

MEMORANDUM FOR

MAR 8 1997
S.A. Richards, Chief
Reactor Projects Branch
Division of Reactor Safety and Projects
Region V

FROM: Jack E. Rosenthal, Chief
Reactor Operations Analysis Branch
Division of Safety Programs
Office for Analysis and Evaluation
of Operational Data

SUBJECT: AEOD SALP INPUT FOR PALO VERDE UNITS 1, 2 AND 3

In support of the ongoing SALP reviews, AEOD has reviewed the Licensee Event Reports (LERs) submitted by Arizona Public Service Company for Palo Verde Nuclear Generating Station Units 1, 2 and 3. Our review concentrated on the safety importance of events, trends, and reporting completeness.

The enclosure provides observations from our review of the licensee's LERs. If you should have any questions regarding this report please contact either myself or Bob Spence of my staff. Mr. Spence can be reached at FTS 492-8609.

Original signed by Jack E. Rosenthal
Jack E. Rosenthal, Chief
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Division of Safety Programs
Office for Analysis and Evaluation
of Operational Data

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Enclosure: As stated
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C. Trammell, NRR

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ENCLOSURE

AEOD INPUT TO SALP REVIEW FOR PALO VERDE UNITS 1, 2 AND 3

The Arizona Public Service Company submitted 32 Emergency Notification System (ENS) and 26 Licensee Event Reports (LERs) for the units at Palo Verde Nuclear Generating Station, in the assessment period from December 1, 1990 to December 1, 1991. Our review included the following LERs numbers:

<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>
90-011 to 90-012	90-009 to 90-011	90-007
91-001 to 91-012	91-001 to 91-007	91-001 to 91-010

Important Operating Events

These were:

- LER 530/90-007-00 On October 20, 1990, a faulty diode generated a false steam header pressure signal, opening all seven inservice steam bypass control valves (SBCV), resulting in an excess steam demand and the core protection calculator tripping the reactor. The power distribution module containing the failed diode was replaced. This and three previous SBCV excess steam demand events placed the plant in an unanalyzed condition, as the FSAR accident analysis assumed only one SBCV would open due to a control system failure; this event resulted in revision to the updated FSAR Chapter 15 analysis for the inadvertent opening of more than one SBCV.
- LER 529/90-010-00 An investigation into cracked tack welds found November 10, 1990, on Unit 3 emergency diesel generator (EDG) jacket cooling water return line support brackets, determined that the jacket water return line on both Units 2 and 3 EDGs did not meet seismic qualification requirements. This could have prevented the EDGs from performing as designed in a seismic event. The brackets on the four EDGs were removed, full-length fillet welds made, and the brackets reinstalled.
- LER 529/91-004-01 On August 16, 1991, a switch failed in the Unit 2 main generator excitation control system and caused a main generator trip, which

initiated a main turbine trip. A reactor trip occurred from 64 percent reactor power due to high pressurizer pressure because control room personnel "did not comply with procedural requirements to have the 8 steam bypass control valves in service at power levels below 75 percent." Only one feedwater pump was in service at the time because the other feedwater pump discharge valve would not open. A hydraulic lock between the check valve and the discharge valve over-pressurized a seven foot section of main feedwater 1875 psig-designed piping to 7000 psig. An engineering evaluation determined that the pipe remained usable. The licensee has ordered that the feedwater pumps discharge valves will remain open when feedwater temperatures exceed 150° F to avoid recurrence.

LER 530/91-003-00 On June 19, 1991, a spurious Unit 3 containment spray system actuation occurred during a surveillance test, as a result of an incorrectly assembled push button test switch. This sprayed 5000 gallons of borated water into the containment. The licensee manually tripped the reactor from 100 percent power, stopped the four reactor coolant pumps, and cooled the reactor down using natural circulation. No systems or components in the containment were found to be adversely affected by the spray and the plant restarted on June 22, 1991.

LER 530/91-008-00 On November 14, 1991, with Unit 1 at 100 percent power, a lightning induced fault on the main transformer caused a generator trip, turbine trip, and reactor power cutback. About 35 seconds later, the reactor tripped on low Departure from Nucleate Boiling Ratio signals, caused by a control element assembly subgroup deviation. The reactor trip was delayed for up to 16 seconds when a second time delay was initiated due to a problem with the control element assembly calculator software design.

LER 530/91-010-01 On November 15, 1991, with Unit 3 in Hot Standby, a mobile crane contacted an energized 13.8 kV overhead power line due to a personnel error, causing a phase-to-ground fault and crane fire. Due to miscommunication, control room personnel secured power to the wrong line and caused a loss of power and the automatic start of B EDG. This line was restored to service and the affected line was de-energized, which caused a loss of power and the automatic start of A EDG. The site fire department extinguished the fire.

Two control room essential filtration ESF actuations (LER 530/91-009 and LER 528/91-12) occurred due to improper restoration after a surveillance test, similar to four previous events.

Comparison of 10 CFR 50.72 and 50.73 Reports

ENS No. 20125

On December 21, 1990, Unit 2 experienced an inadvertent main steam isolation valve (MSIV) closure while at 100 percent power. The licensee reduced power to 65 percent at 5 percent per hour to stabilize conditions. An investigation found a failed solenoid in the MSIV actuation system. Since there was no specific procedure for operation with one MSIV closed, the licensee reported it under §50.72(b)(1)(ii)(C), as a condition outside EOPs, erroneously for information only. AEOD could find no reference to an analysis of operation with one MSIV closed or the 65 percent power level in the Palo Verde FSAR or Technical Specifications. The licensee operated for almost 8 hours in this configuration; TS 3.7.1.5 required that the valve be operable or the plant had to be in MODE 2 within ten hours. Currently effective guidance in NUREG 1022, Appendix C, example C-3 and NRC letter of July 12, 1990, from C. E. Rossi to G. C. Lainas, distributed to all NRC regions, explains that single component ESF actuations are reportable. This guidance provides no exceptions for inadvertent actuations.

LER 528/91-007

On August 22, 1991, with all three units in power operation, an evaluation determined that the normal HVAC system cooling to various engineered safety feature (ESF) pump rooms was inadequate to meet essential cooling loads because the normal HVAC system cooling was not 100 percent redundant to the essential chilled water system (ECWS) service. Whenever a train of ECWS was out-of-service for more than 72 hours, the plant did not meet Technical Specification (TS) action statements for the affected ESF pumps and the system was outside its design basis. The reporting requirements were purposely designed to overlap so that a specific event may be reportable under more than one criteria, or under one criteria, but not another. Thus, when a plant can not meet its Technical Specifications, it may also be outside its design and licensing basis (as in this case), invoking the additional reporting requirements of both §50.72(b)(1)(ii) and §50.73(a)(2)(ii).

April 11, 1991

The licensee determined that a potential nonconforming condition (MNCR 91-QB-9005) existed regarding the inadequacy of essential lighting in the "B" train switchgear room in each Unit. Safe shutdown tasks are required in each room in the event of a control room fire. As interim compensatory actions, the licensee issued memos and night orders identifying these problem areas, the need for flashlights, and option to de-energize certain essential lighting panels to actuate the battery powered emergency lighting system in the areas. Improvements to essential lighting will be implemented by a site modification by the end of 1991. The plant was outside its design basis, which is reportable under §50.72(b)(1)(ii)(B) and (C) and §50.73(a)(2)(ii)(B) and (C), as other licensees have done under similar circumstances. The licensee argued that this condition was not reportable under §50.73(a)(2)(v), in a July 1, 1991, letter to J. B. Martin, of NRC Region V and did not address these reporting requirements. Since the reporting requirements are in effect while the plant is outside its design or licensing basis, prior to compensatory measures being enacted, such compensatory measures can never be considered in an argument for not complying with §50.72 or §50.73 reporting requirements. Compensatory measures may be legitimately referred to in the ENS call and LER in describing the event's affect on the safety of the plant.

May 16, 1991

Unit 3 technicians performed part of a surveillance procedure on the "B" train auxiliary relay cabinet rather than on the "A" train as specified, resulting in an inadvertent ESF actuation of the "B" Emergency Diesel Generator. This appears to be reportable under

§50.72(b)(2)(ii) and §50.73(a)(2)(iv). Currently effective guidance in NUREG 1022, Appendix C, example C-3 and NRC letter of July 12, 1990, from C. E. Rossi to G. C. Lainas, distributed to all NRC regions, explains that single component ESF actuations are reportable. This guidance provides no exceptions for inadvertent actuations or signals inserted midway in the circuitry. NUREG 1022, Rev. 1 continues with this interpretation.

LER Quality

AEOD Reports

No AEOD studies were initiated as a result of LERs submitted by Palo Verde. However, a 1988 Palo Verde Part 21 on Potter & Brumfield MDR relay failures contributed significantly to AEOD's investigation of P&B MDR relay failures in Special Study 92-01.