



Palo Verde Nuclear  
Generating Station

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**10CFR50.73**  
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192-01097-WEI/SAB/REB  
December 12, 2001

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 1  
Docket No. STN 50-528  
License No. NPF-41  
Licensee Event Report 2001-004-00**

Attached please find Licensee Event Report (LER) 50-528/2001-004-00 that has been prepared and submitted pursuant to 10CFR50.73(a)(2)(i)(B). This LER reports a condition prohibited by the technical specification for the reactor coolant system leakage detection system.

In accordance with 10CFR50.73(d), a copy of this LER is being forwarded to the NRC Regional Office, NRC Region IV and to the Sr. Resident Inspector. If you have questions regarding this submittal, please contact Daniel G. Marks, Section Leader, Regulatory Affairs, at (623) 393-6492.

Arizona Public Service Company makes no commitments in this letter.

Sincerely,

WEI/SAB/REB/kg

Attachment

cc: E. W. Merschoff (all with attachment)  
J. H. Moorman  
L. R. Wharton

IE22

NRC FORM 366 (1-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001  Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E8), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.								
<b>LICENSEE EVENT REPORT (LER)</b>  (See reverse for required number of digits/characters for each block)										
FACILITY NAME (1) <b>Palo Verde Nuclear Generating Station Unit 1</b>		DOCKET NUMBER (2) <b>05000528</b>								
PAGE (3) <b>1 OF 4</b>										
TITLE (4) <b>TS Violation for Inoperable RCS Leak Detection Instrument Due to Misaligned O-ring</b>										
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)										
EVENT DATE (5)      LER NUMBER (6)      REPORT DATE (7)      OTHER FACILITIES INVOLVED (8)										
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	14	2001	2001	- 004	- 00	12	12	2001		05000
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)	1      THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)									
POWER LEVEL (10)	100      20.2201(b)      20.2203(a)(3)(iii)      50.73(a)(2)(ii)(B)      50.73(a)(2)(ix)(A)									
	20.2201(d)      20.2203(a)(4)      50.73(a)(2)(iii)      50.73(a)(2)(x)									
	20.2203(a)(1)      50.36(c)(1)(i)(A)      50.73(a)(2)(iv)(A)      73.71(a)(4)									
	20.2203(a)(2)(i)      50.36(c)(1)(ii)(A)      50.73(a)(2)(v)(A)      73.71(a)(5)									
	20.2203(a)(2)(ii)      50.36(c)(2)      50.73(a)(2)(v)(B)      OTHER									
	20.2203(a)(2)(iii)      50.46(a)(3)(ii)      50.73(a)(2)(v)(C)      Specify in Abstract									
	20.2203(a)(2)(iv)      50.73(a)(2)(i)(A)      50.73(a)(2)(v)(D)      below or in NRC Form									
	20.2203(a)(2)(v)      X      50.73(a)(2)(i)(B)      50.73(a)(2)(vii)      366A									
	20.2203(a)(2)(vi)      50.73(a)(2)(i)(C)      50.73(a)(2)(viii)(A)									
	20.2203(a)(3)(i)      50.73(a)(2)(ii)(A)      50.73(a)(2)(viii)(B)									
<b>LICENSEE CONTACT FOR THIS LER (12)</b>										
NAME <b>Daniel G. Marks, Section Leader, Regulatory Affairs</b>						TELEPHONE NUMBER (Include Area Code) <b>623-393-6492</b>				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	
D	IJ	MON	K020	Y						
SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR	
YES (If yes, complete EXPECTED SUBMISSION DATE)					X	NO				
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)</b> On October 17, 2001 with Unit 1 operating at approximately 100 percent power in Mode 1 (Power Operation) chemistry personnel determined that the reading on the particulate channel of the reactor coolant system (RCS) leakage detection system was not consistent with containment atmosphere grab sample results. It was subsequently determined that the particulate channel had been degraded since September 14, 2001, when the particulate filter was replaced. Misalignment of an O-ring following the filter replacement resulted in airflow by-passing the particulate filter resulting in inaccurate indication. A second occurrence of a misaligned O-ring was identified on November 6 for the time period of October 17 to November 2, 2001.  The cause of the O-ring misalignment was determined to be inadequate guidance and controls related to replacement of the O-ring and a design that made O-ring seating difficult. Corrective actions include properly aligning the O-ring and implementing detailed instructions for proper O-ring replacement.  No previous similar events have been reported by Palo Verde Nuclear Generating Station in the last three years.										

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

(1-2001)

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Palo Verde Nuclear Generating Station Unit 1	05000528	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2001	-- 004	-- 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

## 1. REPORTING REQUIREMENT(S):

This LER (50-528/2001-003-00) is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B), to report a condition prohibited by the Technical Specifications (TS). Specifically, the particulate channel (EIIS Code: RI) for the containment (EIIS Code: NH) atmosphere radioactivity monitor (1JSQBRU0001) (EIIS Codes: MON) was rendered inoperable on September 14, 2001 and the REQUIRED ACTIONS were not completed within the COMPLETION TIMES specified in TS 3.4.16, Reactor Coolant System (RCS)(EIIS Code: AB) Leakage Detection Instrumentation (EIIS Code: IJ). The condition occurred again on October 17, 2001.

## 2. DESCRIPTION OF STRUCTURE(S), SYSTEM(S) AND COMPONENT(S):

Radiation monitor RU-1 (KAMAN SCIENCES CORP Model 952140-002), located in the auxiliary building (EIIS Code: NF), provides a method of detecting reactor coolant system leakage. This process monitor continuously draws a containment atmosphere sample into a closed loop that returns the sample back to containment. The sample flow passes through a particulate filter, an I-131 sampler (charcoal) and gaseous sample chamber in order to measure particulate, iodine, and gaseous radioactivity levels, respectively. The particulate and gaseous channels are used to monitor RCS leakage.

There were no structures, systems, or components that were inoperable at the time of discovery that contributed to this condition.

## 3. EVENT DESCRIPTION:

On October 17, 2001 with Unit 1 operating at approximately 100 percent power in Mode 1 (Power Operation) chemistry personnel determined that the reading on the RU-1 monthly particulate sample of the RCS leakage detection system was not consistent with containment atmosphere grab sample results. A review of isotopic printouts revealed a discrepancy between a containment particulate grab sample analyzed on October 13, 2001 and the RU-1 monthly particulate sample that was removed from RU-1 on October 12, 2001. This particulate sample media had been in place since the routine monthly filter replacement performed on September 14, 2001.

The grab sample indicated particulate activity consistent with a known active RCS leak in containment. The RU-1 particulate sample indicated no activity and the iodine charcoal sample (removed from RU-1 at the same time) indicated particulate activity that should have collected on the particulate filter. This indicated that sample flow had partially or completely bypassed the particulate filter in RU-1.

As a result, the RU-1 monitor was declared inoperable on October 17, 2001 at 1500 Mountain Standard Time (MST) to allow technicians to inspect and replace the particulate filter and iodine charcoal. During this activity the O-ring providing the seal between the sample holder and sample outlet piping was replaced based on previous problems with seating the O-ring during filter replacements. Following a channel check, RU-1 was then declared OPERABLE on October 17, at 1620 MST.

Subsequently, during maintenance on RU-1 on November 2, 2001, the O-ring was again found out of alignment. A review of RU-1 trend data indicated the O-ring probably slipped out of place during the previous O-ring replacement on October 17. Following the maintenance on November 2, Chemistry

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<p>personnel verified integrity of RU-1 particulate sample collection and operability through a qualitative assessment of monitor response and trends. The sample media and channel was responding to activity in containment correctly.</p>				
<p>TS 3.4.16 requires one containment atmosphere radioactivity monitor (gaseous and particulate) be OPERABLE in Modes 1-4. If the monitor is inoperable the REQUIRED ACTION is to analyze a containment atmosphere grab sample once every 24 hours or perform the RCS water inventory balance surveillance once every 24 hours. Since it was not recognized at the time of both occurrences (September 14-October 12 and October 17-November 2) that the particulate channel was not operating correctly, the REQUIRED ACTION was not performed as required.</p>				
<p>It should be noted that during the time period of RU-1 inoperability, several RCS water inventory balance surveillances were performed due to an active RCS leak. However, the frequency of performance of these surveillances was not always adequate to meet the REQUIRED COMPLETION time for TS 3.4.16.</p>				
<p>4. CAUSE OF THE CONDITION: An investigation of this event was conducted in accordance with the PVNGS Condition Reporting program. The cause of the inoperability (for both occurrences) of the particulate channel of RU-1 was determined to be the misalignment of the O-ring that provides the seal between the sample holder and sample outlet piping. Contributing factors included a design that makes it difficult to properly maintain the alignment of the O-ring and inadequate guidance/controls related to replacement of the O-ring with this design.</p>				
<p>Complicating the identification of the degraded particulate channel was the low level of activity present in the containment building. Thus when the particulate filter was being bypassed due to the O-ring misalignment there was not a distinctive decrease in the channel indication to alert personnel to the problem.</p>				
<p>5. CORRECTIVE ACTIONS: RU-1 trends for all three Palo Verde units have been reviewed and determined to be indicative of proper sample operation. Future replacement of the O-ring (when required) will be controlled with separate detailed instructions rather than a single performance step in the filter replacement procedure. A design change that would reduce the difficulty aligning the O-ring is being evaluated by engineering.</p>				
<p>In addition, direction and guidance has been provided to the technicians for using the gross counts-per-minute channel as part of qualitatively assessing proper particulate channel response after filter replacement.</p>				
<p>6. SAFETY ASSESSMENT: The reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Radioactivity detection systems for monitoring both particulate and gaseous activities are provided because of their different sensitivities and responses to RCS leakage.</p>				

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
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## NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Leakage detection systems must have the capability to detect significant Reactor Coolant Pressure Boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified leakage.

The particulate channel of RU-1 is a part of the RCS leak detection system. The other portions of the RCS leak detection system are the gas channel of RU-1 and the containment sump monitoring system. Both the gas channel and the sump monitoring system remained OPERABLE during the two occurrences (September 14-October 12 and October 17-November 2) that the particulate channel was inoperable. In addition, surveillance requirement 3.4.14.1 ensures an RCS inventory balance is performed at least every 72 hours during steady state operation to detect RCS leakage.

Based on the alternate means available to detect RCS leakage during the periods the particulate channel was inoperable, the significance of this condition was low. This condition did not result in a safety system functional failure as defined in 50.73(a)(2)(v).

## 7. PREVIOUS SIMILAR EVENTS:

There have been no previous events reported to the NRC by Palo Verde in the last three years regarding compliance with the RCS leakage detection system TS.

## 8. OTHER INFORMATION

The event date of this LER is based on the filter replacement performed on September 14, 2001. However, the impact of that replacement on the monitor was not discovered until October 17, 2001.