

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8903290286 DOC.DATE: 89/03/17 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.
 MORGAN,H.E. Southern California Edison Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-005-00:on 890218,spurious emergency feedwater
 actuation signal.Caused by mechanical error.

W/8 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
PD5 LA	1 1	PD5 PD	1 1
HICKMAN,D	1 1		
INTERNAL: ACRS MICHELSON	1 1	ACRS MOELLER	2 2
ACRS WYLIE	1 1	AEOD/DOA	1 1
AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2
DEDRO	1 1	IRM/DCTS/DAB	1 1
NRR/DEST/ADE 8H	1 1	NRR/DEST/ADS 7E	1 0
NRR/DEST/CEB 8H	1 1	NRR/DEST/ESB 8D	1 1
NRR/DEST/ICSB 7	1 1	NRR/DEST/MEB 9H	1 1
NRR/DEST/MTB 9H	1 1	NRR/DEST/PSB 8D	1 1
NRR/DEST/RSB 8E	1 1	NRR/DEST/SGB 8D	1 1
NRR/DLPQ/HFB 10	1 1	NRR/DLPQ/QAB 10	1 1
NRR/DOEA/EAB 11	1 1	NRR/DREP/RAB 10	1 1
NRR/DREP/RPB 10	2 2	NRR/DRIS/SIB 9A	1 1
NUDOCS-ABSTRACT	1 1	REG FILE 02	1 1
RES/DSIR/EIB	1 1	RES/DSR/PRAB	1 1
RGN5 FILE 01	1 1		
EXTERNAL: EG&G WILLIAMS,S	4 4	FORD BLDG HOY,A	1 1
H ST LOBBY WARD	1 1	LPDR	1 1
NRC PDR	1 1	NSIC MAYS,G	1 1
NSIC MURPHY,G.A	1 1		

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION
 LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 45 ENCL 44

1/10/89

LICENSEE EVENT REPORT (LER)

Facility Name (1) **SAVONHOFRE NUCLEAR GENERATING STATION, UNIT 2** Docket Number (2) **0 5 0 0 0 3 6 1** Page (3) **1 of 0 5**

SPURIOUS EMERGENCY FEEDWATER ACTUATION SIGNAL NO. 2 DURING SURVEILLANCE TESTING

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)	
02	18	89	89	0 0 5	0 0	03	17	89	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)			20.402(b)			20.405(c)			50.73(a)(2)(iv)		
0 9 9			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		
			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)		
									73.71(b)		
									73.71(c)		
									Other (Specify in Abstract below and in text)		

LICENSEE CONTACT FOR THIS LER (12)

Name **H. E. Morgan, Station Manager** TELEPHONE NUMBER **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
B	J E	H S	C 7 7 0	N					

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On February 18, 1989 at 1328, with Unit 2 in Mode 1 at 99% power, a spurious Train "A" and "B" Emergency Feedwater Actuation Signal (EFAS) No. 2 occurred during performance of the 31-day Engineered Safety Features Actuation System (ESFAS) matrix testing. All components actuated as designed. Since the Steam Generator (SG) water level was greater than the actuation setpoint for cycling open the EFAS discharge valves, no emergency feedwater was delivered to either SG.

Based upon the results of testing performed, the cause of the EFAS No. 2 actuation has been attributed to a mechanical and/or electrical mis-operation of the matrix "AB" relay hold push button switch which resulted in a sequencing fault. The sequencing of the matrix relay hold push button switch is designed to preclude an actuation by providing a hold voltage to the matrix relays being tested prior to initiating a test trip signal.

The push button switch has been replaced and a wiring modification has been completed which permits a test trip signal only if the hold voltage contacts are made up. This wiring modification will be completed on all the ESFAS matrix hold push buttons in Units 2 and 3 prior to their use.

8903290286 890317
PDR ADOCK 05000361
S PNU

IEZZ
41

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION
UNIT 2

DOCKET NUMBER
05000361

LER NUMBER
89-005-00

PAGE
2 OF 5

Plant: San Onofre Nuclear Generating Station
Unit: Two
Reactor Vendor: Combustion Engineering
Event Date: 02-18-89
Time: 1328

A. CONDITIONS AT TIME OF THE EVENT:

Mode: 1, Power Operation

B. BACKGROUND INFORMATION:

The Engineered Safety Features Actuation System (ESFAS) (EIIS System Code JE) monitors selected plant parameters and, when necessary, automatically actuates those systems necessary to mitigate the consequences of a postulated accident when plant conditions have exceeded normal operational limits.

The ESFAS actuation logic consists of four channels which are arranged via bistables and relays such that there are six, two-out-of-four, logic matrices (AB, AC, AD, BC, BD and CD). Each logic matrix has two power supplies (i.e., the "AB" matrix has a Channel "A" and a Channel "B" power supply). This arrangement prevents an ESFAS actuation when any single power supply or channel is removed from service. Components powered by the power supplies are designed to actuate to their safety related state when the power supplies are de-energized.

The ESFAS design includes testing circuits which allow on-line matrix testing in order to ensure that the ESFAS remains capable of performing its design function without actuating the associated Engineered Safety Feature (ESF) system(s). This periodic testing is performed at least once every 31-days pursuant to Technical Specification (TS) Surveillance Requirement 4.3.2.1.

The ESFAS matrix testing includes the depression of a matrix relay hold push button switch whose sequencing is designed to preclude an actuation by providing an additional test hold voltage to each of the matrix relays to be tested prior to simulating the trip condition which removes the normal operating hold voltage to the matrix relays. If the test hold voltage is not continually being applied to the matrix relay being tested, the matrix relay can become de-energized, causing the logic to actuate as if a legitimate trip were present.

At the time of the actuation being reported herein, testing of the ESFAS logic matrix "AB" was in progress on the Emergency Feedwater Actuation Signal (EFAS) No. 2. EFAS is designed to automatically initiate Auxiliary Feedwater (AFW) (EIIS System Code BA) system flow to the Steam Generator (SG) (EIIS Component Code SG) when the SG level is low resulting from a loss of main feedwater. EFAS No. 2 serves to provide AFW to SG E-088.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	89-005-00	3 OF 5

C. DESCRIPTION OF THE EVENT:

1. Event:

On February 18, 1989 at 1328, with Unit 2 in Mode 1 at 99% power, a spurious Train "A" and "B" EFAS No. 2 occurred during performance of the 31-day ESFAS matrix testing. All components actuated as designed. Since the SG water level was greater than the actuation setpoint for cycling open the EFAS discharge valves, no auxiliary feedwater was delivered to either SG.

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

None.

3. Sequence of Events:

Not applicable.

4. Method of Discovery:

Control room annunciation of the EFAS No. 2 actuation.

5. Personnel Actions and Analysis of Actions:

Operators promptly verified proper operation of EFAS No. 2 components. In accordance with procedures, operators verified that plant operating parameters were normal and that the EFAS actuation was spurious.

6. Safety System Responses:

All EFAS components operated in accordance with their design.

D. CAUSE OF THE EVENT:

1. Immediate Cause:

Spurious actuation of the ESFAS logic matrix "AB" EFAS circuitry occurred during surveillance testing.

2. Intermediate Cause:

The circumstances of this event suggest the cause of the spurious actuation to be a momentary power interruption to the matrix logic actuation relay. Such actuations can result from certain types of failures in either the ESFAS circuitry or the ESFAS testing circuitry.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 89-005-00	PAGE 4 OF 5
---	---------------------------	-------------------------	----------------

The following investigations and tests were conducted to determine what caused the failure:

- a. The test circuitry, test power supply and the matrix actuation relay hold coil connections were inspected and tested for loose connections. None were found.
- b. Testing of the matrix test power supply determined that its AC and DC voltages were within specification.
- c. The power supplies for all four matrix trip paths were tested and found to be in specification.
- d. The various switches in the test circuitry were tested and found to operate properly.
- e. A recorder was hooked-up to the matrix "AB" hold push button switch which was in use at the time of the actuation in an attempt to verify the sequencing of the push button switch. The button was depressed numerous times. During one operation of the button, a partial EFAS actuation was received and the recording traces identified a failure in the sequencing of the push button switch.

3. Root Cause:

The cause of the EFAS No. 2 actuation has been attributed to a failure in the ESFAS testing circuitry. During the subject matrix testing, a momentary power interruption caused the "AB" matrix to de-energize while the EFAS No. 2 Channel "A" and "B" received a trip voltage thereby, resulting in the Train "A" and "B" EFAS No. 2 actuation. Specifically, based upon the results of testing performed, a mechanical and/or electrical mis-operation of the matrix "AB" relay hold push button switch resulted in a sequencing fault.

E. CORRECTIVE ACTIONS:

1. Corrective Action Taken:

- a. The ESFAS surveillance testing was satisfactorily completed.
- b. The matrix "AB" hold push button switch has been replaced. In addition, to prevent inadvertent actuations caused by faults in the switch's contacting scheme, a wiring modification has been completed which will permit a test trip signal only if the hold voltage contacts are made up.

2. Planned Corrective Actions:

- a. The aforementioned wiring modification will be completed on all Unit 2 and 3 ESFAS matrix hold push buttons prior to their respective use.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 89-005-00	PAGE 5 OF 5
---	---------------------------	-------------------------	----------------

F. SAFETY SIGNIFICANCE OF THE EVENT:

Since all safety systems performed as required, there was no impact on the health and safety of plant personnel or the public as a result of this event.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

The matrix "AB" hold push button switch is a Series 10250T manufactured by Cutler-Hammer.

2. Previous LERs for Similar Events:

1. LER 88-02 (Docket Number 50-362) reported a Safety Injection System and Containment Cooling System actuation during ESFAS testing believed to have been caused by a defect in the matrix "AB" hold push button switch. The defective switch was sent to an independent laboratory where it was determined that switch internals had been installed incorrectly during the manufacturing process. As corrective action, all of the Unit 2 and 3 matrix hold push button switches were replaced with switches that had been radiographed prior to their use to assure the internal assembly was correct.

3. Results of NPRDS Search:

The NPRDS search revealed no additional Series 10250T Cutler-Hammer push button switch failures caused by sequencing faults.

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92672

H. E. MORGAN
STATION MANAGER

TELEPHONE
(714) 368-6241

March 17, 1989

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

Subject: Docket No. 50-361
30-Day Report
Licensee Event Report No. 89-005
San Onofre Nuclear Generating Station, Unit 2

Pursuant to 10 CFR 50.73(a)(2)(iv), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving a spurious emergency feedwater actuation signal. 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. 89-005

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)

IER 22
11