

October 6, 2003

LICENSEE: Virginia Electric and Power Company (VEPCO)

FACILITY: North Anna Power Station, Unit 2

SUBJECT: MEETING SUMMARY - DISCUSSION OF THE FRAMATOME FUEL  
TRANSITION PROGRAM AT NORTH ANNA POWER STATION, UNITS 1  
AND 2 (TAC NOS. MB4714 AND MB4715)

On August 28, 2003, representatives of VEPCO and Framatome Advanced Nuclear Power (ANP) met with the U. S. Nuclear Regulatory Commission (NRC) staff at the NRC's office in Rockville, MD, to discuss VEPCO's proposed license amendment to use Framatome ANP fuel at North Anna Power Station, Units 1 and 2. This was a Category 1 public meeting. The meeting attendance list is included as Enclosure 1.

The public meeting began with a discussion of VEPCO's submittal to the NRC staff dated August 20, 2003. VEPCO had provided this submittal in response to a request for additional information (RAI) from the NRC staff on the realistic large-break loss-of-coolant accident (LBLOCA) analysis for North Anna Power Station. The NRC staff indicated that it had generated this RAI based on concerns about how Topical Report EMF-2103(P), Revision 0, "Realistic Large Break Loss-of-Coolant Accident Methodology for Pressurized Water Reactors" was being used to address plant-specific analysis at North Anna.

The NRC staff stated that it needed additional information on the thermal hydraulic parameters described in VEPCO's submittal dated August 20, 2003. The NRC staff, in its RAI dated August 6, 2003, requested VEPCO demonstrate that the thermal hydraulic parameters specified in Topical Report EMF-2103(P), Revision 0, would remain bounded by the plant-specific LBLOCA analysis at North Anna, Unit 2. By letter dated August 20, 2003, VEPCO had provided a response that included a reference to Tables 7.2-4 and 7.2-5 listed in its May 6, 2003, submittal. During this public meeting, the NRC staff stated that these tables needed to be expanded to include additional heat transfer parameters, such as Prandtl and Reynolds numbers, in order to justify the application of Topical Report EMF-2103(P). As a result of this discussion, the NRC staff indicated that it would provide VEPCO with another RAI for Tables 7.2-4 and 7.2-5 of its May 6, 2003 submittal. This RAI was presented to VEPCO after the public meeting and is included as Enclosure 2.

The NRC staff, VEPCO, and Framatome discussed the heat transfer coefficient that was used in Topical Report EMF-2103(P), Revision 0, and how this coefficient would apply to North Anna Power Station. The NRC staff stated this coefficient did not include the effect of radiation heat transfer as a significant effect. The NRC staff requested that VEPCO run the thermal radiation model in order to determine the magnitude of this effect. To facilitate resolution of this issue, the NRC staff agreed to provide VEPCO and Framatome with a rod-rod thermal radiation computer program. This model is shown in Enclosure 3.

VEPCO agreed to provide a response to the NRC staff's questions that were presented during this public meeting within 3 weeks.

Finally, VEPCO presented an overview of its schedule to implement Framatome Advanced Mark-BW fuel at North Anna, Unit 2, during the spring 2004 outage.

*/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

Enclosures:

1. Meeting Attendance List
2. Request for Additional Information
3. Publicly Available Radiation Model

cc w/encls: See next page

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*/RA/*

Stephen R. Monarque, Project Manager, Section 1  
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cc w/encls: See next page

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Virginia Electric & Power Company

cc:

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

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

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

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

Mr. Stephen P. Sarver, Director  
Nuclear Licensing & Operations  
Support  
Virginia Electric and 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

North Anna Power Station  
Units 1 and 2

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

Mr. David A. Christian  
Sr. Vice President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060-6711

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

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

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

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

**ATTENDEES - MEETING ON AUGUST 28, 2003**  
**TO DISCUSS FRAMATOME FUEL TRANSITION PROGRAM AT**  
**NORTH ANNA POWER STATION, UNITS 1 AND 2**

**NAME**

**ORGANIZATION**

Stephen R. Monarque	NRC/NRR/DLPM
James F. Mallay	Framatome ANP
John Nakoski	NRR/DLPM
Matt Langschmager	NRR/DSSA/SRXB
Jared Wermiel	NRR/DSSA/SRXB
Robert Martin	Framatome ANP
Bert Dunn	Framatome ANP
Joe Cudlin	Framatome ANP
Larry O'Dell	Framatome ANP
John Biller	Framatome ANP
Gary Darden	Dominion
Jennifer L. Uhle	NRR/DSSA/SRXB
Frank Orr	NRR/DSSA/SRXB
Thomas Shaub	Dominion Nuclear Licensing
Kerry Basehore	Dominion Nuclear Analysis and Fuel
Rick Williamson	Framatome ANP
Len Ward	NRR/DSSA
Chris Gratton	NRR/DLPM
Nadiyah Morgan	NRR/DLPM
Brad Grimmel	NRR/DLPM
Ralph Landry	NRR/DSSA
Larry O'Dell	Framatome ANP

## **REQUEST FOR ADDITIONAL INFORMATION**

Virginia Electric and Power Company (VEPCO) is requested to expand Tables 7.2-4 and 7.2-5 of your submittal dated May 6, 2003, to include the upper and lower limits on the plant parameters, described below, that are key to the correlations during the limiting large break loss-of-coolant accident (LBLOCA). Please indicate on the same table the ranges covered by the assessment data.

For the blowdown, refill and reflood phases, provide the following: pressure, peak linear heat generation rate, core mass flux, Reynolds number for both vapor and liquid, Prandtl number, degree of super heat

For the refill and reflood phases, provide the following additional parameters: drop size and steam super heat

For the injection (prior to refill), refill and reflood phases, also provide key parameters in the correlations for condensation in the upper downcomer and cold legs.

Additionally VEPCO is requested to provide the following information:

If the built in S-RELAP5 pump performance curves were used, then verify that they apply to the North Anna plant's pump curves for conditions during the LBLOCA.

Verify that hot leg to downcomer nozzle gaps were not modeled in the LBLOCA analysis.

September 5, 2003

MEMORANDUM TO: John A. Nakoski, Project Directorate  
Project Directorate II-1  
Division of Licensing Project Management

FROM: Jennifer Uhle, Section Chief */RA/*  
PWR Systems Section  
Reactor Systems Branch

SUBJECT: PUBLICLY AVAILABLE RADIATION MODEL

In response to an issue related to the North Anna, Unit 2 license amendment request to adopt Framatome ANP's Realistic Large Break Loss-of-Coolant Accident methodology and exemption request to use Framatome ANP Advanced Mark-BW fuel, the staff requested that the licensee provide additional information regarding the amount of radiative heat transfer expected in the North Anna, Unit 2 core during conditions of the limiting large break loss-of-coolant accident.

To facilitate resolution of this issue, the staff provides a thermal radiation code that will solve an nxn square array of rods for the radiation heat fluxes, assuming no attenuation by steam or water droplets between the rods. This model is publicly available. Two programs are attached. The first program (R2RRAD.FOR) consists of the 5x5 array used to compute the equivalent heat transfer coefficient in the FLECHT-SEASET heat transfer test 31805. The second program (R2RRAD3X3.FOR) is setup for a 3x3 array to validate the model against a simple two-surface model calculation with a known solution. The source code is FORTRAN-IV. No users manual is included; however, the code contains sufficient comments to enable its use.

Any licensee using this model must justify its accuracy and applicability to the conditions of interest. A description of the code theory is also provided in APPENDIXB\_Oct2002.doc and APPENDIXD\_Oct2002.doc.

Enclosure 3