

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
Palo Verde Unit 1

DOCKET NUMBER (2)

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

TITLE (4)

Reactor Trip During Load Rejection Test

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	9	1	2	8	5	8	5	0	6	3	0 0 0 3 1 7 8 6

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following): (11)																												
1	<table border="1"><tr><td>20.402(b)</td><td>20.405(e)</td><td><input checked="" type="checkbox"/></td><td>50.73(a)(2)(iv)</td><td>73.71(b)</td></tr><tr><td>20.405(a)(1)(i)</td><td>50.36(e)(1)</td><td><input checked="" type="checkbox"/></td><td>50.73(a)(2)(v)</td><td>73.71(c)</td></tr><tr><td>20.405(a)(1)(ii)</td><td>50.36(e)(2)</td><td><input checked="" type="checkbox"/></td><td>50.73(a)(2)(vii)</td><td><input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text: NRC Form 365A)</td></tr><tr><td>20.405(a)(1)(iii)</td><td>50.73(a)(2)(i)</td><td><input type="checkbox"/></td><td>50.73(a)(2)(viii)(A)</td><td rowspan="3">Special Report</td></tr><tr><td>20.405(a)(1)(iv)</td><td>50.73(a)(2)(ii)</td><td><input type="checkbox"/></td><td>50.73(a)(2)(viii)(B)</td></tr><tr><td>20.405(a)(1)(v)</td><td>50.73(a)(2)(iii)</td><td><input type="checkbox"/></td><td>50.73(a)(2)(ix)</td></tr></table>	20.402(b)	20.405(e)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)	20.405(a)(1)(i)	50.36(e)(1)	<input checked="" type="checkbox"/>	50.73(a)(2)(v)	73.71(c)	20.405(a)(1)(ii)	50.36(e)(2)	<input checked="" type="checkbox"/>	50.73(a)(2)(vii)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text: NRC Form 365A)	20.405(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	Special Report	20.405(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)	20.405(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)
20.402(b)	20.405(e)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)																									
20.405(a)(1)(i)	50.36(e)(1)	<input checked="" type="checkbox"/>	50.73(a)(2)(v)	73.71(c)																									
20.405(a)(1)(ii)	50.36(e)(2)	<input checked="" type="checkbox"/>	50.73(a)(2)(vii)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text: NRC Form 365A)																									
20.405(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	Special Report																									
20.405(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)																										
20.405(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)																										

LICENSEE CONTACT FOR THIS LER (12)
NAME
William F. Quinn, Manager - Nuclear Licensing (Extension 4087)

TELEPHONE NUMBER

AREA CODE

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 NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)
YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

ABSTRACT (Limit to 7400 spaces, i.e., approximately fifteen single space typewritten lines) (16)
This is a supplement to LER 85-063-00.

On September 12, 1985, Palo Verde Unit 1 was in Mode 1 at 53 percent reactor power when the Main Generator (EL) breaker was opened at 2208 to initiate a load rejection test. As a result, the reactor tripped due to the Core Protection Calculators (CPC) sensing an imminent loss of forced coolant circulation resulting from the slowing down of the Reactor Coolant Pumps (RCP). The reactor trip caused a subsequent turbine trip. Natural Circulation was then established. Due to the combined effects of auxiliary feed, open steam line drain valves, an open atmospheric dump valve, and low decay heat, the Reactor Coolant System (RCS) was cooled down and depressurized to the Safety Injection and Containment Isolation Actuation setpoint (JE). An unrelated failure in the Volume Control Tank (VCT) level instrumentation caused the charging pumps to lose suction due to the VCT being emptied. Essential Chiller (KM) "A" failed due to a loss of refrigerant.

ANPP has implemented the following short term compensatory measures: the VCT level indication reference leg will be verified daily, procedures have been modified to assure proper auxiliary spray and charging pump operation, the remaining power ascension test procedures will be re-reviewed by the appropriate vendor(s), the post trip review process has been reviewed to assure it is adequate, and shift staffing needs for the remaining power ascension tests will be reviewed prior to performing the test.

This report also satisfies the requirement for a Special Report (1-SR-85-016) pursuant to Technical Specification 3.5.2 Action b. There has been one safety injection actuation cycle to date and the injection nozzle usage is less than 0.70.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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

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

This is a supplement to LER 85-063-00.

At 2250 on September 12, 1985, the NRC Operations Center was notified, via the Emergency Notification System, of the declaration of a NOTIFICATION OF UNUSUAL EVENT for Unit 1 of the Palo Verde Nuclear Generating Station. Prior to this event, Palo Verde Unit 1 was in Mode 1 at 53 percent reactor power.

At 2208, the Main Generator (EL) output breaker was opened to initiate a load rejection test. It was anticipated that this would cause the turbine to reduce speed and maintain house load requirements. However, the turbine Electro Hydraulic Control Systems (JJ) was unable to control the turbine at house loads causing the main generator frequency to decay. With the house loads, including the Reactor Coolant Pumps (RCPs), still connected to the main generator and frequency decreasing with turbine speed, a reactor trip occurred due to low projected DNBR due to the reactor protection system Core Protection Calculators (CPC) sensing an imminent loss of forced coolant circulation as a result of the coast down of the RCPs. The reactor trip generated a turbine trip.

As the generator speed continued to decrease, the RCP breakers opened as designed. The house loads were deenergized when the auxiliary transformer breakers opened as designed, deenergizing nonessential buses NAN-S01 and NAN-S02 (EL). The fast transfer of these loads to offsite power did not occur because of the low frequency on buses NAN-S01 and NAN-S02. As a result, power was lost to all nonclass IE powered radiation monitors (RMS) (IL) and to the RMS computer. All RMS units required by Technical Specifications to perform safety related actuations remained powered and capable of performing their safety functions. In addition, although the RMS computer was not functional, all class powered RMS units could be monitored using the Remote Indicating Modules (RICS) located in the Control Room area.

The reactor operators stabilized the plant at approximately 2000 psia in the Reactor Coolant System (RCS). Natural circulation was established and verified per procedure. The shutdown margin was checked per procedure and was maintained at greater than six percent. No credit was taken for boron addition during High Pressure Safety Injection (HPSI).

The nonessential auxiliary feedwater pump, AFN-P01, was started to provide feed flow to the steam generators, and an atmospheric dump valve on each steam generator was manually opened to control steam pressure to ensure adequate temperature differential for natural circulation. Circulating water pumps had lost power when buses NAN-S01 and NAN-S02 were deenergized making the condenser unavailable.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES: 8/31/88

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

TEXT (If more space is required, use additional NRC Form 388A's) (17)

The Reactor Coolant System (RCS) cooldown rate increased due to feeding of auxiliary feedwater, loss of RCP heat input to the RCS, minimal decay heat, and main steam line drain valves reopening after restoration of power to the nonessential buses (these valves had previously been manually closed from the control room). This higher than expected cooldown rate resulted in the pressurizer pressure dropping to less than the Safety Injection Actuation System (SIAS)(JE) setpoint of 1837 psia causing an automatic SIAS and concurrent Containment Isolation Actuation Signal (CIAS)(JE) at 2220 hours. Both systems performed as designed.

The RCS pressure decreased to approximately 1819 psia before recovery within approximately two minutes. The total volume of safety injection was approximately 300 gallons. The Essential Auxiliary Feedwater Pump "B" (BA) auto started but was not used immediately to feed the Steam Generators (SG) due to adequate level in the SG. The charging pumps lost suction and were gas bound by the Volume Control Tank (VCT) hydrogen cover gas due to draining of the VCT, therefore, the requirements of Technical Specification 3.1.2.2 were not met. Charging was reestablished in approximately 1.5 hours, therefore, requirements of Technical Specification 3.0.3 were complied with. The VCT drained due to the lack of auto makeup and failure of the outlet isolation valve (CH-UV-501) to close on a 10-10 level (5 percent) because of an erroneous level indication of 20 percent. This was due to the VCT level instrument reference leg not being entirely full.

Main steam drain line valves were closed and RCS cooldown stopped at 2223. Forced cooling of the primary system was restored at approximately 0029 on September 13, 1985, and the NOTIFICATION OF UNUSUAL EVENT was terminated at approximately 0102. The event did not result in the release of any radioactive materials or challenge any fission product barriers.

Also during this event, the Essential Chiller "A" (KM) tripped due to low refrigerant charge. Subsequently, the chiller was restarted and tripped again. A defective solder joint was discovered on the line from the evaporator to the purge. This line was isolated, the chiller was charged with refrigerant, and was returned to service. At no time during the evolution did the High Pressure Safety Injection, Low Pressure Safety Injection, or Containment Spray pump room temperature reach a level where chiller operation was required. Isolation of the purge line does not affect operability of the chiller.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/90

FACILITY NAME (1) Palo Verde Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 5 2 8	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 5	- 0 6 3	- 0 0	0 4	OF	0 5

TEXT: If more space is required, use additional NRC Form 3664's (17)

The health and safety of the general public was not jeopardized since pressurizer level and pressure could be maintained by High Pressure Safety Injection Pumps (BQ) with the charging pumps not operating until charging flow was reestablished. Operators were aware of the gas binding problem and were also aware of their available options (i.e., Boron Injection Flowpaths and alternate depressurization methods) to maintain safe plant conditions at all times.

The post trip review identified several actions required for restart. These were reviewed with the NRC subsequent to their implementation and subsequent restart. As agreed to in a September 20, 1985, meeting between the NRC and ANPP, the compensatory measures were modified to the following short term measures:

- 1) Monitor the reference leg of the volume control tank level indicator on a daily basis. If the data obtained justify a less frequent monitoring interval, ANPP may propose a different interval to the NRC staff.
- 2) Revise the appropriate procedures to require alignment of the refueling water tank to charging pump suction promptly on loss of offsite power.
- 3) Institute procedural cautions on restart of the charging pumps.
- 4) Examine the post-review process in light of the September 12, 1985, event to ensure that off-normal events are adequately evaluated, particularly with respect to their potential safety significance.
- 5) Examine the process for vendor reviews of the remaining power ascension tests to assure that, for equipment particularly sensitive to the test being conducted, appropriate vendor input has been provided in the test development.
- 6) Review of the shift complement for the remaining power ascension tests will be performed prior to performance of the list, to determine if additional staffing may be appropriate.

Also, ANPP has evaluated the auxiliary pressurizer spray design and have identified the following enhancements.

- 1) Provide power to CH-501 and -536 from an IE Motor Control Center following a Loss-of-Offsite power and/or Safety Injection Actuation Signal.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 9/31/88

FACILITY NAME (1) Palo Verde Unit 1	DOCKET NUMBER (2) 05000528	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		85	063	00	05	OF 05

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

- 2) Enhance the reliability of the Volume Control Tank (VCT) level indication.
- 3) Provide automatic realignment of CH-501 and 536 on Lo-Lo VCT level and loss-of-offsite power, align charging pump suction from the refueling water tank.

These enhancements, along with implementation schedules, were discussed in a letter from E. E. Van Brunt, Jr., ANPP, to G. W. Knighton, NRC, dated October 15, 1985 (ANPP-33713). The schedule for implementation for these enhancements is the first refueling outage for Unit 1, prior to exceeding 5 percent power for Unit 2, and prior to fuel load for Unit 3.

This report also satisfies the requirement for a Special Report (1-SR-85-016) pursuant to Technical Specification 3.5.2, Action b. There has been one safety injection actuation cycle to date and the injection nozzle usage factor is less than 0.70.

No similar reactor trips have occurred previously.



Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

March 17, 1986
ANPP-35537 EEVB/RAB/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 - 85-063-00
Special Report - 1-SR-85-016
File: 86-020-404; 86-056-020; G.1.01.10

Dear Sirs:

Attached please find Supplement No. 01 to Licensee Event Report (LER) No. 85-063-00 prepared and submitted pursuant to 10 CFR 50.73. This report also satisfies the requirement for a Special Report pursuant to Technical Specifications 3.5.2 (Action b) and 6.9.2. In accordance with 10 CFR 50.73(d), and Technical Specification 6.9.2, we are herewith forwarding a copy of the 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.
Executive Vice President
Project Director

EEVB/RAB/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