

March 21, 2003

Mr. David A Christian
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060-6711

SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 - REQUEST FOR
ADDITIONAL INFORMATION ON SMALL-BREAK LOCA EVALUATION IN
SUPPORT OF PROPOSED TECHNICAL SPECIFICATIONS CHANGES AND
EXEMPTION REQUEST TO USE FRAMATOME ANP ADVANCED MARK-BW
FUEL (TAC NOS. MB4714 AND MB4715)

Dear Mr. Christian:

By letter dated March 28, 2002, Virginia Electric and Power Company (VEPCO) requested amendments and exemptions to support the transition to Framatome ANP Advanced Mark BW Fuel at North Anna Power Station, Units 1 and 2 (NA1&2). In a letter dated August 2, 2002, VEPCO submitted its small-break loss-of-coolant accident (SBLOCA) evaluation in support of this action. In its letter dated November 15, 2002, VEPCO stated that based on interactions with the NRC staff, it had changed the methodology for addressing large-break (LB) LOCA. The new method will rely on Framatome ANP's Topical Report EMF-2103(P), "Realistic Large Break LOCA Methodology for Pressurized Water Reactors." VEPCO will submit the revised LBLOCA analysis after the NRC staff has completed its review and approval of Topical Report EMF-2103(P). Furthermore, in the November 15, 2002, letter, VEPCO indicated that the SBLOCA submittal was unaffected by the change in the LBLOCA approach and requested that the NRC continue its review of the SBLOCA evaluation. In addition, VEPCO agreed to have the reanalysis of the SBLOCA completed no later than April 30, 2005, in order to address Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46 reporting requirements.

The NRC staff has evaluated VEPCO's proposed SBLOCA evaluation presented in the August 2, 2002, submittal and has found this approach to be unacceptable because it does not (1) provide the quantification necessary to benchmark the Framatome ANP Advanced Mark BW Fuel in order to determine which type of fuel is limiting for SBLOCA, (2) demonstrate that the licensing basis for NA1&2 has an SBLOCA analysis that is capable of evaluating Framatome ANP Advanced Mark BW Fuel, and (3) provide analyses of record for the Framatome ANP Advanced Mark BW Fuel as a baseline for the emergency core cooling system reporting requirements of 10 CFR 50.46 (a)(3)(i) and (ii). Furthermore, in its August 2, 2002, submittal, VEPCO referenced Topical Report BAW-1017A, Revision 1, "Mark-BW Reload LOCA Analysis for the Catawba and McGuire Units," dated September 1992 and the NRC staff's letter dated September 24, 1991, that forwarded the safety evaluation for Topical Report BAW-10177, "Mark-BW Reload LOCA Analysis for the Trojan Plant," as supporting analyses for the SBLOCA evaluation. The NRC staff has determined that neither of these reports is an acceptable reference for the following reasons: (1) the Framatome Mark-BW and Westinghouse optimized fuel assemblies involved had greater similarity than the advanced fuels discussed in VEPCO's

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August 2, 2002, submittal; (2) the proposals from Trojan, McGuire, and Catawba Nuclear Stations were supported by mixed-core analyses that were not provided in the August 2, 2002, submittal for NA1&2; and (3) both Framatome and Westinghouse methodologies have changed over the past 10 years. Comparisons performed long ago using different codes would not necessarily apply to the licensing basis of NA1&2. For these reasons, VEPCO is requested to perform explicit SBLOCA analyses of Framatome ANP Advanced Mark BW Fuel for NA1&2.

While the NRC staff finds the above reasons sufficient to find the proposed SBLOCA approach to be unacceptable, our review of the August 2 and November 15, 2002, submittals provided the development of questions in this request for additional information (RAI). VEPCO is requested to provide a response in order for the NRC staff to complete its review. The NRC staff requests a response to the RAI by May 31, 2003. This response date was discussed with Mr. Gary Darden of your staff on March 12, 2003, who indicated that VEPCO will be able to meet this date.

Sincerely,

/RA/

Stephen R. Monarque, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

Enclosure: RAI

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION
NORTH ANNA POWER STATION, UNITS 1 AND 2
SMALL-BREAK LOSS-OF-COOLANT ACCIDENT EVALUATION

1. Provide the results of sensitivity studies that identify which fuel type is limiting.
2. The Virginia Electric and Power Company (VEPCO) methodology currently contains a number of changes and errors with a cumulative significant uncertainty. As such, VEPCO is requested to address the following items.
 - a. Discuss how the present analyses bound the loss-of-coolant accident performance of both fuel types.
 - b. Provide information indicating which fuel type is bounding after factoring in the uncertainties.
 - c. Describe how a mixed-core penalty would be validly calculated using an out-of-date model.

3. The fourth paragraph of page 2 of the August 2, 2002, letter states that the suppression of core steam production further depressurizes the reactor coolant system (RCS).

It seems that, all else being equal, pressurization of the RCS would also suppress steam production. This, combined with the above statement, would lead to the conclusion that the pressurization of the RCS depressurizes the RCS. The quoted statement is confusing. Provide a clearer description.

4. If the Framatome Advanced Mark-BW fuel is somewhat cooler near the mid-span mixing grids than the North Anna Improved Fuel (NAIF), then would the present calculations still be bounding?
5. Regarding the discussion of actual flow versus design flow, the design flow is lower than the actual flow to accommodate uncertainties in actual flow, not errors in design flow. In either event the design flow must always be lower than the actual flow to assure that the analyses are conservative. The information provided in paragraph three of page 3 only assures that one design parameter is correctly specified; it isn't clear that it supports the conservatism of the treatment of Framatome Advanced Mark-BW fuel. Does it indicate that the RCS flow specified in the Technical Specifications should be at a higher rate?
6. Pages 3 and 4 discuss swelling and rupture. If NAIF ruptures sooner than Advanced Mark-BW fuel, might it also swell at a different rate? If so, the resulting effect on peak cladding temperature (PCT) could alter the estimated PCTs for both fuels.

Enclosure

Mr. David A. Christian
Virginia Electric and Power Company

North Anna Power Station
Units 1 and 2

cc:

Mr. C. Lee Lintecum
County Administrator
Louisa County
P. O. Box 160
Louisa, Virginia 23093

Mr. David A. Heacock
Site Vice President
North Anna Power Station
P. O. Box 402
Mineral, Virginia 23117-0402

Ms. Lillian M. Cuoco, Esq.
Senior Nuclear Counsel
Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Building 475, 5th floor
Rope Ferry Road
Rt. 156
Waterford, Connecticut 06385

Mr. Richard H. Blount, II
Site Vice President
Surry Power Station
Virginia Electric and Power Company
5570 Hog Island Road
Surry, Virginia 23883-0315

Dr. W. T. Lough
Virginia State Corporation
Commission
Division of Energy Regulation
P. O. Box 1197
Richmond, Virginia 23209

Mr. Robert B. Strobe, M.D., M.P.H.
State Health Commissioner
Office of the Commissioner
Virginia Department of Health
P. O. Box 2448
Richmond, Virginia 23218

Old Dominion Electric Cooperative
4201 Dominion Blvd.
Glen Allen, Virginia 23060

Mr. William R. Matthews
Vice President-Nuclear Operations
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, Virginia 23060-6711

Mr. Stephen P. Sarver, Director
Nuclear Licensing & Operations Support
Virginia Electric Power Company
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, Virginia 23060-6711

Office of the Attorney General
Commonwealth of Virginia
900 East Main Street
Richmond, Virginia 23219

Senior Resident Inspector
North Anna Power Station
U. S. Nuclear Regulatory Commission
1024 Haley Drive
Mineral, Virginia 23117