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Palo Verde Nuclear Generating Station

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April 3, 1997

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, D.C. 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS)**
Unit 3
Docket No. STN 50-530
License No. NPF-74
Licensee Event Report 97-001-00

Attached please find Licensee Event Report (LER) 97-001-00 prepared and submitted pursuant to 10CFR50.73. This LER reports a procedurally-directed manual actuation of an engineered safety feature actuation system for the fuel building essential ventilation following a loss of spent fuel pool level. In accordance with 10CFR50.73(d), a copy of this LER is being forwarded to the Regional Administrator, NRC Region IV. If you have any questions, please contact Daniel G. Marks, Section Leader, Nuclear Regulatory Affairs, at (602) 393-6492.

Sincerely,

Gregg R. Overbeck

GRO/DGM/KR/kr

Attachment 090063

cc: E. W. Merschoff (all with attachment)
K. E. Perkins
K. E. Johnston
INPO Records Center

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Palo Verde Unit 3	0 5 0 0 0 5 3 0	1 OF 0 6

TITLE (4)

Loss of Spent Fuel Pool Level Procedure Requires Manual Fuel Building Essential Ventilation Actuation

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 NUMBERS
									N/A	0 5 0 0 0
0 3	0 6	9 7	9 7	- 0 0 1	- 0 0	0 4	0 3	9 7	N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL(10)	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
Daniel G. Marks, Section Leader, Nuclear Regulatory Affairs	AREA CODE 6 0 2 3 9 3 - 6 4 9 2

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
X	J E	R L Y	G 0 8 0	N					

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 March 6, 1997, at approximately 0643 MST, Palo Verde Unit 3 was in its sixth refueling outage with the core offloaded to the spent fuel pool (SFP) when Control Room personnel manually initiated an Engineered Safety Feature Actuation System (ESFAS) actuation of the fuel building essential ventilation actuation system (FBEVAS) per an approved procedure for loss of SFP level. There was no increase in radiation levels during this event. Train A FBEVAS air filtration unit's (AFU) exhaust fan failed to start and the exhaust damper failed to open. The AFU was manually started using the Control Room handswitch. Control Room personnel entered Technical Specification Limiting Condition for Operation (TS LCO) 3.9.12 ACTION a for an inoperable Train A FBEV system. The Train B FBEV system remained operable and capable of being powered from the operable Train A Emergency Diesel Generator. At approximately 0705 MST, Operations personnel determined that leakage was occurring from the SFP to the fuel transfer canal through the gate seal. Air pressure was restored to the gate seal and the SFP level proceeded to increase. By approximately 2245 MST, both trains of FBEVAS had been reset and TS LCO 3.9.12 ACTION a was exited at approximately 2100 MST on March 7, 1997. There were no automatic ESFAS actuations and none were necessary.

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

FACILITY NAME	DOCKET NUMBER	LER NUMBER			PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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TEXT

1. REPORTING REQUIREMENT:

This LER 530/97-001-00 is being written to report an event that resulted in the manual actuation of an Engineered Safety Feature as specified in 10CFR50.73(a)(2)(iv).

Specifically, at approximately 0643 MST on March 6, 1997, Palo Verde Unit 3 was in its sixth refueling outage with the core (AC) offloaded to the spent fuel pool (SFP) (ND) when Control Room personnel (utility-licensed operator) manually initiated an Engineered Safety Feature Actuation System (ESFAS) (JE) actuation of the fuel building (ND) essential ventilation actuation system (FBEVAS) (JE) per an approved abnormal operating procedure (AOP) for loss of SFP level. There was no increase in radiation levels during this event, nor did radiation levels approach the alarm/trip setpoints for an automatic actuation of a FBEVAS. The Reactor Coolant System (RCS) (AB) was at approximately 75 degrees Fahrenheit (F) and at atmospheric pressure. Unit 3 was in a Train B outage with most of the Train B mechanical equipment tagged out and unavailable.

2. EVENT DESCRIPTION:

At approximately 0625 MST on March 6, 1997, following the receipt of a fuel pool cooling system trouble alarm, Unit 3 Control Room personnel determined that the level in the SFP was decreasing. Control Room personnel entered the AOP for an uncontrolled loss of SFP level. At approximately 0643 MST, in accordance with the AOP, non-essential personnel were evacuated from the fuel building and Control Room personnel manually initiated Train A and Train B FBEVAS. There was no increase in radiation levels during this event, nor did radiation levels approach the alarm/trip setpoints for an automatic actuation of a FBEVAS.

Train A FBEVAS air filtration unit's (AFU) exhaust fan failed to start and the exhaust damper failed to open. The AFU was manually started using the Control Room (NA) handswitch. Control Room personnel entered Technical Specification Limiting Condition for Operation (TS LCO) 3.9.12 ACTION a for an inoperable Train A FBEV system. The Train B FBEV system remained operable and capable of being powered from the operable Train A A.C. source.

At approximately 0647 MST, Control Room personnel initiated makeup from the Refueling Water Tank (RWT) (BQ) to the SFP in accordance with the AOP. Operations personnel (utility nonlicensed and licensed operators), dispatched to investigate the cause of the loss of SFP level, determined at approximately 0705 MST that leakage was occurring from the SFP to the fuel transfer canal (DF) through the gate seal. The seal surrounding the

gate had lost sufficient air pressure necessary to maintain SFP level. The gate seal pressure was approximately 5 psig; normal gate seal pressure is approximately 35 psig. The air pressure was restored to the gate seal via the normal line-up of instrument air (IA) (LD) and the SFP level proceeded to increase.

Although there was no increase in radiation levels, at approximately 0715 MST, Control Room personnel declared and terminated a Notification of Unusual Event (NUE) due to an uncontrolled water level decrease in the SFP with all irradiated fuel assemblies remaining covered by water (RAD-3 in NUMARC/NESP-007). Appropriate regulatory agencies were notified in a timely manner.

The initial SFP level was at an elevation of approximately 138-feet 2-inches and the minimum level achieved was at an elevation of approximately 137-feet. Approximately 10,000 gallons of water which leaked past the gate seal was contained within the fuel transfer canal.

During this event, a fuel assembly was seated on a spacer in a fuel assembly storage location for fuel reconstitution activities. When a fuel assembly is seated on the spacer, the top of the fuel is elevated approximately 9-inches above the top of the spent fuel racks. Therefore, when the SFP level reached a low elevation of approximately 137-feet (minimum elevation level allowed was 137-feet 11-inches with fuel in the reconstitution spacer), at approximately 0625 MST, Control Room personnel entered TS LCO 3.9.11 for having less than 23 feet of water over the top of irradiated fuel assemblies seated in the SFP storage racks. Control Room personnel exited TS LCO 3.9.11 at approximately 0833 MST when SFP level was restored to an elevation greater than 138-feet.

By approximately 2245 MST both trains of FBEVAS had been reset and TS LCO 3.9.12 ACTION a was exited at approximately 2100 MST on March 7, 1997. There were no automatic ESFAS actuations and none were necessary.

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

The FBEV system is designed to respond to 2 different safety system actuation signals, FBEVAS and the safety injection (BP/BQ) actuation signal (SIAS) (JE). FBEVAS is designed to limit the potential release of radioactive iodine in the event of a fuel handling accident in the Fuel Building. SIAS is designed to limit the potential release of radioactive iodine during a loss of coolant accident (LOCA) from the ESF pump room (BP/BQ) exhaust ventilation. The Updated Final Safety Analysis Report Chapter 15 accident analysis considers the offsite dose at the exclusion area boundary and the low population zones for a fuel handling accident

outside the Containment (NH), with and without ESF filtration. The analysis concluded that the radiological consequences of a fuel handling accident outside of containment are less than one-third of the 10 CFR 100 limits, even without crediting the ESF filtration system actuation. There was no increase in radiation levels during this event, nor did radiation levels approach the alarm/trip setpoints for an automatic actuation of a FBEVAS. The manual FBEVAS was inserted per procedure requirement. Therefore, the failure of Train A FBEVAS to start did not impact this event.

The partial loss of SFP inventory did not result in a transient more severe than already analyzed. The leak from the SFP to the fuel transfer canal posed no safety hazard. The leak would have stopped without operator intervention prior to affecting pool cooling or prior to uncovering irradiated fuel assemblies due to the equilibrium level between the SFP and the transfer canal. No safety limits were violated, the fuel was not in danger of exposure, and the water remained contained.

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 adverse safety consequences or implications as a result of this event. This event did not adversely affect the safe operation of the plant or health and safety of the public.

4. CAUSE OF THE EVENT:

An independent investigation of this event was conducted in accordance with the APS Corrective Action Program. As part of the investigation, a determination of the cause of the event was performed. The cause of the manual FBEVAS was attributed to procedural direction from an AOP for loss of SFP level (SALP Cause Code: X: Other). There was no increase in radiation levels during this event, nor did radiation levels approach the alarm/trip setpoints for an automatic actuation of a FBEVAS. The cause of the component failure associated with the manual FBEVAS actuation, and the failure mode, mechanism, and effect is discussed in Section 5. No unusual characteristics of the work location (e.g., noise, heat, poor lighting) directly contributed to this event. There were no personnel errors or procedural errors which contributed to this manual FBEVAS initiation event.

The loss of SFP level was classified as a significant event and an independent investigation of this event was conducted in accordance with the APS Corrective Action Program. Operations personnel, dispatched to investigate the cause of the loss of SFP level, determined at approximately 0705 MST that a leak existed from the SFP to the fuel

TEXT

transfer canal through the gate seal. The seal surrounding the gate had lost sufficient air pressure necessary to maintain SFP level. The gate seal pressure was approximately 5 psig; normal gate seal pressure is approximately 35 psig. Prior to the event, temporary nitrogen was placed in service at the gate seal and IA was isolated. The air pressure was restored to the gate seal via the normal line-up of IA and the SFP level proceeded to increase. The cause of the gate seal leak was due to a depleted nitrogen backup bottle which was inadvertently left in-service following restoration from a planned IA outage. Air supply to the gate seal had previously been isolated due to the IA outage. However, when the IA outage was completed, IA was not restored to the gate seal and the seal remained on backup nitrogen. Specific details surrounding the cause of the loss of SFP level are being investigated under a separate investigation and are not discussed in this LER for a manual actuation of an ESF.

5. STRUCTURES, SYSTEMS, OR COMPONENTS INFORMATION:

Control Room personnel manually initiated Train A and Train B FBEVAS at approximately 0643 on March 6, 1997. Train A FBEVAS AFU's exhaust fan failed to start and the exhaust damper failed to open. The Control Room safety equipment system status (SESS) (IB) annunciated to indicate that the Train A FBEV AFU's fan and damper did not respond as expected. The AFU was manually started using the Control Room handswitch.

Troubleshooting was conducted under an approved corrective maintenance work order. The cause of the component failure was attributed to a faulty contact on an override relay in the breaker for the AFU. The apparent cause of this event was that the high resistance across the normally closed set of contacts in the override relay caused a high enough voltage drop across the closed set of contacts that prevented the start permissive (FX) relay coil from having enough voltage to energize its coil. Failure of the FX relay to energize prevented the fan from starting and the damper from opening.

The FX relay was energized by Control Room personnel when the associated control board handswitch was placed in the START position. This action electrically bypassed the closed contacts on the override relay and energized the FX relay coil. The damper opened and the fan started in response to the FX relay being energized. The override relay was replaced and successfully retested.

The duration between the manual initiation of the Train A FBEVAS, subsequent Control Room personnel action, and the successful operation of the FBEV AFU was approximately one minute.

The override relay is manufactured by General Electric and is an industrial relay Model CR120B, Series A. A preliminary review found that the GE Model CR120B relay is used in 280 essential circuits per unit at Palo Verde. These relays are used as alarm relays, permissive relays, override relays, auxiliary relays, etc. A preliminary review of failure data trending and Palo Verde work history found that the GE CR120B relays are normally very reliable. There was only one other occurrence that a high contact resistance reading caused an alarm relay failure.

There are no indications that any structures, systems, or components were inoperable at the start of the event which contributed to this event. No failures of components with multiple functions were involved.

6. CORRECTIVE ACTIONS TO PREVENT RECURRENCE:

An independent investigation of this event was conducted in accordance with the APS Corrective Action Program. As discussed in Section 5, the Train A FBEVAS failed to fully actuate due to a faulty contact on an override relay. The override relay was replaced under an approved corrective maintenance work order and successfully retested.

The loss of SFP level was classified as a significant event and a separate independent investigation of this event was conducted in accordance with the APS Corrective Action Program. Immediate corrective actions included a valve alignment verification for applicable portions of the pool cooling system including the transfer canal gate seal IA supply and pool cleanup systems, local monitoring of the gate seal pressures, establishing equilibrium between the SFP and the fuel transfer canal, and modifying appropriate procedures (IA AOP) to prevent recurrence. The affected equipment was quarantined and outage-related work was terminated in the SFP area until a management review team assessed the specific details surrounding the event. In addition, the event was reviewed by the Plant Review Board on the following day. Specific details involving corrective actions related to the loss of SFP level are being addressed under a separate investigation and are not discussed in this LER for a manual actuation of an ESF.

7. PREVIOUS SIMILAR EVENTS:

Although previous events for manual ESF or reactor protection system (RPS) (JC) actuations have been reported pursuant to 10CFR50.73, the causes for these events were not similar and the corrective actions taken for the previous events would not have prevented this event.

VERIFICATION OF ACCURACY

1. CRDR Investigation for 3-7-0116 and 3-7-0117
2. Unit 3 Unit logs
3. Personnel statements

COMMITMENT/ACTION PLAN (Stated or Implied)

None

CHANGES TO UFSAR

None