

PMNorthAnna3COLPEmails Resource

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Subject: Draft RAIs 5784 and 5980, FSAR Section 12.2, North Anna 3 COLA
Attachments: Draft RAI 5784.doc; Draft RAI 5980.doc

Please see attached Draft RAIs 5784 and 5980 for the FSAR Section 12.2 of the North Anna 3 application. Please let me know if you need any clarification for these RAIs before COB September 20, 2011. Otherwise, it will be issued as final after September 20, 2011.

Chandu Patel

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Request for Additional Information No. 5784 (Draft)

North Anna, Unit 3
Dominion
Docket No. 52-017
SRP Section: 12.02 - Radiation Sources
Application Section: 12.2

QUESTIONS for Health Physics Branch (CHPB)

12.02-***

Mitsubishi Heavy Industries response to US-APWR DCD Tier 2 RAI 532-4019 Revision 1 Question 12.02-29 dated April 9, 2010 stated that the following COL Information Items were to be added to the US-APWR DCD Tier 2 Section 12.2.3:

- COL 12.2(3) The COL Applicant is to include the conduct of regular surveillance activities and provisions to maintain the dose rate at 2 meters from the surface of both the Refueling Water Storage Auxiliary Tank (RWSAT) and the Primary Makeup Water Tank (PMWTs) under 0.25 mrem/h in the Radiation Protection Program.
- COL 12.2 (4) The COL Applicant is to implement a method of ensuring that the radioactivity concentration in both the RWSAT and the PMWTs remain under the specified concentration level described in the DCD.

North Anna Power Station Unit 3 (NAPS) COL FSAR Revision 3, Section 12.2 "Radiation Sources" states that section 12.2 of the US-APWR Tier 2 DCD Section 12.2 is incorporated by reference, with the stated departures and/or supplements. Departure DEP 9.2(1) "Replacement of Boron Recycle System with a Degasifier Subsystem" eliminated the reuse of reactor coolant water, so the PWMT will not contain any radioactivity, but this change does not affect the amount of radioactive material in the RWSAT. NAPS COL FSAR Section 12.2.1.1.10 "Miscellaneous Sources" does state that the content of the RWSAT is processed by the Spent Fuel Pool purification system until the activity in the fluids is sufficiently low to result in dose rates less than 0.25 mrem/h at 2 meters from the surface of the tank, so the radioactive contents of the RWSAT will continue to impact the dose rates, and the radiation zones surrounding the storage tanks area.

However, NAPS COL FSAR Section 12.2 does not appear to address COL Information Items 12.2(3) and COL 12.2(4). Please explain how the application addresses COL Information Items 12.2(3) and 12.2(4), including any associated departures and alternative approaches.

12.02-***

As described below, North Anna Power Station Unit 3 (NAPS) COL FSAR Revision 3, labels the same piece of equipment with two different names. The "degasifier feed demineralizer" is also referred to as the "Reactor Coolant Drain Demineralizer". The use of multiple identifier labels for the same equipment is inconsistent with NUREG 0800, Standard Review Plan (SRP) Section 18 Revision 2 "Human Factors Engineering," which provides guidance to applicants for acceptable Human Factors Engineering practices, by referencing NUREG-0711 Revision 2, "Human Factors Engineering

Program Review Model” and NUREG-0700 “Human-System Interface Design Review Guidelines.” NUREG-0711 and NUREG 0700 state that labels should be worded consistently.

The following excerpts are from the NAPS COL FSAR:

- Subsection 9.3.4.2.5 “Degasifier Subsystem” states that the Holdup Tank Pumps transfer the liquid in the holdup tanks to the degasifier subsystem by first passing the fluid through the degasifier feed demineralizer.
- Subsection 9.3.4.2.6.17 “Degasifier Feed Demineralizer” states that the degasifier feed demineralizer is also known as the Reactor Coolant Drain Demineralizer.
- Figure 9.3.4-1R “Chemical and Volume Control System Flow Diagram (Sheet 6 of 7)” identifies this demineralizer as the Degasifier Feed Demineralizer.
- Subsection 12.2.1.1.3 .E “Degasifier,” Table 12.2-1R “Radiation Source Parameters (Sheet 3 of 6),” Table 12.2-64R “Chemical and Volume Control System Radiation Sources Reactor Coolant Drain Demineralizer Activity (70 ft3 of Resin),” Table 12.2-65R “Chemical and Volume Control System Radiation Sources Reactor Coolant Drain Demineralizer Activity (70 ft3 of Resin),” Table 12.2-73R “Parameters for the US-APWR demineralizers,” Table 12.2-75R “Inlet Flow Steam Activity of Reactor Coolant Drain demineralizer,” and Table 12.3-1R “Thicknesses of Concrete walls that enclose the major components (Sheet 4 of 4)” list this component as the Reactor Coolant Drain demineralizer.

Please revise and update the NAPS COL FSAR to use a consistent identifier for this component in NAPS COL FSAR sections 9.3, 12.2 and 12.3, or justify an alternative approach.

12.02-***

The guidance contained in NUREG 0800 Standard Review Plan (SRP) Section 12.2 “Radiation Sources” and Regulatory Guide 1.206 “Combined License Applications for Nuclear Power Plants (LWR Edition),” section C.I.12.2.1 “Contained Sources,” states that the applicant is to provide the models, parameters and bases for all values used to calculate source magnitudes used as the basis for designing the radiation protection program and for shield design calculations.

North Anna Power Station Unit 3 (NAPS) COL FSAR Revision 3 Departure DEP 9.2(1) “Replacement of Boron Recycle System with a Degasifier Subsystem” eliminated the reuse of reactor coolant water, so this water will need to be processed as liquid waste. Based on the information contained in USAPWR DCD Tier 2 Revision 2 Table 12.2-73 “Parameters for the US-APWR Demineralizers,” it is estimated that the Liquid Waste Processing System will need to process an additional 1.4 million gallons of Reactor Coolant each cycle, however, NAPS COL FSAR Table 12.2-73R, “Parameters for the US-APWR Demineralizers,” does not appear to reflect the processing of this additional water by the Waste demineralizer (Anion-bed), Waste demineralizer (Cation-bed) or the Waste demineralizer (Mixed bed).

Accordingly, the NAPS COL FSAR does not appear to discuss the impact on the activity values reported in the tables depicting the accumulated activity content for the Waste Demineralizer Anion Bed, Waste Demineralizer Cation Bed and the Waste Demineralizer Mixed Bed demineralizers.

Please describe the changes to the methods, models, assumptions and the impact on radiation zones and shielding needs, including changes to ensure that FSAR Table 12.2-73R appropriately reflects the assumed flow rates and processing times for the additional waste water, and the impact of processing the additional waste water on the activity contained in the Waste Demineralizer Anion Bed, Waste Demineralizer Cation Bed, the Waste Demineralizer Mixed Bed demineralizers and the mobile liquid waste processing systems, or describe an alternative approach that provides an acceptable method of complying with the rules or regulations of the Commission, or portions thereof, that underlie the corresponding SRP acceptance criteria.

Please revise and update the NAPS COL FSAR to reflect actual waste processing radiological impacts or the alternative approach taken.

12.02-***

10 CFR 20.1101(b) requires licensees to control external occupational exposure, and to ensure that engineering controls are used to keep occupational doses as low as is reasonably acceptable (ALARA). 10 CFR Part 50, General Design Criterion (GDC) 61 requires licensees to ensure that there is adequate shielding for routine activities in the area of equipment that may contain radioactivity. The guidance contained in NUREG 0800 Standard Review Plan (SRP) Section 12.2 "Radiation Sources" and Regulatory Guide 1.206 "Combined License Applications for Nuclear Power Plants (LWR Edition)" section C.I.12.2.1 "Contained Sources" states that the applicant is to provide the models, parameters and bases for all values used to calculate source magnitudes used as the basis for designing the radiation protection program and for shield design calculations. Table 12.2-73R "Parameters for the US-APWR demineralizers" states that the Decontamination Factors (DFs) for the Reactor Coolant Drain demineralizer are (Anion=10, Cs, Rb=2, Others=10). NAPS COL FSAR Table 12.2-75R "Inlet Flow Steam Activity of the Reactor Coolant Drain demineralizer" provides the radionuclide concentrations entering the Degasifier Feed/ Reactor Coolant Drain Demineralizer. However, the values presented in COL FSAR Table 12.2-202 "Chemical and Volume Control System Radiation Sources Degasifier Source Strength (Liquid Phase)" do not appear consistent with the inlet fluid activity stated in Table 12.2-75R and the decontamination factors stated in Table 12.2-73R.

Please describe the methods, models and assumptions that support NAPS COL FSAR Table 12.2-202, and explain how those methods, models, and assumptions are consistent with the stated assumptions used in NAPS COL FSAR Tables 12.2-73R and

12.2-75R, or describe an alternative approach that provides an acceptable method of complying with those rules or regulations of the Commission, or portions thereof, that underlie the corresponding SRP acceptance criteria.

Request for Additional Information No. 5980 (Draft)

North Anna, Unit 3
Dominion
Docket No. 52-017
SRP Section: 12.02 - Radiation Sources
Application Section: 12.2

QUESTIONS for Health Physics Branch (CHPB)

12.02-***

The guidance contained in Regulatory Guide (RG) 8.8 "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be as Low as is Reasonably Achievable" states that the applicant should estimate the quantity and isotopic composition of the radioactive material to be contained, deposited, or accumulated in station equipment. The guidance contained in Regulatory Guide (RG) 1.206 "Combined License Applications for Nuclear Power Plants" Section C.1.12.2.1 "Contained Sources," states that the applicant is to provide the models, parameters and bases used to calculate source magnitudes, including isotopic composition for all values.

North Anna Power Station Unit 3 (NAPS) Combined License (COL) "Departures Report," states that NAPS DEP 9.2(1) "Replacement of Boron Recycle System with a Degasifier Subsystem," replaces the Boron Recycle System with a degasifier subsystem. NAPS COL FSAR Table 12.2-203 "Chemical and Volume Control System Radiation Sources Degasifier Activity (Vapor Phase)" and Table 12.2-204 "Chemical and Volume Control System Radiation Sources Degasifier Source Strength (Vapor Phase)" provide source concentrations for the activity contained in the vapor space of the degasifier. NAPS COL FSAR Section 12.2 "Radiation Sources" does not contain the methods models and assumptions, including stripping factors, used to determine these source term activity values for the degasifier as described in the guidance contained in SRP Section 12.2 and RG 1.206 Section C.1.12.2.1. Please provide above information and revise the FSAR as appropriate.