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Chief, Rules and Directives Branch
Division of Administrative Services, Office of Administration
Mailstop T-6 D 59, U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attn: Andrew Kugler

Re: Virginia Electric & Power Company, License Nos. NPF-4 and NPF-7, North Anna Power Station, Lake Anna, Spotsylvania and Louisa Counties, Virginia.

Dear Sir:

The U.S. Department of the Interior, Fish and Wildlife Service (Service) has reviewed the Virginia Electric and Power Company (VEPCO), Appendix E Environmental Report –Operating License Renewal Stage, North Anna Power Station (NAPS) Units 1 and 2 for a new license at the above referenced project and offers the following comments. The Service is responding pursuant to the Clean Water Act (33 U.S.C. § 1251 *et seq.*) and the National Environmental Policy Act (42 U.S.C. 4321-4347), and our authorities under the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) and the Endangered Species Act (16 U.S.C. 1531 *et seq.*).

General Comments

The Nuclear Regulatory Commission (NRC) published a notice of intent on September 4, 2001, to prepare an environmental impact statement for the North Anna Power Station license renewal. The NRC would renew the license for twenty years after the expiration of the existing forty year license in 2018. The Service recognizes the NRC for reducing the term of the license. Natural resource protection and enhancement is a rapidly advancing field and recent findings in the science have explained the variability, complexity, and importance of naturally functioning ecosystems.

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The Service is providing natural resources protection comments on the Applicant's Environmental Report - Operating License Renewal Stage. The VEPCO developed a scoping document to assist NRC with their preparation of a site-specific supplement to a Generic Environmental Impact Statement. The Service has concerns in three general areas: 1. water quality and habitats, 2. fisheries issues, and 3. cumulative adverse effects in Lake Anna and North Anna River. From the NRC list of 92 potential impacts, the Service agrees with the VEPCO determination that 21 (23%) Category 2 Licence Renewal Issues require additional scientific analysis. These Category 2 impacts require analysis of alternatives to reduce adverse impacts. The Service requests an additional four issues be included in the Category 2 classification of potential impacts. These four issues (3, 5, 18, & 19) are included below.

The Service requests a copy of the VEPCO Virginia Pollution Discharge Elimination System Permit for the NAPS, as well as the most recent fisheries study, Waste Heat Treatment Facility study, North Anna River Ecosystem study, NAPS CWA 316 study, and the North Anna Hydroelectric Studies, 1986-1988. These studies will allow us to better understand the potential environmental impacts.

Specific Comments

Fisheries Issues

- Page 2-2 The Service is concerned with the impacts to fish and aquatic vegetation (Issue # 3 & 19) associated with the structures described as, "In addition to the two nuclear reactors, their turbine building, intake structure, discharge canal, and auxiliary buildings." Our concerns also include the impacts of dams on the passage and distribution of fish and mussel species.
- P. 2-8 What is your reference for a healthy fish population stated in, "Reservoirs like Lake Anna with healthy populations of "landlocked" small shad and herring (Lake Anna has both threadfin shad (*Dorosoma petenense*) and blueback herring (*Alosa aestivalis*), are often dominated by small-bodied zooplankters (rotifers and copepods), because larger-bodied forms are selectively preyed upon by schooling clupeids (Ref. 2.2-11)."
- Page 2-9 How do you account for the reduction in abundance of yellow perch, black crappie, pumpkinseed sunfish and an increase in other species of fish as stated in "The community structure remained relatively stable over the 1975-1985 period, with some year-to-year variation in species composition caused by: (1) normal population fluctuations; (2) reservoir aging; (3) the introduction of forage species and competing predators; (4) the installation of fish attractors and artificial habitat; and (5) the increase in *Corbicula* densities. Post-1975 changes included: (1) a decline in relative abundance of yellow perch (*Perca flavescens*) and black crappie (*Promoxis nigromaculatus*); (2) an increase in relative abundance of white perch (*Morone americana*) and threadfin shad; and (3) an increase in redear

sunfish (*Lepomis microlophus*) abundance, with a corresponding decrease in pumpkinseed (*Lepomis gibbosus*). None of these changes appeared to be related to NAPS operation.”

Page 2-10 There continues to be disagreement between the scientific community as to the historical range of anadromous fish spawning habitat in the North Anna River. American shad, hickory shad, blueback herring, sea lamprey, and American eel are reported to migrate to the base of the Ashland Mill Dam on the South Anna River. The VEPCO report states, “Four non-native fish species (striped bass, walleye, threadfin shad, and blueback herring) have been stocked in Lake Anna by the Virginia Department of Game & Inland Fisheries since 1972. Striped bass were introduced in 1973, and have been stocked annually since 1975. They provide a “put-grow-and-take” fishery; streams, including the North Anna River that flow into Lake Anna lack the flow, depth, and length to support striped bass spawning runs. Studies show that striped bass grow and provide a substantial recreational fishery in Lake Anna, but adults are subject to late-summer habitat restrictions (limited to cooler-water refuge areas) and growth limitations. Walleye are also stocked annually by the Virginia Department of Game & Inland Fisheries and are highly sought-after game fish. Threadfin shad were introduced in 1983 to provide additional forage for striped bass and other top-of-the-food-chain predators. This species is vulnerable to cold shock and winter kills, and would not be able to survive in Lake Anna if it were not for NAPS operation. Threadfin shad appear to be thriving in Lake Anna and are an important source of food for game fish. Blueback herring, fish stocked by the Virginia Department of Game & Inland Fisheries in 1980 as a forage species, have not been as successful. A fifth non-native species, the herbivorous grass carp, was stocked by Dominion (with the approval of the Virginia Department of Game & Inland Fisheries) in the WHTF in 1994 to control growth of the nuisance submersed aquatic plant hydrilla (*Hydrilla verticillata*).”

Page 2-11. The water flow in the North Anna River System changed drastically after the impoundment was created. The reduction in river flow from Lake Anna during the Spring spawning migration may limit the range of anadromous and riverine species of fish in the river. The report describes the river as, “The North Anna River joins the South Anna River 23 miles downstream from the North Anna Dam, forming the Pamunkey River. Before 1972, when the river was impounded, flows varied considerably (1 to 24,000 cfs) from year to year and water quality was degraded by acid mine drainage from Contrary Creek. After 1972, fluctuations in flow were moderated (40 to 16,000 cfs from 1972 through 1985) and water quality was improved as a result of reclamation activities at the Contrary Creek mine site and the acid-neutralizing effect of Lake Anna’s waters. Water quality downstream from the North Anna Dam is strongly influenced by conditions in the reservoir and releases at the Dam. Water moving from Lake Anna to the North Anna River is less turbid and more chemically stable than the pre-impoundment flow. Dissolved oxygen levels are high (averaging 9.6

milligrams per liter over the 1981-1985 period) immediately downstream of the Dam and increase further downstream, presumably as a result of turbulent mixing (Ref. 2.2-3). Summer water temperatures from 1970-1985 were higher near the Dam than downstream, reflecting temperatures in the reservoir. The highest water temperature recorded in pre-operational years was 89.4°F in July 1977, at a station one kilometer below the North Anna Dam. The highest temperature recorded in operational years was slightly higher, 90.9°F, recorded in August 1983 at the same station.” Each of these flow related impacts warrant additional river flow study.

Page 3-15 The Service believes the North Anna Hydroelectric project and the dam may be causing significant impacts to the North Anna River and the results from earlier studies should be reevaluated. The report states, “An exemption from licensing (Ref. 3.5-1) was filed with the Federal Energy Regulatory Commission (FERC) in March 1984; an order granting the exemption was issued in September 1984. As part of the exemption from licensing by FERC, the U.S. Fish and Wildlife Service requested that Dominion perform pre-operational and operational fish passage studies to evaluate the need for intake screening. Studies were conducted in 1986, 1987, and 1988 (Ref. 3.5-3). Results of these studies indicated that the number of fish passing from Lake Anna to the North Anna River was minimal (Ref. 3.5-4).

Page 4-6 The Service is concerned with impacts from entrainment of fish and shellfish in early life stages that occur at most power plants. In light of fish passage measures that may be prescribed to mitigate these impacts, this issue should be evaluated for the current and post restoration fish community. The report states, “Section 316(b) of the CWA requires that any standard established pursuant to Sections 301 or 306 of the CWA shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts (33 USC 1326). Entrainment through the condenser cooling system of fish and shellfish in the early life stages is one of the adverse environmental impacts that the best technology available minimizes. Virginia State Water Control Board regulations provide that compliance with a Virginia Pollutant Discharge Elimination System (VPDES) permit constitutes compliance with Sections 301 and 306 of the CWA (Ref. 4.2-1). In response to Board requirements, Dominion submitted a CWA Section 316(b) demonstration for NAPS in May 1985 (Ref. 4.2-2). Based on this and other input, the Board issued the NAPS VPDES permit (Appendix B). Issuance of the NAPS VPDES permit indicates the Board’s conclusion that NAPS, is operating in conformance with the permit, would be in compliance with the CWA requirements. Dominion concludes that the Commonwealth regulation and the NAPS VPDES permit constitute the NAPS CWA 316(b) determination. Dominion also concludes that any environmental impact from entrainment of fish and shellfish in early life stages is small and does not require further mitigation.”

Page 4-8 The Service agrees with the NRC that concludes that impingement of fish and shellfish is a significant issue. “NRC made impacts on fish and shellfish

resources resulting from impingement a Category 2 issue because it could not assign a single significance level to the issue.” The Service believes the impacts will likely require mitigation. The report states, “Impingement impacts are small at many plants, but might be moderate or large at other plants (Ref. 4.0-1, Section 4.2.2.1.3). Information to be ascertained includes: (1) type of cooling system (whether once-through or cooling pond), and (2) current CWA 316(b) determination or equivalent state documentation. As Section 3.1.2 describes, NAPS has a once-through heat dissipation system. Section 4.2 discusses the CWA 316(b) demonstration for NAPS, indicating compliance with the use of best available technology. Section 2.5 also states that no federally- or state listed fish species have been collected in any monitoring studies, nor has any listed species been observed in creel surveys conducted by Dominion biologists and affiliated researchers. Based on the results of the CWA 316(b) Demonstration, Dominion concludes that this environmental impact is small and does not require further mitigation.”

Cooling and Auxiliary Water Systems

Page 2-6 The Service is concerned with water quality and aquatic habitat impacts from thermal discharges, the canal systems, and the Waste Heat Treatment Facilities (Issues # 5, 18, & 44). The report described the conditions as, “Since its creation, Lake Anna has developed into a reservoir with three distinct ecological zones: Upper Lake, Mid-Lake, and Lower Lake. The Upper Lake is essentially riverine, shallow (average depth of 13 feet), and shows some evidence of stratification in summer. The Mid-Lake is deeper and stratifies in summer. It receives waters from Contrary Creek that, because of years of mining in its floodplain, are sometimes low in pH and high in metals. As noted earlier in this section, creation of Lake Anna has reduced the impacts of acid mine drainage on the North Anna River. The Lower Lake is deeper (average depth of 36 feet), clearer (with more light penetration), and shows pronounced annual patterns of winter mixing and summer stratification. The epilimnion (warm layer above the thermocline) was generally eight feet deep during pre-operational years, and 26 to 33 feet deep during operational years. The increase in depth of the epilimnion appears to be related to the heated discharge entering the reservoir from Dike 3 (see Figure 3-2) and the withdrawal of cooler, deeper water at the NAPS intake (Ref. 2.2-3).”

Page 2-7 The VEPCO report continues to describe adverse thermal effect on aquatic organisms, “Results of Lake Anna temperature monitoring indicate that the shallower Upper Lake warms earlier in spring and reaches maximum temperature in summer sooner than the Lower Lake. The Lower Lake, with its greater depth and volume, warms more slowly in spring and retains its heat later in the year. It is estimated that the heat contributed by NAPS corresponds to about 10 percent of the solar heat that enters the reservoir on summer days (Ref. 2.2-3).”

Page 2-7 The Service would like to review the water temperature ranges from the report “Dominion's Environmental Policy & Compliance-Environmental Biology group submits annual reports to the Virginia Department of Environmental Quality on water temperatures and fisheries monitoring in Lake Anna and the Lower North Anna River.” Specifically, the water temperature data from the month of August, 1983, when the mean water temperature was greater than 88°F (Table 4-3).

Page 4-9 As the NRC states, the Service believes heat shock impacts are important and need to be mitigated to the fullest extent possible. The report states, “NRC made impacts on fish and shellfish resources resulting from heat shock a Category 2 issue, because of continuing concerns about thermal discharge effects and the possible need to modify thermal discharges in the future in response to changing environmental conditions (Ref. 4.0-1, Section 4.2.2.1.4). Information to be ascertained includes: (1) type of cooling system (whether once-through or cooling pond), and (2) evidence of a CWA Section 316(a) variance or equivalent state documentation. As Section 3.1.2 describes, NAPS has a once-through heat dissipation system. As discussed below, Dominion has a Section 316(a) variance for NAPS discharges. Section 316(a) of the CWA establishes a process whereby a thermal effluent discharger can demonstrate that thermal discharge limitations are more stringent than necessary and, using a variance, obtain alternative facility-specific thermal discharge limits (33 USC 1326). Dominion submitted a CWA Section 316(a) Demonstration for NAPS to the Virginia State Water Control Board on June 24, 1986 (Ref. 4.4-1). The Fact Sheet (Item 22) accompanying the current NAPS VPDES permit (Appendix B) refers to this submittal, indicating that effluent limitations more stringent than the thermal limitations included in the permit are not necessary to assure the protection and propagation of a balanced indigenous community of shellfish, fish, and wildlife in Lake Anna and in the North Anna River downstream of the Lake. Based on the results of the CWA Section 316(a) Demonstration and the NAPS VPDES permit, Dominion concludes that this environmental impact is small and does not warrant further mitigation.”

Threatened or Endangered Species

Page 2-16 The Service commends VEPCO for their description of Federal and State threatened and endangered species, and the company's efforts to initiate informal consultation on these issues. The report describes the conditions as, “Animal and plant species that are federally- or state-listed as endangered or threatened and that occur or could occur (based on habitat and known geographic range) in the vicinity of NAPS or along associated transmission lines are listed in Table 2-1. Bald eagles (*Haliaeetus leucocephalus*), state and federally classified as threatened, are occasionally observed along Lake Anna. The bald eagle forages along coasts, rivers, and large lakes. Dominion is not aware of any eagle nests at NAPS or along the transmission lines. Loggerhead shrikes (*Lanius ludovicianus*),

state-classified as threatened, have been observed in the vicinity of NAPS. Loggerhead shrikes inhabit agricultural lands and other open areas. With the exception of the bald eagle and loggerhead shrike (*Lanius ludovicianus*), terrestrial species that are federally- and/or state-listed as endangered or threatened are not known to exist at NAPS or along the transmission lines. As of February 2000, there were no candidate federally threatened or endangered species that Dominion believes might occur at NAPS or along the transmission lines (Ref. 2.5-1)."

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The report states errors and gaps in the data regarding some fish and mussel species that need clarification. The report states, "No federally-listed fish species' range includes the North Anna River and Lake Anna. One state-listed species, the emerald shiner (*Notropis atherinoides*), appears on a Final Environmental Statement list of fish collected in the North Anna River prior to its impoundment (Ref. 2.2-1, Appendix 2.14). However, according to several authoritative sources (Refs. 2.5-3, pp. 397-401, and 2.5-4, pp. 321-409), this species is known only from the Clinch and Powell Rivers in the extreme western part of the state. It appears that the fish was misidentified. The emerald shiner is often confused with the closely-related comely shiner (*Notropis amoenus*), which occurs throughout the York River drainage and has been documented from Lake Anna and the North Anna River (Ref. 2.5-3). The comely shiner was not listed in the Final Environmental Statement, but has been collected regularly by Dominion biologists in post-operational monitoring of the lower North Anna River (Ref. 2.2-8, Tables 4.2.2 and 4.2.3). The emerald shiner has not been collected in any of the post-operational surveys or monitoring studies. Based on the Virginia Department of Game & Inland Fisheries' Fish and Wildlife Information Service database, as many as two state- and federally-listed freshwater mussel species could occur in streams in the vicinity of NAPS, or in streams crossed by NAPS transmission corridors (Table 2-1). It should be emphasized that neither of these species has actually been observed as occurring in streams in the vicinity of NAPS or in streams crossed by its transmission lines. They have, however, been collected from counties occupied by NAPS or its transmission corridors."

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"None of these mussel species was collected in pre-impoundment surveys of the North Anna River, and none has been collected in more recent years by Dominion biologists conducting routine monitoring surveys. Three bivalve species were collected in the North Anna basin prior to impoundment: *Elliptio complanatus*, *Elliptio productus*, and *Sphaerium striatum* (Ref. 2.2-1, Appendix 2.13). None of these is a special-status species. In more recent years, the introduced Asiatic clam (*Corbicula fluminea*) has dominated collections from both Lake Anna and the lower North Anna River. Small numbers of Unionids (*Elliptio* sp.) and fingernail clams (*Sphaeriidae*) have also been collected. Acid drainage and sediment from the Contrary Creek mine site (see Section 2.2 discussion) historically depressed mussel populations downstream from the Contrary Creek-North Anna River confluence but, in the 1980s, there were indications that mussel populations

(*Elliptio* sp.) were recovering in the lower North Anna River (Ref. 2.2-3, Section 6.2)."

Cumulative Impact Assessment

Page 2-12. The Service's main goal is the protection and restoration of ecosystems for people. During a license review, the Service' mitigation goal is to work with the license applicant to avoid, minimize, and compensate (in that order) to the fullest extent possible. The National Environmental Policy Act calls for past, present, and future environmental impacts be identified, as well as summarized to determine cumulative effects of the environmental impacts. The VEPCO report clearly identifies ecosystem impacts, but the Service disagrees with VEPCO's conclusion regarding fish and the ecosystem. The report states, "In pre-impoundment surveys, the fish community of the North Anna River downstream from the Contrary Creek inflow was dominated by pollution-tolerant species. In the years following impoundment (and reclamation of the Contrary Creek mine site), there was a steady increase in measures of abundance and diversity (species richness) of fish. In 1984-85, 38 species from 10 families were found in the North Anna River, compared to 25 species from eight families in the control stream, the South Anna River. When reservoir species from Lake Anna were subtracted from the North Anna River totals, the two fish communities showed striking similarities, indicating that operation of NAPS has had little or no effect on fish populations downstream from the North Anna Dam." "Based on the 1999 Annual Report for Lake Anna and the North Anna River, the North Anna River downstream of the North Anna Dam has no major changes in the ecosystem (Ref. 2.2-10). A review of the data from the 1999 monitoring studies indicate that Lake Anna and the North Anna River continue to contain healthy, well-balanced ecological communities."

Mitigation

Page 6-2 The Service believes many of the impacts discussed above will fall under the this policy. We do not agree that all impacts of license renewal are small and would not require mitigation. The current operations do include some mitigation activities that would continue during the term of the license renewal, but additional efforts in the areas of fisheries, water quality, and possibly endangered species will protect and enhance the natural resources in Lake Anna and North Anna River. As stated, Dominion performs routine mitigation and monitoring activities associated with environmental permits to ensure the safety of workers, the public, and the environment. These activities include the radiological environmental monitoring program, continuous emission monitoring, monitoring of aquatic biota that could be affected by NAPS operation, effluent chemistry monitoring, and effluent toxicity testing." As the NRC's statutory requirements state, "The report must contain a consideration of alternatives for reducing adverse impacts...for all Category 2 license renewal issues.... 10 CFR 51.53(c)(3)(iii).

The environmental report shall include an analysis that considers and balances...alternatives available for reducing or avoiding adverse environmental effects.... 10 CFR 51.45(c) as incorporated by 10 CFR 51.53(c)(2)."

Conclusion

The Service has provided comments on various parts of the ecosystem that may be adversely affected by NAPS. Our goal is to restore the North Anna River ecosystem as close to the pre-project condition as possible for the American people, while considering the utility the NAPS provides for the residents of Virginia and surrounding areas. The Service requests documents listed above and time for review. Some of our concerns may be obviated after the review of these documents, but it is unlikely that will be the case for the majority of our concerns. We welcome the opportunity to visit the NAPS in the near future, and look forward to working with the staff and representatives from VEPCO.

We appreciate the opportunity to review the preliminary environmental document and provide comment on natural resource protection. If you have any questions regarding these comments, please contact David W. Sutherland of the Service's Chesapeake Bay Field Office by phone at (410) 573-4535, or by e-mail at David_Sutherland@fws.gov.

Sincerely,

John P. Wolflin
Supervisor

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