ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9009250128 DOC.DATE: 90/09/13 NOTARIZED: NO DOCKET #
FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
AUTH.NAME AUTHOR AFFILIATION
BRADISH,T.R. Arizona Public Service Co. (formerly Arizona Nuclear Power
LEVINE,J.M. Arizona Public Service Co. (formerly Arizona Nuclear Power
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-006-00:on 900814,reactor trip following manual turbine trip.

W/9 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 9
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:STANDARDIZED PLANT 05000528

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	1	PD5 PD	1	1
	PETERSON,S.	1	1	TRAMMELL,C.	1	1
INTERNAL:	ACNW	2	2	ACRS	2	2
	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1
	AEOD/ROAB/DSP	2	2	NRR/DET/ECMB 9H	1	1
	NRR/DET/EMEB 7E	1	1	NRR/DLPQ/LHFB11	1	1
	NRR/DLPQ/LPEB10	1	1	NRR/DOEA/OEAB11	1	1
	NRR/DREP/PRPB11	2	2	NRR/DST/SELB 8D	1	1
	NRR/DST/SICB 7E	1	1	NRR/DST/SPLB8D1	1	1
	NRR/DST/SRXB 8E	1	1	REG FILE 02	1	1
	RES/DSIR/EIB	1	1	RGN5 FILE 01	1	1
EXTERNAL:	EG&G BRYCE,J.H	3	3	L ST LOBBY WARD	1	1
	NRC PDR	1	1	NSIC MAYS,G	1	1
	NSIC MURPHY,G.A	1	1	NUDOCS FULL TXT	1	1
NOTES:		1	1			

R I D S / A D D S

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 35 ENCL 35

A04

Arizona Public Service Company
PALO VERDE NUCLEAR GENERATING STATION
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

JAMES M. LEVINE
VICE PRESIDENT
NUCLEAR PRODUCTION

192-00691-JML/TRB/SBJ
September 13, 1990

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Mail Station P1-37
Washington, DC 20555

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 90-006-00
File: 90-020-404

Attached please find Licensee Event Report (LER) No. 90-006-00 prepared and submitted pursuant to 10CFR50.73. In accordance with 10CFR50.73(d), we are forwarding a copy of the LER to the Regional Administrator of the Region V office.

If you have any questions, please contact T. R. Bradish, Compliance Manager at (602) 393-2521.

Very truly yours,

James M Levine

JML/TRB/SBJ/dmn

Attachment

cc: W. F. Conway (all with attachment)
J. B. Martin
D. H. Coe
A. C. Gehr
C. M. Trammell
A. H. Gutterman
INPO Records Center

IE22
1/1

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 8

TITLE (4)

Reactor Trip Following Manual Turbine Trip

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)
									N/A	0 5 0 0 0
0 8	1 4	9 0	9 0	0 0 6	0 0	0 9	1 3	9 0	N/A	0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 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
	AREA CODE
T. R. Bradish, Compliance Manager	6 0 2 3 9 3 - 2 5 2 1

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
X	E L	X F M R	W 1 2 1	Y							

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 August 14, 1990 Palo Verde Unit 1 was operating in Mode 1 at 100 percent power. At approximately 2159 MST it was discovered that the 'B' phase of the Main Transformer had lost forced cooling. A rapid power reduction was initiated in order to unload the transformer within 30 minutes as required by the alarm response procedure for a loss of transformer cooling and to minimize the transient on the plant. The Main Turbine was manually tripped at approximately 2223 with the reactor at approximately 65 percent power. Approximately 30 seconds after the Main Turbine trip, the reactor tripped on high pressurizer pressure. All systems functioned as designed and the plant was stabilized in Mode 3 (HOT STANDBY).

The loss of cooling to the Main Transformer was caused by the failure of a control power transformer. The reactor trip has been determined to be the expected result of a load reject with the reactor at 65 percent power with steam bypass control configured for normal (100 percent power) operation.

The control power transformer was replaced. The alarm response procedure for the Main Transformer will be revised to enhance directions for the "No Voltage Alarm". Enhancements to the steam bypass control system are currently under evaluation.

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On August 14, 1990 Palo Verde Unit 1 was in Mode 1 (POWER OPERATIONS) at 100 percent power.

B. Reportable Event Description (Including Dates and Approximate Times of Major Occurrences):

Event Classification: An event or condition that resulted in automatic actuation of the Reactor Protection System (RPS)(JC)

On August 14, 1990 at approximately 2223 MST Palo Verde Unit 1 experienced an automatic reactor trip from approximately 65 percent power due to high pressurizer (PZR)(AB) pressure. Immediately prior to the reactor trip, reactor power had been rapidly reduced to approximately 65 percent power and the Main Turbine (TA) manually tripped due to loss of forced cooling to the 'B' phase of the Main Transformer (EL).

Prior to the event, Palo Verde Unit 1 was operating at 100 percent power when the control room (NA) received a Main Transformer 'B' "No Voltage Alarm" at approximately 2123 MST. An operator (utility, non-licensed) was dispatched to investigate the alarm in accordance with the alarm response procedure (41AL-1MA01, Group I). The operator proceeded to the control panel located behind the Main Transformer enclosure wall and discovered a breaker (BKR) in the control panel to the 'B' Main Transformer had tripped. The breaker was reset but tripped open in approximately 4 seconds. The Assistant Shift Supervisor (utility, licensed) then went to investigate the situation. The Assistant Shift Supervisor unsuccessfully attempted to reset the breaker after isolating loads. All actions for the alarm response procedure were taken with the last action being to contact Maintenance. At approximately 2159 MST maintenance personnel (utility, non-licensed) observed that the cooling fans to Main Transformer 'B' were not operating. The Main Transformer alarm response procedure for a loss of cooling was then entered (41AL-1MA01, Group A). The alarm response procedure directed that the Main Transformer load be reduced to zero within 30 minutes of a loss of forced cooling to the Main Transformer.

At approximately 2202 MST a power reduction was initiated in accordance with plant procedures. Approximately 20 minutes into the power reduction with reactor power at approximately 70 percent, it was decided to manually trip the Main Turbine. A quick briefing was held by control room personnel (utility/licensed) to discuss required actions and the anticipated plant response. At approximately 2223 MST, the Main Turbine was tripped with the Reactor at approximately 65 percent power.

The Steam Bypass Control System (SBCS)(JI) responded to the transient as designed. At the time of the event seven of the eight steam bypass valves (SBCV)(PCV) were in service and one SBCV was in manual in accordance with plant procedures. When the Main Turbine was tripped, the SBCS generated a quick open signal. The seven in service SBCV's automatically opened to 100 percent in response to the quick open signal. The SBCS then transferred the SBCVs to modulating control. The time delay for the modulate control signal to integrate to take control of the valves allows the SBCVs to begin to close prior to modulation. During this time period, the pressurizer pressure increased and approximately 30 seconds after the turbine trip, the reactor tripped on high pressurizer pressure.

The control room personnel entered the Emergency Operations Procedure and diagnosed the event as an uncomplicated reactor trip. The plant was then stabilized within 5 minutes in accordance with plant procedures and remained in Mode 3 (HOT STANDBY) pending investigation of the trip.

During the recovery from the trip, it was noted that the 'C' Log Power (IG) channel was reading approximately 2 decades higher than the other channels. The 'C' Log Power channel was declared inoperable and placed in bypass.

C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:

The cooling fans and pumps for the 'B' phase of the Main Transformer were out of service prior to the reactor trip because of the loss of transformer control power is described in Section I. B.

In addition, one of the eight SBCVs was in manual as required by APS procedures (e.g. the valve would not automatically operate) for normal (100 percent) power operation.

D. Cause of each component or system failure, if known:

Cooling to Main Transformer 'B' was lost because of the failure of a transformer (XFMR) supplying control power. The loss of control power caused the cooling fans and pumps to stop and the loss of the annunciator system for other transformer alarms. A root cause of failure is being performed on the control power transformer.

The 'C' log power channel reading was caused by noise introduced into the circuit by the proximity of other cables within the instrument drawer. When the instrument drawer is opened and closed (e.g., during surveillance testing), the cables can be repositioned such that noise will be introduced into the circuit. When the reactor is at power (greater than 0.0001 percent), the signal to noise ratio is high enough that the noise has no affect on the indication. When at low power levels (less than 0.0001 percent), the signal to noise ratio is such that the noise can contribute to the indication.

E. Failure mode, mechanism, and effect of each failed component, if known:

The control power transformer failed such that all control power to the 'B' phase of the Main Transformer was lost. This caused the transformer oil cooling fans and pumps to trip resulting in a potential for the transformer to overheat.

F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:

Not applicable - no component failures with multiple functions were involved.

G. For a failure that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the train was returned to service:

Not applicable - there were no failures that rendered a safety system inoperable.

H. Method of discovery of each component or system failure or procedural error:

The component failures were identified as discussed in I.B.

The limitations of the alarm response procedure for the "No Voltage" alarm to the Main Transformer was discovered during the event investigation. The alarm response procedure did not properly identify the consequences of the alarm (e.g., the loss of other main transformer annunciations, loss of oil pumps and cooling fans). As discussed in Section I. B, Palo Verde procedures require that the transformer be unloaded within 30 minutes of a loss of cooling event. Approximately 36 minutes passed before the loss of cooling was identified because of the procedure limitations.

I. Cause of event

The high pressurizer pressure condition that caused the reactor trip has been determined to be normal plant response to a load rejection at 65 percent power. Combustion Engineering was contacted and verified that a reactor trip is the expected result for a load reject from 65 percent power with one steam bypass valve in manual.

The cause of the control power transformer failure and the erroneous log power channel indication are as discussed in I.D.

A Human Performance Enhancement System (HPES) evaluation was performed. Personnel actions during the event were determined to be adequate and prudent. There was no unusual work characteristic that contributed to the event.

J. Safety System Response:

The Plant Protection System (PPS)(JL) responded to the transient as designed. The reactor was automatically tripped when the 2 out of 4 logic was satisfied in channels 'A" and 'D' for the high pressurizer pressure. In addition, Core Protection Calculator (CPC)(ID) channel 'D' experienced an auxiliary trip on high Pressurizer Pressure. Prior to the event the channel 'D' pressure indicator was reading approximately 30 psia higher than the other channels (this was within the instrument tolerance verified by surveillance tests), therefore, channel 'D' would be expected to reach its auxiliary trip setpoint in the Core Protection Calculator. The PPS actuations were verified to be within technical specification setpoints (less than 2388 pounds per square inch absolute) and response time (less than 1.15 seconds) limits.

K. Failed Component Information:

The control power transformer is model 548G11502M manufactured by Westinghouse Electric Corporation.

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

The reactor trip following the manual Main Turbine trip has been determined to be the expected result based on the current control systems design. A Combustion Engineering evaluation performed on the SBCS shows that a reactor trip will occur on pressurizer pressure after a load reject with the reactor at 65 percent power and one steam bypass control valve in manual.

The plant systems stabilized the plant after the reactor trip as designed. The equipment/system malfunctions identified after the reactor trip did not affect the operation of the plant.

Based on the post trip review of the event, there were no significant safety consequences or any affect on the health and safety of the public because of the event.

III. CORRECTIVE ACTION:

A. Immediate:

Reactor power was rapidly reduced in response to the loss of cooling of the Main Transformer. Subsequently, the Main Turbine was manually tripped.

Following the reactor trip, the plant was stabilized in Mode 3.

The Main Transformer oil was analyzed and found to be within specifications.

B. Action to Prevent Recurrence:

The control power transformer for the 'B' phase Main Transformer was replaced and the associated control circuit functionally checked.

The cable routing for the 'C' log power channel was adjusted to eliminate the noise.

The alarm response procedure for the Main Transformer will be revised to include enhanced direction for the "No Voltage" alarm. This is expected to be completed by November 16, 1990.

An evaluation of the Main Transformer Control Circuit will be performed to determine if any modifications should be made to change the circuit response to a loss of control power. The evaluation is expected to be completed by November 16, 1990.

Combustion Engineering (CE) had previously evaluated the SBCS. Based on an engineering review of the CE report, design and procedural changes have been identified that will improve system performance. The procedural changes will be incorporated into the applicable procedures. The design changes will be scheduled and implemented in accordance with the site work schedule.

IV. PREVIOUS SIMILAR EVENTS

There have been several reactor trips due to High Pressurizer pressure. All of the previous events involved the failure of SBCVs to perform as designed. As discussed in this report, a Reactor trip is the expected result of a load rejection from 65 percent power, therefore, recurrence measures would not have prevented the event discussed in this report.