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**To:** Joseph\_Hegner@dom.com; Marvin\_Smith@dom.com; Tony\_Banks@dom.com  
**Date:** Wed, May 10, 2006 4:53 PM  
**Subject:** North Anna ESP Rev 06 RAI Letter dated 5/10/2006

Attached please find the RAI Letter.

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**CC:** Beckner, William; Cabbage, Amy

**Mail Envelope Properties** (446252D4.998 : 3 : 8232)

**Subject:** North Anna ESP Rev 06 RAI Letter dated 5/10/2006  
**Creation Date:** Wed, May 10, 2006 4:53 PM  
**From:** Nitin Patel

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May 10, 2006

Mr. David A. Christian  
Senior Vice President and Chief Nuclear Officer  
Dominion Resources Services  
Innsbrook Technical Center  
5000 Dominion Blvd.  
Glen Allen, VA 23060-6711

**SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING REVISION 6  
OF THE EARLY SITE PERMIT (ESP) APPLICATION FOR THE NORTH ANNA  
SITE (TAC NOS. MC1126 AND MC1128)**

Dear Mr. Christian:

By letter dated April 13, 2006, Dominion Nuclear North Anna, LLC (Dominion) submitted Revision 6 to its application for an early site permit (ESP) at the North Anna ESP site. This revision proposes to change the cooling system for proposed Unit 3 and to increase the power level for proposed Units 3 and 4 from 4300 MWt to 4500 MWt. The staff reviewed Revision 6 of the application and has determined that additional information is needed to complete its review. The request for additional information (RAI) is enclosed.

We request that Dominion submit the adequate responses to the RAI by May 24, 2006, in order to maintain the published schedule. If the values in either the Site Safety Analysis Report (SSAR) or the Environmental Report (ER) change as a result of the RAI, please submit a revised SSAR and ER containing the new values. If you have any questions on this matter, please contact the NRC project manager, Nitin Patel, at 301-415-3201 or [nxp1@nrc.gov](mailto:nxp1@nrc.gov).

Sincerely,

*/RA/*

Nitin Patel, Project Manager  
ESBWR/ABWR Projects Branch  
Division of New Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 52-008

Enclosure: As stated

cc w/encl: See next page

Mr. David A. Christian  
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May 10, 2006

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Sincerely,

/RA/

Nitin Patel, Project Manager  
ESBWR/ABWR Projects Branch  
Division of New Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 52-008

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ADAMS ACCESSION NO.: ML061290142

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REQUEST FOR ADDITIONAL INFORMATION  
REGARDING REVISION 6 TO THE APPLICATION  
FOR AN EARLY SITE PERMIT (ESP) AT THE NORTH ANNA ESP SITE  
DOMINION NUCLEAR NORTH ANNA, LLC  
DOCKET NO. 52-008

By letter dated April 13, 2006, Dominion Nuclear North Anna, LLC (Dominion) submitted Revision 6 to its application for an early site permit (ESP) at the North Anna ESP site. The revision proposes to change the cooling system for proposed Unit 3 and to increase the power level for proposed Units 3 and 4 from 4300 MWt to 4500 MWt.

The staff has reviewed Revision 6. Using the activity releases given in the environmental report (ER) and the site safety analysis report (SSAR), the breathing rate given in Regulatory Guide (RG) 1.183, the site-specific X/Q's, and the dose conversion factors in Federal Guidance Reports (FGR) 11 and 12 (issued by the Environmental Protection Agency), the staff calculated the doses set forth in RAIs 2-5. In those RAIs, the staff refers to doses calculated by the applicant, which were calculated by multiplying the doses in the ESBWR Design Control Document (DCD) by the ratio of the North Anna ESP site-specific X/Q's to that used for the ESBWR, multiplied by a factor of 1.25. Accordingly, the staff has determined that the following additional information is needed to complete its review:

1. For each of the postulated accidents discussed in RAIs 2-5, provide the activity release for the period giving the highest 2-hour dose at the EAB. Also, provide the period (in hours) used.
2. ESBWR Failure of Small Lines Carrying Primary Coolant Outside Containment.
  - A) Provide a calculation of the highest 2-hour dose at the EAB.
  - B) Using the activity releases given in ER Table 7.1-13a, and the methods described above, the staff calculated 6.82 E-04 rem as the low population zone (LPZ) dose. Please verify that the activity releases in ER Table 7.1-13a are correct, and calculate the LPZ dose using the correct activities and the methods used by the staff described above. If these doses differ from the doses listed in ER Table 7.1-13b, please justify the differences, or otherwise provide the correct result.
  - C) Using the activity releases given in site safety analysis report (SSAR) Table 15.4-12a, and the methods described above, the staff calculated 6.45 E-03 rem as the LPZ dose. Please verify that the activity releases in SSAR Table 15.4-12a are correct, and calculate the LPZ dose using these activities and the methods used by the staff described above. If these doses differ from the doses listed in SSAR Table 15.4-12b, please justify the differences, or otherwise provide the correct result.

3. ESBWR Main Steam Line Break – Equilibrium Activity

- A) Using the activity releases given in ER Table 7.1-20a, and the methods described above, the staff calculated 1.57 E-02 rem as the EAB dose for the 0 to 2 hour period and 1.02 E-03 rem as the LPZ dose. Please verify that the activity releases in ER Table 7.1-20a are correct, and calculate the EAB and LPZ doses using these activities and the methods used by the staff described above. If these doses differ from the doses listed in ER Table 7.1-20c, please justify the differences, or otherwise provide the correct result.
- B) Using the activity releases given in SSAR Table 15.4-19a, and the methods described above, the staff calculated 1.06 E-01 rem as the EAB dose for the 0 to 2 hour period and 9.63 E-03 rem as the LPZ dose. Please verify that the activity releases in SSAR Table 15.4-19a are correct, and calculate the EAB and LPZ doses using these activities and the methods used by the staff described above. If these doses differ from the doses listed in SSAR Table 15.4-19c, please justify the differences, or otherwise provide the correct result.

4. ESBWR Loss-of-Coolant-Accident

Provide a reference for the activity releases for the ESBWR Loss-of-Coolant Accident presented in ER Table 7.1-24a and SSAR Table 15.4-23a

5. ESBWR Fuel Handling Accident

- A) Using the activity releases given in ER Table 7.1-29, and the methods described above, the staff calculated 3.7 E+00 rem as the EAB dose and 2.40 E-01 rem as the LPZ dose. Please verify that the activity releases in ER Table 7.1-29 are correct, and calculate the EAB and LPZ doses using these activities and the methods used by the staff described above. If these doses differ from the doses listed in ER Table 7.1-30, please justify the differences, or otherwise provide the correct result.
- B) Using the activity releases given in SSAR Table 15.4-28, and the methods described above, the staff calculated 2.5 E+01 rem as the EAB dose and 2.27 E-00 rem as the LPZ dose. Please verify that the activity releases in SSAR Table 15.4-28 are correct, and calculate the EAB and LPZ doses using these activities and the methods used by the staff described above. If these doses differ from the doses listed in SSAR Table 15.4-29, please justify the differences, or otherwise provide the correct result.
- C) 10 CFR 50.34(a)(1) establishes a reference value of 25 rem total effective dose equivalent (TEDE) for "An individual located at any point on the boundary of the exclusion area for any 2-hour period." The criterion for acceptability of the radiological consequences of a fuel handling accident (FHA) is set at 6.3 rem in Standard Review Plan Sections 15.0.1 and 15.7.4 (well below the 25 rem reference value, which is defined as not more than 25 percent of the 25 rem reference value). This criterion is stated in Regulatory Guide 1.183.

The dose at the EAB calculated from the releases in SSAR Table 15.4-28 does not satisfy the guidance of RG 1.183. Justify why the dose is acceptable. Note that I-131

is the primary contributor to this dose. The I-131 release for the ESBWR listed in Table 15.4-28 is 45 times larger than the I-131 release listed in Table 15.4-26 for the ABWR, and is almost 21 times larger than the I-131 release listed in Table 15.4-24 for the AP1000. Explain the basis for the value in Table 15.4-28.

Revise the ER and SSAR to include the analyses with documentation of the source term, analytical assumptions, and dose estimates.

6. Severe Accidents

Provide a copy of GEDO-SR5-2006-0020, which contains information regarding ESBWR source term based on MAAP runs dated April 11, 2006. This is reference 5 of the calculation SM-1526 which is included on the CD with the MACCS2 data.

7. ABWR Feedwater System Pipe Break and Cleanup Water Line Break Accidents

Revision 6 of the ESP application includes two ABWR design basis accidents (DBAs) that were not included in revision 5 of the application: feedwater system pipe break and cleanup water line break. Both the SSAR and ER list EAB and LPZ doses for these accidents in the summary tables 7.1-2 and 15.4-1. Supporting information (activity release and dose calculation tables) is provided in both documents for the feedwater system pipe break. However, neither the ER nor the SSAR provides any supporting information for the ABWR cleanup water line break. Provide the supporting documentation for the ABWR cleanup waterline break accident.

The DCD for the ABWR design does not analyze the feedwater system pipe break accident. Revise the ER and SSAR accordingly, or explain why this accident is being analyzed, and provide all information supporting the analyses, together with references for this information. The staff notes that for the ESBWR, the dose for the feedwater system pipe break accident is more than a factor of 1000 lower than the dose from the cleanup water line break accident, while the doses are the same for these two ABWR DBAs. If analysis of the ABWR feedwater line break is necessary, explain this difference.

8. Revise the SSAR and ER to reflect any change in activities and doses as a result of the above RAIs, and provide references for such activities and doses that are inputs to Dominion's calculations.



**NORTH ANNA EARLY SITE PERMIT  
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