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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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Arizona Public Service Company PALO VERDE NUCLEAR GENERATING STATION P.O. BOX 52034 PHOENIX, ARIZONA 85072-2034

JAMES M. LEVINE VICE PRESIDENT NUCLEAR PRODUCTION 192-00753-JML/TRB/WHD November 12, 1991

U. S. Nuclear Regulatory Commission Attention: Document Control Desk Mail Station P1-37 Washington, D.C. 20555

Dear Sirs:

Subject:

Palo Verde Nuclear Generating Station (PVNGS) Unit 2 Docket No. STN 50-529 (License No. NPF-51) Licensee Event Report 91-005-00 File: 91-020-404

Attached please find Licensee Event Report (LER) 91-005-00 prepared and submitted pursuant to 10CFR50.73. In accordance with 10CFR50.73(d), we are forwarding a copy of the LER to the Regional Administrator of the Region V office.

If you have any questions, please contact D. Alan Johnson, Compliance Supervisor, at (602) 393-3703.

Very truly yours,

famer M. Jeine

JML/TRB/WHD/nk

Attachment

cc:

W. F. Conway (all with attachment)

J. B. Martin

D. H. Coe

INPO Records Center

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(9 63)	U.S. NUCL	EAN REGULATORY COMMISSION
LICENSEE EVENT REPORT (LER)	EX	(PIRES: 8/31/88
FACILITY NAME (1) DO	CKET NUMBER (2)	PAGE (3)
	5000	0 [5 [2] 9 1 0F 0 7
Main Steam Safety Valve Setpoints Out of Tolerance		
EVENT DATE (5) LER NUMBER (6) REPORT DATE (7) OTHER F/	CILITIES INVOLV	ED (8)
MONTH DAY YEAR YEAR SEQUENTIAL W REVISION MONTH DAY YEAR FACILITY NAME	s D	OCKET NUMBER(S)
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1 10 019 911 911 010 15 010 111 12 911 N/A	0	15101010111
OPERATING THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR \$: (Check one or more of	the following) (11)	
MODE (9) 20.402(b) 20.405(c) 50,73(s)(2)(iv)	he _	73,71(5)
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20.405(s)(1)(v) 50.73(s)(2)(iii) 50.73(s)(2)(iii)		• ·
LICENSEE CONTACT FOR THIS LER (12)		
	AREA CODE	
D. Alan Johnson, Compliance Supervisor	610123	8 9 3 - 13 7 10 3
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT	(13)	
CAUSE SYSTEM COMPONENT MANUFAC- REPORTABLE TO NPROS	MANUFAC- TURER	REPORTABLE TO NPRDS
	<u> </u>	
SUPPLEMENTAL REPORT EXPECTED (14)	EXPECTED	MONTH DAY YEAR
YES (II yes, complete EXPECTED SUBMISSION DATE)	DATE (15)	
ABSTRACT (Limit to 1400 speces, i.e., approximately fifteen single-spece typewritten lines) (16)		
On October 9, 1991 while Unit 2 was in Mode 1 (POWER OPERAT approximately 97.5 percent power, an engineering evaluation surveillance testing results determined that eleven (11) of Main Steam Safety Valve (MSSV) as-found relief settings wer tolerance limits specified in Technical Specification (TS) testing requirements established by APS. The testing and a performed during the period of October 8 through October 9 was in Mode 1, to verify the relief settings of the MSSVs. The cause of the event is setpoint drift. As immediate con MSSVs have been adjusted and tested satisfactorily. Previous similar events were reported in MSSV LERs 528/88-(00, 529/89-002-00, 529/89-007-00 and 530/91-001-00.	TION) at n of ASME f the twe re out of 3.7.1.1 adjustmen , 1991, w rrective a	nty (20) the and in the ts were hile Unit 2 action the 28/89-010-
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	OOCKET NUMBER	LER NUMBER	PAGE
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Palo Verde Unit 2	0 5 0 0 0 5 2 9	911-01015-010	
TEXT			0121-1017

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On October 8 through 9, 1991, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION) at approximately 97.5 percent power.

B. Reportable Event Description (Including Dates and Approximate Times of Major Occurrences):

Event Classification: Co

ion: Condition Prohibited by the Plant's Technical Specifications.

Palo Verde Unit 2 is a two-loop pressurized water reactor (PWR). Each loop has a vertical U-tube steam generator (SG)(AB) with two outlet main steam lines (SB). Overpressure protection for the shell side of the steam generators and the main steam lines up to the inlet of the turbine (TRB) stop valve (SHV)(TA) is provided by twenty (20) flanged, spring-loaded, direct acting, ASME Code safety valves (RV)(SB) which have open bonnets and discharge to the atmosphere. These safety valves are mounted on each of the main steam lines upstream of the Main Steam Isolation Valves (MSIV)(ISV)(SB) but outside the Containment (CTMT)(NH). The opening pressure of the valves is set in accordance with ASME Code and Technical Specification (TS) requirements. The valves are set to lift sequentially at 1250, 1290, and 1315 pounds per square inch-gauge (psig).

The Main Steam Safety Valves (MSSV)(SB) are required by Technical Specification 4.7.1.1 and the ASME Code to be tested once per five (5) years. The testing is conducted using an approved surveillance test procedure. The surveillance test verifies the actual pressure setpoint and that operation of the MSSVs is acceptable for continued service. The testing is conducted using the Furmanite Trevitest method, which involves the use of hydraulic force to assist in overcoming the closing force of the valve spring. The applied force is measured, recorded, and analyzed to determine lift setpoint. In order to have an acceptable test, three (3) consecutive lifts must be within plus or minus one (1) percent of the nominal setpoint pressure for the valve. The testing sequence involves declaring a safety valve inoperable, installing the testing device, and then testing until three consecutive acceptable lifts are performed. If three consecutive acceptable lifts cannot be made, the valves are adjusted until the acceptance criteria is satisfied. After three successful lifts, the valve is returned to service. The process of testing, adjusting (where necessary) and retesting until satisfactory results are achieved normally encompasses less than four (4) hours per valve.

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p. LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	n k	DOCKET NUMBER	LER NUMBER	PAGE
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Palo Verde Unit 2	•	0 15 10 10 10 15 12 19	9 1 - 0 0 5 - 0 0	0 13 05 01 7

On October 9, 1991, engineering personnel (utility, non-licensed) completed a review of data obtained from MSSV testing conducted in Unit 2 from October 8 through October 9, 1991. This testing was being conducted at less than the five (5) year interval in accordance with corrective action for the previous out-oftolerance relief settings in Units 1, 2, and 3 as reported in Licensee Event Reports (LER) 528/88-014-01, 528/89-010-00, 529/89-002-00, and 529/89-007-00.

Based upon a review of the actual test results, eleven (11) of twenty (20) MSSVs' as-found relief settings were out of tolerance. One (1) MSSV setpoint was below specification and ten (10) MSSV as-found relief settings were above specification. The maximum deviations from setpoint of the as-found settings were 3.2 percent high and 2.1 percent low. The as-found settings for eight valves were greater than 1 percent but less than 2 percent high, one valve was greater than 2 percent but less than 3 percent high, one valve was greater than 3 percent high and one valve was greater than 2 percent low. The following information is provided concerning the Unit 2 MSSVs:

- Six (6) MSSV relief settings were acceptable and did not require adjustment.
- Three (3) MSSV relief settings were out of tolerance upon initial testing and required adjustment.
- Eight (8) MSSV relief settings appeared to be out of tolerance on the initial lift; however, no adjustments were necessary since subsequent lifts were within tolerance.
- Three (3) MSSV relief settings were acceptable on the initial lift; however, subsequent lifts were out of tolerance. Adjustments were necessary to obtain three (3) consecutive acceptable lifts for these safety valves.

Since eleven (11) of the twenty (20) MSSV as-found relief settings were outside the TS limit, it is assumed that one or more of these valves were outside the TS limit during operation. Therefore it is assumed that the OPERABILITY requirements and the associated ACTIONS were not met for TS 3.7.1.1.

C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:

Other than the Main Steam Safety Valves described in Section I.B, no structures, systems, or components were inoperable which contributed to the event.

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FACILITY NAME		DOCKET NUMBER		
			YEAR SEQUENTIAL SALAEVISION	PAGE
Palo Verd	e Unit 2	0 5 0 0 0 5 2 9	911 - 01015-010	014 05 0 17
TEAT				0141-1017
D.	Cause of each component	or system failure,	if known:	
•	Not applicable - no com	ponent or system fa	ilures were involved.	•
E.	Failure mode, mechanism known:	, and effect of eac	h failed component, i	f
a	Not applicable - no com	ponent failures wer	e involved.	
F.	For failures of compone systems or secondary fu	nts with multiple f nctions that were a	unctions, list of lso affected:	-
	Not applicable - no com	ponent failures wer	e involved.	4
G.	For a failure that rend estimated time elapsed train was returned to s	ered a train of a s from the discovery ervice:	afety system inoperab of the failure until	le, the '
	Not applicable - no fai of a safety system inop	lures were involved erable.	which rendered a tra	in
н.	Method of discovery of procedural error:	each component or s	ystem failure or	
	Not applicable - there or procedural errors id	have been no compon entified.	ent or system failure	S .
Ι.	Cause of Event:			
,	The MSSVs are subject t Other). This is a repe 014-01, 528/89-010-00, 530/91-001-00. Industr relief and safety valve performance of the valv	to setpoint drift (S at event as reporte 529/89-002-00, and y and PVNGS experie setpoint drift is 'e.	ALP Cause Code X: d in MSSV LERs.528/88 529/89-007-00 and nce, indicates that within the expected	•
	The Unit 2 MSSVs were p refueling outage. The outage as part of the e is currently in their t	reviously tested du MSSVs were tested d nhanced testing pro hird refueling outa	ring the last Unit 2 uring this refueling gram for MSSVs. Unit ge.	2
Ĵ.	Safety System Response:			
	Not applicable - there were necessary.	were no safety syst	em responses and none	
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Palo Verde Unit 2	0 5 0 0 0 5 2 9	9 11 - 0 10 15 - 01 0	0150F017
TEXT	· · · · · ·		

K. Failed Component Information:

Although there were no failed components associated with this event the following data is provided for information:

Main Steam Safety Valves

Manufacturer: Dresser Valve and Controls Division Dresser Industries, Inc.

Model No:

6" 3707R Consolidated Main Steam Safety Valves Type 3700

II. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THIS EVENT:

As described above, the MSSVs are intended to provide overpressure protection for the secondary side from the steam generators and main steam lines up to the turbine stop valves. The MSSVs ensure that steam generator pressure remains below 110 percent of design pressure and the reactor coolant system pressure remains below the acceptance criteria of 120 percent of design pressure for large feedwater line breaks, for Control Element Assembly (ROD) (AA) ejections and 110 percent of design pressure for all over pressurization events. Review of the as-found condition of the MSSV setpoints found that for the design basis accidents, the MSSVs would have prevented system pressure from exceeding 110 percent of steam generator design pressure and the sequential lifting scheme would have ensured that steam generator integrity would not be compromised. Furthermore, if an event occurred in which the Main Steam Isolation Valves (MSIV) (ISV) (SB) remained open, overpressure protection could have been automatically provided by the Steam Bypass Control System (SB). In addition, it should be noted that secondary side pressure is monitored by Reactor Operators in the Control Room (NA), and manual overpressure protection is provided by remote operation of the Atmospheric Dump Valves (PCV)(SB) from the Control Room.

A preliminary loss of condenser vacuum (LOCV) analysis was performed to determine if the as-found condition discussed in Section I.B. could have resulted in the steam generator pressure or reactor coolant system pressure exceeding the limit of 110 percent of design pressure. The peak reactor coolant system pressure reached during the analysis was 2745.9 pounds per square inch-absolute (psia), which remained below the limit of 2750 psia. The peak steam generator pressure reached during the analysis was 1348.9 psig, which remained below the limit of 1375 psig.

The assumptions made in this LOCV analysis are similar to the assumptions made in the Updated FSAR. The analysis in the Updated FSAR estimates that RCS pressure will reach approximately 2742 psia. Three

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER	PAGE
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Palo Verde Unit 2	0 5 0 0 0 5 2 9	911 - 01015 - 010	01 6050 17

additional assumptions, each supported by either tests or analyses, have been made to limit the RCS peak pressure increase for the as-found condition described above. These assumptions are summarized below:

- The High Pressurizer Pressure Trip (HPPT) response time was changed to 0.5 seconds from 1.15 seconds. Surveillance, tests for
 all three units have shown that the HPPT trip response time is consistently less than 0.3 seconds. An assumed response time of 0.5 seconds is therefore conservative.
- 2) The surge line friction form loss factor was reduced to 3.0 from 3.9 to reflect actual PVNGS design. This change was analytically justified in a calculation performed by ABB - Combustion Engineering (CE) in May, 1989.
- 3) In previous analyses, the pressurizer safety valves (PSV)(RV)(AB) were assumed to open to 70 percent of the nominal area opening at the setpoint. In this analysis, the PSVs are assumed to open to 100 percent (modeled in the CESEC code as 0.99 of the nominal area opening) at the setpoint pressure. This operation of the PSVs is justified based on the test data presented in ABB-Combustion Engineering Topical Report CEN-227 "Summary Report on the Operability of Pressurizer Safety Valves in CE Designed Plants." This report was accepted by the NRC for use at PVNGS in Supplement 8 of the Safety Evaluation Report (NUREG-0857).

The preliminary analysis used the as-found MSSV setpoints and conservatively assumed the PSVs setpoints were equal to 3 percent over set pressure. The assumptions used for the preliminary analysis are the same assumptions used in the previous MSSV and PSV setpoint tolerance calculations described in the LERs discussed in Section IV. The final analysis will be completed after PSV testing is completed and will use the as-found MSSV and PSV setpoints. If the results of the final analysis are significantly different than the preliminary analysis, the analysis will be discussed in a supplement to this report.

III. CORRECTIVE ACTION:

A. Immediate:

Three (3) MSSVs were out of tolerance upon initial testing and required adjustment. These valves were adjusted and successfully retested. Eight (8) MSSVs were out of tolerance upon initial testing and subsequent lifts were within limits. No adjustments were necessary for these valves. Three (3) MSSVs were acceptable upon initial lifts; however, subsequent lifts were out of

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER	PAGE	
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Palo Verde Unit 2	0 15 10 10 10 15 121	19 91 1 - 01 01 5 - 0 10	017 05 017	

tolerance and these values were also adjusted and successfully retested. The remaining six (6) MSSVs were satisfactory on the initial and subsequent lifts, and did not require adjustment. Twenty (20) MSSVs were successfully tested a minimum of three (3) consecutive times.

B. Action to Prevent Recurrence:

Since field setpoint adjustment was successfully accomplished in accordance with the Technical Manual, no further corrective action is necessary at this time.

Due to the tendency toward setpoint drift exhibited by these valves, and NRC Notice 89-90, PVNGS has started a program to remove approximately 10 MSSVs every other refueling outage (starting with Unit 2, 1991) so that the valves can be disassembled, refurbished and steam tested. This cycling of the valves will support the root cause of failure analysis.

An ongoing investigation is in progress to determine if any actions can be taken to reduce the setpoint drift. If any significant actions are identified which reduce setpoint drift, a supplement to this report will be issued.

APS submitted an amendment to the TS to increase the tolerance on the MSSV and PSV setpoints, (161-03587-WFC/JSC, dated November 13, 1990).

IV. PREVIOUS SIMILAR EVENTS:

MSSV LERs 528/88-014-01, 528/89-010-00, 529/89-002-00, 529/89-007-00, and 530/91-001-00 describe events where MSSVs were out of the tolerance limits specified in Technical Specification 3.7.1.1. Corrective actions for these MSSV events included readjustment of the valves and an administrative reduction of the five (5) year testing interval.

Previous corrective actions could not have prevented these events because it would not affect the tendency toward setpoint drift exhibited by the MSSVs.

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