

Arizona Public Service Company

October 3, 1984
ANPP-30733-TDS/TRB

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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 - DER 84-66
A 50.55(e) Reportable Condition Relating To Downcomer
Feedwater Isolation Valve Failed To Close Within Required Time.
File: 84-019-026; D.4.33.2

Reference: A) Telephone Conversation between D. Hollenbach and T. Bradish
on September 4, 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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FINAL REPORT - DER 84-66
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

CESSAR, Chapter 5.1.4, Section I.9, specified a 5-second closing time for the Downcomer Feedwater Isolation Valves, and the Final Safety Analysis Report commits to this requirement, which is necessary to limit the mass of water added to the steam generators following a main steam line break (MSLB) inside the containment. Any water admitted to the steam generator during such an MSLB will be converted to steam and released into the containment, thereby increasing the post-accident pressure and temperature.

Each downcomer feedwater line has two adjacent isolation valves in series located outside the containment. Valves SGB-UV-130 and SGA-UV-172 provide isolation for steam generator 1. Valves SGB-UV-135 and SGA-UV-175 provide isolation for steam generator 2. These pneumatically operated valves close when a main steam isolation signal occurs.

During the startup testing of the feedwater downcomer valves SGB-UV-130, 135, SGA-UV-172, and 175 the valves either failed to close or closed in excess of the 5-second time limit. When tested for closing individually, valves 130 and 135 did not close and allowed a continued flow of approximately 50% of the test quantity flow of 1,000,000 lbs/hr. When adjacent valves were tested simultaneously, valve 135 closed in 6 seconds and valve 175 several seconds later. Adjacent valves 130 and 172 both closed in 6 seconds. Startup issued NCR SJ-4708 to document this condition.

Evaluation

SAR Change Notice No. 1200 has been initiated by the Project to revise the closure time for these valves from 5 seconds to 10 seconds. To evaluate the consequences of a similar deviation from the CESSAR interface requirement for the economizer Feedwater Isolation Valve (FWIV) closure time of 5 seconds to 10 seconds, as reported in DER 83-80, Combustion Engineering (C-E) provided PVNGS-specific mass/energy release data for the design basis main steam line break inside containment assuming a 10-second valve closure time (Letters V-CE-30008 dated 3/30/84, V-CE-30051 dated 4/10/84, V-CE-30177 dated 5/1/84, and V-CE-30370 dated 6/11/84). Bechtel Engineering performed a containment pressure-temperature response analysis using the new data from C-E and verified the following:

- a) The containment temperature profile is enveloped by the equipment qualification thermal profile previously established using generic main steam line break blowdown data from CESSAR-F.
- b) The peak containment pressure is also bounded by the existing loss-of-coolant-accident (LOCA) environmental qualification envelope.

C-E reanalyzed the limiting MSLB with a 10-second FWIV closure time for impact on reactor core thermal-hydraulic response and off-site radiological releases (Letter V-CE-30263 dated 3/21/84). Their analysis confirms that a 10-second closure time will not cause a post-trip return to power, and will not significantly affect core protection or off-site radiological releases.

Combustion Engineering has confirmed that the analysis performed to evaluate DER 83-80 conditions encompasses a 10-second closure time also for the downcomer feedwater isolation valves (Letter B/ANPP-E-121754 dated 9/25/84).

This change provides acceptability for the tests where the valves are closed simultaneously; however postulating a fail-open condition of one downcomer feedwater isolation valve upon receipt of a main steam isolation signal, the inability of the adjacent valve to fully close would result in the continuation of feedwater delivery to the steam generator. This could increase the post-accident pressure and temperature inside containment, representing a significant safety condition.

In order to meet the 10-second closure requirements under all conditions, Anchor-Darling will retrofit the actuators for the 12 downcomer feedwater isolation valves listed below:

<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>
1-J-SGB-UV-130	2-J-SGB-UV-130	3-J-SGB-UV-130
1-J-SGB-UV-135	2-J-SGB-UV-135	3-J-SGB-UV-135
1-J-SGA-UV-172	2-J-SGA-UV-172	3-J-SGA-UV-172
1-J-SGA-UV-175	2-J-SGA-UV-175	3-J-SGA-UV-175

Anchor-Darling's review of the deficiency in closure operation of the valves indicates they had misinterpreted the closure requirements stated in the specification. The root cause of this deficiency is a misinterpretation of the data sheets, which resulted in Anchor-Darling supplying 12 valves within the defined closure time frame under dynamic conditions following a line break downstream of the valve.

In addition to the feedwater downcomer isolation valves listed above, the following valves were supplied by Anchor-Darling to data sheets using a similar format for specifying closure conditions:

<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>
1-J-SGA-UV-500P	2-J-SGA-UV-500P	3-J-SGA-UV-500P
1-J-SGA-UV-500S	2-J-SGA-UV-500S	3-J-SGA-UV-500S
1-J-SGB-UV-500Q	2-J-SGB-UV-500Q	3-J-SGB-UV-500Q
1-J-SGB-UV-500R	2-J-SGB-UV-500R	3-J-SGB-UV-500R
1-J-SGE-UV-169	2-J-SGE-UV-169	3-J-SGE-UV-169
1-J-SGE-UV-183	2-J-SGE-UV-183	3-J-SGE-UV-183
1-J-SGE-UV-170	2-J-SGE-UV-170	3-J-SGE-UV-170
1-J-SGE-UV-171	2-J-SGE-UV-171	3-J-SGE-UV-171
1-J-SGE-UV-180	2-J-SGE-UV-180	3-J-SGE-UV-180
1-J-SGE-UV-181	2-J-SGE-UV-181	3-J-SGE-UV-181
1-J-SGA-UV-174	2-J-SGA-UV-174	3-J-SGA-UV-174
1-J-SGA-UV-177	2-J-SGA-UV-177	3-J-SGA-UV-177
1-J-SGB-UV-132	2-J-SGB-UV-132	3-J-SGB-UV-132
1-J-SGB-UV-137	2-J-SGB-UV-137	3-J-SGB-UV-137

A design review by Anchor-Darling has concluded that these valves will meet their closure requirements.

II. Analysis of Safety Implications

Based on the above evaluation, the non-closure of the downcomer feedwater isolation valves constitutes a condition evaluated as reportable under the requirements of 10CFR50.55(e), in that, were this condition to remain uncorrected it would represent a significant safety condition.

The non-closure of the valves is also evaluated as reportable under 10CFR21.21. This report addresses the reporting requirements of the regulation, with exception of subpart (VI) regarding the number and location of similar components supplied to other facilities.

III. Corrective Action

Anchor-Darling will redesign the actuators for the 12 downcomer feedwater isolation valves (4 per unit). Design Change Packages 1SM-AF-500, 2SM-AF-500, and 3CM-AF-500 for Units 1, 2, and 3, respectively, have been initiated to perform the actuator modifications.

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NCR No. SJ-4708 will be final dispositioned following site testing of the retrofitted actuators at design (dynamic) conditions.

SAR Change Notice No. 1200 has been initiated by the project to revise the closure for the downcomer feedwater isolation valves from 5 seconds to 10 seconds.

Specification 12-PM-221-B will be conformed to reflect the change in the closure times.

Bechtel Engineering has initiated a Bechtel Revision (BR) to the C-E interface requirements document, Bechtel Log No. N001-22.01-9 to reflect the closure time changes.

The actuators are to be modified to close the valves within the revised specified closure time. The valves will be subsequently site-tested for verification of operational capability. The parts necessary to retrofit the actuators are scheduled for delivery and installation prior to fuel load of the respective units.

The final report will be transmitted to Anchor Darling in compliance with 10CFR21.