



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NOS. 155 AND 137 TO  
FACILITY OPERATING LICENSE NOS. NPF-4 AND NPF-7  
VIRGINIA ELECTRIC AND POWER COMPANY  
OLD DOMINION ELECTRIC COOPERATIVE  
NORTH ANNA POWER STATION, UNITS NO. 1 AND NO. 2  
DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

By letter dated June 26, 1990, the Virginia Electric and Power Company (the licensee) proposed changes to the Technical Specifications (TS) for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The proposed changes would revise the TS requirements governing the operability of the emergency and vital busses of AC distribution by making the re-energization and power source requirements of the vital busses more specific. The list of busses in the operability section of the TS and the action statements would both be made more similar to the Westinghouse Standard Technical Specifications (STS). Action statements for the vital busses and the inverters are separated for clarity. In the current NA-1&2 TS, the inverter requirement is not clearly stated. The proposed changes would also add the requirement to have the 120VAC vital busses powered from the inverters and provide actions when an inverter is not in service. The changes require re-energization of a vital bus in less time than the current NA-1&2 TS (2 hours versus 8 hours), and require restoration of the inverter as the source of power to the vital bus within 24 hours.

2.0 DISCUSSION

The vital AC power system provides a highly reliable source of 120VAC power for safety-related instruments and equipment, ensuring proper action when vital power is required. The vital AC power system consists of four separate vital bus panels, each fed independently from an associated 125VDC/120VAC single phase static inverter. The inverters are connected to batteries that are continuously float charged by the battery chargers. Therefore, the effective power sources for the inverters are the 480VAC emergency busses. Should the effective power source to any battery charger fail, the inverter is automatically fed from its associated station battery without disturbing the vital bus voltage or frequency. Thus, an uninterruptible power source is provided for the vital AC busses.

Interruptible voltage regulating transformers fed from the 480VAC emergency busses are provided to supply power to the vital bus in the event the respective inverter fails or is undergoing maintenance. A manual switch is provided for each vital bus to transfer the load to an inverter or to a voltage regulating transformer. The vital bus panels 1-I and 1-III supply 120VAC power to the safety system trains A and B, respectively. All four vital bus panels 1-I, 1-II, 1-III, and 1-IV supply 120VAC power to the safety system channels I, II, III, and IV, respectively.

The proposed changes would revise the NA-1&2 TS 3.8.2.1, AC Distribution - Operating, which govern the operability of the 4160VAC and 480VAC emergency busses and the 120VAC vital busses, to more closely resemble the wording contained in STS 3.8.3.1. The major change is the addition of the requirement that an operable 120VAC vital bus be energized from its associated inverter in turn connected to its associated 125VDC bus. This proposed change is consistent with the STS with the following exceptions:

1. The requirement for the 125VDC busses is not contained in this TS because it is contained in the current NA-1&2 TS 3.8.2.3.
2. The STS Action Statement "b" has been split into two action statements in order to clarify the allowed out-of-service times for two different but associated components. The proposed Action Statement "b" applies to the 120VAC vital busses. The proposed Action Statement "c" applies to the 125VDC/120VAC single phase static inverters.

The proposed changes would also add the allowance that two inverters may be disconnected from their DC bus for up to 24 hours for the purpose of performing an equalizing charge on their associated battery bank provided that their vital busses are energized and that the remaining vital busses are energized from their associated inverters and connected to their associated DC bus. This allowance is in the STS. This allowance is reasonable because in a possible equalizing charge lineup the inverters are merely disconnected to protect the inverters from an overvoltage from the battery chargers. They are not taken out of service for maintenance. All other components in the DC and AC vital system remain capable of performing their design function. The system as a whole, indeed all four vital AC busses, can be quickly restored to being capable of performing their design function by switching the battery chargers back to normal and reconnecting the inverters.

The proposed changes would also add operability requirements for the 120VAC vital bus inverters. It would require that the 120VAC vital busses be powered from their associated inverters. This change is proposed because of recent NRC concerns about the 120VAC vital bus operability requirements at the nuclear facility, Beaver Valley, which has power distribution and associated TS similar to those of NA-1&2. At Beaver Valley, the current NRC definition of an operable 120VAC vital bus requires that the bus be powered from a seismically qualified source, such as the inverters. Another design consideration is that the vital busses be powered from the batteries, not the 480VAC busses, in order to ensure that no bistables in the vital protection systems downstream are adversely affected. With such an interpretation, the

current Beaver Valley TS, and thus also those for NA-1&2, require an 8-hour action statement imposed whenever an inverter is unavailable for service. The proposed change for NA-1&2 would change the current 8-hour action statement to a 2-hour action statement for a de-energized 120VAC vital bus and a 24-hour action statement for an inoperable inverter. The current 8-hour action statement is more restrictive than the allowed outage time permitted by the STS. However, 8 hours is insufficient time to perform troubleshooting, corrective maintenance, and post-maintenance testing. Because the respective 2-hour and 24-hour action statements for a de-energized 120VAC bus and an inoperable inverter are consistent with the STS, and because the proposed change imposes additional operability requirements to minimize the outage time of the 120VAC busses and the inverters, the proposed change is more conservative than the existing NA-1&2 TS. It is also conservative in that it prohibits operation with more than one of the busses listed in TS 3.8.2.1 inoperable. Currently, the specification only addresses "less than the above compliment," which would mean with multiple inoperable busses, 8 hours is allowed in which to restore the busses. Therefore, the proposed NA-1&2 TS is more restrictive.

### 3.0 EVALUATION

The NA-1&2 Updated Final Safety Report (UFSAR) accident analysis sequence includes the vital instruments being first supplied by emergency power sources, next by the batteries, then by the emergency diesel generators. The vital power system has sufficient capacity to supply vital equipment necessary for safe operation and shutdown of the reactor while maintaining the acceptable fuel limits and containment integrity. The system has independence and redundancy of components to ensure the performance of safety functions despite a single failure. For this reason, the current NA-1&2 TS allow for one vital bus to be inoperable for a short period of time and then restored. The proposed changes involve neither an increase in the number of inoperable busses nor an increase in time of inoperability. Rather, they include a reduction in the allowed time a single vital bus is de-energized to 2 hours and include the requirement that the class 1E inverters must be the source of power to the vital bus within 24 hours where no such requirement was specified in the NA-1&2 TS. In addition, the proposed changes revise the operability requirements and action statements by providing greater conformance with the STS and additional clarity to the NA-1&2 TS. Based on the above, the staff finds the proposed changes to be acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendments. The State official had no comment.

### 5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR

Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (55 FR 30320). Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

#### 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: L. Engle

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