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Palo Verde Nuclear
Generating Station

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U. S. Nuclear Regulatory Commission
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Washington, D.C. 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 2
Docket No. STN 50-529
Special Report 2-SR-99-002

Attached please find Special Report 2-SR-99-002 prepared and submitted pursuant to Technical Requirements Manual Limiting Condition for Operation (TLCO) 3.3.106 Required Action (B.1). This report discusses the inoperability of one (1) Loose-Part Detection System channel for more than thirty (30) days.

This letter includes a commitment that "Modifications which will enhance the Loose-Part Detection System mineral cable connectors and cable routing will be implemented in Unit 2 during the next refueling outage."

If you have any questions, please contact Daniel G. Marks, Section Leader, Regulatory Affairs, at (623) 393-6492.

Sincerely,

David Mauldin for
G. R. Overbeck

GRO/DGM/dgm

Attachment

cc: E. W. Merschoff (all with attachment)
P. H. Harrell
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ATTACHMENT

Special Report No. 2-SR-99-002

Palo Verde Nuclear Generating Station Unit 2
Loose-Part Detection Instrumentation Inoperable

Docket No. STN 50-529

Special Report No. 2-SR-99-002

Initial Conditions:

At approximately 1900 MST on May 10, 1999, Palo Verde Unit 2 was in Mode 1 (POWER OPERATION) operating at approximately 100 percent power when Loose-Part Detection System channel 2 was declared inoperable. The thirty-day period for returning the channel to an operable status expired at approximately 1900 MST on June 9, 1997. This Special Report is being submitted pursuant to Technical Requirement Manual Limiting Condition for Operation (TLCO) 3.3.106 Required Action (B.1) to report the inoperability of one (1) Loose-Part Detection System channel for more than thirty (30) days. The remaining seven (7) channels continue to function properly. TLCO 3.3.106 is applicable in Mode 1 (power operation) and Mode 2 (startup).

System Information:

The Loose-Part Detection System is designed to detect and record signals from loose part impacts occurring within the Reactor Coolant System (RCS). The Loose-Part Detection System has eight (8) channels each using high temperature piezoelectric accelerometers (transducers) which are located in areas where loose parts are most likely to become trapped. The eight accelerometers are positioned on the reactor vessel upper head (channels 1 and 2), the lower reactor vessel (channels 3 and 4), Steam Generator No. 1 (channels 5 and 6), and Steam Generator No. 2 (channels 7 and 8). High temperature, low noise, radiation hardened, flame-retardant mineral cables connect the accelerometers to coaxial cables that complete the electrical loop to preamplifiers (charge converters) located outside of the primary shield. The accelerometers detect loose parts using acoustic signals which are generated when loose parts impact an RCS component or structure. Signals in excess of the alarm setpoint will result in a "latch on" type alarm (i.e., the alarm will remain on when the system returns to normal and will not clear until the alarm is manually reset). There is one alarm indicator in the Control Room for the eight channels.

Actions Taken:

On May 10, 1999, during routine daily monitoring as required by surveillance requirement TSR 3.3.106.1, of the Loose-Part Detection System, Operations personnel determined that channel 2 was inoperable due to loss of audio signal from channel 2. Only limited troubleshooting activities could be performed due to the radiological exposure that would be received because of the accelerometer's location on the reactor vessel upper head. TLCO 3.3.106 Required Action (A.1) was entered and applicable plant corrective action documents were initiated. During this time, the other channels functioned normally.

Cause of the Malfunction:

The apparent failure of channel 2 is due to the malfunction of the mineral cable connector to the accelerometer. The failure determination is based upon past failures of the cable connector to the accelerometer. An equipment root cause of failure analysis will not be performed to verify or rectify the Loose-Part Detection System channel 2 problem due to the radiological exposure which would be received because of the accelerometer's location on the reactor vessel upper head.

Plans for Restoring the Channels to OPERABLE Status:

Modifications which will enhance the Loose-Part Detection System mineral cable connectors and cable routing and may prevent similar malfunctions will be implemented in Unit 2 during the next refueling outage. The remaining seven (7) channels continue to function properly. Shift Technical Advisors and Operations personnel continue to perform shiftly aural checks on the remaining operable channels (i.e., during dayshift and nightshift).

