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**Date:** 9/8/2006 2:44:02 PM  
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Here is an electronic copy of the Commonwealth's comments on the SDEIS. As requested, we have combined the comments in the DEIS with comments on the SDEIS. The hard copy with reviewers comments is in the mail.

Ellie Irons

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September 8, 2006

Mr. Michael Lesar  
Chief, Rules and Directives Branch  
Division of Administrative Services  
Office of Administration  
U.S. Nuclear Regulatory Commission  
Mail stop T-6D59  
Washington, D.C. 20555

RE: Supplement to the Draft Environmental Impact Statement for an Early Site Permit (ESP) at the North Anna ESP Site (Dominion Nuclear North Anna, LLC, ESP applicant), NUREG-1811  
DEQ-06-125F

Dear Mr. Lesar:

The Commonwealth of Virginia has completed its review of the above Supplement to the Draft Environmental Impact Statement (hereinafter "SDEIS"). The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth. In addition, DEQ's Office of Environmental Impact Review (this Office) coordinates Virginia's federal consistency reviews pursuant to the Coastal Zone Management Act (CZMA). The following agencies and locality participated in this review:

Department of Environmental Quality (hereinafter "DEQ"), including:

Division of Water Resources  
Northern Virginia Regional Office  
Waste Division  
Division of Air Programs Coordination  
Office of Environmental Impact Review

Department of Game and Inland Fisheries  
Department of Conservation and Recreation  
Department of Transportation

Mr. Michael Lesar  
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Marine Resources Commission  
Department of Historic Resources  
Department of Mines, Minerals, and Energy  
Department of Forestry  
Spotsylvania County.

In addition, the following agencies, regional planning district commissions, and localities were invited to comment:

Department of Emergency Management  
Department of State Police  
RADCO Planning District Commission  
Thomas Jefferson Planning District Commission  
Rappahannock-Rapidan Planning District Commission  
Louisa County  
Orange County  
Town of Mineral.

### Project Description

Dominion Nuclear North Anna LLC, a subsidiary of Dominion Virginia Power Company (hereinafter “Dominion” or “applicant”), is the applicant for an Early Site Permit from the Nuclear Regulatory Commission (“NRC”). The applicant proposes a site for two new nuclear reactor units in Louisa County near Mineral, at the site of the existing North Anna Power Station. The site is on a peninsula on the southern shore of Lake Anna about 5 miles upstream from the North Anna Dam. NRC’s Early Site Permit (“ESP”) would, if issued, allow the applicant to “reserve” the site for as long as 20 years while considering the new reactors and undertaking site preparation activities.

Based on the applicant’s proposal to add two nuclear reactors to the site, the NRC has defined “bounding plant parameters” within which a future site design would be developed. The applicant has not selected a specific plant design for the new units, but will work within the “plant parameter envelope” (“PPE”) to develop the early site permit. The early site permit will include a site redress plan, if issued (Draft EIS, page 1-5, section 1.2). Three additional sites are considered in the Draft EIS: one is at the applicant’s Surry Power Station in Surry County, Virginia; a second is at a U.S. Department of Energy site in Ohio; and a third site is at a Department of Energy site in South Carolina (Draft EIS, page 1.6, section 1.4; see also Chapter 8).

The Supplement to the Draft Environmental Impact Statement (“SDEIS”) addresses a proposed new method of cooling the third nuclear reactor unit,

which is considered a significant change from the original proposal. The proposal considered in the Draft Environmental Impact Statement (“Draft EIS”) contemplated once-through water cooling for the third unit, and air cooling for the fourth unit. The scope of the SDEIS is limited to the environmental impacts associated with the change in the cooling method for the third unit, called a closed-cycle wet-dry system, and increasing the power output of the two proposed units from 4300 to 4500 megawatts-thermal (SDEIS, Executive Summary, page xviii). According to the SDEIS, the preliminary recommendation of NRC staff is that the ESP should be issued (SDEIS, page xxi).

During normal operation at full power, the proposed Unit 3 would use a cooling tower system that can function in different modes, consuming differing amounts of water depending on meteorological and water supply conditions. In times of water abundance, the unit would operate in “energy conservation” (EC) mode, withdrawing a maximum of 22,268 gallons per minute (gpm). In times of water shortage, defined as when lake levels fall below 250 feet above mean sea level (250 feet msl) lasting 7 days or more, the unit would operate in “maximum water conservation” (MWC) mode, withdrawing a maximum of 15,384 gpm. Maximum blowdown rates (i.e., the rate at which re-circulating water is removed from the cooling system to reduce the build-up of contaminants) would be 5,565 gpm in EC mode and 3,844 gpm in MWC mode (SDEIS, page 5-5, section 5.3).

### Related Reviews

*1. Federal Consistency Certification.* In late 2003, Dominion submitted a federal consistency certification pursuant to the Coastal Zone Management Act concerning its application for an Early Site Permit. During the review period, Dominion withdrew the submission, but requested the Commonwealth’s comments anyway for information since the review was almost complete at the time of the withdrawal. Accordingly, DEQ responded (DEQ-03-223F, comments mailed February 10, 2004), stating that the project, as proposed, was inconsistent with the Virginia Coastal Resources Management Program.

*2. Draft Environmental Impact Statement.* In December 2004, NRC issued the Draft Environmental Impact Statement (“Draft EIS”) pursuant to the National Environmental Policy Act (NEPA) for the Early Site Permit application. During the review period, in January 2005, NRC and state agencies met to discuss the Early Site Permit process as it applies to the Dominion project proposal. A public meeting was held by NRC on February 17, 2005, and DEQ staff attended the meeting. DEQ coordinated the review of the Draft EIS (DEQ-04-216F, comments mailed March 3, 2005). DEQ expressed concerns that the North Anna location is part of a relatively small watershed (342 square miles) and that Lake Anna may not be an adequate source of cooling water for a third

nuclear reactor. In addition, DEQ indicated that the Draft EIS had not analyzed cumulative impacts of the proposed third unit on flows of the North Anna River downstream of the dam.

*3. Federal Consistency Certification and New Review.* In late March 2005, Dominion submitted a federal consistency certification to DEQ on the Early Site Permit pursuant to the Coastal Zone Management Act. Before the comment period ended, however, Dominion requested an extension of the review period from DEQ, which is permitted under the Federal Consistency Regulations (15 CFR Part 930, section 930.60(a)(3)). Dominion later requested an additional extension and a stay of the review period to allow consideration of a different cooling method for proposed Unit 3. New information was submitted in January through May 2006, and the federal consistency review (begun under DEQ-05-079F) was re-started on the basis of the new information on May 3. DEQ and reviewing agencies are developing comments on the new information, which will be addressed to Dominion and mailed separately from these Comments on the SDEIS. The federal consistency review was the subject of a public hearing held by DEQ, and attended by NRC staff, on August 16. The deadline for completion of that federal consistency review is November 3, 2006.

*4. Current Review: Supplement to Draft EIS.* In July 2006, NRC issued its Supplement to the Draft EIS ("SDEIS") to analyze new information related to the modified cooling method for proposed Unit 3, in keeping with the requirements of the National Environmental Policy Act. NRC held a public meeting on the SDEIS, attended by DEQ staff, on August 15. NRC has requested that DEQ incorporate comments made on the Draft EIS into the Commonwealth's response to the Supplement to the Draft EIS to facilitate NRC's review by making a single document to include in the "Comments and Responses" analysis of the Final EIS. This letter constitutes the response of the Commonwealth of Virginia to the Draft EIS and the Supplement to the Draft EIS (item 4, below).

#### Difficulties in Review Process

The procedural approach allowed by NRC and pursued by Dominion has resulted in a number of difficulties for state agencies, localities, and interested or affected citizens in this review.

Because the federal consistency certification review requires conclusions on the part of state agencies regarding the consistency of the proposed project with the enforceable policies of the Virginia Coastal Resources Management Program (VCP), it would be beneficial for the NEPA process (review of the Draft EIS and also the Supplement to the Draft EIS) to occur before the consistency review. This approach would facilitate public review of consistency issues since

the NEPA documents would serve their intended role in identifying issues, narrowing alternatives, and producing some agreement on the nature of the project under consideration before conclusions are drawn as to its consistency with the VCP. This was not done. Instead, the consistency certification was submitted before the NRC responded to issues raised by the Commonwealth on the Draft EIS.

Dominion has been allowed to make changes and submit new information since the publication of the SDEIS as well as that of the Draft EIS. An additional difficulty with the new information is that much of it, such as the safety report, cannot readily be reviewed and correlated to the analysis of the SDEIS or the consistency certification by the agencies already involved in these reviews. We have solicited comments of additional agencies and entities in regard to some of the public comments we have received. However, given the time constraints in an on-going review process, as well as the limited distribution of some information such as the safety report, the response to the new information was limited.

The Supplement to the Draft EIS (SDEIS) is one of the new documents submitted for review during the federal consistency certification review. While we are grateful for the two-week extension of time for comments, this large document with its 45-day comment period (extended to about 60) was inserted into the middle of our new consistency review. In the 60-day review period for the SDEIS, the applicant submitted two revisions (Revisions 7 and 8) to its ESP application. This occurred after some reviewers had already submitted comments on the SDEIS.

The SDEIS also revealed discrepancies in the anticipated water resource demands of the project when compared with the demands predicted in the additional information from the applicant. These will become apparent in the discussions of water resources, fisheries, and public comments (respectively, "Environmental Impacts and Mitigation," items 2-5 and "Public Concerns and Analysis," items 1-4 and 6, below).

We recommend that for future NEPA reviews, the NRC ensure that the application (Early Site Permit or Combined License) is complete and all necessary revisions are made before the NEPA document is made available for government and public reviews. Changes provided in the revisions to the application should be analyzed in the NEPA document prepared for an application.

## Summary of Major Concerns on the DEIS and SDEIS

### *1. Alternatives Analysis.*

*(a) Alternative Cooling Method.* In their comments on the DEIS and the SDEIS, reviewers recommended using dry cooling for Unit 3, as proposed for Unit 4, stating that they would have no concerns about this project if both the third and fourth reactors proposed at North Anna were air cooled. According to the DEIS, Unit 4 operating as an air-cooled system would use a maximum of 1 gpm of water and would have negligible water-related impacts on Lake Anna, the cooling lagoons, or the North Anna River. Environmental concerns raised during our review of the Draft EIS and SDEIS are water-related. The SDEIS fails to analyze an air-cooled Unit 3 alternative despite recommendations by several reviewers.

*(b) Alternative Site:* Based on the information provided in the Draft EIS, the two most important disadvantages of the Surry site (aesthetics and impingement and entrainment and) are not substantiated. The Surry site seems “superior” (as described in the DEIS) to the North Anna site for the following reasons:

- the limited water in the North Anna watershed;
- the amount of water already being consumed by lake evaporation from the existing two reactors; and
- the competition for water resources downstream.

*2. Water Resources: Flows, Drought, and Supply.* DEQ’s Division of Water Resources commented previously in regard to its concerns for the adequacy of Lake Anna as a source of cooling water for a third nuclear reactor because the Lake Anna watershed is relatively small (342 square miles). The Supplemental Draft EIS (hereinafter “SDEIS”) analyzes water resource and quality impacts considering the addition of the proposed Unit 3 as a closed-cycle, wet-dry cooled unit and Unit 4 as a dry-cooled unit having negligible effects on water supply. Although the wet-dry cooling method would withdraw less water than a once-through unit, addition of a wet-dry Unit 3 would still increase the drought recurrence interval (from 6% for units 1 and 2 operating to 11% with a wet-dry Unit 3 operating; it would increase to 11.8% with addition of Unit 3 as a once-through unit) as well as increase the total weeks of flows that are 20 cubic feet per second (SDEIS page 5-10, section 5.3.2). Unlike the existing NAPS once-through units, the majority of the water withdrawn for Unit 3 condenser cooling would be consumed by the wet towers while operating in the energy conservation mode, which is for most of the year as currently proposed by the applicant. As stated in the SDEIS (page 5-10, section 5.3.2), consumption of water by the wet

towers would reduce the overall volume of water in the lake, thereby impacting the quantity of water released at Lake Anna dam. The Final EIS must fully analyze the consumptive water use for the proposed closed-cycle, wet-dry Unit 3. Issues associated with water quantity and quality and potential conflict over water use are still unresolved. Resolution of these issues should have been accomplished prior to the NRC's stated position that the site preparation and preliminary construction activities would not result in any significant adverse environmental impacts that cannot be redressed. An air-cooled Unit 3 would eliminate water-related concerns.

*3. North Anna River Fishery Issues.* The Department of Game and Inland Fisheries continues to have reservations about the impacts of proposed Unit 3 on the lake and downstream resources.

*(a) Striped Bass.* Striped bass and other anadromous fish are native to the York River drainage and the North Anna River, while largemouth bass, bluegill, black crappie, walleye, and channel catfish are not. Nevertheless, all of these species are important to the recreational fishery in the lake.

According to DGIF, the downstream impacts to fisheries resources were ignored in the Draft EIS in spite of the increased frequency of low flows that a third water-cooled unit would produce. Currently (with two units in the regulated "base scenario"), 67 weeks of drought conditions (20 cubic feet per second ("cfs")) or less) out of a 26-year period would be expected. Given the addition of a third unit using water, the expected drought frequency would increase considerably. Placing the population of aquatic species under frequent drought stress will shift the community substantially. Recent DGIF surveys of the North Anna River have suggested that the primary sportfish, smallmouth bass, has much lower abundance than in other rivers in the region. Using air cooling for Unit 3 would eliminate this concern.

*(b) Impingement and Entrainment.* The potential amount of fish losses resulting from impingement and entrainment has been reduced by using the closed-cycle, wet-dry cooling method instead of the once-through system originally proposed. The use of an air-cooled Unit 3 would further reduce potential impingement and entrainment losses.

*4. Downstream Flows and Recreation.* The North Anna River is a spectacularly scenic and remote canoeing river with excellent fishing, according to the Department of Conservation and Recreation. Accordingly, discharge rates from the Lake Anna Dam should be adequate to meet minimum in-stream flows needed for recreational boating from State Route 601 to U.S. Route 301. The Department of Conservation and Recreation recommends that a minimum in-stream flow recreation study be conducted to determine what this discharge rate

should be. An air-cooled Unit 3 would have no impacts upon water-related recreation.

*5. Cumulative Impacts and Downstream Effects.* Cumulative impacts of the current and future units on downstream hydrology and biology need to be quantitatively evaluated before any determination can be made that effects of the proposed addition of reactors to the site are “small.” The cumulative impact analysis should start before the existing two reactors were put into operation and the impacts analyzed with the sequential addition of Units 1 and 2 followed by the addition of Unit 3. An air-cooled Unit 3 would eliminate the need for an analysis of cumulative impacts on downstream hydrology and biology.

### Environmental Impacts and Mitigation

*1. Recreation Resources.* The Department of Conservation and Recreation has concerns about the impacts of the proposed addition of Unit 3 upon the water quality and quantity in Lake Anna and in the North Anna River below the dam.

*(a) Lake Anna.* Lake Anna supports a significant amount of recreational activity from people getting to the lake from public and private lands. Lake Anna State Park is a particular example of the public investment in facilitating public use of the Lake. Proposed new generating facilities will deplete the water available for other uses. Impacts of those facilities upon the lake temperature, particularly in the summer months, can affect the downstream fishery.

Several reviewers indicated that the proposed reactors will further increase water evaporation from Lake Anna, and the claim that the closed-cycle cooling tower is an improvement with respect to evaporative loss over the once-through reactor is unsubstantiated. According to the SDEIS, the maximum instantaneous evaporation rate for the proposed closed-cycle reactor will be 37.2 cfs in the Energy Conservation mode (most of the year) and 25.7 cfs in drought conditions (Maximum Water Conservation mode). In the Energy Conservation mode, the rate is 11.2 cfs higher than the 26 cfs estimated for the once-through reactor proposed in the Draft EIS. In the Maximum Water Conservation (MWC) mode, the rate is only 0.3 cfs less than the once-through.

*(b) Downstream Flows, North Anna River.* The North Anna River is a spectacularly scenic and remote canoeing river with excellent fishing, according to the Department of Conservation and Recreation. Between State Route 601 and U.S. Route 301, the River is heavily used because it presents some of the most beautiful and remote paddling opportunities in the mid-Atlantic region. During periods of low rainfall, releases from the Lake Anna Dam are less than

what is needed to support recreational boating on the River. Accordingly, discharge rates from the Lake Anna Dam should be adequate to meet minimum in-stream flows needed for recreational boating from State Route 601 to U.S. Route 301. The Department of Conservation and Recreation recommended, in its earlier comments on the Draft EIS, that a minimum in-stream flow recreation study be conducted to determine what this discharge rate should be.

*2. Water Resources: Flows, Lake Levels, Supply.* The Draft EIS analyzes water resource and quality impacts considering the addition of the proposed Unit 3 as a once-through water-cooled unit and Unit 4 as a dry-cooled unit having negligible effects on water supply (page 5-3, section 5.3). DEQ's Division of Water Resources commented previously (in the review of the first federal consistency certification, DEQ-03-223F, comments mailed February 10, 2004) in regard to its concerns for the adequacy of Lake Anna as a source of cooling water for a third nuclear reactor; these concerns remain. However, the new cooling design eliminates concerns about increased water temperature.

*(a) Flows and Drought.* Earlier discussions between the applicant, DEQ, and the Department of Game and Inland Fisheries (prior to the review of the Draft EIS in 2004-2005) resulted in the selection of 248 feet above sea level as the Lake Anna water level elevation that is representative of a hydrologic drought. Based upon historical data, this level would have a recurrence interval of once every 8.7 years, and it was agreed upon as being indicative of drought conditions. This matches closely other commonly used drought indicators (e.g., 7Q10) as an indicator of drought conditions in streams for water quality and discharge permit conditions. Table 1 (Draft EIS, page F-102) can be used to evaluate the recurrence intervals of droughts. The USGS publication referenced in that table discusses drought recurrence intervals ranging from once every 15 to once every 80 years. Using elevation 248 as an indicator, past Dominion records demonstrate that this level has been observed 3 times in the last 26 years, a reasonable expectation of the recurrence interval (8.6 years) for a drought. Addition of Unit 3 would increase the drought recurrence interval to every 2.6 years and more than double the total weeks of flows that are 20 cubic feet per second (cfs) or lower from 67 to 143. Median duration of drought flows of 20 cfs would be 7 weeks with the proposed Unit 3. Virginia State Water Control Board Bulletin #58 reviewed flow statistics for the gauge downstream at Doswell. Prior to dam construction, flows of 25 cfs or lower would occur once every 10 years for about 10 weeks. Addition of Unit 3 would significantly increase the frequency of drought flows downstream, and the duration of those droughts. The change to drought flows once every 2.6 years, for median duration of 7 weeks, is a significant change from conditions prior to the plant/reservoir construction (see item 4(b), below), and demonstrates the need for cumulative analysis of biological impacts.

*(b) Water Supply.* One of the major earlier concerns of DEQ's Division of Water Resources was the lack of an identifiable source of water for the proposed fourth reactor (Unit 4). The Draft EIS indicated that the proposed Unit 4 would be air-cooled (see Draft EIS, page 5-3, section 5.3); the Division has no objection to an air-cooled unit. However, the fact that the fourth unit would be air cooled does not allay the Division's concern about the adequacy of Lake Anna as a water supply for a third nuclear reactor. The Division looked at other nuclear reactors along the East Coast to compare the water resources available to them with the water resources available at North Anna (see "Table 1," first enclosure to DEQ's March 5, 2005 letter on the Draft EIS). The conclusions drawn from that research are:

- Most of the intake locations are tidal and have an essentially unlimited water supply;
- Of the remaining locations, the North Anna location has the least abundant water supply, based on the average flow of a small watershed (342 square miles) and a medium-sized reservoir; and
- There is a limited number of nuclear power stations located on non-tidal rivers. In these cases, the power plants are on large rivers such as the Connecticut and the Susquehanna.

In fact, the only location remotely similar to North Anna's situation is the Oconee plants on Lake Keowee in South Carolina. However, immediately below Lake Keowee is Hartwell Lake, so the section of non-tidal stream affected by consumptive loss is very short.

*(c) Frame of Reference for Flows.* The Department of Game and Inland Fisheries and DEQ's Division of Water Resources requested the applicant to perform an Index of Hydrologic Alteration (IHA) analysis of pre- and post-project flows below the dam (see Draft EIS, page F-122 through F-125 and the tables on pages F-126 through F-133). The two state agencies had pre-dam conditions in mind when they addressed "pre-project" conditions in their earlier discussions with the applicant. However, the tables on pages F-126 through F-133 do not evaluate pre-dam conditions and therefore cannot be considered complete. Table 1 (pages F-126 and F-127) demonstrates significant shifts in frequency of lower flows and needs to be expanded to address conditions prior to the creation of the lake. DEQ's Division of Water Resources and the Department of Game and Inland Fisheries clarify that "pre-project" meant no dam and no reactors; "post-project" meant the lake and three once-through cooling units. This Indicators study was requested in order to assess the cumulative impact of the existing and proposed project activities on the North Anna River. A cumulative

analysis of impacts of the project does not start with the existing lake conditions (i.e., the lake and two reactors) and then add, incrementally, the effects of operation of the proposed third reactor (so that the “post-project” condition is the lake and three reactors). However, the Nuclear Regulatory Commission has accepted this approach, which means that a finding of no more than “moderate” impacts of the third unit (page 5-10, section 5.3.2, lines 7-13) is not surprising even if cumulative impacts have not been analyzed.

Dominion provided DEQ’s Division of Water Resources (DWR) with the output of a simulation model with which Division staff is able to make some comparisons of true pre- and post-project conditions. Prior to the lake, the North Anna River at the dam site had an average flow of about 286 cubic feet per second (cfs). This is based on the flow records from 1929 to 1971 at the Doswell gauge, proportionately reduced to reflect the smaller drainage area at the dam. According to the NRC water budget analysis, the two existing units account for 50 cfs in evaporation and the third once-through unit would account for 26 cfs in evaporation. The cumulative impact on the average flow of just the power plants (not including lake evaporation) is therefore estimated to be 76 cfs or 26% of the historic average flow. Such a large loss of the normal flow to consumptive uses is unprecedented in Virginia and other mid-Atlantic states. The U.S. Geological Survey (USGS) estimates that the average percentage of surface water lost to consumptive use in the mid-Atlantic states is 1.6% of average flow. (USGS, 1984, National Water Summary)

DWR examined pre-dam gauge records and compared those streamflow records with projected releases with three reactors operating in a once-through cooling mode. This is not a true IHA analysis but it is presented in order to give some perspective of the magnitude of true pre- and post-project conditions.

- Prior to the project, flows at the dam site were less than or equal to 20 cfs only 4.2% of the time; with the third unit, flows are projected to be 20 cfs 11.8% of the time with the once-through reactor and 11% of the time with the closed-cycle reactor (SDEIS, page 5-11, section 5.3.2 and Appendix K, page K-12, Table K-3).
- Prior to the project, flows at the dam site were greater than or equal to 156 cfs 52% of the time (pre-dam Doswell gauge); with three units, flows will be less than or equal to 40 cfs 52% of the time (Draft EIS, page 5-12, section 5.4.1.3),
- Prior to the project, during the driest 14-month period on record (early May 1931 to early July 1931) streamflow in the North Anna River averaged 90 cfs over the 14 months. With the three units, the driest 14-month period

(mid- September 2001 through mid-January 2003) streamflow in the North Anna River would average only 20 cfs.

DWR disagrees with the conclusion in the Draft EIS that these pre- and post-project flow alterations and their impact can be described as small or moderate. Instead, DWR would characterize these types of alterations as large.

*(d) Preferences in Cooling Method.* DEQ's Division of Water Resources prefers the once-through cooling process proposed for Unit 3 to a water cooling tower because the once-through process results in less consumptive use of water than the water cooling tower. This preference would result in larger impingement and entrainment losses (see item 4(g), below) and a larger heat load to the Lake than the cooling tower. (Note: the SDEIS proposes a closed-cycle hybrid wet-dry cooling tower.) DEQ's Division of Water Resources recognizes that the cooling tower is not proposed in the Draft EIS, but some commenters may propose it as a solution to thermal loading and impingement and entrainment concerns. In any case, DEQ's Division of Water Resources would defer to DEQ's Division of Water Quality in regard to thermal impacts of any water-cooled units that might be proposed. DGIF recommends use of dry cooling for Unit 3 as a solution to lake level problems and downstream flow reductions.

The once-through cooling process would also entail larger impingement and entrainment losses. DEQ's Division of Water Resources defers to the Department of Game and Inland Fisheries with regard to impingement and entrainment estimates; see item 4(g), below.

*(e) SDEIS Issues: Lake Water Use and Cooling Methods.* DEQ's Division of Water Resources agrees with the applicant that air cooling (i.e., the MWC mode) should be implemented when the lake level falls below 250 feet msl at a minimum. However, the Division agrees with the Department of Game and Inland Fisheries (DGIF) that the MWC mode should be implemented at other times as well, when the lake is not necessarily below a full condition; see the recommendations in item 4(d), below.

DEQ's Division of Water Resources indicates that the Indicators of Hydrologic Alteration (IHA) analysis performed by Dominion shows a highly altered flow regime below the North Anna Dam, especially in the spring and fall. September is a possible exception to this alteration because it is typically the month of lowest flow; in September, the North Anna River actually retains some semblance of normal flow due to the minimum release from the dam. The cumulative effects of Unit 3 on downstream ecosystems could be reduced by using the air cooling system in spring and fall.

*(f) SDEIS Issues: Maximum Water Conservation Mode Implementation Timing.* As stated elsewhere in these Comments (see item 4(i), below), the Department of Game and Inland Fisheries (DGIF) recommends against the 7-day waiting period after lake levels reach trigger levels to initiate air cooling (Maximum Water Conservation (MWC) mode). DEQ's Division of Water Resources endorses the DGIF recommendation, which is that implementation of the MWC mode should take place when downstream flows have a three-day rolling average at trigger points described in item 4(d), below.

According to DEQ's Division of Water Resources, the applicant endeavored to justify the 7-day waiting period by stating that the electricity needed to operate the air cooling system might already be sold by the time the decision is taken to implement the MWC mode. However, given the number of generation assets controlled by the applicant, and the interconnectivity of the electric transmission system, this reasoning does not appear compelling to the Division.

*(g) SDEIS Issues: Frequency of 20 cfs flows; Lake Levels.* The current operating rules for the power plant allow flows to be reduced from a required 40 cfs to 20 cfs whenever the lake elevation goes down to 248 feet msl, according to the Department of Game and Inland Fisheries (July 7 letter relative to federal consistency of this project, enclosed). While the Department wishes to maintain the frequency and duration of 20-cfs events (see item 4(b), below), DEQ's Division of Water Resources indicates that setting the trigger elevation at 247.5 feet msl instead of 248 feet would require changing the existing Virginia Pollutant Discharge Elimination System (VPDES) permit, and might generate opposition from lakefront property owners. The Division opposes any change in the trigger elevation of 248 feet. However, the Division believes that the DGIF recommendation to raise the lake level three inches in the spring to make more storage available for downstream flows in the spring deserves additional study.

*3. Draft EIS Water Resources Analysis.* The following discussions relate to the analysis or coverage of the Draft EIS in regard to the water supply, flow, and quality issues discussed above. Wetland information deficiency is also addressed.

*(a) Cumulative Impacts and Downstream Effects.* Cumulative impacts of the current and future units on downstream hydrology and biology need to be quantitatively evaluated before any determination can be made that effects of the proposed addition of reactors to the site are "small" (Draft EIS, page 5-10, section 5.3.2, line 9; see SDEIS, page 5-72, Table 5-19). Three options exist to reduce the significant impacts on downstream resources, according to the Department of Game and Inland Fisheries:

- Change the trigger level of elevation (248 feet) to some lower elevation that has a recurrence interval of once every 8.7 years;
- Increase storage by raising the lake level seasonally; or
- Have Unit 3 operate under dry cooling conditions, as is proposed for Unit 4.

*(b) Alternatives Analysis: Surry Power Station site versus North Anna site.*

The Draft EIS indicates that a first-stage of examination aims to determine whether any alternative site is environmentally preferable to the proposed site. Based on the results of this review, the NRC examines alternatives for other factors and decides whether an alternative site is “obviously superior” to the proposed site (Draft EIS, page 8-1). DEQ’s Division of Water Resources believes that the Surry site is “superior” (as described in the Draft EIS) to the North Anna site based on the following reasons:

- the limited water resources in the North Anna River watershed;
- the amount of water already being consumed by lake evaporation and the forced evaporation from the existing two reactors; and
- the competition for water resources downstream.

It appears that water availability would not be an issue on the tidal James River at Surry. According to the Division of Water Resources, the Draft EIS says, “The consumptive use of water to support mechanical draft cooling towers would be undetectable relative to the supply in the estuary.”

At two meetings with DEQ staff (prior to the submission of the Commonwealth’s comments on the Draft EIS, March 3, 2005), NRC officials were asked why North Anna rather than Surry was being proposed for an early site permit. On both occasions, NRC staff cited aesthetics and the fact that the plant might be visible from Jamestown. However, the Draft EIS, in its discussion of aesthetics (pages 8- 32 and 8-33), does not indicate that there is any problem with aesthetics at Surry. In fact, the Draft EIS states that the Surry plant’s “current structures are not visually obtrusive from any vantage point, even from across the James River. However Units 1 and 2 are visible from the highest amusement rides at Busch Gardens” (Draft EIS, page 8-32). The concerns about aesthetics are not supported by statements in the Draft EIS.

Impingement and entrainment issues (see also item 4(e), below) would be a greater problem at the Surry site than at Lake Anna. This is because the James River is an estuary at the Surry site. However, the alternatives section of the Draft EIS states that reactors at Surry would be cooled with cooling towers (page 8-15, section 8.5). As such, the impingement and entrainment problem

would be less than if once-through cooling were to be used. On April 4, 2001, Dr. John Olney of the Virginia Institute of Marine Science wrote to Mr. Tony Banks of Dominion on the subject of impingement and entrainment at Surry while commenting on the re-licensing of the plant. In the letter Dr. Olney states, "Further, the available information on abundance and distribution of fishes at the site suggests that there is a low probability that water withdrawals at the plant are causing declines in federally managed species." Since Dr. Olney does not express concerns about a large once-through cooling water withdrawal, it appears that a cooling tower withdrawal, orders of magnitude smaller, would also not be a concern.

In conclusion, based on the information provided, two of the most important disadvantages of the Surry site (impingement and entrainment, and aesthetics), are not substantiated, while the main disadvantage of the North Anna site (water availability) appears extremely problematic. DEQ's Division of Water Resources and the Department of Game and Inland Fisheries would have no concerns about this project if both the fourth and third reactors at North Anna were air cooled.

*(c) Presentation of Data in the Draft EIS.* As indicated above (item 2(c)), the "pre-project" conditions should be based on the condition of the area before the lake and dam were constructed in the 1970s. Table 1 in Appendix F (Draft EIS, pages F-126 and F-127) is one example of this; it demonstrates significant shifts in frequency of lower flows and needs to be expanded to address conditions prior to creation of the lake.

*(i) Tables in Chapter 5.* The tables in Chapter 5 of the Draft EIS have several problems. Tables 5-4 through 5-6 (pages 5-22 through 5-24) reflect seasonal losses from March through July, so the "Yearly Totals" column is not appropriately named. To properly reflect yearly totals, losses for the remaining seven months need to be added to the table. If summer, fall, and winter data were not collected, that data may have to be extrapolated by the best fitting of a non-linear function to the available data. Only then can the full impacts of entrainment on important fish species begin to be addressed.

Tables 5-2 (Draft EIS, page 5-18) and 5-5 (page 5-23) may have significant errors, or the reasons for the differences are not fully explained. For example, in Table 5-2, for Unit 3, January striped bass and bluegill numbers impinged are greater than in Units 1 and 2 (Draft EIS, Table 5-1, page 5-17), but black crappie, gizzard shad, white perch, and yellow perch numbers are less than in Units 1 and 2. Similar discrepancies exist for other rows in the table, and for the cumulative Tables 5-3 and Table 5-6. These discrepancies should be explained further in the Final EIS.

(ii) *Characterization of Impacts on Fisheries.* The Department of Game and Inland Fisheries disagrees with the assessment that the impact of Unit 3 upon gizzard shad, the most prevalent species, would be a “small” impact (page 5-21, end of section 5.4.2.2). As DGIF states in its comments on the Draft EIS:

Gizzard shad are indeed a “prolific forage fish,” but their abundance has been low in VDGIF samples in two recent years. This species is the primary forage for stocked pelagic predators (striped bass and walleye) and also supplements largemouth bass diet. Further declines in striped bass habitat (another contested issue) combined with potential reductions in the forage base could significantly impact this recreationally and economically important fishery. Section 5.4.2.2 estimates the impingement loss to the fish population as a percentage of the estimated total lake population as derived from cove rotenone. We applied this same technique to entrainment numbers and calculate that 6.8% of the gizzard shad and 87% of the black crappie are lost due to entrainment. When combined with impingement 7.7% of the gizzard shad and 93.9% of the black crappie numbers are killed by the intake structure. We do not consider losing almost 8 and 94% of these populations from an intake a small impact. Several problems exist with this approach and these need to be addressed. Lakes undergo eutrophication with age and that is occurring at Lake Anna as the watershed becomes more fully developed. As that occurs, the biomass of fish increases. The current biomass is undoubtedly higher than twenty years ago when the original entrainment/impingement analysis was conducted. The report uses cove rotenone data but does not account for spatial and temporal variation within that data. Within large reservoirs, biomass typically declines downstream through a trophic gradient. That is apparent from our routine sampling as well as historic rotenone data. The impacts of entrainment and impingement may be even more spatially and numerically significant in the lower lake where the numbers of fish are less than above the Rt. 208 bridge.

The Department points out that the conclusions regarding entrainment losses in the Draft EIS are not based on scientifically sound evidence. This is exemplified by the statement:

Because the fish entrained most frequently are prolific, exhibit a high reproductive potential, and compensatory responses of the fish population occur to offset losses, the staff concludes that the impacts of entrainment would be SMALL [emphasis in the original].

(See Draft EIS, page 5-25, end of section 5.4.2.3.)

(iii) *Recommendations.* The Department of Game and Inland Fisheries recommends that the entrainment tables be corrected to reflect an actual annual loss. The discrepancies should be corrected and a much more rigorous spatial and temporal evaluation conducted before any conclusion can be

reached that the effects of impingement and entrainment are “small.” See also item 4(e), below.

*(d) Wetland Information.*

*(i) Draft EIS Information.* The Draft EIS states, “a few small wetlands and two intermittent streams exist on the North Anna ESP site” (page 4-7, section 4.4.1), but no wetland delineation of the area has been accomplished. The Draft EIS also states, in several different places, that avoidance and minimization of wetland impacts will be practiced to the maximum extent practicable. Given the above information, however, DEQ cannot determine whether project activities would adversely affect wetland or stream areas subject to DEQ water permitting jurisdiction. For this reason, DEQ recommends that the applicant submit the following:

- a National Wetland Inventory (NWI) map identifying the project area;
- photographs of the intermittent streams;
- a confirmation of the wetlands delineation by the Army Corps of Engineers; and
- any other information pertaining to the location of wetlands or streams in or near the project area.

This information would be necessary for any Virginia Water Protection Permit application, but it is also vital for an informed decision on federal consistency and on the environmental impacts of the proposed project.

*(ii) Permit Applicability.* Applicable regulations require a Virginia Water Protection (VWP) Permit as follows. If the activities to be pursued under the Early Site Permit involve one or more of those listed here, the applicant must apply to DEQ for a permit.

Except in compliance with a VWP permit, no person shall dredge, fill, or discharge any pollutant into, or adjacent to surface waters, or otherwise alter the physical, chemical, or biological properties of surface waters, excavate in wetlands, or ...conduct the following activities in a wetland:

1. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
2. Filling or dumping;
3. Permanent flooding or impounding; or

4. New activities that cause significant alteration or degradation of existing wetland acreage or functions.

(See the VWP permit program regulations, 9 VAC 25-210-50.A.)

It should be noted that certain water withdrawals are exempt from permitting (see the State Water Control Law, *Virginia Code* section 62.1-44:15.5.G). The proposed Unit 3 does not appear to qualify for this exemption, according to DEQ's Division of Water Resources (Hassell/Ellis/Irons, 9/8/06).

(iii) *Evaluation factors.* In the permit application review process, DEQ evaluates the following, *inter alia*:

- Avoidance of wetland impacts;
- Minimization of wetland impacts;
- Amount, type, and location of compensatory wetland mitigation, based on the ecologically preferable alternative.

See "Regulatory and Coordination Needs," item 6, below.

4. *Fisheries.* The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state or federally listed endangered or threatened species, but excluding listed insects. The Department (hereinafter "DGIF") is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 *et seq.*), and provides environmental analysis of projects or permit applications coordinated through the Department of Environmental Quality, the Marine Resources Commission, the Virginia Department of Transportation, the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts.

(a) *Lake Water Use, Evaporation, and Downstream Flows.* The Department of Game and Inland Fisheries remains concerned regarding the increased evaporation from Lake Anna and its impacts upon downstream hydrology, attributable to the addition of Unit 3. The increased frequency of flows below 40 cubic feet per second (cfs) will, if allowed, cause the downstream hydrology to change to a drier condition than would occur naturally, resulting in lower flows affecting downstream resources in the Pamunkey River, to which the North Anna River flows. The required release flow of 40 cfs is 11.6% of mean annual flow. Normal summer flows in a stream the size of the North Anna River

would be from 70 to 100 cfs or 20-30% of mean annual flow. Reduced flows would result in reduced summer habitat for resident Lake species as well as downstream migratory species. An analysis of Dominion's long-term North Anna River monitoring data demonstrated that the fish community requires a diverse flow pattern, with different species doing best in wet years. This is similar to study results from the James River and the North Fork of the Shenandoah River.

*(b) Frequency of 20 cfs flows.* The estimates on frequency of 20-cfs flows provided in the applicant's Revision 7 differ significantly from those in the SDEIS. The discrepancy should be fully addressed and resolved before the Final EIS is completed.

*(i) Analysis.* Prior to construction of the North Anna Dam, river flows were less than 20 cfs 4.2% of the time. Currently, flows are decreased to 20 cfs an average of 5.2% of the time. With the proposed Unit 3 wet-dry cooling system, according to the applicant's analysis, the frequency and duration of these 20-cfs events would increase to 7.3% of the time. However, according to the NRC's analysis (SDEIS, Appendix K, page K-12 and page 5-11, section 5.3.2), the 20-cfs events would increase to 11.0% (not 7.3%) with the closed-cycle unit 3 instead of the 11.8% of the time for 20-cfs events with a once-through Unit 3. This is a slight improvement from the original proposal, which would have resulted in reducing flows to 20 cfs 11.8% of the time.

With the existing two units, *according to the applicant's analysis*, there are two 20-cfs flow events predicted over a 24-year period. The proposed Unit 3 would increase that to five such events over a 24-year period. With a third unit, the duration of the first two events is increased by an additional 4 to 5 weeks. The three additional events have durations of 2 to 13 weeks. According to the NRC analysis, that would increase to seven events. These predictions need to be re-evaluated in light of the NRC analysis referred to above.

*(ii) Recommendation.* To reduce the frequency and duration of 20-cfs events, the Department of Game and Inland Fisheries recommends the following. For each additional inch of water stored, an additional 27 days are available during which flows can be maintained at 40 cfs. By storing three inches of water, resulting in a lake elevation of 250.25 feet above mean sea level, the five 20-cfs events predicted by Dominion would be reduced to three events, and the duration of the third event would be reduced from 13 weeks to one week. The other two events would have the same duration as previously. The impact of three inches of storage on the NRC analysis is unclear.

Therefore, DGIF recommends that the normal operating elevation be seasonally increased (April through November) to 250.25 feet msl in order to

minimize the impacts of an increased frequency and duration of 20-cfs flows on downstream resources. Rules could be in place to reduce the pool to 250 feet msl elevation prior to predicted storm events such as hurricanes and tropical depressions.

*(c) Altered Flow Regime above 40 cfs.*

*(i) Analysis.* The proposed Unit 3 would withdraw a maximum of 49.6 cfs, with an average use of 34.3 cfs. Return water could range from near zero to 49.6 cfs, depending on the operation of the dry cooling unit and ambient air temperature. Under summer conditions, dry tower return rates could be in the range of 25%. Winter returns could be 100% with minimal evaporative loss from the lake. Use of only the wet tower will result in almost 100% evaporative water loss. Fishery impacts of this regime will depend on flows and the season.

*(ii) Fishery Resources.* Some of the biologically important fishery resources and critical seasons are the herring spawning during March, shad spawning during late March and April, smallmouth bass spawning in May and June, and juvenile shad survival on the Pamunkey River.

- With regard to herring, based upon results on the Rappahannock and James Rivers, herring runs are strongest when flows are near normal. Low flows have resulted in reduced numbers of fish moving upstream.
- With regard to shad spawning, upstream migration is less during dry years.
- With regard to smallmouth bass spawning, and juvenile bass development during June, DGIF has documented that juvenile bass survival statewide is highest when June flows are between the median and average values. June flows are currently below median values and would decrease more with the addition of Unit 3 to 43% of pre-Lake values. Water conservation during this period is likely to enhance the survival rates of smallmouth bass juveniles.
- With regard to juvenile shad on the Pamunkey River, survival rates are best during wet summers. The Pamunkey River system has the healthiest shad population in Virginia, and it serves as the brood source for shad re-establishment in the James River system. See item 4(c)(iii), next.

*(iii) Stream Flow and Shad.* DGIF has reviewed the impacts of stream flow on American shad juvenile production in the Pamunkey River. The data were presented to Dominion and the NRC in separate meetings in the

spring of 2006. Shad juvenile year class strength and survival were assessed by evaluating catch-per-unit effort of returning brood stock, ages 4 to 6 years. In summary, the best juvenile shad survival occurred during wetter June-August years (those with flows at the 80th percentile). Lake Anna is about one-third (1/3) of the drainage area of the Pamunkey River at the gauge station near Hanover, and is an important contributor to that river's flow. Flow losses within Lake Anna due to evaporation can have a significant impact upon downstream shad resources. The NRC analysis would predict a much more significant impact on potential summer shad habitat than the Dominion analysis.

*(d) Recommendations: Operating Rules for the Maximum Water Conservation Mode.* Impacts upon the above-listed fisheries and other aquatic resources can be minimized by use of the dry tower to reduce consumptive water losses. Accordingly, DGIF recommends that the Maximum Water Conservation (MWC) mode be implemented in keeping with the following rules.

- In March and April, the MWC mode should be implemented when flows are less than 225 cfs. Flows are in the lower quartile, and water conservation savings can result in significant habitat savings and return flows to near existing conditions. These flows are particularly important for herring, shad, migratory striped bass, and resident sucker and minnow spawning.
- In May, the MWC mode should be implemented when flows are less than 175 cfs. These flows are important for smallmouth bass nesting. The addition of Unit 3 would reduce flows by 30% from pre-Lake conditions.
- In June, the MWC mode should be implemented when flows are less than 120 cfs. This value is close to the average value and will enhance smallmouth bass spawning success, and subsequent catch for anglers.

From July through October, the MWC mode should be implemented when flows are less than 90 cfs. High flows are important for the habitat requirements of resident fish species that do best in wet years. Without water conservation in wet years, those optimal habitat conditions cannot be achieved. Wet years are also important for producing strong year classes of American shad in the Pamunkey River.

While this could result in significant improvements in flow, it is unclear how this would affect events below elevation 250.

*(e) Striped Bass Reservoir Habitat.*

(i) *Description and Habitat.* The Department of Game and Inland Fisheries agrees with the descriptive statements in the Draft EIS (page 5-30, lines 24-33). However, line 37 incorrectly states that striped bass are not native to this watershed. The use of nomenclature surrounding native vs. nonnative species appears to minimize the value of the striped bass fishery. This is incorrect. Striped bass are, in fact, native to the York River drainage and downstream reaches of the North Anna can be seasonally important for spawning and juvenile rearing. The lake population is correctly acknowledged as being supported by stocking. In recognition of this fact, the Department of Game and Inland Fisheries strives to stock Chesapeake strain striped bass in the reservoir so as not to change the genetics of downstream populations.

(ii) *Impacts of Temperature and Flow Changes.* An extensive amount of temperature data from historic monitoring of the lake was used to model thermal conditions at various locations in the lake. Despite that extensive data set, no modeling of summer striped bass habitat was conducted to support statements that the impacts would be small in normal years and moderate in drought years (Draft EIS, page 5-31, lines 18-19). In combination with the elevated temperatures and increased frequency of drought conditions (lowering to elevation 248) within the lake, the striped bass population could be stressed every 2.6 years. Based on the information in the Draft EIS, it is inconclusive whether the installation of a third unit *would* cause acute mortality from exacerbated summer habitat squeeze. It is also inconclusive, however, that such mortality *would not* occur. At some point, striped bass will begin to die as water quality declines (based primarily on higher water temperatures and lower dissolved oxygen). Since no modeling of summer habitat was conducted, it is unknown whether the additive impacts of a third unit would allow reservoir conditions to reach this point, and the exact point at which this will occur is unknown; but to discount the possibility is subjective. Even with the elimination of Unit 4, the predicted maximum surface temperature increase at the dam of 3.6 degrees Fahrenheit could result in striped bass mortalities depending on the plume configuration, inflow, and stratification pattern. Striped bass habitat modeling is essential in the Final EIS to explain the potential of a new (third) unit and its impact on striped bass habitat.

(f) *North Anna River Fishery Issues.* According to the Department of Game and Inland Fisheries, the downstream impacts to fisheries resources were ignored in the Draft EIS in spite of the increased frequency of low flows that a third water-cooled unit would produce. Currently, (with two units in the regulated "base scenario"), 67 weeks of drought conditions (20 CFS or less) out of a 26-year period would be expected. Given the addition of a third unit, the expected drought frequency would rise to 150 weeks using the once-through cooling method. The length of time the drought frequency would increase using the

closed-cycle cooling method would depend on factors such as the frequency of triggering the Maximum Water Conservation Mode and the design used.

(i) *Analysis of Flows.* The Tennant method is a common desktop method and summer flows in the 20-30% mean annual flow (MAF) range are beneficial for sustainable fisheries. Because it has been called the Montana Method, it has been deemed as only applicable in Western streams. That is a misconception, as it was developed “over the past 17 years from work on hundreds of streams in the states north of the Mason-Dixon Line between the Atlantic Ocean and the Rocky Mountains” (Fisheries 1(4): 6-10). Summer flows below the desired level of 68 cubic feet per second (cfs), or 20% of MAF, are the norm under current conditions and will worsen under future conditions. The Department of Game and Inland Fisheries recommended that an In-stream Flow Incremental Methodology (IFIM) Study be conducted to properly evaluate this project on the stream fauna. The expected increased frequency of drought flows to a common occurrence (2.6 years) is expected to have significant impacts. Conclusions need to be based upon sound scientific modeling. DGIF states that if Dominion can offer a better approach to modeling flow impacts, DGIF would be happy to consider any alternative.

(ii) *Impacts on River Resources.* According to DGIF, the Draft EIS makes the following statement:

... long-term monitoring of the North Anna River has documented improvements in the abundance and diversity of aquatic biota since impoundment.

DGIF is unaware of any intensive data analysis to support such an assertion. DGIF’s analysis of the Dominion data set documented changes that are reflective of drought conditions. Placing the population of aquatic species under frequent drought stress will shift the community substantially. This analysis was previously provided to Dominion. Recent DGIF surveys of the North Anna River have suggested that the primary sportfish, smallmouth bass, has much lower abundances than in other rivers in the region. Other fish populations were present in relatively low levels. It is the opinion of DGIF biologists that the low abundance and biomass of predator and forage species in the North Anna River is related to higher than naturally occurring incidences of drought conditions. There also is the possibility that drought flow conditions could adversely impact downstream anadromous nursery areas. This potential impact should be evaluated. Increasing the drought frequency to the proposed extent would have an unacceptable negative impact on this fishery.

(iii) *Modeling versus Speculation.* The balance of a major argument within the document centers on subjective speculation on whether the installation of Units 3 and/or 4 would present complications for fish populations. DGIF

believes that such complications would occur. More likely at issue is not if complications would occur, for they almost certainly would; but the extent of such complications and the population-level impacts. Without extensive modeling, it is impossible to argue either point successfully. We recommend the application of sound scientific modeling to the decision process and that appropriate corrections based on model outcomes be incorporated in the Final EIS. The NRC, in section 5.3.2 of the SDEIS, concludes that the impact on the resource is small during most years and moderate during drought years. Extensive hydrologic analysis has been conducted which demonstrates significant changes in the flow patterns. Earlier DGIF recommendations included a similar analysis of incremental habitat changes as impacted by changes in flow. Without that analysis, any conclusion of “small to moderate impacts” is not substantiated.

*(g) Water Intakes: Fish Impingement and Entrainment.* Since commenting on this subject for the Draft EIS, the Department of Game and Inland Fisheries has changed its recommendations. We reiterate the Draft EIS comments first, and explain the changes as necessary.

*(i) Estimates.* In reviewing the Draft EIS, the Department of Game and Inland Fisheries (DGIF) applauded the applicant’s use of “worst case” scenarios for estimating impingement and entrainment, and acknowledged the estimate of a 131% increase in the impingement rate for Unit 3 (Draft EIS, pages 5-13 through 5-18, sections 5.4.2.1 and 5.4.2.2). In developing the total estimate, data derived from 1979 through 1983 was added to worst-case Unit 3 operation. However, it is not clear whether the 1979-1983 values for Units 1 and 2 reflect current operating conditions and are valid. The Final EIS, according to DGIF, should indicate whether water volume pumped for these units has increased or decreased since the 1979-1983 study period, in light of the facts that plant operating time, efficiency, and volume of water pumped have all increased. In such case, the table reflecting the impacts of Units 1 and 2 (Draft EIS, Table 5-1, page 5-17) needs to be revised to reflect current operating conditions.

*(ii) Earlier Recommendations.* The Department of Game and Inland Fisheries, in commenting on the Draft EIS, recommended the use of state-of-the-art intake screens, as encouraged by the U.S. Environmental Protection Agency in recent screen recommendations. Specifically, the Department of Game and Inland Fisheries recommended openings of 1 millimeter (mm), and an intake velocity of 0.25 feet per second (fps) to protect aquatic life. This would greatly alleviate the impingement and entrainment issue, as would the use of a dry cooling tower.

(iii) *Existing and Proposed Intake Screens.* The SDEIS discusses water intakes, impingement, and entrainment in the chapter on operational impacts (specifically pages 5-19 through 5-26, sections 5.4.2.1 through 5.4.2.3). The current intake screen at the North Anna Power Station has a mesh size of 9.5 mm and an intake velocity of 0.7 feet per second (fps). The same design is proposed for the Unit 3 intake structure. With the re-design of the cooling process for Unit 3, the expected number of fish impinged by that unit would be reduced from 147 million to 3.4 million annually.

(iv) *Analysis and Recommendations.* The Department of Game and Inland Fisheries made an earlier recommendation for a 1 mm mesh size screen and an intake velocity of 0.25 fps. During several meetings with NRC and Dominion, there was discussion regarding the lack of sweeping velocity in a reservoir situation. As a result of further review of scientific literature, DGIF arrived at a recommendation of a 2 mm mesh size and an intake velocity of 0.5 fps for the intakes for proposed Units 3 and 4. The 9.5 mm screen proposed by the applicant (SDEIS, pages 5-19, 5-26) will only exclude fish larger than 3.4 inches from the intake. The 2 mm mesh size and 0.5 fps intake velocity will make for more effective resource protection, according to DGIF. The recommendations may be depicted on this table:

	Mesh Size	Intake Velocity
Draft EIS, DGIF recommendation	1 mm	0.25 fps
SDEIS, DGIF Recommendation ( <b>now</b> )	2 mm	0.50 fps

As indicated above (see item 3(c)(iii)), DGIF recommends that entrainment tables in the Draft EIS (see page 5-25, section 5.4.2.3) be corrected.

(h) *Avoiding Adverse Impacts.* In response to the discussions of terrestrial impacts (SDEIS, page 4-8, section 4.4.1) and unavoidable adverse impacts (SDEIS, page 10-4, section 10.1), DGIF recommends avoiding and minimizing adverse impact upon wetlands and streams to the maximum extent possible. Particulars follow.

(i) *Compensation for unavoidable wetland and stream impacts.* Compensation should be based on ratios, as follows:

- 2 acres of compensation for each acre of impacts to palustrine forested (PFO) wetlands, or 2:1;

- 1.5 acres of compensation for each acre of impacts to palustrine scrub-shrub (PSS) wetlands, or 1.5:1;
- 1 acre of compensation for each acre of impacts to palustrine emergent (PEM) wetlands, or 1:1; and
- 1 acre of compensation for each acre of impacts to streams. This 1:1 ratio should be based on the full restoration of a similarly functional stream.

*(ii) Stream enhancement or preservation-only mitigation.* Stream enhancement or preservation-only activities should be based on a ratio ranging from 1.5:1 to 10:1.

*(iii) Conduct of in-stream activities.* All in-stream activities should be conducted as follows:

- Undertake in-stream activities during low-flow conditions;
- Use non-erodible cofferdams to isolate the construction area;
- Stockpile excavated material in a manner that prevents its re-entry into the stream;
- Restore the original streambed and streambank contours;
- Re-vegetate barren areas with native vegetation;
- Implement strict erosion and sediment controls; and
- To minimize potential adverse impacts upon fish inhabiting Lake Anna, schedule all in-stream activities to avoid the spring/summer spawning seasons. This time-of-year restriction has been defined as March 15 through June 30 every year.

*(j) Water Conservation Measures.* The SDEIS indicates that Unit 3 would be operated in the Maximum Water Conservation (MWC) mode after 7 days of low lake level elevation (below 250 feet msl) (SDEIS, page 5-5, section 5.3; see "Project Description," above). The Department of Game and Inland Fisheries recommends against this 7-day waiting period and states that implementation of the MWC mode should take place when downstream flows have a three-day rolling average at trigger points described in item 4(d), above.

(k) *Draft EIS Fisheries Impact Analysis.* The following discussions relate to the analysis or coverage of the Draft EIS in regard to fisheries impacts of the proposed new reactor units.

(i) *Department of Game and Inland Fisheries Assessment.* DGIF continues to have reservations about the impacts of proposed Unit 3 on the lake and downstream resources. The Draft EIS does not address the main concerns outlined in the DGIF letter dated January 27, 2004.

The nomenclature of the Draft EIS on native vs. non-native species appears to minimize the value of the striped bass fishery (Draft EIS, section 2.7.2.1, pages 2-33 through 2-40). Striped bass and other anadromous fish are native to the York River drainage and the North Anna River, while largemouth bass, bluegill, black crappie, walleye, and channel catfish are not. Nevertheless, all of these species are important to the recreational fishery in the lake.

(ii) *Aquatic Ecology Information.* The SDEIS states:

Non-native fish species, including striped bass, walleyes, threadfin shad, and blueback herring, have been stocked in Lake Anna by the Department of Game and Inland Fisheries (VDGIF).

(SDEIS, page 2-14, section 2.7.2.) As stated in DGIF's February 15, 2005 comments on this subject, striped bass and other anadromous fish are native to the York River drainage and the North Anna River, while largemouth bass, bluegill, black crappie, walleye, and channel catfish are not. Nonetheless, all of these species are important to the recreational fishery in Lake Anna.

In addition, the SDEIS makes reference to the shortnosed sturgeon as being

listed as endangered by the National Marine Fisheries Service and by Virginia. It also appears on the Virginia Department of Cultural Resources List of "Extinct and Extirpated Animals of Virginia."

(SDEIS, page 8-29, section 8.5.4). There is no "Virginia Department of Cultural Resources." Perhaps the reference is to the Department of Historic Resources, which does not have responsibility for endangered species. A list of species believed to be extinct or extirpated in Virginia can be found in [A Guide to Endangered and Threatened Species in Virginia](#), coordinated by Karen Terwilliger and John R Tate (Blacksburg, Va.: The McDonald and Woodward Publishing Company, 1995).

(iii) *Drought Comment.* The following comment in the Draft EIS regarding droughts, “In such circumstances, mitigation to reduce the impact could be accomplished by stocking more fish, stocking larger fish, or managing the fishery to provide more catch opportunities of large fish,” is incorrect and not a scientifically recognized fishery management solution, according to the Department of Game and Inland Fisheries. Such a comment does not recognize the biological and physical factors necessary for a successful striped bass population.

5. *Solid and Hazardous Waste Management.* According to DEQ’s Waste Division, the Draft EIS addressed solid waste issues and sites to some extent, but did not address hazardous waste issues or sites, or include a search of waste-related data bases. The SDEIS did not address solid or hazardous waste issues or sites, or include a search of waste-related data bases.

(a) *Data Base Results.* DEQ’s Waste Division did a cursory review of its data files and determined that the North Anna Power station is listed as follows:

- “Vepco-North Anna” (identification number VAD000620237) in the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) data base; no further remedial action is planned, according to the CERCLA listing.
- “Virginia Power North Anna” (identification number VAD065376279) in EPA’s RCRA (Resource Conservation and Recovery Act) data base, as a small-quantity generator of hazardous waste.

DEQ’s Waste Division did not find any waste sites that would affect, or be affected by, the proposed project.

The following web sites may be helpful in locating additional information for these identification numbers:

- [http://www.epa.gov/echo/search\\_by\\_permit.html](http://www.epa.gov/echo/search_by_permit.html)
- [http://www.epa.gov/enviro/html/rcris/rcris\\_query\\_java.html](http://www.epa.gov/enviro/html/rcris/rcris_query_java.html).

(b) *Solid Wastes.* The Draft EIS indicated that solid waste would be handled in compliance with appropriate state and federal regulations (page 3-10, section 3.2.4). See the citations in item 5(c), next.

(c) *Radioactive or Other Contaminated Waste.* The Draft EIS indicated the potential risk of radioactive waste occurring on site after construction (pages

4-39, 4-40, 6-22, and 8-12). Any soil suspected of radioactive wastes or other contamination generated during construction-related activities (including site preparation) must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. These include, but are not limited to:

- Federal laws and regulations: Resource Conservation and Recovery Act (RCRA) (42 U.S.C. sections 6901 et seq.); U.S. Department of Transportation Rules for Transportation of Hazardous Materials (49 CFR Part 107); applicable regulations in Title 40, Code of Federal Regulations (CFR).
- State laws and regulations: Virginia Waste Management Act (*Virginia Code* sections 10.1-1400 et seq.); Virginia Hazardous Waste Management Regulations (9 VAC 20-60); Virginia Solid Waste Management Regulations (9 VAC 20-80); Virginia Regulations for the Transportation of Hazardous Materials (9 VAC 20-110).

*(d) Demolition and/or Renovation of Structures.* The discussion of the Site Redress Plan (Draft EIS, page 4-46) raises the potential for structures to be demolished or removed. These should be checked for lead-based paint and asbestos before any action takes place. If lead-based paints are found, NRC or the applicant must comply with the rules in the Virginia Hazardous Waste Management Regulations (9 VAC 20-60-261); if asbestos-containing materials are found, compliance with the Virginia Solid Waste Management Regulations (9 VAC 20-80-640) is required.

*(e) Pollution Prevention.* DEQ encourages NRC and the applicant to implement pollution prevention principles in all construction activities. This includes reducing wastes at the source, re-using materials, and recycling waste materials. Generation of hazardous waste should be minimized, and hazardous waste should be handled appropriately in keeping with the rules cited in item 5(c) above. See also item 6, next.

*6. Pollution Prevention.* DEQ advocates that principles of pollution prevention be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices (BMPs) will help to ensure that environmental impacts are minimized. However, pollution prevention techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source. We have several pollution prevention recommendations that may be helpful in constructing or operating this project if it goes forward:

- Consider development of an Environmental Management System (EMS). An effective EMS will ensure that the proposed facility is committed to minimizing its environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program.
- Consider designs, techniques, and technologies that will facilitate the re-circulation and re-use of waters used for cooling and steam generation. These techniques can save money by minimizing intake and treatment needs.
- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider contractors' commitments to the environment (such as an EMS) when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.
- Choose sustainable materials and practices for infrastructure and building construction and design. These could include asphalt and concrete containing recycled materials, and integrated pest management in landscaping, among other things.
- Integrate pollution prevention techniques into facility maintenance and operation, to include the following: inventory control (record-keeping and centralized storage for hazardous materials), product substitution (use of non-toxic cleaners), and source reduction (fixing leaks, energy-efficient HVAC and equipment). Maintenance facilities should be designed with sufficient and suitable space to allow for effective inventory control and preventive maintenance.

DEQ's Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. If interested, NRC and/or the applicant may contact that Office (Tom Griffin, telephone (804) 698-4545).

*7. Air Quality.* According to DEQ's Division of Air Program Coordination, the North Anna Power Station is in an ozone non-attainment area. While the change in the cooling system itself will not have any impact on air quality, all precautions are necessary to restrict emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>), during pre-construction activities allowed

under the Early Site Permit and also during implementation of the site redress plan in the event the proposed addition of Units 3 and 4 does not materialize.

(a) *Fugitive Dust Control.* During construction (and pre-construction activities, and site redress implementation if that is the case), fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 et seq. of the Regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

(b) *Open Burning.* If any project activities include the burning of construction or demolition material or land-clearing debris, this activity must meet the requirements under 9 VAC 5-40-5600 et seq. of the Regulations for open burning, and it may require a permit (see “Regulatory and Coordination Needs,” item 1, below). The Regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. The applicant should contact Louisa County officials to determine what local requirements, if any, apply. The model ordinance includes, but is not limited to, the following provisions:

- All reasonable effort shall be made to minimize the amount of material burned, with the number and size of the debris piles;
- The material to be burned shall consist of brush, stumps and similar debris waste and clean burning demolition material;
- The burning shall be at least 500 feet from any occupied building unless the occupants have given prior permission, other than a building located on the property on which the burning is conducted;
- The burning shall be conducted at the greatest distance practicable from highways and air fields;
- The burning shall be attended at all times and conducted to ensure the best possible combustion with a minimum of smoke being produced;
- The burning shall not be allowed to smolder beyond the minimum period of time necessary for the destruction of the materials; and
- The burning shall be conducted only when the prevailing winds are away from any city, town or built-up area.

(c) *Fuel-burning Equipment.* Fuel-burning equipment used in construction activities may require an air pollution control permit, depending on capacities and potential to emit air pollutants. See “Regulatory and Coordination Needs,” item 1, below.

8. *Natural Area Preserves.* According to the Department of Conservation and Recreation, there are no state Natural Area Preserves in the vicinity of the proposed project.

9. *National Heritage Resources.* The Department of Conservation and Recreation (DCR) has searched its Biotics Data System for occurrences of natural heritage resources in the project area. “Natural heritage resources” are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. According to DCR, natural heritage resources have been documented in the project area.

(a) *Findings.* Laura’s Clubtail, an odonate (*Odonata*, i.e., dragonflies and damselflies), has been historically documented in Lake Anna. This insect species is not listed as endangered or threatened (Hypes/Ellis, 8/28/06). Adult *odonata*, commonly seen flitting and hovering along the shores of most freshwater habitats, are accomplished predators. Adults typically forage in clearings with scattered trees and shrubs near the parent river. They feed on mosquitoes and other smaller flying insects, and are thus considered highly beneficial. Odonates lay their eggs on emergent vegetation or debris at the water’s edge. Unlike adults, the larvae inhabit the sand and gravel of riffle areas. Wingless and possessing gills, they crawl about the submerged leaf litter and debris stalking their insect prey. The larvae seize unsuspecting prey with a long, hinged “grasper” that folds neatly under their chins. When larval development is complete, the aquatic larvae crawl from the water to the bank, climb up the stalks of shoreline vegetation, and the winged adult emerges (Hoffman, 1991; Thorpe and Covich, 1991). Because of their aquatic lifestyle and limited mobility, the larvae are particularly vulnerable to siltation and to shoreline disturbances that cause the loss of shoreline vegetation. Larvae are also sensitive to alterations resulting in poor water quality, aquatic substrate changes, and thermal fluctuations.

(b) *State-listed Insect and Plant Species.* Under a Memorandum of Agreement between DCR and the Department of Agriculture and Consumer Services (VDACS), DCR represents VDACS in commenting on project impacts on state-listed endangered or threatened plant or insect species. DCR finds that the project would not affect such species. During the earlier review of the Draft

EIS, VDACS confirmed this finding; VDACS was not involved in the review of the SDEIS.

*(c) Recommendations.* To minimize adverse effects to the aquatic ecosystem, DCR recommends that the applicant implement an erosion and sediment control plan in areas excavated along the creek. DCR also recommends that the applicant protect emergent vegetation adjacent to the creek.

*10. Historic Structures and Archaeological Resources.* The Department of Historic Resources (DHR), which is the State Historic Preservation Office in Virginia, has previously advised NRC and the applicant that a Programmatic Agreement is necessary between NRC, DHR, and other consulting parties if the NRC does not wish to complete the identification and effect process pursuant to section 106 of the National Historic Preservation Act.

The SDEIS indicates that an archaeological site assessment has been conducted on the project property in question (Voight, 2003), and that portions of the property appear to retain the potential to contain intact archaeological resources (pages 2-18 and 2-19, section 2.9). This suggests that NRC and the applicant wish to complete the section 106 process prior to permitting, rather than to address NRC's responsibilities programmatically. However, DHR had not, as of its August 9 letter to NRC (enclosed), received the report of the assessment and cannot, therefore, comment on the report's conclusions. DHR recommends that NRC submit this report to DHR to allow its comment on the need for further studies of identification and evaluation of archaeological resources.

In the absence of an executed Programmatic Agreement or the completion of the section 106 process, as prescribed in the regulations at 36 CFR Part 800, the Department of Historic Resources finds the NRC's site redress plan to be insufficient to fully consider the project's effects on historic properties. Continued consultation, however, is expected to resolve the matter. See "Regulatory and Coordination Needs," item 2, below.

*11. Mineral Resources.* According to the Department of Mines, Minerals, and Energy, the proposed new cooling system for Units 3 and 4 would not affect mineral resources. (The Department had no comment on the Draft EIS in the earlier review.)

*12. Forest and Tree Protection.* The Department of Forestry indicates that activities contemplated under the Early Site Permit will not give rise to significant impacts upon Virginia's forest lands. However, the Department reserves the right

to comment further should the project proceed. We offer the following guidance on protection of trees, or forested areas, in the event the project proceeds.

In order to protect trees in the project area, not slated for removal, from the effects of construction activities associated with this project, the applicant should mark and fence them at least to the dripline or the end of the root system, whichever extends farther from the tree stem. Marking should be done with highly visible ribbon so that equipment operators see the protected areas easily.

Parking and stacking of heavy equipment and construction materials near trees can damage root systems by compacting the soil. Soil compaction, from weight or vibration, affects root growth, water and nutrient uptake, and gas exchange. The protection measures suggested above should be used for parking and stacking as well as for moving of equipment and materials. If parking and stacking are unavoidable, the applicant should use temporary crossing bridges or mats to minimize soil compaction and mechanical injury to plants.

Any stockpiling of soil should take place away from trees. Piling soil at a tree stem can kill the root system of the tree. Soil stockpiles should be covered, as well, to prevent soil erosion and fugitive dust.

Questions on tree protection may be directed to the Department of Forestry (Mike Foreman, telephone (434) 977-6555).

*13. Transportation.* The Department of Transportation (VDOT) provided comments on the SDEIS (below), and also responded to public comments made available to it (see "Public Concerns and Analysis," item 1, below).

*(a) Comments on the SDEIS.* According to the Virginia Department of Transportation (VDOT), the SDEIS makes reference to several plans and recommendations for roadway improvements in the Lake Anna area of Louisa County, and acknowledges that these plans are not tied to any time frame or funding source.

The SDEIS states that a plan will be developed and implemented to address construction traffic. This plan would include the following elements:

- Adding turn lanes, signage, and intersection improvements to address congestion caused by construction activity;
- Shift scheduling and car or van pools to reduce trips to the site;

- Repair of road damage caused by increased construction traffic would be accomplished by the applicant.

(b) *VDOT Road Plans.* VDOT does not now have any plan for improving the road network in the project area. The proponents of some developments are proposing road improvements; the largest of these is the Cutalong Club development, whose proponents hope to move the connection between Routes 208 and 652 to eliminate the skewed intersection and add the required turning lanes at the intersection. These plans are under design and are proposed for construction in the next several years, according to VDOT.

14. *Chesapeake Bay Preservation Areas.* According to the Department of Conservation and Recreation's Division of Chesapeake Bay Local Assistance, the project area, which is in Louisa County (Draft EIS, page 2-5, section 2.2.1), is not within a Chesapeake Bay Preservation Act jurisdiction.

15. *Local and Regional Comments.* Spotsylvania County reiterated earlier comments, provided in the review of the Draft EIS. The County adopted a resolution on February 8, 2005 which recited a number of concerns about the Early Site Permit process, chiefly the demands of the proposed project for Lake Anna water in light of the rapidly growing population in the Lake region and the impacts on Lake residents and visitors of lowering the water level of the Lake. The County objected to the ESP process.

#### Regulatory and Coordination Needs

1. *Air Quality Regulation.* As indicated above ("Environmental Impacts and Mitigation," item 6(b)), an open burning permit may be required if the applicant intends to burn construction or other waste material. Fuel-burning machinery used in construction activities may require air pollution control permits. For guidance on both kinds of permit requirements, the Department should contact DEQ's Northern Virginia Regional Office (Mr. Terry Darton, Air Permits Manager, telephone (703) 583-3845).

2. *Historic Resources.* NRC is requested to submit the archaeological site assessment on the North Anna Power Station property (see "Environmental Impacts and Mitigation," item 9, above) to the Department of Historic Resources:

Virginia Department of Historic Resources  
2801 Kensington Avenue  
Richmond, Virginia 23221.

This will allow the Department to comment on the need for further identification and evaluation studies of the project area. As indicated above (“Environmental Impacts and Mitigation,” item 9), continued consultation with the Department (Roger Kirchen, telephone (804) 367-2323, extension 153 or e-mail roger.kirchen@dhr.virginia.gov) is in order so that the section 106 process or the execution of a Programmatic Agreement may be completed.

*3. Transportation Coordination.* Any Department of Transportation (VDOT) land use requirements, lane closures, traffic control, or work zone safety issues should be closely coordinated with the affected localities and with VDOT’s Louisa Residency (telephone (540) 967-3710).

*4. Wildlife Protection.* In the event the ESP is issued, and Dominion or its contractors should discover any new or unconfirmed bald eagle nests near the project vicinity, Dominion should coordinate immediately with the Department of Game and Inland Fisheries (Andy Zadnik, telephone (804) 367-2733) and the U.S. Fish and Wildlife Service, Virginia Field Office (Karen Mayne, Supervisor, telephone (804) 693-6694).

*5. Subaqueous Lands.* According to the Marine Resources Commission, that agency’s permit jurisdiction would extend to the portions of the project which result in direct impacts and encroachment to the historic stream channel of the North Anna River (Ellis/Madden, 8/31/06). Questions on this jurisdiction may be directed to the Commission (Jeff Madden or Ben McGinnis, telephone (757) 247-2200).

*6. Wetlands and Water Resource Permitting.* The project must comply with applicable requirements of (1) the Virginia Water Protection Permit (see *Virginia Code* section 62.1-44:15 et seq. and the regulations at 9 VAC 25-210-10 et seq.) for water withdrawals and wetland impacts, and (2) the VPDES permit governing discharges (9 VAC 25-31-10 et seq.).

*(a) Virginia Water Protection Permit.* As indicated above (“Environmental Impacts and Mitigation,” item 3(d)), several items of information are needed for a determination whether the proposed addition of Units 3 and 4 would adversely affect stream or wetland areas. Questions on the DEQ Virginia Water Protection Permit process may be directed to DEQ’s Division of Water Resources (Joseph Hassell, telephone (804) 698-4072) or DEQ’s Northern Virginia Regional Office (Joan Crowther, telephone (703) 583-3828).

*(b) Virginia Pollutant Discharge Elimination System (VPDES) Permit.* Insights on coverage and operation of the VPDES permit are given in the discussion of public concerns (see “Public Concerns and Analysis,”

items 3 and 8, below). Questions on the North Anna Power Station's existing VPDES permit, or on permit coverage for the proposed Early Site Permit activities or the proposed 3rd and 4th reactor units, may be directed to DEQ's Northern Virginia Regional Office (Tom Faha, telephone (703) 583-3846).

### Public Concerns and Analysis

Many citizens commented to both DEQ and NRC concerning the proposed Early Site Permit in connection with DEQ's public notice and its August 16 public hearing relative to the federal consistency review, and with NRC's public notice and its August 15 public meeting relative to the SDEIS. On July 27, following the internal deadline for agencies' comments on the SDEIS as well as the federal consistency certification, DEQ distributed copies of one letter, from the Friends of Lake Anna which represents 2650 residents of properties on or near the Lake, to a number of state agencies and the affected localities for additional review and any comments they might have. The chief characteristic of this letter was its emphasis on matters beyond the enforceable policies of the Virginia Coastal Resources Management Program. For this reason, we solicited additional comments from agencies and localities on several topics. More recently, we have sent two letters from a representative of a neighborhood organization within the Lake Anna Citizens' Association (LACA) to other agencies for any additional comments or analysis they might be able to offer for our review comments.

In this section, we summarize the concerns of the Friends of Lake Anna and indicate the additional comments which these concerns elicited from state and local entities. We do the same for the comments of LACA.

#### *1. Summary of Public Concerns: Friends of Lake Anna, June 15 letter.*

*(a) Concern 1 - Too Many Workers and Residents, Small Road.* The Friends of Lake Anna (FOLA) state that Dominion will add about 5,000 construction workers to the permanent staff of 800 to build the new units, and add 1120 permanent workers to the plant. FOLA also mentions several existing and planned developments using State Route 652. Because of the time needed to plan and implement road projects, FOLA recommends that Dominion and/or NRC make proffers to widen State Route 652 in advance of the Construction and Operating License phase. See item 5, below.

*(b) Concern 2 - Emergency Evacuation on 2-lane Roads.* FOLA indicates that most of the 500,000 annual users of the lake and residents have boat trailers and camping trailers, and states that there would be a "traffic nightmare" in the event of an emergency at the plant. Same recommendation as in Concern 1,

except that state government should also participate in the widening of Route 652 and the protection of citizens from a disaster or attack on the nuclear facilities. See item 5, below.

*(c) Concern 3 - Influx of Populations and a Need for New Schools.* The major influx of workers, both temporary and permanent, will necessitate the building of new schools in Louisa, Spotsylvania, and Orange Counties, according to FOLA. FOLA recommends that local citizens should not have to fund new schools, if the addition of nuclear reactors is a national priority.

*(d) Concern 4 - Use of the Lake or the North Anna River for Water Needs.* FOLA states that Spotsylvania and Louisa Counties may need additional water to serve their populations, which are growing at high rates, and asks how the new units at the North Anna Power Station would diminish either County's ability to look to the Lake for future water supplies.

*(e) Concern 5 - Height, Noise, and Fog of Proposed Cooling Towers.* FOLA states that the height of the cooling towers in the ESP application is 150 to 180 feet, whereas a Dominion vice-president assured the public in June that they would not exceed 75 feet. The towers would emit noise at a constant level of 65 decibels (Db), which exceeds the nighttime noise limit of 55 Db in Louisa County. The new towers would also create plumes of water and steam, making fog formation, and the creation of ice plumes in the winter, more likely. FOLA asks that the towers be limited to 80 feet in height, and the noise be limited to 55Db, and inquires about traffic safety in the fog.

*(f) Concern 6 - Possible Raising of Lake Level.* FOLA indicates that the lake level might be raised, and indicates that this would create hardships to adjoining landowners.

*(g) Concern 7 - Water Levels, Flows, and Temperature.* FOLA states that it is unclear, based on the varied documentation under review (ESP application, requests for information, Dominion responses), what the impacts of the new units on the "cold side" and the "warm side" of the lake would actually be. The shifts, in the documents, from Fahrenheit to Celcius temperatures to thermal heat indicators, are but one example of the confusing presentation of project impacts on temperature, flow, lake levels.

*(h) Concern 8 - Additional Sources of Confusion from Supplemental Documents.* FOLA wrote (before the SDEIS came out) that the NRC's "Requests for Additional Information," the answers from Dominion, and other documentation including the SDEIS and a separate, non-public Safety Report, made the review effort very difficult.

(i) *Concern 9 - Unreviewed Safety Report.* FOLA criticizes the absence of a state government review or a public review of NRC's Safety Report. FOLA recites a number of questions that, in its judgment, should be answered by such a report, and indicates that reviewing agencies such as DEQ and the Department of Game and Inland Fisheries should work with VDOT and other agencies to review and comment on the Safety Report and to address other questions.

2. *Summary of Public Concerns: Friends of Lake Anna, September 5 Letter.* The Friends of Lake Anna (FOLA) have asked that a number of additional concerns, relating to the conduct of the public hearing process and the extent of public involvement with the Safety Report, be considered in the NEPA and CZMA review processes.

(a) *Dominion's Attempt to Influence Public Hearings.* According to FOLA, more than 50% of the speakers at the NRC public meeting on August 15, and the DEQ public hearing on federal consistency on August 16, were Dominion employees, retirees, or contractors. Whenever a Dominion person spoke, a busload of approximately 60 of Dominion's retirees would clap loudly and voice approval of the comments. Before the end of the DEQ hearing, an announcement was made by one of the retirees that the Vepco/Dominion bus was leaving for Richmond; about 60 people got up and left the hearing.

FOLA believes that, in an auditorium with a capacity of about 300 people, the numbers of employees, retirees, and contractors for the applicant made a mockery of the public hearing process. FOLA cites the federal government's NEPA obligation:

It is the continuing responsibility of the Federal Government to use all practicable means consistent with other essential consideration of national policy to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may *[in part]* (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasant surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; ...

FOLA then asks how this domination of the hearing process can be prevented in future public hearings.

(b) *Safety Report and Public Involvement.* FOLA makes reference to the March 1979 Three-Mile Island nuclear plant incident in Pennsylvania, stating that the absence of water in the steam generators meant that no heat could be removed from the reactor. The result was a partial melt-down of fuel in the reactor. FOLA's representative at the NRC public meeting asked a number of

questions relating to the safety of the North Anna Power Station and the North Anna Dam. He stated that the Lake, which provides cooling water for the plant, would empty out in the event of an attack on the dam, and that re-filling the lake would take three years. The FOLA letter urged that the air cooling method for the proposed Unit 4 could be used, as well, for Unit 3, and that this makes more sense than water-cooling for Unit 3 in a small watershed such as that of Lake Anna.

(c) *Conclusions.* FOLA stated that the public needs to be involved in reviewing the Safety Report, and to be given time for it in light of the voluminous documentation that has been provided over the review period, and the continuing changes that the documentation reflects. FOLA requested an extension of the public comment period for review of all of this material.

3. *Summary of Public Concerns: Lake Anna Civic Association, Waterside Property Owners' Association (WPOA), August 28 letter and e-mail; August 29 letter and e-mail.* The WPOA is a small residential community on the reservoir side of Lake Anna near the dam. We present summaries of the concerns stated by the WPOA, to the extent they do not duplicate concerns of the FOLA, listed above.

(a) *Quality of Cooling Water Discharges.* WPOA indicates its concern with the chemical nature of hot make-up water returning to the Lake from proposed Units 3 and 4, and inquires whether there are criteria for the discharge. See item 8(a), below.

(b) *Transportation.* According to WPOA, the NRC staff deems the road network in the vicinity of the project site to be "well developed." WPOA seeks a construction traffic management plan, worked out with members of the public, and improvements including a traffic light to the intersection of State Routes 652 and 700. See item 5, below.

(c) *Bald Eagle Protection.* According to WPOA, the Commonwealth requires a 1/4-mile buffer between construction activities and any bald eagle nest, and inquires about how the applicant will protect the closest nest. See item 6, below.

(d) *Decision Responsibility on Lake Levels.* WPOA indicates its understanding, from the SDEIS, that the determination of lake levels is up to Virginia regulators, and asks which ones. WPOA also asks how residents can be assured that the lake level will remain at 250 feet msl.

(e) *Water Use and Dry Cooling.* WPOA states that blowdown and make-up water taken from the reservoir would be 38.7 cfs at Unit 3's 100% power level, while the discharge over the dam is 40 cfs or 20 cfs in a drought. Thus the blowdown and make-up water use would be as much as the downstream discharge when the lake is at 250 feet or less. WPOA recommends dry cooling for Unit 3 to preserve the water in the watershed. (See also item 3(i), below.)

(f) *VPDES Permit and Temperatures.* WPOA quotes the SDEIS as saying that the new plant can operate to a 242-foot msl lake level and an inlet water temperature of 100 degrees F., and states that this is a much greater variance than allowed in the VPDES permit, which allows an inlet temperature of 95 degrees. WPOA urges the Department of Health (VDH) to put limits on the temperature of the water at the exit of the power plant, and states that the situation will get worse with the addition of Unit 3.

(g) *Sprayers for Cooling.* WPOA urges that sprayers be used in the discharge canal on hot days, as is done for Units 1 and 2.

(h) *Pre-Lake Water Flows.* The SDEIS indicated that historic pre-dam minimum flows were 5 cfs (page 2-10, section 2.6), whereas the Department of Game and Inland Fisheries stated that such flows were 12 cfs (July 7, 2006 letter, Table 1). SPOA states that this discrepancy should be resolved. (See item 7, below.)

(i) *Availability of Dry Cooling.* WPOA states that foreign nuclear reactors use air cooling technology, and that Dominion has not stated clearly why it cannot be proposed for Unit 3 as well as Unit 4.

(j) *Cost Savings: Reduced Intake Size and Cooling Towers.* Dominion says that adding cooling towers will add \$200 million to the \$2.5 billion cost of each unit. However, the intake for the proposed Unit 3 will be much smaller than the original intake, which also required dredging and shoreline alteration. Dominion did not address this potential cost saving.

(k) *Duration of 20 cfs flow.* WPOA cites the SDEIS for the proposition that the 20-cfs flow will increase from 6% to 11% of the time if Unit 3 operates as proposed; this means an increase from 22 days to 40 days of low flow (SDEIS, page 5-11, section 5.3.2). However, Dominion stated in its Revision 7 that the duration of the 20-cfs discharge would go from 5.2% to 7% of the time. The discrepancy should be resolved.

4. *Other Concerns: Louisa County School Board.* The Louisa County School Board has sent correspondence to DEQ and to NRC indicating its

concerns relative to the impacts of the construction of Units 3 and 4 upon the educational system. The School Board cites potential increases in student population attributable to the increased temporary and permanent population stemming from the project. The School Board also cites potential difficulties in teacher retention because of increased housing market pressures and long commutes attributable to the project. In light of the federal assistance for the applicant in the ESP process, the Board requests federal grant money to address education impacts. (Comments enclosed.)

*5. Transportation.* VDOT indicates that it intends to work with Dominion, the applicant, to ensure that roads in the vicinity of the North Anna Power Station are maintained and that necessary improvements are in place prior to any major activities at the project site. VDOT has requested a traffic impact analysis from Dominion; this would compare the future background traffic in the area with future traffic including construction traffic (“total traffic”), and would identify areas of impacts. The impacts -- some of which would be temporary, from construction, and some of which would be permanent -- are the responsibility of Dominion. The traffic impact analysis should also provide mitigation measures to reduce the impacts.

According to VDOT, an evacuation plan was not included in the SDEIS and therefore cannot be addressed.

*6. Wildlife Protection.* According to the Department of Game and Inland Fisheries, the existing power plant does not appear to be within the primary or secondary management zones of any of the confirmed bald eagle nests. It is possible that a new or unconfirmed nest might be found closer to the project site, in which case, the applicant should coordinate with DGIF and the U.S. Fish and Wildlife Service; see “Regulatory and Coordination Needs,” item 4, above.

*7. Historic Flows and Flow Discrepancies.* The Department of Game and Inland Fisheries, responding to one of the LACA-WPOA comments (item 2(h), above), states that 12 cfs is the lowest 10% of the flow range. Lower flows occur, but at less frequency historically. The same letter and table documented that most flows are reduced substantially from pre-Lake conditions, and fish habitat reductions follow the reductions in flow. Flows higher than historic levels are infrequent.

DGIF shares the LACA-WPOA concern relative to discrepancies between the SDEIS figures on flows and lake levels and the figures given by Dominion in Revision 7 (item 2(k), above), and believes that the discrepancies should be resolved.

Mr. Michael Lesar  
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8. *Water Quality Comments and Responses.* DEQ's Northern Virginia Regional Office offers the following responses to four of the comments from LACA-WPOA.

(a) *Chemical discharges* (see item 3(a), above). DEQ's Northern Virginia Regional Office will evaluate chemical usage and effluent discharge concentrations against applicable water quality criteria if and when the applicant applies for a modification of its VPDES permit for Units 3 and 4. According to the Regional Office, the VPDES permit will contain conditions to ensure that water quality standards are met.

(b) *Lake Levels* (see item 3(d), above). The existing VPDES permit has no requirement for maintaining the lake level at 250 feet msl.

(c) *Section 316(a) variance* (see section 3(f), above). The section 316(a) variance does not set a maximum temperature level of the effluent, or for temperatures in the Lake. The temperature criteria in the VPDES regulations (9 VAC 25-260-50 through 9 VAC 25-260-80) are superseded, in accordance with 9 VAC 260-90, because Dominion demonstrated that the heat rejection limits set out in the VPDES permit do not impair the fishery of the Lake or the North Anna River. This demonstration was made through a section 316(a) study and through subsequent annual fishery monitoring.

(d) *Sprayers* (see section 3(g), above). In setting effluent limits and permit conditions, DEQ does not dictate the processes or treatment units that permittees must use to comply with effluent limits. Dominion may use sprayers to assist in compliance with its permit.

Thank you for the opportunity to comment on the Supplement to the Draft EIS for the Early Site Permit. If you have questions, please feel free to call me (telephone (804) 698-4325) or Charlie Ellis of this Office (telephone (804) 698-4488).

Sincerely,

Ellie L. Irons  
Program Manager  
Office of Environmental Impact Review

Enclosures  
cc: (next page)

Mr. Michael Lesar  
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cc: Jack Cushing, NRC  
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John Kauffman, DGIF  
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C. Lee Lintecum, Louisa County  
Ted Coberly, Orange County  
Jim Candeto, Town of Mineral  
Harry Ruth, Friends of Lake Anna  
Kenneth Remmers, Lake Anna Civic Association

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