VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

10 CFR 50.90

March 1, 2004

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

Serial No. 03-313M
NLOS/ETS
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
PROPOSED TECHNICAL SPECIFICATIONS CHANGES AND EXEMPTION REQUEST FOR USE OF FRAMATOME ANP ADVANCED MARK-BW FUEL
SUPPLEMENTAL INFORMATION FOR SBLOCA SLOT BREAKS

In a May 6, 2003 letter (Serial No. 03-313) Dominion submitted the Realistic Large Break LOCA (RLBLOCA) results for Advanced Mark-BW fuel in North Anna Unit 2 to support the NRC's review of a proposed amendment and exemptions that will permit North Anna Units 1 and 2 to use Framatome ANP Advanced Mark-BW fuel. On August 20, 2003 (Serial No. 03-313A) Dominion provided a response to an August 6, 2003 NRC request for additional information regarding the RLBLOCA results. In an August 28, 2003 meeting to discuss the RLBLOCA analysis results, the NRC staff requested further clarification of Dominion's August 20, 2003 responses. Supplemental information was provided for Questions 1, 5, 9, and 10b on September 5, 2003 (Serial No. 03-313C), Questions 6 and 11a on September 22, 2003 (Serial No. 03-313D), Questions 2, 3, and 4 on September 26, 2003 (Serial Nos. 03-313E and F), Questions 2, 4, 10a, 10b and containment modeling on November 10, 2003 (Serial No. 03-313G), and December 8, 2003 (Serial No. 03-313H), Question 4 on December 17, 2003 (Serial No. 03-313I), containment modeling and radiation heat transfer on January 6, 2004 (Serial No. 03-313J) and January 22, 2004 (03-313K). Information relating to mixed core evaluation for LOCA was provided on February 12, 2004 (03-313L). In follow-up telephone calls between February 23-27, 2004, the NRC Staff requested additional information regarding the assessment of LOCA scenarios that may refill the loop seals during post-LOCA recovery.

The attachment to this letter provides the requested information. As noted in our August 20, 2003 letter, this information is applicable to both North Anna Units 1 and 2 even though the RAIs received were specific to Unit 2.

To support the use of Framatome Advanced Mark-BW fuel in North Anna Unit 2, Cycle 17, we respectfully request the NRC to complete their review and approval of the

A001

license amendment by March 31, 2004. We appreciate your consideration of our technical and schedular requests.

If you have any questions or require additional information, please contact us.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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SN: 03-313M
Docket Nos.: 50-338/339
Subject: Proposed Technical Specifications Changes and Exemption Request
Framatome ANP Advanced Mark-BW Fuel

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz who is Vice President – Nuclear Engineering of Virginia Electric and Power Company. She has affirmed before me that she 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 her knowledge and belief.

Acknowledged before me this 1ST day of March, 2004.

My Commission Expires: May 31, 2006.

Vicki L. Hull
Notary Public

(SEAL)

Attachment 1

Supplemental Information Regarding Loop Seal Refilling During Post-LOCA Recovery

Framatome Fuel Transition Program Technical Specification Change

Virginia Electric and Power Company
(Dominion)
North Anna Power Station Units 1 and 2

Supplemental Information Regarding Loop Seal Refilling During Post-LOCA Recovery

In an August 28, 2003 meeting to discuss the RLBLOCA analysis results, the NRC staff requested further clarification of Dominion's August 20, 2003 responses. Supplemental information was provided for Questions 1, 5, 9, and 10b on September 5, 2003 (Serial No. 03-313C), Questions 6 and 11a on September 22, 2003 (Serial No. 03-313D), Questions 2, 3, and 4 on September 26, 2003 (Serial Nos. 03-313E and F), Questions 2, 4, 10a, 10b and containment modeling on November 10, 2003 (Serial No. 03-313G), and December 8, 2003 (Serial No. 03-313H), Question 4 on December 17, 2003 (Serial No. 03-313I), containment modeling and radiation heat transfer on January 6, 2004 (Serial No. 03-313J) and January 22, 2004 (03-313K). Information relating to mixed core evaluation for LOCA was provided on February 12, 2004 (03-313L). In follow-up telephone calls conducted between February 23-27, 2004, the NRC Staff requested additional information regarding the assessment of LOCA scenarios that may involve refilling the loop seals during post-LOCA recovery. The requested information is provided below.

NRC Request (paraphrased)

There are potential LOCA scenarios in which the action of the emergency core cooling systems may, during the period of post-LOCA recovery, result in the reactor coolant system loop seal piping refilling with water. This could potentially lead to an extended period of core uncovery. Even though the peak cladding temperatures may exhibit significant margin to the limit, this situation could cause the cladding oxidation limits of 10CFR50.46(b) to be exceeded. Please address the impact of the transition to Framatome ANP fuel at North Anna Units 1 and 2 on the ability to mitigate the scenario described.

Dominion Response

Framatome ANP evaluations of the LOCA scenarios of concern to the NRC staff were addressed for North Anna Units 1 and 2 in Dominion letters dated May 27, 2003 (Reference 1) and August 20, 2003 (Reference 2). The assessment in Attachment 1, Section 7.3.4 of Reference 1 is applicable to the Framatome ANP small break LOCA evaluation model and the response to Q8 in Attachment 1 of Reference 2 is applicable to the realistic large break LOCA evaluation model. The following response supplements these Framatome ANP assessments with a Dominion evaluation of existing plant Emergency Operating Procedures (EOPs) and their effectiveness in mitigating the postulated scenarios.

The scenarios described in the NRC request are primarily dependent on NSSS features such as core power and relative elevation between loop seal piping and the active fuel region of the core. A small pressure drop difference exists under full flow conditions between the Framatome ANP Advanced Mark-BW and existing Westinghouse fuel designs (Reference 3, Attachment 2, Section 4.2.13). However, the plant response

during the scenarios of interest is insensitive to pressure drop effects between fuel designs because of the relatively stagnant core conditions that would be expected to exist during long-term recovery.

The North Anna Units 1 and 2 plant-specific EOPs are based upon the NRC-approved Westinghouse generic Emergency Response Guidelines (ERGs). The EOPs are symptom-based procedures designed to provide assurance that high-level safety functions remain satisfied while providing structured operator guidance to diagnose and respond to design basis events. Dominion has evaluated the North Anna EOP effectiveness with regard to mitigating the postulated break scenarios. This evaluation involved review of accident progression in conjunction with review of EOP guidance that would apply during the response to a LOCA event. This longer-term guidance involves performing numerous actions, which include:

- RCS Cooldown
- RCS Depressurization
- Start an RCP (or stop all but 1 running RCP), if offsite power available

Expectations from analytical assessments of these break scenarios indicate that the onset of loop seal refilling occurs no earlier than approximately 6 hours after occurrence of the break, assuming no operator action (Reference 4). Dominion's review has confirmed that the EOP guidance summarized above would be initiated at significantly less than 6 hours into the accident, and that the EOPs would provide adequate guidance to preclude the development of conditions leading to extended core uncovery and long-term oxidation.

The overall conclusion is that the introduction of Framatome ANP Advanced Mark-BW fuel will not adversely affect the plant behavior or the ability of plant operators to diagnose and mitigate the postulated LOCA transient scenarios. This conclusion is equally applicable to North Anna Units 1 and 2 with Westinghouse fuel, Framatome ANP fuel, or mixed cores of both fuel designs. Should the postulated break scenario occur, there would be adequate time for operator diagnosis and action to prevent an extended period of core uncovery so that the oxidation limits of 10CFR50.46(b) would be met.

References:

1. Letter, Leslie N. Hartz to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Small Break Loss of Coolant Accident (SBLOCA) Analysis Results for the Proposed Technical Specifications Changes and Exemption Request Use of Framatome ANP Advanced Mark-BW Fuel," Serial Number 03-245, May 27, 2003.

2. Letter, E. S. Grecheck to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Request for Additional Information Regarding RLBLOCA Analysis Results for the Proposed Technical Specifications Changes and Exemption Request Use of Framatome ANP Advanced Mark-BW Fuel," Serial Number 03-313A, August 20, 2003.

3. Letter, Leslie N. Hartz to USNRC, "Virginia Electric and Power Company, North Anna Units 1 and 2 Proposed Technical Specifications Changes and Exemption Request, Use Of Framatome ANP Advanced Mark-BW Fuel," Serial No. 02-167, March 28, 2002.

4. Letter, Stephen Dembek (USNRC) to J. F. Mallay (Framatome ANP), "Break Orientation Analysis for Small Break Loss of Coolant Accident (TAC No. MA9313)," August 2, 2001.