

# PRIORITY 1

(ACCELERATED RIDS PROCESSING)

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9507110110      DOC.DATE: 95/07/06      NOTARIZED: NO      DOCKET #  
 FACIL:STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529 P  
 AUTH.NAME      AUTHOR AFFILIATION  
 GRABO,B.A.      Arizona Public Service Co. (formerly Arizona Nuclear Power R  
 LEVINE,J.M.      Arizona Public Service Co. (formerly Arizona Nuclear Power  
 RECIP.NAME      RECIPIENT AFFILIATION

SUBJECT: LER 95-003-00:on 950613,TS LCO 3.0.3 entered following loss  
 of both trains of essential CW sys & both hydrogen  
 recombiners.Caused by spurious actuations due to broken EDG  
 speed probe connector.Connector replaced.W/950706 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:Standardized plant.

05000529

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD4-2 PD	1 1	HOLIAN, B	1 1
	TRAN,L	1 1		
INTERNAL:	ACRS	1 1	AEOD/SPD/RAB	2 2
	AEOD/SPD/RRAB	1 1	<u>FILE CENTER</u>	1 1
	NRR/DE/ECGB	1 1	NRR/DE/EELB	1 1
	NRR/DE/EMEB	1 1	NRR/DISP/PIPB	1 1
	NRR/DOPS/OECB	1 1	NRR/DRCH/HHFB	1 1
	NRR/DRCH/HICB	1 1	NRR/DRCH/HOLB	1 1
	NRR/DSSA/SPLB	1 1	NRR/DSSA/SPSB/B	1 1
	NRR/DSSA/SRXB	1 1	RES/DSIR/EIB	1 1
	RGN4 FILE 01	1 1		
EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE,J H	2 2
	NOAC MURPHY,G.A	1 1	NOAC POORE,W.	1 1
	NRC PDR	1 1	NUDOCS FULL TXT	1 1

**NOTE TO ALL "RIDS" RECIPIENTS:**

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL  
 DESK, ROOM OWFN 5D8 (415-2083) TO ELIMINATE YOUR NAME FROM  
 DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED  
 TOTAL NUMBER OF COPIES REQUIRED: LTTR 28 ENCL 28

A0-4



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

192-00939-JML/BAG/KR  
July 6, 1995

JAMES M. LEVINE  
VICE PRESIDENT  
NUCLEAR PRODUCTION

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Station P1-37  
Washington, DC 20555-0001

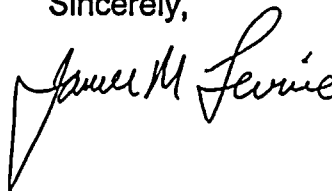
Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 2  
Docket No. STN 50-529 (License No. NPF-51)  
Licensee Event Report 95-003-00**

Attached please find Licensee Event Report (LER) 95-003-00 prepared and submitted pursuant to 10CFR50.73. This LER reports an entry into Technical Specification Limiting Condition for Operation (TS LCO) 3.0.3 following the loss of both trains of essential cooling water system and both hydrogen recombiners.

In accordance with 10CFR50.73(d), a copy of this LER is being forwarded to the Regional Administrator, NRC Region IV. If you have any questions, please contact Burton A. Grabo, Section Leader, Nuclear Regulatory Affairs, at (602) 393-6492.

Sincerely,



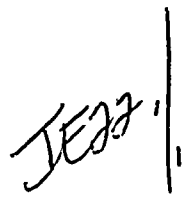
JML/BAG/KR/pv

Attachment

cc: L. J. Callan (all with attachment)  
K. E. Perkins  
K. E. Johnston  
INPO Records Center

110071

9507110110 950706  
PDR ADOCK 05000529  
S PDR





# LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>Palo Verde Unit 2</b>	DOCKET NUMBER (2) <b>05000529</b>	PAGE (3) <b>1 OF 6</b>
-----------------------------------------------	--------------------------------------	---------------------------

TITLE (4)  
**TS 3.0.3 For Loss of Both Trains of Essential Cooling Water and Hydrogen Recombiners**

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
06	13	95	95	003	00	07	06	95	N/A	
									N/A	

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10) <b>100</b>	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)	X	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)(v)	

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>Burton A. Grabo, Section Leader, Nuclear Regulatory Affairs</b>	TELEPHONE NUMBER AREA CODE <b>602 393 - 6492</b>
----------------------------------------------------------------------------	--------------------------------------------------------

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
<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 June 13, 1995, at approximately 1119 MST, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 100 percent power when Control Room personnel entered Technical Specification Limiting Condition for Operation (TS LCO) 3.0.3 following the loss of both trains of essential cooling water system (EW) and both hydrogen recombiners (H2R). Train A EW and supported systems/components were inoperable for preventative maintenance and Train A H2R was inoperable for calibration and functional testing, when the Train B emergency diesel generator (EDG-B) was declared inoperable following spurious actuations of support systems. Since the redundant Train A support system and supported systems/components were inoperable, Train B EW and supported systems/components and Train B H2R were also considered inoperable (cascading TS) and TS LCO 3.0.3 was entered. At approximately 1151 MST, Train A EW was returned to service, and at approximately 1333 MST, Train A H2R was returned to service and TS LCO 3.0.3 was exited.

The cause of the spurious actuations of EDG-B support systems was attributed to a broken EDG speed probe amphenol cable connector. As corrective action, the connector was replaced.

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



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 2		YEAR	SEQUENTIAL NUMBER	REVISO NUMBER			
		9   5   -	0   0   3	-   0   0	0   2	of	0   6

TEXT

**1. REPORTING REQUIREMENT:**

This LER 529/95-003-00 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 1119 MST on June 13, 1995, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 100 percent power when Control Room personnel (utility, licensed) entered Technical Specification Limiting Condition for Operation (TS LCO) 3.0.3 following the loss of both trains of essential cooling water system (EW) (BI) and both hydrogen recombiners (H2R) (BB). Train A EW and supported systems/components were inoperable for preventative maintenance and Train A H2R was inoperable for calibration and functional testing, when the Train B emergency diesel generator (EDG-B) (EK) was declared inoperable following spurious actuations of support systems. Since the redundant Train A support system and supported systems/components were inoperable, Train B EW and supported systems/components and Train B H2R were also considered inoperable (cascading TS), and TS LCO 3.0.3 was entered.

**2. EVENT DESCRIPTION:**

Prior to the event, at approximately 1002 MST on June 12, 1995, the Train A H2R was declared inoperable for calibration and functional testing and Control Room personnel entered the TS LCO 3.6.4.2 ACTION statement. At approximately 0811 MST on June 13, 1995, the Train A EW pump was declared inoperable for preventative maintenance and Control Room personnel entered TS LCO 3.7.3 ACTION statement. Control Room personnel declared the following EW supported systems/components inoperable and entered the corresponding TS LCO ACTION statements:

- Emergency Core Cooling System (ECCS) (BP/BQ), TS LCO 3.5.2;
- Containment Spray System (CSS) (BE), TS LCO 3.6.2.1;
- Auxiliary Feedwater System (AFWS) (BA), TS LCO 3.7.1.2;
- Essential Chilled Water System (EC) (KM), TS LCO 3.7.6;
- Control Room Essential Filtration System (CREFS) (VI), TS LCO 3.7.7;
- and Shutdown Cooling System (SDC) (BP), TS LCO 3.7.11.

In accordance with TS LCO 3.7.6 ACTION b, (1.) the normal HVAC system (VI) was verified to be providing space cooling to the vital power distribution (EJ) rooms that depend on EC for space cooling; (2.) safe shutdown systems [one train each for boration, pressurizer heaters (AB), and AFWS] which do not depend on the inoperable EC were determined to be operable; and (3.) all required systems/components that depend on the remaining operable Train B EC for space cooling were determined to be operable.





# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME  Palo Verde Unit 2	DOCKET NUMBER  0 5 0 0 0 5 2 9		LER NUMBER			PAGE		
			YEAR	SEQUENTIAL NUMBER	REVISIO NUMBER			
			9 5	- 0 0 3	- 0 0			
				0 3	of		0 6	

TEXT

At approximately 1119 MST on June 13, 1995, Control Room personnel received several alarms associated with EDG-B. These included an EDG-B status trip alarm, an EDG-B high priority trouble alarm on failure turbo thrust bearing, a Train B load sequencer mode change alarm, and finally an EDG-B low priority trouble alarm on starting air low pressure or system malfunction. Another EDG-B low priority trouble alarm on jacket water high temperature occurred shortly after the initial alarms. The load sequencer mode change alarm indicated that a normal EDG-B run was in progress. As a result, the sequencer attempted to start selected EDG support equipment, specifically, the EDG-B essential exhaust fan (VJ) and the Train B essential spray pond (ESP) (BS) pump. EDG-B remained in standby condition available to start in emergency mode.

Control Room personnel entered TS LCO 3.8.1.1 ACTION b for one inoperable EDG (EDG-B) and TS LCO 3.3.3.5 for inoperable EDG-B remote shutdown system (IU) monitoring instrumentation channels. Train A EW and supported systems/components and Train A H2R were already inoperable when the Train B emergency diesel generator (EDG-B) was declared inoperable following the spurious actuations. Since the redundant Train A EW and supported systems/components and Train B H2R were inoperable, Train B EW and supported systems/components and Train B H2R were also considered inoperable (cascading TS), and a TS LCO 3.0.3 condition was entered.

At approximately 1151 MST, Train A EW was returned to service without performing the maintenance activities. The following TS LCO ACTION statements were exited: TS LCO 3.5.2 (ECCS), TS LCO 3.6.2.1 (CS), TS LCO 3.7.1.2 ACTION a and b (AFWS), TS LCO 3.7.3 (EW), TS LCO 3.7.6 (EC), TS LCO 3.7.7 (CREFS), and TS LCO 3.7.11 (SDC). The unit remained in TS LCO 3.0.3 for both trains of H2R inoperable.

At approximately 1217 MST, the TS LCO 3.8.1.1 1-hour ACTION requirement to demonstrate the operability of the remaining AC offsite sources was met. At approximately 1333 MST, Unit 1 Control Room personnel restored the Train A H2R to service and Unit 2 Control Room personnel exited TS LCOs 3.6.4.2 and 3.0.3.

Troubleshooting was initiated in accordance with an approved work document. During an inspection of the EDG-B speed probe, an amphenol cable connector to flexible conduit was found to be broken. In addition, the bottom part of the amphenol cable connector going to the speed probe was found to be loose. The broken amphenol cable connector resulted in erroneous signals to be input to the EDG engine speed sensing control. The speed sensing control reacted to the erroneous speed probe input signal and output a "NORMAL EDG RUN" signal to the load sequencer that EDG-B had reached greater than 280 rpm. The load sequencer output



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 2		YEAR	SEQUENTIAL NUMBER	REVISIO NUMBER			
		9 5	- 0 0 3	- 0 0	0 4	of	0 6

TEXT      electrical start signals to the EDG-B essential exhaust fan and the Train B ESP pump. The speed sensing control output signal also released interlocks in the EDG control circuitry which resulted in the high and low priority trouble alarms in the Control Room because EDG-B was not actually running at the time. The damaged speed probe amphenol cable connector was replaced and the connection going to the speed probe was tightened under the direction of an approved work document.

At approximately 0145 MST on June 14, 1995, Control Room personnel declared EDG-B operable and exited TS LCO 3.8.1.1 ACTION b and TS LCO 3.3.3.5 following the satisfactory completion of the EDG-B surveillance requirement. At approximately 0830 MST, the surveillance requirement for EDG-A to verify operability was satisfactorily completed.

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

With the exception of the Train A H2R, the Train A EW and supported systems/components were restored to service within approximately 32 minutes. The preventative maintenance work on the Train A EW pump had not begun; only the power supply was removed. EDG-B remained in standby condition available to start in emergency mode. No conditions were found during troubleshooting that would have prevented the EDG from performing its intended safety function for emergency mode operations. The EDG engine controls have redundant speed sensing controls and only one probe is required to perform the required functions needed to support the EDG functions during emergency operations

NUREG 1432, "Standard Technical Specifications Combustion Engineering Plants," April 1995, LCO 3.8.1 ACTION B would have allowed for 4 hours prior to declaring the required features supported by the inoperable EDG inoperable when its redundant required feature(s) is inoperable. This ACTION is intended to provide assurance that a loss of offsite power during the period that an EDG is inoperable, does not result in a complete loss of safety function of redundant required features. 4 hours from the discovery of these events existing concurrently is acceptable because it minimizes the risk while allowing time for restoration before subjecting the unit to transients associated with shutdown. The remaining OPERABLE EDG and offsite circuits are adequate to supply electrical power to onsite Class 1E power distribution systems. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour completion time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour completion time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repair, and the low probability of a design



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 2		YEAR	SEQUENTIAL NUMBER	REVISIO NUMBER			
		0 5 0 0 0 5 2 9	9 5 - 0 0 3 - 0 0	0 5	of	0 6	

TEXT basis accident occurring during this period. The Train A system and components were only inoperable for approximately 32 minutes. Therefore, there were no adverse safety consequences or implications as a result of this event. 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:

The TS LCO 3.0.3 entries were attributed to required redundant equipment being inoperable on Train A when EDG-B was declared inoperable following the spurious actuations of the EDG-B essential exhaust fan and the Train B ESP pump.

An independent investigation of this event was conducted in accordance with the APS Corrective Action Program. As part of the investigation, a root cause of failure analysis of the broken amphenol cable connection will be performed by APS Engineering personnel. The amphenol cable connector is currently protected by a steel step platform. The flexible cable leading to the connection is partially exposed and unprotected if personnel miss the steel step platform. The connector was most likely damaged by stepping off of the protective steel platform onto the flexible cable. A preliminary evaluation has determined that the apparent failure mechanism is attributed to inattention to detail during maintenance, operations, or engineering activities (SALP Cause Code A: Personnel Error). If the evaluation results differ from this determination, a supplement to this report will be submitted to describe the final root cause of failure.

No unusual characteristics of the work location (e.g., noise, heat , poor lighting) directly contributed to this event. There were no procedural errors which contributed to this event.

5. STRUCTURE, SYSTEM, OR COMPONENT INFORMATION:

The broken amphenol cable connector, which was discovered during troubleshooting, rendered the EDG-B engine speed probe inoperable. EDG-B was declared inoperable at approximately 1119 MST on June 13, 1995 following the spurious actuations of the EDG-B essential exhaust fan and the Train B ESP pump. EDG-B was returned to service at approximately 0145 MST on June 14, 1995. EDG-B was out of service for approximately 14 hours and 26 minutes.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 2		YEAR	SEQUENTIAL NUMBER	REVISIO NUMBER			
		9   5   -	0   0   3	-   0   0	0   6	of	0   6

TEXT

Other than the spurious actuation of the EDG-B essential exhaust fan and the Train B ESP pump, there were no other safety system responses and none were necessary. No failures of components with multiple functions were involved.

The amphenol cable connector is supplied by Cooper Energy Services. The model number is MS3108A-10SL-4S.

**6. CORRECTIVE ACTIONS TO PREVENT RECURRENCE:**

The remaining speed probes in all three units were visually inspected and no anomalies were found.

No corrective actions to prevent recurrence have been identified. The amphenol cable connection is currently protected by a steel step platform. Although the flexible cable leading to the connection is partially exposed and unprotected if personnel miss the steel step platform, since Unit 2 commercial operation began in September 1986, no similar failure has occurred in Unit 2 causing the speed probe to be inoperable. A search of work history has identified two times in Unit 3 (EDG-B) when broken amphenol cable connectors had been replaced (August 1987 and October 1992). However, these events in Unit 3 did not result in erroneous signals to be input to the EDG engine speed sensing control and subsequent spurious actuations of support systems. The investigation determined that a design modification providing additional protection was not warranted.

**7. PREVIOUS SIMILAR EVENTS:**

There have been no previous similar events reported pursuant to 10CFR50.73 in the last three years.

