

Southern California Edison Company

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November 21, 1995

R. W. KRIEGER
VICE PRESIDENT
NUCLEAR GENERATION

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

Subject: Docket Nos. 50-361 and 50-362
Supplemental Report
Licensee Event Report No. 95-011, Revision 1
San Onofre Nuclear Generating Station, Units 2 and 3

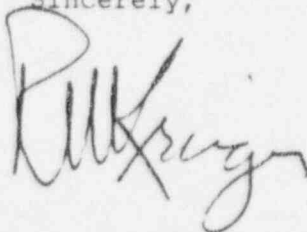
- References: 1) Letter, R. W. Krieger (Edison) to USNRC Document Control Desk, dated July 5, 1995
- 2) Letter, R. W. Krieger (Edison) to USNRC Document Control Desk, dated October 4, 1995

Reference 1) provided Licensee Event Report (LER) No. 95-011 reporting inoperable fire dampers in Units 2 and 3. This occurrence involved similar systems, causes, and corrective actions applicable to Units 2 and 3; therefore, a single report for Unit 2 was submitted in accordance with NUREG-1022. The report indicated that Edison would submit a supplemental report to discuss the cause, planned corrective actions, and safety significance of this occurrence.

In Reference 2), Edison indicated our intention to submit the supplemental report by November 3, 1995. Subsequent discussions with Mr. Dyle Acker of the Region IV Walnut Creek Field Office indicated that the supplemental report would be delayed beyond November 3. The report is provided as Enclosure 1. 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,



CEWilliams
Enclosure: LER No. 95-011-01

cc: L. J. Callan, Regional Administrator, NRC Region IV
J. E. Dyer, Director, Division of Reactor Projects, Region IV
K. E. Perkins, Jr., Director, Walnut Creek Field Office, NRC Region IV
J. A. Sloan (USNRC Senior Resident Inspector, Units 1, 2 and 3)
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
Institute of Nuclear Power Operations (INPO)

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LICENSEE EVENT REPORT (LER)

Facility Name (1) *missing*
 SAN ONOFRE NUCLEAR GENERATING STATION (SONGS), Unit 2
 Title (4)
 Docket Number (2) 0 | 5 | 0 | 0 | 0 | 3 | 6 | 1 | 1 | of 0 | 6
 Page (3)

Inoperable Fire Dampers

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	6	0	5	9	5	9	5	9	SONGS Unit 3	0 5 0 0 0 3 6 2
0	6	0	5	9	5	9	5	9		0 5 0 0 0 3 6 1

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) 0 | 9 | 9
 20.402(b) --- 20.405(c) --- 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) --- X 50.73(a)(2)(vii) --- 0 --- (Specify in
 20.405(a)(1)(iii) --- 50.73(a)(2)(i) --- 50.73(a)(2)(viii)(A) --- Abstract below and
 20.405(a)(1)(iv) --- 50.73(a)(2)(ii) --- 50.73(a)(2)(viii)(B) --- in text
 20.405(a)(1)(v) --- 50.73(a)(2)(iii) --- 50.73(a)(2)(x)

LICENSEE CONTACT FOR THIS LER (12)

Name R. W. Krieger, Vice President, Nuclear Generation
 TELEPHONE NUMBER
 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 NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC- TURER	REPORTABLE TO NPRDS
X	V	-	D M P A 1 2 4	N					

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15)

Yes (if yes, complete EXPECTED SUBMISSION DATE) X NO

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

During routine 18-month Technical Specification (TS) visual and voluntary functional fire damper surveillance testing conducted from 5/9/95 through 6/15/95, Edison drop tested 44 fire dampers (non-safety related fire protection components) and 26 failed. On 6/5/95, Edison concluded it was likely the dampers had been inoperable for longer than the one hour TS out of service time limit. Because Edison did not know the dampers were not operable until the drop tests were performed, compensatory fire watches had not been established for these dampers. Accordingly, Edison reported this condition on 7/5/95 in accordance with 10CFR50.73. This revised report provides the final results of Edison's evaluation of the cause, corrective actions, and safety significance of this event.

The fire damper failures were due to long term material degradation. Edison expanded the initial test group and tested additional dampers, and 28 additional failures were identified. Edison is completing the repair or replacement of all 54 impaired fire dampers and servicing any fire dampers that have not been tested in the initial and expanded groups. Edison will service the dampers at appropriate intervals and will increase damper drop test frequency. Also, one or more dampers will be replaced with a material that is less susceptible to long-term material degradation. Appropriate compensatory measures remain in place.

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DESCRIPTION OF THE EVENT:

Plant: San Onofre Nuclear Generating station (SONGS)
 Units: Two and Three
 Reactor Vendor: Combustion Engineering
 Event Date: June 5, 1995
 Mode: Both Units were in Mode 1
 Power: Unit 2, post-refueling up power ramp to 99% power
 Unit 3, 96% power

During routine 18-month Technical Specification (TS) visual and voluntary functional fire damper surveillance testing conducted from 5/9/95 through 6/15/95, Edison drop tested 44 fire dampers (non-safety related fire protection components) [DMP] and 26 failed. On 6/5/95, Edison concluded, due to the types of failures observed (dirt and corrosion, ineffective springs, out-of-true blades), it was likely the dampers had been inoperable for longer than the one hour TS 3.7.9 out of service time limit. Because Edison did not know the dampers were not operable until the drop tests were performed, compensatory fire watches had not been established for these dampers. Accordingly, Edison reported this condition on 7/5/95 in accordance with 10CFR50.73. This revised report provides the final results of Edison's evaluation of the cause, corrective actions, and safety significance of this event.

CAUSE OF THE EVENT:

The fire damper failures observed were due to long term material degradation. Edison has instituted enhancements to the surveillance program to ensure damper operability.

CORRECTIVE ACTIONS:

Edison expanded the initial test group and tested additional dampers, and 28 additional failures were identified. Edison is completing the repair or replacement of all 54 impaired fire dampers and servicing any fire dampers that have not been tested in the initial and expanded groups. Edison will service the dampers at appropriate intervals and will increase damper drop test frequency. Also, one or more dampers will be replaced with a material that is less susceptible to long-term material degradation. Appropriate compensatory measures remain in place.

SAFETY SIGNIFICANCE OF THE EVENT:

Although it is likely the individual dampers could not have fully performed their function, Edison believes the fire damper failures described above did not significantly reduce the overall level of safety provided by the fire protection program at SONGS. The purpose of the fire protection program is to provide assurance, through a defense-in-depth design, that a postulated fire would not: (1) prevent the performance of plant equipment required for safe shutdown functions; nor (2) significantly increase the risk of radioactive releases to the environment.

The defense-in-depth design includes: preventing fires from starting; early detection and suppression of fires (thereby limiting potential fire related damage); and designing plant systems such that if a fire were to burn for a considerable time, essential plant safety functions would still be operable. Defense-in-depth features

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at SONGS include: fire barriers; control of combustibles; fire detection and suppression systems; and certified fire fighters.

Although this LER reports degraded dampers within an element of the fire protection program, the features listed below were/are available to provide assurance that fire protection program objectives were satisfied. Note, however, that over the life of the plant, these features have been periodically removed from service for maintenance, repair, surveillances, or have been otherwise unavailable. Notwithstanding this fact, based on the discussion below, Edison believes the overall fire protection program objectives were satisfied.

1. Fire Barriers

The TS fire dampers are located in fire barriers which are of substantial construction, and are 2 or 3 hour fire rated. Penetrations in these barriers are typically sealed commensurate with the barrier's fire rating. With operable fire dampers, these fire barriers are highly effective in preventing fire from propagating to an adjacent area.

Although the entire fire barrier may not be able to pass a 2 or 3 hour fire endurance test due to a damper failure, the barriers themselves are still expected to minimize the propagation of a postulated fire at SONGS to an adjacent area because: (1) generally the dampers within these barriers represent only a small portion of the entire surface areas of the barriers, the remainder of which continue to provide robust fire barriers; and, (2) the dampers are enclosed in ductwork on at least one side of the barrier and the ductwork has an inherent fire resistant capability.

2. Minimization of Combustible Loads

The quantity of fixed combustibles in most fire areas affected by the inoperable fire dampers is low. Procedures control quantities of transient combustibles. As a result, the heat generated by an unmitigated fire in these areas is unlikely to challenge the fire resistance capability of the fire barriers.

Most of the fixed combustible material in the affected fire areas is cable insulation. The majority of exposed cable in these areas will pass the IEEE-383 flame test, and is therefore resistant to fire propagation.

3. Detection Systems

Except for fire areas that have very small combustible loadings (less than an eight minute fire duration), all affected fire areas are provided with a fire detection system. The fire alarm system annunciates in both the Control Room and the fire department office, allowing for quick notification of fire department personnel.

4. Suppression Systems

For affected fire areas that have combustible loadings significantly greater than a one hour duration fire, suppression systems are installed to control or

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extinguish postulated fires, thus eliminating the potential for high sustained heat release.

5. Trained Personnel

The SONGS Fire Department consists of professionally trained, full time personnel whose primary responsibility is fighting fires at SONGS. The fire department is certified by the state of California Fire Marshall's office to provide fire suppression activities. A minimum of five certified fire fighters are on duty per shift. A review of fire response records conducted recently as part of the Individual Plant Examination of External Events (IPEEE) fire analysis indicated an average fire department response time of under 10 minutes. Initiation of manual suppression activities by certified fire fighters will control/suppress a fire before the fire barrier resistance capability is challenged.

Based on these design features, the overall fire protection program at SONGS continued to provide assurance that safety systems are adequately protected and safe shutdown could be achieved for a fire in any fire area. Therefore, this occurrence had minimal safety significance.

ADDITIONAL INFORMATION:

Prior to 1985, Edison verified damper operability as required by TS 4.7.9.2.b by performing a visual inspection once every 18 months. The visual surveillance checked general conditions and looked for broken or damaged dampers.

In response to a fire protection program inspection conducted by NRC Region V in 1985, Edison committed to supplement the TS visual surveillance by a voluntary "drop test" of 10 percent of the fire dampers every 18 months. Selection of the 10% sample was made to ensure all dampers were functionally tested within 10 periods.

In June 1989, the NRC issued Information Notice (IN) 89-52, "Potential Fire Damper Failures." That information notice indicated that several utilities had discovered that some fire dampers would not close against the existing ventilation duct air flow (operational air flow conditions). IN 89-52 recommended utilities adopt one of the following three strategies to ensure that fire dampers would operate in the event of a postulated fire: (1) type testing "worst case" air flow conditions of plant specific fire damper configurations; (2) testing all dampers installed in required fire barriers; or (3) revising plant emergency procedures to require plant operators to administratively shut down ventilation systems to an area upon confirmation of a fire.

In response to IN 89-52, Edison initiated a fire damper study to identify: (a) which of the 394 TS fire dampers needed administrative controls to shut down ventilation systems upon confirmation of a fire; (b) which were required to close with air flow; and (c) appropriate administrative controls to turn off appropriate ventilation fans. Of the 394 TS fire dampers, only 5 dampers are required to close under air flow conditions. Edison subsequently added closure springs to 4 of these 5 dampers to ensure the capability to close against air flow (the remaining damper did not require modification). Also, Edison revised administrative controls to require operators to

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turn off appropriate ventilation fans when any of the remaining 389 fire dampers is required to function following confirmation of a fire.

Due to the operational inconvenience of turning off ventilation systems that provide ventilation to areas of the plant that are continuously occupied, Edison does not always shut down ventilation systems when drop testing fire dampers. When fire dampers failed to close during 1989 - 1993 functional testing, Edison subsequently cleaned the dampers and considered that the failures were due to the inability of the damper to close against air flow (i.e., the dampers subsequently passed when cleaned and tested with air flow turned off).

In retrospect, a mind set may have developed that air flow was the reason for the failures. This may have resulted in Edison insensitivity to another possible failure mode associated with deteriorating material conditions. In 1994, three failures were attributed to corrosion and dirt buildup, and were considered isolated failures. After cleaning, no further action was taken. It is possible that a more aggressive response to the 1993 failures may have identified the environmental degradation one test cycle earlier.

A mind set that air flow was the cause of damper failures, and the belief that dirt/material condition failures were isolated conditions, resulted in personnel not following up on suggestions to enhance the preventive maintenance program during the 1989-1994 period.

In 1995, as a result of the 54 test failures, Edison initiated a review of past damper surveillances, Maintenance Orders (MO), and Non-Conformance Report (NCR) data. Edison's review, presented in the table below, confirmed that the majority of the pre-1995 failures were attributable to "air flow." As noted on many of these previous NCRs, Edison believed that the "failed" dampers would have functioned properly had the appropriate ventilation fans been turned off.

FIRE DAMPER TEST FAILURES

Year	Number Tested	Air Flow (1)	Air Flow & Dirt/Corr. (2)	Dirt/Corrosion & Other (3)	Unknown (4)
1986	31	0	0	0	0
1988	45	0	4	0	2
1989	43	0	0	0	1
1990	43	0	9	1	4
1992	38	1	9	0	0
1994	44	1	6	3	0
1995	153	5	0	49	0

Notes:

(1) failure was definitely due to air flow [passed without any problems once the air was turned off, and not "cleaned up" prior to retest]

(2) failure was due to air flow [passed when air was turned off]; but prior to retest, the damper was "cleaned up" with dirt and corrosion removed (i.e., the

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material condition failure mechanism, if a contributor to the cause, would have been corrected prior to retest)

(3) failure was definitely due to corrosion or involved a mechanical failure [i.e., broken spring, bar in damper louvers, louver stuck, did not have dynamic springs (needed to close under air flow)]

(4) failure was indeterminate [not enough information in MO or NCR to determine whether air flow related or whether corrosion was involved]

In the subsequent review of these data, Edison has concluded that the TS visual surveillance is not fully effective in establishing operability. Cases were identified where the damper appeared to be fully operable but would not function during a drop test, and conversely some dampers appeared corroded but functioned satisfactorily. As previously mentioned, Edison is increasing the frequency of the functional drop test as appropriate.

The review of the data also identified that at times in the past, Edison non-conservatively considered that the fire dampers were failing at the time of the drop test (i.e., "failed when found"). In accordance with the guidance in NUREG-1022, Supplement 1, these failures were not reported. In retrospect, this judgment was considered inappropriate; Edison has instructed appropriate individuals in proper reporting criteria. This report bounds these previously reportable conditions.

One additional item is of note. One of the dampers reported above as failed in 1995 was found to have a "security bar" installed across the ductwork in the plane of the damper, preventing unauthorized access into a vital area, but also preventing the damper from fully closing. This damper also had a bent louver that impeded its closure. The security bar was relocated and the damper was repaired. The damper subsequently passed its drop test. The installation of this security bar in the fire damper tracks is considered an isolated occurrence.

Edison has submitted three LERs involving fire protection systems in the last three years: 2-94-002 and 2-94-003 for missed surveillances; 2-95-004 for an inoperable fire sprinkler system. These previous LERs did not involve fire dampers.