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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Subject: **Docket No. 50-206**
**Station Blackout**
**San Onofre Nuclear Generating Station, Unit 1**

This letter provides as an enclosure our responses to the NRC recommendations identified in the Station Blackout Safety Evaluation Report (SER) for San Onofre Unit 1. Your letter dated July 19, 1991 transmitting the SER requested that we respond to these recommendations in order to demonstrate our conformance with the station blackout rule.

If you have any questions regarding this matter, please call me.

Very truly yours

R M Rosenblum

Enclosure

cc: J. B. Martin, Regional Administrator, NRC Region V
George Kalman, NRC Senior Project Manager, San Onofre Unit 1
J. O. Bradfute, NRC Project Manager, San Onofre Unit 1
C. W. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2&3



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ENCLOSURE 1

# RESPONSES TO UNRESOLVED ISSUES FROM THE STATION BLACKOUT SER (7/10/91) SAN ONOFRE UNIT 1

## Section 2.2.2, Proposed AAC Power Source

NRC Recommendation:

The licensee, in accordance with their stated intention, should complete the testing of the AAC source to show that it can be started and loaded, in less than an hour. The test results should be included with the other documentation that is to be maintained in support of the licensee's response to the SBO rule.

SCE Response:

We have completed a timed test of the alternate AC (AAC) power source. This test verified that the AAC could be started and all required SBO loads powered in less than one hour. A copy of the results of this test are in the SBO file.

## Section 2.3.2, Class 1E Battery Capacity

NRC Recommendation:

The licensee should develop and implement the necessary modifications, such as battery charging from the AAC power source or additional battery capacity, which will maintain the main control room fully functional and manned for the full four hour SBO duration. The supporting analysis should be submitted for staff review and included in the documentation supporting the SBO submittals to be maintained by the licensee.

SCE Response:

In our letter dated July 29, 1991 we provided the staff with a copy of our battery capacity evaluation. This evaluation demonstrates that Battery No. 1 has sufficient capacity to cope with a four hour station blackout provided certain loads are stripped during the blackout. The details of the loads which are stripped and the methodology of the evaluation are described in the July 29, 1991 letter.

Our July 29, 1991 letter also confirmed that Battery No. 2 will need to be replaced with a larger battery to cope with a station blackout.

Replacement of Battery No. 2 with a larger battery and the load stripping proposed for Battery No. 1 will provide sufficient instrumentation and control to keep the control room functional.

## 2.3.4, Effect of Loss of Ventilation

NRC Recommendation:

The licensee should: 1) complete the calculation of the ambient temperature in the DC switchgear room resulting from a four hour SBO event, and verify that the equipment in this room will remain operable under such temperature conditions and; 2) verify whether the control room temperatures used in heatup calculations is the maximum bounding design temperature. If not, an initial maximum bounding temperature should be used to re-evaluate the loss of ventilation effects inside the control room, including SBO equipment operability for the required SBO duration. The results of these evaluations, justification for each assumption used, and a description of any resulting modifications should be submitted to the NRC for review. The complete evaluations and details of the modifications should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

SCE Response:

DC Switchgear Room

We have completed the calculation determining the effects of loss of ventilation in the DC Switchgear Room during a station blackout. This information was provided to the NRC in our letter dated December 20, 1990. Our evaluation demonstrates that the temperature in the DC Switchgear Room will reach approximately 98°F during a station blackout. The equipment in this room which is required for a station blackout event will function at 98°F.

It should be noted that, a deviation from the NUMARC 87-00 methodology for calculating the room temperature during a station blackout was used for each of the rooms requiring a heatup calculation. We used a time dependent equation to determine the temperature in the rooms rather than the steady state equation recommended by NUMARC. This deviation is explained in more detail in our December 20, 1990 letter.

Control Room Initial Temperature

The initial temperature of 75°F for the Control Room loss of ventilation analysis was not based on the maximum bounding design temperature of 85°F. The temperature is based on actual Control Room temperature measurements of 71°F to 73°F as allowed by NUMARC 87-00 guidance. The initial temperature used in the heatup calculation for the Control Room of 75°F will be administratively controlled by Procedure SO1-7-23.

HVAC Calculation Assumptions:

The following assumptions were used in all of the HVAC calculations:

1) All plant equipment is in its normal operating conditions prior to a station blackout event. This is a NUMARC 87-00 assumption identified in 2.2.1 (2).

2) Chargers for batteries are not operating and the batteries are supplying power to their normally powered components. This is the plant condition during an SBO.

3) Heat input due to conductive heat transfer through the walls and ceiling is one dimensional. By modeling one dimensional heat transfer, the calculations are greatly simplified and the total heat transfer through the wall being evaluated is increased over what it would be if three-dimensional (actual) heat transfer were modeled. This assumption is also recommended in NUMARC 87-00, Appendix E.

4) The air temperature in rooms surrounding a room being evaluated does not change during the SBO. Because the equipment in rooms next to a dominant area of concern (DAC) will be deenergized during a station blackout, it will no longer generate heat. Therefore the temperature in these rooms will likely decrease, thereby increasing conductive heat transfer away from the neighboring dominant area of concern. It is conservative to assume that the temperature in surrounding rooms is unchanged because heat transfer away from the DAC will be minimized.

5) Heat gain from personnel and emergency lights is assumed to be negligible for all rooms except the Control Room. NUMARC 87-00 does not require this heat load to be considered.

6) The air volume above the suspended ceiling in the Control Room is not credited for heat transfer analysis. This is an assumption from the NUMARC 87-00 guidance.

7) There is no heat transfer through the 4Kv Switchgear Room ceiling slab to the Control Room Area. This is an assumption from the NUMARC 87-00 guidance which states that heat transfer through floors need not be considered. This assumption is also based on an evaluation of the heat loads for the 4Kv Switchgear Room and the Control Room (see Assumption 12 below) .

8) The initial temperature in the DC Switchgear Room will be 80°F. Presently the DC Switchgear Room is cooled by A/C Unit A-925 and will be administratively maintained in the range of 72°F to 75°F. Therefore it is conservative to assume that room temperature is initially 80°F.

9) No solar heat effect is considered in these analyses. This is an assumption from the NUMARC 87-00 guidance.

10) The heat generated within the room being evaluated is constant. Heat generated in adjacent spaces is not considered. (See Assumption 4). The heat generated in a dominant area of concern is constant based on the heat output of the SBO equipment in the room.

11) The station blackout coping duration is four hours. This is based on the NUMARC 87-00 guidance.

12) The electrical heat load for each room is as follows:

| | | |
|---|---|---|
| 480V Switchgear Room | - | 1.64 kw |
| 4Kv Switchgear Room | - | 5.794 kw |
| Charging Pump Room | - | 23.27 kw |
| Control Room | - | 26.9 kw |
| DC Switchgear Room | - | 6.0 kw |

No modifications were required as a result of the HVAC calculations.

These calculations are being retained in our SBO file.

## 2.3.5, Containment Isolation

NRC Recommendation:

For those CIVs that are not "locked closed" the licensee should verify that these valves can be closed independent of the preferred and Class 1E AC power supplies and have position indications (e.g., local mechanical, DC powered, or alternate AC powered) that is independent of the preferred and blacked-out unit's Class 1E AC power supplies. This verification should be included in the documentation supporting the SBO submittals that is to be maintained by the Licensee.

SCE Response:

In response to the recommendation we will address both normally open and normally closed containment isolation valves.

As discussed in our August 6, 1990 letter which identified the containment isolation valves which are normally closed but not locked closed, we have verified that these valves can be closed independent of the preferred and Class 1E power supplies and have position indication. These valves are CRS 021, CRS 426, HV 851A, HV 851B, MOV 850A, MOV 850B, MOV 850C, MOV 866A, MOV 866B and MOV 880.

All normally open containment isolation valves fall into one of the criteria used for exclusion of containment isolation valves from further evaluation. The exclusion criteria are discussed in our May 1, 1990 submittal.

## 2.3.6, Reactor Coolant Inventory

NRC Recommendation:

The licensee should provide the analysis for staff review to support their assumption that no RCP seal degradation will occur during an SBO event or demonstrate adequate reactor coolant inventory is maintained considering the assumed reactor coolant leakage of 87 gpm for SONGS 1. These evaluations should be included in the documentation supporting the SBO submittals to be maintained by the licensee.

SCE Response:

On July 29, 1991 we provided the NRC with a copy of our calculation of RCS inventory during a station blackout. This analysis uses the NUMARC 87-00 assumption of 25 gpm leakage per reactor coolant pump, the maximum technical specification leakage of 6 gpm, and 20 gpm leakage through the letdown orifice isolation valves. Using these assumptions the calculation demonstrates that adequate RCS inventory is maintained during the station blackout with this total leakage of 101 gpm.

A copy of this calculation is being retained in the SBO file.

## 2.5, Proposed Modifications

NRC Recommendation:

The licensee should include a full description including the nature and objective of all modifications required for compliance with the SBO rule in the documentation supporting the SBO submittals that is to be maintained by the licensee.

SCE Response:

The only modification required to cope with a station blackout is the replacement of Battery No. 2 with a larger battery. As discussed in our July 29, 1991 letter, this modification has been scheduled for the Cycle 13 refueling outage. When the design is finalized and documented, the appropriate documentation will be included in the SBO file.

## 2.7, EDG Reliability Program

NRC Recommendation:

It is the staff's position that an EDG reliability program should be developed in accordance with the guidance of RG 1.155 Section 1.2. Confirmation that such a program is in place or will be implemented should be included in the documentation supporting the SBO submittals that is to be maintained by the licensee.

SCE Response:

We will develop a reliability program to maintain and monitor the reliability level of each Emergency Diesel Generator consistent with Regulatory Guide 1.155, Section 1.2. Supporting documentation will be maintained in the SBO file.

## 3.0, Conclusions

NRC Recommendation:

The licensee is expected to ensure that the baseline assumptions of NUMARC 87-00 are applicable to the SONGS 1 plant.

SCE Response:

We have reviewed each of the applicable assumptions in Section 2.0 of NUMARC 87-00 and have verified their applicability to San Onofre Unit 1.