

## North Anna RP RAIs for Discussion

<b>NAPS RAI Question Number</b>	<b>RAI Topic</b>
12.02-5(a)	Procedures and controls of rad materials
12.02-5(b)	How will materials be secured and tracked?
12.02-5(c)	What is meant by 'approved procedures?'
12.02-7(a)	Shielding requirements of radiation sources
12.02-7(b)	Provide a list of radiation sources
12.02-8	Special handling criteria of radiation sources
12.02-9	Cf-252 source placement and duration of residence
12.03-12.04-1(a)	Criteria for placement and sensitivity of portable airborne rad monitors
12.03-12.04-1(b)	Verification sufficient number of portable airborne rad monitors
12.05-1(a)	Provide number of instruments
12.05-1(b)	Procedures and training for airborne iodine concentration
12.05-3	Provide details for RPP milestones and elements

**NRC RAI 12.02-5**

*FSAR Section 12.2.1.5, "Other Contained Sources," (STD SUP 12.2-1) states that the control and use of the additional contained by-product, source, or special nuclear material sources which are not part of the permanent plant design and which are not listed in the ESBWR DCD will be governed by plant procedures.*

*a) State whether these procedures will be part of the Radiation Protection Program, as described in Section 12.5 of the North Anna COL. Additionally, state whether these materials will be controlled under the procedures described in Section 12.5.4.10 (Radioactive Material Control) of NEI 07-03.*

*b) 10 CFR 20.1801 requires licensees to secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas. Describe how the additional contained sources described in STD SUP 12.2-1 (response to COL Information Item 12.2-4-A) will be secured in accordance with 10 CFR 20.1801. Describe how the materials will be tracked.*

*c) STD SUP 12.2-1 (response to COL Information Item 12.2-4-A) of the COL application states that "Radiography is conducted in accordance with approved procedures". Describe what is meant by approved procedures.*

**Dominion Response**

North Anna Unit 3 FSAR Section 12.5, "Operational Radiation Protection Program," incorporates by reference the DCD Section 12.5. Each of the three COL Information Items are stated as being addressed by Appendix 12BB of the FSAR. The FSAR Appendix 12BB, "Radiation Protection," incorporates by reference in its entirety the NEI template NEI 07-03, "Generic FSAR Guidance for Radiation Protection Program Description." Therefore, NEI 07-03 is the Radiation Protection Plan for North Anna Unit 3. NEI 07-03, Section 12.5, states, "(a) radiation protection program is developed, documented and implemented through plant procedures...."

**RAI 12.02-5 - Part a)**

Radiation protection plant procedures including those described in this RAI (particularly those referred to in STD SUP 12.2-1) will be part of North Anna Unit 3 Radiation Protection Program. NEI 07-03, Section 12.5, part 1.d., "Procedures," states that procedures will be established, implemented and maintained sufficient to maintain adequate control over the receipt, storage, and use of radioactive materials..." The procedures described in Section 12.5.4 (including 12.5.4.10) will control the use of the additional contained by-product, source, or special nuclear material sources. Specifically, NEI 07-03, Section 12.5.4 states, "(r)adiation protection procedures are established, implemented and maintained sufficient to provide adequate control over the receipt, possession, use, transfer, and disposal of byproduct, source, and special nuclear material..."

RAI 12.02-5 – Part b)

Detailed procedures necessary to implement the program requirements of NEI 07-03 have not been created. However, NEI 07-03 has been incorporated by reference in the FSAR and thus the NEI 07-03 requirements are FSAR requirements. NEI 07-03, Section 12.5.3.1, "Facilities," states that, "a radioactive materials storage area(s) is established, as needed and in accordance with 10 CFR 20.1801..." In addition, 12.5.4.10, "Radioactive Material Control," states that, "(p)rocedures are established, implemented and maintained that assure compliance with the requirements of 10 CFR 20.1801....to assure positive control over licensed radioactive material..." Therefore the requirements for future procedures for secure storage and tracking are provided in the FSAR via NEI 07-03.

RAI 12.02-5 – Part c)

An approved procedure is one that has been signed by the proper cognizant management personnel.

Proposed COLA Revision

None.

**NRC RAI 12.02-7**

*Regulatory Guide 1.206 states that the applicant should describe any required radiation sources containing byproduct, source, and special nuclear material that may warrant shielding considerations, and, for any such sources, should provide a listing by isotope, quantity, form, and use for all of these sources that exceed  $3.7 \text{ E}+9 \text{ Bq}$  (100 millicuries).*

*a) Describe the uses and shielding requirements of any radiation sources containing byproduct, source, and special nuclear material not described in the ESBWR DCD that may require shielding design considerations.*

*b) Provide a listing, by isotope, quantity, form, and use, of any of the sources described in your response to a) above that exceed 100 millicuries.*

**Dominion Response**

FSAR Section 12.2.1.5, "Other Contained Sources," in response to COL Information Item 12.2-4-A, addresses additional contained radiation sources not described in the DCD.

**Radiation Source Uses and Shielding Requirements**

FSAR Section 12.2.1.5, "Other Contained Sources," in response to COL Information Item 12.2-4-A, identifies and describes check, calibration and radiography sources as additional radiation source uses not described in the DCD that may require shielding considerations. FSAR Appendix 12BB incorporates by reference NEI 07-03, Generic FSAR Template Guidance for Radiation Protection Program Description, which addresses in Section 12.5.4.2 the methods to maintain exposures ALARA, including shielding requirements for portable sources. Additional criteria for shielding will be identified at the time of source purchase, when the specific isotope is known. NEI 07-03 Section 12.5.4 states that radiation protection procedures are established and implemented to provide adequate control over the receipt, possession, use, transfer and disposal of byproduct, source and special nuclear material and assure compliance with the requirements of 10 CFR Parts 19, 20, 50, 70 and 71.

**Sources that Exceed 100 Millicuries**

Based on operating experience and the existing radiation protection program at North Anna Units 1 and 2, Dominion is aware of two standard calibration sources that exceed 100 millicuries. These standard calibration sources are a neutron (Am-Br) source and a Cs-137 source. Details of isotope type, quantity, form, shielding requirements, and use of future contained sources will be available when these required sources are purchased. These sources will be controlled by the Radiation Protection Program as described above.

FSAR Table 13.4-201, Item 10, lists the implementation milestone for the Radiation Protection Program.

**Proposed COLA Revision**

None.

**NRC RAI 12.02-8**

*STD SUP 12.2-1 (Section 12.2.1.5) states that check sources that are integral to the area, process, and effluent monitors consist of small quantities of by-product material and do not require special handling, storage, or use procedures for radiation protection purposes. Specify your criteria for determining when radiation sources would not require special handling, storage, or use procedures for radiation protection purposes.*

**Dominion Response**

Check sources used in area, process and effluent monitors do *not* require special handling, storage, or use procedures for radiation protection purposes when the source is actually physically located in (i.e., integral to) the monitors. These check sources are an integral part of the radiation monitors and are not easily removed. Access to these sources would require procedures and tools to disassemble components of the monitors.

**Proposed COLA Revision**

None.

**NRC RAI 12.02-9**

*Tier 2, Section 12.2.1.1.2, of the GEH ESBWR DCD states that during the first refueling outage, the Cf-252 reactor startup source and source holder will be removed from the reactor and moved to a designated location in the spent fuel pool (SFP). The DCD then states that operations and radiation protection personnel determine placement and duration of residence for the Cf-252 source and holder in the SFP. Identify in the North Anna FSAR where the issue of placement and duration of residence for the Cf-252 source and holder in the SFP is addressed.*

**Dominion Response**

FSAR Section 12.2 incorporates by reference DCD Section 12.2, which states, "(t)he source and source holder is removed from the reactor during the first refueling outage and moved to a designated location in the spent fuel pool (SFP). Operations and radiation protection personnel determine placement and duration of residence for the Cf-252 source and holder in the SFP."

Details regarding the specific placement and duration of residence will be addressed as a part of the operational radiation protection program described in FSAR Section 12.5.

The Cf-252 reactor startup sources will be stored in the spent fuel pool in a designated location until final disposition can be determined.

**Proposed COLA Revision**

None.

**NRC RAI 12.03 – 12.04-1**

10 CFR 20.1501 requires the ability to identify potential radiological hazards. COL Information Item COL 12.3-2-A requires the COL applicant to discuss the placement of portable airborne radiation monitors as well as the operational considerations. COL Section 12.3.4 states that the placement of these monitors is located in COL Section 12.5. COL Section 12.5 references NEI template 07-03. NEI template 07-03 discusses types of radiation monitors that may be used at a plant as well as the corresponding operational considerations that will be considered for these monitors. However, this template does not discuss the criteria for placement of the airborne portable monitors.

a) Describe the criteria for placement and the sensitivities of portable airborne monitors that are used for normal operation, anticipated operational occurrences, and accident conditions.

b) Verify that North Anna, Unit 3, will have a sufficient number of portable airborne radiation monitors to sample air at all normally occupied locations where airborne radioactivity may exist.

**Dominion Response**

As stated in FSAR Appendix 12BB, "Radiation Protection," NEI Template 07-03 is incorporated by reference.

a) Describe the criteria for placement and the sensitivities  
NEI 07-03, Section 12.5.3.2 states that:

"Continuous air monitors (CAMs) provide a means to observe trends in airborne radioactivity concentrations. CAMs equipped with local alarm capability are used in occupied areas where needed to alert personnel to sudden changes in airborne radioactivity concentrations."

NEI 07-03, Section 12.5.3.2, also states that radiation monitoring instrumentation and equipment will provide the appropriate detection capabilities, ranges, sensitivities and accuracies required for the types and levels of radiation anticipated at the plant and in the environs during routine operations, major outages, abnormal occurrences, and postulated accident conditions. The level of detail presented in NEI 07-03 represents the level of detail necessary for the COLA regarding the radiation protection program, including descriptions of the use of portable airborne monitors.

b) sufficient number of portable airborne radiation monitors

Consistent with NEI 07-03, Section 12.5, Item III, adequate equipment will be available to effectively implement the radiation protection program. Milestone 1, Item c ensures an adequate number of instruments will be available to provide for appropriate detection capabilities to conduct radiation surveys in accordance with 10 CFR 20.1501 and 20.1502, including the capability to sample air at all normally occupied locations where airborne radioactivity may exist.

**NRC RAI 12.05-1**

*Per 10 CFR 50.34 (f)(2)(xxvii) (as supplemented by the criteria in Item III.D.3.3 of NUREG-0737) the Applicant shall provide equipment and associated training and procedures for accurately monitoring inplant radiation and airborne radioactivity (iodine concentration) in areas within the facility where plant personnel may be present during an accident and for a broad range of routine conditions. NEI template 07-03, which STD COL 12.5-2-A references, does not describe the numbers of the instruments that will be available to comply with this requirement, nor does it describe the training program and procedures on the use of these instruments.*

*a) Provide the number of instruments that the licensee will have available for use to determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident.*

*b) Verify that the Applicant will have procedures and a training program to instruct plant personnel on how to accurately determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident and for a broad range of routine conditions.*

**Dominion Response**

As stated in FSAR Appendix 12BB, "Radiation Protection," NEI template 07-03 is incorporated by reference.

Consistent with NEI template 07-03, Section 12.5, Item III, adequate equipment will be available to effectively implement the radiation protection program. Milestone 1, Item c ensures an adequate number of instruments will be available to provide for appropriate detection capabilities to conduct radiation surveys in accordance with 10 CFR 20.1501 and 20.1502, including the capability to determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident.

As stated in NEI template 07-03 Section 12.5.2.4, paragraph 1, radiation protection technicians (RPTs) will carry out responsibilities defined in the radiation protection program and procedures. Section 12.5.2.4, paragraph 2, states that RPTs will be trained and qualified under a program established in accordance with 10 CFR 50.120. These procedures and training will ensure adequate determination of airborne iodine concentration in areas within the facility where plant personnel may be present during an accident and for a broad range of routine conditions.

**Proposed COLA Change**

None.



**NRC RAI 12.05-3**

For each of the Radiation Protection Program Milestones listed below (and shown in Table 13.4-201 of the North Anna FSAR), provide a listing of the specific operational radiation protection program elements and procedures that will be implemented consistent with each milestone. *These are all in the template*

- a) Prior to the initial receipt of by-product, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18), and thereafter, when such radioactive materials are possessed under this license.
- b) Prior to receiving reactor fuel under this license, and thereafter, when reactor fuel is possessed under this license.
- c) Prior to initial loading of fuel in the reactor.
- d) Prior to initial transfer, transport or disposal of radioactive materials. Verify that, prior to initial loading of fuel in the reactor, the radiation protection program described in NEI template 07-03 will be fully implemented, with the exception of the organization, facilities, equipment, instrumentation, and procedures necessary for transferring, transporting or disposing of radioactive materials in accordance with 10 CFR Part 20, Subpart K, and applicable requirements in 10 CFR Part 71. In addition, verify that the position of Radiation Protection Manager will be filled and at least one radiation protection technician for each operating shift, selected, trained and qualified consistent with the guidance in RG 1.8, will be onsite and on duty when fuel is initially loaded in the reactor, and thereafter, whenever fuel is in the reactor.

**Dominion Response**

FSAR Appendix 12BB incorporates NEI 07-03, "Generic FSAR Template Guidance for Radiation Program Protection Description," by reference. NEI Template 07-03, Section 12.5, milestones 1 through 4 indicate the stages in which the operational radiation protection program will be implemented.

Consistent with milestones 1 through 4, the program elements of organization, facilities, instrumentation & equipment, procedures and training will be implemented as stated prior to the initial receipt of by-product, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18), and thereafter, when such radioactive materials are possessed, prior to receiving reactor fuel under this license, and thereafter, when reactor fuel is possessed under this license, prior to initial loading of fuel in the reactor, and prior to initial transfer, transport or disposal of radioactive materials.

Additionally, milestone 3 specifically requires that the position of Radiation Protection Manager be filled and at least one radiation protection technician for each operating shift, selected, trained and qualified consistent with the guidance in RG 1.8, be onsite

and on duty when fuel is initially loaded in the reactor, and thereafter, whenever fuel is in the reactor.

These milestones and implementation requirements are listed in FSAR Table 13.4-201. Dominion will implement the Radiation Protection Program as described in NEI Template 07-03 in accordance with the milestones listed in FSAR Table 13.4-201.

**Proposed COLA Change**

None.