

# ACCELERATI DOCUMENT DISTRIBUTION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9302010234      DOC. DATE: 93/01/27      NOTARIZED: NO      DOCKET #  
 FACIL: STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi      05000529  
 AUTH. NAME      AUTHOR AFFILIATION  
 BRADISH, T.R.      Arizona Public Service Co. (formerly Arizona Nuclear Power  
 LEVINE, J.M.      Arizona Public Service Co. (formerly Arizona Nuclear Power  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 91-008-00: on 911223, discovered loss of RCS inventory during cold shutdown. Caused by stuck open relief valve. Sufficient makeup provided to RCS to restore pressurizer level. W/930127 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Standardized plant.

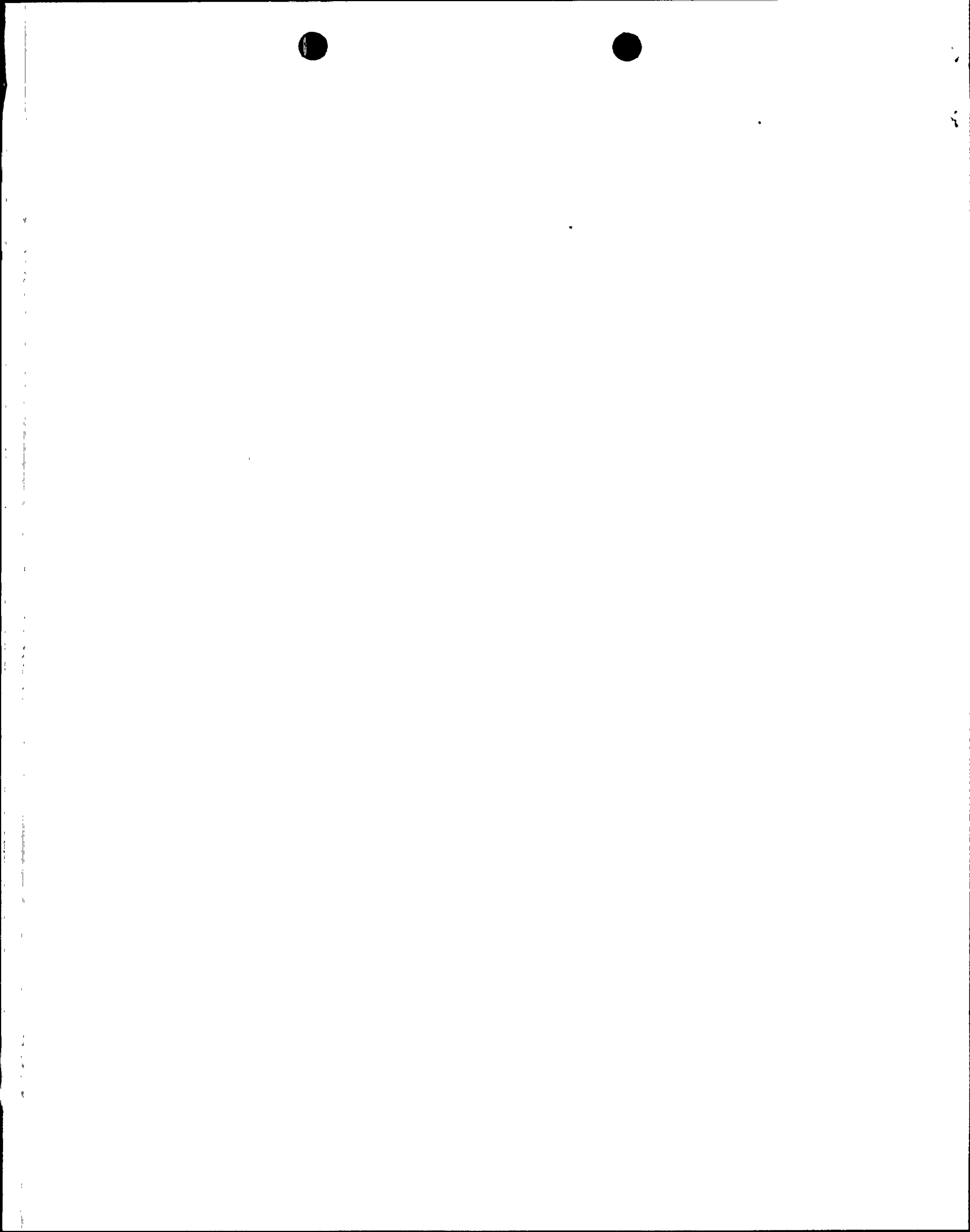
05000529

	RECIPIENT		COPIES			RECIPIENT		COPIES		
	ID CODE/NAME		LTR	ENCL		ID CODE/NAME		LTR	ENCL	
	PDS LA		1	1		PD5 PD		1	1	
	TRAMMELL, C		1	1						
INTERNAL:	ACNW		2	2		ACRS		2	2	
	AEOD/DOA		1	1		AEOD/DSP/TPAB		1	1	
	AEOD/ROAB/DSP		2	2		NRR/DET/EMEB 7E		1	1	
	NRR/DLPQ/LHFB10		1	1		NRR/DLPQ/LPEB10		1	1	
	NRR/DOEA/OEAB		1	1		NRR/DREP/PRPB11		2	2	
	NRR/DST/SELB 8D		1	1		NRR/DST/SICB8H3		1	1	
	NRR/DST/SPLB8D1		1	1		NRR/DST/SRXB 8E		1	1	
	<del>REG FILE</del> 02		1	1		RES/DSIR/EIB		1	1	
	RGNS FILE 01		1	1						
EXTERNAL:	EG&G BRYCE, J.H		2	2		L ST LOBBY WARD		1	1	
	NRC PDR		1	1		NSIC MURPHY, G.A		1	1	
	NSIC POORE, W.		1	1		NUDOCS FULL TXT		1	1	

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 504-2065) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED  
 TOTAL NUMBER OF COPIES REQUIRED: LTR 31 ENCL 31



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

JAMES M LEVINE  
VICE PRESIDENT  
NUCLEAR PRODUCTION

192-00826-JML/TRB/RKR  
January 27, 1993

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Mail Station P1-37  
Washington, D.C. 20555

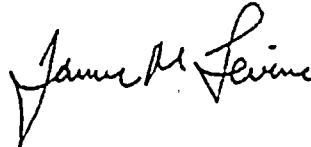
Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 2  
Docket No. STN 50-529 (License No. NPF-51)  
Licensee Event Report 91-008-00  
File: 93-020-404

Attached please find voluntary Licensee Event Report (LER) 91-008-00 prepared and submitted pursuant to guidelines contained within 10CFR50.73. This LER reports a loss of reactor coolant system inventory event which could have been significant under different conditions (i.e., at initial shutdown with higher decay heat or at reduced inventory). 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 T. R. Bradish, Manager, Nuclear Regulatory Affairs at (602) 393-5421.

Very truly yours,



JML/TRB/RKR

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

010031

9302010234 930127  
PDR ADDCK 05000529  
S PDR



## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>Palo Verde Unit 2</b>	DOCKET NUMBER (2) <b>050005219</b>	PAGE (3) <b>1 OF 05</b>
---	---------------------------------------	----------------------------

TITLE (4)  
**Loss of RCS Inventory During Cold Shutdown**

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)
1	2	9	1	0	0	0	1	2	N/A		050005
2	3	9	1	0	0	1	2	7	N/A		050005
9	1	1	9	1	1	9	3	3			

OPERATING MODE (9) **5**

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(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"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	<b>Voluntary</b>
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(viii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>Thomas R. Bradish, Nuclear Regulatory Affairs Manager</b>	TELEPHONE NUMBER
	AREA CODE: <b>6102</b> NUMBER: <b>393-5421</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)

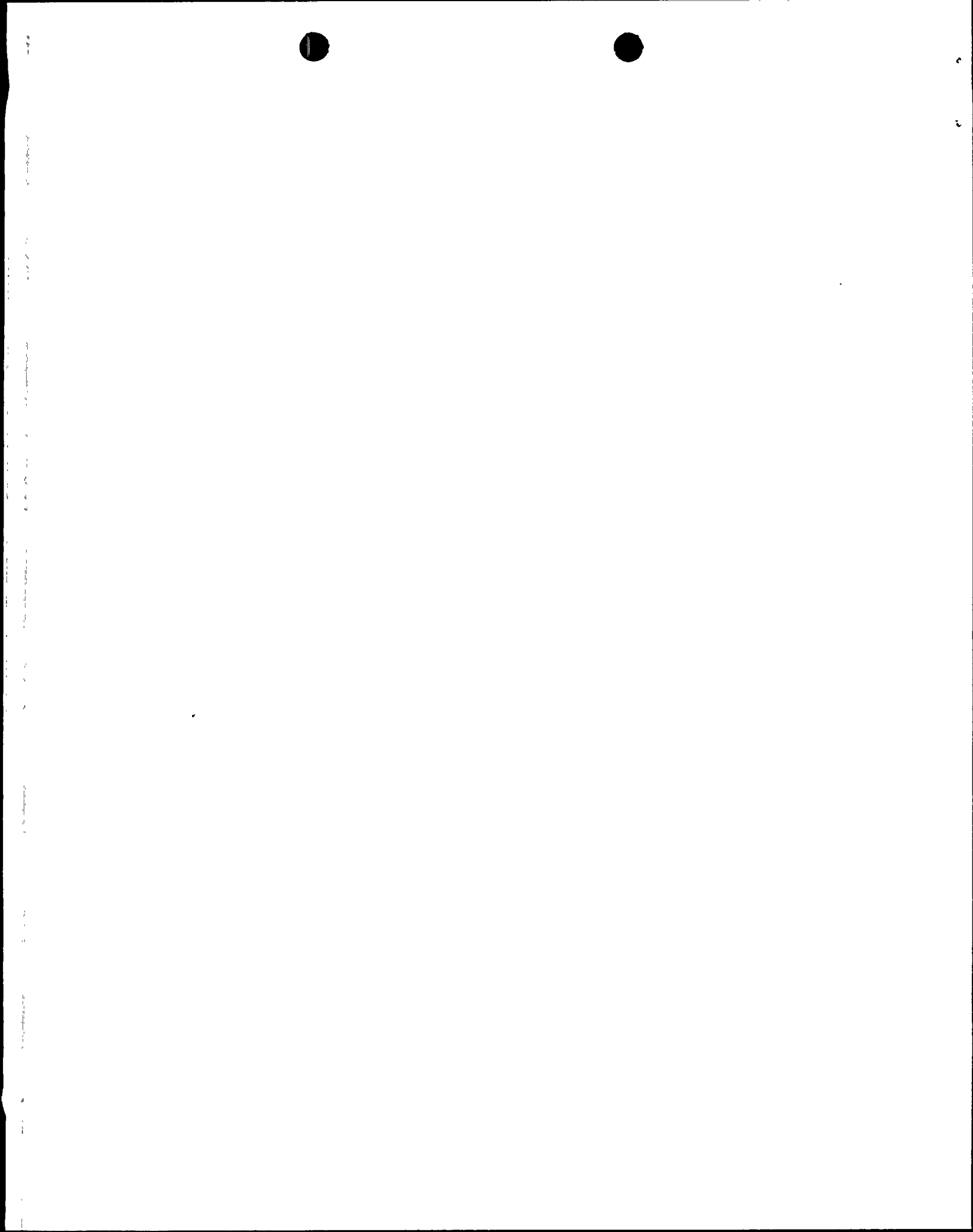
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH:    DAY:    YEAR:
--	--	-------------------------------	-------------------------

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1555 MST on December 23, 1991, Palo Verde Unit 2 was in Mode 5 (COLD SHUTDOWN) during startup from a planned refueling outage, when a relief valve on the "A" train shutdown cooling (SDC) loop stuck open resulting in a loss of reactor coolant system (RCS) inventory. In accordance with Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.1.4.1, the "A" train SDC loop was OPERABLE and operating, and the "B" train SDC loop was OPERABLE and in standby. At the time of this event two charging pumps were in operation.

As immediate action, a third charging pump and a High Pressure Safety Injection pump were manually started to provide sufficient makeup to the RCS to restore pressurizer level. The "A" train SDC loop was isolated from the RCS, terminating the loss of RCS inventory.

This is being reported as an information-type LER (i.e., voluntary LER). No previous similar events have been reported pursuant to 10CFR50.73.



**LICENSEE EVENT REPORT (LER) TEXT CONTINUATION**

FACILITY NAME  Palo Verde Unit 2	DOCKET NUMBER  05000529	LER NUMBER			PAGE		
		YEAR 91	SEQUENTIAL NUMBER -008	REVISION NUMBER -00			
					02	OF	05

**TEXT**

**I. DESCRIPTION OF WHAT OCCURRED:**

**A. Initial Conditions:**

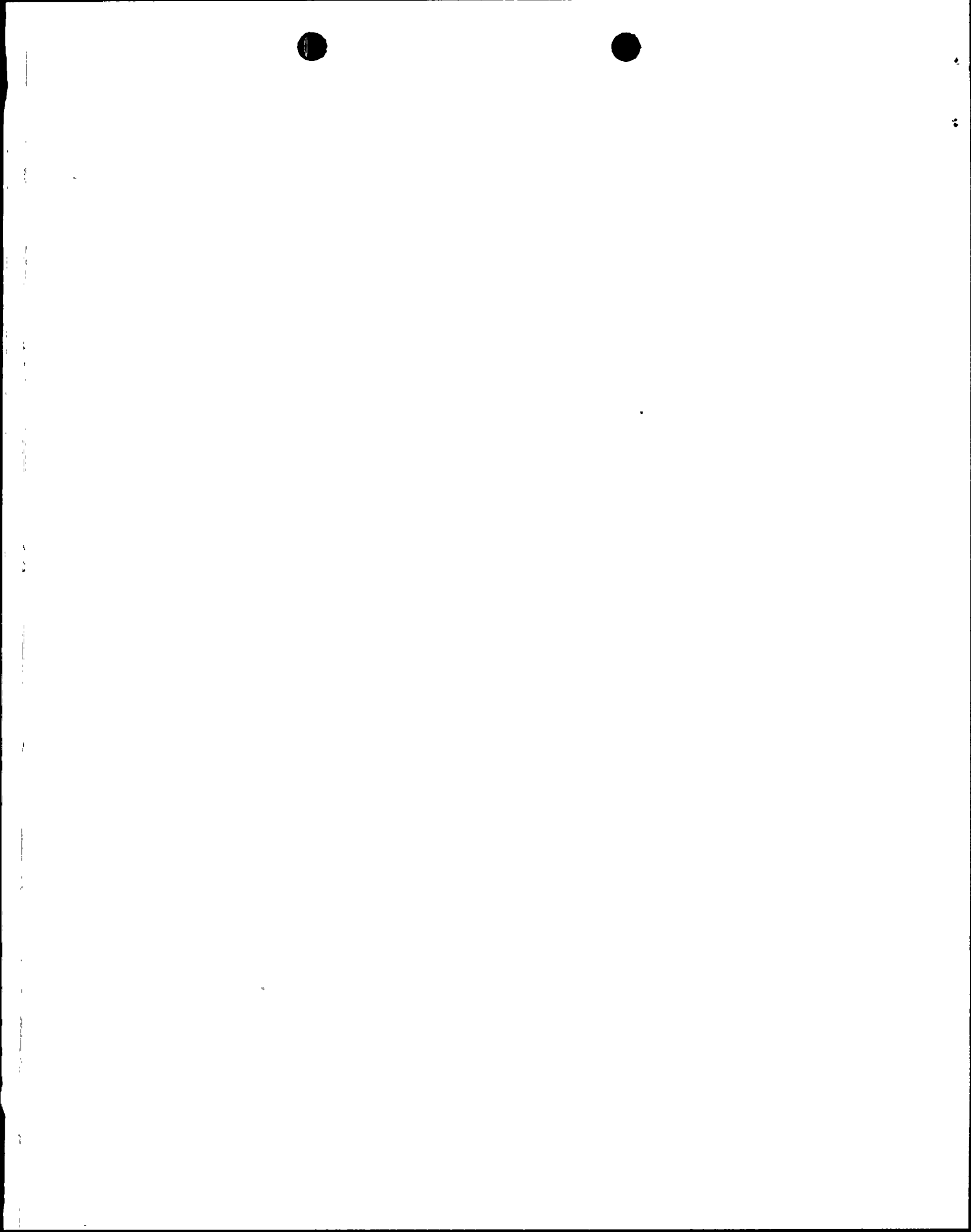
At 1555 MST on December 23, 1991, Palo Verde Unit 2 was in Mode 5 (COLD SHUTDOWN) during startup from a planned refueling outage with the Reactor Coolant System (RCS)(AB) at approximately 135 degrees Fahrenheit and 380 pounds per square inch absolute (psia).

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

Event Classification: Voluntary LER.

At approximately 1555 MST on December 23, 1991, a relief valve on the "A" train shutdown cooling (SDC) loop stuck open resulting in a loss of RCS inventory. In accordance with Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.1.4.1, the "A" train SDC loop was OPERABLE and operating, and the "B" train SDC loop was OPERABLE and in standby. At the time of this event two charging pumps were in operation.

Prior to the event, Unit 2 was performing Emergency Core Cooling System (ECCS) leak testing in accordance with an approved surveillance test procedure. During the test, a valve connecting the "A" train SDC loop to the number 1 Containment Spray Header was opened. The piping connecting the "A" train SDC loop to the number 1 Containment Spray Header was partially voided, resulting in a pressure transient greater than the lift setpoint of a relief valve on the "A" train SDC loop. At approximately 1555 MST on December 23, 1991, Control Room personnel (utility, licensed) noticed that Pressurizer level was decreasing. At approximately 1602 MST, a third charging pump was started. At approximately 1612 MST, RCS letdown was isolated, however Pressurizer level continued to decrease. At this point, Control Room personnel suspected that a relief valve on the "A" train SDC loop was leaking. At approximately 1619, Control Room personnel began starting equipment to support swapping SDC trains. At approximately 1620 MST, the "B" High Pressure Safety Injection (HPSI) pump was manually started to restore pressurizer level. The HPSI pump provided a makeup rate of approximately 100 gallons per minute (gpm). At approximately 1625 MST, the "B" train SDC loop was placed in operation and the "A" train SDC loop was placed in standby. At approximately 1629 MST, the "A" train SDC loop was isolated from the RCS, terminating the RCS inventory loss. At approximately 1630 MST, the HPSI pump and one of the charging pumps were secured from operation. At approximately 1632 MST, RCS



**LICENSEE EVENT REPORT (LER) TEXT CONTINUATION**

FACILITY NAME  Palo Verde Unit 2	DOCKET NUMBER  05000529	LER NUMBER			PAGE	
		YEAR 91	SEQUENTIAL NUMBER 008	REVISION NUMBER 00		
					03	OF 05

**TEXT**

letdown was returned to service.

The relief valve reseated when the "A" train SDC loop was isolated from the RCS. An investigation, including repressurization of the "A" train SDC loop, was unsuccessful in identifying the specific relief valve that stuck open. However, since the Reactor Drain Tank (RDT)(TK)(CA)(SDC relief valves drain to the RDT) level was increasing and no other valves were found to be out of position, it is believed that the leakage was due to a stuck open relief valve in the "A" train SDC loop.

During this event, pressurizer level dropped from a level of approximately 57 percent to approximately 36 percent (decrease of approximately 1600 gallons). It would take a loss of over 20,000 gallons to reduce RCS level enough to affect shutdown cooling capability. Because this event could have been significant under different conditions (i.e., at initial shutdown with higher decay heat or at reduced inventory), APS is submitting this information-type LER (i.e., voluntary LER). APS believes that the information provided in this voluntary LER might prove useful and be of generic interest to the nuclear industry.

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

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:

As discussed in Section I.B, the loss of RCS inventory was due to a stuck open relief valve.

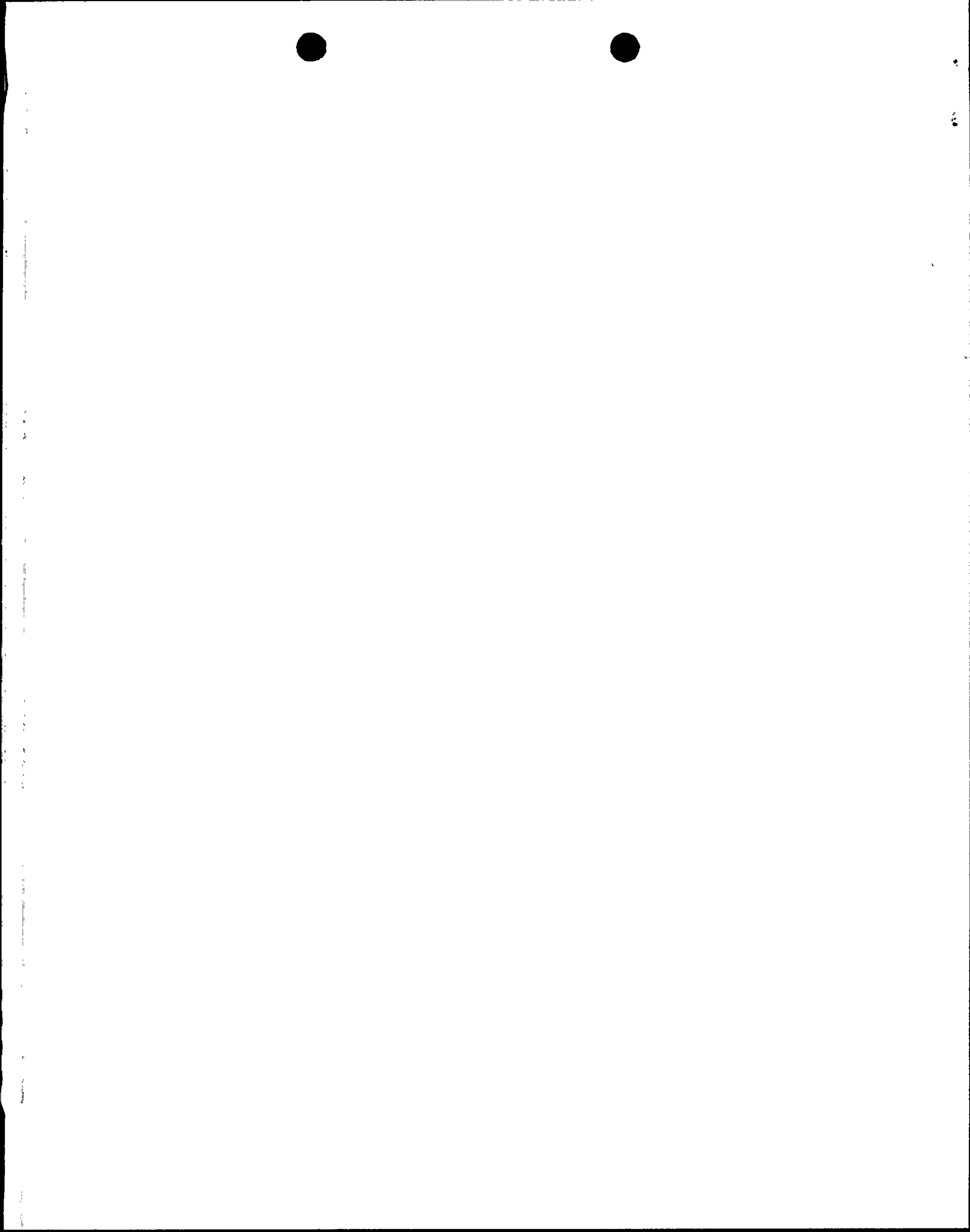
- E. Failure mode, mechanism, and effect of each failed component, if known:

As discussed in Section I.B, the relief valve stuck open following a pressure transient during ECCS leak testing.

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

Not applicable - no failures of components with multiple functions were involved.





LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME Palo Verde Unit 2	DOCKET NUMBER 0500052991	LER NUMBER			PAGE	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		91	008	00	04	OF 05

TEXT

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 - no failures that rendered a train of a safety system inoperable were involved.

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

As discussed in Section I.B, the event was discovered by Control Room personnel when Pressurizer level was decreasing. There have been no procedural errors identified.

I. Cause of Event:

As discussed in Section I.B, the loss of RCS inventory was due to a stuck open relief valve. The relief valve stuck open following a pressure transient during ECCS leak testing (SALP Cause E: Component Failure). The relief valve reseated when the "A" train SDC loop was isolated from the RCS. An investigation, including repressurization of the "A" train SDC loop, was unsuccessful in identifying the relief valve that stuck open. However, since the Reactor Drain Tank (SDC relief valves drain to the RDT) level was increasing and no other valves were found to be out of position, it is believed that the leakage was due to a stuck open relief valve in the "A" train SDC loop.

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

J. Safety System Response:

Not applicable - there were no safety system responses and none were necessary.

K. Failed Component Information:

Not applicable - no component failures were involved.



100

100

100

100

100

100

100

**LICENSEE EVENT REPORT (LER) TEXT CONTINUATION**

FACILITY NAME  Palo Verde Unit 2	DOCKET NUMBER  0 5 0 0 0 5 2 9 9 1	LER NUMBER			PAGE	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 0 8	0 0	0 5	OF	0 5

TEXT

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

The RCS inventory loss was immediately identified and actions were taken to isolate the leak path and provide sufficient makeup to restore pressurizer level. Shutdown cooling was operating and there was no immediate threat for the loss of shutdown cooling. This condition did not adversely affect plant safety or the health and safety of the public. The event did not result in any challenges to the fission product barriers or result in any releases of radioactive materials. Therefore, there were no other adverse safety consequences or implications as a result of this event.

**III. CORRECTIVE ACTION:**

**A. Immediate:**

Sufficient makeup was provided to the RCS to restore pressurizer level. The "A" train SDC loop was isolated from the RCS, terminating the loss of RCS inventory.

**B. Action to Prevent Recurrence:**

This event occurred during ECCS leak testing. Actions by Control Room personnel were appropriate for this type of event. Therefore, no further actions were identified.

**IV. PREVIOUS SIMILAR EVENTS:**

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

