

## **PMNorthAnna3COLPEmails Resource**

---

**From:** Patel, Chandu  
**Sent:** Thursday, May 26, 2011 5:04 PM  
**To:** 'na3raidommailbox@dom.com'  
**Cc:** Weisman, Robert; NorthAnna3COL Resource; Kallan, Paul  
**Subject:** Draft RAI 5811, Section 10.2.3, North Anna 3 COLA  
**Attachments:** Draft RAI 5811.doc

Please see attached Draft RAI 5811 for Section 10.2.3 of North Anna 3 COLA. Please let me know if you need any clarification by COB June 2, 2011. Otherwise, it will be issued as final after June 2, 2011.

Sincerely,  
Chandu Patel  
Lead Project Manager for North Anna 3 COLA  
DNRL, NRO

**Hearing Identifier:** NorthAnna3\_Public\_EX  
**Email Number:** 972

**Mail Envelope Properties** (8C658E9029C91D4D90C6960EF59FC0D62027F0CE57)

**Subject:** Draft RAI 5811, Section 10.2.3, North Anna 3 COLA  
**Sent Date:** 5/26/2011 5:04:21 PM  
**Received Date:** 5/26/2011 5:04:21 PM  
**From:** Patel, Chandu

**Created By:** Chandu.Patel@nrc.gov

**Recipients:**

"Weisman, Robert" <Robert.Weisman@nrc.gov>

Tracking Status: None

"NorthAnna3COL Resource" <NorthAnna3COL.Resource@nrc.gov>

Tracking Status: None

"Kallan, Paul" <Paul.Kallan@nrc.gov>

Tracking Status: None

"na3raidommailbox@dom.com" <na3raidommailbox@dom.com>

Tracking Status: None

**Post Office:** HQCLSTR02.nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	312	5/26/2011 5:04:21 PM
Draft RAI 5811.doc	36346	

**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

Request for Additional Information No. 5811 (Draft)  
North Anna, Unit 3  
Dominion  
Docket No. 52-017  
SRP Section: 10.02.03 - Turbine Rotor Integrity  
Application Section: 10.2.3

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects)  
(CIB1)

10.02.03-\*\*\*

The MHI Report MUAP-10005-P, Revision 0 should specify which model turbine this analysis supports, since it appears to be very similar to MHI Report MUAP-07028. In addition, the proposed model for the turbine generator should be specified in the COL FSAR that corresponds to the turbine missile analysis, MHI Report MUAP-10005-P, Revision 0.

10.02.03-\*\*\*

Provide a discussion similar to the information provided in the US-APWR DCD on the material to be used for the LP rotors if it differs from the material used for the standard US-APWR LP rotors. Also, explain why the fracture toughness used in the analysis in Section 3.3 of MHI Report MUAP-10005-P, Revision 0 is different than that used in the standard US-APWR LP rotor analysis, MHI Report MUAP-07028. Also, include technical basis for the different fracture toughness to ensure the integrity of the rotor as outlined in NUREG-0800, Section 10.2.3, subparagraph III.2.

10.02.03-\*\*\*

The differences, such as the number of discs, etc., between the North Anna site-specific LP rotor and the standard US-APWR LP rotor should be explained in detail, to ensure the appropriate information is used in the turbine missile analysis. Also, discuss whether the North Anna LP rotor is also a non-bored integral rotor design similar to the standard LP rotor design specified in the US-APWR DCD, or is a different design, including the blade attachment design (i.e., christmas tree, side entry type root blade attachment). If a different blade attachment design is used, discuss how the blade attachment changes the crack initiation and growth at the attachment area of the LP rotor, and whether ultrasonic inspection performed during inservice inspection in accordance with US APWR DCD, Tier 2, FSAR Section 10.2.3.5 can still be performed. Sketches/drawings may be helpful to illustrate the differences.

10.02.03-\*\*\*

Provide in detail what is different about this steam turbine design that can affect the valve test frequency analysis, MUAP-07029, for the destructive overspeed turbine failure. This should include, but not limited to:

- Differences in turbine control system and turbine protection system.

- Are these the same valves, solenoid, mechanical and electrical systems, etc. with similar common cause and common mode failures?

Discuss how these differences in the turbine design have been accounted for in the valve test frequency analysis MUAP-07029.

10.02.03-\*\*\*

Explain why the average tangential stress for disc 1 in Table 3.1-1 of the MHI Report MUAP-10005-P for the North Anna specific LP rotor is much lower than the standard LP rotor design specified in the US-APWR DCD and the corresponding MHI Report MUAP-07028.

10.02.03-\*\*\*

Explain why the high cycle fatigue peak alternating stresses, and the corresponding failure stresses ( $\sigma_{fail}$ ) in Table 3.2-1 of the MHI Report MUAP-10005-P are different than the standard US-APWR LP rotors.

10.02.03-\*\*\*

Figure 3.3-1 in the MHI Report MUAP-10005-P is difficult to read. Therefore, provide color copy of report and details of Figure 3.3-1. Also, explain why there seems to be a large difference in the temperature distributions between the two LP turbine designs.

10.02.03-\*\*\*

Revision 3 of the North Anna COL FSAR revised Section 10.2.3.5 to state that a turbine maintenance and inservice inspection procedure will be established prior to fuel load. However, the description of the inspection program, including the inspection intervals that follow the guidance of NUREG-0800, SRP Sections 3.5.1.3 and 10.2.3 were not provided in this revised COL FSAR Section 10.2.3.5 in order to meet the requirements of General Design Criterion (GDC) 4, "Environmental and Missile Dynamic Effects Design Bases" of 10 CFR Part 50. Therefore, provide the following in order to meet the requirements of General Design Criterion 4 of 10 CFR Part 50:

- a) The guidelines in Section C.I.10.2.3.5 of Part I to RG 1.206 specify that if the plant-specific inspection program is not available at the time of the COL application, the representative information (description of the inspection program and inspection interval) may be submitted for staff review as part of the COL application. Therefore, describe the inservice inspection program and inspection intervals in the COL FSAR, or specify in the COL FSAR that the inspection procedure will be consistent with the inspection program and inspection intervals identified in Section 10.2.3.5 of the US-APWR DCD FSAR.
- b) The submittal and implementation of the inservice inspection procedure for COL Item 10.2(1), which is based on the as-built properties of the turbine rotor, should be included as a proposed license condition in Section 1.8.1.2 and Table 1.8-201 of the North Anna S-COL FSAR application since this item will not be resolved prior to the issuance of the license. The proposal of a license condition, as discussed in Section C.I.10.2.3.5 of Part I to RG 1.206, ensures that the as-built

plant is consistent with the design reviewed during the licensing process, and is consistent with a Luminant Generation Company letter dated August 9, 2010, for the R-COL application, Comanche Peak, Units 3 and 4.