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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 92-001-00:on 920102,pressure boundary leak led to cold shutdown per TS 3.4.5.2.Caused by crack in PRZ steam space instrument nozzle.Pad weld made to stop leak & 7 Inconel 600 nozzles to be replaced at next outage.W/920203 ltr.

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EXTERNAL:	EG&G BRYCE,J.H	3	3	L ST LOBBY WARD	1	1
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Arizona Public Service Company
PALO VERDE NUCLEAR GENERATING STATION
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

JAMES M. LEVINE
VICE PRESIDENT
NUCLEAR PRODUCTION

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 92-001-00
File: 92-020-404

Attached please find Licensee Event Report (LER) 92-001-00 prepared and submitted pursuant to 10CFR50.73. In accordance with 10CFR50.73(d), a copy of this LER is being forwarded to the Regional Administrator, NRC Region V.

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

Very truly yours,

JML/TRB/WHD/nk

Attachment

cc: W. F. Conway (all with attachment)
J. B. Martin
D. H. Coe
INPO Records Center

IE22
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FACSIMILE

LICENSEE EVENT REPORT (LER)

FACILITY NAME	DOCKET NUMBER	PAGE
Palo Verde Unit 1	0 5 0 0 0 5 2 8	1 OF 0 5

TITLE: Reactor Shutdown Required By Technical Specifications

EVENT DATE			LER NUMBER			REPORT DATE			OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 1	0 2	9 2	9 2	0 0 1	0 0	0 2	0 3	9 2	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

OPERATING MODE: 1

POWER LEVEL: 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check one or more of the following)*

- [ ] 20.402(b)
- [ ] 20.405(a)(1)(i)
- [ ] 20.405(a)(1)(ii)
- [ ] 20.405(a)(1)(iii)
- [ ] 20.405(a)(1)(iv)
- [ ] 20.405(a)(1)(v)
- [ ] 20.405(c)
- [ ] 50.36(c)(1)
- [ ] 50.36(c)(2)
- [X] 50.73(a)(2)(i)
- [ ] 50.73(a)(2)(ii)
- [ ] 50.73(a)(2)(iii)
- [ ] 50.73(a)(2)(iv)
- [ ] 50.73(a)(2)(v)
- [ ] 50.73(a)(2)(vii)
- [ ] 50.73(a)(2)(viii)(A)
- [ ] 50.73(a)(2)(viii)(B)
- [ ] 50.73(a)(2)(x)
- [ ] 73.71(b)
- [ ] 73.71(c)
- [ ] OTHER *(Specify in Abstract below and in Text)*

LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (AREA CODE)
Thomas 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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
B	A B	N Z L	C 4 9 0	Y						

SUPPLEMENTAL REPORT EXPECTED

- [ ] YES *(If yes, complete EXPECTED SUBMISSION DATE)*
- [X] NO

EXPECTED SUBMISSION DATE: MONTH | DAY | YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines)*

At approximately 1739 MST on January 2, 1992, Palo Verde Unit 1 was in Mode 1 (POWER OPERATION) at approximately 100 percent power when a condition identified as a PRESSURE BOUNDARY LEAK was discovered. ACTION (a) of Technical Specification 3.4.5.2 requires the plant to be in Mode 3 (HOT STANDBY) within six hours and Mode 5 (COLD SHUTDOWN) within the following 30 hours. The plant was shutdown and cooled down using approved procedures. No safety system responses occurred and none were required. The plant was stabilized in Mode 5 (COLD SHUTDOWN) and repairs were made to the pressurizer steam space nozzle that was leaking.

The cause of this event is believed to be Primary Water Stress Corrosion Cracking in an Inconel 600 pressurizer steam space instrument nozzle.

A previous event involving PRESSURE BOUNDARY LEAKAGE was described in LER 528/87-018.

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

At approximately 1739 MST on January 2, 1992, Palo Verde Unit 1 was in Mode 1 (POWER OPERATION) at approximately 100 percent power.

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

Event Classification: Completion of a plant shutdown required by Technical Specifications.

At approximately 1739 MST on January 2, 1992, a plant shutdown was commenced to comply with ACTION (a) of Technical Specification (TS) Reactor Coolant System Operational Leakage Limiting Condition for Operation (LCO) 3.4.5.2, No PRESSURE BOUNDARY LEAKAGE, after engineering (utility, non-licensed), operations (utility, licensed and non-licensed) and radiological control (utility, non-licensed) personnel determined that a leak existed in a pressurizer steam space instrument nozzle (NZL)(AB). During a routine containment entry to perform a monthly surveillance test, radiological control personnel, using an instrument modified to detect small amounts of radioactive gas in high background areas, located a leak in a pressurizer steam space instrument nozzle. The leak was not visually detectable. (i.e., no steam or condensate was visible, and there were no detectable cracks on the nozzle). The leakage was classified as PRESSURE BOUNDARY LEAKAGE. T.S. 3.4.5.2 Action (a) requires that:

"With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours".

At approximately 2138 MST on January 2, 1992, the reactor was manually tripped from 20 percent power, in accordance with an approved operating procedure, and the plant was stabilized in Mode 3 (HOT STANDBY). Cooldown was initiated, and Mode 5 (COLD SHUTDOWN) was achieved at approximately 2327 MST, on January 3, 1992, and T.S. 3.4.5.2 was exited.

PVNGS Emergency Plan Implementing Procedures require the declaration of a Notification of Unusual Event (NUE) for exceeding T.S. Reactor Coolant System Operational Leakage. At approximately 1739 MST on January 2, 1992, an NUE was declared. Appropriate local and state agencies were notified. At approximately 1756 MST

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the Nuclear Regulatory Commission (NRC) Operations Center was notified. When the Unit reached Mode 5 (COLD SHUTDOWN) the NUE was terminated as T.S. 3.4.5.2 ACTION (a) is only applicable in Modes 1 (POWER OPERATIONS) thru 4 (HOT SHUTDOWN). Unit 1 had remained in the NUE for approximately 30 hours.

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

Not applicable - no structures, systems, or components were inoperable at the start of the event which contributed to this event.

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

The crack in the pressurizer steam space instrument nozzle was classified as a nonvisible, intergranular crack in the Inconel 600 material. The cause of the crack is believed to be due to Primary Water Stress Corrosion Cracking (PWSCC) (SALP Cause Code B: Design, Manufacturing, Installation Error). This cracking is believed to be a result of the machining methods used in manufacturing the nozzle, the susceptible material (Inconel 600), and the environment it is used in. Industry experience has indicated that nozzles manufactured from Inconel 600 are susceptible to predominantly axial oriented cracking. APS Engineering had identified this nozzle and six (6) other pressurizer nozzles as having a susceptibility to PWSCC.

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

The crack in the pressurizer steam space instrument nozzle is believed to be due to PWSCC. The crack resulted in an increased level of radioactive gas in the containment. As discussed in Section I.B, there was no visible water or steam condensation emitting from the crack. There was only gas escaping from the crack. There was no visible crack in the nozzle.

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

Not applicable - no failures of components with multiple functions were involved.

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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 - no failures were involved which rendered a safety system inoperable.

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

The leakage from the pressurizer steam space instrument nozzle was discovered during sampling by radiological control personnel in containment during monthly surveillance testing. There were no system failures or procedural errors which contributed to this event.

I. Cause of Event:

The cause of this event was a nonvisible intergranular crack in a pressurizer steam space instrument nozzle as described in Section I.D. There were no personnel errors that contributed to this event. No unusual characteristics of the work location (e.g., noise, heat, poor lighting) directly contributed to this event.

J. Safety System Response:

Not applicable - there were no safety system responses and none were necessary.

K. Failed Component Information:

The pressurizer steam space instrument nozzle is supplied by Combustion Engineering as part of the pressurizer package and is identified by line number 1PRCA002-BCBA-3/4". The nozzle is manufactured from Inconel 600, 3/4 inch pipe, and is welded into the upper vertical side of the pressurizer to provide a tap for pressure and level indication.

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

The leakage from the pressurizer steam space instrument nozzle contributed to an increased level of radioactive gas in containment. Because of the small size and the location on the pressurizer there was little or no contribution to the Reactor Coolant System (RCS) Leakage. With the intergranular leak only a small volume of gas was able to pass with no steam or water escaping. The location of the nozzle, high on the vertical side of the pressurizer, above the water level in the

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pressurizer helped minimize the reactor coolant system leakage. The Updated Final Safety Analysis Report (FSAR) Chapters 6 and 15 were reviewed, and it was concluded that this event was bounded by the RCS loss of inventory accidents via pressure boundary leaks. TS requirements were met during this event, and the plant was shutdown within the TS allowable time limits. Therefore, there were no safety consequences or implications resulting from this event. Past industry experience with Inconel 600 pressurizer nozzle failures has shown that axial cracks do not propagate, thus not jeopardizing structural integrity.

III. CORRECTIVE ACTIONS:

A. Immediate:

The plant was shutdown and cooled down in accordance with TS. Using an approved work document, a pad weld was made to stop the reactor coolant system gas leakage.

B. Action to Prevent Recurrence:

The seven Inconel 600 nozzles on the pressurizer are planned to be replaced during the next refueling outage scheduled to start in February 1992.

IV. PREVIOUS SIMILAR EVENTS:

A previous similar event was reported in LER 528/87-018. The LER discussed a reactor trip during a shutdown to investigate a leak in a cracked socket weld of an isolation valve for the flanged refueling water level indication. The cause of the crack was fatigue failure, induced in part by cyclic loading. The valve was cut out, replaced, and additional pipe supports were installed. The corrective actions taken for the flanged refueling water level indication isolation valve would not have affected the situation described in LER 528/92-001.