Arizona Nuclear Power Project
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December 12, 1984
ANPP-31450-TDS/TRB

U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane - Suite 210
Walnut Creek, California 94596-5368

Attention: Mr. D. F. Kirsch, Acting Director
Division of Reactor Safety and Projects

Subject: Final Report - DER 84-06
A 50.55(e) Reportable Condition Relating To Foxboro Alarm Modules.
File: 84-019-026; D.4.33.2

Reference: (A) Telephone conversation between P. Narbut and T. Bradish on February 16, 1984
(B) ANPP-29030, dated March 9, 1984 (Interim Report)
(C) ANPP-29665, dated June 5, 1984 (Time Extension)
(D) ANPP-30305, dated August 23, 1984 (Time Extension)
(E) ANPP-30563, dated September 19, 1984 (Time Extension)
(F) ANPP-31011, dated October 30, 1984 (Time Extension)
(G) ANPP-31164, dated November 16, 1984 (Time Extension)
(H) ANPP-31276, dated November 30, 1984 (Time Extension)
(I) Telephone conversation between D. Hollenbach and L. Spiers on December 10, 1984

Dear Sir:

Attached is our final written report of the Reportable Deficiency under 10CFR50.55(e) referenced above.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President
Nuclear Production
ANPP Project Director

EEVB/TRB/nj
Attachment

cc: See Page Two

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cc: Richard DeYoung, Director
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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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FINAL REPORT - DER 84-06
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

The Foxboro Company has identified a possible deficiency in Absolute and Deviation Alarm Modules (Models 2AP+SLM-AR, -AS, -BR, -BS) supplied under C-E Purchase Order 9603108 and Bechtel Purchase Order 10407-13-JM-111 (see Reference Section V). Factory testing and evaluation has shown that 1K ohm setpoint potentiometers, utilized to set the alarm point or gap for alarms on the above-listed modules, may have been mechanically stressed during assembly. This condition could possibly cause the setpoint potentiometer(s) to open or short circuit.

The suspect component description is as follows:

1. Part #E0285VX is stamped on the base of the component.

2. The component is housed in a plastic cube approximately 1/2" on each side.

3. The date code stamped on the base is 8048 to 8152. The date code's first two digits identify the year, the next two digits the week of manufacture. Components with date codes prior to or after these dates are not suspect.

Foxboro has requested that all components of this description be returned to their facilities for repair.

Evaluation

Foxboro has indicated that in some cases the mechanical stress may have created a fracture in the lead to the resistive element connection (see Reference Section IV). This fracture, with subsequent stress due to temperature variations, vibration or additional mechanical stress due to setting adjustments, could cause an intermittent open or short circuit to occur.

A review of PVNGS applications of the subject alarm modules shows that the majority are used for alarm purposes only. Others provide not only alarm signals but also permissives to allow actuation of control components, some of which are safety-related.

For modules providing alarms only, alarm signals are typically transmitted to the Plant Annunciator and Plant Computer, and in some cases to the Emergency Response Facilities Data Acquisition and Display System (ERFDADS). Though these alarms are not required for safe shutdown or for maintaining safe shutdown conditions, some are provided to alert the operator of possible impending violations of technical specifications.

For modules that further provide permissives, a potentiometer failure (open or short circuit) could potentially lead to loss of or improper control actuation of various safety-related components. For example, actuation of Safety Injection Tank (SIT) injection valves SI-634 and SI-644 (14" motor operated valves) and Shutdown Cooling System (SCS) suction line valves SI-651 and SI-655 (16" motor operated valves) is interlocked with Reactor Coolant System pressure via alarm modules 1JRCAPC103-3 and 1JRCAPC103-4 installed in PVNGS Unit 1. Both of these alarm modules have been identified to contain the suspect potentiometer. During shutdown cooling mode, an open circuit in these alarm modules would: 1) prohibit the SIT injection valves from closing when RCS pressure drops below 700 psia; and 2) prohibit the SCS suction line valves from opening when RCS pressure drops to 370 psia. The first condition would result in overpressurization of the SCS during shutdown cooling, while the second condition would require local operation of SCS suction line valves. A short circuit would allow premature operation of the above valves. Premature closing of SIT injection valves would eliminate availability of the SITs for core flooding, while premature opening of the SCS suction line valves could compromise the integrity of the SCS.

The resolution to this problem is to return all alarm modules containing the suspect potentiometer to Foxboro for potentiometer replacement. Consequently, a case-by-case analysis of each alarm module application will not be supplied.

II. Analysis of Safety Implications

As indicated in the above evaluation, a failure of the potentiometer in the subject alarm modules could lead to loss of/improper alarm or control actuations of various safety-related systems.

Based on the above, this condition is evaluated as reportable under the requirements of 10CFR50.55(e); since, if this condition were to remain uncorrected, it would represent a significant safety condition.

This project also has evaluated this condition as reportable under 10CFR21.21(b)(3). This report addresses the reporting requirements of the regulation with the exception of subpart (vi), regarding the number and location of such components supplied to other facilities.

III. Corrective Action

1) A complete investigation of PVNGS Unit 1 has been performed per Bechtel Investigaton Requests IR-016 and IR-022 to identify all subject Foxboro alarm modules with potentiometers part #E0285VX having date code 8048 to 8152. A number of dual such alarm modules were identified in Unit 1 as a result of this investigation and are documented on APS Operations Nonconformance

Report (NCR) 0-243-84-1. This NCR has been dispositioned per the Investigation Requests to have these modules returned to Foxboro for potentiometer replacement. All identified potentiometers in Unit 1 have been replaced.

2) An inspection of the alarm modules purchased under the spare parts program revealed no suspect modules in the inventory.

3) A complete investigation of PVNGS Units 2 and 3 will be performed per IR-016 and IR-022 prior to operating license for Unit 2 and Unit 3. NCRs will be generated in accordance with Bechtel Project Internal Procedure 4.31 to document all subject alarm modules containing the suspect potentiometer. These NCRs will be dispositioned in accordance with the findings of the investigation.

IV. References

Letter V-CE-19501, January 4, 1984