

## NorthAnnaRAIsPEm Resource

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**From:** Patel, Chandu  
**Sent:** Thursday, May 12, 2011 3:46 PM  
**To:** 'na3raidommailbox@dom.com'  
**Cc:** Weisman, Robert; NorthAnnaRAIsPEm Resource; Nold, David  
**Subject:** RAI Letter 70, RAI 5669, Section 6.4, North Anna 3 COLA  
**Attachments:** RAI Letter 70 RAI 5669.doc

By letter dated November 26, 2007, Dominion Virginia Power (Dominion) submitted a Combined License Application for North Anna, Unit 3, pursuant to Title 10 of the *Code of Regulations*, Part 52. The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this COLA.

The NRC staff has identified that additional information is needed to continue portions of the review and a Request for Additional Information (RAI), is enclosed. To support the review schedule, Dominion is requested to respond within 30 days of the date of this request. If the RAI response involves changes to the application documentation, Dominion is requested to include the associated revised documentation with the response.

Sincerely,  
Chandu Patel  
Lead Project Manager for NA3 COLA

**Hearing Identifier:** NorthAnna3\_eRAI  
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**From:** Patel, Chandu

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RAI Letter No. 70  
5/12/2011  
North Anna, Unit 3  
Dominion  
Docket No. 52-017  
SRP Section: 06.04 - Control Room Habitability System  
Application Section: 6.4.4.2

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

Request for Additional Information No. 5669

06.04-1

Dominion indicated in its letter (ML103160406) to the staff of November 10, 2010 (Serial No. NA3-10-019), that the SCOL applicant did not endorse the RCOL applicant's response to RAI #3451, (CP RAI # 77) Question #06.04-1. There was no note provided in the letter's "Endorsement Clarification" column that would explain the SCOL applicant's reasons for non endorsement. The staff requests that the SCOL applicant provide resolutions to the following issues documented in Question #06.04-1.

North Anna 3 combined license NAPS COL 6.4(1) pertains to the evaluation of threats from toxic chemicals of mobile and stationary sources to control room habitability. During the NRC staff's review of the regulatory requirements associated with NAPS COL 6.4(1), the NRC staff could find no commitment by the applicant nor mechanism in the COL FSAR that will drive the SCOL applicant to perform future surveys of stationary and mobile sources of hazardous chemicals on a periodic basis.

The NRC staff notes that Regulatory Guide 1.196 Regulatory Position 2.5 "Hazardous Chemicals" states:

"Regulatory Guide 1.78 encourages licensees to conduct periodic surveys of stationary and mobile sources of hazardous chemicals in the vicinity of their plant sites. The periodicity should be based on the number, size, and type of industrial and transportation activities in the vicinity of the plant and regional and local changes in uses of land. The staff recommends conducting a survey of the location, types, and quantities of the mobile and stationary hazardous chemical sources at least once every 3 years, or more frequently as applicable.

The staff also recommends annual performance of an onsite survey of hazardous chemical sources.

As such, the NRC staff requests additional information as to how the SCOL applicant intends to satisfy the intent of this regulatory guide during the life cycle of North Anna Unit 3. The NRC staff requests that the SCOL applicant amend the COL FSAR to ensure that the intent of this passage from Regulatory Guide 1.196 is satisfied throughout the life cycle of North Anna Unit 3.

06.04-2

As part of its review per the guidance of NUREG-0800, Standard Review Plan (SRP) Chapter 6.4 and Regulatory Guide 1.78, 'Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release.' the staff plans to perform confirmatory modeling with

either ALOHA and/or HABIT as appropriate for the toxic gas events described in North Anna 3 FSAR subsection 6.4.4.2 and summarized in Table 6.4-201.

North Anna 3 FSAR section 6.4.4.2 "Toxic Gas Protection" reads that *"With the exception of the evaluation of NOVEC 1230, the subject evaluation for Unit 3 used the ALOHA air dispersion model."* The SCOL applicant went on to provide a brief description of methodology used to evaluate the NOVEC1230 concentration within the main control room (MCR). In the same FSAR section the applicant indicated that sodium hypochlorite required an upfront calculation before performing a hazardous chemical dispersion analyses via ALOHA. FSAR section 6.4.4.2 also reads *"Calculations performed to evaluate the habitability of the MCR for accidental releases of hydrogen or nitrogen indicate MCR personnel are not subject to the hazard of breathing air with insufficient oxygen inside the MCR due to a release of hydrogen or nitrogen."*

The applicant's FSAR fails to include an update to DCD section 6.4.8 "References" that would capture in engineering document form, the said evaluations and calculations. Does the applicant have a calculation available for audit that reflects the above calculations and evaluations? Does the applicant have a formal engineering calculation that summarizes the inputs used in the ALOHA modeling and the outcomes of the ALOHA modeling for all the chemicals/materials of FSAR Table 6.4-201?

The NRC staff requests that the applicant make available to the staff, the calculations, assumptions and input parameters used in their hazardous chemical dispersion analyses.

In making this request for additional information, the staff is aware of the additional information supplied by the applicant in their response to RAI 50, Question 02.02.03-8.

06.04-3

Dominion indicated in its letter (ML103160406) to the staff of November 10, 2010 (Serial No. NA3-10-019), that the SCOL applicant did not endorse the RCOL applicant's response to RAI #3451, (CP RAI # 77) Question #06.04-5. There was no note provided in the letter's "Endorsement Clarification" column that would explain the SCOL applicant's reasons for non endorsement. As similarly documented in Question #06.04-5, the staff requests that the SCOL applicant provide resolutions to the following issues:

North Anna 3 FSAR section 6.4.3 "System Operational Procedures" does not address the threat of asphyxiates to main control room (MCR) habitability. Table 6.4-201 lists several asphyxiates as potential threats to MCR habitability.

The staff notes that the expectation created in Section 3.1 of RG 1.78, MCR operators will take protective measures within two minutes (adequate time to don a respirator and protective clothing) of perception (e.g. odor threshold) of a toxic gas to prevent prolonged exposure levels to IDLH concentration levels.

The staff notes that all the toxic chemicals and asphyxiates of SCOL FSAR Table 6.4-201 screened in as potential threats to control room habitability. With respect to these potential threats, would the control room concentrations of any of these toxic chemicals or asphyxiates reach levels perceptible to the MCR operator?

The staff requests that the SCOL applicant clarify in the FSAR, the operator actions that would be captured in the plant's toxic gas response procedures upon sensing the presence of toxic chemicals versus asphyxiates. Would donning a respirator and protective clothing take precedence over isolating the control room envelope for a toxic gas? Upon the MCR operators sensing a toxic gas or asphyxiate, would donning a respirator and/or protective clothing be a mandatory response or a prescribed response? In particular, how would the procedural response to a perceived threat from a toxic gas differ from a perceived threat from an asphyxiate?

#### 06.04-4

Dominion indicated in its letter (ML103160406) to the staff of November 10, 2010 (Serial No. NA3-10-019), that the SCOL applicant did not endorse the RCOL applicant's response to RAI #3451, (CP RAI # 77) Question #06.04-6. There was no note provided in the letter's "Endorsement Clarification" column that would explain the SCOL applicant's reasons for non endorsement. As similarly documented in Question #06.04-6, the staff requests that the SCOL applicant provide resolutions to the following issues:

The level of detail provided in the SCOL FSAR 6.4.3 is not adequate to determine if the regulatory requirements are met. Please provide in the FSAR the essential elements of the training and procedures necessary to demonstrate the regulatory commitments are met. Specifically, what will the operators be directed and trained to do to meet the recommendations in RG 1.196. The NRC staff requests that in responding and revising the FSAR, that the applicant establish a consistency with the following regulatory positions:

- Regulatory Position C.5 "Emergency Planning" of Regulatory Guide 1.78;
- Regulatory Position 2.5 "Hazardous Chemicals" of Regulatory Guide 1.196;
- Regulatory Position 2.2.1 "Comparison of System Design, Configuration, and Operation with the Licensing Bases" of Regulatory Guide 1.196; and
- Regulatory Position 2.7.1 Periodic Evaluations and Maintenance of Regulatory Guide 1.196

Please include a discussion of what operators will be directed to do when they smell toxic gas or are notified by external sources that there was a toxic gas release. Please include a discussion any arrangements that will be in place for notification of the control room when a release has occurred. The staff requests that the SCOL applicant amend the FSAR to provide a short description of how the training and procedures will address these regulatory positions.

Please provide a sufficient level of detail in the FSAR for the staff to make a safety finding. A short description is needed in the SCOL FSAR explaining how the procedures and training will address the noted regulatory positions.

#### 06.04-5

The refrigerants used for refrigeration and HVAC cooling systems throughout North Anna Unit 3 have not been evaluated with respect to the guidance of Regulatory Guide (RG) 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," for toxic gas analyses for the control room envelope.

Neither the SCOL application FSAR subsection 2.2.3.1.3 "On-Site Chemicals" discusses refrigerants nor do Tables 2.2-202, 2.2-203 & 6.4-201 list refrigerants. The staff acknowledges that the SCOL applicant has endorsed RCOL applicant's response to CP RAI #172, Question #06.04-11 (Reference Dominion Letter of March 16, 2011, Serial No. NA3-11-014) but the SCOL applicant failed to include any "Endorsement Clarification" note that would indicate their intent to update the FSAR.

From Section 6.4.7 of the US-APWR DCD, Revision 2:

*COL 6.4(1) states "The COL Applicant is responsible to provide details of specific toxic chemicals of mobile and stationary sources within the requirements of RG 1.78 (Ref 6.4-4) and evaluate the control room habitability based on the recommendation of RG 1.78 (Ref 6.4-4)."*

Please provide a RG 1.78 evaluation in the FSAR for the refrigerants to be used at North Anna Unit 3. The applicant's response should also address the issue of the oil charge laced in the refrigerant.