

## LICENSEE EVENT REPORT (LER)

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digits/characters for each block)

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FACILITY NAME (1)

Palo Verde Nuclear Generating Station Unit 2

DOCKET NUMBER (2)

05000529

PAGE (3)

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TITLE (4)

Unit 2 Spent Fuel Assembly Stored in Wrong Location

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 NAME	DOCKET NUMBER
03	26	1999	1999	003	00	04	25	1999	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
POWER LEVEL (10)		92	20.2201(b)		20.2203(a)(2)(v)		X		50.73(a)(2)(i)(b)	50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)				50.73(a)(2)(ii)	50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)				50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)				50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)				50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)				50.73(a)(2)(vii)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME Daniel G. Marks, Section Leader, Regulatory Affairs

TELEPHONE NUMBER (Include Area Code) 623-393-6492

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## SUPPLEMENTAL REPORT EXPECTED (14)

YES  
(If yes, complete EXPECTED SUBMISSION DATE.)

X NO

## EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 26, 1999, at approximately 1139 MST, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 92 percent power, when reactor engineering personnel notified operations that fuel assembly P1B241, which was stored in the spent fuel pool (SFP) region 3, location C36, should have been placed in region 2 of the SFP based on the initial enrichment and assembly burn-up factors. The assembly was stored in this region from approximately August 27, 1997 to March 26, 1999. Operations personnel entered Technical Specification (TS) 3.7.17 condition A, to restore the fuel assembly to the correct SFP region. On March 26, 1999 at approximately 1727 MST, the fuel assembly was moved and secured in SFP region 2, location S01.

An engineering evaluation determined that there was not an immediate safety concern with respect to reactivity control in that Keff remained less than 0.95. The evaluation concluded that up to four new 4.3 percent enriched assemblies can be placed incorrectly in a 4/4 configuration with 2150 PPM boron, and Keff would remain less than or equal to 0.95.

The preliminary cause of the misplaced assembly was due to personnel error in preparing the material balance area transfer form set, which was also not detected by independent verification.

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



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		1999	- 003 -	000	

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

### 1. REPORTING REQUIREMENT:

This LER 529/99-003-00 is being submitted to report an event that resulted in Palo Verde unit 2 operating in a condition prohibited by the plant's Technical Specifications, as specified in 10CFR50.73(a)(2)(I)(b).

Specifically, on March 26, 1999, at approximately 1139 MST, Palo Verde unit 2 was in Mode 1 (POWER OPERATION), operating at approximately 92 percent power, when reactor engineering personnel (utility non-licensed) notified operations personnel that spent fuel assembly P1B241, which was stored in the spent fuel pool (SFP) region 3, location C36, should have been placed in region 2 of the SFP based on initial enrichment and assembly burnup factors. Technical Specification (TS) 3.7.17 ACTION A.1 requires that the combination of initial enrichment and burnup of each fuel assembly stored in each of the three regions of the fuel storage pool shall be within the acceptable burnup domain for each region and to initiate action to move the noncomplying assembly into an appropriate region immediately. Spent fuel assembly P1B241 was stored in this region from approximately August 27, 1997 to March 26, 1999. On March 26, 1999 at approximately 1727 MST, fuel assembly P1B241 was moved from region 3 to region 2 location S01 to comply with technical specifications.

### 2. EVENT DESCRIPTION:

On March 26, 1999, reactor engineering reviewed the draft of the spent fuel pool region specifications in preparation for the unit 2 refueling outage. The unit 2 region specifications were generated using an ACCESS database, which was used for the first time in unit 2. This program was previously implemented in units 1 and 3. A comparison of the draft ACCESS-base region specs and the previously approved spec indicated a discrepancy in the allowed region for storage of P1B241. The burnup specifications for fuel assembly P1B241, required the assembly to be in region 2. However, the assembly was located in region 3 at location C36. Reactor engineering personnel verified the discrepancy and immediately contacted the unit 2 control room. Operations personnel entered technical specification 3.7.17, required ACTION A.1, which requires immediate action (without delay and in a controlled manner) to move the noncomplying fuel assembly to its correct location. On March 26, 1999 at approximately 1727 MST, fuel assembly P1B241 was moved from region 3 to region 2 location S01 to comply with technical specifications.

Further evaluation by reactor engineering concluded that fuel assembly P1B241 was stored in this region from approximately August 27, 1997 to March 26, 1999. The current safety analysis shows that up to four 4.3 percent enriched assemblies in a 4/4 configuration with 2150 PPM boron can be placed incorrectly, and Keff would remain less than or equal to 0.95. Fuel assembly P1B241 had an initial enrichment of approximately 2.734 percent.



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## 2. EVENT DESCRIPTION cont'd:

The eight fuel assemblies surrounding the mispositioned assembly had initial enrichments that varied between 1.923 percent and 3.950 percent. Reactor engineering evaluation of this data determined that there was not an immediate safety concern with respect to reactivity control in that Keff remained less than 0.95.

A transportability review (100 percent verification) was conducted for units 1, 2, and 3 to verify the spent fuel storage configurations. This review included verification of the coordinates of each fuel assembly in the fuel pool using the material balance area transfer forms. The initial enrichment and burnup data for each fuel assembly was compared to the coordinates of each assembly to ensure it was stored in the proper location. The evaluation concluded that out of approximately 2052 fuel assemblies stored in units 1, 2, and 3, only P1B241 was out of configuration.

The spent fuel pool region specification in place on August 08, 1997 identified fuel assembly P2B241 as eligible for storage in all three regions of the spent fuel pool. However, fuel assembly P1B241 was eligible for storage in only regions 1 and 2. Personnel apparently documented the wrong fuel assembly number for the corresponding spent fuel pool location when preparing a material balance area transfer form. Subsequent independent verification was inadequately performed for 100% of information on the material balance area transfer form sets as required by procedure 72DP-9NF01.

There were no safety system actuations and none were required.

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

The safety analysis regarding TS 3.7.15 describes an event where a fuel assembly could be inadvertently loaded into a spent fuel rack not allowed by TS 3.7.17. The event could have a positive reactivity effect, decreasing the margin to criticality. However, the negative reactivity effect of 2150 PPM boron compensates for increased reactivity caused by this postulated accident scenario.

As a result of a NRC question regarding a 1994 Technical Specification Change for the spent fuel pool, ABB/CE provided an analysis for misplacement of fuel assemblies. The analysis assumed that four fuel assemblies of 4.3 percent would be incorrectly loaded in the spent fuel pool in a four out of four configuration with a soluble boron concentration of 2150 PPM. Fuel assembly P1B241 had an initial enrichment of approximately 2.734 percent. The eight fuel assemblies surrounding the mispositioned assembly had initial enrichments that varied between 1.923 percent and 3.950 percent.



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### 3. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THIS EVENT cont'd:

Keff would still remain less than or equal to 0.95 for this condition since the actual assemblies are less limiting (lower enrichment/higher burnup) than those assumed in the analysis. Therefore, this event is bounded by the current safety analysis. On March 26, 1999 at approximately 1727 MST, fuel assembly P1B241 was moved from region 3 to region 2 location S01 and TS 3.7.17 was exited.

A transportability review (100 percent verification) was conducted for units 1, 2 and 3 to verify spent fuel storage configurations. The review confirmed that out of approximately 2052 fuel assemblies, only P1B241 was out of configuration. The event did not result in any challenges to the fission product barriers or result in the release of radioactive materials in excess of quantities allowed by 10CFR20. 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 the health and safety of the public.

### 4. CAUSE OF THE EVENT:

An independent investigation of this event is being conducted in accordance with the APS Corrective Action Program. The cause of the misplaced fuel assembly was apparently personnel error in preparing a material balance area transfer form, and subsequent verification was not adequately performed to verify the appropriate assembly configuration. If the final results differ from this determination, a supplement to this report will be submitted to describe the final root cause determination.

No unusual characteristics of the work location (e.g., noise, heat, poor lighting) directly contributed to the event. No additional procedural errors contributed to the event.

### 5. STRUCTURES, SYSTEMS, OR COMPONENTS INFORMATION:

The spent fuel storage is designed to store either new (nonirradiated) or burned (irradiated) fuel assemblies in a vertical configuration underwater. The current storage configuration, which allows credit to be taken for burnup, is designed as three separate regions with region 1 containing the most reactive fuel assemblies and region 3 the least reactive. To prevent inadvertent storage of a fuel assembly in a cell required to be vacant, cell blocking devices are used in regions 1 and 2. There are no cell blocking devices placed in region 3. The spent fuel storage cells are installed in parallel rows with a nominal center-to-center spacing of 9.5 inches. This spacing and storage of fuel based on burnup is sufficient to maintain Keff less than or equal to 0.95 for spent fuel of original enrichment of up to 4.30 percent with no credit for soluble boron.

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## 5. STRUCTURES, SYSTEMS, OR COMPONENTS INFORMATION cont'd:

This assures that Keff will remain less than or equal to 0.95 in the event of a fuel handling accident. There are no indications that any structures, systems, or components were inoperable at the start of the event, which contributed to the event. No other component or system failures were involved. No failures of components with multiple functions were involved. No failures that rendered a train of a safety system inoperable were involved.

## 6. CORRECTIVE ACTIONS TO PREVENT RECURRENCE:

As immediate corrective action, Operations personnel entered Technical Specification (TS) 3.7.17 condition A, to restore the fuel assembly to the correct SFP region. On March 26, 1999 at approximately 1727 MST, the fuel assembly was moved and secured in SFP region 2, location S01.

A transportability review was conducted for units 1, 2, and 3 to verify spent fuel storage configuration. The review confirmed that out of approximately 2052 fuel assemblies reviewed, only P1B241 was out of configuration.

An ongoing evaluation is being conducted in accordance with the APS Corrective Action Program to address personnel error associated with verification of data.

Enhancements to procedure 72DP-9NF01 Rev.3 will be made by June 30, 1999 to further define independent review responsibilities for the material balance area transfer form sets.

To ensure engineering personnel awareness of the anomalies associated with this event, the lessons learned will be placed in the Engineering industry events training and will be completed by June 30, 1999.

## 7. PREVIOUS SIMILAR EVENTS:

There have been no previous similar events reported pursuant to 10CFR50.73 in the past three years for misplacing a spent fuel assembly.



