Arizona Nuclear Power Project
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July 25, 1985
ANPP-33107-TDS/TPS

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 & Projects

Subject: Final Report - DER 85-19
A 50.55(e) Evaluation Relating To High Hydrazine Flow Rate
File: 85-019-026; D.4.33.2

Reference: A) Telephone conversation between A. Hon and P. Coffin on May 23, 1985
B) ANPP-32860, dated June 20, 1985 (Interim Report)

Dear Sir:

Attached is our final written report of the above-referenced deficiency which has been determined Not Reportable under the requirements of 10CFR50.55(e) and 10CFR21.

Very truly yours,

EE Van Brunt Jr. /jrs

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/TPS/nj

Attachment

cc: See Page Two

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

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FINAL REPORT - DER 85-19
DEFICIENCY EVALUATION 50.55(e)
ARIZONA NUCLEAR POWER PROJECT (ANPP)
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

In letter V-CE-32332, May 3, 1985, Combustion Engineering (CE) identified a potential for the Spray Chemical Addition Pumps (SCAPs) to operate at flow rates that are greater than the design flow rate of 0.63 ± 0.02 gpm. This potential was identified during the review of recent Technical Specification testing of the Iodine Removal System (IRS).

Following a Loss-of-Coolant Accident (LOCA), the IRS injects hydrazine via the SCAPs into the Containment Spray Pump suction. This enhances the removal of radioactive iodine from the containment atmosphere.

There are three areas of concern associated with increased hydrazine flow rates:

(1) The hydrazine concentration in the containment spray will exceed the concentration for which the safety-related equipment and structures are qualified;

(2) The duration of automatic IRS operation after a LOCA will be reduced to less than the two hours required for dose reduction (automatic operation is terminated when the level of hydrazine in the Spray Chemical Storage Tank (SCST) drops to 45%); and

(3) Long-term control of iodine with the ANPP Hydrazine Management System will be hindered.

Evaluation

The SCAP is a positive displacement pump, with spring operated suction and discharge valves included as integral parts of the pump. The SCAP takes suction from the Spray Chemical Storage Tank (SCST) and discharges to the suction piping of the Containment Spray Pump (CSP), which takes suction from the refueling water tank (RWT) or the containment sump. During Technical Specification testing, the cover gas pressure of the SCST and the elevation of the SCAP with respect to the RWT produces sufficient differential pressure to open the SCAP suction and discharge valves; the observed flow rate was estimated as about 15 gpm per pump, compared to the design flow rate of 0.63 gpm.

However, Technical Specification testing of the spray chemical addition portion of the iodine removal system is not a complete system flow test. The Technical Specification testing method only verifies a clear flow path up to the solenoid operated isolation valve (SI-680, -681), which isolates the spray chemical addition system from the CSP suction piping. This testing is effected by discharging SCAP flow through the drain valve (SI-253, -254) located immediately upstream of SI-680, -681.

The spray chemical addition system is designed to perform its safety function with the SCAP discharging through SI-680, -681. Substantial hydraulic resistance is provided by these valves. The excessive flow rate observed during Technical Specification testing does not occur when the spray chemical addition system is operating in the design mode due to the hydraulic resistance of SI-680, -681.

In V-CE-32499, Combustion Engineering has evaluated the three areas of concern identified in Section I of this DER, and has determined the following:

(1) Safety-related containment equipment and structures are qualified for a 200 ppm hydrazine concentration in the containment spray. However, the hydrazine concentration corresponding to the higher-than-design hydrazine flow rate of 15 gpm would be less than 150 ppm.

(2) The higher-than-design flow rates would have reduced the duration of automatic IRS operation to less than the four hour time period noted in the CESSAR, but not less than the two hour dosage reduction period required by 10CFR100, section 100.11, part (a), subpart (1).

(3) Despite increased hydrazine flow rates, the ANPP Hydrazine Management System (implemented as required for manual restart of one IRS train following automatic shutdown of the IRS) would have assured long-term, post-LOCA iodine control. The SCST might have had to be refilled with hydrazine sooner than previously anticipated, but the Hydrazine Management System (described in Letter ANPP-24059-WFQ/RJP, dated June 13, 1983) states that, "Access to the SCST shall be provided following a LOCA such that the concentrated hydrazine solution can be replenished prior to reaching a minimum level of 5%."

Therefore, the safety function of the IRS is not impacted by the subject deficiency. There is no significant decrease in protection of public health and safety.

From the above, it is deduced that the root cause of this deficiency is the use of a flow path during Technical Specification testing that is different from that used during design mode operation. There is no other means to accomplish this test than by using the drain valves as stated above.

Although the SCAP high-flow problem may be generic to all SCAPs of the same type (Union SX-3 Simplex Positive Displacement Pump) which are employed in similar system configurations, no generic corrective action is necessary since the pumps will perform their safety functions as required. However, corrective action will be implemented at Palo Verde (see Section III) in order to make the SCAPs perform as originally intended during Technical Specification testing.

II. Analysis of Safety Implications

Based on the above, the condition is evaluated as not reportable under the requirements of 10CFR50.55(e); since, if this condition were to remain uncorrected, it would not represent a significant safety condition.

This project has also evaluated this condition as not reportable under 10CFR21 since the subject defect does not present a substantial safety hazard.

III. Corrective Action

Although the SCAPs will perform their required safety function, to ensure that the SCAPs operate at their design flow rate during Technical Specification testing DCP 10M-, 2SM-, 3SM-SI-807 has been issued for Palo Verde to add stiffer springs to the SCAPs. By installing stiffer springs (larger spring constant) in the discharge valves of the SCAPs, excessive hydrazine flow during Technical Specification testing will be prevented (Reference DCP input letter V-CE-32349, May 8, 1985).