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 AUTH. NAME AUTHOR AFFILIATION
 MORGAN, H.E. Southern California Edison Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-010-00: on 890910, fuel handling isolation sys Train A
 actuation due to power supply failure.

W/8 ltr.

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Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92672

H. E. MORGAN
STATION MANAGER

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October 10, 1989

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

Subject: Docket No. 50-362
30-Day Report
Licensee Event Report No. 89-010
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 or the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

H E Morgan

Enclosure: LER No. 89-010

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)

Feb 11

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 | 1 | of | 0 | 5
 Title (4)

FUEL HANDLING ISOLATION SYSTEM TRAIN "A" ACTUATION DUE TO POWER SUPPLY FAILURE

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	9	10	89	0	1	0	1	0	10	89	NONE	0 5 0 0 0

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)

20.402(b)	20.405(c)	X	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	MANUFACTURER	REPORTABLE TO NPD	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD
B	V	I	M	O	D	N	3	0	5

SUPPLEMENTAL REPORT EXPECTED (14)

Yes (If yes, complete EXPECTED SUBMISSION DATE) XX NO
 Expected Submission Date (15)

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

At 0045 on September 10, 1989, Fuel Handling Isolation System (FHIS) Train "A" actuated due to the loss of power on the particulate/iodine channel. After determination that the FHIS actuation was spurious, FHIS Train "A" was reset at 0115. The monitor was placed in bypass and the Fuel Handling Building (FHB) ventilation system was returned to normal. There was no safety significance to this event since radiation levels remained normal and all FHIS Train "A" components functioned as designed. The redundant FHIS Train "B" remained operable throughout the event.

The loss of power to the radiation monitor module was caused by an overcurrent condition due to a short in the module's power supply circuit which resulted in a blown fuse, interrupting current to the module. The root cause is manufacturing deficiencies with Nuclear Measurement Corporation CRM 74/75 instrument modules. A nylon screw, which secures the -15 VDC voltage regulator to a metal plate heat sink, with mica insulation in between the regulator and heat sink, was found broken due to thermal aging. This permitted the regulator to shift slightly and allowed a burr on the metal heat sink to penetrate the mica insulation. The burr established the short circuit from the plate to the voltage regulator. A previous FHIS actuation due to a similar module power supply failure was reported in LER 88-011 (Docket 50-361).

The burr on the heat sink plate was removed and the nylon screw and blown fuse were replaced. The module was tested satisfactorily and returned to service. The 18-month surveillance procedures for similar modules will be revised and inspections for such defects will be performed. SCE will review the vendor's quality program to determine if enhancements by the vendor are necessary.

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 FILE ATOMIC 00000362
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 3	DOCKET NUMBER 05000362	LER NUMBER 89-010-00	PAGE 2 OF 5
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Plant: San Onofre Nuclear Generating Station
Unit: Three
Reactor Vendor: Combustion Engineering
Event Date: 09-10-89
Time: 0045

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 1, Power Operations at 100% reactor power

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 and initiates recirculation.

C. DESCRIPTION OF THE EVENT:

1. Event:

At 0045 on September 10, 1989, an unanticipated spurious Train "A" actuation occurred due to the loss of power in the radiation monitor module on the particulate/iodine channel of 3RT-7822. After determining that the FHIS actuation was spurious, FHIS Train "A" was secured. The monitor was placed in bypass and the Fuel Handling Building (FHB) ventilation system was returned to normal.

All FHIS Train "A" components functioned as designed. The redundant FHIS Train "B" remained operable throughout the event.

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

None.

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3. Sequence of Events:

<u>TIME</u>	<u>ACTION</u>
0045	FHIS Train "A" actuated.
0115	Proper response of FHIS Train "A" components verified and the FHB ventilation returned to normal status.

4. Method of Discovery:

Control room alarms and indications alerted the operators of the FHIS actuations.

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 operated in accordance with design.

D. CAUSE OF THE EVENT:

1. Immediate Cause:

The loss of power to the radiation monitor module was caused by an overcurrent condition which resulted in a blown fuse, interrupting current to the module.

2. Intermediate Causes:

The overcurrent condition was due to a short in the module's power supply [JX] circuit. A nylon screw secures the -15 VDC voltage regulator to a metal plate (aluminum) heat sink, with mica insulation in between the regulator and heat sink. Inspection of these components revealed that the nylon screw had broken, permitting the regulator to shift slightly and allowed a burr on the metal heat sink to fully penetrate the mica insulation, shorting out the regulator. The nylon screw failed due to thermal aging.

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3. Root Cause:

The root cause of the FHIS actuation was equipment failure due to manufacturing deficiencies with Nuclear Measurement Corporation (NMC) CRM 74/75 instrument modules. These deficiencies include the use of a nylon screw which failed due to thermal aging, and the failure to de-burr the heat sink plate. A previous FHIS actuation due to a similar module power supply failure was reported in LER 88-011 (Docket No. 50-361). Our root cause analysis for that power supply failure has recently been completed which also attributes the failure to the presence of a burr on the heat sink plate.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

The burr on the heat sink plate was removed and the nylon screw and blown fuse were replaced. The module was tested satisfactorily and returned to service.

2. Planned Corrective Actions:

- a. As a corrective action for a deficiency discussed in LER 88-001 (Docket No. 50-361), an enhanced printed circuit card will be installed in all inservice and spare ESF-related Units 2 and 3 radiation modules. During their installation, the modules will be inspected for burrs on the heat sink plate. In addition, if discoloration or embrittlement is observed on the nylon screws, they will be replaced. It is anticipated that the inspection of all such modules at SONGS will be completed by mid-1990.
- b. The manufacturer did not use or require a thermal conduction compound in these modules between the regulator and aluminum heat sink. Such a compound may reduce the heat conduction into the screw and allow better heat conduction into the heat sink. The use of a thermal conduction compound in this application will be evaluated, and if appropriate, implemented for the modules.
- c. The 18-month surveillance procedures for ESF-related monitors will be revised to include an inspection of the nylon screws for discoloration or embrittlement and replacement, if necessary.
- d. SCE will review the vendor's quality program to determine if enhancements by the vendor are necessary to preclude recurrence of similar defects in future replacement modules (see also LER 88-011-01, Docket 50-361).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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F. SAFETY SIGNIFICANCE OF THE EVENT:

1. There is no safety significance to this event since all FHIS Train "A" components operated in accordance with design. In addition, the redundant FHIS Train "B" remained operable.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

The radiation monitor module is a CRM-74/75 instrument module manufactured by NMC. The component part number for the nylon screw (No. 6/32) is NMC 312235.

2. Previous LERs for Similar Events:

LER 88-011, Docket No. 50-361, reported a FHIS Train "A" actuation. This spurious actuation was also caused by a burr on the metal flat plate heat sink which established a short circuit. The root cause analysis for that event has recently been completed, and therefore, corrective actions to prevent recurrence for the two events are being pursued jointly.

LER 85-034, Docket No. 50-362, reported a FHIS Train "A" actuation from 3RT-7822 due to loss of power in the monitor. However, the loss of power was due to a loose electrical lead and not from a power supply failure. Corrective actions for the previous event would not be applicable to this event.

3. Results of NPRDS Search:

An NPRDS search revealed no information associated with -15 VDC power supply failures.