SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

R. W. Krieger
Vice President
Nuclear Generation

May 13, 1996

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

Subject: Docket Nos. 50-361 and 50-362
Voluntary Report
Licensee Event Report No. 2-96-004
San Onofre Nuclear Generating Station, Units 2 and 3

This submittal provides a voluntary report for a potential condition involving the Auxliary Feedwater System. Neither the health nor the safety of plant personnel or the public was affected by this condition.

If you require additional information, please so advise.

Sincerely,

Raymond Waldo for
R. W. Krieger

Enclosure: LER No. 2-96-004

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LICENSEE EVENT REPORT (LER)

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

Title (4)

Auxiliary Feedwater System Turbine Driven Pump Relatch

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 4	1 1	9 6	9 6	---	0 0 4	0 0	0 5	1 3 1	9 6	SONGS UNIT 3	0 5 0 0 0 3 6 2

OPERATING MODE (9): 1

POWER LEVEL (10): 0 9 9

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

___ 20.402(b)	___ 20.40(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)		
___ 20.405(a)(1)(I)	___ 50.36(c)(I)	___ 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 Abstract below and in text)		
___ 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)			

VOLUNTARY REPORT

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER AREA CODE
R. W. Krieger, Vice President, Nuclear Generation	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.- TRUER	REPORTABLE TO NPRDS	///////	CAUSE	SYSTEM	COMPONENT	MANUFAC.- TRUER	REPORTABLE TO NPRDS	///////
					///////						///////
					///////						///////

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On April 11, 1996, during an independent review of the turbine driven auxiliary feedwater pump (TDAFW) reliability, it was recognized that the presence of an Emergency Feedwater Actuation Signal (EFAS) has some potential to prevent operators from relatching the TDAFW pump trip linkage. If an EFAS signal is present at the time an operator attempts to reset the trip linkage, the EFAS signal may cause the valve stem to begin to reposition before the trip linkage can be reset thereby preventing restart of the pump.

If an accident were to occur which requires the TDAFW pump and it were to spuriously trip following receipt of the EFAS, concurrent with the unavailability of one or both of the electrically powered AFW pumps, operators may not be able to supply AFW to the steam generator(s). However, there was a previous event when an operator was able to relatch the trip linkage with an EFAS signal present. As reported in Licensee Event Report No. 83-099, on October 31, 1983, Unit 3 was manually tripped in response to a loss of main feedwater. Even though an EFAS signal was present, the operator was able to manually reset the mechanical linkage (as trained) and the pump started immediately.

Edison has revised appropriate procedures to instruct control room operators to depress the EFAS override and close handswitch(s) prior to allowing a plant equipment operator to reset the overspeed trip mechanism. This will prevent the motor actuator for HV-4716 from moving the valve stem when the overspeed trip limit linkage is moved away from the limit switch. This action will ensure the latching mechanism can be reset.

Description of Events:

Plant: San Onofre Nuclear Generating Station, Units 2 & 3 Reactor
Vendor: Combustion Engineering
Discovery Date: April 11, 1996
Mode: Both Units were in Mode 1 Power:
Both Units were at 100% Power

Background:

The Auxiliary Feedwater (AFW) System [BA] is comprised of three 100% capacity Auxiliary Feedwater Pumps [P]. Two of the pumps (P141 and P504) are driven by electric motors with each pump discharge piping lined up to one of the two steam generators. The third pump (P140) is driven by a Terry steam turbine [TRB]. The AFW discharge from P140 is interconnected with both steam generators via the same piping used by the motor-driven pumps. The AFW pumps are normally isolated from the steam generators by two sets of remote actuated isolation valves. Normal pump testing is accomplished via installed mini-flow lines.

Steam supply to the turbine for AFW Pump P-140, is connected to the two main steam lines between the containment penetrations and the main steam isolation valves. Each of the steam supply lines to the turbine has a check valve and a pneumatically-actuated steam supply isolation valve (HV-8200 or HV-8201)[ISV]. The steam from both supply lines combine and is then directed to the turbine through stop valve HV-4716 [SCV] and governor valve SV-4700 [SCV].

The function of stop valve HV-4716 is to open upon receipt of an Emergency Feedwater Actuation Signal (EFAS) and to close in response to a turbine overspeed event. If an EFAS is generated by the plant protective system, turbine stop valve HV-4716 opens and provides steam to the turbine governor valve SV-4700 which controls the speed of the turbine during normal turbine operation.

Valve HV-4716 also functions as part of the mechanical overspeed trip system for the steam turbine for Pump P-140. The mechanical overspeed trip system protects the turbine from a possible overspeed event by automatically closing Turbine Stop Valve HV-4716 when the turbine reaches a shaft speed of 3927 +/- 100 rpm. The overspeed protection mechanism functions as follows: The shaft of the Terry turbine K-007 is hollow and contains a pre-calibrated spring-loaded trip weight. If shaft rotation exceeds 3927 +/- 100 rpm, centrifugal acceleration forces the weight outward from the shaft. When the trip weight contacts and raises the trip plunger, the overspeed trip linkage is released and retracted by the emergency trip spring. A coil spring on the sliding nut of HV-4716 then forces the sliding nut and valve stem down, thereby closing the valve. This terminates steam flow to the turbine (see attached figure 1).

Description of the Event:

On April 11, 1996, during an independent review of the turbine driven auxiliary feedwater pump (TDAFW) reliability, it was recognized that the presence of an Emergency Feedwater Actuation Signal (EFAS) has some potential to prevent operators from relatching the TDAFW pump trip linkage. The following event sequence illustrates the potential complicating effect of the EFAS signal:

> Valve HV-4716 has two functions: (1) to open in response to an EFAS signal, and thereby start TDAFW pump P-140, and (2) to automatically close in response to a turbine overspeed event.
>
> When the turbine trips on overspeed, the trip linkage allows the valve stem to close and actuates a limit switch. Actuating the limit switch causes (1) the valve motor actuator to automatically reposition the valve stem to allow the trip mechanism to be reset, (2) disconnects the valve actuator from EFAS control, and (3) provides a control room alarm to alert operators to an overspeed event.
>
> When the mechanism is manually reset by repositioning the trip linkage, the limit switch electrically re-enables EFAS control of the valve (HV-4716).
>
> If an EFAS signal is present at the time an operator attempts to reset the trip linkage, the EFAS signal may cause the valve stem to begin to reposition before the trip linkage can be reset. The resulting automatic movement of the valve stem might prevent successful relatching of the trip mechanism and thereby prevent restarting the TDAFW pump. (Note: It typically takes less than one second to reset the trip linkage, and it may be possible to reset the linkage before the actuator begins moving).

If an accident were to occur which requires the TDAFW pump and it were to spuriously trip following receipt of the EFAS, an operator may not be able to restart the pump locally due to the potential difficulty in relatching the trip linkage. If the postulated accident were to occur concurrent with the unavailability of one or both of the electrically powered AFW pumps, operators may not be able to supply AFW to the steam generator(s). Because 10CFR50.72/.73 does not require Edison to postulate a spurious trip of the TDAFW pump coincident with a design basis accident and the unavailability of the electriclly powered AFW pumps, this potential event sequence is not reportable. However, because of the importance of the AFW system, Edison is voluntarily providing this report due to potential industry interest.

Also note that while the sequence outlined above may interfere with relatching the trip linkage, it is not certain that it would always prevent the relatching. For instance, there was a previous event when an operator was able to relatch the trip linkage with an EFAS signal present. As reported in

Licensee Event Report No. 83-099, on October 31, 1983, Unit 3 was manually tripped in response to a loss of main feedwater. When the Unit was tripped, an EFAS was initiated and both motor driven AFW pumps started; however, 3P-140 failed to start. When an operator inspected the pump locally, it was noted that the trip linkage was in the tripped position (not reset). Even though an EFAS signal was present, the operator was able to manually reset the mechanical linkage (as trained) and the pump started immediately.

Cause of Event

As stated in the existing UFSAR Failure Modes and Effects Table 10.4-7, failure of the TDAFW pump or steam inlet valve, coincident with an EFAS signal, is considered a random single active failure for which the inherent compensating provision is one or both redundant motor-driven pumps. This is consistent with the AFW system reliability studies performed as part of initial plant licensing. Therefore, the potential need to manually relatch the trip linkage coincident with an EFAS is not part of the as-Licensed design basis for the system.

Corrective Actions

Edison has revised appropriate procedures to instruct control room operators to depress the EFAS override and close handswitch(s) prior to allowing a plant equipment operator to reset the overspeed trip mechanism. This will prevent the motor actuator for HV-4716 from moving the valve stem when the overspeed trip limit linkage is moved away from the limit switch. This action will ensure the latching mechanism can be reset.

Safety Significance

Difficulty in re-latching a TDAFW pump overspeed trip could have an impact on the best estimate calculation of plant risk due to the relatively high risk-significance of the pump. However, because of the large scatter in data for the effectiveness of prescribed actions to reset the trip, and for the probable operator responses in the time available, Edison is not able to quantify the risk significance of this condition. Given historical experience, it would appear that actual risk is low.

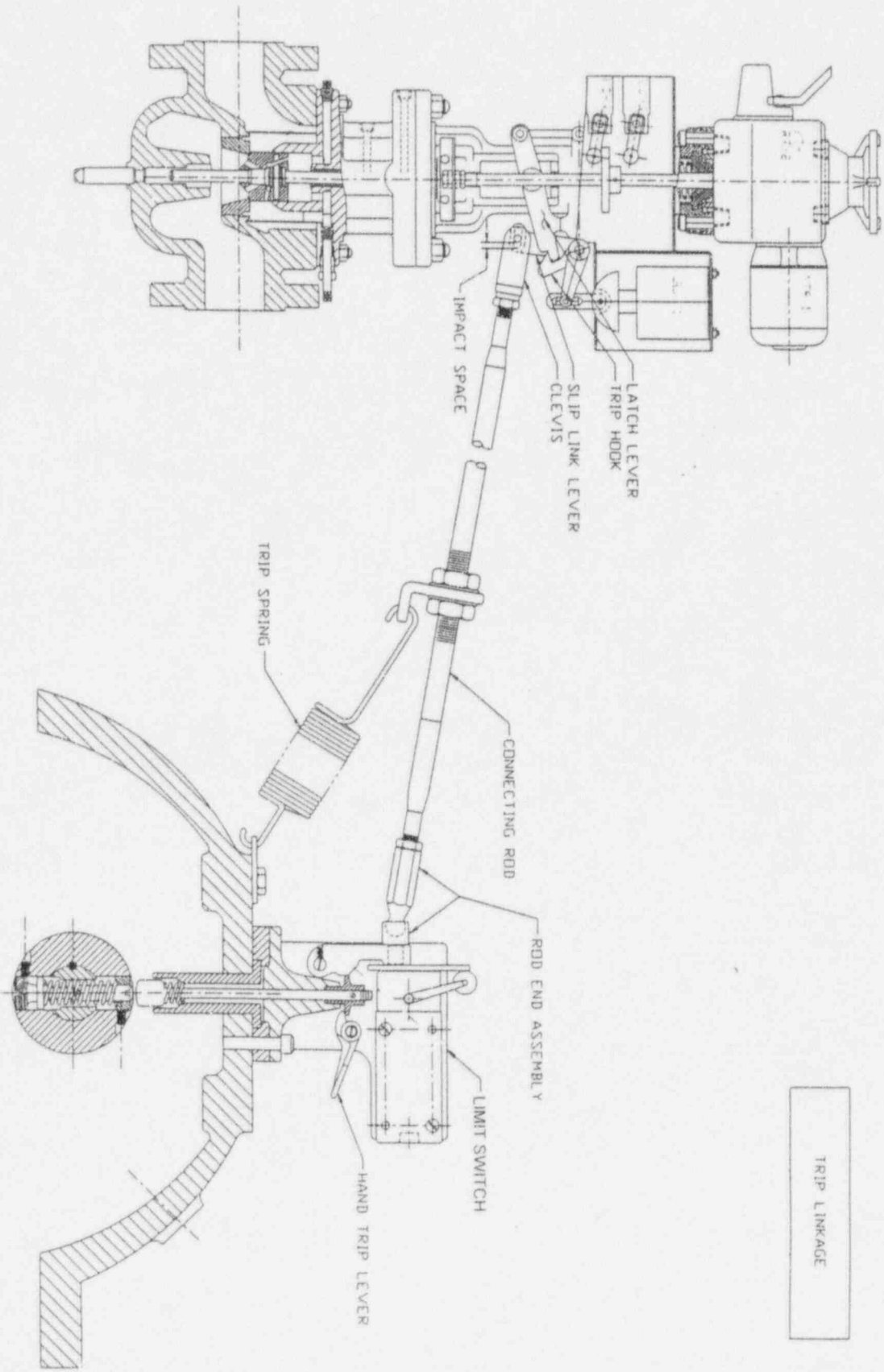

FIGURE 1

TRIP LINKAGE