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March 28, 1990

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ELV-01474
0308

Docket Nos. 50-424
50-425

U. S. Nuclear Regulatory Commission
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Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
SUPPLEMENTAL RESPONSE TO STATION BLACKOUT RULE

By our letter ELV-00432 dated April 12, 1989, Georgia Power Company (GPC) submitted the conclusions of the station blackout analysis for Plant Vogtle Units 1 and 2 which had been conducted pursuant to 10 CFR 50.63. Included in that letter were:

A. A proposed station blackout (SBO) duration - including a justification for the selection based on the redundancy and reliability of the onsite emergency AC power sources, the expected frequency of loss of offsite power, and the probable time needed to restore offsite power;

B. A description of the procedures that will be implemented for station blackout events for the duration (as determined in A above) and for recovery therefrom; and

C. A list and proposed schedule for any needed modifications to equipment and associated procedures necessary for the specified SBO duration.

By letter dated January 4, 1990, NUMARC requested that each member utility review its initial submittal and supplement it as appropriate based upon the guidance and clarifications enclosed with that letter. Pursuant to that request, GPC has reviewed the April 12, 1989, submittal and developed additional detail provided herein and marked by change bar.

Regulatory Guide 1.155 "Station Blackout" describes a means acceptable to the NRC staff for meeting the requirements of 10 CFR 50.63. Regulatory Guide (RG) 1.155 states that the NRC Staff has determined that NUMARC-8700 "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors" provides guidance that is in large part identical to the RG 1.155 guidance and is acceptable to the NRC Staff for meeting these requirements.

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GPC has evaluated Plant Vogtle Units 1 and 2 against the requirements of the SBO rule using the guidance from NUMARC-8700 for "AC Independent" plants (including NUMARC supplemental letter to the NUMARC Board of Directors dated January 4, 1990) except where RG 1.155 took precedence. Further, GPC has evaluated the NUMARC-8700 general criteria and baseline assumptions (Section 2) and verified compliance where applicable to Plant Vogtle. The results of this evaluation are detailed below. Applicable NUMARC-8700 sections, as supplemented, are shown in parenthesis.

A. Proposed Station Blackout Duration

Regulatory Guide 1.155 and NUMARC-8700, Section 3 were used to determine a proposed SBO coping duration of four hours. The following plant factors were identified in determining the proposed station blackout duration:

1. AC Power Design Characteristic Group is P1 based on:

   a. Expected frequency of grid-related Loss of Offsite Power (LOOPs) does not exceed once per 20 years; (Section 3.2.1, Part 1A, p. 3-3)

   b. Estimated frequency of LOOPs due to extremely severe weather places the plant in ESW Group 2; (Section 3.2.1, Part 1B, p. 3-4)

   c. Estimated frequency of LOOPs due to severe weather places the plant in SW Group 1; (Section 3.2.1, Part 1C, p. 3-7)

   d. The offsite power system is in the I 1/2 Group; and (Section 3.2.1, Part 1D, p. 3-10)

   e. The severe weather recovery factor was evaluated and did not affect the AC Power Design Characteristic Group determination. (Regulatory Guide 1.155 Table 7)

2. The emergency AC power configuration group is C based on: (Section 3.2.2., Part 2C, p. 3-13)

   a. There are two emergency AC power supplies not credited as alternate AC power sources; and (Section 3.2.2, Part 2A, p. 3-15)

   b. Only one emergency AC power supply is necessary to operate safe shutdown equipment following a loss of offsite power. (Section 3.2.2, Part 2B, p. 3-15)

3. The target Emergency Diesel Generator (EDG) reliability is 0.95.

   A target EDG reliability of 0.95 was selected based on having a nuclear unit average EDG reliability for the last 20 demands greater than 0.90. (Section 3.2.4)

   The GPC goal is to maintain the average EDG reliability for each unit equal to or better than the established target reliability of 0.95. Any needed EDG reliability program improvements will be addressed following resolution of Generic Issue B-56, Diesel Generator Reliability.

   The modifications required to attain this proposed coping duration category are discussed in Section "C" below.

B. Procedure Description

Procedural requirements for coping with a station blackout have been reviewed by GPC. For offsite actions by those personnel charged with the responsibility for control of the Georgia Power Company transmission network, grid restoration procedures have been updated to meet the requirements of the Station Blackout Rule. Specifically, the following two documents have been added to those procedures:

- Black Start Procedure for Plant Vogtle; and
- Restoration of Offsite AC Power for the Shutdown of Plant Vogtle.

Onsite actions are addressed principally by three procedures:

- Loss of All AC;
- Severe Weather; and
- System Operating Procedures for Diesel Generator Operation.

These procedures are being evaluated against the criteria of NUMARC-8700 for SBO considerations. If necessary, changes to the procedures will be made to support the response to a SBO. Pursuant to the interpretation of NUMARC-8700 guidance provided by Paragraph 2.3 of Attachment 1 to the January 4, 1990 NUMARC letter, changes to both the Unit 1 and 2 SBO ambient temperature analyses have been made to incorporate average wall temperatures and to exclude walls which are not constructed of poured concrete as heat sinks. As a result of these changes, the Plant Vogtle SBO procedures will be revised to require that during a SBO event, the doors to the rooms which house the vital inverters will be opened. This course of action has been evaluated and complies with NUMARC-8700 criteria for use of adjacent rooms as heat sinks. All of these SBO procedure revisions are scheduled to be implemented within one year of receipt of NRC approval of Plant Vogtle's Station Blackout analysis.

C. Proposed Modifications and Schedule

The ability of Vogtle Electric Generating Plant, Units 1 and 2 to cope with station blackout for four hours was assessed using NUMARC-8700, Section 7 with the following results:

1. Condensate Inventory For Decay Heat Removal (Section 7.2.1)

It has been determined by application of the processes described in Section 7.2.1 of NUMARC-8700 that 203,000 gallons of water are required for decay heat removal for a four hour station blackout. The minimum permissible condensate storage tank level per technical specifications provides 340,000 gallons of water, which exceeds the required quantity for coping with a four hour station blackout.

2. Class 1E Batteries Capacity (Section 7.2.2)

A battery capacity calculation was performed pursuant to NUMARC-8700, Section 7.2.2 which verified that the Class 1E batteries have sufficient capacity to meet station blackout loads for four hours, and still enable field flashing of the Diesel Generator and closing of required circuit breakers in the last minute of the four hour coping duration.

It was noted, however, that lighting in the main control rooms will require augmentation to assure sufficient light after the initial 90 minutes of lighting provided by self-contained, gel-cell battery packs.

3. Compressed Air (Section 7.2.3)

No air-operated valves are relied upon to cope with a station blackout for four hours.

4. Effects of Loss of Ventilation (Section 7.2.4)

a. The calculated steady state ambient air temperature for the steam driven AFW pump room (the dominant area of concern for a PWR) during a station blackout induced loss of ventilation is 121°F.

b. The assumption in NUMARC-8700, Section 2.7.1 that the control room will not exceed 120°F during a station blackout has been assessed. The control room at Plant Vogtle Units 1 and 2 does not exceed 120°F during a station blackout. Therefore, the control room is not a dominant area of concern.

c. The bulk ambient temperature in the Class 1E 125 VDC/120 VAC equipment rooms (four per unit) may approach 120°F during a station blackout, resulting for each unit in a derating of the trip setpoint for certain molded case circuit breakers below their potential current loading.

Reasonable assurance of the operability of station blackout response equipment in the above dominant areas of concern was assessed using the October 1988 Revision 1 to Appendix F of NUMARC-8700 and/or the October 1988 NUMARC-8700 Topical Report, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors". In order to provide reasonable assurance for equipment operability, six circuit breakers in Unit 1 and seven circuit breakers in Unit 2 will be replaced with larger size circuit breakers to avoid the potential of spurious tripping. This proposed plant modification has been revised from that originally proposed in our April 12, 1989 letter, again due to clarifications obtained in the January 4, 1990 NUMARC letter.

5. Containment Isolation (Section 7.2.5)

The plant list of containment isolation valves was reviewed, and it was verified that valves which must be capable of being closed or that must be operated (cycled) under station blackout conditions can be positioned (with indication) independent of the preferred and blacked-out unit's Class 1E power supplies. It was determined that no plant modifications and/or associated procedure changes are required to ensure that appropriate containment integrity can be provided under SBO conditions.

6. Reactor Coolant Inventory (Section 2.5)

The ability to maintain adequate reactor coolant system inventory for four hours under SBO conditions was assessed to ensure that core cooling could be sustained. The generic analyses listed in Section 2.5.2 of NUMARC-8700 were used for this assessment and are applicable to the specific design of Vogtle Electric Generating Plant Units 1 and 2. This assessment employed an assumption of a seal leakage rate of 25 gpm per Reactor Coolant Pump (RCP) in accordance with the referenced guidance. However, this assumption is currently the subject of a resolution program (NRC Generic Issue 23). If the resolution of Generic Issue 23 indicates that modifications are necessary in order to maintain RCP seal leakage below a value that is consistent with the coping duration, they will be implemented following development and acceptance of the modification. Based on current assumptions, make-up systems beyond those currently available under SBO conditions are not required to maintain core cooling under natural circulation.

In summary, the following modifications will be required to attain the proposed four hour coping duration category:

1. Lighting in the common main control room will be augmented to assure sufficient lighting after the 90 minutes of initial lighting provided by self-contained, gel-cell battery packs.

2. Six circuit breakers in Unit 1 and seven circuit breakers in Unit 2 will be replaced with larger size circuit breakers to avoid the potential of spurious tripping due to temperature induced shift in tripping characteristics at elevated ambient temperatures.

3. If the resolution of Generic Issue 23 indicates that modifications to RCP seals are required, they will be implemented according to our current RCP maintenance schedule after the appropriate modifications are available.

The modifications and associated procedure changes identified in Sections B and C above, with the exception of modifications to the RCP seals, will be completed one year from the time that notification of acceptance of Plant Vogtle's SBO coping analysis is provided by the Director, Office of Nuclear Reactor Regulation in accordance with 10 CFR 50.63.

Sincerely,

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WGH,III/AFS/gm

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