

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9003070033 DOC.DATE: 90/03/01 NOTARIZED: NO DOCKET #  
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 MORGAN,H.E. Southern California Edison Co.  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-001-00:on 900130,FHIS Train A spurious actuation due to manufacturing deficiency.

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	AEOD/ROAB/DSP	2 2	DEDRO	1 1
	NRR/DET/ECMB 9H	1 1	NRR/DET/EMEB9H3	1 1
	NRR/DET/ESGB 8D	1 1	NRR/DLPQ/LHFB11	1 1
	NRR/DLPQ/LPEB10	1 1	NRR/DOEA/OEAB11	1 1
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	NRR/DST/SICB 7E	1 1	NRR/DST/SPLB8D1	1 1
	NRR/DST/SRXB 8E	1 1	<del>REG FILE 02</del>	1 1
	RES/DSIR/EIB	1 1	RGN5 FILE 01	1 1
EXTERNAL:	EG&G WILLIAMS,S	4 4	L ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
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*Southern California Edison Company*

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March 1, 1990

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

Subject: Docket No. 50-362  
30-Day Report  
Licensee Event Report No. 90-001  
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the spurious actuation of the Fuel Handling Isolation System (FHIS). Neither the health and safety of plant personnel nor the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

*HEMog*

Enclosure: LER No. 90-001

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   6				
Title (4) FUEL HANDLING ISOLATION SYSTEM (FHIS) TRAIN "A" SPURIOUS ACTUATION DUE TO MANUFACTURING DEFICIENCY																				
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)				
0	1	3	0	9	0	9	0	0	3	0	NONE					0   5   0   0   0   0				
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																	
POWER LEVEL (10) 1   0   0			20.402(b)				20.405(c)				<input checked="" type="checkbox"/> 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 Abstract below and in text)					
			20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)									
			20.405(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)									
			20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)									
LICENSEE CONTACT FOR THIS LER (12)																				
Name H. E. Morgan, Station Manager												TELEPHONE NUMBER AREA CODE 7   1   4 3   6   8   -   6   2   4   1								
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											
B	V   G	I   M   O   D	N   3   0   5	YES																
X	K   M	R   L   Y	P   2   9   7	NO																
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)				Month Day Year						
<input type="checkbox"/> Yes (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO										
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																				

At 1815 on January 30, 1990, an unanticipated Fuel Handling Isolation System (FHIS) Train "A" actuation occurred on a spurious high alarm signal from radiation monitor 3RT7822 particulate/iodine channel. After determining that the FHIS actuation was spurious, FHIS Train "A" was secured. At 1835, the monitor was placed in bypass. At 2305, alignment of FHIS components, including the FHB ventilation system alignment, were returned to normal. There was no safety significance to this event since radiation levels remained normal and the redundant FHIS Train "B" remained operable throughout the event.

The failure of the radiation monitor module was caused by electrical noise which was not filtered out in accordance with the design due to a capacitor which was installed at an incorrect location. The root cause of this event was a manufacturing deficiency in assembly of the printed circuit board.

The printed circuit board was conformed to the design, tested and returned to service. As discussed in previous LERs, inspections and installation of upgraded circuit cards are being performed on all Units 2 and 3 ESF-related radiation modules as long-term corrective action.

During restoration of the FHB ventilation alignment to normal status, a "High Motor/Bearing Temperature" trip indication of Emergency Chiller E-336 was received. The chiller trip most likely resulted from an intermittent failure of one of trip relays. These relays were replaced and have been sent to a failure analysis laboratory to determine the cause of failure(s).

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Plant: San Onofre Nuclear Generating Station  
Unit: Three  
Reactor Vendor: Combustion Engineering  
Event Date: 01-30-90  
Time: 1815

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 1, Power Operations at 100% reactor power.  
RCS Temperature: 553 F

B. BACKGROUND INFORMATION:

The Fuel Handling Isolation System (FHIS) [VG] consists of two independent "trains" of radiation monitors (3RT-7822 for Train "A" and 3RT-7823 for Train "B") [RIT], associated dampers, alarms, recirculation air filtration units, chillers, and cooling water pumps. Each monitoring train consists of a particulate/iodine channel and a gas channel. Only one channel (i.e. detector, signal processor, power supply and channel actuation relay) is required to initiate a train actuation. Each train actuation relay is triggered by either a remote manual push-button or by one of the radiation monitor channel actuation relays in response to either high radiation, instrument failure, or loss of power. A FHIS actuation isolates normal ventilation to the Fuel Handling Building (FHB) and initiates recirculation.

The Emergency Chilled Water System (ECWS) [KM] serves to provide chilled water to remove heat from air conditioning cooling coils [CCL] that are in service during emergency conditions, including air conditioning [ACU] for various Engineered Safety Feature (ESF) equipment. There are two independent ECWS trains that are common to Units 2 and 3. Each of the ECWS trains is provided with a 100% capacity emergency chiller [CHU]. The chillers are normally in standby, and start upon receipt of a signal from the Safety Injection Actuation System (SIAS), Toxic Gas Isolation System (TGIS), Control Room Isolation System (CRIS), or Fuel Handling Isolation System (FHIS).

C. DESCRIPTION OF THE EVENT:

1. Event:

At 1815, on January 30, 1990, an unanticipated FHIS Train "A" actuation occurred on a spurious high alarm signal from radiation monitor 3RT7822 particulate/iodine channel. After determining that the FHIS actuation was spurious, FHIS Train "A" was secured. At 1835, the monitor was placed in bypass. At 2305, alignment of FHIS components, including the FHB ventilation system alignment, were returned to normal. The redundant FHIS Train "B" remained operable throughout the event.

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

None.

3. Sequence of Events:

<u>TIME</u>	<u>ACTION</u>
1815	FHIS Train "A" actuated
1835	Radiation Monitor placed in bypass
2305	Completed Train "A" FHIS reset and restoration

4. Method of Discovery:

The spurious actuation of FHIS Train "A" was observed by control room operators (utility, licensed).

5. Personnel Actions and Analysis of Actions:

The operators responded properly to the FHIS actuation by 1) verifying each FHIS Train "A" component actuated as required, and 2) verifying radiation levels in the FHB were normal prior to resetting FHIS and returning the ventilation lineup to normal.

6. Safety System Responses:

All FHIS Train "A" components actuated and functioned as required with the exception of Emergency Chiller E-336 (see Part G.2 below, Additional Information).

D. CAUSE OF THE EVENT:

1. Immediate Cause:

The 3RT7822 radiation monitor strip chart recorded a single "spike" for the event. The chart does not indicate any other spikes before or after the event. The observed "spike" resulted from electrical noise being induced or coupled into the monitor's circuits. A review of available information does not indicate any plant activity outside the monitor, at the time of the event, which could cause a significant noise spike. In order to determine the source of the electrical noise within the monitor, extensive testing of the radiation monitor circuits, cabling, power supplies and other components was performed. This testing was unable to determine the source of the noise spike.

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The monitor's circuitry was compared to the design documentation. A discrepancy was noted in that a capacitor was installed at an incorrect location on a printed circuit board (IC-55-4) in the monitor's count-rate module. The spurious actuation of the radiation monitor module was caused by electrical noise which was not filtered out by the capacitor. This discrepancy would result in the observed monitor spike causing the circuit to spuriously trip when influenced by noise in the output of the -6 vDC power supply. Testing of this power supply found that it was stable and did not produce noise spikes capable of actuating the monitor with the above described deficiency.

2. Root Cause:

The root cause of the incorrectly installed capacitor is a manufacturing deficiency in assembly of the Nuclear Measurement Corporation (NMC) IC-55-4 printed circuit board which is a part of the CRM 74/75 instrument module. Previously identified deficiencies with these modules were reported in LERs 88-001 (Docket No. 50-361), 88-011 (Docket No. 50-361) and 89-010 (Docket No. 50-362).

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. The IC-55-4 printed circuit board was modified to be in conformance with the design, tested and returned to service.
- b. A program to inspect circuit cards to ensure conformance with the design was underway at the time of this actuation. This monitor was one of four of 24 ESF monitors manufactured by NMC which had not yet been inspected. This program has since been completed.

2. Planned Corrective Actions:

As discussed in LER 88-001 (Docket Number 50-361) and LER 88-010 (Docket Number 50-362), circuit cards of an improved design are being installed on all Units 2 and 3 ESF-related radiation monitors as long-term corrective action. Prior to installation, the improved circuit cards are inspected to ensure conformance with the design. It is anticipated that the installation and inspection of the improved modules in the remaining monitors at SONGS will be completed by mid-1990.

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F. SAFETY SIGNIFICANCE OF THE EVENT:

There is no safety significance to this event as this was a spurious actuation and radiation levels remained normal. The tripping of Train "A" chiller E-336 was not safety significant since the redundant FHIS Train "B" and associated chiller E-335 remained operable throughout this event.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

The IC-55-4 printed circuit board circuit cards for the CRM 74/75 instrument modules described above are manufactured by Nuclear Measurement Corporation (NMC).

2. Chiller E-336 Trip:

Forty minutes after the FHIS actuation, at 1855, during restoration of the FHB ventilation alignments to normal status, a "High Motor or Bearing Temperature" trip indication of Emergency Chiller E-336 was received. The "High Motor or Bearing Temperature" trip on the chiller control panel is designed to trip the chiller and provide visual indication on trip. This trip also actuates on high compressor gas discharge temperature. During troubleshooting efforts of the chiller control circuit, all of these sensors were checked and found to function normally. The "High Motor or Bearing Temperature" trip indication can also be caused by failure of the control power fuse, motor/bearing temperature trip relays, or motor/bearing temperature module. The control power fuse was found to be satisfactory. Troubleshooting and testing efforts included jumpering of the motor temperature module, and then the bearing temperature module, effectively removing them from the trip actuation circuitry. The chiller tripped with the temperature modules jumpered; as a result, these temperature modules are not suspected to be the cause.

Since all trips during testing were momentary, the failed component could not be specifically identified. However, it has been determined that the trip was most likely due to an intermittent failure of either the motor temperature trip relay or the bearing temperature trip relay. These relays were replaced and the chiller was manually started. The chiller was operated successfully during a 10 hour test run and was declared operable at 0345 on 2/1/90. There have been no similar trips of this chiller or the redundant Train "B" chiller E-335. The motor temperature trip relay and the bearing temperature trip relay on chiller E-335 will be replaced the next time the chiller is removed from service for scheduled preventive maintenance and inspection.

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The suspect relays have been submitted to an outside laboratory for additional failure analysis. The results of the failure analysis will be evaluated for potential generic implications.

3. Previous LERs for Similar Events:

LER 88-001 (Docket 50-361) reported a Control Room Isolation System (CRIS) actuation due to a momentary interruption of power caused by the degradation of the electrical connections. As long term corrective action, SCE is inspecting and installing upgraded circuit cards. At the time of this event, this was one of four ESFAS modules on Units 2 and 3 for which upgraded circuit cards had not yet been installed.

LERs 88-011 (Docket No. 50-361) and 89-011 (Docket No. 50-362) reported FTHIS actuations due to power supply failures.

3. Results of NPRDS Search:

Not applicable.