

Southern California Edison Company

SCE

P. O. BOX 800

2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

L. T. PAPAY
VICE PRESIDENT

TELEPHONE
213-572-1474

December 2, 1981

Mr. R. H. Engelken, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, California 94596-5368



Dear Mr. Engelken:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station, Units 2 and 3

In a letter to your office dated November 4, 1981 we identified a condition which we considered potentially reportable in accordance with 10CFR50.55(e). The condition involves flood level alarm switches in various safety related applications which have become inoperative due to corrosion.

Enclosed are twenty-five (25) copies of a final report entitled, "FINAL REPORT ON INCORRECT MAGNETROL FLOOD LEVEL SWITCH ENCLOSURES, San Onofre Nuclear Generating Station, Units 2 and 3."

If you have any questions regarding this report we would be pleased to discuss them with you at your convenience.

Very truly yours,

Enclosures

cc: Victor Stello (NRC, Director I&E)
A. E. Chaffee (NRC, San Onofre Units 2 and 3)

REGION V

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FINAL REPORT ON INCORRECT MAGNETROL FLOOD LEVEL SWITCH ENCLOSURES

San Onofre Nuclear Generating Station, Units 2 and 3

INTRODUCTION

This report is submitted pursuant to 10CFR50.55(e)(3). It describes a condition discovered during preoperational testing of flooding switches supplied by Magnetrol Corporation of Downers Grove, Illinois. This report includes a description of the deficiency, analysis of the safety implications and a summary of the corrective action taken. By letter dated November 4, 1981, Edison confirmed notification to the NRC of this potentially reportable condition.

BACKGROUND

Magnetrol Model FLS flood level switches are float operated liquidlevel switches using magnetic coupling to transmit float movement to the electrical switch. These devices are used in ninety locations throughout San Onofre Units 2 and 3, to detect flooding which can occur due to leakage from valves, vessels or pipe lines. Upon actuation of the switch, a control room alarm is actuated and an indicating light is illuminated alerting the control room operator to the leak. The flood level switches and indicating lights are Class 1E.

During preoperational testing, a number of switches failed to operate. Upon investigation, it was determined that water had leaked into the switch enclosure when the area in which the flood level switch was located became flooded.

DISCUSSION

The following discussion is responsive to 10CFR50.55(e)(3).

Description of the Deficiency

The vendor supplied flood level switches were specified by the Purchaser as required to meet NEMA 6 (submersible) requirements. Magnetrol catalog information stated NEMA 6 submersible enclosures were standard and Magnetrol drawings submitted for review and approval indicated a NEMA 6 enclosure. The switch enclosure in fact did not meet these requirements. When the area in which the switch was located was flooded, water leaked into the electrical switch enclosure through the switch housing and through the electrical conduit connection. Leakage through the switch housing occurred in the area of the vendor's nameplate through "sealed" rivets, through the connection between enclosure base and cover, and through a grommated hole in the enclosure cover where a screw is provided for tightening the enclosure. Points of leakage were confirmed by pressurizing the assembled enclosure with approximately 1 psi air with the enclosure submerged, and witnessing air leakage from the described areas.

Final Report on mproper Magnetrol Flood Level Switch Enclosures
San Onofre Nuclear Generating Station, Units 2 and 3

Leakage through the conduit connection occurred because the conduit fittings which were used were not suitable for submersible service.

Leakage into the switch enclosure resulted in corrosion which caused failure of the electrical switch and mechanical linkage.

Analysis of Safety Implications

A switch enclosure and conduit allow inleakage of water to the switch enclosure during flooded conditions. This could result in electrical switch failure and/or corrosion of the mechanical linkage causing improper or no operation of the switch.

The San Onofre Units 2 and 3 equipment required for long term cooling following a postulated LOCA is designed to remain operable during and following the LOCA, and system redundancy assures that the ECCS will perform its post LOCA function without maintenance. One application of the subject flood level switch is to detect leakage from the Safety Injection or Containment Spray System pump seals. Leakage drains to a cofferdam area and trips the Class 1E, flood level switch. A control room alarm is actuated, thus identifying the affected train. This allows the operator to remotely shut the containment isolation valves for that train of the ECCS and secure the respective pumps, thereby securing the leak.

Improper operation of the flood level switch could prevent identification of a faulted line and prevent isolation of the line prior to the leak creating undesirable consequences such as flooding and excessive radioactive fluid outside the containment.

CORRECTIVE ACTION

Resolution of the flood level switch leakage problem, identified by Startup Problem Report 2210, was accomplished by replacing the original switch enclosure (Magnetrol type S-1), with a Magnetrol EP (explosion proof) enclosure for NEMA 6 submersible service. The EP enclosure is of cast iron construction with a threaded, gasketed (O-ring) connection between enclosure base and top, and is void of riveted application of the nameplate and grommited hole at top.

Leakage through conduit was eliminated by replacing improper fittings with those suitable for submersible service and by sealing the conduit entrance with a waterproof sealant.