10 CFR 50.90

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 23, 2009

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 09-688
NL&OS/ETS R0
Docket Nos. 50-338/339
License Nos. NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR
PROPOSED LICENSE AMENDMENT REQUEST
ADOPTION OF TSTF-490, REVISION 0, REGARDING
DELETION OF E-BAR DEFINITION AND REVISION TO RCS SPECIFIC ACTIVITY

In a letter dated December 17, 2008 (Serial No. 08-0729), Dominion requested amendments, in the form of changes to the Technical Specifications (TS) to Facility Operating License Numbers NPF-4 and NPF-7, for North Anna Power Station Units 1 and 2, respectively. The proposed amendment would replace the current Technical Specifications limits on reactor coolant system (RCS) gross specific activity with a new limit on RCS noble gas specific activity. In an October 21, 2009 e-mail, the NRC staff requested additional information (RAI) to complete the review of the proposed license amendment request.

Attachment 1 to this letter provides the requested additional information and addresses another NRC concern communicated to the Technical Specification Task Force that is applicable to North Anna. To address the NRC's RAI, Dominion is revising the proposed TS change to remove the Notes from surveillance requirements (SR) 3.4.16.1 and SR 3.4.16.2. Accordingly, revised marked-up and typed Technical Specification pages and the affected marked-up Bases pages are included in Attachment 2. Please use the revised Technical Specification pages to complete your review of our December 17, 2008 amendment request.

The information provided in this letter, including the changes to the Technical Specifications, does not affect the conclusion of the significant hazards consideration discussion provided in Dominion letter dated December 17, 2008 (Serial No. 08-0729).

If you have any questions or require additional information, please contact Mr. Thomas Shaub at (804) 273-2763.

Very truly yours,

J. Alan Price
Vice President – Nuclear Engineering

Attachment:
1. Response to Request for Additional Information
2. Marked-up and Typed TS Pages and Marked-up Bases Pages

Commitments made in this letter: None

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. Alan Price, who is Vice President – Nuclear Engineering, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 23rd day of November, 2009.

My Commission Expires: 4/30/13.

Notary Public

GINGER L. ALLIGOOD
Notary Public
Commonwealth of Virginia
310847
My Commission Expires Apr 30, 2013

cc: U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, Georgia 30303

Mr. J. E. Reasor, Jr.
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, Virginia 23060

State Health Commissioner
Virginia Department of Health
James Madison Building - 7th floor
109 Governor Street
Suite 730
Richmond, Virginia 23219

NRC Senior Resident Inspector
North Anna Power Station

Ms. K. R. Cotton
NRC Project Manager
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O8 G9A
11555 Rockville Pike
Rockville, Maryland 20852

Dr. V. Sreenivas
NRC Project Manager
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O8 G9A
11555 Rockville Pike
Rockville, Maryland 20852

ATTACHMENT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION PROPOSED LICENSE AMENDMENT REQUEST ADOPTION OF TSTF-490, REVISION 0, REGARDING DELETION OF E-BAR DEFINITION AND REVISION TO RCS SPECIFIC ACTIVITY

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Background

By letter dated December 17, 2008 (Agencywide Documents and Access Management System Accession No. ML083530982), Virginia Electric and Power Company submitted a license amendment for North Anna Power Station, Units 1 and 2. The proposed amendment will revise Technical Specification (TS) to adopt Technical Specification Task Force (TSTF) - 490, "Deletion of E-Bar Definition and Revision to RCS Specific Activity," for North Anna Power Station, Unit Nos. 1 and 2. The proposed changes would replace the current Technical Specification 3.4.16 limit on RCS gross specific activity with a new limit on RCS noble gas specific activity. The noble gas specific activity limit would be based on a new dose equivalent XE-133 definition that would replace the current E-Bar average disintegration energy definition.

In an October 21, 2009 e-mail, the Nuclear Regulatory Commission staff requested the additional information to complete its review of the proposed TS changes. In separate discussions with the Technical Specification Task Force (TSTF), the NRC raised several additional generic concerns regarding TSTF-490. Consequently, Dominion is providing additional information for the concern applicable to North Anna.

NRC Question

"In the subject license amendment request, the licensee proposed TS changes to revise Limiting Condition for Operation (LCO) 3.4.16, "RCS Specific Activity," APPLICABILITY requirements to specify that the LCO is applicable in MODES 1, 2, 3, and 4. In accordance with this proposal, the licensee also proposed to add the NOTE that states, "Only required to be performed in MODE 1." to the surveillance requirements of the TS, thus removing the applicability of the surveillance requirements to other MODES.

The NRC staff has a concern about the proposed addition of the aforementioned NOTE. The proposed change revises the conditions for sampling, and may exclude sampling during the plant conditions where LCO 3.4.16 may be exceeded. After transient conditions (i.e. reactor trip, plant depressurization, shutdown or startup) that end in MODES 2, 3, or 4, the SR is not required to be performed. Isotopic spiking and fuel failures are more likely during transient conditions than during steady state plant operations.

Because LCO 3.4.16 could potentially be exceeded after plant transient or power changes, please justify why sampling is no longer needed in the plant MODES that are proposed to be eliminated and justify how the LCO 3.4.16 remains consistent with the design bases analysis from which the LCO limits are derived (i.e. main steamline break, steam generator tube rupture, etc.). Furthermore, please justify why there is an apparent disparity between the modes of applicability (MODES 1, 2, 3, and 4) and the limited mode (MODE 1) under which the surveillance is required."

Dominion Response

Even though Surveillance Requirements (SR) 3.4.16.1 and 3.4.16.2 do not require the SR to be performed in MODES 2, 3, and 4, these surveillance requirements are still required to be met during all Modes of Applicability (MODES 1, 2, 3, and 4) in accordance with SR 3.0.1. If at any time during MODES 1 through 4 if there is information or plant indication that SR 3.4.16.1 or SR 3.4.16.2 may not be met, they are required to be performed to ensure there is not a failure to meet the LCO. However, after additional discussion with the industry and the NRC regarding the surveillance requirements and the Notes, Dominion is removing the limitation (i.e., the NOTE) on Surveillance Requirements (SR) 3.4.16.1 and SR 3.4.16.2. Thus, the surveillances will be required to be performed during all Modes of Applicability (MODES 1, 2, 3, and 4), which will ensure the potential consequences of a steam line break or steam generator tube rupture are bounded by the approved accident analysis. The TS surveillances are revised to eliminate the proposed Note in SR 3.4.16.1 and delete the existing Note in SR 3.4.16.2 as follows:

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.16.1	~~Verify reactor coolant gross specific activity ≤ 100/Ē µCi/gm.~~	
	Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ 197 µCi/gm.	7 days
SR 3.4.16.2	~~NOTE Only required to be performed in MODE 1.~~	
	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 µCi/gm.	14 days AND Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period

Corrected marked-up and typed Technical Specification pages and the associated marked-up bases pages are provided in Attachment 2 to this letter.

ADDITIONAL NRC ISSUES/CONCERNS

NRC Question/Concern

"The staff requires confirmation that the site-specific limits for both DEI and DEX, and the DCFs used for the determination of DEI and DEX surveillances, are consistent with the current design basis dose analyses (SGTR and MSLB). Also for DEX, the staff requires the DCFs and RCS radioisotopic concentrations to verify the proposed DEX limit. Thus, the licensee should provide calculation of the site specific limits on DEI and DEX or provide the input and assumptions for the calculation so that the NRC can confirm."

Dominion Response

Although North Anna is licensed to 10 CFR 50.67, the station is maintaining the current conversion factors in the definition of dose equivalent I-131 (DEI). The current definition of dose equivalent I-131 allows DEI to be calculated using either TID-14844 or RG 1.109 dose conversion factors (DCFs) and is based upon information presented in letters dated September 12, 2003 and May 7, 2004 (Serial No. 03-464 and 03-464D) and approved in amendments 240/241, dated June 15, 2005 (TAC Nos. MC0776 and MC0777).

The information presented and approved in the letters above, discusses the acceptability for the pre-accident and concurrent iodine spike source terms to be based on RG 1.109 DCFs and the doses to be calculated using Federal Guidance Report No. 11 (FGR-11). RG 1.183 requires that the pre-accident and concurrent iodine spikes used in design basis analyses be based on the maximum value permitted by Technical Specifications. The North Anna main steamline break (MSLB) and steam generator tube rupture (SGTR) accidents are analyzed using the maximum reactor coolant system activity. Dose conversion factors from FGR-11 are used to calculate the Total Effective Dose Equivalent consequences described using the guidance from RG 1.183 while the 1 μCi/gm DEI inventory is calculated using RG 1.109 dose conversion factors. RG 1.109 DCFs result in a lower total allowable iodine inventory in the RCS than would be attainable using FGR-11 DCFs. Amendments 240/241 approved the use of DCFs from either RG 1.109 or TID-14844 to perform the Technical Specification surveillance for DEI. The station DEI surveillance uses TID-14844 DCFs and the definition of DEI allows the flexibility, approved in amendments 240/241, to upgrade to RG 1.109 DCFs.

The DCFs used to determine dose from noble gases and the calculation of dose equivalent Xe-133 (DEX) are from Federal Guidance Report No. 12 (FGR-12). DEX is that concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138 actually present. If a specific noble gas nuclide is not detected, it will be assumed to be present at the minimum detectable activity. The calculation of DEX is shown below.

Design Basis DE Xe-133 based on FGR-12 DCFs

	Col. 1 FGR-12 DCF (Sv-m^3/Bq-sec)	Col. 2 Primary Coolant Concentration (equivalent to 1 µCi/gm DEI) (µCi/gm)	Col. 3 Xe-133 Equivalent (µCi/gm)
Kr-85	1.19E-16	1.570E+00	1.20E-01
Kr-85m	7.48E-15	6.469E-01	3.10E+00
Kr-87	4.12E-14	3.743E-01	9.89E+00
Kr-88	1.02E-13	1.131E+00	7.40E+01
Xe-131m	3.89E-16	0.000E+00*	0.00E+00
Xe-133m	1.37E-15	9.602E-01	8.43E-0l
Xe-133	1.56E-15	8.666E+01	8.67E+01
Xe-135m	2.04E-l4	5.818E-02	7.61E-01
Xe-135	1.19E-l4	1.880E+00	1.43E+01
Xe-138	5.77E-l4	2.067E-01	7.65E+00
Total Dose Equivalent Xenon (DEX)			**1.97E+02**

* Xe-131m is not present in the current design basis accident analysis source term. Its exclusion in the calculation of DEX is conservative since the limit will be lower and the actual surveillance will include either the actual concentration detected or the minimum detectable activity.

Column 1 above lists the DCFs from FGR-12. The RCS concentrations for noble gas isotopes used in the AST analyses, equivalent to the more limiting LCO of 1 µCi/gm DEI, are given in column 2. Values from column 1 and 2 are multiplied, then normalized to the Xe-133 DCF, and the result displayed in Column 3. The values in Column 3 are summed to determine the DEX limit.

Example: Xe-133 Equivalent of Kr-85 = 1.19E-16 * 1.57E+0 / 1.56E-15 = 1.20E-01

ATTACHMENT 2

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PROPOSED LICENSE AMENDMENT REQUEST
ADOPTION OF TSTF-490, REVISION 0, REGARDING
DELETION OF E-BAR DEFINITION AND REVISION TO RCS SPECIFIC ACTIVITY**

MARKED-UP AND TYPED TS PAGES AND MARKED-UP BASES PAGES

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION**

Marked-up and Typed Technical Specification Pages

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	~~Verify reactor coolant gross specific activity ≤ 100/Ē µCi/gm.~~	
	Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ 197 µCi/gm.	7 days
SR 3.4.16.2	~~NOTE~~ ~~Only required to be performed in MODE 1.~~	
	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 µCi/gm.	14 days AND Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period
~~SR 3.4.16.3~~	~~NOTE~~ ~~Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.~~	
	~~Determine Ē from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.~~	~~184 days~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ 197 μCi/gm.	7 days
SR 3.4.16.2	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 μCi/gm.	14 days AND Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period

Marked-up Technical Specification Bases Page

BASES

SURVEILLANCE REQUIREMENTS (continued)

activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7 day Frequency considers the low probability of a gross fuel failure during this time.

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes within similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

SR 3.4.16.2

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. The 14 day Frequency is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change $\geq$ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following the iodine spike initiation; samples at other times would provide accurate results.