

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9108120240      DOC. DATE: 91/07/31      NOTARIZED: NO      DOCKET #  
 FACIL: STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi      05000530  
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 BRADISH, T.R.      Arizona Public Service Co. (formerly Arizona Nuclear Power  
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 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 91-004-00: on 910713, spurious Train A containment purge  
 isolation actuation signal initiated on balance-of-plant  
 ESFAS, resulting in spike of monitor RU-37. Caused by failure  
 of detector tube. Technicians briefed. W/910731 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. 05000530

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	RES/DSIR/EIB	1				1	RGNS <del>FILE</del> 01	1				1
EXTERNAL:	EG&G BRYCE, J.H	3				3	L ST LOBBY WARD	1				1
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Arizona Public Service Company  
PALO VERDE NUCLEAR GENERATING STATION  
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JAMES M. LEVINE  
VICE PRESIDENT  
NUCLEAR PRODUCTION

192-00734-JML/TRB/KR  
July 31, 1991

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 3  
Docket No. STN 50-530 (License No. NPF-74)  
Licensee Event Report 91-004-00  
File: 91-020-404

Attached please find Licensee Event Report (LER) No. 91-004-00 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 T. R. Bradish, Compliance Manager at (602) 393-2521.

Very truly yours,

*James M. Levine*

JML/TRB/KR/nk

Attachment

cc: W. F. Conway (all with attachment)  
J. B. Martin  
D. H. Coe  
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A. H. Gutterman  
INPO Records Center

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LICENSEE EVENT REPORT (LER)

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TITLE  
ESF Actuation Due to Radiation Monitor Failure

EVENT DATE			LER NUMBER			REPORT DATE			OTHER FACILITIES INVOLVED			
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(S)
0   7   1   3   9   1	9   1	1	0   0   4	0	0	0   7   3   1   9   1			N/A	0   5   0   0   0		
									N/A	0   5   0   0   0		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following)

OPERATING MODE 1	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
POWER LEVEL 1   0   0	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text)
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(viii)	

LICENSEE CONTACT FOR THIS LER

NAME Thomas R. Bradish, Compliance Manager		TELEPHONE NUMBER 6   0   2   3   9   3 -   2   5   2   1	
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	I	L	R	I	X	9	9	9	NO

SUPPLEMENTAL REPORT EXPECTED

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines)

On July 13, 1991, at approximately 2329 MST, Palo Verde Unit 3 was in Mode 1 (POWER OPERATION) at approximately 100 percent power, when a spurious Train A Containment Purge Isolation Actuation Signal (CPIAS) was initiated on the Balance of Plant Engineered Safety Features Actuation System. The Train A CPIAS resulted in the designed cross trips of Train B CPIAS and Train A and B Control Room Essential Filtration Actuation Signals (CREFAS). The actuations occurred when the Train A Power Access Purge Area Radiation Monitor (RU-37) spiked above its high alarm/trip setpoint. At the time of the event, no containment purge was in progress and the Containment Purge System isolation valves were closed. All components operated as designed. Control Room and Radiation Protection personnel verified that normal radiation levels existed in the area monitored by RU-37.

The cause of the RU-37 spiking above its high alarm/trip setpoint was a premature failure of the detector's Geiger-Mueller tube resulting from a dent on the tube's sidewall. Technicians were briefed on the importance of ensuring that replacement Geiger-Mueller tubes have no signs of physical damage prior to installation in the radiation monitor's detector assembly.

There have been no previous similar events reported pursuant to 10CFR50.73 which resulted from a damaged Geiger-Mueller tube.



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TEXT

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On July 13, 1991, at 2329 MST, Palo Verde Unit 3 was in Mode 1 (POWER OPERATION) at approximately 100 percent power.

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

Event Classification: An event or condition that resulted in an Engineered Safety Feature (ESF)(JE) actuation.

At approximately 2329 MST, on July 13, 1991, a spurious Train A Containment Purge Isolation Actuation Signal (CPIAS) (VA)(JE) was initiated on the Balance of Plant Engineered Safety Features Actuation System (BOP ESFAS) (JE). The Train A CPIAS resulted in the designed cross trips of Train B CPIAS and Trains A and B Control Room Essential Filtration Actuation Signals (CREFAS) (VI). The actuations occurred when the Train A Power Access Purge Area Radiation Monitor (RU-37) (VA)(IL)(RI) spiked above its high alarm/trip setpoint. At the time of this event, no Containment (NH) purge was in progress and all Containment Purge System isolation valves (VA)(ISV) were closed. All components in the Control Room Essential Filtration System (VI) responded properly to the CREFAS. Control Room personnel (utility, licensed) verified that radiation monitors adjacent to RU-37 were indicating normal radiation levels. Radiation Protection personnel (utility, non-licensed) verified that normal radiation levels existed in the area monitored by RU-37 and in the Plant Vent (VL) exhaust.

The BOP ESFAS actuations resulted in close signals being sent to Trains A and B Containment Purge System isolation valves and resulted in the actuation of Trains A and B Control Room Essential Ventilation System (VI), Trains A and B Essential Chilled Water System (KM), Trains A and B Essential Cooling Water System (BI), and Trains A and B Essential Spray Pond System (BS). All components operated as designed.

The BOP ESFAS actuations were identified by Control Room personnel as a result of main control board annunciators (ANN)(MCBD). There were no operator actions which contributed to the cause of the event. No other ESF actuations occurred and none were required. Unit 3 personnel (utility, licensed and non-licensed) verified that the ESF actuations did not occur as a result of high radiation levels in the Containment Purge System.



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At approximately 2333 MST, on July 13, 1991, Train A CPIAS was placed in bypass for troubleshooting and the remaining actuated equipment was secured, reset and returned to normal service.

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

Not applicable - no structures, systems, or components were inoperable at the start of the event which contributed to this event.

- D. Cause of each component or system failure, if known:

The ESF actuations described in Section I.B were caused by the Train A Power Access Purge Area Radiation Monitor (RU-37) spiking above its high alarm/trip setpoint. Troubleshooting performed in accordance with an approved work authorization document and an engineering root cause of failure investigation determined that the cause of the RU-37 spiking was a premature failure of the detector's Geiger-Mueller tube resulting from a small dent on the tube's sidewall. The cause of the dent could not be determined. This was a new Geiger-Mueller tube that had been in service approximately four weeks at the time of the event.

The detector channel and the detector assembly were inspected for physical causes of failure (e.g., loose connections, corrosion, bent pins). During the inspection, a damaged Geiger-Mueller tube was found. The tube had a dent in its sidewall near the center. During testing, the detector indicated detector saturation failure. The dented Geiger-Mueller tube was tested in a known good detector assembly and detector saturation recurred.

The dent could lead to insufficient clearance between the tube's sidewall and the anode necessary to permit proper tube quenching. Geiger-Mueller tubes with this type of damage may appear to operate normally for a short period of time.

- E. Failure mode, mechanism, and effect of each failed component, if known:

The detector's damaged Geiger-Mueller tube resulted in the output of RU-37 spiking high. The spike was above the high alarm/trip setpoint for actuating a Train A CPIAS and subsequent actuation signals as described in Section I.B.



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TEXT

- F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:

Not applicable - the Train A Power Access Purge Area Radiation Monitor (RU-37) does not have multiple functions.

- G. For a failure that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the train was returned to service:

Not applicable - the malfunction in the Train A Power Access Purge Area Radiation Monitor (RU-37) did not render a train of a safety system inoperable.

RU-37 was declared inoperable at approximately 2329 MST, on July 13, 1991 when the actuation was determined to be spurious. Following replacement of the detector assembly, retest, and evaluation to ensure that there were no other problems, RU-37 was returned to service at approximately 0135 MST, on July 26, 1991. RU-37 was inoperable approximately 12 days and 2 hours. Delays occurred while obtaining necessary components.

- H. Method of discovery of each component or system failure or procedural error:

The damaged Geiger-Mueller tube was discovered during troubleshooting performed in accordance with an approved work authorization document and an engineering root cause of failure investigation. There were no procedural errors identified.

- I. Cause of Event:

The cause of the event was a premature failure of the detector's Geiger-Mueller tube as described in Section I.D (SALP Cause Code E: Component Failure). No unusual characteristics of the work location (e.g., noise, heat, poor lighting) contributed to this event. The event was not a result of personnel errors or procedural errors. However, two contributing factors were identified in the root cause of failure evaluation:

1. Radiation Monitoring System Maintenance technicians were unaware that minor denting of the Geiger-Mueller tube could lead to detector failure, and
2. Precautionary statements were not included in work documents to ensure that replacement Geiger-Mueller tubes were not damaged prior to installation in the detectors.



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TEXT

J. Safety System Response:

The following safety system responses occurred:

- Containment Purge Isolation System, Trains A and B,
- Control Room Essential Ventilation (VI), Trains A and B,
- Essential Chilled Water System (KM), Trains A and B,
- Essential Cooling Water System (BI), Trains A and B, and
- Essential Spray Pond System (BS), Trains A and B.

K. Failed Component Information:

The failed component is a Geiger-Mueller tube, Model 713, manufactured by LND, Inc.

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

Trains A and B Power Access Purge Area Radiation Monitors (RU-37 and RU-38) are located outside Containment near the power access purge exhaust ducts (VA) (DUCT) and the refueling purge exhaust ducts. RU-37 and RU-38 monitor the purge exhaust ducts for airborne radioactivity concentrations that could potentially result in off-site doses exceeding 10CFR100 limits. RU-37 and RU-38 perform the safety function of monitoring purge exhaust and, if necessary, initiating a high dose rate alarm initiation signal to BOP ESFAS. BOP ESFAS performs the safety function of shutting the Containment Purge System isolation valves, activating Control Room Essential Ventilation, and starting necessary support systems (see Section I.J). As discussed in Section I.B, Unit 3 personnel verified that no actual high radiation levels existed. In addition, Containment Purge System isolation valves were shut at the time of the event. There were no safety consequences or implications resulting from this event. All components operated as designed.

III. CORRECTIVE ACTION:

A. Immediate:

As immediate corrective action, Unit 3 personnel verified that no abnormal radiation levels existed as described in Section I.B.

B. Action to Prevent Recurrence:

Radiation Monitoring System Maintenance technicians were briefed on the importance of ensuring that replacement Geiger-Mueller tubes have no signs of physical damage prior to installation in the radiation monitor's detector assembly.



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TEXT

In addition, a precautionary note was placed in the model work document for radiation area monitors to instruct the Radiation Monitoring System Maintenance technicians to verify that the Geiger-Mueller tube is cylindrical in shape and free of dents and scrapes.

IV. PREVIOUS SIMILAR EVENTS:

There have been no previous similar events reported pursuant to 10CFR50.73 which resulted from a damaged Geiger-Mueller tube.

