

LICENSEE EVENT REPORT (LER)

Facility Name (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1	Docket Number (2) 0 5 0 0 0 2 0 6	Page (3) 1 of 0 6
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Title (4)
ENGINEERED SAFETY SYSTEMS DESIGN FAILS TO MEET SINGLE FAILURE CRITERIA

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)
1 0	0 7	8 7	8 7	--- 0 1 5	--- 0 1	0 5	1 7	8 8	NONE	0 5 0 0 0

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 2	<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)	<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 checked="" type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(iii)

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	MANUFAC-TURER	REPORTABLE TO NPRDS	/////	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	/////
					/////						/////

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)

On October 7, 1987, with Unit 1 at 92% power, an ongoing Engineered Safety Features (ESF) analysis determined several scenarios where a single failure could prevent certain ESF systems from performing their functions as required for design basis transients and accidents.

The cause of the event was detailed in letters from M. O. Medford (SCE) to Document Control Desk (NRC), Subject: ESF Single Failure Analysis, Docket No. 50-206, which were submitted on October 16, 1987, and November 6, 1987.

Immediate corrective action to preclude occurrence or mitigate the consequences was taken by enhancing administrative controls, operator training and completion of best estimate analysis. Plant modifications to correct single failure discrepancies under consideration are to be completed during the next refueling outage. These are discussed in separate submittals to the NRC dated November 20, 1987, and April 5, 1988.

The health and safety of plant personnel and the public were not affected by this event.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 1	05000206	87-015-01	2 OF 6

Plant: San Onofre Nuclear Generating Station (SONGS)
Unit: 1
Reactor Vendor: Westinghouse
Event Date: 10-07-87

A. PLANT CONDITIONS AT TIME OF THE EVENT:

Mode: 1 (92% Power) on 10-07-87

B. BACKGROUND INFORMATION:

In accordance with an NRC request provided by letter dated September 23, 1986, a single failure analysis of the Reactor Protection System (RPS) (EIIIS System Code JC) and the Engineered Safety Features (ESF) (EIIIS System Code JE) for San Onofre Unit 1 has been ongoing. This request was made as a result of the failure of PT-459 (EIIIS System Code JC)(EIIIS Component Code PT) which occurred on July 30, 1986, and which identified a single failure susceptibility of the RPS which had not been previously identified. The results of the RPS analysis was submitted by letter dated March 11, 1987. The results of this analysis determined that the RPS meets its design basis criteria with the exception of the mismatch trip as previously identified. The results of the ongoing ESF analysis have identified several additional scenarios where a single failure can prevent certain ESF systems from performing their functions as required for design basis transients and accidents.

On October 7, 1987, NRC notification was made pursuant to 10 CFR 50.72(b)(ii)(B). A conference call with NRC Region V staff was held following the notification to provide a more complete discussion of the affected equipment and postulated scenarios. Additionally, a meeting between SCE and NRR staff was held in Bethesda, Maryland on October 9, 1987.

The scenarios involve the loss of recirculation capability due to single failure susceptibilities following a postulated Loss of Cooling Accident (LOCA).

The event was detailed in letters from M. O. Medford (SCE) to Document Control Desk (NRC), Subject: ESF Single Failure Analysis, Docket No. 50-206, which were submitted on October 16, 1987, and November 6, 1987.

Other single failure susceptibilities were identified relative to Main Steam Line Breaks (MSLB) or steam generator overfill events. However, these items were concluded to be outside the current design basis for San Onofre Unit 1 for the following reasons:

- 1) The plant is currently not designed to be able to withstand a MSLB concurrent with a single failure of the Auxiliary Feedwater System (EIIIS System Code BA). This single failure susceptibility has been recognized by the NRC and a relaxation of single failure criteria for this event has been granted until the next refueling outage.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 1	DOCKET NUMBER 05000206	LER NUMBER 87-015-01	PAGE 3 OF 6
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- 2) The plant is currently not designed to mitigate the consequences of a Feedwater System (EIIS System Code SJ) malfunction which could result in a steam generator overfill condition. The NRC has recognized this susceptibility as part of the Systematic Evaluation Program. SCE has committed to evaluate the overfill issue as an open item from the San Onofre Unit 1 Integrated Plant Safety Assessment.

As part of the 1976 Sphere Enclosure Project, modifications were made to the Containment Spray System (CSS) (EIIS System Code BE). Isolation valve MOV-883 (EIIS Component Code ISV) was identified as having single failure susceptibilities which could affect multiple trains of CSS. A separate control power lockout was provided to preclude spurious valve closure due to a single failure in the control power circuit. The details of this modification were submitted to the NRC on January 18, 1977. The Single Failure Analysis submitted to the NRC on December 21, 1976, concluded that the design modification made to MOV-883 as part of the Sphere Enclosure Project was adequate to meet single failure criteria. On April 1, 1977, the NRC issued Amendment No. 25 to the Provisional Operating License which reviewed the design modification to MOV-883 and concluded that the design meets the single failure criterion consistent with the provisions of the Electrical, Instrumentation and Control Systems Branch Technical Position 18, and is, therefore, acceptable. Although additional single failure susceptibilities were identified in submittals to the NRC on October 16, 1987, and November 6, 1987, the single failure susceptibility of MOV-883 was not reanalyzed since it had been previously reviewed and approved by the NRC.

As part of recent ongoing Equipment Qualification (EQ) evaluations initiated by the Quality Assurance (QA) Organization, it was confirmed that there is an additional single failure mechanism associated with MOV-883 that was not previously considered. This newly identified single failure discrepancy is being included in this LER for information only and is not considered to be reportable since, unlike other identified discrepancies discussed above, the modified design for MOV-883 fully complied with single failure criteria.

MOV-883's only active safety function is to provide back-up isolation for the Refueling Water Storage Tank (RWST) (EIIS Component Code TK) during post LOCA recirculation. MOV-883 is normally in the open position and would be closed during the recirculation phase following a LOCA. However, spurious closure of MOV-883 could cause a loss of Containment Spray and charging flow in the event of a LOCA or MSLB.

C. DESCRIPTION OF THE EVENT:

1. Event:

On October 7, 1987, it was confirmed that several scenarios existed where a single failure could prevent the ESF from performing their designed function as required for design basis transients and accidents. Subsequent to initial notification of the event, numerous discussions have taken place with the NRC to describe the scenarios and consequences of the failures.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 1	DOCKET NUMBER 05000206	LER NUMBER 87-015-01	PAGE 4 OF 6
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On February 25, 1988, it was confirmed that a single failure susceptibility not previously reported had been identified. During the 1976 Sphere Enclosure Project, it was determined that MOV-883 needed to be locked open. It was determined that isolation of the control power to MOV-883 through the use of dual hand-operated switches in the Control Room was sufficient to preclude spurious closure of the valve. The current regulatory position requires that motive power be considered capable of a fault which causes a spurious valve actuation. Therefore, even with control power isolated, under the current regulatory position, MOV-883 is susceptible to spurious changes of state. An inappropriate change of state could have an impact on multiple trains of safety equipment.

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

None.

3. Sequence of Events:

Not Applicable.

4. Method of Discovery:

ESF Single Failure Analysis; a detailed description of this analysis was submitted to NRC on November 6, 1987.

A QA surveillance of equipment required operable following a MSLB outside containment was being conducted on Motor Control Center (MCC) No. 3 (EIIS System Code ED). The increased QA evaluations were a result of recently found EQ discrepancies. Subsequent research determined that the motive power for MOV-883 located in MCC-3 is susceptible to a failure mechanism that was previously considered but not considered credible.

D. CAUSE OF THE EVENT:

The cause of the event was detailed in submittals to the NRC dated October 16, 1987, and November 6, 1987, referenced above.

The cause of the event concerning MOV-883 was a failure to review the affect of revised single failure regulatory guidance. Since single failure susceptibilities of MOV-883 had been previously analyzed, it was not included in the November 6, 1987, submittal to the NRC.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a) Best estimate analysis has been completed and was provided as an enclosure to an October 16, 1987, submittal to the NRC. This analysis justifies the time required for the additional operator actions credited for the mitigation of a single failure.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 1	DOCKET NUMBER 05000206	LER NUMBER 87-015-01	PAGE 5 OF 6
---	---------------------------	-------------------------	----------------

- b) Administrative controls have been established to prevent the occurrence or mitigate the consequences of potential single failure scenarios. Additionally, shift manning has been increased to provide additional personnel to mitigate the single failure scenarios.
- c) Special operator training has been provided to identify and mitigate the potential consequences of the single failure scenarios.
- d) Administrative controls have been established to lock out the motive power to MOV-883 in Modes 1 through 4, and to restore motive power thus permitting closure of MOV-883 during recirculation following a LOCA.

2. Planned Corrective Actions:

Plant modifications to correct the single failure deficiencies under consideration are to be completed during the next refueling outage. These are discussed in separate submittals to the NRC dated November 20, 1987, and April 5, 1988. Additionally, we are evaluating design alternatives for MOV-883 as an enhancement to long term operation of Unit 1.

F. SAFETY SIGNIFICANCE OF THE EVENT:

This event did not result from plant equipment failures or operational errors, but is the result of newly identified time-dependent single failure susceptibilities. Justification for continued operation was provided in submittals to the NRC dated October 16, 1987, and November 6, 1987, referenced above.

The failure of MOV-883 is predicated on a single fault which causes the motive power to spuriously change the state of the valve. This could cause a loss of containment spray and charging capability by isolating the RWST suction path. A loss of containment spray during a LOCA or MSLB (inside containment) would cause a loss of the ability to mitigate the containment pressure transient. Loss of charging during a MSLB outside containment would only be significant in the unlikely event a previously identified single failure caused diversion of both trains of safety injection into the steam generators. Should such a single failure occur, the spurious closure of MOV-883 could result in insufficient negative reactivity addition to the core during some periods in the core cycle.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

Not applicable

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 1	DOCKET NUMBER 05000206	LER NUMBER 87-015-01	PAGE 6 OF 6
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2. Previous LERs on Similar Events:

LERs 86-007 and 86-010 (Docket No. 50-206) involved a failure of Main Steam Pressure Transmitter PT-459. Our investigation into the event reported in LER 86-007 had identified a single failure criteria design deficiency with PT-459, and as a result, analysis of other plant systems was initiated.

3. Results of NPRDS Search:

Not applicable.



Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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H. E. MORGAN
STATION MANAGER

May 17, 1988

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

Subject: Docket No. 50-206
Supplemental Report
Licensee Event Report No. 87-015, Revision 1
San Onofre Nuclear Generating Station, Unit 1

Reference: Letter, H. E. Morgan (SCE) to USNRC Document Control Desk, dated
November 6, 1987.

The reference provided the required 30-day written Licensee Event Report (LER) involving the failure to meet single failure design criteria. As a result of ongoing analyses, an additional item failing to meet single failure design criteria was identified. Accordingly, as required by 10 CFR 50.73, this submittal provides the revised LER to include this additional item.

If you require any additional information, please so advise.

Sincerely,

Enclosure: LER No. 87-015, 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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11