U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

DIVISION OF FUEL CYCLE SAFETY, SAFEGUARDS, AND ENVIRONMENTAL REVIEW

FINAL ENVIRONMENTAL ASSESSMENT FOR THE AMENDMENT OF THE U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SNM-2507 FOR THE NORTH ANNA POWER STATION INDEPENDENT SPENT FUEL STORAGE INSTALLATION

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ACRONYMS

ac	acres
ALARA	as low as is reasonably achievable
AQCR	air quality control region
CoC	Certificate of Compliance
CFR	*Code of Federal Regulations*
EA	environmental assessment
FONSI	Finding of No Significant Impact
FR	*Federal Register*
ft	feet
FWS	U.S. Fish and Wildlife Service
HA	hectares
in.	inches
ISFSI	independent spent fuel storage installation
kW	kilowatt
LAR	license amendment request
mi	miles
mrem	millirem
mSv	miliSievert
NA	North Anna (Power Station)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRC	U.S. Nuclear Regulatory Commission
RAI	request for additional information
REMP	Radiological Environmental Monitoring Program
SAR	safety analysis report
SER	safety evaluation report
SHPO	State Historic Preservation Officer
SNM	Special Nuclear Materials
TLD	thermoluminescent dosimeter
TN-32	Transnuclear-32
TS	technical specifications
USCB	U.S. Census Bureau

FINAL ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED LICENSE AMENDMENT OF
U.S. NUCLEAR REGULATORY COMMISSION LICENSE NO. SNM-2507
FOR THE NORTH ANNA POWER STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION

1.0 INTRODUCTION

By letter dated May 27, 2014, Virginia Electric and Power Company (Dominion) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) requesting an amendment to Special Nuclear Materials License Number SNM-2507 for the North Anna (NA) Power Station Independent Spent Fuel Storage Installation (ISFSI) located in Louisa County, Virginia (Dominion, 2014a). Dominion is proposing to amend the Technical Specifications (TS) 4.2.3, "Storage Pad," to revise the minimum center-to-center spacing for Transnuclear-32 (TN-32) casks with heat loads no greater than 27.1 kilowatts (kW) from 16 feet (ft) to 14 ft.

In accordance with NRC regulations at Title 10 of the *Code* of *Federal Regulations* (10 CFR) Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," that implement the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. § 4321 et seq.), the NRC staff's environmental review of the proposed license amendment is documented in this environmental assessment (EA). The purpose of this document is to assess the potential environmental impacts of the proposed license amendment and reasonable alternatives.

The NRC is also conducting a safety evaluation of this request, which is documented in a separate Safety Evaluation Report.

1.1 Background

On June 30, 1998, the NRC issued Dominion a 20-year license to receive, possess, store, and transfer the NA Units 1 and 2 spent nuclear fuel to an ISFSI located on the NA site. The NA specific license, SNM-2507, allows for the storage of 84 TN-32 sealed surface storage casks (TN-32 casks)—28 TN-32 casks per each of the three pads. Each TN-32 cask is designed to hold 32 pressurized water reactor (PWR) fuel assemblies (NRC, 1997). Currently the ISFSI consists of one pad with 27 TN-32 casks. In support of the 1998 application to construct and operate the ISFSI, the NRC staff prepared a final EA and determined a finding of no significant impact (FONSI) was appropriate (NRC, 1997). In 2003, the NRC approved a license amendment that revised the TS of SNM-2507 to permit the use of the TN-32 storage casks to store spent fuel with a higher initial enrichment and burnup at the NA ISFSI. Specifically, the amendment requested that the enrichment and burnup limits be revised to allow storage of fuel with initial enrichment less than or equal to 4.35 percent (weight uranium-235), assembly average burnup less than or equal to 45,000 megawatt days per metric ton of uranium, and heat generation less than or equal to 1.02 kW/assembly in the TN-32 casks. The NRC staff prepared an EA and determined a FONSI was appropriate in support of the NRC's review and approval of this license amendment request (68 FR 35013).

On August 23, 2011, a 5.8 magnitude earthquake was recorded in Mineral, Virginia, which is approximately 10 km (6 mi) from NA. During the seismic event, 25 of the 27 TN-32 casks on the NA ISFSI Pad 1 shifted from their original positions. Originally, the center-to-center spacing was 16 ft. After the earthquake, it ranges from 16 ft to a range of 15 ft 2.25 inches (in.) to 16 ft

11.25 in. (Dominion, 2014a). A detailed inspection and monitoring was performed by both NA and Transnuclear personnel to confirm there was no damage that had any impact on safety-related features (Dominion, 2013). No indications of cracks in the casks or pad were found. Thermal, nuclear, and structural analyses were conducted to support the requested TS amendment, the results of which can be found in the License Amendment Request (LAR) (Dominion, 2014a).

NRC inspections in response to the earthquake found that the casks withstood the earthquake and concluded there were no immediate safety issues associated with the movement of the casks (NRC, 2011a). The spent fuel continues to be surrounded by several tons of steel and sealed in an inert helium environment. Radiation surveys indicated no changes to cask surface dose rates (NRC, 2011a). Currently, the two casks with the least separation (15 ft 2.25 in.) are casks that had decay heats of 15.4 kW and 18.0 kW when loaded in 2000 and 2001, both well below the 27.1 kW requirement (NRC, 2011b).

1.2 Proposed Action

Dominion is requesting to amend SNM-2507, TS 4.2.3, “Storage Pad,” which in part defines the distance between individual casks (center-to-center) on the ISFSI pad. The licensee is proposing to change the allowable distance between individual casks from a “nominal16 ft” to a “minimum of 14 ft” (center-to-center) for casks with a heat load no greater than 27.1kW on ISFSI Pad 1. The NRC’s Federal action is the decision whether to approve the license amendment to change TS 4.2.3 as described in Section 1.1 of this EA. If approved, the minimum allowed distance between individual casks would be 14 ft for those casks with a heat load no greater than 27.1 kW. In a response to an NRC request for additional information (RAI) (NRC, 2014a), Dominion confirmed that because the casks would remain in place, the LAR would not result in changes to routine operations and maintenance activities (Dominion, 2014b).

1.3 Purpose and Need

During the August 23, 2011 seismic event, 25 of the 27 casks on Pad 1 shifted so that their center-to-center spacing ranges from 15 ft 2.25 in. to 16 ft 11.25 in. (Dominion, 2014a). Analysis of the current spacing has shown that all of the affected casks have a heat load less than 27.1 kW and continue to meet thermal requirements with a center-to-center spacing as close as 14 ft (Dominion, 2014a). Dominion is requesting this amendment in lieu of physically moving the 25 individual casks back to their pre-earthquake positions, which could result in additional occupational doses and an increase in the potential of an accident caused by lifting and moving the casks (Dominion, 2014a). If approved, the requested amendment would allow the TN-32 casks to remain in their current positions.

1.4 Scope of the Environmental Analysis

The NRC staff has addressed the potential environmental impacts associated with the proposed action of amending SNM-2507 TS 4.2.3, and alternatives to the proposed action, and has documented the results of the assessment in this EA. The NRC staff performed this review in accordance with the requirements of 10 CFR 51 and staff guidance found in NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NRC, 2003).

The following documents were reviewed and considered in the development of this EA:

- Information contained in the LAR dated May 27, 2014 (Dominion, 2014a), and supplemental information submitted in a response to an NRC RAI on November 7, 2014 (Dominion, 2014b);
- Information in an NRC action plan to address the NA ISFSI following the August 2011 earthquake (NRC, 2011a);
- Information contained in previous NRC environmental review documents for the NA site and ISFSI (NRC, 2010, 2006,1997); and
- The current safety analysis report (Dominion, 2014c).

The NRC staff is using the EA prepared for the original license application (NRC, 1997) as a basis for this EA and is only focusing on changes as a result of the proposed action. The conclusions presented in this EA are based on all aspects of the proposed action and the affected environment. To limit redundancy and to focus this EA on the proposed action, the NRC staff refers to past environmental review documents for more detailed descriptions of those aspects of analysis that remain unchanged.

1.4.1 Continued Storage of Spent Nuclear Fuel

On September 19, 2014, the NRC published a final rule at 10 CFR 51.23, "Environmental impacts of continued storage of spent nuclear fuel beyond the licensed life for operations of a reactor" (79 FR 56238). That rule, effective October 20, 2014, codified the NRC's generic determinations in NUREG-2157, "*Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel"* (NRC, 2014g), regarding the environmental impacts of the continued storage of spent fuel. In Commission Order CLI-14-08, the Commission held that the revised 10 CFR 51.23 and associated NUREG-2157 cured the deficiencies identified by the court in *New York v. NRC*, 681 F.3d 471 (D.C. Cir., 2012) and stated that the rule satisfies the NRC's NEPA obligations with respect to continued storage.

In EAs prepared for future reactor and spent fuel storage facility licensing actions, 10 CFR 51.23(b) now requires the NRC to consider the environmental impacts of continued storage, if the impacts of continued storage of spent fuel are relevant to the proposed action. In this case, the proposed action, if approved, will authorize Dominion not to perform certain activities that would otherwise be required under the terms of Dominion's current license. The proposed action will not change the ISFSI's authorized possession limits (e.g., it will not expand the ISFSI's capacity) or license term (e.g., it will not extend the term of the license), nor will it change the scope or nature of the activities currently licensed by the NRC. Further, the proposed action, if approved, will not change the spent fuel type authorized to be stored at the ISFSI or in the approved cask for dry storage. Therefore, the NRC has determined that the impacts of continued storage of spent fuel are not relevant to the proposed action. Accordingly, the NRC has not considered the environmental impacts of continued storage in this EA.

2.0 ALTERNATIVES TO THE PROPOSED ACTION

The alternative considered in this EA is the no-action alternative. Under the no-action alternative, the NRC would deny the LAR. Denial of the request would leave TS 4.2.3 as is, requiring the TN-32 casks in each row to be spaced at a nominal 16 feet apart, center-to-center—this would require Dominion to physically move the individual casks back to their pre-earthquake positions. The LAR and Dominion's response to NRC's RAI (Dominion,

2014a, 2014b) identified two methods for moving the casks back to their pre-earthquake position:

- Using a Cask Transporter

  The cask transporter requires a ramp to access the pad and an unobstructed path to move individual casks. Ramps are located on the north and south ends of the pad and the casks are oriented in two side-by-side rows oriented north and south. Therefore, to access casks on the interior of the pad numerous casks to the north and south would need to be removed to create an unobstructed approach to the interior casks. The casks would be moved to a temporary storage area that meets the radiological and security requirements for dry storage of spent fuel (Dominion, 2014b). This alternative would require movement of all 27 casks (this includes the two casks that did not shift during the 2011 earthquake) (Dominion, 2014b). The removed casks could then be placed back in their pre-earthquake positions. Dominion estimates this alternative would require about eight additional contractors and three to four weeks of work required to move the casks (Dominion, 2014b).

- Using a Gantry-Style Crane System

  A gantry-style crane system would be engineered and erected on the ISFSI site and then utilized to move the casks. This system would allow only the individual casks that shifted during the earthquake (25 of the 27 casks on ISFSI Pad 1) to be lifted and moved. Using a crane system would limit the number of times a cask would need to be lifted to return it to the pre-earthquake position. Dominion estimates this alternative would not disturb any previously undisturbed land, would require about ten additional contractors and four weeks to complete the work (Dominion, 2014b).

While the two no-action alternatives would use different methods to move the casks to their pre-earthquake positions, both no-action alternatives would result in increased radiological dose to workers, and both would require the casks to be placed on a temporary cask over-pressure monitoring system. Both no-action alternatives could also result in an increased potential for accidents due to the need to physically move the casks (Dominion, 2014b).

3.0 AFFECTED ENVIRONMENT

The NA ISFSI is located within the boundary of the NA site approximately 610 meters (2,000 ft) southwest of the NA Units 1 and 2 protected area (NRC, 1997). The closest site boundary to the ISFSI is approximately 2,500 ft south-southwest at the exclusion area (Dominion, 2014b). Two operating nuclear generating units, Units 1 and 2, are currently located on the NA site, and a small hydroelectric power plant is located at the base of the North Anna Dam (NRC, 2006). The ISFSI occupies approximately 4.4 hectares (ha) (11 acres [ac]) of the approximately 422 ha (1043 ac) of land occupied by the NA site (NRC, 1997). The NA ISFSI Pad 1 is located west-adjacent to ISFSI Pad 2, which is a generally-licensed ISFSI under Certificate of Compliance (CoC) No. 1030. Pad 2 contains 26 NUHOMS-HD 32PTH canisters, 13 of which are loaded (NRC, 2011a).

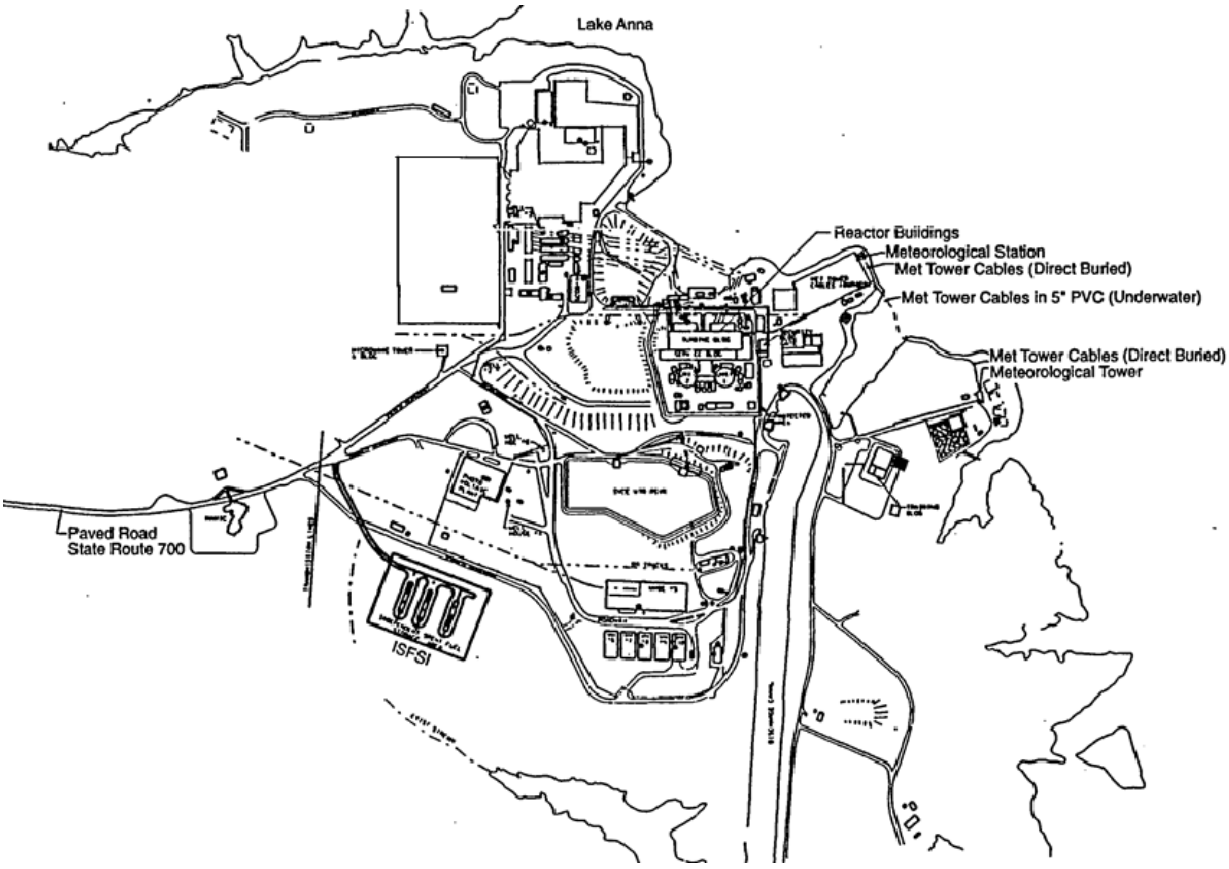

Figure 1. NA Site Layout (NRC, 1997)

The NA site is located in rural Louisa County, Virginia, approximately 64 kilometers (km) (40 miles [mi]) northwest of Richmond, Virginia (NRC, 2002) and approximately 22 km (35 mi) southwest of Fredericksburg, Virginia (Dominion, 2014a). The NA site is located approximately 10 km (6 mi) northeast of the town of Mineral. The NA site is located on a peninsula on the southern shore of Lake Anna, a man-made reservoir. The nearest community is the town of Mineral, approximately 10 km (6 mi) southwest of the NA site. The nearest permanent resident is located approximately 872 m (2,860 ft) southeast of the NA ISFSI (Dominion, 2014b).

Downstream of the North Anna Dam, the North Anna River flows southeasterly, joining the South Anna River to form the Pamunkey River about 43 km (27 mi) southeast of the NA site. Lake Anna, which was created as a source of cooling water for NA, has become a popular recreation area, and the dam provides downstream flood control.

The earthen dam that creates Lake Anna is about 8 km (5 mi) southeast of NA. The lake is not used as a source of potable or industrial water, except for water use by NA Units 1 and 2. Water for domestic use at the NA site is taken from groundwater wells (NRC, 1997). As discussed in the EA for the construction and operation of the NA ISFSI (NRC, 1997), the closest offsite well to the ISFSI site is in a residential area approximately 1,067 m (3,500 ft) to the south. The wells in this residential area are drilled very close to the lake and the effects of the presence of the lake (hydrostatic pressure), and the distance from the site, would preclude any groundwater movement from the ISFSI to this location (NRC, 1997).

The topography in the region of NA is characteristic of the central Piedmont Plateau of Virginia, with a gently undulating surface varying from 61 to 152 meters (from 200 to 500 ft) above sea level. The surrounding region is covered with forest and cut-over second growth timber, interspersed with an occasional farm (NRC, 2002). The Blue Ridge Mountains lie approximately 73 km (45 mi) northwest of the site. The predominant land use in Louisa County is forestry.

As described in the EA for the construction and operation of the NA ISFSI (NRC, 1997), the climate of the site is modified continental. The summers are warm and humid, while winters are generally mild. The Blue Ridge Mountains to the west act as partial barriers to winter storms, moderating their intensity.

As discussed in NUREG-1811, "*Environmental Impact Statement for an Early Site Permit (ESP) at the North Anna ESP Site"* (NRC, 2006), the site can experience severe weather in the form of thunderstorms, hail, tornadoes, snow and ice, and hurricanes. Data from Richmond Airport are considered representative of long-term climate conditions at the site. Based on data presented in the ER (Dominion 2006a), Richmond receives an annual average rainfall of 109.6 cm (43.16 in.). Normal monthly rainfall is equally distributed throughout the year with maximum amounts of 12.8 cm (5.03 in.) and 11.2 cm (4.40 in.) occurring in July and August, respectively, and the minimum of 7.5 cm (2.96 in.) during April. The maximum monthly rainfall amounting to 47.9 cm (18.87 in.) occurred in July 1945, and the minimum amounting to 0.03 cm (0.01 in.) occurred in October 2000. The probability of a tropical storm at the site is far greater than a hurricane, because hurricanes lose intensity and degrade into tropical storms soon after they make landfall.

Louisa County is located within the Northeastern Virginia Intrastate Air Quality Control Region (AQCR) (40 CFR 81.144). All counties in this AQCR are designated as in attainment or unclassified for all criteria pollutants for which National Ambient Air Quality Standards have been established (40 CFR 81.347). Attainment areas are areas where the ambient air quality levels are better than designated by the U.S. Environmental Protection Agency.

Louisa County has two incorporated towns, Louisa and Mineral. Louisa County has a population of approximately 33,153 (USCB, 2010). The county is largely rural with a population density of about 66.8 persons per square mile (USCB, 2010). The town of Mineral has a population of approximately 467 (USCB, 2010).

As discussed in the EA for the construction and operation of the ISFSI (NRC, 1997), the loss of biological production of about one percent of the NA site area due to construction and operation of the ISFSI is not expected to result in a significant disturbance to the ecological systems in the area.

The area around the NA ISFSI is rich in prehistoric and historic Native American and historic Euro-American resources. Section 2.9.2, "*Historic and Cultural Resources at the North Anna ESP Site*," of NUREG-1811 provides a full discussion about historic and cultural resources (NRC, 2006). However, there are no points in the immediate ISFSI site area of historic, archaeological, or geologic significance (EA, 1997).

A radiological environmental monitoring program (REMP) has been conducted around the NA site since 1976. The NA REMP report is submitted to the NRC annually in accordance with NA Unit 1 and 2 Technical Specification 5.6.2 and NA ISFSI Technical Specification 5.5.2. The environmental radiation doses are measured using thermoluminescent dosimeters (TLDs). According to the 2013 REMP report (Dominion, 2014d), TLD results have remained essentially

constant over the years. In the 2013 REMP, the licensee estimated that the maximum dose to a hypothetical individual at the site boundary due to liquid and gaseous effluents released during 2013 was 0.0045 milliSievert (mSv) (0.45 millirem [mrem]) (Dominion, 2014d) compared to the approximately 3.6 mSv (360 mrem) an individual can expect to receive from background radiation (Dominion, 2014d).

4.0 ENVIRONMENTAL IMPACTS

The NRC staff reviewed the applicant's environmental report and evaluated the potential environmental impacts to the various resources of the affected environment from the proposed action and the no-action alternative. The NRC staff used the guidance outlined in NUREG-1748 (NRC, 2003) in its evaluation. In accordance with this guidance, the NRC staff evaluated the direct effects, indirect effects, and cumulative impacts that each resource area may encounter from the proposed action and the no-action alternative. The NRC staff categorizes environmental impacts in terms of small, moderate, or large, defined as follows:

- SMALL—environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

- MODERATE—environmental effects are sufficient to alter noticeably, but not to destabilize important attributes of the resource.

- LARGE—environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

4.1 Proposed Action

The proposed action involves allowing the casks to remain in place at their current post-earthquake positions and spacing.

4.1.1 Radiological Impacts

The NA ISFSI is a radiologically controlled Protected Area located within the NA Owner Controlled Area; the closest site boundary (the exclusion area) is 762 m (2500 ft) from the ISFSI (Dominion 2014b). External exposure to direct and scattered radiation is the primary pathway of radiation exposure from the ISFSI to workers, the public, and biota. Dominion surveyed the ISFSI following the earthquake and found no damage to the casks or changes to the casks' surface dose rates (Dominion, 2014a, 2014b). The NRC follow-up inspections also concluded there were no safety issues—the TN-32 casks continue to perform their shielding, criticality, thermal, and confinement design functions and radiological conditions remained unchanged (NRC, 2011a).

Because no physical changes to the casks would take place under the proposed action there would be no additional radiological dose to workers, and leaving the casks in place would not have an additional effect on dose rates to workers and the public from continued routine operation and maintenance of the ISFSI. Dominion confirmed in a response to an NRC RAI (NRC, 2014b) that granting the LAR would not result in any change to routine operation or maintenance of the ISFSI (Dominion, 2014b). Radiological doses to biota (such as birds and mammals) are similar to those calculated for humans and would arise from the same pathways. As such, impacts to biota would be negligible because the proposed action would have an insignificant effect on dose rates.

Accident scenarios affecting the safe operation of the NA ISFSI were evaluated in the NRC's 1997 EA (NRC, 1997). Casks are designed to withstand forces from off-normal accidents such as earthquakes, tornadoes, flood, explosion, fire, and storage of an unauthorized fuel assembly, and no release of radioactive materials is anticipated from these accidents (NRC, 1997). The NRC inspections following the August 2011 earthquake confirmed that the cask designs are robust and consider severe natural phenomena; and as expected, the casks withstood the earthquake (NRC, 2011a). Dominion considered the current cask heat loads, post-earthquake cask surface dose rates and spacing measurements, and offsite doses, and determined that allowing the casks to remain in place will have a negligible effect on thermal and structural performance of the casks. The NRC thermal performance measurements for all loaded casks found no abnormal temperature differences and no changes to cask surface dose rates (NRC, 2011a). As such, the proposed action would not result in an increased risk of accidents.

Due to the insignificant effects on the casks' surface dose rates and thermal and structural performance, the NRC staff concludes that the proposed action would result in SMALL and not significant radiological impacts to workers, the public, and biota.

4.1.2 Non-Radiological Impacts

Because the proposed action would not require any physical changes to the casks, there would be no impacts to non-radiological resources, including land use, geology and soils, water resources, ecology, threatened and endangered species, meteorology, climate, air quality, noise, occupational health, historic and cultural resources, visual and scenic resources, socioeconomic resources, transportation, and waste management. See Section 7.0 of this EA for NRC consultations with state and Federal agencies regarding listed species and historic and cultural resources.

4.2 No-Action Alternative

The no-action alternative (i.e., the NRC would deny the LAR) would require Dominion to return the shifted casks to their original pre-earthquake positions and spacing. As stated above in Section 2.0, Dominion could move the casks using either a cask transporter or a gantry crane system. Both no-action alternatives would result in greater environmental impacts than the proposed action because they require movement of some or all of the casks. Due to the configuration of the storage pad (only north-south access ramps and orientation of the casks), use of the cask transporter would require temporarily removing numerous casks from Pad 1 in order to first gain access to the interior casks. The gantry crane system would require less movement of the casks—the casks would be lifted from above to shift them back to their original pre-earthquake positions and spacing. Both alternatives would result in increased radiological dose to workers and an increased risk of accidents due to movement of the casks. Due to the number of cask movements required, both radiological and non-radiological environmental impacts from the cask transporter alternative would be greater than those for the gantry crane system alternative. The analysis below generally discusses the two no-action alternatives and notes where impacts from the alternatives would differ.

4.2.1 Radiological Impacts

Both no-action alternatives would primarily result in increased radiological doses to workers, due to increased worker exposure to direct radiation from the casks while coordinating their movement and disconnecting and connecting their cask over-pressure monitoring systems

(Dominion, 2014b). Both alternatives would also result in an increased risk of cask drop accidents or other industrial accidents. In the LAR (Dominion, 2014a), Dominion stated that accidents associated with the no-action alternatives would be bounded by the cask drop accident analysis in the NA ISFSI SAR (Dominion, 2014c). Due to the smaller number of cask movements required, doses to workers and the risk of accidents from the gantry crane alternative are postulated to be less than from the cask transporter alternative. Radiological doses to members of the public and biota would likely be similar to the proposed action.

The NRC staff concludes that although radiological impacts and the risk of accidents would be greater for the no-action alternatives than the proposed action, the radiological impacts from the no-action alternatives would still be SMALL and not significant. The primary impact of the alternatives would be dose rates to workers, however Dominion would be required to comply with dose limits specified in 10 CFR Part 20, Subpart C, "Occupational Dose Limits," 10 CFR Part 20, Subpart D, "Radiation Dose Limits for Individual Members of the Public," and 10 CFR Part 72.104, "Criteria for Radioactive Materials in Effluents and Direct Radiation from an ISFSI or MRS." Furthermore, Dominion maintains a radiation protection program for NA Units 1 and 2 and the ISFSI in accordance with 10 CFR Part 20 to ensure that radiation doses are as low as reasonably achievable (ALARA).

4.2.2 Non-Radiological Impacts

Movement of the casks associated with the no-action alternatives would have minimal impacts to non-radiological resources. Both no-action alternatives could create minimal, temporary, and localized air quality impacts due to diesel exhaust emissions and fugitive dust from operation of the cask transporter and crane. Neither alternative would result in any disturbance to previously undisturbed land. Furthermore, with the exception of the bald eagle (*Haliaeetus leucocephalus*), no Federally listed threatened or endangered species are known to occur at the NA site (NRC 2006). Occupational health impacts in the form of worker injuries could occur from both alternatives due to the need to coordinate movement of the casks. Minor, temporary, and localized noise impacts could result from both alternatives due to operation of the cask transporter and crane. The gantry crane system could have limited impacts to visual and scenic resources, however placement of the crane would be temporary and as stated above, the closest site boundary is 762 m (2,500 ft) away. Dominion stated that each alternative would require approximately four weeks to complete and eight to ten additional contractors (Dominion, 2014b), therefore, resulting in negligible socioeconomic and transportation impacts to the local area.

No water use or liquid effluents would be associated with implementation of the alternatives. There would be no ground-disturbance associated with the no-action alternatives, and temporary storage of the casks associated with the cask transporter alternative would occur within the ISFSI fenced-in area (Dominion, 2014b). Furthermore, as documented in the NRC's 1997 EA (NRC, 1997), there are no sites of historic, archaeological, or geologic significance in the area of the ISFSI. There will be no impacts to cultural sites because there are no land disturbing activities due to this action, nor will the proposed action authorize any operational changes at the site. No waste generation (hazardous or nonhazardous) would be associated with either alternative.

Although there could be minimal, temporary, and localized impacts to air quality in the immediate vicinity of the storage pad, minimal noise impacts, and the potential for increased occupational injuries, the NRC concludes that impacts to non-radiological resources from the no-action alternative would be SMALL and not significant.

4.3 Environmental Justice

Under Executive Order 12898 (59 FR 7629), Federal agencies are responsible for identifying and addressing potential disproportionately high and adverse human health and environmental impacts on minority and low-income populations. Environmental justice (EJ) refers to a Federal policy implemented to ensure that minority, low-income, and tribal communities historically excluded from environmental decision-making are given equal opportunities to participate in decision-making processes. In 2004, the Commission issued a Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions(69 FR 52040). Regarding EAs, the NRC's policy statement on environmental justice states, "…If there will be no significant impact as a result of the proposed action, it follows that an EJ review would not be necessary. However, the agency must be mindful of special circumstances that might warrant not making a FONSI. In most EAs, the Commission expects that there will be little or no offsite impacts and, consequently, impacts would not occur to people outside the facility. However, if there is a clear potential for significant offsite impacts from the proposed action then an appropriate EJ review might be needed to provide a basis for concluding that there are no unique impacts that would be significant. If the impacts are significant because of the uniqueness of the communities, then a FONSI may not be possible and mitigation or an EIS should be considered."

In the "Guidelines for Implementation of NEPA as to Environmental Justice Issues" (69 FR 52040), the NRC explains that special circumstances arise only where the proposed action has a clear potential for off-site impacts to minority and low-income communities associated with the proposed action.

Sections 2.10 in both NUREG-1811 and NUREG-1917 (NRC, 2006, 2010) contain detailed descriptions of minority and low-income populations around the NA site. As discussed in Sections 4.1.1 and 4.2.1 in this EA, off-site radiation doses from the NA ISFSI Pad 1 would remain unchanged for both the proposed action and the no-action alternatives. As discussed in Sections 4.1.2 and 4.2.2 in this EA, there would be no non-radiological impacts associated with the proposed action and impacts would be SMALL and not significant for the no-action alternative. The NRC staff does not expect that the proposed action or the alternatives adversely affect any offsite population and, thus, no special circumstances have been identified.

5.0 CUMULATIVE IMPACTS

The NRC staff considered the impacts of the proposed action, as described in Section 4.0 of this EA, combined with other past, present, and reasonably foreseeable future actions that could affect the same resources impacted by the proposed action. Because there are no expected off-site environmental impacts associated with the proposed action, the geographic area considered in this cumulative impacts discussion is the NA site. The time frame considered for future actions extends through 2018, the expiration year of the site-specific license SNM-2507 for the NA ISFSI. (The NRC staff notes that renewal of license SNM-2507 would be a Federal action that would require its own NEPA evaluation at that time.)

Other actions considered in this discussion of cumulative impacts include normal operation and maintenance of the generally licensed ISFSI Pad 2 (adjacent to ISFSI Pad 1) and NA Units 1 and 2. Because only minimal radiological impacts are expected to result from the proposed action, this discussion focuses only on radiological impacts.

Dominion performs routine radiological monitoring activities, which includes the REMP for NA Units 1 and 2 and the ISFSIs. The NA REMP report is submitted to the NRC annually in accordance with NA Unit 1 and 2 TS 5.6.2 and NA ISFSI TS 5.5.2. The direct exposure pathway measures environmental radiation doses by use of TLDs. According to the 2013 NA REMP report (Dominion, 2014d), TLD results have remained essentially constant over the years. The licensee's estimated maximum dose to a hypothetical individual at the site boundary due to liquid and gaseous effluents released during 2013 was to 0.0045 mSv (0.45 mrem) (Dominion, 2014d), as compared to the approximately 3.6 mSv (360 mrem) an individual can expect to receive from background radiation (Dominion, 2014d). Therefore, normal operations of NA Units 1 and 2 and the ISFSIs result in radiological doses to members of the public that are a fraction of background levels and are well below regulatory limits.

In October 2009, the NRC approved a measurement uncertainty recapture power uprate request for NA Units 1 and 2 from 2,893 to 2,940 megawatts thermal (NRC, 2009). The NRC found that the power uprate would not result in a significant increase to the individual or cumulative occupational radiation exposure (NRC, 2009).

Continued operation of ISFSI Pad 2 (under general license NRC CoC No. 1030), is not expected to significantly contribute to cumulative radiological effects at the NA site. After the August 2011 earthquake, NRC inspections of both storage pads in the ISFSI (specifically-licensed Pad 1, the subject of this EA, and generally-licensed Pad 2) confirmed that radiological conditions at the ISFSI remain unchanged and the ISFSI is acceptable for continued operation without undue risk to the health and safety of the public (NRC, 2011a). Furthermore, Dominion maintains a radiation protection program for NA Units 1 and 2 and the ISFSI in accordance with 10 CFR Part 20 to ensure that radiation doses are as low as reasonably achievable (ALARA).

NUREG-0713, "Occupational Radiation Exposure at NRC Licensed Facilities" (NRC, 2014e), includes a compilation of occupational exposure reports from all NRC-licensed facilities. The review of these data associated with NA indicates exposure to all workers associated with the NA, including the ISFSI, are well below the regulatory limits in 10 CFR 20.1201.

Due to the passive nature of the proposed action, approval of the LAR would not result in an increased risk of accidents for the ISFSI, therefore, there would be no cumulative impacts associated with accidents.

Because the proposed action would result in negligible radiological impacts, and Dominion performs routine radiological monitoring and maintains an ALARA program for NA Units 1 and 2 and the ISFSI, NRC approval of the proposed LAR is not anticipated to significantly contribute to cumulative impacts at the NA site.

6.0 FEDERAL, STATE, AND LOCAL AGENCIES

Dominion is responsible for complying with all NRC regulations and other applicable Federal, State, and local requirements and statutes. No other regulatory requirements or permits are necessary for this proposed license amendment (Dominion, 2014b).

7.0 CONSULTATIONS

The NRC staff consulted with other agencies regarding the proposed action in accordance with NUREG–1748 (NRC, 2003). These consultations were intended to: (i) ensure that the requirements of Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act were met, and (ii) provide the designated state liaison agencies the opportunity to comment on the proposed action.

7.1 National Historic Preservation Act

The National Historic Preservation Act of 1966, as amended (NHPA) (See 16 U.S.C. 470 et seq.) was enacted to create a national historic preservation program, including the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP). Section 106 requires Federal agencies to consider the effects of their undertakings on historic properties. Regulations define an undertaking as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval (See 36 CFR800.16(y). The ACHP regulations implementing Section 106 of the Act are found in 36 CFR Part 800, "Protection of Historic Properties." NRC approval of this LAR is a Federal undertaking in accordance with the 36 CFR 800.16(y). The NRC, however, determined that the scope of activities described in this LAR does not have the potential cause effects on historic properties, assuming those were present. NRC approval of this LAR will not result in changes to routine operations, maintenance activities, construction activities, land disturbance, or any physical movement of the casks. Therefore, in accordance with 36 CFR 800.3(a)(1), no further consultation is required under Section 106 of the NHPA. The NRC staff, however, consulted with the Virginia's State Historic Preservation Officer (SHPO) by letter dated October 7, 2014 (NRC, 2014b). On November 10, 2014, the SHPO concurred with NRC's determination that the proposed action does not have the potential to affect historic properties, if present (VDHR, 2014).

7.2 The Endangered Species Act

Section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1536), through its implementing regulations (50 CFR Part 402, Subpart B), requires Federal agencies to either initiate the process to prepare a biological assessment (50 CFR 402.12) or alternatively, engage in informal consultation (50 CFR 402.13) with the Fish and Wildlife Service (FWS) of the U.S. Department of the Interior or the National Marine Fisheries Service of the U.S. Department of Commerce (NMFS). Under informal consultation, if the agency determines that the proposed action is not likely to adversely affect endangered or threatened species or their critical habitats, and the FWS or the NMFS, as appropriate, concurs, then the consultation process is terminated and no further action is required on the part of the agency. If the agency cannot make the required informal consultation findings, or if the FWS or the NMFS does not concur with the agency's findings, then the agency must prepare a biological assessment and proceed to formal consultation with either the FWS or the NMFS, as appropriate (50 CFR 402.14). Formal consultation may result in further obligations upon the agency and/or the applicant or licensee.

Although endangered and threatened species or their critical habitats could be known to occur in the vicinity of the NA site, the proposed action will not affect listed species or their critical habitats because NRC approval of this LAR will not result in changes to routine operations, construction activities, land disturbance, or any physical movement of the casks. The NRC staff

consulted with the FWS and the Virginia Department of Game and Inland Fisheries by letters dated October 7, 2014 (NRC, 2014c, 2014d, respectively). On November 20, 2014, the FWS concurred with the NRC's determination that the proposed action does not have the potential to affect listed species or critical habitats (FWS, 2014).

7.3 Virginia Department of Health

On December 19, 2014, a copy of the draft EA was sent to the Virginia Department of Health (VDH) for comment. VDH responded in an email dated December 23, 2014, from the Director of the Office of Radiological Health for the State of Virginia. The letter stated that, "The Virginia Department of Health's (VDH) Office of Radiological Health has reviewed the draft Environmental Assessment (EA) for the Amendment of U.S. NRC License No. SNM-2507 to the North Anna Independent Spent Fuel Storage Installation (Docket No. 72-16). While the draft EA provides sound rationale with regard to the "draft finding of no significant impact," VDH takes "no position" in support of or opposition to the Commission's conclusion" (VDA, 2014).

8.0 CONCLUSION AND FINDING OF NO SIGNIFICANT IMPACT

Based on its review of the proposed action, in accordance with the requirements in 10 CFR Part 51, the NRC staff has preliminarily determined that approval of the LAR will not significantly affect the quality of the human environment. In the LAR, Dominion is proposing to amend Materials License SNM-2507, TS 4.2.3, "Storage Pad," to change the allowable distance between individual casks from a nominal16 ft to a minimum of 14 ft (center-to-center) for casks with a heat load no greater than 27.1kW on ISFSI Pad 1. Dominion is requesting this amendment in lieu of physically moving the casks back to their pre-earthquake locations. No changes to Dominion's operation and maintenance of the NA ISFSI are associated with the LAR.

No significant radiological or non-radiological impacts are expected to result from approval of the LAR. Occupational dose estimates associated with the proposed action and continued normal operation and maintenance of the ISFSI are expected to be at ALARA levels and within the limits of 10 CFR 20.1201. No measurable radiation exposure to a member of the public is expected as a result of the LAR, and public exposure associated with normal operation of the ISFSI will be less than the applicable exposure limits in 10 CFR 20 and 10 CFR 72. Furthermore, the NRC staff determined that the proposed action is more favorable than the no-action alternative, which would require movement of the casks and result in increased radiological exposure to workers and potential for accidents. Therefore, the NRC staff has determined that pursuant to 10 CFR 51.31, preparation of an environmental impact statement is not required for this proposed action, and pursuant to 10 CFR 51.32, a finding of no significant impact (FONSI) is appropriate.

9.0 LIST OF PREPARERS

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