

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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March 11, 1992

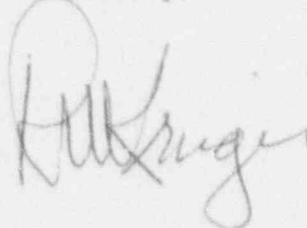
U. S. Nuclear Regulatory Commission
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Subject: Docket No. 50-361
30-Day Report
Licensee Event Report No. 92-003
San Onofre Nuclear Generating Station, Units 2 and 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the 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,



Enclosure: LER No. 92-003

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)										Docket Number (2)			Page (3)	
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2										0 5 0 0 0 3 6 1			1 of 0 7	
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 DURING BUS TRANSFER TEST														
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 2	1 1	9 2	9 2	0 0 3	---	0 0	---	0 3	1 1	9 2	SONGS, UNIT 3		0 5 0 0 0 3 6 2	
OPERATING MODE (9)				THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)										
1				<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> 20.402(b) <input type="checkbox"/> 20.405(a)(1)(i) <input type="checkbox"/> 20.405(a)(1)(ii) <input type="checkbox"/> 20.405(a)(1)(iii) <input type="checkbox"/> 20.405(a)(1)(iv) <input type="checkbox"/> 20.405(a)(1)(v) </div> <div style="width: 50%;"> <input type="checkbox"/> 20.405(c) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(iii) </div> <div style="width: 50%;"> <input checked="" type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(x) </div> <div style="width: 50%;"> <input type="checkbox"/> 73.71(b) <input type="checkbox"/> 73.71(c) <input type="checkbox"/> Other (Specify in Abstract below and in text) </div> </div>										
POWER LEVEL (10)														
1 0 0														
LICENSEE CONTACT FOR THIS LER (12)														
Name										TELEPHONE NUMBER				
R. W. Krieger, Station Manager										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-TURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPDs
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)				
<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 1548 on February 11, 1992, with Unit 3 defueled and Unit 2 at 100% power, a surveillance test was performed that involved the momentary de-energization (during a transfer operation) of Unit 3 train "B" class 1E 4160 VAC bus 3A06. When 3A06 was de-energized, the Unit 3 engineered safety feature actuation system (ESFAS) train "A" valve group relays de-energized, resulting in associated component actuations, including a control room isolation system train "A" actuation, an automatic start of the Unit 3 train "A" emergency diesel generator 3G002, and de-energization of instrumentation associated with the Unit 3 non-1E 120 VAC uninterruptible power supply. There is no safety significance to this event since all affected ESFAS components actuated as required. Due to the refueling outage in progress, most of the other equipment that would have actuated was either out of service or already in its actuated state. Affected equipment was returned to normal alignment by 1630.

With one of two redundant power supplies for the ESFAS train "A" valve group relays previously removed from service, the electrical alignment at the time of the test resulted in the remaining ESFAS power supply being momentarily de-energized when 3A06 was transferred, resulting in the de-energization of the valve group relays. Control room operators did not realize that the valve group relays would become de-energized during the test. The tailboard held prior to the surveillance test did not discuss the ESFAS power supply being removed from service, and therefore, did not identify its impact.

This event was reviewed with appropriate Operations personnel, stressing the need for thorough tailboards. To minimize recurrence: 1) Administrative controls have been implemented; and 2) Additional ESFAS training will be provided to appropriate Operations personnel.

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Plant: San Onofre Nuclear Generating Station
 Units: Two and Three
 Reactor Vendor: Combustion Engineering
 Event Date: 02-11-92
 Time: 1548

A. CONDITIONS AT TIME OF THE EVENT:

Mode: Defueled
 RCS Temperature: 72 F

B. BACKGROUND INFORMATION:

1. Electrical Distribution:

a. Class 1E 4160 Volt AC (VAC) System:

Two trains of Class 1E 4160 VAC [EB] buses [BU] (A04 for Train "A", and A06 for Train "B") are provided for each of Units 2 and 3 to supply power to emergency components. The buses are normally supplied power from the offsite power grid [EA], but can also be supplied power from its associated emergency diesel generator (EDG) [EK]. If the voltage on a class 1E 4160 VAC bus degrades below a preset value, an automatic transfer sequence is initiated for that bus. During this sequence, the bus will transfer to the equivalent bus associated with the opposite unit, provided the bus on the opposite unit is energized from offsite power. For example, a degradation of voltage of bus 3A06 will cause initiation of a transfer to bus 2A06. This transfer sequence is functionally tested by performance of an associated surveillance test procedure.

b. Class 1E 120 VAC System:

Each of four Class 1E 120 VAC vital buses [EF], Y01, Y02, Y03, and Y04, is supplied power from an associated class 1E 125 VDC battery [EJ, BTRY] bus (D1, D2, D3, and D4, respectively), via an inverter [INVT]. When the battery bus is not available, each vital bus can be supplied power from its alternate source. This alternate source consists of power from the associated class 1E 4160 VAC bus through a step-down transformer [XFMR] to a class 1E 480 VAC [ED] load center, motor control center, and regulating transformer. The alternate source of power for buses Y01 and Y03 originates from train "A" 4160 VAC bus A04, and the alternate source of power for buses Y02 and Y04 originates from train "B" bus A06.

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c. Non-1E 120 VAC Uninterruptible Power Supply (UPS):

The non-1E UPS [EE] bus Q069 is normally supplied power from the train "A" class 1E 4160 volt bus A04, via a transformer, charger [BYC], and inverter. The inverter can also be supplied by the non-1E UPS battery. A maintenance bypass bus 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 [BKR] as the charger. This breaker automatically trips upon receipt of a Safety Injection Actuation Signal (SIAS) [JE].

2. Engineered Safety Features Actuation System (ESFAS) 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 group component actuation relays energized. De-energization of a component actuation relay results in actuation of that component.

Each ESFAS DC power supply is provided power from its associated 120 VAC vital bus. Buses Y01 and Y02 provide power to the redundant DC power supplies for the ESFAS train "A" pump and valve group relays. Buses Y03 and Y04 provide power to the redundant DC power supplies for the ESFAS train "B" pump and valve group relays.

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 Unit 3 train "A" EDG 3G002, and automatic opening of the normal supply breaker to the non-1E UPS. 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.

C. DESCRIPTION OF THE EVENT:

1. Event:

At 1548 on February 11, 1992, with Unit 3 defueled and Unit 2 at 100% power, a surveillance test to verify the capability of the Unit 3 Train "B" class 1E 4160 VAC bus 3A06 to automatically transfer to bus 2A06 was performed. When bus 3A06 was momentarily de-energized in accordance with the surveillance, 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

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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 in progress, most of the other equipment that would have actuated was either out of service or already in its actuated state.

Affected equipment was returned to normal alignment by 1630.

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

a. Unit 3 ESFAS Train "A" DC Power Supply Alignment:

At the time of the actuations, an outage had been in progress on class 1E 125 VDC battery bus 3D2, and class 1E 120 VAC bus 3Y02 had been aligned to its alternate source. Additionally, the ESFAS train "A" valve group DC power supply associated with bus 3Y01 had been previously de-energized to allow maintenance on the ESFAS cabinet. This condition resulted in only one power supply (which was associated with bus 3Y02) providing power to the Unit 3 ESFAS train "A" valve group relays. The momentary de-energization of train "B" bus 3A06 during the surveillance test caused de-energization of the associated load center and the MCC that provides the alternate source of power to bus 3Y02. With the described electrical alignment, this, in turn, resulted in the de-energization of the Unit 3 ESFAS train "A" valve group relays.

b. Unit 3 Non-1E UPS:

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
1548	De-energization of Unit 3 ESFAS train "A" valve group relays occurred. De-energization of the SIAS valve group relays caused a CRIS train "A" actuation, an automatic start of EDG 3G002, and de-energization of instrumentation associated with the non-1E UPS.
1630	Affected equipment was returned to normal alignment.

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4. Method of Discovery:

Control room indications and alarms alerted the control room operators (utility, licensed) to the actuations caused by de-energization of the Unit 3 ESFAS component actuation relays.

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 Unit 3 non-1E UPS, control room operators correctly deduced that the cause involved a train "A" SIAS generation. Upon a review of the plant electrical alignment and the class 1E 4160 VAC bus transfer surveillance procedure, the operators correctly concluded that de-energization of the Unit 3 ESFAS train "A" valve group relays had occurred when bus 3A06 was momentarily de-energized during the transfer.

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 Unit 3 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:

Due to the electrical alignment and an out-of-service ESFAS DC power supply, performance of the 3A06 bus transfer surveillance resulted in de-energization of the Unit 3 ESFAS train "A" valve group relays. (See section C.2.a.)

2. Root Cause:

The control room operators did not realize that the momentary de-energization of the Unit 3 train "B" 4160 VAC bus would result in de-energization of the train "A" ESFAS valve group relays. The tailboard held prior to the 3A06 bus transfer surveillance test did not discuss the ESFAS power supply alignment, and therefore, did not identify its impact.

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E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. This event was reviewed with appropriate Operations personnel, emphasizing the power supplies to the ESFAS cabinets, the alternate sources of power to the class 1E 120 VAC vital buses, and the relationship between them. In addition, the need for thorough tailboards prior to performing evolutions was stressed.
- b. Administrative controls regarding the ESFAS DC power supplies have been implemented to minimize the time that the power supplies are de-energized. This action reduces the susceptibility of unplanned ESFAS component actuations due to de-energization of the remaining, inservice power supply.

2. Planned Corrective Actions:

- a. Training will be provided to appropriate Operations personnel to further their understanding of the electrical distribution associated with the ESFAS DC power supplies and the impact of having one ESFAS DC power supply out of service.

F. SAFETY SIGNIFICANCE OF THE EVENT:

There is no safety significance to this event since all in-service ESFAS components, including CRIS train "A" components and EDG 3G002, actuated as required. In addition, since the inadvertent actuation did not affect the ESFAS pump group relays, water was not injected into the RCS, and safety limits were not approached.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable.

2. Previous LERs for Similar Events:

- a. LER 92-002 (Docket No. 50-361):

On February 9, 1992, a similar de-energization of the ESFAS train "A" valve group relays occurred. The cause of that event was believed to be the inadvertent operation of the supply breaker from 3Y02 to the ESFAS train "A" valve group DC power supply. (In that event, the associated redundant valve group DC power supply had also been previously de-energized to perform maintenance on the ESFAS cabinet.) Although that event was discussed with appropriate Operations personnel

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(including the shift which was on duty when the event described in this report occurred). that discussion centered on the impact of losing both power supplies to ESFAS valve or pump group relays. Corrective actions implemented following that actuation involved the prevention of inadvertent operation of the D₁ power supply breakers, and therefore would not have prevented this event.