

*Southern California Edison Company*

SAN ONOFRE NUCLEAR GENERATING STATION

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January 29, 1991

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

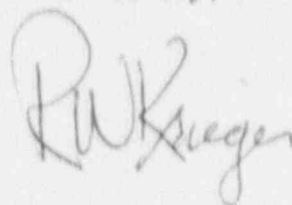
Subject: Docket No. 50-562  
30-Day Report  
Licensee Event Report No. 90-014, Revision 1  
San Onofre Nuclear Generating Station, Unit 3

Reference: Letter, R. W. Krieger (SCE) to USNRC Document Control Desk, dated  
January 22, 1991

The referenced letter provided Licensee Event Report (LER) No. 90-014 for an occurrence involving an inoperable Post-Accident Monitoring Instrument. As indicated in the original LER, the results of our investigation, including the root cause and corrective actions to prevent recurrence, have been provided in this supplemental LER. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,



Enclosure: LER No. 90-014, Revision 1

cc: C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)  
J. B. Martin (Regional Administrator, USNRC Region V)  
Institute of Nuclear Power Operations (INPO)

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LICENSEE EVENT REPORT (LER)

Facility Name (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3	Docket Number (2) 0   5   0   0   0   3   6   2	Page (3) 1 of 0 7
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CONTAINMENT SPRAY SYSTEM PRESSURE INDICATOR INOPERABLE DUE TO FAILED PRESSURE TRANSMITTER

EVENT DATE (5)				LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Year	Sequent Number	Revision Number	Month	Day	Year	Facility Name	Docket Number (8)		
1   2	2   7	9   0	9   0	0   1   4	0   1	0   1	2   9	9   1	NONE	0   5   0   0   0   1   1		

OPERATING MODE (9) 1

POWER LEVEL (10) 1 | 0 | 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(f)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input checked="" type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in text)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name R. W. Krieger, Station Manager	TELEPHONE NUMBER AREA CODE 7   1   4   3   6   8   1   6   2   5   5
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	B	E	PIT	F   1   B   0	YES				

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> Yes (if yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	Expected Submission Date (15)	Month	Day	Year
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On 12/23/90, with Unit 3 at 100% power, Containment Spray System (CSS) Train "B" pump discharge pressure indicator 3PI-0303-2 was determined to be inoperable due to its failure to display the correct pressure reading. This instrument is a Post-Accident Monitoring Instrumentation (PAMI) component and as such is subject to the requirements of Technical Specification (TS) 3.3.3.6, which allows for the inoperability of PAMI equipment for up to 7 days. Our investigation concluded that 3PI-0303-2 became inoperable on 12/12/90 when the associated pressure transmitter 3PT-0303-2, which provides the input to 3PI-0303-2, failed during subgroup relay testing associated with the CSS. This represents a condition prohibited by TS 3.3.3.6, since 3PI-0303-2 was inoperable for greater than 7 days.

Inspection of the pressure transmitter revealed a small metallic particle located in the vicinity of the feedback coil. It is believed that the particle resulted in the jamming of the feedback coil, and thus produced a pressure indication which was substantially greater than actual pressure (approximately 400 psig versus 25 psig). The transmitter was replaced, and the indicator was returned to operable status on 12/25/90.

SCE's investigation into the reasons why the instrument failure was not identified more promptly revealed procedural deficiencies and a lack of detailed knowledge by control room operators of important standby system parameters.

CSS Train "B" pressure indicator 3PI-0303-2, which is used for indication purposes only, would not have affected the ability of the CSS to fulfill its safety function. In addition, CSS Train "A", including the required PAMI, remained operable during this event.

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Plant: San Onofre Nuclear Generating Station  
 Unit: Three  
 Reactor Vendor: Combustion Engineering  
 Event Date: 12-12-90

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 1, 100% Power Operation

B. BACKGROUND INFORMATION:

1. Post-Accident Monitoring Instrumentation:

Post-Accident Monitoring Instrumentation (PAMI) [IP] provides for remote monitoring of post-accident conditions within the Reactor Coolant System (RCS) [AB], the Steam Generators (SGs) [SB,SG] and the containment [NH]. The instrumentation is used by the control room operating personnel in the evaluation, assessment, and monitoring of plant conditions resulting from an accident, and in the execution of control room functions in response to that accident.

2. Containment Spray System Pressure Indication:

Containment Spray System (CSS) [BE] pressure indication [PI] is the PAMI instrument used for inferring containment spray flow. CSS pressure indication is provided via two control room illumigraph indicators, 3PI-0303-1 for Train "A" and 3PI-0303-2 for Train "B", and a recorder 3PR-0303-1 for Train "A" located directly outside the control room. The indicators range from 0 - 650 psig. CSS pressure indication is also provided on one of the display pages of the Critical Functions Monitoring System (CFMS) and as an entry on the Plant Monitoring System (PMS) computer.

The CSS pressure indicators receive signals from Foxboro N-E11DM pressure transmitters [PT] 3PT-0303-1 for Train "A" and 3PT-0303-2 for Train "B". The pressure transmitters are located downstream of the containment spray pumps [P] 3P-012 and 3P-013, respectively, between the pump discharge check valve and the normally closed containment spray isolation valve. Therefore, the transmitters are located in a section of piping that may trap pressure following operation of the spray pump. This piping section is not vented on a routine basis; therefore, operation of a containment spray pump can cause an elevated pressure to exist in the piping for a period of time until it decays at an acceptably small leakage rate to connecting systems at lower pressures. Nominal pressure in this section of piping is approximately 25 psig.

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The CSS pressure indicators are also used to indicate system pressure upstream of the shutdown cooling heat exchangers during the shutdown cooling mode of operation. In this mode, nominal pressure varies between approximately 200 - 550 psig.

3. PAMI Technical Specification Requirements:

San Onofre Unit 3 Technical Specification (TS) Section 3.3.3.6, "Accident Monitoring Instrumentation," requires that each PAMI channel be maintained operable in Modes 1-3 and permits one channel of CSS pressure indication to be out-of-service for up to seven days. Each PAMI channel is demonstrated operable by performance of a monthly channel check and a 18-month interval channel calibration in accordance with TS 4.3.3.6.

4. Foxboro N-E11DM Pressure Transmitter:

Foxboro N-E11DM pressure transmitters are electronic force-balance instruments that measure differential pressure and transmit it as a proportional current output signal. The output current is transmitted to the associated indicating and recording devices.

C. DESCRIPTION OF THE EVENT:

1. Event:

On December 23, 1990, with Unit 3 at 100% power, CSS Train "B" pump discharge pressure indicator 3PI-0303-2 was determined to be inoperable due to its failure to display the correct pressure reading. This instrument is a PAMI component and as such is subject to the requirements of TS 3.3.3.6, which allows for the inoperability of PAMI equipment for up to 7 days. Our investigation concluded that 3PI-0303-2 became inoperable on December 12, 1990, when the associated pressure transmitter 3PT-0303-2, which provides the input to 3PI-0303-2, failed during subgroup relay testing associated with the CSS. This represents a condition prohibited by TS 3.3.3.6, since 3PI-0303-2 was inoperable for greater than 7 days.

2. Inoperable Structures, Systems or Components that Contributed to the Event:

None.

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3. Sequence of Events:

<u>DATE</u>	<u>TIME</u>	<u>ACTION</u>
12/12/90	1837	Containment spray pump 3P-013 operated during subgroup relay testing. 3PT-0303-2 failed, resulting in 3PI-0303-2 indicating high.
12/23/90	0245	CSS piping vented with no change in 3PI-0303-2 indication. 3PI-0303-2 declared inoperable.
12/25/90	2315	3PI-0303-2 returned to service following replacement of 3PT-0303-2.

4. Method of Discovery:

On December 22, 1990, the high Train "B" CSS pressure indication was identified by routine, on-shift monitoring of equipment status by the Control Room Supervisor (utility, licensed).

5. Personnel Actions and Analysis of Actions:

An investigation of the high pressure indication was appropriately commenced upon recognition.

6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

1. FAILURE OF THE PRESSURE TRANSMITTER

Inspection of the pressure transmitter revealed a small foreign object (i.e., metallic particle) located in the vicinity of the feedback coil. It is believed that the particle resulted in the jamming of the feedback coil, thus producing a pressure indication which was substantially greater than actual pressure (approximately 400 psig versus 25 psig). The transmitter was replaced and the indicator returned to operable status on December 25, 1990.

The particle and the transmitter's feedback coil have been sent to an independent laboratory for further failure analysis. If the analysis reveals information which would significantly change the cause or corrective actions of this event, a revision to this LER will be submitted.

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2. DELAY IN DETECTING INSTRUMENT FAILURE

A. Pressurization of CSS Piping

The possibility of experiencing an elevated pressure (following pump operation) for an extended period of time in the section of the CSS discharge piping in which the PAMI instrument transmitter is located was known to exist. However, adequate guidance was not provided to either periodically check the pressure reading with the expectation that it would decrease in a relatively short period of time (i.e., a few days), or vent the system to return it to its normal condition. Either of these actions would have caused the identification of the failed pressure transmitter more promptly.

B. Knowledge of Standby Equipment Performance Parameters

The displayed CSS discharge pressure was more than 100 psig greater than the discharge pressure of the containment spray pump. Operators (utility, licensed) performing the subgroup relay testing did not recognize this difference as a result of both a procedural deficiency and a lack of detailed knowledge of important standby system performance parameters. Appropriate procedural direction to verify that actuated equipment has generated the proper and anticipated system response (e.g., discharge pressure for a pump is observed to be correct) was not provided. Although we have concluded that this guidance is necessary, we also believe that the knowledge level of control room operators (utility, licensed) should be such that parameters (such as anticipated discharge pressures of standby safety system pumps) are either known or action is taken to verify that indications are appropriate (e.g., use of reference material).

C. Review of Control Board Status

Our investigation indicated that several of the operators working on the shifts following the subgroup relay test did not question the elevated pressure indication. This was due to the practice of marking the various gauge indications using a grease pencil for the purpose of identifying changes which may occur over a period of time. (This practice is considered a valuable aid to the operators in assisting them in quickly identifying and trending important parameter changes). Since in this case the elevated pressure indication was not changing, operator attention was not focused on this indication and it was therefore not addressed. We have concluded that the use of grease pencils as an aid in monitoring the control board status, while performing a useful and necessary function, is not adequately controlled so as to

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avoid marking equipment deficiencies such as occurred in this event.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. The CSS pressure transmitter was replaced with an in-kind component, calibrated, and returned to service.
- b. The particle removed from the suspect pressure transmitter and the transmitter's feedback coil have been sent to an independent laboratory for further failure analysis. If the analysis reveals information which would significantly change the cause or corrective actions of this event, a revision to this LER will be submitted.
- c. The significance of this event was discussed with the operating crews by the Shift Superintendents and the Operations Manager.

2. Planned Corrective Actions:

- a. All Units 2 and 3 safety related Foxboro transmitters of a similar type will be inspected for foreign materials during their environmental qualification rebuild, currently scheduled to be completed prior to startup following the Cycle 6 refueling outage for each unit, with particular attention given to the feedback coil/housing gap.
- b. The Units 2 and 3 control room operators (utility, licensed) will be retrained via on-the-job training concerning parameters (i.e., pressures and flows) expected when starting and operating equipment in the containment spray system, the safety injection system, and the auxiliary feedwater system.
- c. Criteria and guidance for when and how to depressurize standby systems will be incorporated into system operating instructions.
- d. A document which contains expected full power operating parameters for all control room indicators will be developed and placed within the control room for ready access.
- e. This event will be included in annual licensed operator requalification training for Units 1, 2 and 3.
- f. The use of grease pencils for marking and trending plant parameters will be proceduralized to ensure that a consistent methodology of their use is maintained.

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- g. Appropriate operating procedures will be enhanced to improve guidance for monitoring pump starts.

F. SAFETY SIGNIFICANCE OF THE EVENT:

There was no safety significance to this event since the CSS Train "B" pressure indicator 3PI-0303-2, which is used for indication purposes only, would not have affected the ability of the system to fulfill its safety function. In addition, Train "A", including the required PAMI, remained operable during this event.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

The failed containment spray pressure transmitter is a Foxboro differential pressure transmitter, model number N-E11DM-IID2-F.

2. Previous LERs for Similar Events:

None.

3. Results of NPRDS Search:

There were no instances of similar Foxboro differential pressure transmitter failures.