Draft
Supplemental Information to the Biological Assessment

North Anna Power Station Combined License Application

U.S. Nuclear Regulatory Commission
Docket No. 52 – 017

Louisa County, Virginia

September 2013

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application submitted by Dominion Virginia Power (Dominion) in November 2007 for a combined license (COL) for construction and operation of a third nuclear power plant at its North Anna Power Station (NAPS) in Louisa County, Virginia. Dominion's COL application references an Early Site Permit (ESP) issued by the NRC to Dominion in 2007. An ESP is the NRC's approval of a site for one or more nuclear power facilities. The staff developed an Environmental Impact Statement for the ESP application review (ESP EIS), which was published in December 2006 as NUREG-1811 (NRC 2006). The ESP EIS evaluated environmental impacts that would result from building and operating two additional nuclear units at the NAPS site except for those issues deferred to the COL review. In order to construct and operate a nuclear power plant, Dominion, as an ESP holder must also obtain a COL for each proposed nuclear unit. Issuance of a COL constitutes a separate major federal action and requires that the NRC prepare a supplement to the ESP EIS. In February 2010, the NRC published the *Final Supplemental Environmental Impact Statement for the Combined License (COL) for North Anna Power Station Unit 3* as NUREG-1917. The 2010 COL SEIS documented the NRC staff's environmental review for the NAPS Unit 3 COL and was a supplement to the 2006 ESP EIS.

As part of its environmental review for the ESP EIS (NUREG-1811), the NRC consulted with the U.S. Fish and Wildlife Service (USFWS) Chesapeake Bay Field Office and received concurrence (USFWS 2005) on a biological assessment (BA) (NRC 2005) evaluating the impacts of ESP-related activities on Federally listed threatened and endangered species under Section 7 of the Endangered Species Act (ESA). A list of related correspondence between NRC and USFWS to date is found in Appendix A.

Since the BA was issued in 2005, Dominion has (1) acquired approximately 96 additional acres of land adjacent to the NAPS site (hereafter referred to as the Route 700 parcels) that would be used for construction-related activities, (2) determined the need for a new transmission line (routed entirely within an existing corridor), (3) proposed a site to offload oversized and/or overweight reactor components transported up the Mattaponi River by barge (hereafter referred to as the Walkerton roll-off location), and (4) identified a large component transport route (LCTR) for transporting large components from the Walkerton roll-off location to the NAPS site during construction. Acquisition of the Route 700 parcels and the determination of the need for a large component transport route and a new transmission line were evaluated in the COL SEIS (NRC 2010). The updated analysis of pertinent environmental issues documented in the COL SEIS, including impacts to fish and wildlife and their habitats, indicated that impacts remained small and did not result in changes to the characterization of impacts provided in the ESP EIS. The Walkerton roll-off location and additional details related to the LCTR were not evaluated in the COL SEIS. This technical memorandum serves to update and supplement the project

information provided to the USFWS in the 2005 BA. It evaluates the impact of construction and operation of the new nuclear unit, including information regarding the Route 700 parcels, the proposed new transmission line, the LCTR and the Walkerton roll-off facility on Federally protected species.

In September 2010, Dominion submitted a joint application to the US Army Corps of Engineers (USACE) and the Commonwealth of Virginia agencies for Federal and State water/wetland permits. The USACE issued its public notice in January 2011 and completed its environmental review in September 2011 with the issuance of an Environmental Assessment (EA) (USACE 2011a). This environmental review resulted in a Finding of No Significant Impact. As part of this environmental review, the "… USACE made a 'no effect' determination for the project". USACE subsequently (September 29, 2011) issued the required Department of the Army (DA) permit to Dominion pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) (USACE 2011b). The NRC coordinated with the USACE during their review of the proposed project. The USACE's review, related surveys, findings and resulting permit are presented later in this document.

Table 1, which is an update of Table 1 in the 2005 BA, provides the list of Federally threatened and endangered species with the potential to occur in the vicinity of the project, including the NAPS site, proposed transmission corridor, LCTR, and Walkerton roll-off location (USFWS 2013). Changes to Table 1 from the 2005 BA reflect updated information on recorded occurrences of listed species in the vicinity of the project site since the BA was published. One species, James spinymussel (*Pleurobema collina*), has been added. Although evaluated as a protected species under the ESA in the 2006 ESP EIS, the bald eagle (*Haliaeetus leucocephalus*) was Federally delisted on June 28, 2007; therefore, it has been removed from Table 1.

Table 1. Federally Threatened or Endangered Species Known or Potentially Occurring In the Vicinity of the Proposed North Anna COL Project.

Scientific Name	Common Name	Counties	Status[(a)]
Invertebrates			
Alasmidonta heterdon	dwarf wedgemussel	Louisa, Orange, Hanover, Caroline	FE
Pleurobema collina	James spinymussel	Hanover, Louisa, Orange	FE
Vascular Plants			
Isotria medeoloides	small whorled pogonia	Caroline, Hanover, Spotsylvania	FT
Helonias bullata	swamp pink	Caroline, Spotsylvania	FT
Aeschynomene virginica	sensitive joint-vetch	King William	FT

Sources: USFWS 2013 (Species Reports – by County http://www.fws.gov/endangered/)
FE = Federally Endangered, FT = Federally Threatened

Although the bald eagle is no longer listed as a Federally endangered species, it still is afforded protection under the Bald and Golden Eagle Protection Act of 1940. In May 2007, National Bald Eagle Management Guidelines were published to assist in understanding protections afforded to, and prohibitions related to, the bald eagle under the *National Bald Eagle Management Guidelines* (USFWS 2007). Current FWS guidelines recommend that active nests be protected from disturbance with a 201 m (660 ft) buffer (USFWS 2007). In its Joint Permit Application (Dominion 2010a), Dominion commits to compliance with all state and federal Bald and Golden Eagle requirements, management guidelines, and conservation measures.

Bald eagle nests are located in most counties (i.e., Louisa, Orange, Caroline, Spotsylvania, Hanover and King William) associated with the NAPS site, proposed transmission line corridor, LCTR, and Walkerton roll-off location; however, there are no known nest sites within 3.2 km (2 mi) of the proposed project area (CCB 2013, Watts and Byrd 2011). All known nest sites are greater than 6.4 km (4 mi) from the proposed transmission line corridor (CCB 2013, Watts and Byrd 2011). The closest nests to the LCTR and the Walkerton roll-off location (Louisa and King William counties) are more than 322 km (200 mi) from proposed project locations (VDGIF 2011). The only known nest site in the vicinity of the NAPS site (Louisa County) is located over 3.2 km (2 mi) south of the proposed project location (CCB 2013, Watts and Byrd 2011). However, the nest was listed as inactive in the 2011 Virginia Bald Eagle Nest and Productivity Survey (Wyatt and Byrd 2011). Based on Dominion's commitment to follow all state and federal Bald and Golden Eagle requirements, management guidelines, and conservation measures; the *National Bald Eagle Management Guidelines* for protection of active nests and the project distance from the closest nest site [more than 3.2 km (2 mi)], NRC staff determined it is unlikely the project would adversely affect the bald eagle.

2.0 Updated Project Description

This section discusses the updated proposed project information since the 2005 BA. Dominion proposes to construct and operate a new nuclear unit, Unit 3, at the existing NAPS site in Louisa County in north-central Virginia[1]. Figure 1 shows the proposed locations for the project, including the NAPS site, transmission line corridor, LCTR, and Walkerton roll-off location. The proposed NAPS Unit 3 and supporting buildings would be situated wholly within the NAPS site, in a predominantly disturbed area west-southwest of, and adjacent to, existing Units 1 and 2 (see Figure 2). The disturbance footprint of the proposed Unit 3 project and adjacent Route 700 parcels are shown in Figure 3.

[1] The ESP EIS (and the associated BA) evaluated the impacts from two additional units at NAPS; however, Dominion's COL application is for only one new unit.

At the time of the ESP review, Dominion had not chosen a reactor design type, but instead provided a set of bounding plant parameters specified to envelope any future chosen design. For the COL, Dominion has chosen the new Economic Simplified Boiling Water Reactor (ESBWR) design from GE-Hitachi Nuclear Energy. Dominion has proposed a closed-cycle, combination wet and dry cooling tower system, with make-up water supplied from Lake Anna. Cooling system discharges from the proposed cooling tower blowdown will be sent to the existing NAPS Waste Heat Treatment Facility (WHTF) via the existing discharge canal.

NAPS Site , Adjacent Route 700 Parcels, and Lake Anna

The proposed Unit 3 will have a rated thermal power level of 4500 megawatts thermal (MW(t)) with an estimated net electrical power output between approximately 1425 MW(e) and 1510 MW(e). Much of the construction site for proposed NAPS Unit 3 consists of dirt and paved roads, cleared areas, parking lots, buildings, and other areas recovering from prior disturbances. 128 acres on the NAPS site will be permanently affected from constructing and operating the onsite facilities. The proposed cooling towers for Unit 3 will be located to the west of Units 1 and 2. The footprint for the cooling tower complex is approximately 15.378 ha (38 ac), and the grading required for construction of the complex, along with two road crossings through the portion of the facility near the towers, will result in permanent impacts to 384 linear m (2572 linear ft) of stream and 0.348 ha (0.86 ac) of palustrine forested wetlands (USACE 2011a). The Route 700 parcels, adjacent to the NAPS site, would be used for disposal of spoils and for construction access and support, but would not be part of the permanent NAPS site (USACE 2011a).

Impacts to the Route 700 parcels include approximately 1161 linear m (3808 linear ft) of stream, 1.30 ha (3.21 ac) of palustrine forested wetland and 0.016 ha (0.04 ac) of palustrine emergent wetlands (USACE 2011a).

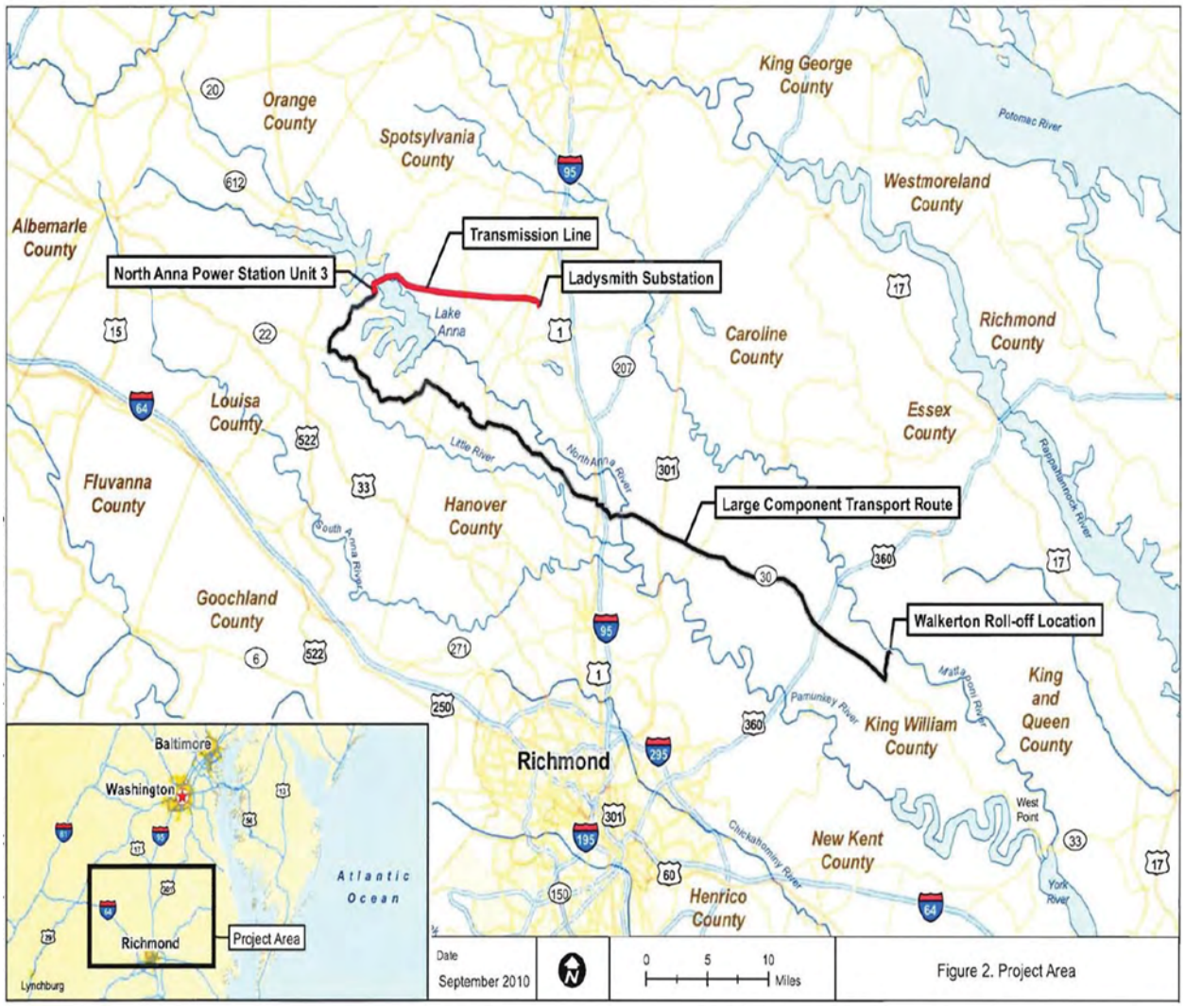

Figure 1. Proposed Location for the Project, including the NAPS Site, Transmission Line Corridor, LCTR, and the Walkerton Roll-Off Location (Dominion 2010b)

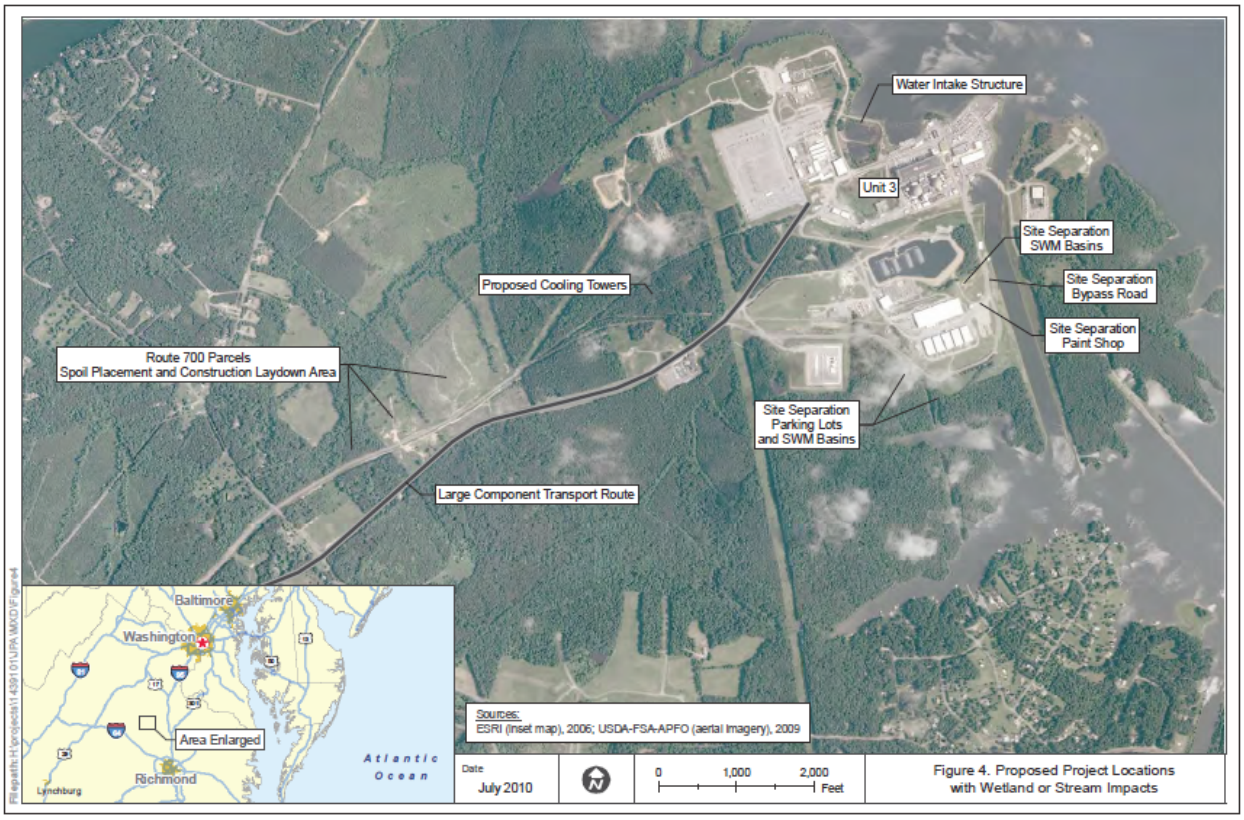

Figure 2. NAPS Site including the Adjacent Route 700 Parcels (Dominion 2010b)

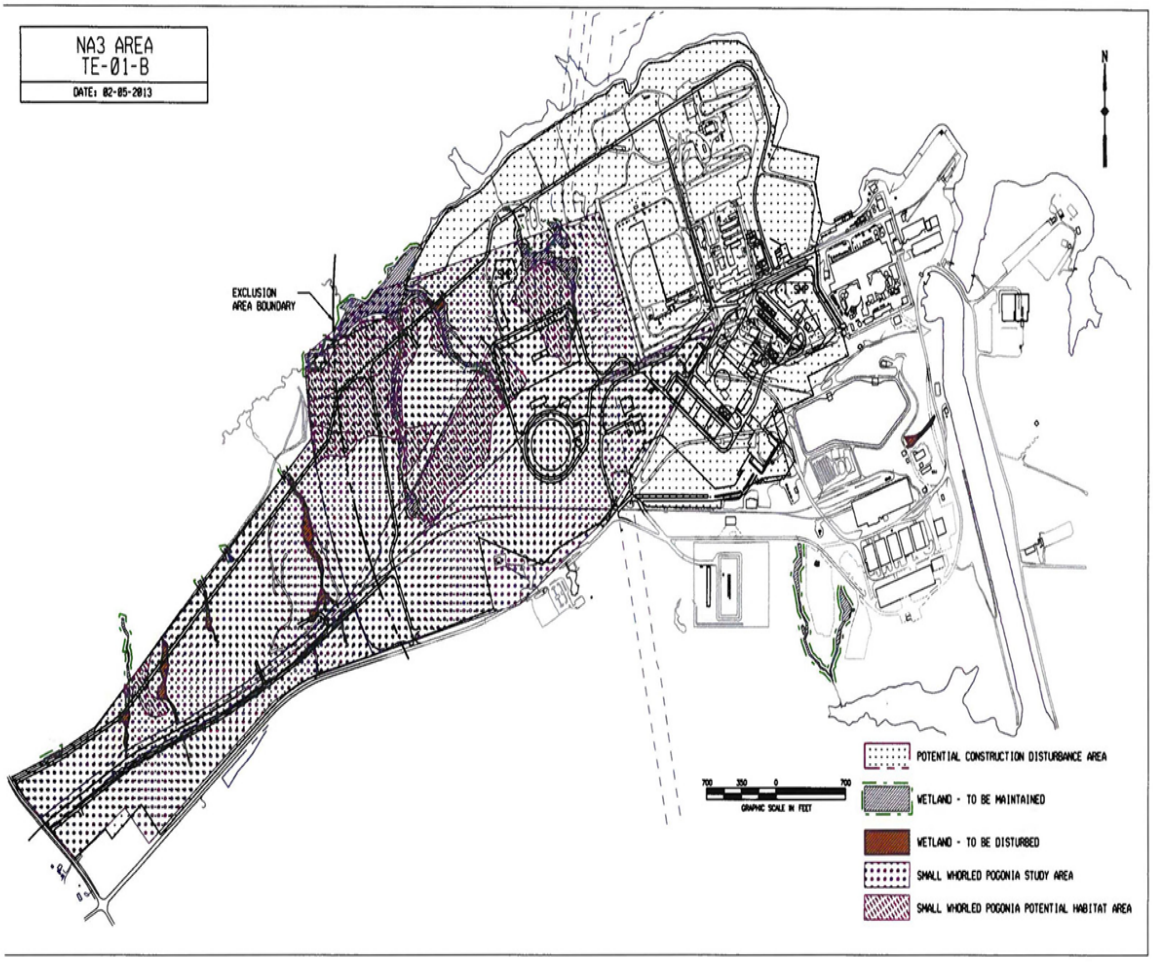

Figure 3 Disturbance Footprint for the NAPS Site and Adjoining Property (Dominion 2013)

The cooling system for the proposed Unit 3 was described in the COL SEIS (NRC 2010). Makeup water from Lake Anna would be provided to the proposed unit through a new intake structure located just west of the existing Units 1 and 2 intake. The intake would be a concrete structure set into the shoreline, 72 ft long and extending approximately 60 feet back into the shoreline. Three pump bays would house three makeup water pumps, two station pumps, two screen-wash pumps, and two fire-water pumps. Upstream of any water pumps, each bay would have a bar screen to exclude large debris, and dual-flow traveling screens designed to keep fish and small debris from reaching the pumps. The traveling screens would have 2 mm (0.08 in) mesh and 8 ft wide collection baskets. The intake location is separated from the main body of Lake Anna Reservoir by a cofferdam. As described in the COL SEIS, the cofferdam would be modified by installing five 10 ft x 12 ft box culverts that would allow lake water to reach the intake at a flow velocity similar to the current velocity in Lake Anna (NRC 2010). This is intended to minimize entrainment of debris, sediment and aquatic life.

Two sets of cooling tower systems are proposed for Unit 3. As previously mentioned, the cooling water system would used a closed-cycle wet/dry hybrid cooling system. When sufficient water is available, Unit 3 would be cooled using only the wet portion of the cooling system. When water is limited, at least one third of the waste heat can be dissipated by the dry tower system, with the actual percentage depending on the dry bulb temperature.

Design characteristics of the project which would affect ecological impacts were evaluated for new and significant information during the preparation of the COL SEIS. The staff determined the impacts presented in the ESP EIS remain valid for the COL review.

Transmission Lines

Approximately 24 km (15 mi) of new 500-kV transmission line connecting NAPS to the Ladysmith Substation will be needed to deliver power from the proposed NAPS Unit 3; however, the line would be located entirely within an existing transmission line corridor (NRC 2010). The line would run east from NAPS to the Ladysmith Substation in an existing transmission corridor that is 84 m (275-ft) wide, parallel to the existing line (NRC 2010). The existing NAPS switchyard would be expanded by approximately 0.809 ha (2 ac) to accommodate upgrades needed to connect the new 500-kV transmission line and to provide adequate 230-kV auxiliary power to the proposed NAPS Unit 3 (Dominion 2012a). No additional clearing of forested vegetation would be required for construction of this transmission line, and existing access roads would be used for inspection and maintenance activities in the right-of-way.

Land clearing would be limited to that necessary to accommodate the new transmission tower foundations, and Dominion would follow established procedures and best management practices (BMPs) to minimize impacts and restore vegetative communities. Only hand-clearing would be used within 30.5 m (100 ft) of streams or creeks, and BMPs for erosion and sedimentation control would be followed (NRC 2010). There would be no impacts to wetlands or streams or the Blanton's Conservation Area from building activities associated with the proposed transmission line (USACE 2011a). Transmission line maintenance activities during station operation would be consistent with current Dominion practices in existing corridors.

Maintenance of the transmission lines during operation is discussed in Section 2.2.2 in the ESP EIS (NRC 2006). Dominion maintains rights-of-way in forested lands and in the vicinity of road crossings on a 3-year mowing cycle. In areas inaccessible to mowers, non-restricted herbicides are used. In areas of dense vegetation or wetlands, maintenance by hand treatments may be used. Areas of rare or sensitive plant species are identified and avoided, or modified treatment practices are used to avoid adverse impacts. Vegetation treatments have been developed in cooperation with the Virginia Department of Conservation and Recreation (VDCR) Natural Heritage Program. (NRC 2006).

Because the new 500-kV transmission line will be located entirely in an existing corridor and no additional clearing of land will be required and Dominion's vegetation management plan for operation will be consistent with Commonwealth of Virginia guidelines, the impacts described in the COL SEIS (NRC 2010) are unchanged and consistent with those discussed in the ESP EIS (NRC 2006).

Large Component Transport Route and Walkerton Roll-Off Location

Dominion proposed an LCTR between the NAPS site and a proposed barge offloading facility (known as the Walkerton roll-off location), which is located on the Mattaponi River at Walkerton, about 80 km (50 miles) southeast of the site (see Figure 1). From the Walkerton roll-off location, the LCTR heads west on Route 30, crosses over Interstate-95, and continues north and west on Route 1 and local roads to the NAPS site. A temporary bridge would be constructed to span the North Anna River. However, other than at the Walkerton roll-off site, no wetlands would be expected to be affected by the proposed LCTR (Dominion 2010c).

The barge slip at the Walkerton roll-off location is a proposed temporary structure that is part of the LCTR and was the location used for the same purpose during construction of NAPS Units 1 and 2. The barge offloading facility would consist of a solid cofferdam constructed of filled sheetpile and a roll-on/roll-off ramp to connect the barge with the onshore roadway. The cofferdam would be 36.6 m (120 ft) wide and extend approximately 51.8 m (170 ft) into the river from the shoreline; several mooring dolphins would extend the affected area approximately 133 m (435 ft) (measured from mean high water) into the Mattaponi River channel. The upstream and downstream shoreline (approximately 93.9 m [308 ft] of total

affected shoreline) would be stabilized to protect the shoreline and the cofferdam structure from scour. Dominion expects these facilities to be in place for 3 years. (USACE 2011a). As required by the special conditions in the USACE's DA permit, "… mitigation for the temporary impacts at Walkerton in the Mattaponi River and the associated shoreline and wetlands shall be accomplished by the removal of all fills and dolphins and the restoration of the impacted areas to pre-construction conditions within 90 days of the termination of the facility's use. The wetland and submerged aquatic vegetation (SAV) bed restoration and subsequent monitoring shall be completed in accordance with the plans revised and received in June 2011…." (USACE 2011b).

The LCTR and Walkerton roll-off facility were not specifically evaluated in either the COL SEIS or the ESP EIS. Based on an understanding of the activities associated with the construction, use, and deconstruction of the barge unloading facility at Walkerton and the limited terrestrial and aquatic impacts associated with the LCTR, the staff finds that these impacts are consistent with and bounded by the onsite and offsite impacts described in the COL SEIS and ESP EIS. The impacts are temporary, confined, largely mitagable and minor.

Wetlands and Streams

Permanent impacts to wetlands and streams from the proposed project would be associated with building activities on the NAPS site and the adjacent Route 700 parcels. Temporary impacts to wetlands and streams are primarily associated with offsite areas during the site-development phase of the proposed project (see details below). Areas not permanently disturbed would be available for other uses after construction is complete.

Dominion's DA Permit (No. 10-V1256/NAO-2008-2534) authorizes both permanent and temporary wetlands/stream impacts (USACE 2011b). Permanent wetlands/stream/lake impacts include the following:

- 1.68 ha (4.15 ac) of palustrine forested wetlands (cooling towers [0.348 ha (0.86 ac)], support facilities for Units 1 and 2 [0.032 ha (0.08 ac)], Route 700 parcels development [1.3 ha (3.21 ac)])
- 0.162 ha (0.4 ac) of palustrine emergent wetlands (support facilities for Units 1 and 2 [0.146 ha (0.36 ac)], Route 700 parcels development [0.016 ha (0.04 ac)])
- 0.105 ha (0.26 ac) of open water in Lake Anna (intake structure)
- 1945 linear m (6380) linear ft of stream (cooling towers [784 linear m (2572 linear ft)], Route 700 parcels development [1161 linear m (3,808 linear ft)])
- 3.29 ha (8.14 ac) of shoreline wetlands surrounding Lake Anna and the waste heat treatment facility (cooling tower operations).

Temporary impacts to wetlands, streams and Lake Anna include the following:

- 0.024 ha (0.06 ac) of palustrine emergent wetland (installation of cofferdam, shoreline and structure protection, and mooring dolphins at the proposed Walkerton roll-off facility)
- 0.073 ha (0.18 ac) of estuarine emergent wetland (installation of cofferdam, shoreline and structure protection, and mooring dolphins at the proposed Walkerton roll-off location)
- 0.206 ha (0.51 ac) of open water in Lake Anna (installation of cofferdam for intake)
- 93.9 linear m (308 linear ft) of Mattaponi River shoreline (Walkerton roll-off location)
- 133-m (435-ft) encroachment into the Mattaponi River (Walkerton roll-off location).

As compensation, Dominion would preserve 3589 linear m (11,775 linear ft) of stream channels with riparian buffers and secure 3.52 ha (8.7 ac) of wetland compensation credits and 5624 stream compensation credits from an approved wetland/stream-mitigation bank (USACE 2011b). In addition, Dominion stated that it would implement construction mitigation measures. These measures would include instituting construction BMPs for erosion and dust control, noise abatement, and proper equipment maintenance; restricting the timing of activities to minimize impacts to resources; and adhering to applicable permit conditions (NRC 2010).

Although the number of acres and linear feet permanently affected have changed from that evaluated in the ESP EIS, the changes are not great and the losses are minor. Securing stream and wetland credits will compensate for the permanent loss of habitat. Employing construction BMPs will minimize impacts to aquatic and terrestrial resources during construction. Construction impacts are temporary, largely reverseable and confined.

3.0 Updated Surveys and Environmental Review Information

Since the 2005 BA was prepared, Dominion has conducted several surveys for aquatic and terrestrial species and habitat. In addition, USACE has completed an Environmental Assessment for the project and has issued a DA Section 404 and Section 10 Permit . These surveys and the USACE review are summarized below.

In the fall of 2008, a Virginia DEQ-approved freshwater mussel survey was conducted in Lake Anna using scuba gear by Creek Laboratory, LLC for Dominion Environmental Biology (see Figure 4 for survey locations) (Dominion 2010d). No Federally protected freshwater mussel species were identified from any of the survey locations.

In September 2009, the Virginia Department of Conservation and Recreation (VDCR) determined that the project location may support habitat appropriate for the small whorled pogonia, (*Isotria medeoloides*), and, therefore, recommended a site inventory be conducted (Dominion 2010a). A plant-specific habitat survey was conducted in the fall of 2009 of the NAPS Site, Route 700 parcels, and the Blanton's Conservation Area along the North Anna to Ladysmith transmission line corridor to identify sites where Federally listed threatened and endangered species would have highest potential to occur (WEG 2009a, 2009b; Dominion 2010a). Results from the habitat surveys determined there were approximately 1.8 ha (4.5 ac) of potential habitat for the small whorled pogonia on the Route 700 parcels and proposed transmission line corridor, and based on these results, Dominion conducted detailed in-season surveys in 2010 and 2012 (WEG 2010a, 2010b, 2012a, 2012b). See Figure 5 for survey locations. No specimens of small whorled pegonia were observed at any of the survey locations.

In September 2010, Wetland Studies and Solutions, Inc. conducted a survey of SAV and other aquatic habitats in a portion of the tidal influenced section of the Mattaponi River where the proposed LCTR barge slip would be located (i.e., at the Walkerton roll-off location) (EA 2010). The survey area was visually inspected for SAV from a boat, and samples were collected using a double-sided rake that was dragged along the river bottom (EA 2010). A total of six SAV habitat types were identified in the study; these types and classified according to the *Virginia Marine Resource Commission Wetland Guidelines* (VMRC 1993). These habitat types included (1) dense SAV beds, (2) sparse SAV/Yellow Pond Lily (*Nuphar lutea*) Community (VMRC type IX), (3) sparse SAV beds, (4) Mixed Freshwater Community (WMRC type XI), (5) Intertidal Beach Community (VMRC type XIII), and (6) dense SAV/Mixed Flat Community (VMRC type XV) (EA 2010, VMRC 1993). In addition, EA Engineering, Science and Technology (EA) conducted a second SAV survey in September of 2012 at the Walkerton roll-off location (see Figure 6 for survey locations). Transects were set up in the field at approximately 15.24 m (50 ft) spacings from north to south, and sampling occurred at approximately 30.5 m (100 ft) intervals for a total of 31 stations (Dominion 2012b). SAV was observed in 13 of the 31 sampling stations. Habitat types that were found included dense SAV beds, Sparse SAV beds, sparse SAV/Yellow Pond Lily Community (VMRC IX), and Mixed Freshwater Community (VMRC type XI), and all were dominated by hydrilla (*Hydrilla verticillata*) (Dominion 2012b). No threatened or endangered species were found during either of the surveys.

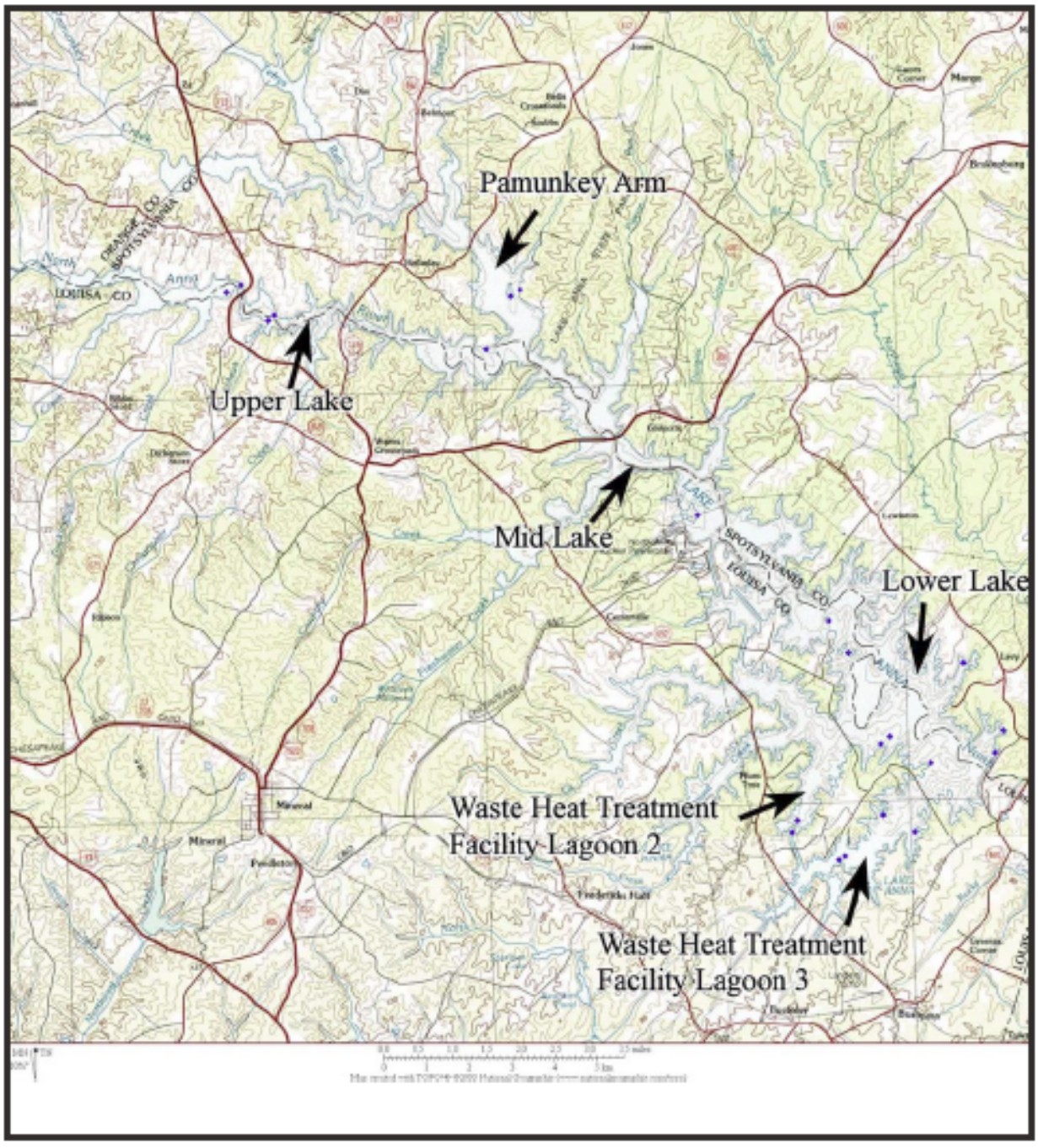

Figure 4. Locations of Fall 2008 Freshwater Mussel Surveys Conducted in Lake Anna and the WHTF (Dominion 2010d)

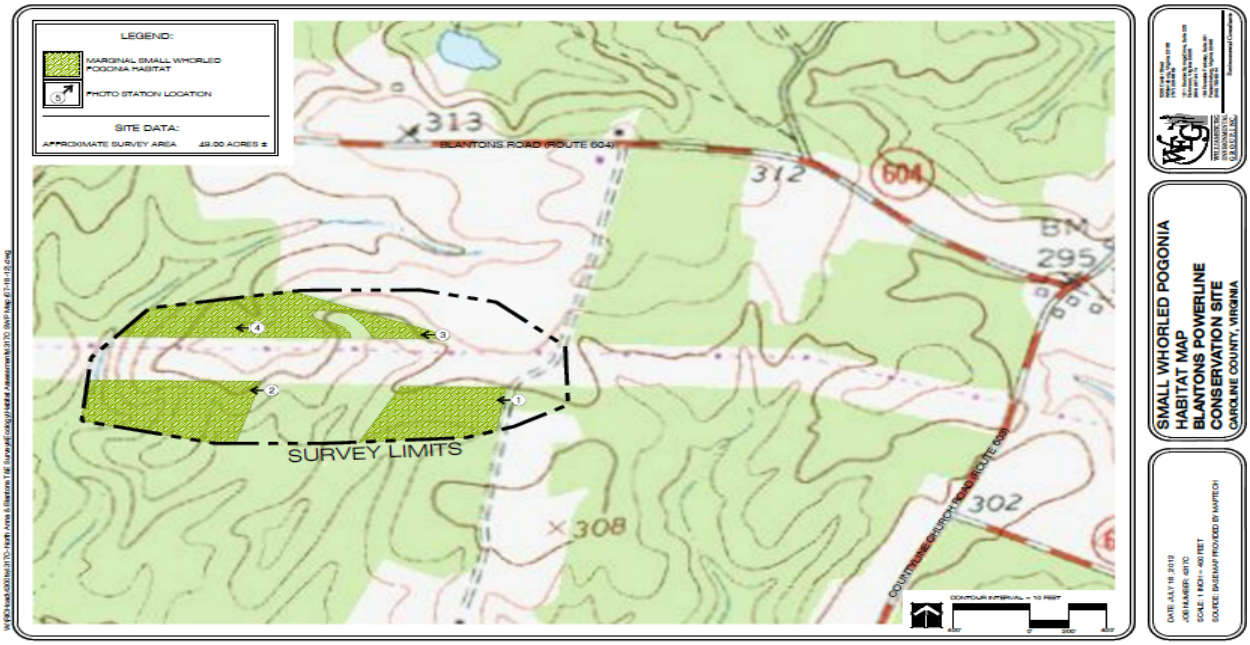

Figure 5. Survey Locations for the 2012 SWP Survey Sites (WEG 2012a, 2012b)

A special condition of the USACE DA permit requires that, beginning in 2012 and ending when COL activities commence, Dominion conduct biennial surveys for Federally listed threatened and endangered species and/or their habitat. The permit states:

> "If any survey results in a finding that differs from those prior to this permit authorization, the Corps' project manager shall be notified and impacts shall not be taken until a Corps' review and determination of effect has been completed."

In August 2012, in support of the DA permitting requirements associated with the proposed project, a targeted survey for sensitive joint-vetch was conducted by Vanasse Hangen Brustlin, Inc. (VHB) at the Walkerton roll-off location on a small section of shoreline along the river (see Figure 7) (VHB 2012). Prior to the on-the-ground survey, VHB reviewed offsite reference materials such as soil surveys, National Wetland Inventory maps, topographic mapping, and aerial photography that indicated potential suitable habitat for a protected species (VHB 2012).

Transects at 3.048 m (10 ft) spacing were established, and all vegetated portions of the study site were surveyed on foot. Habitat conditions were recorded, and representative photographs were taken to document field conditions (VHB 2012).

Methods for surveys are described in detail by WEG (2009a; 2009b; 2010a; 2010b; 2012a, 2012b), VHB (2012), EA (2010), and Dominion (2010d, 2012b). Despite repeated surveys no specimens of sensitive joint-vetch were found during the 2010 and 2012 SAV surveys or the 2012 in-season detailed ground survey.

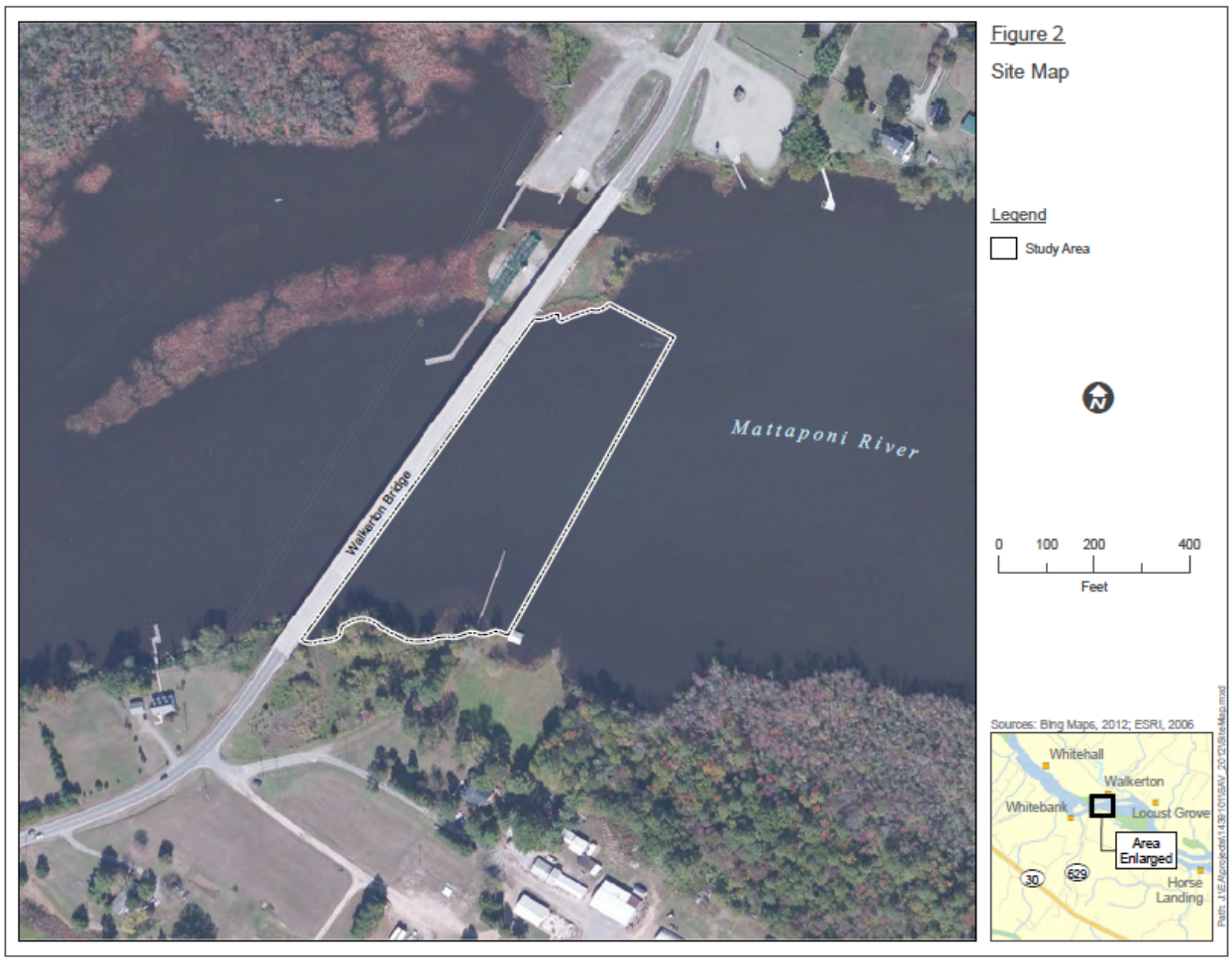

Figure 6. Survey Area for the 2012 SAV Survey at the Walkerton Property (Dominion 2012b)

Figure 7. Location of the Targeted Survey for Sensitive Joint-Vetch at the Walkerton Property (VBH 2012)

4.0 Updated Species Determinations

Aquatic Species

Dwarf Wedgemussel (*Alasmidonta heterdon*)

As described in the 2005 BA, the dwarf wedgemussel occurs sporadically in Atlantic coastal rivers from Canada to North Carolina and is found in small streams to medium-sized rivers with slow to moderate current and fine sediment, sand, or gravel substrates (NRC 2005). This species is a small freshwater mussel (<55 mm [2.16 in.] long), roughly trapezoidal in shape, and has a brown or yellowish-brown outer shell and bluish or silvery white inner shell (NRC 2005). The dwarf wedgemussel is known to occur in the South Anna River in Louisa County but has not been recorded in the North Anna River or its tributaries (NRC 2005).

In May 2005, USFWS stated in its concurrence letter to NRC that although "… the dwarf wedgemussel is known to occur in the South Anna River in Louisa County and may occur in other streams and rivers in the county…no appropriate habitat exists on the NAPS site and therefore no impact to this species is expected (USFWS 2005)."

In addition, as part of the environmental review process, Dominion conducted a freshwater mussel survey in Lake Anna in late September and early October of 2008 and found no protected species (Dominion 2010d). Based on the results of the 2008 freshwater mussel survey and the lack of suitable habitat in the project area, the NRC staff concludes the proposed action would have no effect on the dwarf wedgemussel. This determination is consistent with the determination in the 2005 BA.

James Spinymussel *(Pleurobema collina)*

James spinymussel is a freshwater mussel primarily found in the upper James and Dan River basins in small, headwater tributaries (USFWS 2013). This species has not been reported from the York River drainage or in Louisa County. The historical distribution of this species is south and west of the North Anna site. The USFWS lists Louisa County as a county in which the James spinymussel might occur, probably because some small headwater streams in the southern part of the county are part of the James River drainage. These headwater tributaries likely do not contain suitable habitat for this species. Moreover, the construction and operation of North Anna Unit 3, wholly within the York River drainage, and will not adversely affect any of these small James River tributaries. Additionally, no James spinymussels were found during the freshwater mussel survey conducted in Lake Anna (Dominion 2010a). Based on the known and limited distribution of the James spinymussel (headwater tributaries of the James and Dan Rivers) and the fact that none have been reported from the York River drainage and none were

found during the freshwater mussel survey conducted by Dominion, the NRC staff concludes the proposed action would have no effect on the James spinymussel.

Terrestrial Species

Small Whorled Pogonia (*Isotria medeoloides*)

The small whorled pogonia (SWP) is a perennial orchid that is 10.2 to 30.5 cm (4 to 12 in.) in height with a whorl of five or six leaves beneath the flower (USFWS 2008). This rare species is found in 17 eastern states and generally grows in open, deciduous forests with acidic, sandy, loamy, low-nutrient soils often near streams (USFWS 2008, NRC 2005). In Virginia, the SWP is found primarily in third-growth, open upland forests with closed canopy, usually associated with decaying litter (USFWS 1999a). This species has not been reported in Louisa County and, despite the presence of potential habitat, is not known to occur on NAPS site, Route 700 parcels, or within the Blanton's Conservation Area along the transmission line corridor.

In 2009, targeted habitat surveys for the small whorled pogonia (described above) were conducted within the COL project site (WEG 2009a, 2009b). These surveys identified three small areas of potential habitat in the Route 700 parcels and in Blanton's Conversation Area (Dominion 2010a). As a result, detailed in-season surveys were conducted in June 2010 (WEG 2010a, 2010b). Although it was determined that potential habitat likely exists within the project area, no SWPs were found in any of the survey areas during the 2010 surveys (WEG 2010a, 2010b). In 2012, two additional in-season surveys were conducted in potential habitat within the Route 700 parcels and Blanton's Conservation Area (see Figure 5) (WEG 2012a, 2012b). No specimens of this species were found at any of the survey locations (WEG 2012a, 2012b).

There is limited potential habitat for the small whorled pogonia in the project area, and the 2010 and 2012 detailed in-season surveys did not record any occurrences of the small whorled pogonia. In addition, as part of the USACE permit conditions, Dominion will continue to survey for small whorled pogonia every two years until initiation of project impacts. Therefore, the NRC staff concludes the proposed project will have no effect on the small whorled pogonia. This determination is consistent with the determination in the 2005 BA.

Swamp Pink (*Helonias bullata)*

The swamp pink is a perennial, evergreen herbaceous plant with large lance-shaped leaves that grow at ground level and a stem that ranges from 20.3 to 88.9 cm (8 to 35 in.) at flowering (USFWS 1999b). Swamp pink is found in New Jersey, Delaware, Maryland, Virginia, the Carolinas, and Georgia, and occurs in a variety of wetland habitats (e.g., bogs, spring seeps, stream edges, wet meadows, etc.) (VDCR 1997a, USFWS 1999b, NRC 2005). Habitats are typically saturated year-round but are rarely flooded, and soils are neutral to acidic (NRC 2005). In Virginia, populations of this species are found in the mountains and/or coastal plain in only four counties—Augusta, Nelson, Henrico, and Caroline (USFWS 1999b, VDCR 1997a). This rhizomatous plant requires stable water levels, and tolerates only brief or infrequent flooding (VDCR 1997a).

The swamp pink has not been recorded in Louisa County or other counties crossed by the proposed transmission line, LCTR, or at the Walkerton roll-off location. However, according to VCDR, swamp pink may occur in specific areas along the LCTR (VDCR 2011). Use of the LCTR will be infrequent and of limited duration and existing roads will be used for the transport route; therefore, the staff has determined that there are no anticipated impacts on swamp pink. The VDCR agrees with the staff's assessment (VDCR 2011). Other than at the Walkerton roll-off location, no wetlands would be affected by the proposed LCTR (USACE 2011a). Swamp pink was not observed during any of the field surveys at the NAPS site, the adjoining Route 700 parcels, or in the proposed transmission line corridor. Based on the lack of suitable habitat within the area that will be disturbed by the project, no known historic occurrence within the project area, and no individuals observed during field surveys, the NRC staff concludes that the proposed project activities would have no effect on the swamp pink. This determination is consistent with the determination in the 2005 BA.

Sensitive Joint-Vetch (*Aeschynomene virginica*)

The sensitive joint-vetch is an annual herb that can grow up to 15.2 cm (6 ft) in height with compound leaves of up to 56 leaflets (VDCR 1997b*)* This species once occurred in Delaware, Pennsylvania, Maryland, New Jersey, North Carolina, and Virginia; however, it is no longer found in Delaware or Pennsylvania (VDCR 1997b). In Virginia, sensitive joint-vetch populations occur on the Potomac, Rappahanock, Pamunkey, Chickahominy, James, and Mattaponi Rivers in fresh to slightly brackish tidal river systems in the intertidal area where the plants are flooded twice daily and the soils are mucky, sandy, or gravelly (NRC 2006, VDCR 1997b). Sensitive joint-vetch thrives in areas that are open with little to no plant competition (VDCR 1997b).

As described in Section 3.0, the September 2010 survey for submerged aquatic vegetation and other aquatic and semi-aquatic habitats was conducted by Wetland Studies and Solutions, Inc. in a portion of the tidally influenced Mattaponi River at the proposed Walkerton roll-off location

(EA 2010). The survey area included approximately 1.74 ha (4.3 ac) of submerged land and immediately adjacent shoreline. Survey methods included visual observations of submerged aquatic vegetation from a boat, collection of submerged aquatic vegetation using a double-sided rake, and observations of emergent and semi-emergent vegetation in the survey area (EA 2010). Although several vegetation habitat types were noted and described, no specimens of the sensitive joint-vetch were observed in the study area.

The survey for sensitive joint-vetch was repeated in October 2012 at the Walkerton roll-off location (see Figure 7). Again, no specimens of sensitive joint-vetch were found during this survey.

In August 2012, a targeted survey for the sensitive joint-vetch was conducted by Vanasse Hangen Brustlin, Inc. at the Walkerton roll-off location on a small section of shoreline along the river (VHB 2012). As stated in Section 3.0, Vanasse Hangen Brustlin reviewed offsite reference materials that indicated potential suitable habitat prior to conducting the on-the-ground study (VHB 2012). Results from the targeted survey determined that, although some fringe wetlands were present, the study area lacked suitable marsh substrate to support sensitive joint-vetch growth, and no specimens were found (VHB 2012).

Sensitive joint-vetch specimens were not found during the 2010 and 2012 SAV surveys, and no suitable substrate or individuals were found during the 2012 in-season detailed ground surveys; therefore, the NRC staff concludes that the proposed action would have no effect on the species. This determination is consistent with the determination in the 2005 BA.

5.0 Conclusions

Since the 2005 BA was prepared, Dominion has conducted several surveys for aquatic and terrestrial species and habitat. No Federally listed species were found in any of the survey areas. In addition, USACE has completed an EA for the project and has issued a DA permit that requires Dominion to conduct biennial surveys for Federally listed threatened and endangered species and/or their habitat beginning in 2012 and ending when COL activities commence.

The “no effect” determinations from ESP activities made by NRC in the 2005 BA on the dwarf wedgemussel, swamp pink, small-whorled pogonia, and sensitive joint-vetch species still hold true for the proposed action described in the COL application. The James spinymussel was not evaluated in the 2005 BA because it was not listed in any of the counties where the ESP project would occur. For this evaluation, NRC staff have determined that, because this species has such specific habitat requirements and it is not found in any of the water bodies in the project

area, construction and operation of the new nuclear unit would similarly have no effect on the James spinymussel.

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APPENDIX A

Correspondence between the NRC and USFWS to Date Concerning North Anna Unit 3

December 21, 2003.	Letter to FWS from NRC. Subject:Application for an early site permit for the North Anna Power Station site. NRC Assession No. ML033570088)
October 29, 2004.	Letter from FWS to NRC. Subject: List of threatened or endangered species for North Anna ESP and the alternate Surry ESP site.(NRC Assession No. ML043090290)
January 31, 2005.	Letter from NRC to FWS. Subject: Biological Assessment for the Early Site Permit of the North Anna Site and a Request for Informal Consultation (NRC Accession No. ML050320461).
May 20, 2005.	Letter from FWS to NRC. Subject: Concurrence on the Biological Assessment for North Anna Early Site Permit (NRC Accession No. ML051600263).
April 4, 2008.	Letter from NRC to FWS. Subject: Request for List of Protected Species within the Area Under Evaluation for the North Anna Power Station, Unit 3 Combined License Application (NRC Accession No. ML080710278).
January 27, 2009.	Letter from NRC to FWS. Subject: Request for Comments on the Draft Supplemental Environmental Impact Statement for the North Anna Power Station, Unit 3 Combined License (NRC Accession No. ML090130266).
February 01, 2011[1].	Letter from NRC to FWS. Subject: Request for Scoping Comments on the North Anna Power Station, Unit 3 Supplemental Environmental Impact Statement (NRC Accession No. ML110040927).

[1] In late 2010, Dominion revised its COL application to reference a reactor design other than that which was evaluated in the SEIS that had been issued in 2010. In February 2011, the NRC issued a Notice of Intent to prepare a supplemental EIS and to conduct scoping based on Dominion's revised application. Dominion has since reverted back to its original reactor design. The NRC is currently reassessing its plans to prepare a supplemental EIS.