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 MORGAN,H.E. Southern California Edison Co.
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SUBJECT: LER 89-010-01:on 890520,main steam safety valve flow
 capacity apparently less than nameplate rating.

W/9 ltr.

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Southern California Edison Company

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March 16, 1990

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

Subject: Docket No. 50-361
Supplemental Report
Licensee Event Report No. 89-010, Revision 1
San Onofre Nuclear Generating Station, Units 2 and 3

Reference: Letter, H. E. Morgan (SCE) to USNRC Document Control Desk, dated
June 30, 1989

The referenced letter provided Licensee Event Report (LER) No. 89-010, for a condition involving the Units 2 and 3 Main Steam Safety Valve capacity. The enclosed supplemental LER provides additional information concerning the condition, its causes and corrective actions. Since this condition affected similar systems at Units 2 and 3, a single report is being submitted in accordance with NUREG 1022. Neither the health and safety of plant personnel or the public was affected by this condition.

If you require any additional information, please so advise.

Sincerely,

H E Morgan

9003260229 900316
PDR ADDCK 05000361
S PTF

Enclosure: LER No. 89-010, Rev. 1

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)

LEP
11

LICENSEE EVENT REPORT (LER)																	
Facility Name (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2												Docket Number (2) 0 5 0 0 0 3 6 1				Page (3) 1 of 0 5	
Title (4) MAIN STEAM SAFETY VALVE (MSSV) FLOW CAPACITY APPARENTLY LESS THAN NAMEPLATE RATING																	
EVENT DATE (5)			ER 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)			
015	210	819	819	---	0 1 0	---	0 1	013	116	910	SONGS, UNIT 3			0 5 0 0 0 3 6 2			
OPERATING MODE (9) 5			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)														
POWER LEVEL (10) 0 0 0			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)			50.73(a)(2)(vii)			X Other (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)						VOLUNTARY					
<div style="display: flex; justify-content: space-between;"> LICENSEE CONTACT FOR THIS LER (12) TELEPHONE NUMBER </div> <div style="display: flex; justify-content: space-between;"> <div> Name H. E. Morgan, Station Manager </div> <div> AREA CODE 7 1 4 </div> <div> 3 6 8 - 6 2 4 1 </div> </div>																	
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	//////						
B	S B	R V	C 7 1 0	YES	//////						//////						
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																	

On 5/20/89, with Unit 2 in Mode 5 (cold shutdown) and Unit 3 at 100% power, during an ongoing evaluation of Information Notice (IN) 86-05, it was concluded that the main steam safety valve (MSSV) flow capacities were most likely less than nameplate rating. This conclusion was based upon best available findings of the Westinghouse Owners Group (WOG) Subcommittee on MSSVs, and upon the factory-set ring settings of the Units 2 and 3 MSSVs. Analyses performed indicate that overpressure protection with all MSSVs operable is adequate and would not alter the results of the safety analyses; these conclusions are supported by actual performance data taken following two actual loss of heat removal events (LER 86-022 [Docket No. 50-361] and LER 90-002 [Docket No. 50-362]). However, the power reduction required by the linear power level-high reactor trip (LPLHT) setpoint with one MSSV removed from service specified by TS 3.7.1.1 does not provide sufficient margin to preclude exceeding the secondary design pressure limit of 110% if the plant were operated just below the LPLHT setpoint. In practice, a reduction in operating power level would have occurred to preserve a sufficient operating margin. SONGS Units 2 and 3 have never operated with a gagged MSSV. As a result, there is minimal safety significance to this finding. This voluntary LER is being submitted to provide notification of these findings.

As reported in IN 86-05, MSSVs with initial factory-set ring settings obtain a disc lift that is less than rated lift. The MSSV ring settings were initially set based upon valve operational tests conducted at limited volume test facilities on valves typically smaller than the MSSVs. Test facilities for full flow testing of MSSVs were not available at the time the valves were manufactured.

The ring settings for the Unit 2 MSSVs were changed, and the Unit 3 MSSV ring settings will be changed (during its next refueling outage) such that full flow capacity of the MSSVs is achieved. Administrative controls have been implemented on Unit 3 to ensure overpressure protection of the secondary plant with an inoperable MSSV until the ring settings are adjusted.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 89-010-01	PAGE 2 OF 5
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Plant: San Onofre Nuclear Generating Station
Units: 2 and 3
Reactor Vendor: Combustion Engineering
Event Date: 05-20-89

A. CONDITIONS AT TIME OF THE EVENT:

Unit 2: Mode 5, Cold Shutdown
Unit 3: Mode 1, Power Operation

B. BACKGROUND INFORMATION:

1. Main Steam Safety Valves (MSSVs)

Nine (9) MSSVs [RV] are provided on each of two main steam (MS) lines (one line per steam generator [SG]) to protect the MS system [SB] from overpressurization. The MSSVs each have a nameplate rating of approximately 233 pounds mass per second at 103% of setpoint pressure (i.e., at 3% accumulation). This rating is dependent upon the valve obtaining rated lift. Rated lift of the valve is dependent, in part, upon the ring settings of the valve. The ring settings also determine, in part, the blowdown and accumulation characteristics of the valves.

2. Technical Specification (TS) Requirements

TS 3.7.1.1 establishes the operability requirements of the MSSVs and the maximum allowable reactor protection system [JC] linear power level-high reactor trip (LPLHT) setpoint when one or more MSSVs are inoperable. The purpose of these TS requirements is to ensure that the secondary system pressure will be limited to within 110% of its design pressure during the most severe anticipated system operational transient.

3. Westinghouse Owners Group (WOG) Subcommittee on MSSVs:

Information Notice (IN) 86-05, "Main Steam Safety Valve Test Failures and Ring Setting Adjustments", and Supplement 1 were issued in 1986. This IN was provided to alert recipients of the potential for MSSVs to possess less than full-rated flow capacity due to initial factory-set ring settings. The WOG Subcommittee on MSSVs was formed to address the ring setting problem and to establish recommended MSSV generic ring settings such that full capacity of the MSSVs is achieved. These generic ring settings and their relationship with other MSSV design parameters have been established.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION
UNIT 2

DOCKET NUMBER
05000361

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89-010-01

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C. DESCRIPTION OF THE EVENT:

1. Event:

On 5/20/89, with Unit 2 in Mode 5 (cold shutdown) and Unit 3 at 100% power, during an ongoing evaluation of IN 86-05, it was concluded that the MSSV flow capacities were most likely less than nameplate rating. This conclusion was based upon best available findings of the WOG Subcommittee on MSSVs and upon the factory-set ring settings of the Units 2 and 3 MSSVs. The MSSV ring settings had not been subsequently changed by SCE.

An evaluation was performed to determine the capability of the Units 2 and 3 MSSVs, with factory-set ring settings, to meet design requirements. This analysis indicates that overpressure protection with all MSSVs operable is adequate. However, the power reduction required by the LPLHT setpoint with one MSSV removed from service specified by TS 3.7.1.1 does not provide sufficient margin to preclude exceeding the secondary design pressure limit of 110% if the plant were operated just below the LPLHT setpoint. In practice, a reduction in operating power level would have occurred to preserve a sufficient operating margin.

If one MSSV had been removed from service, the likelihood of operation at a power approaching the LPLHT setpoint specified in TS 3.7.1.1 would have been low, since this condition represents operation of the plant with little or no operating margin. The required reduction in the LPLHT setpoint due to an inoperable MSSV is intended to be coincident with a reduction in operating power level; this reduction in operating power level would necessarily have occurred to preserve an operating margin similar to that present during normal full power operation.

This voluntary LER is being submitted to provide notification of the aforementioned findings.

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

Not applicable.

3. Sequence of Events:

Not applicable.

4. Method of Discovery:

As discussed in section C.1, "Event", above.

5. Personnel Actions and Analysis of Actions:

Not applicable.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION UNIT 2	DOCKET NUMBER 05000361	LER NUMBER 89-010-01	PAGE 4 OF 5
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6. Safety System Responses:

Not applicable.

D. CAUSE OF THE EVENT:

As reported in IN 86-05, MSSVs with initial, factory-set ring settings obtain a disc lift that is less than rated lift. The MSSV ring settings were initially set based upon valve operational tests conducted at limited volume test facilities on valves typically smaller than the MSSVs. Test facilities for full flow testing of MSSVs were not available at the time the valves were manufactured.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

- a. The ring settings for the Unit 2 MSSVs were changed to be consistent with the new recommended generic settings during the Unit 2 Cycle V refueling outage, thus achieving full flow capacity of the MSSVs.
- b. Administrative controls have been implemented on Unit 3 to ensure power operation is below the LPLHT setpoint by approximately 9% whenever the plant is operated with an inoperable MSSV. These controls ensure overpressure protection of the secondary plant with an inoperable MSSV. These controls will remain in effect until the Unit 3 MSSV ring settings are adjusted, per the following section (E.2).

2. Planned Corrective Actions:

The ring settings for the Unit 3 MSSVs will be changed during the Unit 3 Cycle V refueling outage (currently scheduled to commence in April 1990) to be consistent with the new recommended generic settings, achieving full flow capacity of the MSSVs.

F. SAFETY SIGNIFICANCE OF THE EVENT:

Conservative evaluation techniques indicate that the Unit 3 MSSV capacities are currently sufficient to meet design bases and would not alter the results of the safety analyses. The MSSV analytical model utilized to arrive at this conclusion estimates 75% of full nameplate flow. This model is more conservative than the model which was used to estimate full nameplate flow at 108% of set pressure (as referenced in Revision 0 of this LER). In addition, these conclusions are supported by actual performance data taken following two actual loss of heat removal events (LER 86-022 [Docket No. 50-361] and LER 90-002 [Docket No. 50-362], which will be submitted to the NRC by March 26, 1990).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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The analysis which concluded that 110% of design pressure may be exceeded if the plant is operated with one MSSV removed from service while at a power level approaching the TS limit was based on very conservative assumptions. Based on engineering judgement, more realistic assumptions would yield acceptable results. In addition, the plant has never operated with a gagged MSSV, and present administrative controls provide adequate margin should an MSSV be declared inoperable prior to the upcoming refueling outage. Therefore, there is minimal safety significance associated with this event.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

The MSSVs are manufactured by Crosby Valve and Gage Co. (Model No. 6R10 HA75FN).

2. Previous LERs for Similar Events:

None.

3. Results of NPRDS Search:

Not applicable. The WOG Subcommittee on MSSVs evaluated reduced MSSV capacities reported at other facilities and in IN 86-05.

4. Additional Information:

The MSSVs satisfy Technical Specification (TS) 3.7.1.1, Safety Valves, which requires the MSSVs to be operable with specific set pressures. Also, they satisfy the Bases for this TS by limiting steam pressure to 110% of design during certain severe transients. However, the evaluation has revealed that the MSSVs' total flow rate stated in the TS Bases and in FSAR Appendix 5.2A, Over Pressure Protection, is a preliminary value used prior to manufacture rather than the flow needed to limit steam pressure. The UFSAR has been updated to reflect the appropriate design basis. A TS amendment application to revise the basis to TS 3.7.1.1 will be submitted by June 30, 1990, as indicated in a letter from SCE to the NRC dated February 9, 1990.