February 11, 2002

NOTE TO: File

FROM: Andrew J. Kugler, Sr. Environmental Project Manager **/s/AJKugler**
Environmental Section
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation.

SUBJECT: INFORMATION PROVIDED BY VIRGINIA ELECTRIC AND POWER COMPANY IN RELATION TO SEVERE ACCIDENT MITIGATION ALTERNATIVES IN ITS LICENSE RENEWAL APPLICATION FOR THE NORTH ANNA POWER STATION, UNITS 1 AND 2 (TAC NOS. MB1994 AND MB1995)

The Virginia Electric and Power Company (VEPCo, or the licensee) provided the attached information to the NRC staff via emails dated February 4 and February 6, 2002. Because the staff may rely on some of this information in its environmental review of VEPCo's application for renewal of the North Anna Power Station, Units 1 and 2, licenses, this information is being docketed and made publicly available.

Docket Nos. 50-338 and 50-339

Attachment: As stated

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INFORMATION PROVIDED BY VIRGINIA ELECTRIC AND POWER COMPANY IN RELATION TO SEVERE ACCIDENT MITIGATION ALTERNATIVES IN ITS LICENSE RENEWAL APPLICATION FOR THE NORTH ANNA POWER STATION, UNITS 1 AND 2 (TAC NOS. MB1994 AND MB1995)

The following information was provided in a February 4, 2002, email from VEPCo in response to a January 25, 2002, email from the NRC:

In order to complete the North Anna SAMA input, the NRC has requested that Dominion provide clarification/additional information for the following items. Dominion addressed the first two items for Surry but their response did not specifically address North Anna:

Question 1: We request that Dominion provide a clear and consistent description of the various PRA revisions for NAPS, and which version of the PRA was used for the NAPS SAMA analysis. (Source of confusion: The response to RAI 1a states that there were 3 major revisions and then goes on to describe 4 revisions - the first one at the time of IPEEE fire analysis (1994?), and subsequent revisions in 1997, 1998, and 2000. The text on page G-18 of the ER states that updates were performed in 1994, 1996, and 1997 - it says nothing about updates in 1998 and 2000.) So we need to know how many revisions have been made and which of these revisions was used to support the SAMA analyses. If the latest version of the PRA was not used for the SAMA analysis, justification should be provided.

Response: As stated in Section G.2.3 of the NAPS ER, the first update was performed to support the IPEEE fire analysis that was completed in June 1994. A significant update was performed in 1996 to add the system model for the station blackout diesel (SBO) as part of a risk-informed Technical Specification AOT submittal. The last major update was begun in 1997 as part of an upgrade to support implementation of the maintenance rule and was completed in 1998. The third update is called the N7B model and is the most up-to-date model. Model N7B was used for the SAMA analysis. (A fourth model update initially thought to be complete, is ongoing and is expected to be completed in 2002.)

Question 2: We request that Dominion clarify how importance analyses for NAPS were used to assess the results of the cutset-based SAMA screening. (Note: a similar response for Surry was provided by Dominion via Tony Banks email of 1/15/2002, but that response appears to be specific to Surry. For example, it states that there were 131 basic events with a RRW greater than 1.005. We understood this to be a Surry result rather than a North Anna result.)

Response: The approach regarding the use of importance analysis in the assessment of results of the cutset-based SAMA screening is the same for both Surry and North Anna. In summary, a review of the top 100 cutsets was chosen as the primary source for identifying potential plant specific SAMA candidates for the following reasons. The top 100 cutsets contain 70.2% of the core damage frequency (CDF), and 72% of the total plant risk. The top contributors to core damage, LERF and plant risk are all captured in these top 100 cutsets. The top contributors to LERF and plant risk are SGTR and ISLOCA events, both of which appear in the top 100 cutsets. Therefore, confidence is obtained that no important SAMAs were missed. Most of the quantifications for the SAMA analysis were performed as bounding

calculations. In other words, the maximum benefit was obtained by assuming that the SAMA completely eliminated rather than reduced the likelihood or consequence for which the SAMA was proposed. In these instances, the SAMA would take into account any cutset that resulted in the undesirable outcome regardless of its rank in the cutset list. Similarly, many of the SAMAs were calculated by eliminating an initiating event frequency or a reduction of an initiating event frequency. Since initiator basic events are included in all cutsets regardless of rank, these SAMA evaluations also included more than the top 100 cutsets. So, while it is true that the potential SAMA list was developed by looking at the top 100 cutsets, the SAMA evaluations were performed in a way that considered many more than the top 100 cutsets.

As indicated in the revised response to Surry question 2b in the original RAI, an importance analysis is typically performed as part of the model update process. In order to verify that the important events are contained in the top 100 cutsets, the following review of the N7B model importance list was completed. The importance list was sorted based on risk reduction worth (RRW) assuming that this is the logical measure to use for a SAMA evaluation. A review of the 110 basic events with a RRW greater than or equal to 1.005, the NUMARC 93-01 break point for high-risk significance, was performed. The spot check revealed that the risk significant basic events were contained in the top 100 cutsets. This parallel review validates the use of the top 100 cutsets as the source for identifying plant specific SAMAs.

Question 3: The benefit of SAMA 69, "Develop Procedures to Repair or Change Out Failed 4kV Breakers," has risen in the NAPS SAMA assessment, to a point that it appears cost beneficial, i.e., a benefit of $88 K for a procedure change. The situation is similar to that for Surry SAMA 70. Specifically, Dominion indicates that the benefits are overestimated and the costs would be substantial, but has not provided a basis for these claims. Similar to Surry SAMA 70, we request that Dominion provide: (a) a more realistic risk reduction value, and a revised estimate of the total benefit based on this value, and (b) a description and approximate estimate of the costs associated with the SAMA, which seems to include purchasing, pre-staging, and maintaining additional breakers, in addition to the procedure changes.

Response: SAMA 69 was selected for evaluation from an industry event database, and is therefore not directly applicable to the North Anna plant configuration. The emergency busses are designed to be independent of the non-safety busses. However, there are seven non-safety 4kV breakers associated with the alternate AC (AAC) diesel, for which this SAMA would be applicable. It is conservative in a SAMA evaluation analysis to increase the potential benefit so that it is more likely to be cost-beneficial. To accomplish this for SAMA 69, the PRA model was conservatively adjusted to reduce the failure probability of all 4kV breakers by 50%. A total of 21 breakers were considered (per unit) in the evaluation including the seven AAC system breakers. If the change in failure probability were applied only to the seven 4kV breakers discussed above, the reduction in CDF would have been at most 1/3 of the bounding benefit reported in Table 4-6 of the ER. Based on this assessment, the bounding benefit would be on the order of <$30K for North Anna.

As stated in Table 4-6, the implementation for SAMA 69 would primarily involve the “cost of purchasing, sheltering, and maintaining multiple pre-staged 4kV breakers.” A minimum of two pre-staged replacement breakers would be required; one at each of the two physical locations where AAC breakers are installed. The material cost alone for two non-safety related 4kV

breakers is estimated to be $60k. The associated procedures, maintenance, and sheltering would increase the implementation cost. Therefore, this SAMA is not cost-beneficial since it would exceed twice the benefit.

The following information was provided in a February 6, 2002, email from VEPCo in response to a February 5, 2002, email from the NRC:

In order to complete the North Anna SAMA input to the Draft EIS, the NRC has requested that Dominion provide clarification for the following item:

Question: I received your email response to remaining items on North Anna. The 2/4/2002 response to question 3 indicates that in assessing the risk reduction for SAMA 69 the failure rate for all 4 kV breakers was reduced by 50%, but in Table B of your 1/15/2002 email you indicate that for SAMA 69 the failure rate was reduced by a factor of four. (I've attached both of the emails for convenience). Can you please provide clarification of which value is correct, and provide this promptly, as we are holding the SER until we have it.

Response: The reduction factor in the 1/15/02 response for North Anna Table B should have been a factor of 2. This corresponds to the 50% failure probability of the 2/4/02 response.