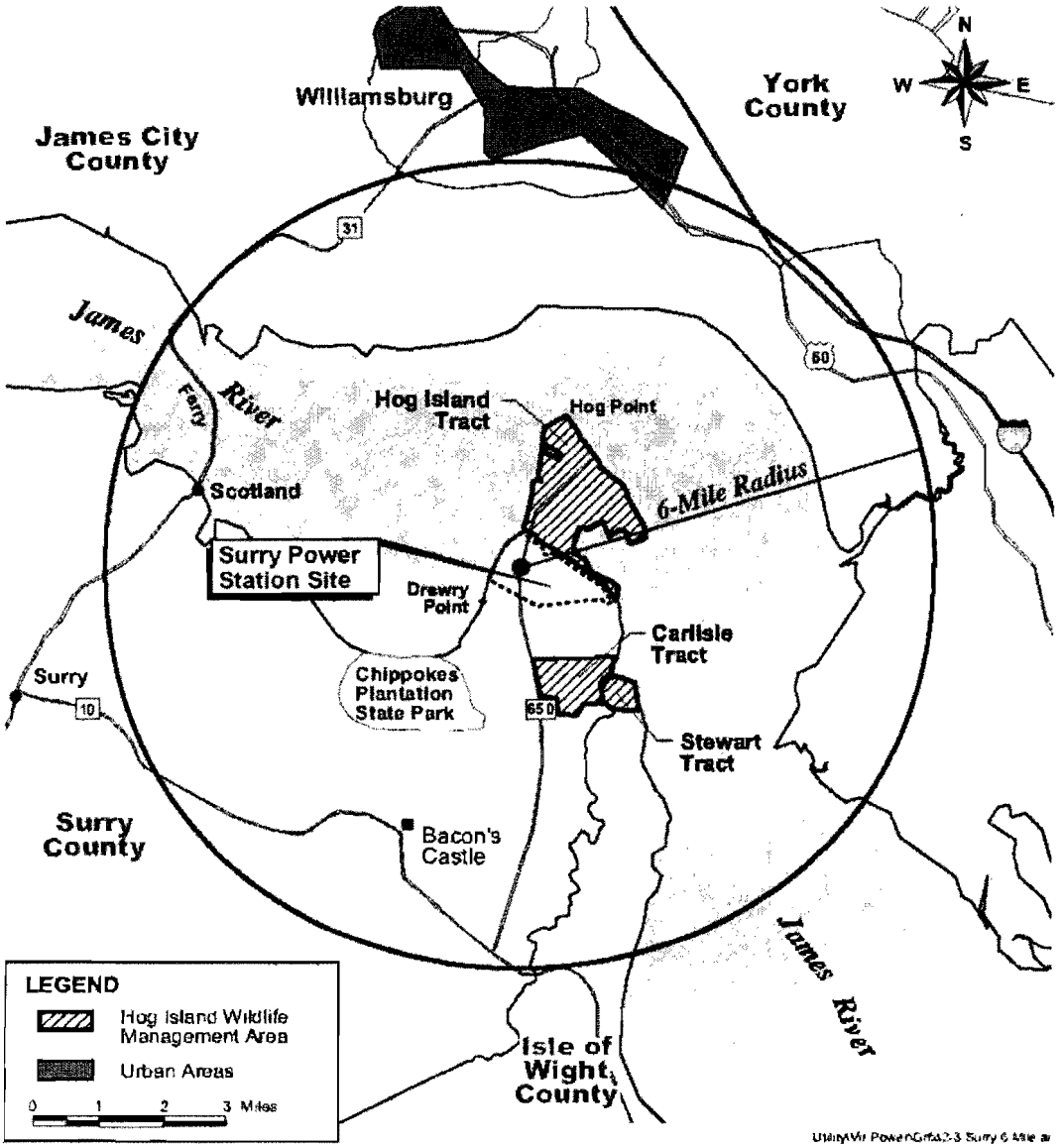

Figure Source: NRC 2002

Figure 2. Surry Site and Surrounding 50-Mile Vicinity

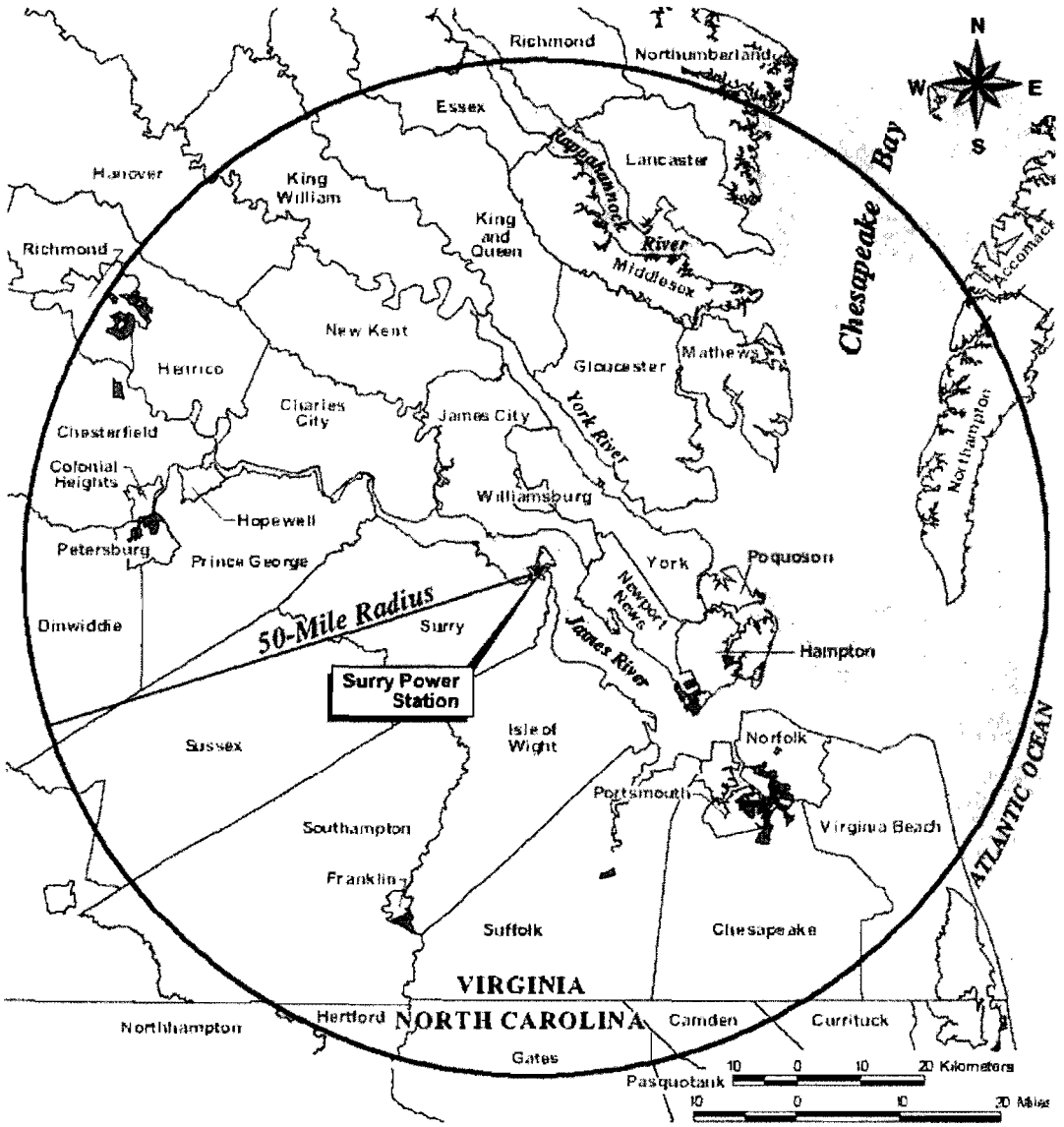

Figure Source: NRC 2002

4.0 Federally Listed Species Considered

4.1 Listed Species Previously Considered

As part of the NRC's review of the license renewal application for Surry, the staff prepared a supplemental environmental impact statement (SEIS; NRC 2002) that considered the potential effects of license renewal on Federally listed species. The SEIS analyzed the effects of license renewal on the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon, which was a candidate for Federal listing at the time. During informal section 7 consultation under the ESA, the NMFS indicated in a March 23, 2001, letter that though shortnose sturgeon spawning habitat is thought to occur in the James River, there had been no reports of shortnose sturgeon in the river system and that no further consultation pursuant to section 7 of the ESA was required (NMFS 2001).

4.2 Atlantic Sturgeon

4.2.1 Life History

The Atlantic sturgeon is an anadromous bony fish that can grow to 14 ft (4.3 m) and weigh up to 800 lbs (370 kg) (Gilbert 1989; NOAA 2012). Atlantic sturgeon are similar in appearance to shortnose sturgeon—bluish-black to olive brown dorsally with pale sides and underbelly—but are larger in size and have a smaller and differently shaped mouth (NOAA 2012). Females reach maturity at 7 to 30 years of age, and males reach maturity at 5 to 24 years of age, with those fish inhabiting the southern range maturing earlier (ASMFC 2007). Females return to natal freshwater rivers to spawn between April and May. Females lay 400,000 to 4 million highly adhesive eggs, which fall to the bottom of the water column and adhere to cobble or other hard bottom substrate. Eggs hatch in 94 to 140 hours at temperatures of 20°C (68°F) and 18°C (64.4°F), respectively (ASSRT 2007). Larvae consume their yolk sac in 8 to 12 days, during which time larvae migrate downstream into brackish water, where they live for a few months (ASSRT 2007). Larvae are demersal and use benthic structures as refugia; thus, they are typically not found in the water column (ASSRT 2007). When juveniles reach a size of 30 to 36 in. (76 to 92 cm), they migrate to nearshore coastal waters, where they feed on benthic invertebrates, including crustaceans, worms, and mollusks (NOAA 2012). Juveniles and non-spawning adults inhabit estuaries and coastal marine waters dominated by gravel and sand substrates (NOAA 2012).

4.2.2 Distribution

Historically, the Atlantic sturgeon has inhabited riverine, estuarine, and coastal ocean waters from St. Lawrence River, Canada to St. John's River, Florida (ASMFC 2007). Within the U.S., the species was present in approximately 38 rivers from St. Croix, Maine to Saint John's River, Florida. Currently, the species resides in 36 U.S. rivers and spawns in at least 20 of these rivers (ASSRT 2007). Within Virginia, the Atlantic sturgeon occurs in the Potomac, James, York, Rappahannock, and Nottoway Rivers (ASSRT 2007). Spawning historically occurred in all of these rivers. Today, the Atlantic sturgeon only spawns in the James River, possibly spawns in the York River, and the species' spawning status in the Nottoway River is unknown (ASSRT 2007). Atlantic sturgeon use the Potomac, James, York, and Rappahannock Rivers as nursery areas.

4.2.3 Population Status

Atlantic sturgeon have been commercially fished from as early as 1628, though a substantial Atlantic sturgeon fishery did not appear until the late 1800s (Shepard 2006). Overfishing and

habitat degradation caused a decline in landings beginning in the early 1900s; however, landings increased from 1950 to 1980, specifically in the Carolinas, and ranged from 45 metric tons per year (mt/yr) to 115 mt/yr (Shepard 2006). In 1998, the Atlantic States Marine Fisheries Commission (ASMFC), which manages the commercial harvest of the species, instituted a moratorium on Atlantic sturgeon harvest in U.S. waters (NOAA 2012). Today, the species is still caught as bycatch. Based on data from 2001 to 2006, the ASMFC (2007) estimated that in U.S. waters, between 2,752 and 7,904 individuals per year are caught as bycatch in sink gillnets, and 2,167 to 7,210 individuals per year are caught as bycatch in trawls.

Information is unavailable on the current estimated population size of the Chesapeake Bay DPS or its subpopulations. However, the ASSRT (2007) considers the James River subpopulation to be of significant value to the Chesapeake Bay DPS because its current population size is relatively large, and if extirpated, would likely result in the loss of spatial structure of the DPS. In the U.S., estimates exist for only the Hudson River, New York (870 spawning adults/year) and the Atlamaha River, Georgia (343 spawning adults/year) (75 FR 61872). These two rivers are considered to have the healthiest subpopulations (ASSRT 2007); therefore, the Chesapeake Bay DPS subpopulations are predicted to have fewer spawning adults per year than either of these.

4.2.4 Listing History

In 2007, the NMFS considered listing the Atlantic sturgeon under the ESA but concluded that listing was not warranted at that time. In 2009, the Natural Resources Defense Council (NRDC) petitioned for the NMFS to reconsider the listing of the species (NRDC 2009). The NMFS accepted the NRDC's petition in a 90-Day Finding on January 6, 2010 (75 FR 838). On October 6, 2010, the NMFS published Proposed Listing Determinations for five Atlantic sturgeon DPSs (75 FR 61872; 75 FR 61904). On February 6, 2012, the NMFS listed the five Atlantic sturgeon DPSs under the ESA (77 FR 5880; 77 FR 5914). Atlantic sturgeon in the vicinity of Surry are part of the Chesapeake Bay DPS, which is listed as endangered.

5.0 Action Effects Analysis

Surry has the potential to entrain or impinge Atlantic sturgeon when the facility withdraws James River water for cooling or to cause heat shock from the return of cooling water to the river at the facility's discharge point.

Entrainment

Entrainment occurs when aquatic organisms (usually eggs, larvae, and other small organisms) are drawn into the cooling water system and are subjected to thermal, physical, and chemical stress.

Because Atlantic sturgeon spawn in freshwater upstream of Surry and eggs adhere to hard substrate material, the occurrence of eggs in the water column near Surry is unlikely. Larvae may occur in the James River in the vicinity of Surry. However, larvae are unlikely to be near enough to the intake to be entrained because the intake lies within a dredged channel. Larvae seek refuge in hard substrate, gravel, and other benthic structures and would, therefore, likely avoid the channel due to habitat preference. Additionally, during a 3-year sampling period as part of Surry's Clean Water Section 316(b) demonstration, Atlantic sturgeon eggs or larvae were not identified in any samples (VEPCo 1977 *in* NRC 2002).

Impingement

Impingement occurs when aquatic organisms are pinned against intake screens or other parts of the cooling water system intake structure.

Impingement of juvenile Atlantic sturgeon is unlikely because juveniles migrate downstream to estuarine waters and then to nearshore coastal waters when they reach larger sizes. Therefore, juveniles rarely occur in the vicinity of Surry. Migrating adults are unlikely to be impinged because adults are large and travel up fast-flowing rivers to spawn and would, therefore, be capable of avoiding Surry's low intake velocity. No records of Atlantic sturgeon impingements at Surry exist to date.

Heat Shock

Heat shock is acute thermal stress caused by exposure to a sudden elevation of water temperature that adversely affects the metabolism and behavior of fish and other aquatic organisms.

Little information exists on the temperature preferences or tolerances of Atlantic sturgeon, which makes the evaluation of thermal impacts to the species difficult. Smith (1985 *in* Gilbert 1989) reported that when temperatures drop below 20°C (68°F), juvenile Atlantic sturgeon in the Hudson River congregate downstream in deeper, brackish waters where they remain until spring. As the river warms throughout the season, the juveniles again move downstream to waters of temperatures 24.2 to 24.7°C (75.6 to 76.5°F).

Available information on shortnose sturgeon, which have similar habitat preferences to Atlantic sturgeon, indicates that adult shortnose sturgeon occur in water temperatures ranging from as low as 2 to 3°C (36 to 37°F) to as high as 34°C (93°F) (Crance 1986). However, Crance (1986) noted that young shortnose sturgeon may experience distress or rapid mortality at temperatures over 25°C (77°F). Crance (1986) concluded that for the purpose of habitat suitability modeling, the optimal summer water temperature range for foraging adults was 11 to 22°C (52 to 72°F) and that temperatures equal to or below 8°C (47°F) or equal to or above 35°C (95°F) were unsuitable.

Ziegeweid et al. (2008) studied lethal and behavioral responses (loss of equilibrium) of juvenile shortnose sturgeon to temperature change after being acclimated to different temperatures. Final thermal preferences ranged from 26.2°C (79.2°F) to 28.3°C (82.9°F) and upper limits of safe temperatures based on loss of equilibrium ranged from 28.7°C (83.7°F) to 30.1°C (86.2°F) (Ziegeweid et al. 2008). In its evaluation of thermal impacts to shortnose sturgeon at Indian Point Nuclear Generating, Units 2 and 3, in Buchanan, New York, the NRC (2011) used Ziegeweid et al.'s upper safe limit of 29.8°C (85.6°F)—rounded to 30°C (86°F)—as a conservative thermal limit for the species, although shortnose sturgeon near the facility would likely be much larger and older than those tested by Ziegeweid et al. (2008). In the absence of species-specific information, the NRC staff will also consider 30°C (86°F) to be the thermal limit for Atlantic sturgeon in this assessment.

Parker and Fang (1975) studied the thermal effects of Surry operations on the James River. During pre-operational monitoring (1971-1972), the lowest monthly water temperature was 54.4°F (12.4°C) in November 1972, and the highest monthly average water temperature was 81.4°F (27.4°C) in July 1971. The river's water column within the upper 6 ft (1.8 m) stratifies seasonally with temperatures approximately 1°F (0.6°C) cooler at this depth than at the surface during the summer months, less than 1°F (0.6°C) cooler in May and September, and about the same temperature as the surface in April, October, and November. A mid-depth high temperature of 86.7°F (30.4°C) occurred in July 1971, which probably correlated with a surface temperature of 1 to 2°F (0.6 to 1°C) higher (up to 89°F [32°C]) assuming typical stratification conditions. Therefore, natural conditions may exceed the Atlantic sturgeon's assumed thermal preference of 29.8°C (85.6°F) during the peak of summer. Non-spawning adults occur in coastal waters and estuaries and could, therefore, experience temperatures that exceed their thermal preference. However, individuals would likely move to nearby deeper, cooler waters.

Larvae, which may also occur in the vicinity of Surry, would occur near the river bottom where temperatures would be cooler.

Parker and Fang (1975) monitored river temperatures for three years after Surry began operating. The river experienced the greatest temperature differences in June and September or October when surface water temperatures across eight river transects were 2 to 7°F (1.1 to 3.9°C) higher under post-operational conditions. Isotherm plots indicate that waters surrounding the discharge exceeded 30°C (86°F) (Atlantic sturgeon's assumed thermal limit) in July and August of both years. Within the discharge canal, temperatures reached up to 99.9°F (37.7°C); however, Parker and Fang (1975) did not record such high temperatures in the river itself. The spatial extent of the plume varied with the tides, but Parker and Fang (1975) noted that increased water temperatures attributable to Surry operations extended up to 6 ft (1.8 m) in depth and no more than half the width of the river at its narrowest point. In cases where water temperatures exceeded 30°C (86°F) in the discharge canal, temperatures rapidly decreased once canal water mixed with river water. These limited-area unsafe conditions would not last long, however, as they would change with the tidal cycle. Further, as noted above, adult Atlantic sturgeon are unlikely to occur in the vicinity of Surry in the summer months, and larvae would occur near the river bottom. Any adult Atlantic sturgeon that did occur in the vicinity of Surry when temperatures exceed the species' thermal limit would be able to retreat to adjacent deeper and cooler water. Because the thermal plume generally only extends to depths of 6 ft (1.8 m), larvae would be unaffected by the increased temperatures attributable to Surry's discharge.

6.0 Conclusion and Determination of Effects

The NRC staff concludes that Surry is **not likely to adversely affect** the Atlantic sturgeon during the remainder of the current operating license period (through May 25, 2032, for Unit 1 and January 29, 2033, for Unit 2).

The life history of the species indicates that eggs are unlikely to be in the area and that juveniles would avoid the intake channel due to habitat preferences. Juveniles are unlikely to occur in the area because they migrate downstream to estuarine waters. Migrating adults would easily avoid the low intake velocities. Additionally, no studies or records indicate that Atlantic sturgeon have been entrained or impinged at Surry since it began operating. Concerning the potential for heat shock, temperatures may rise above the Atlantic sturgeon's thermal preference during the summer months, but only larvae, which occur near the river bottom, are expected to be in the area during this time of year. Because the thermal plume rises to the top of the water column, larvae are unlikely to be impacted by higher temperatures attributable to Surry's discharge.

7.0 References

References that appear with an Agencywide Document Access and Management System (ADAMS) accession number can be accessed through NRC's web-based ADAMS at the following URL: http://adams.nrc.gov/wba/.

75 FR 838. National Oceanic and Atmospheric Administration. "Endangered and Threatened Wildlife; Notice of 90-Day Finding on a Petition to List Atlantic Sturgeon as Threatened or Endangered under the Endangered Species Act (ESA)." *Federal Register* 75(3):838-841. January 6, 2010.

75 FR 61872. National Oceanic and Atmospheric Administration. "Endangered and Threatened and Plants; Proposed Listing Determinations for Three Distinct Population Segments of Atlantic Sturgeon in the Northeast Region." *Federal Register* 75(193):61872-61904. October 6, 2010.

75 FR 61904. National Oceanic and Atmospheric Administration. "Endangered and Threatened Wildlife and Plants; Proposed Listing Determinations for Two Distinct Population Segments of Atlantic Sturgeon in the Southeast Region." *Federal Register* 75(193):61904-61929. October 6, 2010.

77 FR 5880. National Oceanic and Atmospheric Administration. "Endangered and Threatened Wildlife and Plants; Final Listing Determinations for Two Distinct Population Segments of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the Northeast." *Federal Register* 77(24):5880-5912. February 6, 2012.

77 FR 5914. National Oceanic and Atmospheric Administration. "Endangered and Threatened Wildlife and Plants; Final Listing Determinations for Two Distinct Population Segments of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the Southeast." *Federal Register* 77(24):5914-5982. February 6, 2012.

[ASMFC] Atlantic States Marine Fisheries Commission. 2007. *Estimation of Atlantic Sturgeon Bycatch in Coastal Atlantic Commercial Fisheries of New England and the Mid-Atlantic*. Special Report to the ASMFC Atlantic Sturgeon Management Board. August 2007. Available at <http://www.asmfc.org/speciesDocuments/sturgeon/bycatchReportAug07.pdf> (accessed 14 February 2012).

[ASSRT] Atlantic Sturgeon Status Review Team. 2007. *Status Review of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus)*. Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. Available at <http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/atlanticsturgeon2007.pdf> (accessed 14 February 2012).

Crance, J.H. 1986. Habitat Suitability Index Models and Instream Flow Suitability Curves: Shortnose Sturgeon. U.S. Fish and Wildlife Service Biological Report 82(10.129). 31 pp.

Endangered Species Act of 1973. 16 U.S.C. 1531, et seq.

Gilbert CR. 1989. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Mid-Atlantic)—Atlantic and Shortnose Sturgeons*. U.S. Fish and Wildlife Service Biological Report 82(11.122). U.S. Army Corps of Engineers TR EL-82-4. December 1989. Available at <http://www.nwrc.usgs.gov/wdb/pub/species_profiles/82_11-122.pdf> (accessed 14 February 2012).

[NMFS] National Marine Fisheries Service. 2001. Letter from Colligan M, Acting Assistant Regional Administrator for Protected Resources, to Banks T, Dominion Generation. Subject: Federally listed species at Surry Power Station. March 23, 2001. *in* NRC 2002, Appendix E. ADAMS No. ML023310721

[NOAA] National Oceanic and Atmospheric Administration. 2012. "Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)." Available at <http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm> (accessed 14 February 2012).

[NRC] U.S. Nuclear Regulatory Commission. 2002. *Final Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG-1437, Supplement 6, *Regarding Surry Power Station, Units 1 and 2*. NRC: Washington, DC. November 2002. 133 p. ADAMS No. ML023310721.

[NRC] U.S. Nuclear Regulatory Commission. 2011. Letter from Bauer L, Acting Branch Chief, to Colligan M, Assistant Regional Administrator for Protected Resources, NMFS. Subject: Supplement to revised biological assessment for license renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3. July 26, 2011. ADAMS No. ML11203A100.

[NRDC] Natural Resources Defense Council. 2009. *Before the Secretary of Commerce, Petition to List Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus) as an Endangered Species, or List Specified Atlantic Sturgeon DPSs as Threatened and Endangered Species, and to Designate Critical Habitat.* September 30, 2009. Available at <http://www.nmfs.noaa.gov/pr/pdfs/species/petition_atlanticsturgeon_nrdc.pdf> (accessed 14 February 2012).

Parker GC, Fang CS. 1975. The thermal effects of the Surry Nuclear Power Station on the James River, Virginia. Part V. Results of monitoring physical parameters during the first two years of plant operation. Virginia Institute of Marine Science (VIMS), Applied Marine Science and Ocean Engineering, Special Report No. 92. VIMS: Gloucester Point, VA. 163 p. Available at <http://web.vims.edu/GreyLit/VIMS/sramsoe092.pdf?svr=www> (accessed 23 February 2012).

Shepard G. 2006. "Status of Fishery Resources off the Northeastern U.S.: Atlantic and Shortnose Sturgeons." December 2006. Available at <http://www.nefsc.noaa.gov/sos/spsyn/af/sturgeon/archives/42_Atlantic_ShortnoseSturgeons_2006.pdf> (accessed 14 February 2012).

Smith CL. 1985. *The Inland Fishes of New York State.* The New York State Dep. of Environmental Conservation: Albany, NY. 522 pp.

[VEPCo] Virginia Electric and Power Company. 1977. Section 316(a) Demonstration (Type I) For Surry Power Station, Units 1 and 2. Richmond, Virginia.

[VEPCo] Virginia Electric and Power Company. 2001. *Application for License Renewal for Surry Power Station, Units 1 and 2.* Appendix E, Environmental Report—Operating License Renewal Stage. Richmond, VA. 230 p. May 2001. ADAMS No. ML011500486.

Ziegeweid JR, Jennings CA, Peterson DL. 2008. Thermal maxima for juvenile shortnose sturgeon acclimated to different temperatures. Environmental Biology of Fishes 82:299-307.

I have also forwarded a copy of this letter to Ms. Julie Crocker of your office. Ms. Crocker has been NRC's main point of contact for section 7 consultations related to operating nuclear power plants within the NMFS's northeast region.

Sincerely,

/RA/ J. Susco for

Andrew S. Imboden, Chief
Environmental Review and
Guidance Update Branch
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosure:
As stated

cc w/encl: Listserv

DISTRIBUTION:
See next page

ADAMS Accession No: ML12060A131

OFFICE	LA:RPB2:DLR	PM:RERB:DLR	AB:RERB:DLR	OGC (NLO)	BC:RERB:DLR
NAME	IKing	BBalsam	DLogan	MSmith	AImboden (JSusco for)
DATE	3/9/12	3/13/12	3/19/12	3/15/12	3/20/12

OFFICIAL RECORD COPY

Letter to P. Kurkul from A. Imboden dated March 20, 2012

SUBJECT: REQUEST TO INITIATE INFORMAL SECTION 7 CONSULATION FOR ATLANTIC STURGEON AT SURRY POWER STATION, UNITS 1 AND 2

DISTRIBUTION:

E-MAIL:
PUBLIC
RidsNrrDlr Resource
RidsNrrDlrRpb1 Resource
RidsNrrDlrRpb2 Resource
RidsNrrDlrRarb Resource
RidsNrrDlrRasb Resource
RidsNrrDlrRapb Resource
RidsOgcMailCenter Resource
RidsNrrSurry

AImboden
BBalsam
DLogan

julie.crocker@noaa.gov