

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8809070567 DOC.DATE: 88/09/01 NOTARIZED: NO DOCKET #
 FACIL:50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
 AUTH.NAME AUTHOR AFFILIATION
 MORGAN,H.E. Southern California Edison Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-004-01:on 880310,spurious control room isolation sys
 actuation due to spike on radiation monitor RT-7825.
 W/8 ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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LICENSEE EVENT REPORT (LER)

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|---|--------|-----------|--|---------------------|-------|--|-----------|--|---|---|---|---|--------------------|--|----------------------|--|--|
| Facility Name (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2 | | | | | | | | | | Docket Number (2) 0 5 0 0 0 3 6 1 | | | | | Page (3) 1 of 0 5 | | |
| Title (4) SPURIOUS CONTROL ROOM ISOLATION SYSTEM ACTUATION DUE TO SPIKE ON RADIATION MONITOR RT-7825 | | | | | | | | | | | | | | | | | |
| EVENT DATE (5) Month Day Year 0 3 1 0 8 8 | | | LER NUMBER (6) Year Sequential Number Revision Number 8 8 0 0 4 0 1 | | | | | REPORT DATE (7) Month Day Year 0 9 0 1 8 8 | | | OTHER FACILITIES INVOLVED (8) Facility Names Docket Number(s) SONGS, UNIT 3 0 5 0 0 0 3 6 2 | | | | | | |
| OPERATING MODE (9) 1 | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11) | | | | | | | | | | | | | | |
| POWER LEVEL (10) 1 0 0 | | | <input type="checkbox"/> 20.402(b) | | | <input type="checkbox"/> 20.405(c) | | | <input checked="" type="checkbox"/> 50.73(a)(2)(iv) | | | <input type="checkbox"/> 73.71(b) | | | | | |
| | | | <input type="checkbox"/> 20.405(a)(1)(i) | | | <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 type="checkbox"/> 50.36(c)(2) | | | <input type="checkbox"/> 50.73(a)(2)(vii) | | | 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) | | | | | | | | |
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| 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 NPRDS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | | | | | | | | |
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| 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 0925 on March 10, 1988, with Unit 2 and Unit 3 at 100% power, a Control Room Isolation System (CRIS) Train B actuation occurred when both channels of CRIS Train B radiation monitor RT-7825 spiked, resulting in the gas channel, RT-7825B2, exceeding its actuation set point. All CRIS Train B components were verified to operate in accordance with design. Air sample results verified the actuation to be spurious, and CRIS Train B was reset and the ventilation lineup returned to normal at 1110.

The radiation monitor cabling and detector module were inspected, but the cause of the actuation could not be initially determined. Subsequent investigation was unable to definitively identify the root cause, but did identify two design and installation problems which could have caused the actuation. Specifically, (1) certain relay operating coils have been observed to initiate electrical noise spikes when they are de-energized, and (2) there are conductor locations susceptible to cross coupling of these noise spikes between the monitor's power and signal cables.

As corrective action, transient noise suppressors will be installed at appropriate locations in the monitor's circuits. If necessary, signal and power cables will be separated at appropriate locations to preclude cross coupling of any remaining electrical noise spikes.

There is no safety significance to this event since radiation levels remained normal and all CRIS Train B components operated in accordance with design.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2 | DOCKET NUMBER 05000361 | LER NUMBER 88-004-01 | PAGE 2 OF 5 |
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Plant: San Onofre Nuclear Generating Station (SONGS)
Unit: 2
Reactor Vendor: Combustion Engineering
Event Date: March 10, 1988
Time: 0925

A. PLANT CONDITIONS AT THE TIME OF THE EVENT:

Mode: 1, Power Operation

B. BACKGROUND INFORMATION:

The Control Room Isolation System (CRIS) (EIIS System Code VI) consists of two independent trains of radiation monitors (RT-7824 and RT-7825) (EIIS Component Code RIT), emergency ventilation supply (EVS) units (A-206 and A-207) (EIIS Component Code AHU), emergency air conditioning (EAC) units (E-418 and E-419) (EIIS Component Code ACU), cabinet area emergency air cooling units (E-423, E-424, E-426, and E-427) (EIIS Component Code ACU), and associated emergency isolation dampers (EIIS Component Code BDMP). Each radiation monitor is comprised of a particulate/iodine channel and a noble gas channel. Upon receipt of either a high radiation or instrument failure signal, the dampers operate to direct outside air through the EVS and EAC units, both of which contain filtration units (EIIS Component Code FLT), thus providing purified and cooled air to the control room and minimizing exposure to personnel.

C. DESCRIPTION OF THE EVENT:

1. Event:

At 0925 on March 10, 1988, with Unit 2 and Unit 3 at 100% power, a CRIS Train B actuation occurred when both channels of CRIS Train B radiation monitor RT-7825 spiked, resulting in the noble gas channel, RT-7825B2, exceeding its actuation set point. All CRIS Train B components were verified to operate in accordance with design. Air sample results verified the actuation to be spurious, and CRIS Train B was reset and the ventilation lineup returned to normal at 1110.

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> |
|-------------|---|
| 0920 | Repairs and inspection of the RT-7825 control room module had been completed following a recent spurious actuation (reference LER 88-006, Docket No. 50-361). After observing no problems while monitoring RT-7825 for approximately one week, RT-7825 was declared operable. |
| 0925 | CRIS Train B actuation occurred when RT-7825 spiked. |
| 0945 | Verified CRIS Train B components actuated in accordance with design. |
| 1000 | Placed RT-7825 in "Alarm Defeat" to prevent further spurious actuations. |
| 1110 | After verifying the actuation to be spurious, reset CRIS Train B and returned ventilation lineup to normal. |

4. Method of Discovery:

Control room indications and alarms alerted the operators of the CRIS Train B actuation.

5. Personnel Actions and Analysis of Actions:

The operators responded properly to the CRIS Train B actuation by 1) verifying each CRIS Train B component operated in accordance with design, and 2) verifying the actuation was spurious prior to resetting CRIS Train B and returning the ventilation lineup to normal.

6. Safety System Responses:

All CRIS Train B components functioned as designed.

D. CAUSE OF THE EVENT:

1. Immediate Cause:

Both channels of the CRIS Train B radiation monitor RT-7825 spiked, resulting in the noble gas channel, RT-7825B2, exceeding its actuation set point and causing the actuation.

2. Root Cause:

Initial Investigation

After an extensive investigation, the root cause of this spurious actuation could not be determined.

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As a result of recent spurious CRIS actuations caused by electrical noise on RT-7825 (Reference LER 2-88-006, Docket No. 50-361), an inspection had been performed and necessary repairs had been implemented on the RT-7825 control room module. The investigation to determine the root cause of this actuation therefore concentrated on the other components of the radiation monitor. However, the instrument rack-to-module connector, which had caused the previous spurious actuation, was inspected with no problems being noted.

The radiation monitoring cables related to RT-7825 were walked down to determine if any welding or transmission equipment could have caused the spurious signal. No evidence was found that would support this as the cause of the actuation.

The cables were also tested with a time-domain reflectometer (TDR), which checks for impedance changes along the signal path. Although a discontinuity in the impedance on the detector cable connector was indicated by one TDR measurement, subsequent TDR measurements did not reproduce this condition.

The entire signal line was checked for impedance mismatch. Also, the heat shrink was removed and solder joints inspected for various terminations. No discrepancies were found that would have caused the actuation.

The detector connector was checked to determine if any arc-over could occur between pins of the connector. No evidence of arc-over was found.

The detector was disassembled, inspected for deficiencies, and reassembled, after which a primary isotopic calibration was performed. No discrepancies were found in the detector that would have caused the actuation.

Subsequent Investigation

As the result of subsequent detailed investigations, two inter-related problems in the design and installation of the system were identified as discussed below:

- a. De-energization of certain relay operating coils in the monitoring system have been observed to occasionally cause electrical noise spikes. Operation of these relays is infrequent, as they are manually initiated by push-button switches in order to accomplish functions such as advancing filter paper and collecting flow stream samples. These electrical noise spikes have been observed to be as much as 5 to 10 times the 120 VAC line voltage.
- b. The monitoring system's power and signal cables run parallel and in contact with each other for considerable distances in cable trays and in various cabinets. Such an arrangement is conducive to cross coupling electrical noise spikes (such as those described in "a" above) from the power cables to the signal cables.

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However, these problems can not be definitely characterized as a root cause for this event since it is not now possible to relate operation of one of the push-button switches and the associated relays to the CRIS. To date, there have been no subsequent CRIS actuations which can be attributed to noise spikes.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

The TDR measurements which were taken after the initial RT-7825 inspection was completed show no unusual discontinuities in impedance and support the return to service of the monitor.

2. Planned Corrective Actions:

Transient voltage suppressors will be installed on applicable relay coils in order to suppress generation of electrical noise spikes. Testing will be performed to determine the effectiveness of these suppressors. Design of these changes is now in progress. It is anticipated that implementation and testing of these design changes will be completed by mid-1989.

In the event that electrical noise spikes capable of causing spurious actuations cannot be adequately suppressed, the monitoring system's power and signal cables will be separated where appropriate. This separation will reduce cross coupling of any remaining noise spikes from the power cables to the signal cables.

F. SAFETY SIGNIFICANCE OF THE EVENT:

There is no safety significance to this event since radiation levels remained normal and all CRIS Train B components operated in accordance with design.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable

2. Previous LERs on Similar Events:

Spurious CRIS actuations due to electrical noise have occurred and were most recently documented in LER 85-033 (Docket No. 50-361). In late 1985, the detector was replaced and the preamplifier was verified to be properly grounded, reducing the noise significantly. A spurious CRIS actuation due to electrical noise from unknown causes has not occurred since this was performed.

3. Results of NPRDS Search:

Not applicable

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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SAN CLEMENTE, CALIFORNIA 92672

H. E. MORGAN
STATION MANAGER

TELEPHONE
(714) 368-6241

September 1, 1988

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

Subject: Docket No. 50-361
Supplementary Information
Licensee Event Report No. 88-004, Revision 1
San Onofre Nuclear Generating Station, Units 2 and 3

Reference: Letter, H. E. Morgan (SCE) to USNRC Document Control Desk, dated
April 11, 1988

The referenced letter provided the required 30-day written Licensee Event Report (LER) for an occurrence involving a spurious actuation of the Control Room Isolation System. This submittal provides additional information concerning the cause of the event and corrective action. Neither the health and safety of plant personnel nor the health and safety of the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

L. W. Kreeger for H. E. Morgan

Enclosure: LER No. 88-004, Revision 1

cc: F. R. Huey (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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