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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
RESPONSE TO STATION BLACKOUT RULE (TAC 68595)

Gentlemen:

On July 21, 1988 the Nuclear Regulatory Commission (NRC) amended its regulations in 10 C.F.R., Part 50. A new section, 50.63, was added which requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout (SBO) of a specified duration. Utilities are expected to have the baseline assumptions, analyses, and related information used in their coping evaluation available for NRC review. It also identifies the factors that must be considered in specifying the station blackout duration. Section 50.63 requires that, for the station blackout duration, the plant be capable of maintaining core cooling and appropriate containment integrity. Section 50.63 further requires that each licensee submit the following information:

1. A proposed station blackout 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 off-site power;

2. A description of the procedures that will be implemented for station blackout events for the duration (as determined in 1 above) and for recovery therefrom; and

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

The NRC has issued Regulatory Guide 1.155, "Station Blackout," which describes a means acceptable to the NRC Staff for meeting the requirements of 10 C.F.R. 50.63. Regulatory Guide (RG) 1.155 states that the NRC Staff has determined that NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors," also 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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Table 1 to RG 1.155 provides a cross-reference between RG 1.155 and NUMARC 87-00 and notes where the RG takes precedence.

Carolina Power & Light Company has evaluated H. B. Robinson Unit No. 2 against the requirements of the SBO rule using guidance from NUMARC 87-00 except where RG 1.155 takes precedence. The results of this evaluation are detailed below. (Applicable NUMARC 87-00 sections are shown in parentheses.) One exception to NUMARC 87-00 is detailed in Section C.5.

A. Proposed Station Blackout Duration

NUMARC 87-00, Section 3 was used to determine a proposed SBO duration of four hours.

The following plant factors were identified in determining the proposed station blackout duration:

1. AC Power Design Characteristic Group is P2* based on:

   a. Expected frequency of grid-related LOOP - 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 3 (Section 3.2.1, Part 1B, p. 3-4);

   c. Estimated frequency of LOOPs due to severe weather places the plant in SW Group 2 (Section 3.2.1, Part 1C, p. 3-7);

   d. The offsite power system is in the I1/2 Group (Section 3.2.1, Part 1D, p. 3-10);

   e. Plant-specific pre-hurricane shutdown requirements and procedures which meet the guidelines of Section 4.2.3 of NUMARC 87-00 have been implemented.

2. The emergency AC power configuration group is C based on: (Section 3.2.2, Part 2C, p. 3-16)

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

   b. 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 EDG reliability is 0.95.

   a. A target EDG reliability of 0.95 was selected based on having a nuclear unit average EDG reliability for the last 100 demands greater than 0.95, consistent with NUMARC 87-00, Section 3.2.4.

4. An alternate AC (AAC) power source will be utilized at H. B. Robinson Unit No. 2 which meets the criteria specified in Appendix B to NUMARC 87-00.

The AAC power source is available within one hour of the onset of the station blackout event and has sufficient capacity and capability to operate systems necessary for coping with a station blackout for the required SBO duration of four hours to bring and maintain the plant in safe shutdown. An AC independent coping analysis was performed for the one hour required to bring the AAC power source on line.

The Dedicated Shutdown Diesel Generator (DSDG) will be the AAC power source. The DSDG, the DS Bus, and the DS System were installed at H. B. Robinson Unit No. 2 to meet fire protection requirements. This system is described in Section 8.3 of the UFSAR. The single-line diagram of the Dedicated Shutdown Bus is shown in Figure 8.3.1-4 of the UFSAR. A copy is attached.

B. Procedure Description

Plant procedures have been reviewed and modified, if necessary, to meet the guidelines in NUMARC 87-00, Section 4 in the following areas:

1. AC power restoration per NUMARC 87-00, Section 4.2.2:

   - Procedure DTRM-GP-2; Restoration of Service Following a System Shutdown - Eastern Area

2. Severe weather per NUMARC 87-00, Section 4.2.3;

   - Operations Management Manual Procedure OMM-021; Operations During Adverse Weather Conditions

Plant procedures have been reviewed and changes necessary to meet NUMARC 87-00 will be implemented in the following areas:

1. Station blackout response per NUMARC 87-00, Section 4.2.1:

   - End Path Procedure EPP-1: Loss of All AC Power

   - End Path Procedure EPP-22: Energizing Plant Equipment Using the Dedicated Shutdown Diesel Generator.

2. Procedure changes associated with any modifications required after assessing coping capability per NUMARC 87-00, Section 7.

C. Proposed Modifications and Schedule

During the SBO evaluations it was observed that the DSDG system conduits and electrical ducts and a battery storage cabinet are external to the existing buildings and will require additional supports to avoid exceeding the allowable stresses in the structural steel supports due to Uniform Building Code wind loads. Some structural modifications will also be required to the 4160 V switchgear room. These modifications are minor in nature. They do not require any procedure changes.

The AAC source has the capability to power the equipment necessary to cope with a SBO in accordance with NUMARC 87-00, Section 7 for the required coping duration determined in accordance with NUMARC 87-00, Section 3.2.5.

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

It has been determined from Section 7.2.1 of NUMARC 87-00 that 73,800 gallons of water are required for decay heat removal for four hours. The minimum permissible condensate storage tank level per technical specifications provides 35,000 gallons of water. The following additional water sources have been identified as being necessary to provide the total required amount of condensate for decay heat removal for four hours:

- o A procedure change will be implemented to administratively ensure that a minimum usable volume of 40,800 gallons is maintained to permit AC independent operation during the first hour of a SBO.

- o Existing service water system cross-connect to auxiliary feedwater system for remainder of the required water. This capability is currently addressed in plant procedures.

2. Class 1E Batteries Capacity (Section 7.2.2)

A battery capacity calculation has been performed pursuant to NUMARC 87-00, Section 7.2.2 to verify that the Class 1E batteries have sufficient capacity to meet station blackout loads for one hour.

3. Compressed Air (Section 7.2.3)

The air-operated valves that are relied upon to cope with a station blackout for four hours are the steam generator PORVs. Backup nitrogen gas supplies and hose connections for temporary hook-up are provided to operate the PORVs with nitrogen when compressed air is not available. Procedure DSP-010 provides instructions for making the necessary repairs to connect the nitrogen supply. After the DSDG is operational, one instrument air compressor could also be started to supply compressed air.

4. Effects of Loss of Ventilation (Section 7.2.4)

a. The steam-driven AFW pump is located in an open area in the ground floor of the turbine building which is not enclosed. Therefore, this is not a dominant area of concern.

b. The assumption in NUMARC 87-00, Section 2.7.1 that the control room will not exceed 120°F during a station blackout has been assessed. The control room at H. B. Robinson Unit No. 2 does not exceed 120°F during a station blackout. Therefore, the control room is not a dominant area of concern.

No other dominant areas of concern were identified.

5. Containment Isolation (Section 7.2.5)

The plant list of containment isolation valves has been reviewed to verify 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. No valves of concern have been identified with the exception of the RHR Pump B suction line isolation valves (SI-860B and 861B) whose position needs to be verified per Step 3 of NUMARC 87-00, Section 7.2.5. These valves are series isolation valves that are required by plant procedure to be closed under all normal modes of plant operation. It is extremely unlikely that these valves could be inadvertently mispositioned prior to an SBO for the following reasons: (1) access to these valves is controlled by a locked barrier under security control and (2) if both valves were mispositioned open, the Refueling Water Storage Tank (RWST) would begin to drain into the containment. RWST level is checked each shift by two individuals, independently, using RWST level indicators. Redundant containment water level indicators are verified operable once per shift. Therefore, for these reasons, it is assumed that these valves would be in the closed position at the onset of a station blackout.

6. Reactor Coolant Inventory (Section 2.5)

The ability to maintain adequate reactor coolant system inventory to ensure that the core is cooled has been assessed for four hours.

A plant-applicable analysis contained in Westinghouse Owners' Group Background Document ECA-0.0, "Loss of All AC Power," was used for this assessment. The expected rates of reactor coolant inventory loss under SBO conditions do not result in core uncovery in a SBO of four hours. Therefore, makeup systems in addition to those currently available under SBO conditions are not required to maintain core cooling under natural circulation.

The modification and procedure changes identified in Parts B and C above will be completed within two years of the notification provided by the Director, Office of Nuclear Reactor Regulation in accordance with 10 C.F.R. 50.63 (c) (3).

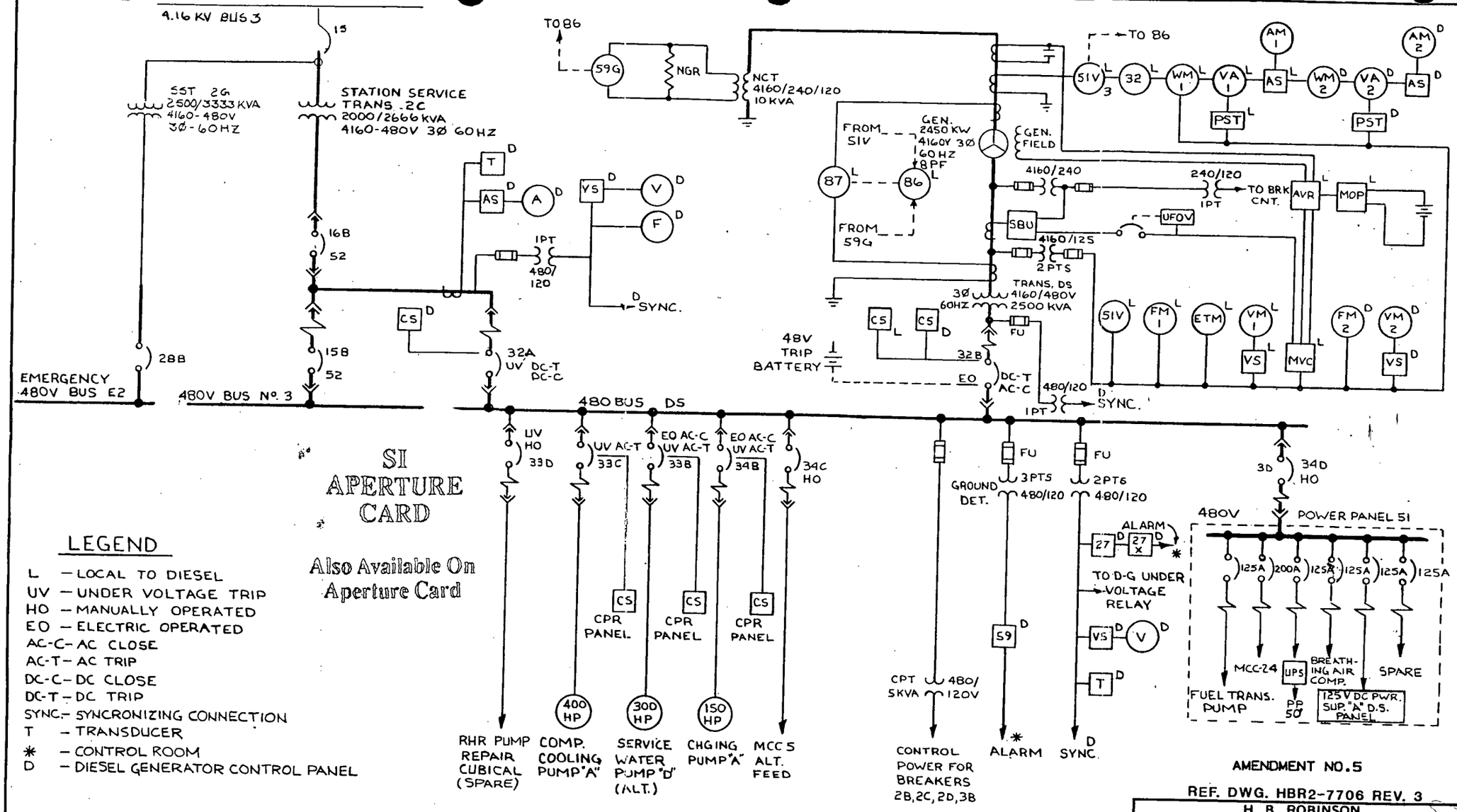
If you should have any questions, please contact Mr. S. D. Floyd at (919) 546-6901.

Yours very truly,

M. A. McDuffie

MAM/MDM/crs (216CRS)

cc: Mr. S. D. Ebneter
Mr. L. Garner (NRC - HBR)
Mr. R. Lo
NUMARC



LEGEND

- L – LOCAL TO DIESEL
- UV – UNDER VOLTAGE TRIP
- HO – MANUALLY OPERATED
- EO – ELECTRIC OPERATED
- AC-C – AC CLOSE
- AC-T – AC TRIP
- DC-C – DC CLOSE
- DC-T – DC TRIP
- SYNC. – SYNCRONIZING CONNECTION
- T – TRANSDUCER
- * – CONTROL ROOM
- D – DIESEL GENERATOR CONTROL PANEL

AMENDMENT NO. 5

REF. DWG. HBR2-7706 REV. 3

H. B. ROBINSON
UNIT 2
Carolina Power & Light Company
UPDATED FINAL SAFETY ANALYSIS REPORT

DEDICATED SHUTDOWN BUS

FIGURE 8.3.1 - 4