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April 14, 1989

Re: Indian Point Unit No. 2
Docket No. 50-247

Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Subject: Station Blackout Rule 10 CFR 50.63

This is our response to the Station Blackout Rule, 10 CFR 50.63 which was issued on July 21, 1988. The rule requires that each light-water- cooled nuclear power plant be able to withstand and recover from a station blackout (SBO) of a specified duration and 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 SBO duration. Section 50.63 requires that for the SBO 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 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;

2. A description of the procedures that will be implemented for station blackout events of the duration 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, entitled "Station Blackout," which describes a means acceptable to the NRC Staff for meeting the requirements of 10 CFR 50.63. Regulatory Guide (R.G.) 1.155 states that the NRC Staff has determined that NUMARC 87-00, entitled "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 R.G. 1.155 guidance and is acceptable to the NRC Staff for meeting these requirements. Table 1 to R.G. 1.155 provides a cross-reference between R.G. 1.155 and NUMARC 87-00 and notes where the R.G. differs.

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We have evaluated the Indian Point 2 plant against the requirements of 50.63 using guidance from NUMARC 87-00 and R.G. 1.155. The results of this evaluation are detailed below. (Applicable NUMARC 87-00 sections are shown in parenthesis.)

A. Proposed Station Blackout Duration

NUMARC 87-00, Section 3, was used to determine a proposed SBO duration of 8 hours.

1. The AC Power Design Characteristic Group is P3 based on:

   a. Expected frequency of grid-related LOOPs -- does exceed once per 20 years (Section 3.2.1, Part 1A, p. 3-3);

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

   a. There are three 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 Emergency Diesel Generator (EDG) reliability is 0.95. The target EDG reliability is based on having a nuclear unit average EDG reliability for the last 100 demands greater than 0.95.

4. An alternate AC (AAC) power source is utilized at Indian Point 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 8 hours to bring and maintain the plant in a safe shutdown condition. An AC-independent coping analysis was performed for the one hour required to bring the AAC power source on line.

The AAC system at Indian Point 2 consists of three internal combustion gas turbines. One gas turbine is located onsite, and the other two are located nearby at the Buchanan substation. The combination of three gas turbines will give the AAC system a high overall reliability. Each gas turbine

currently has blackstart capability and each can be started from the Indian Point 2 Central Control Room. There are multiple installed paths for routing power from the gas turbines to the shutdown buses. A diagram of the AC system is provided in Figure 1.

B. Procedure Description

Relevant system and plant procedures have been reviewed against the guidelines in NUMARC 87-00, Section 4, in the following areas:

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

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

3. Station blackout response per NUMARC 87-00, Section 4.2.1;

Procedure revisions necessary to meet the NUMARC 87-00 guidance will be implemented for station blackout response per NUMARC 87-00, Section 4.2.1. As a result of the coping assessment performed per NUMARC 87-00, Section 7, the loss of all AC power procedure will be revised to include a manual action to open the roll-up door in the AFW pump room. No procedure changes are necessary to comply with the NUMARC 87-00 guidance on AC power restoration or severe weather. It should be noted that, although not specifically necessary, additional procedure clarifications may be implemented for coping and AC power restoration.

C. Proposed Modifications and Schedule

Gas Turbine No. 2 currently has limited blackstart capability. To further assure a highly reliable AAC system, we will install a blackstart diesel generator capable of carrying all auxiliary loads for Gas Turbine No. 2. Upon demand, the diesel generator will automatically start and load to provide emergency AC power to GT-2, thereby ensuring independent operation upon loss of preferred power. Section 4 of Indian Point 2 System Operating Procedure 31.2.2, entitled "Gas Turbine 2 Operating Procedure - Local," will require revision due to the addition of a blackstart diesel. System Operating Procedure 31.2.1, entitled "Gas Turbine No. 2 Operating Procedure - Remote (CCR)," will also need revision to include the blackstart capability.

The AAC source has the capacity and capability to power the equipment necessary to cope with an 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 pursuant to Section 7.2.1 of NUMARC 87-00 that 127,300 gallons of water are required for decay heat removal and primary system cooldown for 8 hours at the current power rating. At the proposed stretch power, 142,850 gallons of water are required for 8 hours of decay heat removal and primary system cooldown.

The minimum permissible condensate storage tank level required by existing Technical Specifications provides 360,000 gallons of water, which exceeds the required quantity for coping with an 8-hour station blackout.

2. Class 1E Battery(ies) Capacity (Section 7.2.2)

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

3. Compressed Air (Section 7.2.3)

Air-operated valves specifically relied upon to cope with a station blackout for one hour can either be operated manually or have sufficient backup sources independent of the preferred and the plant's "blacked-out" Class 1E power supply. Valves requiring either manual operation or backup sources for operation are identified in appropriate plant procedures.

4. Effects of Loss of Ventilation (Section 7.2.4)

a. AFW Pump Room

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 126°F.

b. Control Room Complex

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. It has been determined by analysis that the Control Room at Indian Point 2 does not exceed 120°F during a station blackout. Therefore, the Control Room is not a dominant area of concern.

Reasonable assurance of the operability of equipment necessary to respond to an SBO event in the above dominant area of concern has been assessed using the Appendix F Topical Report. To provide reasonable assurance of equipment operability under blackout conditions a manual action to open the roll-up door in the AFW pump room will be added to the loss of all AC power procedures.

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 SBO conditions can be positioned (with indication) independent of the preferred and "blacked-out" Class 1E power supplies. No plant modifications and/or associated procedure changes were determined to be required to ensure that containment integrity can be provided under SBO conditions.

6. Reactor Coolant Inventory (Section 2.5)

The ability to maintain sufficient reactor coolant system inventory to ensure core cooling has been assessed for one hour. A plant-specific analysis was utilized for this assessment. The expected rates of reactor coolant inventory loss under SBO conditions do not result in core uncovery in an SBO of one hour. Therefore, additional makeup systems to those currently available under SBO conditions are not required to maintain core cooling under the natural circulation mode of cooling, including reflux boiling.

The modifications and associated procedure changes identified in Parts A, B, and C above will be completed two years after the notification provided by the Director, Office of Nuclear Reactor Regulation, in accordance with 10 CFR 50.63(c)(3).

Should you or your staff have any questions, please contact Mr. Jude G. Del Percio, Manager, Regulatory Affairs.

Very truly yours,

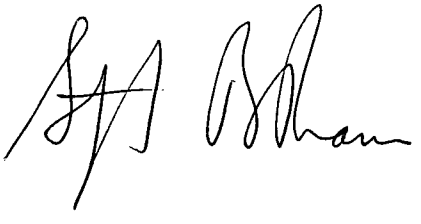

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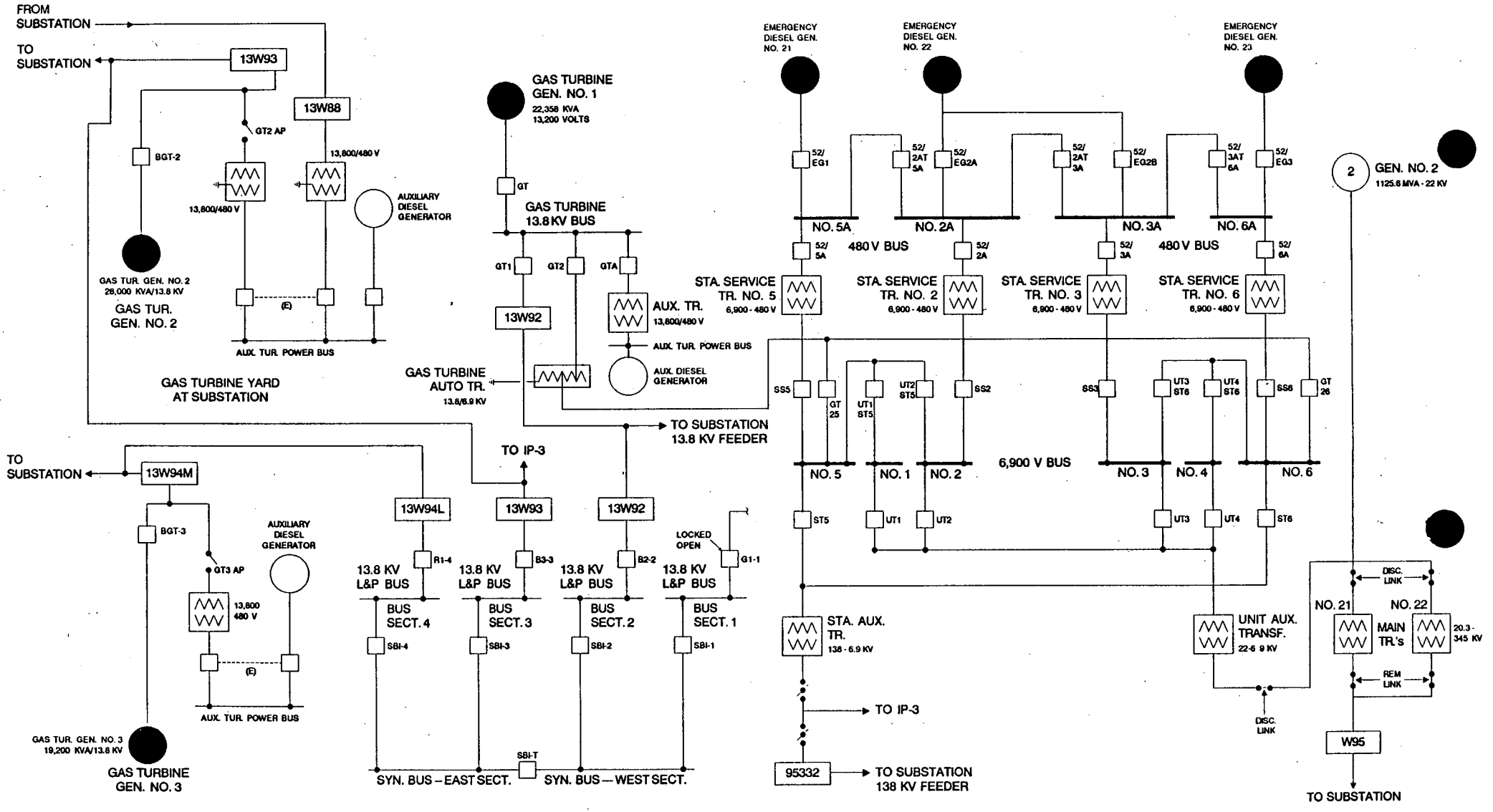
FIGURE 1
INDIAN POINT 2 ALTERNATE AC POWER SYSTEM



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