

LICENSEE EVENT REPORT (LER)

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FACILITY NAME (1)

Palo Verde Nuclear Generating Station, Unit 1

DOCKET NUMBER (2)

05000528

PAGE (3)

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TITLE (4)

Inadequate Procedure Results in Nuclear Power Channels Not Calibrated During Power Ascension Tests

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
05	07	1996	1996	008	00	01	15	1999	Palo Verde, Unit 2	05000529
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
POWER LEVEL (10)	70%	20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	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 368A
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, Nuclear Regulatory Affairs

TELEPHONE NUMBER (Include Area Code)

(602) 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 December 21, 1998 with Palo Verde Units 1 and 2 operating in Mode 1 at approximately 100 percent power, Engineering personnel discovered that incorrect acceptance criteria had been used for the calibration of nuclear power channels during power ascension testing following refueling outages for Unit 1 in April 1998 and Unit 2 in May 1996 and October 1997. The incorrect acceptance criteria was located in the Power Calibration procedure and resulted in a condition prohibited by Technical Specifications in that the lower limit of acceptance (-0.5 percent) was not met. The procedure had the incorrect acceptance criteria since December 1995 but was only used to calibrate nuclear power channels for initial startups following refueling outages. A review of other performances of the procedure did not identify additional occurrences of Technical Specification non-compliance.

The cause of the events was determined to be a deficient procedure used during power ascension tests conducted during initial startups following refueling outages. Corrective actions include revising the procedure to incorporate the correct acceptance criteria.

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		1996 - 008 - 00			

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

1. REPORTING REQUIREMENT:

This LER 528/96-008-00 is submitted to report events that resulted in an operation or condition prohibited by the plant's Technical Specifications (TS) as specified in 10CFR50.73(a)(2)(i)(B).

Specifically, on April 23, 1998 with Unit 1 in MODE 1 (POWER OPERATION) at approximately 68 percent power during the initial startup following a refueling outage, the B channel of the core protection calculator (CPC) (JC) delta T power indication was not calibrated to within the TS required -0.5 percent of Rated Thermal Power (RTP).

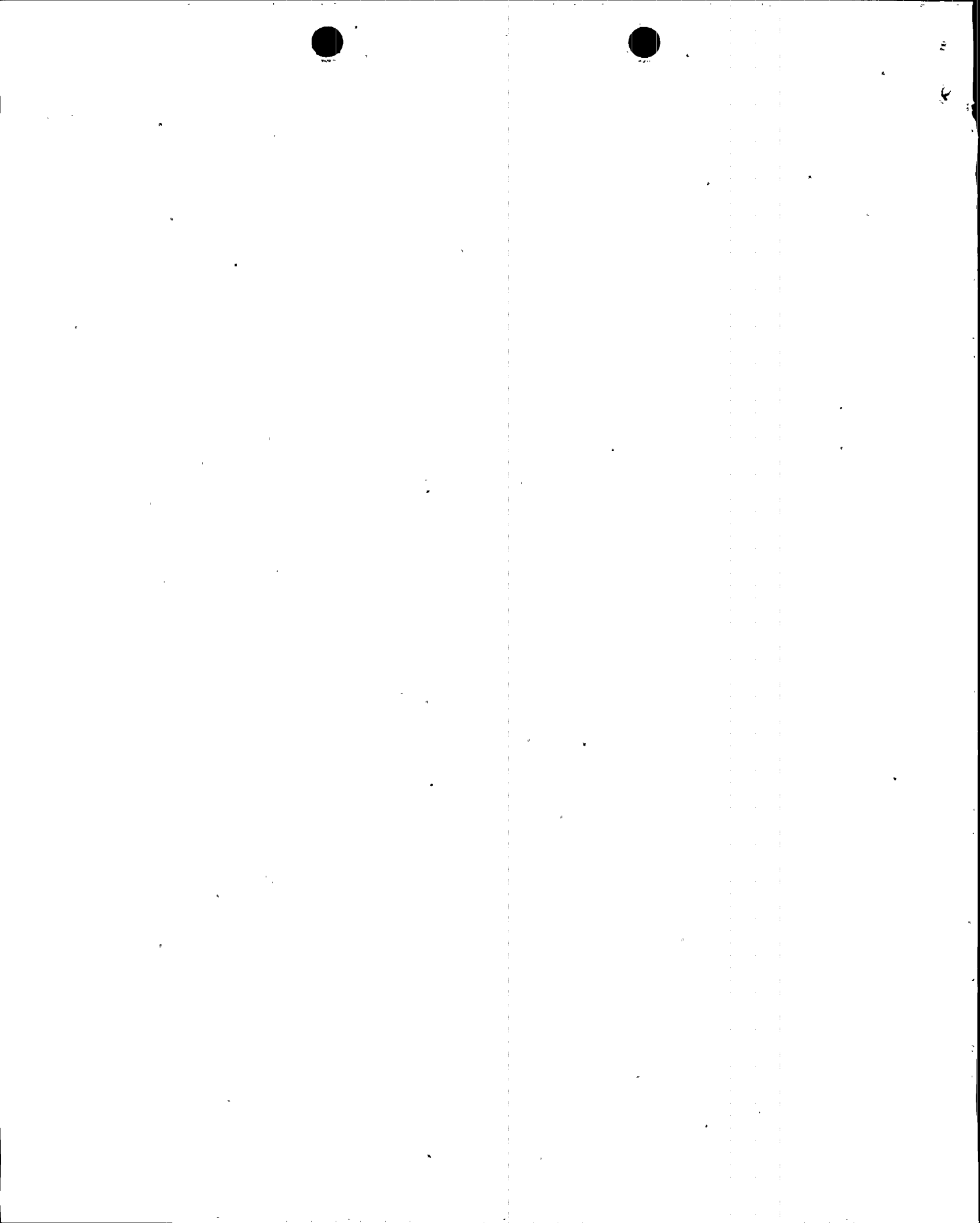
On October 16, 1997 with Unit 2 in MODE 1 at approximately 68 percent power during the initial startup following a refueling outage, the A channel of the plant protection system (PPS) (JC) linear power indication was not calibrated to within the TS required -0.5 percent of RTP.

On May 7, 1996 with Unit 2 in MODE 1 at approximately 67 percent power during initial startup following a refueling outage, the B and D channels of the PPS linear power indication were not calibrated to within the TS required -0.5 percent of RTP.

These conditions were discovered on December 21, 1998 during a review of procedures used to calibrate the nuclear power channels for initial startups following refueling outages.

2. EVENT DESCRIPTION:

In December 1995 a TS amendment was implemented which changed the acceptance criteria for calibration of nuclear power indication generated by the CPCs and the excore linear power indicators. The criteria prior to the amendment was +/- 2 percent RTP when power level was > 15% RTP. The amendment changed the calibration criteria to -0.5 to + 10 percent RTP when the power level was between 15 to 80 percent RTP. The TS remained at +/- 2 percent for power levels >= 80 percent. TS Surveillance Requirement 4.3.1.1 (ITS 3.3.1.4) required a daily calibration of the nuclear power indication channels except during PHYSICS TESTS when the daily calibrations could be suspended provided the calibration is performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau. The procedure used to calibrate the channels was not changed to reflect the amended criteria and contained acceptance criteria of -0.5 percent to + 2 percent with power < 30 percent and +/- 2 percent with power >= 30 percent.



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On May 7, 1996 with Unit 2 in MODE 1 power was stabilized at approximately 67 percent power to perform physics testing at the 70 percent power plateau during the initial startup following a refueling outage. At the completion of the 70 percent plateau testing the B and D channels of the PPS linear power indications were verified during performance of the Power Calibration procedure to be 0.82 and 0.76 percent respectively below the calorimetric power indication. The procedure acceptance criteria was +/- 2 percent RTP and no calibration of the B and D channels was performed.

On October 16, 1997 with Unit 2 in MODE 1 power was stabilized at approximately 68 percent power to perform physics testing at the 70 percent plateau during the initial startup following a refueling outage. The A channel of the PPS linear power indication was verified during performance of the Power Calibration procedure to be 0.6 percent below the calorimetric power indication. The procedure acceptance criteria was +/- 2 percent RTP and no calibration of the A channel was performed.

On April 23, 1998 with Unit 1 in MODE 1 power was stabilized at approximately 68 percent power to perform physics testing at the 70 percent plateau during the initial startup following a refueling outage. At the completion of the 70 percent plateau testing the B channel of the core protection calculator delta T power indication was verified during performance of the Power Calibration procedure to be .6 percent below the calorimetric power indication. The procedure acceptance criterion was +/- 2 percent RTP and no calibration of the B channel was performed.

In each event the condition was not detected and physics testing was completed. Following completion of the testing, daily calibration of the nuclear power channels was completed by control room personnel (utility-licensed operator) using different procedures. The procedure deficiency was discovered during an Engineering (other utility personnel) review of Unit 3 startup testing paper work following a refueling outage in October 1998. Once the error in the Power Calibration procedure was identified, a review of all initial startups following refueling outages since December 1995 for all three units was completed. On December 21, 1998 the three events described in this LER were identified, all the others were within the -.05 to +10 percent band.

An investigation was initiated in accordance with the APS corrective action program and has determined the cause of the TS non-compliance was a deficient procedure. There were no safety system actuations and none were required for the three events.

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

A daily calibration (heat balance) was performed when thermal power was ≥ 15 percent. The PPS linear power level signal, CPC delta T power, and CPC nuclear power channels were adjusted to make them agree with the calorimetric calculation. The difference value of ± 2 percent when RTP is ≥ 80 percent RTP, and -0.5 to 10 percent RTP was between 15 and 80 percent is adequate because this value is assumed in the safety analysis. These checks (and, if necessary, the adjustment of the linear power level signal and the CPC addressable constant coefficients) are adequate to ensure that the accuracy of these CPC calculations is maintained within the analyzed error margins.

The tolerance between 15 and 80 percent RTP is +10 percent to reduce the number of adjustments required as the power level increases. The -0.5 percent tolerance between 15 and 80 percent RTP is based on the reduced accuracy of the calorimetric data inputs at low power levels. Performing a calorimetric calibration with a -0.5 percent tolerance at low power levels ensures the difference will remain within -2.0 percent when power is increased above 80 percent RTP.

The Transient Analysis Section of Nuclear Fuel Management completed an assessment of these events and concluded there was no effect on the consequences of UFSAR Chapter 15 events and other safety analyses due to the non-conservative power calibrations. The specifics of this assessment are:

1. During the Unit 1 power ascension testing on April 23, 1998, the power increase from the 70% power testing plateau to the 100% power testing plateau was executed with one single channel (Channel B) of CPC Delta T power not calibrated within the required TS tolerance.
2. During the Unit 2 power ascension testing on May 7, 1996, the power increase from the 70% power testing plateau to the 100% power testing plateau was executed with two channels (Channels B & D) of PPS Linear Power not calibrated within the required TS tolerance.
3. During the Unit 2 power ascension testing on October 16, 1997, power was maintained at the 70% power testing plateau with one single channel (Channel A) of PPS Linear Power not calibrated within the required TS tolerance.

It should be noted that ITS requirements, implemented in August 1998, contain the same criterion with the exception of applying the reduced band between 20 to 80 percent instead of between 15 to 80 percent.

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In case 1 above, the non-compliance resulted in one single channel of CPC DeltaT power being calibrated low. This does not have an impact on the safety analysis because the PPS uses a 2 out of 4 logic and the other three CPC channels were in compliance with the required TS tolerances and would have calculated power conservatively. Further, the CPC uses the higher of the two power inputs from DeltaT power and Nuclear Power. Nuclear Power input was calibrated in compliance with the required TS tolerances.

In cases 2 and 3 above, there is no impact on safety analysis since PPS Linear Power provides input to the Variable Over Power Trip (VOPT) which is not credited in any Design Basis Event (DBE) analysis. The VOPT function that is credited in the safety analysis is generated within the CPCs and remained OPERABLE during the events.

The event did not result in any challenges to the fission product barriers or result in any release 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 EVENTS:

An independent investigation of this event was conducted in accordance with the APS corrective action program. The root cause of the TS non-compliance in each of the three cases was determined to be a deficient procedure in that the Power Calibration procedure (72PA-9RX01) contained incorrect acceptance criteria for nuclear power channel calibrations performed during PHYSICS TESTS when power was between 30 percent to 80 percent of RTP. An impact review for the TS amendment that changed the criteria was sent to the appropriate Engineering organization however, the personnel performing the review did not recognize the need to change the procedure.

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

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5. STRUCTURES, SYSTEMS, OR COMPONENTS INFORMATION:

There are no indications that any structures, systems, or components were inoperable at the start of the event, which contributed, to the event. No 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:

Action being taken to prevent recurrence includes revising the Power Calibration procedure (72PA-9RX01) to incorporate the correct acceptance criteria. This will be completed prior to performing PHYSICS TESTS following the Unit 2 refueling outage currently scheduled to begin in March 1999.

The investigation included a review of other procedures that may have been impacted by the TS amendment. The corrective action process is tracking changes to procedures identified as a result of this review.

7. PREVIOUS SIMILAR EVENTS:

A similar event was reported in LER 529/530/97-004-00. The reported event involved the use of incorrect acceptance criteria when performing daily calibration of the nuclear power channels as required by TS SR 4.3.1.1. The procedure that was used to perform the calibration, Standard Full Power Surveillances 40ST-9ZZ34, was intended to be used by Operations personnel when the Unit was operating at or near 100 percent power and contained acceptance criteria of +/- 2 percent. However, in Units 2 and 3 the procedure was used when power was below 80 percent resulting in the application of incorrect acceptance criteria. The investigation into the event included a transportability review however, since the procedure was an Operations procedure the review did not include the Engineering procedure used during power ascension testing.

LER 528/529/530/97-005-00 reported a TS violation due to an impact review not being sent out for a TS amendment. The cause of that event was different and the actions taken would not have prevented the events reported in LER 528/529/96-008-00.

No other similar events have been reported in the last three years.

