NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Palo Verde Unit 2	0 5 0 0 0 5 2 9	1 OF 0 3

TITLE (4)

RPS Actuation in Response to Loss of Seal Injection Flow

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	0 4	8 6	8 6	—	0 1 5	—	0 0	0 5	0 5	8 6		0 5 0 0 0
												0 5 0 0 0

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)							
POWER LEVEL (10)	0 0 0		20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
William F. Quinn, Manager - Nuclear Licensing (Extension 4087)	6 0 2 9 4 3 - 7 2 0 0

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
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On April 4, 1986, at 1344, with Unit 2 in Mode 3 (HOT STANDBY), an automatic actuation of all 4 channels of the reactor protection system (RPS) occurred due to low reactor coolant system flow through steam generator No. 2. Although all control element assemblies were in the fully inserted position, all reactor trip breakers opened as expected, satisfying the minimum actuation logic for RPS actuation. All systems and components responded satisfactorily.

The RPS actuation occurred when reactor coolant pump (RCP) 2B was secured, in accordance with an approved procedure, due to a loss of seal injection flow which resulted in a high seal injection temperature. The cause of the loss of the seal injection flow was a restriction in a system strainer. As corrective action, the strainer was flushed, and seal injection was restored to RCP 2B at 1635. Additionally, an engineering evaluation has been initiated to determine if additional actions are necessary to enhance the performance of the strainer.

There have been no previous similar events.

8605140090 860505
PDR ADOCK 05000529
S PDR

IE22
1/1

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Palo Verde Unit 2	0 5 0 0 0 5 2 9	8 6	— 0 1 5	— 0 0	0 2 OF 0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

On April 4, 1986, at 1344, with Unit 2 in Mode 3 (HOT STANDBY), an automatic actuation of all 4 channels of the reactor protection system (RPS)(JC) occurred due to a low reactor coolant system (RCS)(AB) flow condition through steam generator (SG) No. 2. At the time of this event, all control element assemblies (CEAs) were in the fully inserted position and the reactor trip breakers (52) were closed to support CEA testing. In response to the RPS actuation, all reactor trip breakers opened as required. This satisifed the minimum actuation logic for an RPS actuation and represented the satisfactory response of an automatically initiated safety system. There were no other automatically or manually initiated safety system responses. There were no inoperable structures, components, or systems at the start of this event that contributed to the event.

Prior to the RPS actuation, all 4 reactor coolant pumps (RCPs)(P) were operating. An evolution was in progress to supply auxiliary steam (SA) to the seal injection heat exchanger (HX) to support testing required by the piping verification program. This heat exchanger preheats RCP seal injection water which is supplied from the chemical and volume control system (CB). The preheated seal injection water is then supplied in parallel to each RCP where it is combined with the effluent from the water lubricated journal bearings. This combined seal injection flow then passes through a high pressure cooler (HX), a cyclone strainer (STR), and enters the respective RCP casing/seals.

When steam was admitted to the seal injection heat exchanger on April 4, 1986, at 1300, the heat exchanger outlet temperature increased rapidly, resulting in a high temperature alarm in the control room and initiating automatic isolation of seal injection flow at 1308. The flow of steam to the heat exchanger was greater than normal due to the inability of the steam control valve to regulate steam flow. Control room operators (utility-licensed) responded to the loss of seal injection flow, and commenced flow restoration in accordance with an approved procedure at 1323.

Normal seal injection flow (approximately 6.6 gpm) was restored to RCP's 1A, 2A, and 1B but flow to RCP 2B could only be supplied at approximately 4 gpm. The licensed operator (utility) attempted to increase flow to RCP 2B. At approximately 1334, seal injection flow to RCP 2B was again lost. At 1344, the RCP 2B high pressure cooler inlet temperature reached 250°, necessitating the securing of RCP 2B. Since all control element assemblies were in the fully inserted position, the reactor was not manually tripped. However, the reactor trip breakers did receive an automatic trip signal. With all 4 RCP's operating, securing an RCP will result in a low RCP flow condition in the associated SG based upon the logic actuation established for operations at PVNGS. However, this would not normally result in the minimum actuation logic for an RPS actuation since the reactor trip breakers are typically open in Mode 3, except to support CEA testing or when preparing for Mode 2 (STARTUP) entry.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Palo Verde Unit 2	0 5 0 0 0 5 2 9	8 6	— 0 1 5	— 0 0	0 3 OF 0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Troubleshooting of the loss of seal injection flow to RCP 2B determined that the cyclone filter on the outlet of the high pressure cooler was restricted. As corrective action, the filter was flushed and normal seal injection flow was restored to RCP 2B at 1635. RCP 2B was restarted at 1705, and the RPS was reset at 1826. The event lasted approximately 4 hours and 42 minutes.

There were no personnel errors associated with this event. Required procedures were adequate and were complied with. There are no safety consequences associated with this event since RCS flow was maintained throughout the event, maintaining the capability to remove decay heat. Note that Unit 2 did not require decay heat removal at the time of this event since the Unit had not achieved initial criticality. It should also be noted that even if all four RCP's had been secured due to this condition, the plant is designed to remove decay heat through natural circulation. All safety systems operated as designed. Therefore, based on the above, there was no threat to the health and safety of the public.

It is believed that the root cause of this event was the accumulation of suspended solids in the RCP 2B cyclone strainer, resulting in the restriction of seal injection flow. Due to the prompt action taken by the operators to flush the strainer to return seal injection flow to RCP 2B, a sample of the RCS water from the strainer was not obtained for analysis. However, since the other three (3) RCP's show no signs of restrictions and since Unit 1 (Docket No. 50-528) has never experienced this problem, it is believed that this is an isolated occurrence. As a prudent action, an engineering evaluation has been initiated to determine if additional actions are necessary to enhance the performance of the strainer.

The auxiliary steam supply to the seal injection system has not been required to be in use in either Unit 1 or 2 due to the high temperature water experienced at the Palo Verde site location. Therefore, no immediate action will be taken to adjust the steam control valve to the heat exchanger. This system will remain secured until an engineering evaluation request is dispositioned to address the formal resolution of the valve operation.

There have been no previous similar events.

Arizona Nuclear Power Project
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

May 5, 1986
ANPP-36507-EEVB/PGN/98.05

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 2
Docket No. STN 50-529 (License NPF-51)
Licensee Event Report - 86-015-00
File: 86-020-404

Dear Sirs:

Attached please find Licensee Event Report (LER) No. 86-015-00 prepared and submitted pursuant to 10 CFR 50.73. In accordance with 10 CFR 50.73(d), we are herewith forwarding a copy of the LER to the Regional Administrator of the Region V Office.

If you have any questions, please contact me.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/PGN/rw
Attachment

cc: J. B. Martin (all w/a)
R. P. Zimmerman
A. L. Hon
E. A. Licitra
A. C. Gehr
INPO Records Center

IE22
1/1