Arizona Public Service Company

October 9, 1984
ANPP-30783-TDS/TRB

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

Attention: Mr. T. W. Bishop, Director
Division of Resident
Reactor Projects and Engineering Programs

Subject: Final Report, Revision 1 - DER 83-63
A 50.55(e) Reportable Condition Relating To HPSI Isolation Valves By Borg-Warner Failed To Open Against HPSI 'A' And 'B' Pump Flows.
File: 84-019-026; D.4.33.2

Reference: A) Telephone Conversation between P. Narbut and R. Tucker on September 20, 1983
B) ANPP-28072, dated October 24, 1984 (Interim Report)
C) ANPP-28954, dated February 28, 1984 (Time Extension)
D) ANPP-29131, dated March 22, 1984 (Final Report)
E) Telephone conversation between P. Narbut and T. Bradish on April 2, 1984
F) ANPP-29395, dated April 30, 1984 (Time Extension)
G) ANPP-29971, dated July 16, 1984 (Time Extension)
H) ANPP-30420, dated September 4, 1984 (Time Extension)
I) ANPP-30590, dated September 20, 1984 (Time Extension)

Dear Sir:

Attached is Revision 1 of our final written report of the Reportable Deficiency under 10CFR50.55(e), referenced above. This Revision updates the Condition Description and the Corrective Action.

Very truly yours,

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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IE-27

cc: Richard DeYoung, Director
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FINAL REPORT, REVISION 1 - DER 83-63
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APSO
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

Two separate deficiencies have been reported for the eight High Pressure Safety Injection valves that isolate the injection path to the cold legs. The description of these deficiencies along with their corresponding safety implication and corrective actior. are delineated as Items "A" and "B" below.

A. During preoperational testing on Units 1 and 2, the 2-inch Motor-Operated High Pressure Safety Injection (HPSI) valves, failed to open against the discharge pressure of HPSI pumps train A and B. The valves would not open beyond the bypass limit switch setpoint. The cause of this condition is attributed to incorrect torque switch settings and resulted in loosening of the valve yoke from the bonnet assembly. Torque switches are set at the factory, however, field adjustment is required as a normal evolution refinement to tailor valve operability to actual as-built installation and system parameters. Adjustment is within the minimum/maximum range of adjustment as specified (torque limit plate) by the manufacturer. Further investigation revealed that this problem is generic to all the Borg-Warner Model 77620-2 HPSI valves furnished to PVNGS.

The HPSI valves are supplied by Combustion Engineering (C-E) and are manufactured by Borg-Warner Nuclear Valve Division. They are identified by the following unit tag numbers:

1, 2 & 3 - SIB-UV-616	1, 2 & 3 - SIA-UV-617
1, 2 & 3 - SIB-UV-626	1, 2 & 3 - SIA-UV-627
1, 2 & 3 - SIB-UV-636	1, 2 & 3 - SIA-UV-637
1, 2 & 3 - SIB-UV-646	1, 2 & 3 - SIA-UV-647

The above condition was addressed in the Final Report for DER 83-63 (dated March 22, 1984) and corrective action was prescribed.

B. On March 30, 1984 after the above conditions had been corrected in Unit 1 and while conducting further prerequisite testing, valves 1-SIA-UV-627 and 1-SIA-UV-647 failed performance tests when their motors remained energized after completion of the closing stroke.

A current imbalance in the 3-phase motor circuit was noted, and it was suspected that the Limitorque motor operators were not developing sufficient torque to actuate the "close" torque switch.

It was determined by Borg-Warner that the cause of this condition was due to improper setting of the torque switch bypass limit switch. This effectively removes the torque switch from the circuit. The torque switch bypass limit switch is also factory set, but field adjustment may also be required as determined by operability performance testing. The observed current imbalance was determined to be within manufacturer's specifications (Reference C-E letter V-CE-21694).

In addition to the valves listed above, HPSI pump mini-flow isolation valves 1, 2 & 3 - SIA-UV-666 and 1, 2 & 3 - SIB-UV-667 have similar Limitorque motor operators (Model SMC-04-7.5). These latter valves, however, are of a different type (Borg-Warner Model No. 77620-4 in Unit 1 and Model No. 77620-3 in Units 2 & 3). Operational problems with valve SJA-UV-667 are addressed in DER 84-72. No operational problems have been experienced with valve SIA-UV-666.

II. Analysis of Safety Implications

A. The HPSI valves are required to open and allow the HPSI pumps to deliver water to the reactor during a small pipe break LOCA or in the recirculation mode after a large pipe break LOCA to maintain the reactor coolant inventory. The identified failure mode of these valves would preclude the Safety Injection System from performing its safety-related function.

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.

The PVNGS Project considers the deficiency to be also reportable under the requirements of 10CFR Part 21. Letter V-CE-19168, dated October 21, 1983, indicates that this condition is limited to PVNGS Units 1, 2, and 3.

B. The incorrect setting of the close limit switches is also evaluated as reportable under the requirements of 10CFR50.55(e); since, if this condition were to remain uncorrected, it could possibly prohibit the valves from opening and this would represent a significant safety concern. This condition is evaluated as not reportable under the requirements of 10CFR Part 21, since there is no defect with the basic component.

III. Corrective Action

A. Final disposition of NCR SM-2591 and input from C-E letter V-CE-19310 define the corrective action as follows:

For valves SI-616, 617, 626, 627, 636, 637, 646, and 647 for all 3 units is as follows:

1. A site inspection was made by Borg-Warner of all valves to verify that a 1979 factory modification to the torque spring packs has been incorporated.

2. Adjustment of the full open limit switch to stop the opening valve stroke at 95% plus/minus 4%. This maintains the present practice of opening these valves to their full open position.

3. Adjustment of the opening torque switch bypass limit switch to 65% plus/minus 5% of valve stroke (stem travel). This adjustment will prevent the motor operator from shutting off on torque below the C-E maximum specified Cv.

4. Settings for both the opening and closing torque switches are to be between 3.0 and 3.25. Unit 1 has been set to 3.0.

5. The yoke tack-welded to the bonnet to prevent loosening.

6. Adjustment of the "Open" light limit switch setpoint to go out at 1/8 inch of stroke before the valve is seated. Limitorque's stated accuracy for limit switch setting is plus/minus 1/8 inch.

The following actions are also being taken in addition to those outlined by C-E:

7. NCRs SJ-2591 for Unit 1 and SE-2744 for Unit 2 will be dispositioned as "Repair." The repairs will be completed prior to fuel load for the respective units.

8. Unit 3 valves will be modified via DCP 3CM-SI-113 prior to fuel load.

9. All unit valves will be retested in accordance with Test Procedure 91PE-1SI08, on completion of modification program.

10. A copy of this report has been sent to C-E and Borg-Warner for their review under the requirements of 10CFR 21.

B. C-E letter V-CE-21694 outlines actions taken in troubleshooting the close limit switch problem.

1. The close limit switches were re-set to the correct settings which resulted in proper operation of the valves.

2. During troubleshooting and to facilitate completion of the testing program, the Limitorque motor-operators were replaced; however, subsequent testing at Borg-Warner has confirmed that the motors were developing the proper torque and Limitorque has confirmed that the observed motor phase imbalance was acceptable.

3. All Unit 1 valves have been confirmed to be operating properly as part of Test Procedure 91PE-1-SI08. Units 2 & 3 valves will be tested in accordance with the same procedure during their respective startup testing programs.