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 1	0 5 0 0 0 5 2 8	1 OF 0 5

TITLE (4)
Functional and Response Time Surveillance Test Not Acceptable

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)
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1 1	1 5	8 5	8 5	–	0 7 9	–	0 1	0 4	0 3	8 6		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 0		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)	X 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)

This is a supplemental report to LER 85-079-00.

On November 15, 1985, with Unit 1 in Mode 5 at 0% reactor power (COLD SHUTDOWN), it was determined that Unit 1 had operated in a condition prohibited by the Technical Specifications from April 30, 1985 until November 24, 1985. This condition had occurred due to inadequate performance of all aspects of the Channel Functional Test surveillance requirement for the 4.16 kV emergency bus loss of voltage and degraded voltage relays, and unacceptable performance of the response time surveillance requirement for the 4.16 kV emergency bus degraded voltage relays.

All aspects of the Channel Functional Test surveillance had not been addressed due to an insufficient procedure. The response time surveillance had not been acceptably performed due to personnel error. As corrective action, a procedural revision was implemented and the appropriate personnel were counseled. The surveillances were performed by November 24, 1985, while Unit 1 remained in Mode 5.

To prevent recurrence, increased surveillance/maintenance schedules and conservative test values have been initiated.

There have been no previous similar events.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Palo Verde Unit 1	0 5 0 0 0 5 2 8	8 5	— 0 7 9	— 0 1	0 2 OF 0 5

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

This is a supplemental report to LER 85-079-00.

On November 15, 1985, with Unit 1 in Mode 5 at 0% reactor power (COLD SHUTDOWN, with cold leg temperature < /= 210 degrees F), an onsite procedure review committee was performing a review of a revision to the Surveillance Test Procedure for the Class 4.16 kV bus undervoltage protective relays (note that the revision being reviewed was not related to this event). During this review, it was determined that performance of this procedure did not address all aspects of the 18 month Channel Functional Test (CFT) surveillance required by Technical Specification (T.S.) section 4.3.2.1, Table 4.3-2 VIII A and B, for the Engineered Safety Features Actuation System (ESFAS) (JE) 4.16 kV emergency bus loss of voltage and degraded voltage relays (27). Further investigation revealed that, due to personnel error, the 18 month Engineered Safety Features Response Time surveillance test required by T.S. section 4.3.2.3 had not been acceptably performed for the 4.16 kV emergency bus degraded voltage relays (the response time surveillance for the 4.16 kV emergency bus loss of voltage relays had been satisfactorily performed under a Preventive Maintenance Test).

Based on these findings, the CFT surveillance requirement for the loss of voltage and degraded voltage relays, and the response time surveillance requirement for the degraded voltage relays had not been adequately performed. Since entry into an OPERATIONAL MODE or other specified condition shall not be made unless the Surveillance Requirements associated with the Limiting Condition for Operation have been performed within the stated surveillance interval (T.S. section 4.0.4), Unit 1 inadvertently operated in a condition prohibited by the T.S. from initial Mode 3 entry (HOT STANDBY with cold leg temperature > /= 350 degrees F) on April 30, 1985, until November 24, 1985, when the surveillances were completed (note that Unit 1 was periodically in modes during this time frame which did not require these relays to be operable).

All aspects of the CFT for the loss of voltage and degraded voltage relays had not been addressed due to an insufficient procedure. Previous functional testing of these relays had been performed during a Preoperational Test in October 1983. This test consisted of de-energizing the circuit to each relay with a local test pushbutton. Circuit integrity was then verified for each relay by operation of a light on the Balance of Plant (BOP) ESFAS panel, and a light extinguishing on a control room panel. Although the Preoperational Test did not address all aspects of the T.S. definition of CFT, it did establish that the undervoltage relays would function as designed during a loss of voltage or degraded voltage condition. Therefore, there are no significant safety consequences or implications. As corrective action, the procedure was revised to address CFT requirements. With Unit 1 remaining in Mode 5, the CFT surveillance was completed on November 24, 1985.

On December 9, 1985, a review of the surveillance which was completed on November 24, 1985, determined that there was no documentation of annunciator (ANN) window and computer (CPU) identification point verification as required by the T.S. definition of a CFT. A computer alarm printout was reviewed. The review verified that appropriate computer identification points had been received during the November, 1985, performance of the CFT. The shift supervisor (utility-licensed) who was on-shift during performance of this surveillance confirmed that appropriate annunciator window and audible alarms were received. The procedure was revised to require this verification for subsequent performances.

The root cause of both events associated with incomplete channel functional testing was personnel error (utility and contractor), due to performance of a procedure which did not adequately cover a required activity (i.e., CFT).

The response time surveillance requirement for the degraded voltage relays had not been acceptably performed due to cognitive personnel error. Contrary to an approved procedure, contractor personnel applied the 10% testing sample used for overcurrent protective devices (51) (T.S. section 4.8.4.1), to the response time surveillance. This resulted in only 2 of the required 16 (8 loss of voltage relays and 8 degraded voltage relays) relays being response time tested in March, 1985. Note that all 8 loss of voltage relays had been response time tested during preventive maintenance testing in November, 1984, and all had operated within the T.S. requirement of </= 2.4 seconds. Therefore, the response time surveillance requirement was satisfied for these relays.

The 8 degraded voltage relays had been response time tested during a Preoperational Test in October, 1983. Several relays required initial calibration, and the subsequent retest was completed on November 1, 1983. Although 4 of the 8 "as-left" response times (3 on Train B and 1 on Train A) exceeded the present T.S. requirement of </= 35 seconds (worst case being 35.8 seconds), the T.S. requirement had not been established at that time. The response times met the existing test requirements (33.25 to 36.75 seconds) and the relays were assumed to be functionally operable. An engineering evaluation has verified that, based on the required 2 out of 4 logic for actuation, the degraded voltage relays would have fulfilled the ESFAS requirement for a postulated Loss of Offsite Power event, in that emergency onsite A.C. power would have been restored to the emergency buses within the maximum time allowance of the safety analysis of </= 45 seconds. Therefore, there are no significant safety consequences or implications since the equipment would have performed its design function.

As corrective action, the appropriate personnel were counseled. With Unit 1 remaining in Mode 5, all loss of voltage and degraded voltage relays were response time tested by November 24, 1985. During this testing, 3 of the 4 Train A, and 3 of the 4 Train B degraded voltage relay "as-found" response times exceeded the T.S. requirement of </= 35 seconds. These relays were subsequently calibrated and retested satisfactorily. An engineering evaluation has verified that, based on the required 2 out of 4 logic for actuation, the degraded voltage relays would have fulfilled the ESFAS requirement for a postulated degraded voltage condition in that emergency onsite A.C. power would have been restored to the emergency buses within the maximum time allowance of the safety analyses. Therefore, there are no significant safety consequences or implications since the equipment would have performed its design function.

On December 9, 1985, a review of the surveillance test package which had been completed on November 24, 1985, determined that one loss of voltage relay had response time tested at 2.43 seconds. This was determined to exceed the T.S. acceptance criteria of </= 2.4 seconds, and the relay was reset to an acceptable value. This event was reported in LER 85-087-00.

On February 18, 1986, a review by the NRC resident inspector of the surveillance test package which had been completed on November 24, 1985, identified a discrepancy in the recorded value for one loss of voltage relay trip value. The T.S. requires the relay to trip at >/= 3250 volts, which corresponds to a test reading value of >/= 92.85 volts. One relay was recorded as tripping at 92.8 volts (corresponding to 3248 volts), and was initially considered acceptable. A retest was performed on February 18, 1986, without adjusting the relay, and the test value was found to be acceptable.

The root cause of this discrepancy was cognitive personnel error by the supervisory personnel responsible for reviewing surveillance data. Appropriate personnel have been counseled on the importance/consequences of accurate review of surveillance tests, especially those involving T.S. components. An engineering evaluation has verified that, based on the required 2 out of 4 logic for actuation, the loss of voltage relays would have fulfilled the ESFAS requirement for a postulated loss of offsite power event in that emergency onsite A.C. power would have been restored to the emergency buses within the maximum time allowance of the safety analyses. Therefore, there are no significant safety consequences or implications associated with this discrepancy since the equipment would have performed its design function.

There were no unusual characteristics of the work locations that directly contributed to any of the personnel errors discussed in this LER.

In response to the various discrepancies identified in this LER, several corrective actions have been initiated to prevent recurrence. The 18 month Surveillance Test Procedure for the class 4.16 kV bus undervoltage protective relays, which provides methods for calibration, functional, and response time testing of the class 4.16 kV undervoltage protective relays, will be performed on a quarterly schedule. This schedule may be relaxed in the future if determined to be appropriate by engineering evaluation of the trended results of the testing. In addition, the loss of voltage relays will be response time tested/calibrated to (approximately) 2.2 seconds, and the degraded voltage relays will be response time tested/calibrated to (approximately) 33.5 seconds. Although the respective T.S. response time limits of </= 2.4 seconds and </= 35 seconds will still define operability, testing to the more conservative setpoints will minimize the potential for relay drift resulting in inoperable equipment. To minimize the potential for response time drift of the degraded voltage relays, a preventive maintenance task will exercise these relays monthly. This is in response to the vendor's recommendation that repeatability can be improved by increasing the frequency at which the relay is operated. This monthly schedule may be relaxed in the future if determined to be appropriate by engineering evaluation of the trended results of the surveillance testing of these relays. The increased maintenance activities described above are expected to minimize testing results that are outside of T.S. values for the undervoltage and degraded voltage relays.

The function of the ESFAS 4.16 kV emergency bus loss of voltage and degraded voltage relays is to provide the emergency start signal to enable the diesel generator (DG) to supply the emergency bus following a degraded or loss of voltage condition. Two actual loss of offsite power events occurred in October, 1985 (see LER's 85-058 and 85-076). In each case, the diesel generators started and provided power to the emergency buses as required. Although surveillance credit is not being assumed for these occurrences, they are positive indications that the loss of voltage relays would have performed (and in fact did perform), their design safety function during the time period since Unit 1 had initially entered Mode 3.

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April 3, 1986
ANPP-35941-EEVB/BJA/98.05

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

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License NPF-41)
Licensee Event Report - 85-079-01
File: 86-020-404

Dear Sirs:

Attached please find Supplement Number 01 to Licensee Event Report (LER) No. 85-079-00 prepared and submitted pursuant to 10 CFR 50.73. In accordance with 10 CFR 50.73(d), we are herewith forwarding a copy of this report to the Regional Administrator of the Region V Office.

If you have any questions, please contact me.

Very truly yours,

E E Van Brunt Jr/JH

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

EEVB/BJA/rw
Attachment

cc: J. B. Martin (all w/a)
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