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 FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
 AUTH.NAME AUTHOR AFFILIATION
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 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-020-01:on 870416,inadvertent ESF actuation occurred.
 Caused by parity error on byte of data between
 microprocessor & remote indication controller.Mod to install
 time delay relays developed.W/930722 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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05000528

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	NRR/DSSA/SRXB		1	1		REG FILE 02		1	1	
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EXTERNAL:	EG&G BRYCE,J.H		2	2		L ST LOBBY WARD		1	1	
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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

192-00853-JML/TRB/RJR
July 22, 1993

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 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 87-020-01
File: 93-020-404

Attached please find Licensee Event Report (LER) 87-020-01 prepared and submitted pursuant to 10CFR50.73. This LER supplemental report changes previously identified corrective action. In accordance with 10CFR50.73(d), a copy of this LER is being forwarded to the Regional Administrator, NRC Region V.

If you have any questions, please contact Thomas R. Bradish, Manager, Nuclear Regulatory Affairs, at (602) 393-5421.

Sincerely,



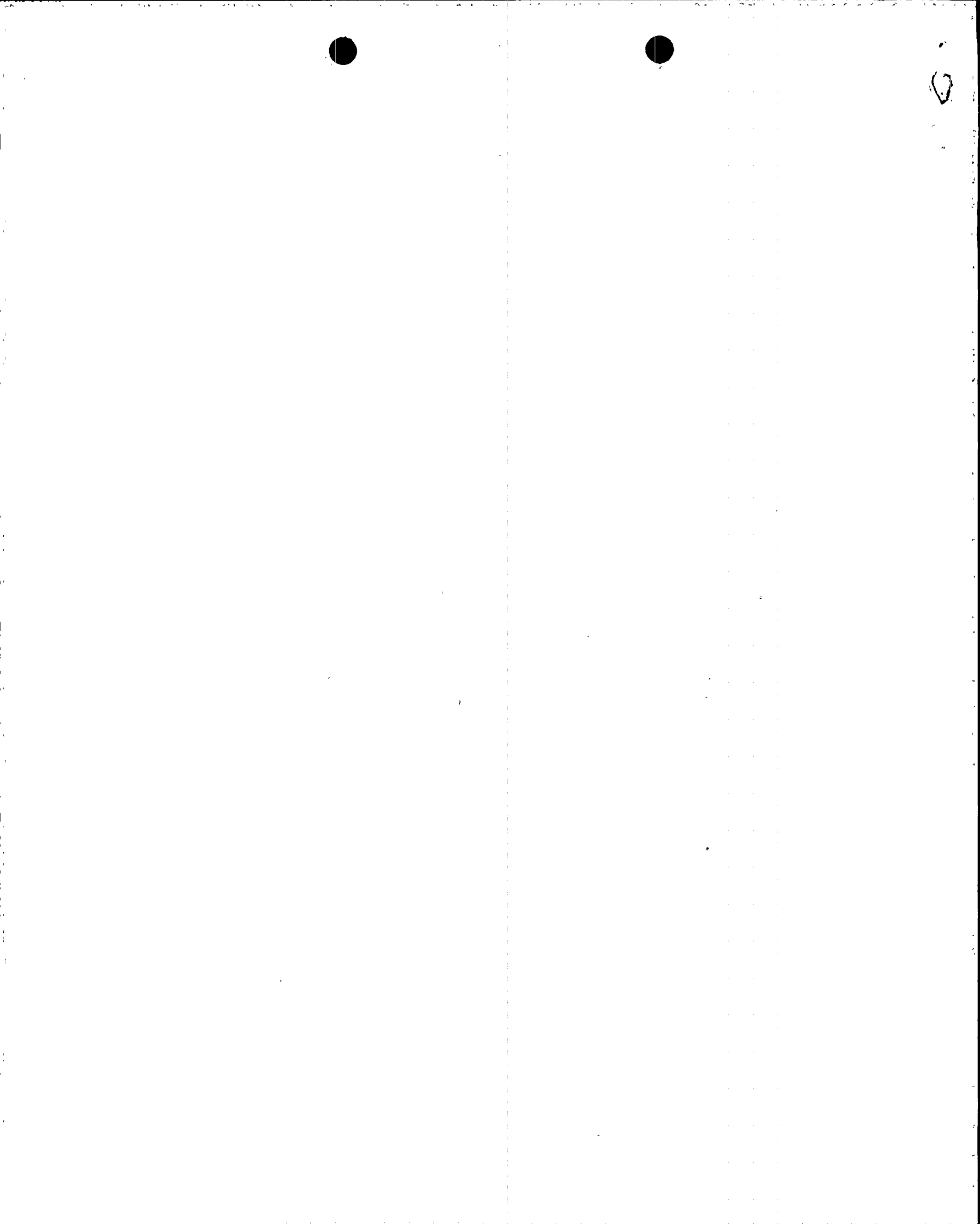
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Attachment

cc: W. F. Conway (all with attachment)
B. H. Faulkenberry
J. A. Sloan
INPO Records Center

9308040024 930722
PDR ADDCK 05000528
S PDR





LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palo Verde Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 5 2 8	PAGE (3) 1 OF 0 4
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TITLE (4)
Inadvertent Engineered Safety Features Actuation Due to Spurious Equipment Operation

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 6	8 7	8 7	0 2 0	0 1	0 7	2 2	9 3	N/A		0 5 0 0 0	
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0			20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			73.71(b)
			20.405(a)(1)(i)			50.36(c)(1)			<input type="checkbox"/> 50.73(a)(2)(v)			73.71(c)
			20.405(a)(1)(ii)			50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(vi)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)
			20.405(a)(1)(iii)			50.73(a)(2)(i)			<input type="checkbox"/> 50.73(a)(2)(vii)(A)			
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(vii)(B)			
			20.405(a)(1)(v)			50.73(a)(2)(iii)			<input type="checkbox"/> 50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME Thomas R. Bradish, Manager, Nuclear Regulatory Affairs	TELEPHONE NUMBER 6 0 2 3 9 3 - 5 4 2 1
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

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)

At approximately 1356 MST on April 16, 1987, Palo Verde Unit 1 was in Mode 1 (POWER OPERATION) at 100 percent power when a Train "B" Fuel Building Essential Ventilation Actuation Signal (FBEVAS) was received on the Balance of Plant Engineered Safety Features Actuation System (BOP ESFAS) due to a digital communication malfunction. This resulted in the designed cross trips to Train "A" FBEVAS and Train "A" and "B" Control Room Essential Filtration Actuation Signal on the BOP ESFAS. These represented automatic actuations of Engineered Safety Features (ESF).

The root cause of the event has been attributed to a parity error on a byte of data between the microprocessor and the remote indication controller causing a trip signal to be present for one second. Previously, corrective action consisted of developing a modification to install time delay relays in the circuitry to the BOP ESFAS input to eliminate the possibility of similar, short, spurious spikes causing ESF actuations. The modification to the BOP ESFAS circuitry is no longer required and has been cancelled.

This LER also contains a Special Report that is being submitted pursuant to Technical Specification (T.S.) 3.3.3.9 ACTION 42 and T.S. 6.9.2 for a Radiation Monitor that has been inoperable for greater than 72 hours.

No similar events have been reported.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Palo Verde Unit 1	05000528	87	020	01	02	OF 04

TEXT

At approximately 1356 MST on April 16, 1987, Palo Verde Unit 1 was in Mode 1 (POWER OPERATION) at 100 percent power when a Train "B" Fuel Building Essential Ventilation Actuation Signal (FBEVAS)(VG) was received on the Balance of Plant Engineered Safety Features Actuation System (BOP ESFAS)(JE). This resulted in the designed cross trips to Train "A" FBEVAS and Train "A" and "B" of the Control Room Essential Filtration Actuation Signal (CREFAS)(VI) on the BOP ESFAS. These represented automatic actuations of Engineered Safety Features (ESF)(JE).

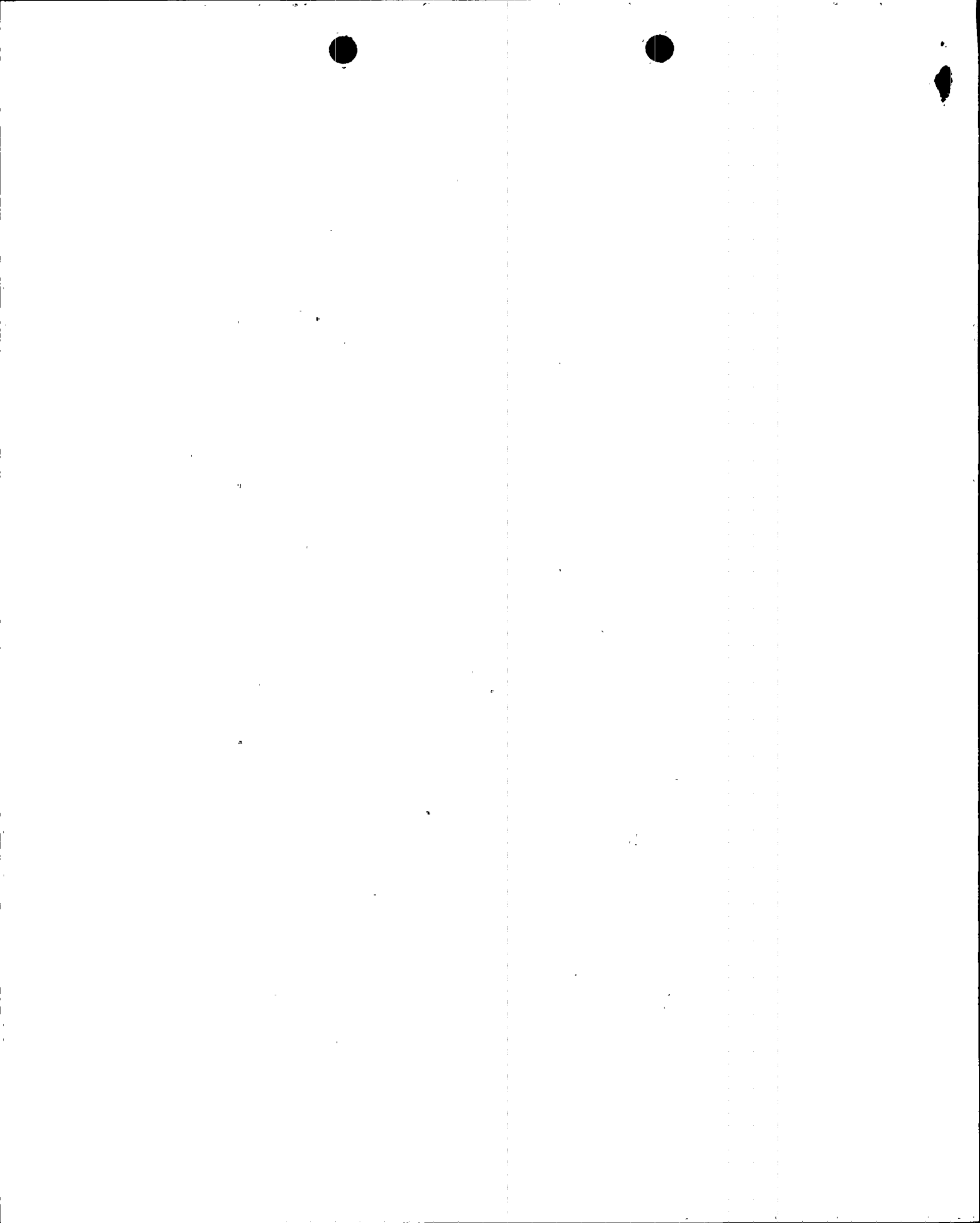
All safety equipment operated as designed with the exception of essential cooling water pump "A" (BJ,P). The pump was started manually by control room operators (utility-licensed). The actuations were annunciated (ANN) and responded to by utility-licensed operators in the control room. All actuated equipment was restored to normal operating status and the BOP ESFAS was reset at approximately 1457. The duration of the event was approximately 1 hour.

A review of the Radiation Monitoring System (RMS)(IL) alarm (ALM) typer data revealed that the FBEVAS trip signal did not originate from the low range Fuel Building (ND) Vent Exhaust Monitor (RU-145)(IL). A gas grab sample taken in the vicinity of RU-145 verified that there were no unusually high radiation levels present which would have caused the actuation. The Shift Supervisor (utility-licensed) informed the RMS system engineer (contractor non-licensed) that he witnessed the remote indication controller (RIC) for RU-145 cycle from approximately E-7 microcuries per cubic centimeter (cc) to E-2 microcuries/cc and back to E-7 microcuries/cc in approximately 1 second. This occurred 2 or 3 times approximately 4 minutes after the ESF actuation. The HIGH, ALERT and RATE alarm lights also cycled on and off during this evolution. In the event of a valid alarm signal, these lights are designed to lock in.

A spike from 1E-7 microcuries/cc to 1E-2 microcuries/cc is an acceptable result for the monitor algorithm to process. However, the algorithm does not support a return from 1E-2 microcuries/cc to 1E-7 microcuries/cc within 1 second. Testing conducted under an authorized work document involved simulating a high count rate at the detector (DET) by utilizing the installed check source. These tests verified that all alarms locked in and that it took in excess of 1 minute for the count rate to decay to 1E-7 microcuries/cc.

A review conducted by the Computer Group of the communications from the microprocessor (CPU) to the RIC determined that the cause of the FBEVAS was a parity error on a byte of data causing the counter to reset and establish a new set of sequencing data for the RIC display. This is the first time this situation has occurred.

Previously, corrective action consisted of developing a modification to install time delay relays (RLY) into the circuitry to the BOP ESFAS input to eliminate the possibility of ESF actuations due to 1 or 2 second spikes. On May 25, 1993, the Plant Modifications Committee cancelled the implementation of Design Change Package 89-13-SQ-024 since a dedicated RMS group was



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 1		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
	05000528	87	020	01	03	OF	04

TEXT

developed and has been responsible for maintaining the various RMS components. This has significantly reduced the number of spurious actuations and the modification to the BOP ESFAS circuitry is no longer required.

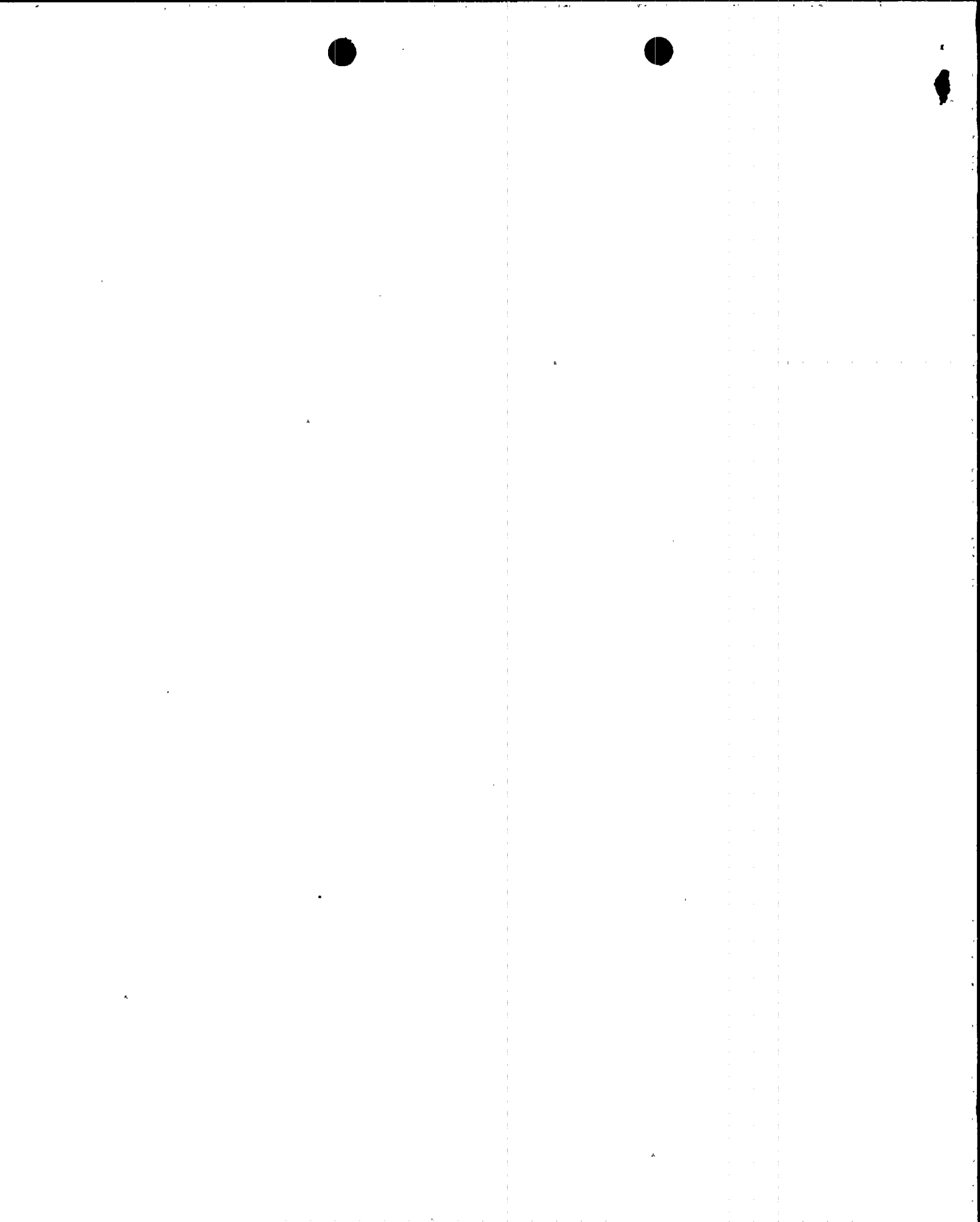
A root cause of failure investigation was also conducted to determine the cause of essential cooling water pump "A" not automatically starting. This investigation revealed that a breaker alignment pin on essential cooling water pump "A" start breaker 1EPBAS03M (bkr) was binding on the breaker frame. It cannot be determined why the pin was misaligned. The breaker pin was realigned and the breaker was cycled to ensure that it was operating properly. Additionally, the override relay (RLY) that permits manual operation of the pump was serviced and cleaned. Following corrective maintenance essential cooling water pump "A" was successfully started by the automatic start circuitry by simulating and ESF actuation.

Similar events involving an ESF actuation and essential cooling water pump "A" not automatically starting were reported in Unit 1 (Docket No. STN 50-528) LER 86-014-01 and LER 86-037-01. The events have not occurred on Unit 1 Train "B" or either train in Units 2 and 3. This indicates that this occurrence is isolated to Unit 1 Train "A". In LER 87-014-01, it was determined that the most likely cause of essential cooling water pump "A" not automatically starting was dirty contacts in the override relay. A subsequent event reported in LER 86-037-01 could not identify the cause of the pump not starting. In both events, the breaker was inspected and no problems were identified. Therefore, it is believed that the alignment pin discovered in this event is not related to the previous events.

This LER also contains a Special Report which is being submitted pursuant to Technical Specification (T.S.) 3.3.3.9 ACTION 42b and T.S. 6.9.2 to report an event in which a high range noble gas activity monitor (RU-146) was inoperable for greater than 72 hours. The 72 hour limit for operability was exceeded at approximately 1356 MST on April 19, 1987. Pursuant to T.S. 3.3.3.9 ACTION 42a the Preplanned Alternate Sampling Program was initiated to monitor the plant ventilation system.

Monitors RU-145 and RU-146 monitor the fuel building ventilation exhaust for release of activity due to a fuel handling accident. Monitor RU-145 performs the safety function of isolating the normal ventilation system initiating a FBEVAS signal on a HIGH-HIGH activity alarm. Monitors RU-145 and RU-146 work as a pair with RU-145 being the low range monitor and RU-146 being the high range monitor. Normal configuration consist of RU-145 operating and RU-146 in standby. When RU-145 reaches it's maximum range, RU-146 starts and RU-145 goes to standby.

Since RU-145 and RU-146 work in tandem, both monitors must be declared inoperable if the other malfunctions. The cause of the RU-145 malfunction, as discussed above, has been attributed to a parity error on a byte of data. This caused the counter to reset and establish a new set of sequencing data



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE		
Palo Verde Unit 1		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		87	020	01	04	OF	04

TEXT

for the RIC display and would account for the cyclic behavior described by the Shift Supervisor.

As described above, a modification is being developed to install time delay relays into the circuitry to the BOP ESFAS input to eliminate the possibility of ESF actuations due to spurious spikes. RU-145 and RU-146 are expected to be returned to service by June 15, 1987.

Operator (utility-licensed) actions during this event were proper and in accordance with approved procedures. No inoperable systems, structures or components contributed to the event. No unusual characteristics of the work location contributed to this event.

Since an actual emergency condition did not exist at the time of the event, as verified by the negative results obtained from the gas grab sample taken in the vicinity of RU-145 there was no threat to the safe operation of the plant or the health and safety of the public.

Although events involving spurious ESF actuations have been reported, none of these events were attributed to the same root cause.

