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R. W. Krieger
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May 15, 2000

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

Subject: **Docket Nos. 50-361 and 50-362**
Licensee Event Report No. 2000-004
San Onofre Nuclear Generating Station, Units 2 and 3

Gentlemen:

This submittal provides a 30-day Licensee Event Report (LER) in accordance with 10CFR50.73(a)(2)(ii) describing a condition outside the design basis of the plant. While this occurrence is applicable to both Units 2 and 3, a single report for Unit 2 is being submitted in accordance with NUREG-1022, Rev. 1. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

Any actions listed are intended to ensure continued compliance with existing commitments as discussed in applicable licensing documents; this LER contains no new commitments. If you require any additional information, please so advise.

Sincerely,

LER No. 2000-004

cc: E. W. Merschoff, Regional Administrator, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 & 3

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NRC FORM 366 (MM-YYYY) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES MM/DD/YYYY
Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If a document used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
San Onofre Nuclear Generation Station (SONGS) Unit 2	05000-361	1 of 5

TITLE (4)
ECCS Rooms Outside the Design Basis Due To Missing Piping Insulation

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	20	2000	2000	-- 004 --	00	05	15	2000	SONGS Unit 3	05000-362
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER:
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R. W. Krieger, Vice President, Nuclear Operations	949-368-6255

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 4/19/2000, during an NRC inspection, it was noted that portions of the ECCS piping were not insulated as assumed in design calculations. Without insulation, the heat loading into ECCS pump rooms would be greater than assumed in the design calculations. Consequently, room temperatures could be above the 104 degrees F design limit during a Loss Of Coolant Accident or normal shutdown that uses the Shutdown Cooling system. A 1-hour non-emergency notification was made in accordance with 10CFR50.72(b)(1)(ii)(B). This report is provided in accordance with 10CFR50.73(a)(2)(ii)(B).

Due to the passage of time, the cause of the missing insulation was not determined.

Temporary insulation was installed on portions of the piping to increase thermal margin. SCE will install permanent insulation as required and revise calculations as needed to match the as-installed insulation configuration.

SCE concludes that the condition has minimal safety significance. The lack of insulation did not result in a Safety System Functional Failure and was evaluated as GREEN using the latest draft of the Reactor Safety Significance Determination Process.

Plant: San Onofre Nuclear Generating Station, Units 2 and 3
Discovery Date: April 20, 2000
Reactor Vendor: Combustion Engineering

	Unit 2	Unit 3
Mode:	1 – Power Operation	1 – Power Operation
Power:	99.9 percent	99.8 percent
Pressure:	538 F	538 F
Temperature:	2250 psia	2250 psia

Background

The Safety Injection Pump Rooms Emergency Cooling Subsystem (UC)

Engineered Safety Features (ESF) pump rooms No. 002 (Train B) and 005 (Train A), each have one 100 percent capacity emergency cooling unit (CLR). Each emergency unit is connected to the same train power source as the respective pump. The third pump room, No. 015, which houses the "swing" High Pressure Safety Injection (HPSI)(BQ) pump, has two 100 percent capacity cooling units (one Train A and one Train B). Each of the three rooms has one 100 percent normal cooling unit (CLR) which are not powered by emergency power (EK).

The emergency cooling units start automatically on a Safety Injection Actuation Signal (SIAS)(JC) by energizing the fan. Each cooling unit can also be operated manually from the control room.

The cooling medium for the emergency coolers is chilled water furnished by the Emergency Chilled Water System (ECWS)(KM) units located in the Auxiliary Building. A SIAS signal starts the ECWS, thus providing cooling for each safety injection pump during emergency operation. Each emergency cooling unit train is served by a chilled water circuit of the corresponding train.

The safety function of the emergency room coolers is to maintain room temperature below the 104 degrees F design limit without taking credit for any heat removal by the normal room cooler. No credit is taken for the normal cooler because a Loss Of Offsite Power (LOP) is postulated during the event scenarios.

Description of the Event

On April 19, 2000, during an NRC inspection, it was noted that portions of the ECCS piping were not insulated as assumed in design calculations (AR 000401086). The affected pipes are the suction and discharge of the High Pressure Safety Injection (HPSI) pumps (P017, P018, and P019), the Low Pressure Safety Injection (LPSI)(BP) pumps (P015 and P016), and Containment Spray (CS)(BE) pumps (P013 and P014).

Without insulation, the heat loading into ECCS pump Rooms 002, 005, and 015 in the Safety Equipment Building would be greater than assumed in the design calculations. Consequently, temperatures in Rooms 002 and 005 could be above the 104 degrees F design limit during a Loss Of Coolant Accident (LOCA) or normal shutdown that uses the Shutdown Cooling (SDC) system. Room 015 would not

exceed its design basis temperature because the room contains only the swing HPSI pump, and the piping runs are short and relatively small diameter.

A 1-hour non-emergency notification was made in accordance with 10CFR50.72(b)(1)(ii)(B) to the NRC Operations Center on April 20, 2000 (discovery date) at 0843 PDT (NRC Operations Log #36908). This follow-up 30-day report is provided in accordance with 10CFR50.73(a)(2)(ii)(B).

Cause of the Event

Due to the passage of time, the cause of the missing insulation was not determined. The insulation assumptions included in the calculations for hot piping and ECCS pumps were incorporated in the Plant Thermal Insulation Specification. However, they were not implemented at the plant.

Corrective Actions

- In order to reduce the temperature in Room 005 (both units), temporary insulation was installed on portions of the suction line of the LPSI pump, the discharge line of the LPSI pump and the branch connection to the shutdown cooling in Room 005. (Before all planned temporary insulation was installed, the as-found condition of the ECCS pumps was confirmed to be operable and the installation of the temporary insulation was halted.)

- SCE is investigating the potential for similar conditions in other plant areas or systems.

- SCE will install permanent insulation as required and revise the heat load calculations as needed to match the as-installed insulation configuration.

Safety Significance

The safety significance of this condition is minimal because all affected ECCS equipment remained operable at the higher room temperatures (<212 degrees F). The three scenarios below required assessment regarding operability. Note that for each, a LOP was assumed. Under that assumption, there would be a consequential loss of normal room cooling. Under non-LOP scenarios, normal room cooling would be available to further reduce maximum room temperatures.

1. Main Steam Line Break (MSLB):

   For MSLB, the plant is placed on SDC before ECCS recirculation occurs. Therefore, there is no increase in ECCS piping heat load during this scenario from HPSI and CS. Post-MSLB shutdown using SDC is bounded by the SDC case discussed below.

2. Large Break Loss of Coolant Accident (LOCA):

   For large break LOCA, the ECCS piping in these rooms will operate at approximately the same temperature as the containment sump. The maximum room temperature resulting from this scenario was estimated to be well below 200 degrees F. This estimate assumed quasi-steady state conditions, where the room temperature increases until the heat removal capacity of the emergency room cooler equals the total room heat load (including the previously unaccounted for heat load due to uninsulated piping). The increased capacity of

the emergency room coolers at higher room temperatures was estimated using the effectiveness-number of transfer unit (NTU) method.

It is judged that SDC for small break LOCA would result in lower temperatures, and is bounded by the large break LOCA and SDC cases.

3. Shutdown Using Shutdown Cooling System:

   During unit shutdowns, SDC is normally placed in service when the Reactor Coolant System (RCS) temperature is about 350 degrees F. However, under worst case or emergency scenarios, SDC can be initiated with the RCS temperature as high as 394 degrees F (e.g., in RSB 5-1 safe shutdown scenario). The RCS temperature will decrease a minimum of 30 degrees F per hour. For this worst case scenario, and the maximum room temperature was estimated to be well below 200 degrees F, using methods similar to those discussed above for the LOCA scenario.

Emergency Chiller Operation –

The emergency chillers were confirmed to have adequate capacity to accommodate the additional heat load from the emergency room coolers under both LOCA and RSB 5-1 cooldown, and still maintain the chilled water supply temperature of approximately 44 degrees F to the emergency room coolers. The emergency chillers are estimated to have a margin of approximately 1.4 million BTU/hr, while the additional heat load from the uninsulated piping is much less than 0.5 million BTU/hr. Therefore, the chillers will remain capable of transferring the additional heat load to the Component Cooling Water System (CCW).

Component Cooling Water System Operation --

The CCW system is designed to accommodate the additional margin in chiller heat load (i.e., the CCW system is designed to accommodate 6.4 million BTU/hr from the emergency chillers, while the actual estimated load is less than 5 million BTU/hr). Therefore, CCW is not adversely impacted by the heat load due to the uninsulated piping.

Environmental Qualification Evaluation—

Environmental Qualification Materials List (EQML) test data indicates that all of the equipment in the ECCS pump rooms can withstand a maximum temperature of 212 degrees. A search of the EQML identified several types of equipment installed in Harsh Zone C1 (LPSI, HPSI and CS pump rooms). The equipment types installed are:

- Reliance Motor (EQDP M37625)
- Weed/Foxboro Transmitter (EQDP M37606)
- Westinghouse Pump Motor (EQDPs M37642 & M85105)
- Rosemount RTD (EQDP M37629)
- Namco Limit Switch (EQDP M37618)
- Limitorque Actuator (EQDP M37706)
- Magnetrol Liquid Level Control Switch (EQDP M37617)

Weed/Foxboro Transmitter, Rosemount RTD, Namco Limit Switch, and Limitorque Actuator have been qualified for both inside and outside containment. This equipment is qualified for a much more severe environment than the post-accident conditions in the LPSI, HPSI and CS pump rooms.

The EQDPs for the commodity equipment (such as cables, terminal blocks and tape) which could possibly be installed in Zone C1 were reviewed. The commodity equipment which are also qualified for inside containment were excluded from further review. The following commodity equipment EQDPs were reviewed in detail as they are only used outside containment: Anaconda 8KV Cable (M37602), GE Power & Control Cable (M37613), 3M Tape (M38783), GE Terminal Block (M38796), Buchanan Terminal Block (M38799).

Lubricants associated with some of the equipment, such the motors, Limitorque actuators, and Namco limit switches, are also qualified for service up to 212 degrees F.

SCE concludes that:

- The lack of insulation would not have prevented the fulfillment of the safety function of structures, systems, or components needed to shut down and maintain the reactor in a safe shutdown condition (remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident). Therefore, this condition did not result in a Safety System Functional Failure (SSFF).

- The condition reported herein was evaluated by SCE as GREEN using the latest draft of the Reactor Safety Significance Determination Process (SDP).

Additional Information

A review of LER submittals for the past three years did not identify any similar reported events.

During its investigation, SCE identified several missed opportunities to correct this condition. The more recent opportunities were:

- Safety Equipment Building Emergency HVAC System Safety System Functional Assessment (SSFA), SA 99-013 was conducted in September 1999. More timely disposition of discrepancies identified during that assessment, such as the lack of periodic testing of the emergency HVAC units to confirm continuing compliance with design and licensing basis, and the need to update the UFSAR and design documents to reflect pre-operational test results, could have identified the condition reported herein.

- Changes to the room heat load calculations were issued in 1994 and 1995 to increase the cooling equipment margin. However, these changes did not include verification of the existing conditions.