

Attachment IV

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2
DOCKET NO. 50-397
LICENSE NO. CPPR-93
10CFR50.55(e) CONDITION #248
ANACONDA FLEXIBLE CONDUIT

Interim Report

Description of Deficiency

In response to an NRC Open Item from the Environmental Qualification Audit in February 1983, a pressure temperature test was performed March 15 and 16, 1983, on the Anaconda flexible conduit (UAP sealtight) used inside containment to hook up safety-related electrical equipment. The design requirement of this conduit is to seal the electrical device from moisture intrusion (moisture inside electrical equipment eventually results in equipment failure by shorting).

This test was the first in a series of tests planned to determine the conduits ability to seal the electrical interface from LOCA effects. The test was performed to the pressure/temperature profile as defined in FSAR 3.11 for the first 24 hours (340 F for 3 hours, 320 F for 3 hours, 250 F for 18 hours, all steam conditions, and 45 psig for 6 hours, dropping to 25 psig for remainder of test).

The failure mode was melting, bubbling, and dripping of the Polyethylene copolymer jacket material which exposed the convoluted flexible metal core. This allowed moisture to penetrate the conduit into the device housing (represented in the test by a typical junction box arranged in the test chamber to collect any moisture).

Visual inspection at the end of the test revealed the following.

1. Melting of the polyethylene copolymer jacket.
2. Dripping of the jacket.
3. Blistering of the jacket.
4. Water collection in the bottom of the junction box, verifying moisture intrusion.

Safety Implication

The electrical conduit inside the containment is required to seal the electrical devices from moisture intrusion which could eventually result in equipment failure by shorting of the electrical connections. This condition related to safety system equipment is considered to be a reportable deficiency.

Cause of the Deficiency

The condition, failure to specify an installation capable of precluding moisture intrusion for safety-related electrical equipment under post LOCA or MSLB condition in specific areas of WNP-2, represents a design omission by the Architect Engineer (AE).

Action to Prevent Recurrence

The Project recognized that certain environmental conditions impose unique failure mechanisms upon exposed equipment resulting both from manufacture and installation. The Supply System Equipment Qualification group was formed which established a program to perform qualification reviews and to assure design requirements and installation conditions of safety-related equipment meet environmental requirements for plant operation. Implementation of Technical Directorate Procedure TDP-3.32 and PMI 6-8 should preclude such an omission in the future.

Corrective Action

The Project has conducted a survey of areas at WNP-2 that potentially experience high temperature (> 300 F) and a concurrent steam environment. Safety-related electrical equipment in these areas; primary containment and the main steam tunnel, which must function during and after a LOCA or main steamline break accident have been identified. The configuration of the deficient flexible conduit at the equipment is covered by two conditions.

Condition 1. The flexible conduit is installed such that moisture can physically drain into the safety-related device.

Condition 2. The flexible conduit is installed such that moisture cannot physically drain into the device.

Corrective action for Condition 1 is to install an internal water seal at the flex conduit-device interface. The conduit's sole function will be to physically protect the cable.

Corrective action for Condition 2 is to replace the existing conduit with a qualified and approved flexible conduit meeting the service conditions.

This work is scheduled to begin in mid-July and to be complete prior to fuel load.