Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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

Subject: Docket No. 50-361
30-Day Report
Licensee Event Report No. 92-002
San Onofre Nuclear Generating Station, Unit 2

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the Control Room Isolation System in Units 2 and 3 and an emergency diesel generator in Unit 3. Since this occurrence involves a system applicable to Units 2 and 3, a single report for Unit 2 is being submitted in accordance with NUREG-1022. 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,

R.W. Krieger

Enclosure: LER No. 92-002

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)

IE22

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
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Title (4)

CONTROL ROOM ISOLATION SYSTEM ACTUATION AND AUTOMATIC START OF EMERGENCY DIESEL GENERATOR 3G002 DUE TO DE-ENERGIZATION OF UNIT 3 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM POWER SUPPLY

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)
									SONGS, UNIT 3	0 5 0 0 0 3 6 2
0 2	0 9	9 2	9 2	0 0 2	0 0	0 3	1 0	9 2		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	TELEPHONE NUMBER AREA CODE
R. W. Krieger, Station Manager	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	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

	Expected Submission Date (15)	Month	Day	Year
___ Yes (If yes, complete EXPECTED SUBMISSION DATE) X NO				

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

At 2000 on February 9, 1992, with Unit 3 defueled and Unit 2 at 100% power, a control room isolation system (CRIS) train "A" actuation, an automatic start of the Unit 3 train "A" emergency diesel generator (EDG) 3G002, and de-energization of instrumentation associated with the non-1E uninterruptible power supply (UPS) occurred when the Unit 3 engineered safety feature actuation system (ESFAS) train "A" valve group relays de-energized. Due to the refueling outage, most of the other equipment that would have actuated was either out of service or already in its actuated state. There is no safety significance to this event since all affected ESFAS components actuated as required.

With one of two redundant, parallel ESFAS train "A" valve group DC power supplies previously de-energized for maintenance, the supply breaker to the remaining power supply opened, resulting in de-energization of the valve group relays. The breaker was tested but no malfunctions of the breaker or connected circuitry were identified that could have caused its opening. It is probable that a technician inadvertently and unknowingly contacted the breaker and caused it to open.

Affected equipment was returned to normal alignment by 2112. Actions were taken to reduce the possibility of inadvertent contact with the ESFAS DC power supply breakers, including installation of temporary breaker covers, implementing temporary controls on the ESFAS cabinet doors, and discussion of the event with appropriate personnel. Installation of permanent supply breaker covers is planned.

Plant: San Onofre Nuclear Generating Station
Unit: Two and Three
Reactor Vendor: Combustion Engineering
Event Date: 02-09-92
Time: 2000

A. CONDITIONS AT TIME OF THE EVENT:

Mode: Defueled
RCS Temperature: 72 F

B. BACKGROUND INFORMATION:

1. Engineered Safety Features Actuation System (ESFAS) [JE] Initiation Circuitry:

Two DC power supplies [JX] operate in parallel to supply power to the ESFAS component actuation relays [RLY] generally associated with valve [V] actuations (termed the "valve group" relays). Two other DC power supplies operate in parallel to supply power to the ESFAS component actuation relays generally associated with pump [P] actuations (termed the "pump group" relays). Only one of the two parallel DC power supplies is required to maintain the component actuation relays energized. De-energization of a component actuation relay results in actuation of that component.

2. Safety Injection Actuation Signal (SIAS) [JE] Effects:

De-energization of certain valve group relays associated with the train "A" SIAS causes a control room isolation system (CRIS) [NA] train "A" actuation, an automatic start of the train "A" emergency diesel generator (EDG) [EK] 3G002, and automatic opening of the normal supply breaker [BKR] to the non-1E uninterruptible power supply (UPS) [EE] (see below). A CRIS causes outside supply air to the Units 2 and 3 control room to be directed through air filtration units [FLT]. The non-1E UPS provides power to some non-class 1E instrumentation.

3. Non-1E UPS Alignment:

The non-1E UPS bus Q069 is normally supplied power from the train "A" class 1E 4160 volt [EB] bus A04, via a transformer [XFMR], charger [BYC], and inverter [INVT]. The inverter can also be supplied by the non-1E UPS battery [BTRY]. A maintenance bypass bus [BU] is provided to allow work to be performed on the inverter or charger. The maintenance bypass bus is provided power from upstream of the charger, and thus is supplied power from the same A04 breaker as the charger. This breaker automatically trips upon receipt of a SIAS.

C. DESCRIPTION OF THE EVENT:

1. Event:

At 2000 on February 9, 1992, with Unit 3 defueled and Unit 2 at 100% power, a de-energization of the Unit 3 ESFAS train "A" valve group relays occurred. As a result of de-energization of the valve group relays associated with SIAS, a CRIS train "A" actuation, an automatic start of the Unit 3 train "A" EDG 3G002, and de-energization of instrumentation associated with the non-1E UPS occurred. Due to the refueling outage, most of the other equipment that would have actuated was either out of service or already in its actuated state.

Control room operators (utility, licensed) performed an investigation directly following the actuations. One of the two redundant DC power supplies that supply power to the Unit 3 ESFAS train "A" valve group relays had been previously de-energized (its breaker had been tagged open) to allow maintenance on the ESFAS cabinet. The supply breaker to the other associated redundant DC power supply was found open, which resulted in a loss of power to the ESFAS train "A" valve group relays.

At 2020, after reviewing the control room panels [PL] and verifying that the ESFAS train "A" components actuated as required, the control room operators reclosed the supply breaker to the train "A" ESFAS DC power supply, restoring power to the associated component actuation relays. Affected equipment was returned to normal alignment by 2112.

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

One of the two DC power supplies that supply power to the ESFAS train "A" valve group relays was previously de-energized to allow outage work to be performed on the ESFAS cabinet. This condition resulted in only one power supply providing power to that part of the ESFAS initiation circuitry. Therefore, loss of that remaining power supply resulted in de-energization of the ESFAS train "A" valve group relays and actuation of the affected components.

The Unit 3 non-1E UPS bus was being supplied power from the maintenance bypass bus since maintenance was being performed on its battery-backed normal power supply. As a result, when the non-1E UPS normal supply breaker opened due to de-energization of the SIAS valve group relays, the battery-backed normal power supply was not available, and a loss of associated instrumentation occurred.

3. Sequence of Events:

TIME	ACTION
2000	De-energization of ESFAS train "A" valve group relays occurred, causing actuation of affected components. De-energization of the valve group relays associated with SIAS caused a CRIS train "A" actuation, an automatic start of EDG 3G002, and de-energization of instrumentation associated with the non-1E UPS. The supply breaker to the operable ESFAS train "A" DC power supply was found open.
2020	Control room operators reclosed the supply breaker to the ESFAS train "A" DC power supply, restoring power to the associated component actuation relays.
2112	Affected equipment was returned to normal alignment.

4. Method of Discovery:

Control room indications and alarms alerted the control room operators to the actuations caused by de-energization of the ESFAS component actuation relays. After deducing that the power supply to the ESFAS train "A" initiation circuitry had been de-energized, the operators inspected the ESFAS cabinet and identified that the supply breaker to the DC power supply was open.

5. Personnel Actions and Analysis of Actions:

Upon receipt of alarms and indications associated with a train "A" CRIS actuation, automatic start of EDG 3G002, and loss of instrumentation powered from non-1E UPS, control room operators correctly deduced that the cause involved a train "A" SIAS generation. Upon inspection of the train "A" ESFAS cabinet [CAB], the open DC power supply breaker was identified, and later was properly reclosed.

Operators also properly verified that all affected ESFAS components, including CRIS train "A" components and EDG 3G002, actuated as required prior to returning the components to normal alignment.

6. Safety System Responses:

Control room panels were reviewed to ensure all affected ESFAS components associated with the train "A" valve group, including CRIS train "A" components and EDG 3G002, actuated as required. Due to the refueling outage, most of the other equipment that would have actuated was either out of service or already in its actuated state.

Since the actuation involved only the ESFAS train "A" valve group relays, pumps were not affected. As a result, injection of water into the reactor coolant system [AB] did not occur.

D. CAUSE OF THE EVENT:

1. Immediate Cause:

The supply breaker to the (remaining) parallel DC power supply was found open following actuation of the affected ESFAS train "A" valve group components. It is concluded that de-energization of the valve group relays occurred when this breaker opened. (It should be noted that the supply breaker does not have a separate switch [HS] position indicating when the breaker trips on overcurrent.)

2. Root Cause:

An extensive root cause investigation was performed to determine the cause of this event. The investigation focused on the two most probable causes for the opening of the ESFAS DC power supply breaker: a) operation of the breaker caused by a malfunction of either the breaker or connected circuitry (such as an overcurrent condition); and b) inadvertent opening of the breaker by personnel who were working in the ESFAS cabinet area.

a. As mentioned in section C.1, Event, the installed breaker was reclosed soon after its opening. The breaker operated properly until its replacement with an in kind part on February 26, 1992, indicating that a malfunction of connected circuitry did not cause the breaker to open. In addition, a review of planned work which occurred in other nearby cabinet bays did not identify any activity that could have caused a malfunction of the connected circuitry that would have caused the supply breaker to open.

The supply breaker was tested and performed satisfactorily in accordance with the manufacturer's specifications. No malfunction was identified during this testing which could have caused an inadvertent electrical opening of the breaker. However, the testing demonstrated that the breaker operating switch handle could be repositioned with a low impact force. The breaker was then disassembled, and no abnormalities (pitting or discoloration) were found.

Since the supply breaker testing and inspection did not reveal any abnormalities, and other work activities did not cause an overcurrent condition, SCE believes that neither a breaker malfunction nor an overcurrent condition associated with the connected circuitry caused the breaker to trip electrically.

b. The operating switch for the DC supply breaker is located in the lower portion of the bay six ESFAS cabinet such that it is easily accessible. The switch is a two position handle; the breaker is closed when the handle is in the "up" position and open when the handle is in the "down" position. During the refueling outage, work was ongoing to install electrical circuitry in this and other ESFAS cabinet bays. The doors [DR] to the ESFAS cabinet bays were routinely left open to facilitate this work.

Prior to the start of the outage work activity, duct tape had been installed on this and other DC power supply breaker switches to reduce the risk of inadvertent operation. This tape was installed over the breaker switch handle and obscured the position of the handle such that the tape would have to be removed to ascertain the handle position.

In-depth interviews were conducted with all personnel (utility and non-utility, licensed and non-licensed) who were present in the ESFAS cabinet area immediately prior to and following the opening of the breaker. Although no work was authorized to be performed in ESFAS cabinet bay six, two technicians (non-utility, non-licensed) were present in bay six at approximately the time of the opening of the breaker.

Due to the orientation of the breaker switch and its location in the cabinet, coupled with the ESFAS cabinet doors being open and the low impact force necessary to open the breaker, SCE believes that it is probable that one of the technicians inadvertently and unknowingly (since the breaker switch position was covered by tape) contacted the breaker switch handle, causing it to open. SCE has therefore determined that the root cause of this event is that the ESFAS DC power supply breakers are susceptible to inadvertent opening by personnel.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

a. Following the actuation of affected ESFAS components, the ESFAS DC power supply breaker was reclosed, and affected equipment was returned to normal alignment. Neither the supply breaker nor its replacement has automatically opened since the actuation.

b. This event was reviewed with appropriate personnel, emphasizing the impact of de-energization of both redundant ESFAS DC power supplies.

c. The breaker was replaced with an in-kind part to facilitate testing on the installed breaker (which had been found open).

d. Actions were taken to reduce the susceptibility for inadvertent operation of the ESFAS DC power supply breakers, including installation of temporary covers over some of the breakers, implementing temporary controls on the ESFAS cabinet doors, and discussion of the event with appropriate personnel.

2. Planned Corrective Actions:

a. Installation of permanent covers to protect inadvertent operation of the ESFAS DC power supply breakers is being planned.

F. SAFETY SIGNIFICANCE OF THE EVENT:

There is no safety significance to this event since all train "A" CRIS components and EDG 3G002 actuated as required. In addition, with the reactor defueled, most of the equipment affected by the ESFAS component actuation relays was not required to be operable.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable.

2. Previous LERs for Similar Events:

LER 85-026 (Docket No. 50-362) describes an event which occurred during a refueling outage. One of the supply breakers to the redundant train "A" ESFAS DC power supplies which provide power to ESFAS pump group relays had been opened while performing modification work in the cabinet. The other supply breaker was found open, causing an actuation of affected ESFAS components. As corrective action, temporary covers were installed to protect the supply breakers during the completion of the modification work. Further use of the covers was to have been considered on a case by case basis. Although the covers were not installed on all the DC power supply breakers in this (LER 92-002) event, tape was utilized to reduce the risk of inadvertent operation of the breakers. Since the cause of this event cannot be absolutely ascertained, SCE cannot determine whether use of the covers on all the supply breakers would have prevented recurrence. In accordance with corrective action E.2.a above, the installation of permanent breaker covers is being planned.