

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palo Verde Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 5 2 9	PAGE (3) 1 OF 0 6
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TITLE (4)
Containment Spray Technical Specification Violation Due to Unrecognized Valve Failure

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 NUMBERS
0 8	1 7	9 4	9 5	- 0 0 1	- 0 0	0 8	2 2	9 5	N/A	
									N/A	

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 2: (Check one or more of the following) (11)				
POWER LEVEL (10) 8 8	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)	
	20.405(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)	
	20.405(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
	20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)		
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)		
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(viii)		

LICENSEE CONTACT FOR THIS LER (12)	
NAME Burton A. Grabo, Section Leader, Nuclear Regulatory Affairs	TELEPHONE NUMBER AREA CODE 6 0 2 3 9 3 - 6 4 9 2

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
E	B E	I S V	B 3 5 0	Y					

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 August 17, 1994, at approximately 1145 MST, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 88 percent power when Control Room personnel entered Technical Specification Limiting Condition for Operation (TS LCO) 3.6.2.1 following the failure of the Containment Spray (CS) pump mini-recirculation isolation valve (2JSIAUV664) to stroke closed. Control Room personnel reopened and successfully cycled the valve. Based on the valve's ability to successfully operate, at approximately 1154 MST, the Shift Supervisor (SS) exited TS LCO 3.6.2.1. On September 5, 1994, 2JSIAUV664 failed to stroke closed again. The valve was reworked and returned to service on September 7, 1994. A subsequent evaluation, performed in May 1995, determined that 2JSIAUV664 had been inoperable from August 17 to September 7, 1994. A TS violation occurred when Unit 2 did not comply with TS LCO 3.6.2.1 ACTION statement (i.e., restore CS to OPERABLE status within 72 hours).

The cause of the event was attributed to personnel error when the SS did not quarantine the valve and initiate an equipment root cause of failure immediately following the initial failure. As corrective action, procedures were revised to provide guidance on the proper actions to take in the event of motor operated valve failures.

There have been no previous similar events reported pursuant to 10CFR50.73.

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TEXT

1. REPORTING REQUIREMENT:

This LER 529/95-001-00 is being written to report a condition prohibited by the plant's Technical Specifications (TS) as specified in 10 CFR 50.73(a)(2)(i)(B).

Specifically, at approximately 1145 MST on August 17, 1994, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 88 percent power when Palo Verde Unit 2 Control Room personnel (utility, licensed) entered Technical Specification Limiting Condition for Operation (TS LCO) 3.6.2.1 following the failure of the Train A Containment Spray (BE)(CS) pump mini-recirculation isolation valve (2JSIAUV664) to stroke closed. Control Room personnel reopened and successfully cycled the valve. Based on the valve's ability to successfully operate, at approximately 1154 MST, the Shift Supervisor (SS) (utility, licensed) exited TS LCO 3.6.2.1. On September 5, 1994, 2JSIAUV664 failed to stroke closed again. The valve was reworked and returned to service on September 7, 1994. A subsequent evaluation, performed in May 1995, determined that 2JSIAUV664 had been inoperable from August 17 to September 7, 1994. A TS violation occurred when Unit 2 did not comply with TS LCO 3.6.2.1 ACTION statement (i.e., restore CS to OPERABLE status within 72 hours).

2. EVENT DESCRIPTION:

On August 17, 1994, Control Room personnel attempted to verify valve position on 2JSIAUV664, a motor operated valve (MOV) that is normally key-locked in the open position. The design function of the valve is to remain open to protect the CS pump from low flow conditions, and to close on a Recirculation Actuation Signal (RAS)(JE). When the Control Room operator attempted to stroke closed 2JSIAUV664, the valve failed to fully close as demonstrated by local indication at the valve and dual indication in the Control Room. At approximately 1145 MST, the SS declared Train A CS inoperable and entered the 72 hour ACTION statement for TS LCO 3.6.2.1. Control Room personnel then attempted to re-open the valve. On the third attempt, 2JSIAUV664 fully opened. After several minutes 2JSIAUV664 was again stroked closed and open, this time without incident. Based on the valve's ability to successfully operate, the SS considered the valve OPERABLE. At approximately 1154 MST, on August 17, 1994, the SS exited TS LCO 3.6.2.1 and declared Train A CS OPERABLE.

Subsequent to exiting the LCO, the SS requested the Shift Technical Advisor (STA) (utility, non-licensed) to contact APS Engineering personnel (utility, non-licensed) to discuss the OPERABILITY of 2JSIAUV664. APS Section XI Engineering and Valve Services personnel (utility, non-licensed) were contacted. The SS, STA, and APS Section XI Engineering

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TEXT personnel discussed the functional status of 2JSIAUV664 and concurred that the MOV was currently OPERABLE. 2JSIAUV664 was cycled several more times and tested in accordance with an approved Surveillance Test (ST) procedure 73ST-2XI03, "Section XI Valve Stroke Timing & Position Indication Verification...." 2JSIAUV664 met the ST acceptance criteria but fell within the "alert range" which required the valve to be tested on an increased frequency. When APS Valve Services personnel (responsible for MOV maintenance) were contacted, the valve was considered to be functioning properly, and the need to perform further evaluation or diagnostic testing was not recognized. The STA initiated a Condition Report/Disposition Request (CRDR) to determine why 2JSIAUV664 failed to stroke and to evaluate OPERABILITY prior to the initial failure.

Subsequent to the event, on August 31, 1994, a night order was issued alerting the Control Room personnel to problems experienced with the failure of 2JSIAUV664 to close on August 17, 1994. The night order provided guidance on addressing future MOV problems, specifically with regard to informing the proper organization (Valve Services) as soon as possible to evaluate operation of the MOV.

On September 5, 1994, 2JSIAUV664 failed to stroke closed during the performance of routine Section XI Inservice valve testing. The Unit 2 SS declared 2JSIAUV664 inoperable at 0253 MST, entered the ACTION statement for TS LCO 3.6.2.1, and quarantined the valve. In addition, APS Valve Services personnel were notified to assess the condition of the valve, and a troubleshooting work order was written. As-found running loads in the closed direction were found to be very high. The valve actuator was removed and the valve stem was thoroughly lubricated; however, the running load did not improve. The valve was repacked using graphite composite packing and satisfactorily retested. Failure of the valve to close was determined to be caused by excessive packing loads. On September 7, 1994, at 1113, 2JSIAUV664 was declared OPERABLE, and the SS exited the ACTION statement for TS LCO 3.6.2.1.

On November 11, 1994, the CRDR evaluation for the August 17 valve failure was completed; however, the OPERABILITY of the valve was not considered. On April 27, 1995, in response to the NRC resident's inquiries, another CRDR was initiated questioning the OPERABILITY of 2JSIAUV664 from August 17 through September 5, 1994. An investigation was conducted in accordance with the APS Corrective Action Program. A preliminary evaluation determined that 2SIAUV664 would not have stroked closed on a RAS between the August 17 and September 5 failures, and that 2JSIAUV664 should have remained inoperable on August 17 until the cause of the failure was known, and the valve was reworked and had successfully passed a valid retest. Therefore, a TS violation occurred when Unit 2 did not

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TEXT comply with TS LCO 3.6.2.1 ACTION statement (i.e., restore CS to OPERABLE status within 72 hours). The event was determined to be reportable on May 23, 1995, following a review of the interim evaluation.

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

Valve 2JSIAUV664 is a MOV that is normally key-locked in the open position. The design function of the valve is to remain open to protect the CS pump from low flow conditions, and to close on a RAS. Assuming that a large break loss of coolant accident occurred during the period from August 17, 1994 until September 5, 1994, and a downstream solenoid operated inlet valve to the Refueling Water Tank (RWT) (BQ) failed to close during a RAS, the potential existed to exceed 10CFR100 dose limits since an unanalyzed leak path exists from the containment (NH) recirculation sump to the RWT which is vented to the Fuel Building (ND) and eventually to atmosphere. A previously performed calculation concluded 10 percent of the 10CFR100 dose limit would be reached in 30 days with 43 gpm leaking into the RWT (approximately 1.8 million gallons). While Control Room personnel may not immediately have recognized the failure of 2JSIAUV664 to close on a RAS, Control Room indications available to the operator such as valve position indication, rising RWT levels, and Safety Equipment Actuation System (IB) alarms are available in the Control Room (NA). CS mini-flow rate to the RWT has been calculated to be 224 gpm with the valve fully open. Since Control Room personnel could realistically recognize and terminate the recirculation flow within 30 minutes (which equates to approximately 6720 gallons), the unanalyzed leak path is bounded (i.e., much less than 1.8 million gallons). The safety consequences and implications of this event are low.

The event did not result in any challenges to the fission product barriers or result in any releases of radioactive materials. This event did not adversely affect the safe operation of the plant or the health and safety of the public.

4. CAUSE OF THE EVENT:

An independent investigation of this event was conducted in accordance with the APS Corrective Action Program. Based on the results of the independent investigation, the cause of the TS violation was attributed to personnel error when the SS did not quarantine the valve and initiate an equipment root cause of failure immediately following the failure on August 17, 1994 (SALP Cause Code A: Personnel Error). Once the valve was reopened and the SS had some assurance that the valve would stroke if needed, the CS system was believed to be OPERABLE. Adequate consideration was not given to determining the cause of the initial failure.

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TEXT

APS Section XI Engineering personnel stroke time tested the affected valve after the valve had been successfully stroked. The investigation also determined that this act of "preconditioning" contributed to the event since Section XI testing was not capable of determining or verifying valve OPERABILITY once the valve had been preconditioned. Only diagnostic testing was capable of detecting the high packing load condition of the valve. When Valve Services was contacted, the valve was considered to be functioning properly, and the need to perform a diagnostic test was not recognized.

No unusual characteristics of the work location (e.g., noise, heat , poor lighting) directly contributed to this event. Although there were no procedural errors involved, an opportunity was missed to identify the inoperable valve because the Operability Determination procedure was not used.

5. STRUCTURE, SYSTEM, OR COMPONENT INFORMATION:

An independent investigation of this event was conducted in accordance with the APS Corrective Action Program. Based on the interim evaluation in the CRDR initiated on April 27, 1995, 2JSIAUV664 would not have been able to perform its safety function to automatically close on a RAS. Therefore, 2JSIAUV664 and the Train A CS System were inoperable after the initial failure at approximately 1145 MST on August 17, 1994 until 1113 MST on September 7, 1994 (20 days, 23 hours, and 28 minutes), when 2JSIAUV664 was reworked and successfully passed its post-maintenance retest.

2JSIAUV664 is a Borg Warner 2 inch globe valve, model number 77620, equipped with a Limitorque SMC-04 actuator.

On August 17, 1994, and September 5, 1994, 2JSIAUV664 failed to close from the Control Room. The cause of the failure was attributed to excessive packing loads caused by a degradation of the original packing. When the valve was repacked on September 7, 1994, ten braided packing rings and one lantern ring were removed from the valve. Prior to July 1, 1990, when the specification for the installation of valve stem packing was issued, packing leakage was controlled by adjusting valve packing gland nuts, adding an extra ring(s) of packing, or completely repacking the valve. The practice of adding additional packing is no longer acceptable. The current specification for the installation of valve stem packing specifies a standard 5-ring packing configuration.

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TEXT 2JSIAUV664 failed to close from the Control Room because the valve packing caused excessive frictional forces on the valve stem which resulted in high actuator running loads. The effect of 2JSIAUV664's failure to close would have prevented the valve from performing its safety function in the event of a RAS, therefore, causing the Train A CS system to be inoperable.

There were no safety system responses and none were necessary.

6. CORRECTIVE ACTIONS TO PREVENT RECURRENCE:

As stated previously, a night order was issued on August 31, 1994, alerting Control Room personnel to problems experienced with the failure of 2JSIAUV664 to close on August 17, 1994. The night order provided guidance on addressing future MOV problems, specifically with regard to informing the proper organization (Valve Services) as soon as possible to evaluate operation of the MOV. This guidance, which was appropriately followed by the SS on September 5, 1994 when the valve failed the second time, has been incorporated into an approved procedure.

As part of the April 27, 1995 CRDR, a transportability review was performed on the Generic Letter 89-10 MOVs with rising rotating stems equipped with Limitorque SMC-04 actuators. Diagnostic test data was reviewed on the MOVs that were not repacked since the specification for the installation of valve stem packing was issued. The valves identified as potential problems were evaluated for immediate operational concerns. No immediate operational concerns were identified. Work requests have been written to repack the affected MOVs at the next scheduled refueling outages.

7. PREVIOUS SIMILAR EVENTS:

There have been no previous similar events reported pursuant to 10CFR50.73 in the last three years attributed to personnel error on the part of Operations personnel for not quarantining degraded equipment and initiating an equipment root cause of failure immediately following the initial failure.

