September 11, 2003

To: Virginia Electric and Power Company

FROM: Stephen Monarque, Project Manager ***/RA/***
Project Directorate II, Section 1
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: NORTH ANNA POWER STATION, UNITS 1 AND 2 - FACSIMILE TRANSMISSION OF QUESTIONS ON PROPOSED LICENSE AMENDMENT TO USE FRAMATOME ANP ADVANCED MARK-BW FUEL (TACS MB4714, AND MB4715)

A facsimile of the attached questions on containment analysis was transmitted on September 11, 2003 to Mr. Tom Shaub of Virginia Electric and Power Company (VEPCO). These questions supersede the containment questions sent on September 8, 2003 and are being transmitted to VEPCO in order to support a conference call scheduled for September 15, 2003.

Enclosure: Request for Additional Information

REQUEST FOR ADDITIONAL INFORMATION

NORTH ANNA POWER STATION, UNITS 1 AND 2

REALISTIC LOSS OF COOLANT ACCIDENT ANALYSIS

TACs MB4714 AND MB4715

1. Reference 15 of Topical Report EMF-2103 Revision 0 is Supplement 1 to Revision 2 of ICECON. This has not been supplied to the NRC staff. What is its relevance to the review of the calculation of minimum containment pressure?

2. Please confirm that the version of ICECON documented in XN-CC-39 dated August 1975 and approved by the NRC in a June 30, 1978 safety evaluation report (SER) is identical with the version documented in EMF-CC-39(P), dated November 1999. If this is not the case, please describe any differences and explain their effect on calculated minimum containment pressure.

3. The NRC staff's SER approving ICECON (June 30, 1978) requires, as a condition for approval, that a user of ICECON will provide justification for the values of the area and heat capacities of the structural heat sinks used in the analysis of minimum containment pressure. Please describe how these values were obtained and provide justification for the values used. It is not necessary to provide the values themselves.

4. An important consideration in calculating containment pressure is the distribution of the break flow (liquid, vapor and drops) as it enters the containment atmosphere. Please describe the assumption used. CONTEMPT, the starting point for ICECON, contains a temperature flash model. If temperature flash was used for minimum containment pressure calculations please explain why this is acceptable since temperature flash tends to overestimate pressure.

5. The calculation of peak cladding temperature conservatively assumes a worst single failure. VEPCO's submittal dated May 6, 2003, states that the loss of one HHSI and one LHSI pump is assumed. It is not clear that this single failure is the worst single failure. Actually, the worst case could be no failure since this would provide more ECCS flow and hence more break flow which would result in cooler sump water. The cooler sump water may have a significant effect on containment pressure. Please provide the results of a realistic large break LOCA (RLBLOCA) calculation with no single failure.

6. What is the basis for assuming the distribution of volumes from minimum to maximum is uniform? (Table 7.2-3 of the May 6, 2003 letter)

7. Other factors besides the containment volume can have a significant influence on the containment pressure. For instance, the containment pressure is affected by the containment atmosphere initial conditions, heat transfer coefficient between the sump surface and the containment atmosphere (see RAIs 5 and 8), heat transfer coefficient to the containment structural heat sinks (see RAIs 3 and 9), spray flow, distribution of break flow vapor, liquid and droplets in the containment atmosphere (see RAI 4), service

water temperature, etc. Explain why it is not necessary to account for variations in other parameters which have a significant effect on the containment minimum pressure.

8. Describe the modeling of the heat transfer from the containment atmosphere to the water in the sump.

9. Section 3.4.2 of Topical Report EMF-2103 states that in order to make ICECON results realisitic, conservatism is removed from the conservative evaluation model multipliers on the Tagami and Uchida correlations. (a) What were the original multipliers on the Tagami and Uchida correlations in ICECON? (b) The guidance in Standard Review Plan Section 6.2.1.5, Branch Technical Position CSB 6-1, states that for minimum pressure calculations a peak heat transfer coefficient value of four times the peak Tagami correlation should be used and 1.2 times the value of the Uchida correlation should be used. However, changes were made to the use of these correlations in order to produce realistic results. This appears to be much less conservative. Please justify this deviation from Branch Technical Position CSB 6-1 to use realistic results when the heat transfer coefficients to structures are not included in the uncertainty analysis.

10. Provide the results of calculations which demonstrate that the RLBLOCA model significantly reduces the sensitivity of the calculated peak cladding temperature to containment backpressure, relative to the current Appendix K-based ECCS evaluation models as claimed in Section 3.4.2 of Topical Report EMF-2103. This statement is significant in determining the required accuracy and conservatism in the RLBLOCA containment calculations.

11. Will the sump water temperatures calculated with this model be used for ECCS NPSH calculations? If so, please justify why this is acceptable.

12. Provide or reference comparisons of ICECON with experimental data.

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