

Southern California Edison Company

P. O. BOX 126

SAN CLEMENTE, CALIFORNIA 92674-0126

R. W. KRIEGER
VICE PRESIDENT
NUCLEAR GENERATION

September 29, 1994

TELEPHONE
714 368-6255

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

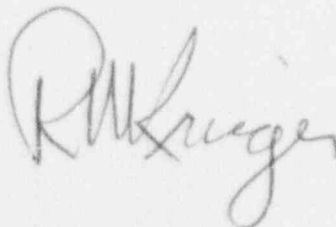
Subject: Docket No. 50-361
Supplemental Report
Licensee Event Report No. 91-019, Revision 1
San Onofre Nuclear Generating Station, Unit 2

Reference: Letter, H. E. Morgan (SCE) to USNRC Document Control Desk, dated
December 24, 1991

The referenced letter provided Licensee Event Report for an occurrence involving containment pressure instrumentation. The enclosed supplemental LER provides additional information concerning the root cause of the inoperable instrumentation and the associated corrective actions to prevent recurrence. This plant condition had no effect on the health and safety of plant personnel or the public.

If you require any additional information, please so advise.

Sincerely,



Enclosure: LER No. 91-019, Rev. 1

cc: L. J. Callan, Regional Administrator, USNRC Region IV
A. B. Beach, Director, Division of Reactor Projects, NRC Region IV
K. E. Perkins, Jr., Director, Walnut Creek Field Office,
NRC Region V
J. A. Sloan, NRC Senior Resident Inspector,
San Onofre Units 2 & 3
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
Institute of Nuclear Power Operations (INPO)

9410050256 940929
PDR ADDCK 05000361
S PDR

IF22
11

LICENSEE EVENT REPORT (LER)

Facility Name (1)										Docket Number (2)										Page (3)																																																																																																																																																																																																																																																																					
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2										01501003611										1 of 05																																																																																																																																																																																																																																																																					
Title (4)																																																																																																																																																																																																																																																																																									
INOPERABLE CONTAINMENT PRESSURE INSTRUMENTATION DUE TO MISCONFIGURED WIRING FROM INSTRUMENT LINE ISOLATION VALVE SOLENOID ACTUATOR																																																																																																																																																																																																																																																																																									
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 Names										Docket Number(s)																																																																																																																																																																																																																																																									
																						NONE																																																																																																																																																																																																																																																																			
11		16		91		91		---		019		---		011		019		219		914																																																																																																																																																																																																																																																																					
OPERATING MODE (9)										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																																																																																																																																																																																																																																																																															
3										<table border="0"> <tr> <td>20.402(b)</td> <td>20.405(c)</td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td>20.405(a)(1)(i)</td> <td>50.36(c)(1)</td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td>20.405(a)(1)(ii)</td> <td>50.36(c)(2)</td> <td>50.73(a)(2)(vii)</td> <td>Other (Specify in</td> </tr> <tr> <td>20.405(a)(1)(iii)</td> <td>X 50.73(a)(2)(i)</td> <td>50.73(a)(2)(viii)(A)</td> <td>Abstract below and</td> </tr> <tr> <td>20.405(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td>50.73(a)(2)(viii)(B)</td> <td>in text)</td> </tr> <tr> <td>20.405(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(x)</td> <td></td> </tr> </table>																				20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Abstract below and	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	in text)	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)																																																																																																																																																																																																																																					
20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)																																																																																																																																																																																																																																																																																						
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)																																																																																																																																																																																																																																																																																						
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in																																																																																																																																																																																																																																																																																						
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Abstract below and																																																																																																																																																																																																																																																																																						
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	in text)																																																																																																																																																																																																																																																																																						
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)																																																																																																																																																																																																																																																																																							
POWER LEVEL (10)																																																																																																																																																																																																																																																																																									
0100																																																																																																																																																																																																																																																																																									
<table border="1"> <tr> <td colspan="30">LICENSEE CONTACT FOR THIS LER (12)</td> </tr> <tr> <td colspan="20">Name</td> <td colspan="10">TELEPHONE NUMBER</td> </tr> <tr> <td colspan="20">R. W. Krieger, Vice President, Nuclear Generation</td> <td colspan="10"> <table border="0"> <tr> <td>AREA CODE</td> <td>7</td> <td>1</td> <td>4</td> <td>3</td> <td>6</td> <td>8</td> <td>-</td> <td>6</td> <td>2</td> <td>5</td> <td>5</td> </tr> </table> </td> </tr> <tr> <td colspan="30">COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</td> </tr> <tr> <td>CAUSE</td> <td>SYSTEM</td> <td>COMPONENT</td> <td>MANUFAC-</td> <td>REPORTABLE</td> <td>CAUSE</td> <td>SYSTEM</td> <td>COMPONENT</td> <td>MANUFAC-</td> <td>REPORTABLE</td> </tr> <tr> <td></td> <td></td> <td></td> <td>TURER</td> <td>TO NPRDS</td> <td></td> <td></td> <td></td> <td>TURER</td> <td>TO NPRDS</td> </tr> <tr> <td>B</td> <td>JIC</td> <td>IISIV</td> <td>V101310</td> <td>N</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="10">SUPPLEMENTAL REPORT EXPECTED (14)</td> <td colspan="10">Expected Submission Date (15)</td> <td colspan="10">Month Day Year</td> </tr> <tr> <td colspan="10">Yes (If yes, complete EXPECTED SUBMISSION DATE)</td> <td colspan="10">XX NO</td> <td colspan="10"></td> </tr> <tr> <td colspan="30">ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)</td> </tr> </table>																														LICENSEE CONTACT FOR THIS LER (12)																														Name																				TELEPHONE NUMBER										R. W. Krieger, Vice President, Nuclear Generation																				<table border="0"> <tr> <td>AREA CODE</td> <td>7</td> <td>1</td> <td>4</td> <td>3</td> <td>6</td> <td>8</td> <td>-</td> <td>6</td> <td>2</td> <td>5</td> <td>5</td> </tr> </table>										AREA CODE	7	1	4	3	6	8	-	6	2	5	5	COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																														CAUSE	SYSTEM	COMPONENT	MANUFAC-	REPORTABLE	CAUSE	SYSTEM	COMPONENT	MANUFAC-	REPORTABLE				TURER	TO NPRDS				TURER	TO NPRDS	B	JIC	IISIV	V101310	N						SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)										Month Day Year										Yes (If yes, complete EXPECTED SUBMISSION DATE)										XX NO																				ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																													
LICENSEE CONTACT FOR THIS LER (12)																																																																																																																																																																																																																																																																																									
Name																				TELEPHONE NUMBER																																																																																																																																																																																																																																																																					
R. W. Krieger, Vice President, Nuclear Generation																				<table border="0"> <tr> <td>AREA CODE</td> <td>7</td> <td>1</td> <td>4</td> <td>3</td> <td>6</td> <td>8</td> <td>-</td> <td>6</td> <td>2</td> <td>5</td> <td>5</td> </tr> </table>										AREA CODE	7	1	4	3	6	8	-	6	2	5	5																																																																																																																																																																																																																																																
AREA CODE	7	1	4	3	6	8	-	6	2	5	5																																																																																																																																																																																																																																																																														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																																																																																																																																																																																																																																																									
CAUSE	SYSTEM	COMPONENT	MANUFAC-	REPORTABLE	CAUSE	SYSTEM	COMPONENT	MANUFAC-	REPORTABLE																																																																																																																																																																																																																																																																																
			TURER	TO NPRDS				TURER	TO NPRDS																																																																																																																																																																																																																																																																																
B	JIC	IISIV	V101310	N																																																																																																																																																																																																																																																																																					
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)										Month Day Year																																																																																																																																																																																																																																																																					
Yes (If yes, complete EXPECTED SUBMISSION DATE)										XX NO																																																																																																																																																																																																																																																																															
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																																																																																																																																																																																																																																																																																									

At 2030 on 11/25/91, with Unit 2 at 100% power, it was determined that containment pressure instrument line isolation valve 2HV0352C had been closed (although indicating open) since the valve operating solenoids and position indication assembly had been replaced on 11/9/91, during the previous refueling outage. As a result, the channel "C" containment pressure transmitters had been isolated from containment, and inoperable, since that time. Technical Specification (TS) 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," requires that in Modes 1-3, an inoperable containment pressure channel must be bypassed within one hour. Mode 3 was entered at 2329 on 11/15/91. Therefore, operation in Modes 1-3 after 0029 on 11/16/91, with PPS channel "C" not bypassed, represented an operation prohibited by TSs. There is minimal safety significance to this event since the remaining channels of containment pressure instrumentation remained capable of initiating associated plant protection system actuations.

While performing maintenance on valve 2HV0352C solenoid actuator assembly internals, the intended polarities of both the opening coil and the closing coil were inadvertently reversed. As a result, the valve actuator was installed such that both operation and control room indication of the valve were reversed. The valve's position cannot be locally, visually ascertained; therefore, the restoration and maintenance verification testing of the valve relied solely on control room indication to verify proper valve operation and indication. A more rigorous test would have identified the reverse operation of the valve prior to its return to service.

After the valve solenoid actuator assembly internals were corrected, Edison performed a more rigorous restoration and maintenance verification test to verify proper valve operation. This event has been included in the applicable training programs for personnel who determine valve restoration and maintenance verification testing requirements. Additionally, Edison will enhance the Restoration and Maintenance Verification Testing procedure, for this and similar valves, to require a means to verify proper valve operation and indication.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	91-019-01	2 of 5

Plant: San Onofre Nuclear Generating Station Unit: Two
 Reactor Vendor: Combustion Engineering Event Date: 11-16-91
 Time: 0029

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 3, Hot Standby
 RCS Temperature: ~365 F

B. BACKGROUND INFORMATION:

1. Technical Specifications (TS):

TS 3.3.1, "Reactor Protective Instrumentation" [JC], and TS 3.3.2, "Engineered Safety Feature Actuation System Instrumentation" [JE], define the operability requirements for instrumentation which provides input to those systems, including containment pressure instrumentation [PT]. TS 3.3.1 is applicable in Modes 1-2, and TS 3.3.2 is applicable in Modes 1-3. Both TSs require that with one channel of containment pressure instrumentation inoperable, that channel must be placed in bypass within one hour.

2. Containment Pressure Instrument Line, Associated Instrumentation and Isolation Valve 2HV0352C:

Narrow range containment pressure transmitter 2PT0351-3 and wide range containment pressure transmitter 2PT0352-3 provide inputs to channel "C" of the plant protection system (PPS) for the high containment pressure reactor trip signal, containment isolation actuation signal (CIAS), safety injection actuation signal (SIAS), and containment spray actuation signal (CSAS). The pressure transmitters sense pressure from a containment pressure instrument line which can be isolated from containment with solenoid valve 2HV0352C [ISV]. Valve 2HV0352C is required to be open in order for the associated containment pressure transmitters to be considered operable.

Valve 2HV0352C is operated from a control room handswitch [HS]. An open solenoid [SOL] and a close solenoid operate the valve. A reed switch assembly [ZI] on top of the solenoid housing, in conjunction with magnets on the valve plunger, provide position indication of the valve to the control room. Due to the physical configuration of the valve, position indication of the valve cannot be visually ascertained at the valve.

During installation of the solenoid valve actuator, a portable power supply is utilized to activate the open and close operating solenoids (identified by wiring labeled by the manufacturer), and portable instrumentation is utilized to locally verify operation of the solenoids. The reed switches are then adjusted (also using local, portable instrumentation) to match the plunger magnet movement caused by operation of the solenoids.

3. Restoration and Maintenance Verification Testing Procedure:

The Restoration and Maintenance Verification Testing Procedure specifies the requirements for post-maintenance testing for Valcor solenoid valve switch and solenoid replacement. Following installation of solenoid valves, the test procedure requires that the valve be stroked to "verify proper operation and indication."

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	91-019-C1	3 of 5

C. DESCRIPTION OF THE EVENT:

1. Event:

On November 9, 1991, with Unit 2 in Mode 5 during the Cycle 6 refueling outage, containment pressure instrument line isolation valve 2HV0352C operating solenoids and position indication reed switch assembly were replaced. Unit 2 entered Mode 4 on 11/13/91, Mode 3 at 2329 on 11/15/91, and Mode 2 at 0437 on 11/18/91.

At 2300 on 11/24/91, following a review of the Operations shiftly surveillance, the control room supervisor (CRS) (utility, licensed) identified that 2PT0351-3 did not appear to be tracking the slight containment pressure increase which had occurred following the outage (however, its indicated pressure was within the cross-check acceptance criteria when compared with the other three PPS channels).

During the resulting investigation of the 2PT0351-3 apparent lack of response, pressure was applied to the containment pressure instrument line from the instrument side of isolation valve 2HV0352C. It was identified that the containment pressure instrument line did not hold pressure when 2HV0352C indicated closed, and did hold pressure when 2HV0352C indicated open (opposite from the expected response). Based on this pressure response of the instrument line, it was concluded (at 2030 on 11/25/91, with Unit 2 at 100% power) that the valve had been closed since the valve operating coils and reed switch assembly had been replaced on 11/9/91. As a result, the channel "C" containment pressure transmitters had been isolated from containment, and inoperable, since 11/9/91. Therefore, subsequent operation in Modes 1-3 following the first hour after entering Mode 3 (i.e., 0029 on 11/16/91) and Mode 2, with PPS channel "C" not bypassed, represented an operation prohibited by TSs 3.3.2 and 3.3.1, respectively.

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

None.

3. Sequence of Events:

DATE	TIME	ACTION
11/9		2HV0352C operating coils and position switch assembly were replaced.
11/15	2329	Unit 2 entered Mode 3.
11/18	0437	Unit 2 entered Mode 2.
11/24	2300	2PT0351-3 declared inoperable due to apparent non-response.
11/25	2030	During investigation of 2PT0351-3 non-response, it was identified that 2HV0352C operated in a reverse manner.

4. Method of Discovery:

Refer to Section C.1 above.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 91-019-01	PAGE 4 of 5
---	---------------------------	-------------------------	----------------

5. Personnel Actions and Analysis of Actions:

Upon noting the apparent non-response of 2PT0351-3, control room operators (utility, licensed) properly declared the transmitter inoperable and bypassed the associated PPS channels within 1 hour.

6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

An investigation to determine why 2HV0352C operated in a reverse manner found that on 11/9/91, while performing maintenance on the actuator internals, the wiring from the operating solenoids of the valve had been misconfigured. Edison had misconfigured the wiring on 11/9/91 due to a misinterpretation of the wiring shown on the vendor schematic. Testing performed on the valve following this maintenance was inadequate to verify correct operation of the valve.

After the 11/9/91 maintenance was completed, Edison tested 2HV0352C by operating the valve from the control room and verifying that the control room indication corresponded to the valve position switch. However, because the control room indication had been locally adjusted during valve installation to correspond to the improperly configured solenoid wiring, this test did not, in fact, verify proper valve operation and indication. As a result, the valve was returned to service with the wiring such that positioning the control switch to the "open" position energized the "open" coil with reverse polarity (thus closing the valve), and positioning the switch to the "close" position energized the "close" coil with reverse polarity (thus opening the valve). A more rigorous test (which did not rely solely on control room indication to verify proper valve operation and indication) would have identified that the indicated position of 2HV0352C did not correspond to its actual valve position.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. Containment pressure instrument line isolation valve 2HV0352C was reworked, and a proper restoration and maintenance verification test (including pressurization of the instrument line with the valve closed) was performed.
- b. Since the containment pressure instrumentation for the other three channels in Unit 2 and the four channels in Unit 3 have exhibited proper response to slight pressure changes, it was concluded that the position indication for the associated instrument line isolation valves reflect their actual position. No further corrective actions on those valves are required.
- c. This event has been included in applicable training programs for maintenance, operations, and engineering personnel who determine restoration and maintenance verification test requirements for valves. This training emphasized the requirements for testing to verify proper valve operation and indication.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	91-019-01	5 of 5

2. Planned Corrective Actions:

The Restoration and Maintenance Verification Testing Procedure will be enhanced to require a means, in addition to control room indication, to verify proper operation and indication of valves (the valves' position cannot be locally, visually verified). The enhanced Restoration and Maintenance Verification Testing Procedure will identify deficiencies, such as misconfigured internal wiring, prior to returning the valves to service.

F. SAFETY SIGNIFICANCE OF THE EVENT:

There is minimal safety significance to this event since the other three channels of PPS containment pressure instrumentation remained operable (except for a routine surveillance test of one channel), and thus were capable of initiating a reactor trip, CIAS, SIAS, or CSAS. With one of the three remaining channels inoperable for routine surveillance testing (which occurs typically less than 2 hours per channel per month), the other two channels would have been capable of satisfying the initiation logic for high containment pressure actuations, barring the unlikely failure of one of those two channels. In addition, other signals such as low pressurizer pressure, low steam generator (SG) levels or low SG pressures, which would be generated during events causing a significant increase in containment pressure, remained capable of initiating a reactor trip and related engineered safety feature (SIAS, emergency feedwater actuation signal, or main steam isolation signal, respectively).

G. ADDITIONAL INFORMATION:

1. Component Information:

The containment pressure instrument line isolation valve is a direct operating, 2-way, latching solenoid valve. The valve is manufactured by Valcor Engineering Corporation [V030], part no. V52600-539.

2. Previous LERs for Similar Events:

LERs 90-015 (Docket No. 50-361) and 91-001, Rev. 3 (Docket No. 50-206), describe events which involve inadequate post-maintenance retests for standby engineered safety feature (ESF) equipment. A corrective action resulting from these events included establishing a Retest Committee, comprised of personnel from Operations, Maintenance, and Engineering, to review retests for certain standby ESF systems. This corrective action did not prevent recurrence since 2HV0352C did not fall within the charter of the Retest Committee. However, proper retests of valves in accordance with the Restoration and Maintenance Verification Testing Procedure, following its enhancement as planned (see Section E.2), should prevent recurrence.