Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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September 9, 1991

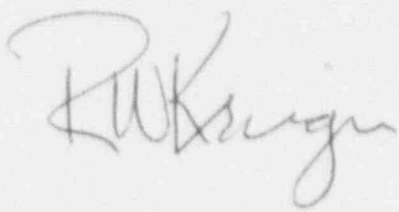
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Docket No. 50-206
30-Day Report
Licensee Event Report No. 91-014
San Onofre Nuclear Generating Station, Unit 1

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving entry into Technical Specification 3.0.3 for maintenance on a level transmitter. 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. 91-014

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)

IE22 1/1

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1	0 5 0 0 0 2 0 6	1 of 0 8

Title (4)

ENTRY INTO TECHNICAL SPECIFICATION 3.0.3 DUE TO INOPERABLE VOLUME CONTROL TANK LEVEL TRANSMITTERS

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)
									NONE	0 5 0 0 0
0 8	0 7	9 1	9 1	0 1 4	0 0	0 9	0 9	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)					
1		___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)		
POWER LEVEL (10)	0 9 0	___ 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)	___ Other (Specify in		
		___ 20.405(a)(1)(iii)	X 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	TELEPHONE NUMBER AREA CODE
R. W. Krieger, Station Manager	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	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
XX	Yes (If yes, complete EXPECTED SUBMISSION DATE)	___ NO	0 3	2 8	9 2

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

On August 7, 1991 at 1135, with Unit 1 in Mode 1 at approximately 90% power, Volume Control Tank (VCT) level transmitter LT-1100 was exhibiting erratic indication as compared to the opposite train level transmitter (LT-2550). These level transmitters function to realign the charging pumps from the VCT to the refueling water storage tank when the VCT level becomes low, and provides a protective trip to the charging pumps to avoid the introduction of VCT hydrogen gas to the pump suction. To avoid inadvertent actuation during corrective maintenance on LT-1100, the automatic actuation functions of both transmitters were bypassed. At 0440 on August 8th, the automatic protection afforded by LT-2550 was restored since maintenance which could affect both transmitters had been completed.

At about 1700 on August 8th, it was recognized that removal of the automatic actuation feature was contrary to the requirements of TS 3.3.1, "Safety Injection System ... - Operating Status," section A(3) since an applicable action statement governing these components is not provided. As such, shutdown of Unit 1 was initiated at 1800 per TS 3.0.3. SCE requested a temporary 72-hour waiver of compliance from the above TS requirements since a previously submitted TS change provided a 72-hour action statement for this situation. The NRC verbally approved the waiver at approximately 2000. The unit shutdown was then suspended.

LT-1100's erratic indication resulted from loose fasteners in the transmitter which have been corrected and the transmitter restored to service. SCE's investigation into the cause of the loose fasteners is continuing. Resolution of NRC questions on the pending TS change are being expedited. The results of the investigation and any applicable corrective actions will be reported in a supplement to this LER.

Plant: San Onofre Nuclear Generating Station
Unit: One
Reactor Vendor: Westinghouse
Event Date: August 7, 1991
Time: 1135

A. CONDITIONS AT TIME OF THE EVENT:

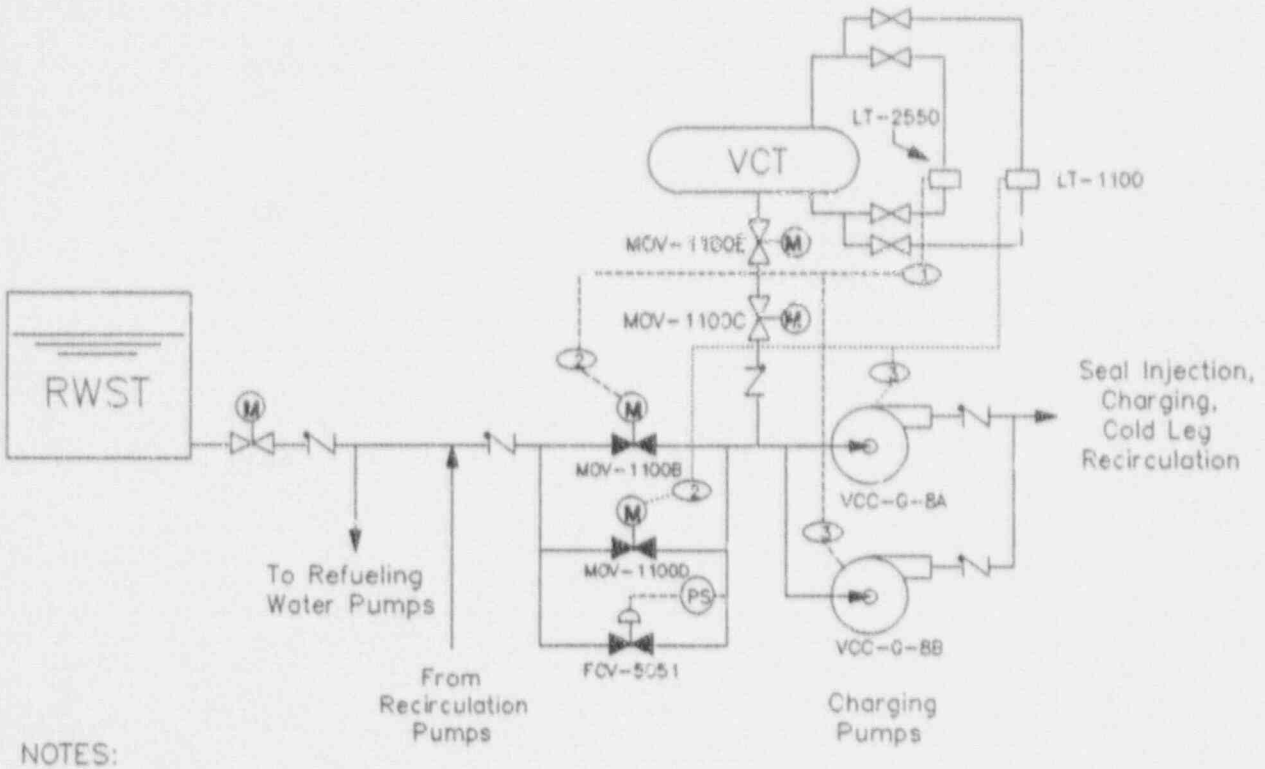
Mode: 1, Power Operation

B. BACKGROUND INFORMATION:

1. Charging Pump Protection on Low Volume Control Tank (VCT) Level:

During normal power operation, one of the two charging pumps provide borated water from the VCT [CB,TK] to the Reactor Coolant System (RCS) [AB] as shown in the following figure. In the event of certain small break Loss of Coolant Accident (LOCA) scenarios, the centrifugal charging pumps [CB,P] could maintain sufficient RCS inventory to prevent initiation of a safety injection actuation signal while emptying the VCT. Two trains of automatic charging pump protection are provided on low VCT level to preclude the VCT hydrogen cover gas from gas binding and potentially damaging the charging pump(s) after the VCT empties during such events. Each train consists of a VCT level transmitter [LT] and an associated control loop, a normally open valve [ISV] in the charging pump suction from the VCT, a normally closed valve [ISV] in the charging pump suction from the Refueling Water Storage Tank (RWST), and trip circuitry for the associated charging pump. On a low-low VCT level, each train's level transmitter (LT-1100 for train "A" and LT-2550 for train "B") initiates opening of its respective RWST isolation valve (MOV-1100D and MOV-1100B, respectively); when these valves complete opening, limit switches initiate closure of the associated VCT isolation valves (MOV-1100C and MOV-1100E, respectively). On a low-low-low VCT level LT-1100 trips charging pump VCC-G3A, and LT-2550 trips charging pump VCC-G3B. LT-2550 also initiates a VCT level low alarm in the control room. LT-1100 also automatically maintains VCT level by controlling makeup.

During surveillance testing or when corrective maintenance is necessary on loop components, it is necessary to block automatic actuation of components whose automatic actuation could upset plant operations (i.e., stop the running charging pump or switch charging pump suction from the VCT to the RWST).



NOTES:

① Control Room Alarm on Low VCT Level.
② Opens MOV-1100 B & D on Low-Low VCT Level.
MOVs 1100 B & D Open Contacts Initiate Closure of MOV-1100 C & E.
③ Stops Charging Pump on Low-Low-Low VCT Level.

Figure - Charging Pump Low VCT Level Protection

2. Existing Technical Specifications (TS):

TS 3.3.1, defines the operability requirements for the Safety Injection System (SIS) [BP and BQ]. The objective of the TS is to ensure availability of the SIS while the reactor is critical. TS 3.3.1, A(3) requires, in part, that valves and interlocks associated with the SIS be maintained operable but does not provide an ACTION statement with an Allowable Out-of-service Time (AOT) for many SIS components, including the VCT level transmitters. This specification was written before the Standard TS's which generally allow most Emergency Core Cooling System (ECCS) components having a redundant counterpart (or system) an AOT of 72 hours. This specification applies to the VCT level transmitters LT-1100 and LT-2550 and the associated MOVs.

TS 3.0.3 requires, in part, that when a limiting condition for operation is not met, except pursuant to associated ACTION

requirements, unit shutdown shall be initiated within one hour and that the unit be placed in COLD SHUTDOWN in the following 36 hours.

3. TS Amendment Application:

SCE submitted a proposed TS change (letter, H. B. Ray (SCE) to USNRC Document Control Desk, Amendment Application 188, dated August 31, 1990) which among other changes, would modify the existing TS 3.3.1 and add TS 3.3.2 to be generally consistent with the Standard TS philosophy for ECCS. Appropriate action statements provided in the proposed change would permit the removal of one train of certain safety injection components (including the VCT level transmitters) from service for up to 72 hours.

C. DESCRIPTION OF THE EVENT:

1. Event:

On August 7, 1991 at 1135, with Unit 1 in Mode 1 at approximately 90% power, VCT level transmitter LT-1100 was exhibiting erratic indication as compared to the opposite train level transmitter (LT-2550). Maintenance was initiated on LT-1100 at that time and, to preclude potential spurious actuations due to the maintenance: 1) Automatic actuation of the MOVs on low VCT level by LT-1100 and LT-2550 was blocked; and 2) The low VCT level charging pump automatic trip was blocked for both pumps. Since: 1) the valves controlled by LT-1100 and LT-2550 were still capable of being repositioned by their respective safety injection initiated contacts, and 2) a comparison of the level transmitter function to potentially applicable TS did not reveal any TS applicability, no TS was thought to apply. At 0440 on August 8th, both MOVs controlled by LT-2550 were restored to automatic operation and the associated low VCT level charging pump trip was restored since the maintenance which could potentially affect both level transmitters had been completed. The automatic operation of the MOV's associated with LT-1100 and its associated charging pump trip remained blocked, however, since the cause of the erratic operation of the transmitter had not been determined.

At about 1700 on August 8th, it was concluded that operation in Modes 1 or 2 with one inoperable level transmitter (LT-1100) was contrary to the requirements of TS 3.3.1, A(3) (i.e., inoperable valves and interlocks). Therefore, shutdown of Unit 1 was initiated at 1800 per the requirements of TS 3.0.3 and an Unusual Event (UE) was declared in accordance with our Emergency Plan Implementing Procedures. The UE was exited at 1922. SCE requested a temporary 72-hour waiver of compliance from the above TS requirements since a TS change then under NRC review, would have allowed a 72-hour action statement in this circumstance. The NRC verbally approved the waiver at approximately 2000 on August 8th. The unit shutdown was then suspended.

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

Not applicable.

3. Sequence of Events:

DATE - TIME ACTION

8/7 - 1135 LT-1100 and LT-2550 removed from service. MOVs 1100B, C, D and E placed in manual control; the VCT low level trip for both charging pumps is blocked.

8/8 - 0440 MOVs 1100B and E were restored to automatic actuation by LT-2550; Charging pump VCC-G8B low VCT level trip is restored.

8/8 - 1700 TS 3.0.3 is entered.

8/8 - 1800 Unit shutdown initiated and UE declared.

8/8 - 1922 UE exited.

8/8 - 2000 Waiver of TS compliance granted and the unit shutdown is suspended.

8/9 - 1635 LT-1100 restored to operability, MOVs 1100C and D returned to automatic actuation, and the charging pump VCC-G8A low VCT level trip is restored.

4. Method of Discovery:

Operators observed differences in the indicated VCT level between the two level channels (LT-2550 and LT-1100) and erratic level indication by LT-1100.

Due to the erratic behavior of LT-1100, a temporary design change was requested to switch the automatic VCT level control function from LT-1100 to LT-2550. During a feasibility review of the change request, it was recognized that operation with blocked charging pump protection on low VCT level was contrary to the TSs.

5. Personnel Actions and Analysis of Actions:

Not applicable.

6. Safety System Responses:

Not applicable.

D. ROOT CAUSE OF THE EVENT:

1. The problems exhibited by LT-1100 were caused by loose fasteners in the transmitter which allowed some internal parts to bind and others (which should be locked together) to rotate. An investigation has been initiated to determine why the level transmitter fasteners were loose.

2. The safety function of the charging pump suction isolation valves and the charging pump trip was determined to be satisfied with the automatic controls either enabled or blocked since proper automatic operation would occur in the event of a safety injection signal. It was not recognized that for certain small break LOCA events, the VCT could empty and potentially lead to charging pump damage prior to initiation of the safety injection signal which would switch the charging pump suction to the RWST.

E. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

LT-1100 has been repaired, calibrated, and returned to service.

2. Planned Corrective Actions:

a. As noted in Section D.1 above, an investigation to determine the root cause of the loose LT-1100 fasteners is in progress. Appropriate corrective action will be developed and implemented based on the findings of our investigation. The investigation results and our corrective action to prevent recurrence will be provided in a supplement to this LER.

b. Appropriate procedures will be revised to preclude simultaneously disabling both trains of charging pump low VCT level protection.

c. Guidance provided to the operators with respect to the equipment governed by TS 3.3.1 is being augmented by a background document intended to correlate the ECCS components to the associated LCOs and action requirements.

d. A TS change has been proposed which would provide a 72-hour AOT for one train of safety injection components.

F. SAFETY SIGNIFICANCE OF THE EVENT:

1. One VCT level transmitter inoperable:

Continued operation with a VCT level transmitter inoperable for a period of 72 hours is of no safety significance for the following reasons:

a. Unit 1 is provided with two independent and redundant trains of ECCS (which includes safety injection), including the capability to realign the charging pump suction from the VCT (on low VCT level or safety injection) to the RWST. Either train is capable of mitigating any event requiring the use of the ECCS. These provisions ensure that a single failure could not prevent completion of this aspect of a required safety function. In this regard, SCE has recently completed an ECCS single failure analysis and certain plant upgrades to assure completion of required ECCS functions in the event of a single failure.

b. Consistent with these changes, SCE had previously concluded that a TS change was appropriate to preclude unnecessary entries into TS 3.0.3. In this regard, SCE submitted a proposed TS change which would modify the existing TS 3.3.1 and add TS 3.3.2 to be consistent with the Standard TSs for ECCS as discussed in Section B.3 above.

c. The AOT (72 hours) being proposed is of minimal safety significance when compared to the risks associated with initiating a plant shutdown for the purposes of repairing or testing these level transmitters. The risks for the AOT are also similar to that for any other one-of-two train systems or components having a 72-hour action statement.

Further, the probability of core damage as a result of the inoperability of a VCT level transmitter for up to 72 hours has been calculated to be approximately 5E-7 per year.

2. Operation with Blocked Charging Pump Protection on Low VCT Level:

In the event of a large break LOCA or Main Steam Line Break, MOVs 1100B, C, D and E would be automatically actuated to realign the charging pumps' suction from the VCT to the RWST by the safety injection signal thereby satisfying the safety function of these valves.

For certain small break LOCA scenarios, the operating charging pump would maintain RCS pressure and volume above the SI actuation conditions while drawing down the VCT level. Operators were fully aware of the blocked automatic charging pump protection on low VCT level and the consequences of gas binding the charging pumps. In the event of a small break LOCA, LT-2550 would have initiated a low VCT level alarm in the control room as the VCT was pumped down and the operators would have realigned the charging pump suction to the RWST per procedure.

In the unlikely event that operators were unsuccessful in preventing charging pump damage, the RCS would be depressurized and low head pumps would be used in accordance with procedures to re-establish and

maintain core cooling. Therefore the conditions described above are of minimal safety significance.

G. ADDITIONAL INFORMATION:

1. Component Failure Information:

LT-1100 is a torque tube displacer type level transmitter manufactured by Masoneilan International, Inc, model number 0120.

2. Previous LERs for Similar Events:

LERs 89-024 and 89-026 (Docket No. 50-206) reported, in part, TS violations which occurred as the result of misinterpretation of the existing TS 3.3.1. The corrective action described in these LERs to address such misinterpretations was preparation of a TS amendment application which would establish appropriate TS requirements and appropriate out-of-service times for ECCS components. Concurrent with preparation of this amendment application, SCE was performing an ECCS single failure analysis which identified needed ECCS single failure enhancements. These enhancements were implemented during the Cycle 11 refueling outage during the last half of 1990. A TS amendment application was submitted to the NRC on August 31, 1990 to provide appropriate ECCS TSs which also address the added single failure enhancements. This TS amendment application is being actively reviewed. Due to the comprehensive nature of the proposed TS change, the review process has not yet been completed. As a result, this corrective action could not prevent recurrence of TS 3.3.1 misinterpretation.

3. Other Additional Information:

By letter dated August 26, 1991, R. W. Krieger (SCE) to USNRC Document Control Desk, "Level Transmitter Surveillances - Safety Injection," SCE requested a temporary waiver of compliance from the requirements of TS. 3.0.3, without fully complying with the requirements of TS 3.3.1. The purpose of this request was to avoid unnecessary plant shutdowns while the affected level transmitter (LT-1100 or LT-2550) is removed from service for surveillance testing and for the performance of any corrective maintenance which may become necessary. The duration of the requested waiver was from August 28th until issuance of the TS changes proposed by Amendment Application number 163. On August 28, 1991, the NRC verbally approved SCE's August 26th request. Following NRC approval of the waiver request, LT-1100 and LT-2550 were removed from service for performance of the routine monthly surveillance on August 29, 1991 in accordance with the provisions of the waiver.