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Director, Office of Nuclear Reactor Regulation
Attention: W. A. Paulson, Acting Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
SEP Topic IX-5, Ventilation Systems
San Onofre Nuclear Generating Station
Unit 1

References: 1. Letter, K. P. Baskin, SCE, to D. M. Crutchfield, NRC, SEP Topic IX-5, Ventilation Systems, June 24, 1983

2. Letter, M. O. Medford, SCE, to D. M. Crutchfield, NRC, Systematic Evaluation Program Integrated Assessment, February 24, 1984

3. Letter, K. P. Baskin, SCE, to D. G. Eisenhut, NRC, Additional Information in Support of Responses to NRC TMI Requirements, January 17, 1980

Reference 1 provided our commitment to perform, prior to startup from the current outage, an analysis of the temperature profile for the 4160V and 480V rooms in order to confirm that post accident cooling of these rooms is not necessary to assure the operability of electrical components supplying power to safety-related systems. We also indicated that the need for additional cooling in the DC switchgear and inverter room will be determined during the Integrated Assessment. Reference 2 provided a schedule for the completion of the return to power effort and the analysis for the DC switchgear and inverter room. In compliance with our commitment the following information is offered regarding the results of analyses performed for us by NUTECH, Engineers, Inc.

The 4160V and 480V switchgear rooms at San Onofre Nuclear Generating Station Unit 1 have a recently installed non-safety related, heating, ventilating, and air conditioning (HVAC) system to maintain room air temperature below 40°C (104°F), the ambient temperature operating limit for essential equipment in those rooms. The analysis performed by NUTECH addressed the issue of room ambient temperature in the switchgear rooms in the event of loss of the HVAC function and also examined a similar situation for the battery charger/inverter room. The analysis focused on two concerns: (1) the ability to shut down the plant using the safety systems and (2) the ability of the plant to continue normal operation in the event of HVAC system failure. The initiating events for these concerns are: (1) a Safety

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Injection System Actuation/Loss of Offsite Power (SIS/LOP) when the HVAC is load-shed from the bus and (2) the failure of the HVAC system and its backup ventilating fan during normal operation. The criteria for safe operation in both cases is that continuous room temperatures be maintained at or below 40°C (104°F) to ensure reliable operation of safety related equipment.

A room energy and heat balance analysis was performed using the commercial building energy analysis code, CALPAS3, which has been verified for this application by NUTECH. The analysis uses very conservative assumptions. Ambient air temperatures are the 1% summer design temperatures from the ASHRAE Handbook. The temperature used correlates to essentially the same design parameter determined as part of SEP Topic II-2.A, Severe Weather Phenomena for San Onofre Unit 1. No cloud cover and no wind is used and solar heat gain is assumed to be that of July 21. Equipment heat generation rates are those given by the manufacturer at rated load.

Given these extremely conservative assumptions, the capability to safely shutdown the plant or mitigate an accident can be assured by the simple expedient of opening the 4160V and 480V switchgear room doors and turning off the lights. During normal operation, these procedures will delay ambient temperature from reaching 104°F for 11 hours in the 4160V room and 12 hours in the 480V room if performed promptly after loss of HVAC.

Considering the gross conservatism implicit in the method of accounting for equipment heat generation (using rated current), an effort was made to realistically estimate the heat generation in the 4160V room. Representatives of Westinghouse, the switchgear vendor, supplied a formula that allowed a realistic heat rate to be calculated for the 4160V switchgear based on actual current. Similar information on 480V switchgear and the motor control centers was not available so the very conservative values for heat rate of that equipment is retained in the "realistic" case as is the conservative estimate of heat from the motor heater centers, sphere system, auxiliary panels and other ancillary equipment.

Given these assumptions, 4160V room temperature will not exceed 104°F if lights are turned off and doors opened promptly after loss of HVAC. The lights can be left on for up to 13 hours without exceeding 104°F. Since in all cases analyzed, the 4160V room is warmer than the 480V room, it is concluded that a realistic evaluation of equipment heat generation in the 480V switchgear room would result in room temperature estimates lower than those for the 4160V room. An estimate of low-voltage switchgear heat rate based on actual current was not available from Westinghouse. However, the conservatisms are such that it is concluded that during normal operation the temperature of the 480V switchgear room would, in actuality, be limited to 104°F or less if the doors were opened and lights extinguished promptly after loss of HVAC. The post-accident heat loads in the 4160 V and 480 V rooms are lower due to reduced equipment needs for post-accident operations. Therefore, the post-accident temperature should not exceed 104°F in either room, if the lights are turned off and doors opened.

The battery charger/inverter room was also subject to an analysis similar to that performed on the switchgear rooms. The results of that analysis conclude that the inverter room will not exceed 104°F during normal or SIS/LOP operating conditions.

As discussed above there are no modifications necessary for the DC switchgear and inverter room. In order to meet the continuous room temperature criteria for the 4160V and 480V rooms, a room temperature monitoring program will be implemented. This program will ensure that in the event of the failure or shutdown of the HVAC, the doors to these rooms are opened and lights are turned off to allow the temperature to remain below 104°F. The temperature monitoring program will be implemented prior to return to power from the current outage.

The shielding design review documented in Reference 3 indicated that access to the 480V room would be on a restricted basis and access to the 4160V room would be allowable on an infrequent basis following a postulated accident involving large amounts of post-accident radiation. The shielding design review study assumed that the entire post-accident dose is released into the containment at time $t = 0$. This assumption is very conservative since most LOCA accidents which involve core damage would develop over a matter of hours, giving operations personnel enough time to go to the 480V room for the purpose of shutting off the lights and opening the doors. Also, since shutdown can be performed using those systems powered from the 4160V room, to which infrequent post-accident access is allowed, opening of the 4160V room doors and turning off the lights will also assure the ability to mitigate an accident. We also consider the probability of a LOCA involving core damage coincident with the assumed hottest day of the summer, failure of HVAC equipment in the 4160V room and 480 V room, and a LOP to be extremely low.

Based upon the above discussion, the program to monitor the temperature in the 4160V and 480V rooms will resolve the remaining open items for SEP Topic IX-5, Ventilation Systems. If you have any questions regarding the above discussed SEP Topic, please let me know.

Very truly yours,

M. O. Medford