



Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

RECEIVED
NRC

1984 DEC -3 PM 12:30

November 28, 1984
ANPP-31254-TDS/TRB

REGION VINE

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 84-36
A 50.55(e) Reportable Condition Relating To SI Valve Stalls
Just Off Closing Seat When Opening Or Closing.
File: 84-019-026; D.4.33.2

Reference: A) Telephone Conversation between P. Narbut and T. Bradish on
May 17, 1984
B) ANPP-29731, dated June 12, 1984 (Interim Report)
C) ANPP-30354, dated August 29, 1984 (Time Extension)
D) ANPP-30633, dated September 24, 1984 (Time Extension)
E) ANPP-30949, dated October 25, 1984 (Time Extension)
F) ANPP-31204, dated November 21, 1984 (Time Extension)

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 / BSK

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

EEVB/TRB/nj
Attachment

cc: See Page Two

8412120076 841128
PDR ADOCK 05000529
S PDR

IE-27

Mr. D. F. Kirsch
DER 84-36
Page Two

cc: Richard DeYoung, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

T. G. Woods, Jr.
D. B. Karner
W. E. Ide
D. B. Fasnacht
A. C. Rogers
L. A. Souza
D. E. Fowler
T. D. Shriver
C. N. Russo
B. S. Kaplan
J. R. Bynum
J. M. Allen
A. C. Gehr
W. J. Stubblefield
W. G. Bingham
R. L. Patterson
R. W. Welcher
H. D. Foster
D. R. Hawkinson
R. P. Zimmerman
L. Clyde
M. Matt
T. J. Bloom
D. N. Stover
J. D. Houchen
J. E. Kirby
D. Canady

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, GA 30339

FINAL REPORT - DER 84-36
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNIT 2

I. Description of Deficiency

Unit 2 High Pressure Safety Injection (HPSI) valve 2JSIBUV636 was disassembled for inspection as requested by Borg-Warner and Combustion Engineering (C-E) to determine the cause of valve stall. Site inspection of the valve revealed chatter marks on the interior valve body surfaces and excessive clearances between the disc guides and the valve bore. This condition was documented by NCR SM-3941. As a result of the above condition, the valve was cut out and sent to Borg-Warner for further inspection and repair. Borg-Warner's inspection revealed extensive cavitation damage to the valve body with a region of deep erosion extending approximately half way through the body and a second region of significant pitting extending into the piping (Reference 1). The area of deep erosion violated the minimum wall thickness requirement of 0.399 inches as specified in the Operation and Maintenance Instruction Manual, Bechtel Log No. N001-11.04-263.

The subject valve is a 2 inch, motor operated globe valve manufactured by Borg-Warner and supplied by C-E.

Evaluation

There are eight HPSI injection valves per unit. Their tag numbers are listed below:

JSIBUV616	JSIAUV617
JSIBUV626	JSIAUV627
JSIBUV636	JSIAUV637
JSIBUV646	JSIAUV647

As stated in Section I, valve 2JSIBUV636 was severely damaged due to cavitation. In evaluating this deficiency, radiographic examinations were performed on the remaining seven valves in Unit 2 to determine if they also were damaged. The radiographic examination revealed indications of cavitation damage in all seven valves (Reference 1). Ultrasonic thickness testing of the valves indicated that the remaining wall thickness exceeded the minimum wall thickness of 0.399 inch on all valves except 2JSIBUV616. A precise wall thickness measurement on valve 616 could not be obtained due to interference of the testing equipment with nearby components.

Radiographic examination of the eight Unit 1 injection valves revealed no cavitation damage. However, Unit 1 valve 1JSIAUV627 was disassembled in accordance with NCR SM-4957 to inspect for chatter marks to determine if the chatter marks found on the Unit 2 valve resulted from cavitation or if they occurred due to a deficiency in the valve. No chatter marks were found on the Unit 1 valve. Therefore, the chatter marks on the Unit 2 valves are attributed to cavitation.

This deficiency is isolated to the Unit 2 HPSI injection valves. The root cause is attributed to high velocity flushing through these valves in accordance with startup flush procedure 91FL-2SI02. The Unit 2 HPSI system was flushed at higher velocities and for longer durations than Unit 1. Flows of 600 to 700 gpm through these valves have been reported. The normal expected flow is approximately 277 gpm. Additionally, the valves were throttled for hours at a time during recirculation flushes in accordance with the flush procedure.

Unit 1 and the remainder of the Unit 2 safety injection system were not flushed at velocities much higher than normally expected. Therefore, they are not suspected of having cavitation damage.

II. Analysis of Safety Implications

The function of the HPSI system is to inject borated water into the Reactor Coolant System (RCS) during a Loss of Coolant Accident (LOCA). Failure of the injection valves to operate or maintain their pressure boundary integrity would prevent the HPSI system from performing its intended safety function.

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

This project evaluates this condition as not reportable under the requirements of 10CFR Part 21, since this deficiency constitutes operational damage to a component rather than the delivery of a defective component.

III. Corrective Action

Although ultrasonic thickness testing indicated that six of the subject valves were still within acceptable minimum wall thickness requirements, all eight valves in Unit 2 were removed and replaced with valves from Unit 3. This work was performed per NCRs SM-3941 on May 1, 1984 and SM-4626 on August 24, 1984.

The piping directly downstream of the subject valves will be inspected for damage per NCR SM-5228 when the valves are removed per DCP 2SM-SI-150 to perform work not associated with this deficiency. Damaged piping will be replaced as required and documented on NCR SM-5228.

The flushing procedure for Unit 3, when issued, will ensure the excess flows observed in Unit 2 will not occur.

IV. References

1. Letter, PVNGS-OJZ-M84-187, August 9, 1984
2. Letter, V-CE-30587, July 19, 1984