



Arizona Nuclear Power Project

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REGION V

50-588

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 84-56
A 50.55(e) Reportable Condition Relating To Fire Dampers Close
Inconsistently.
File: 84-019-026; D.4.33.2

Reference: A) Telephone Conversation between J. Ball and T. Bradish on
August 22, 1984
B) ANPP-30569, dated September 19, 1984 (Interim Report)
C) ANPP-31007, dated October 30, 1984 (Time Extension)
D) ANPP-31162, dated November 16, 1984 (Time Extension)
E) ANPP-31253, dated November 28, 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, Jr.
APS Vice President
Nuclear Production
ANPP Project Director

EEVB/TRB/nj
Attachment

cc: See Page Two

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Mr. D. F. Kirach
DER 84-56
Page Two

cc: Richard DeYoung, Director
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FINAL REPORT -- DER 84-56
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

In the presence of a fire, and under normal operating air flow conditions, all fire dampers must close in order to insure the integrity of fire rated walls in which fire dampers are located. The closure of dampers is accomplished via the melting of a fusible link on the damper in the presence of a fire. Some dampers close on the detection of smoke from the incipient stages of a fire after the fire control panel transmits a signal which melts an electrothermal link (ETL) on the damper.

SFR 1HJ-153 and NCRs SM-4579 and SM-4580 document the failure of various dampers to close fully under normal operating air flow conditions. All dampers closed fully under "no flow" conditions. These dampers are manufactured by Ruskin Manufacturing Company and supplied by The Waldinger Corporation (TWC).

Evaluation

The dampers that failed to close are Ruskin Model NIBD23. Though the damper sizes and duct connection shapes (round or rectangular) may differ, the prime difference between dampers is the installation position. Dampers mounted in the floor are defined as horizontal dampers, and those mounted in a wall are defined as vertical dampers. The primary difference in operation of the two types of dampers is that the vertical dampers are spring loaded and closure is gravity assisted, while the horizontal dampers do not have the gravity assist due to the installation position of the dampers.

A. Vertical Dampers

NCRs SM-4579 and SM-4580 specifically identified vertical dampers HJB-M08, M11, M15 and HJN-M102 as having failed to fully close during testing. All vertical dampers were later retested (in the presence of TWC and Ruskin representatives) and it was determined that in all cases, except for damper HJB-M11, the ETL conduits were interfering with the closing of the damper. The root cause of this condition appears to be in the conduit design of the ETLs. After the link melts, the conduit "holds up" the ETL so that the ETL interferes with the closing of the damper. For damper HJB-M11, it was determined that the negator spring was kinked and required replacement (Ref. Letter F-TWC-BCI-84-241, August 24, 1984).

B. Horizontal Dampers

Since the vertical dampers are mounted in the wall, gravity assists their closing. The closing of the horizontal dampers is not assisted in this way. The same negator springs are used in both types of dampers. This spring is sufficient to close the gravity assisted vertical dampers, but not the horizontal dampers. Further testing of the horizontal dampers in Ruskin's facility has shown that use of a stronger negator spring and a modified locking mechanism will cause dampers to close during design flow conditions. The results of these tests are documented in Ruskin Test Report, Bechtel Log no. 13-10407-MM598-3018. A complete list of affected horizontal dampers is supplied as Attachment 1.

The root cause of this condition is that the springs in these dampers were not designed to close in horizontal duct mounted installations under air flow conditions.

II. Analysis of Safety Implications

The failure of the fire dampers which are installed in ductwork to fully close when required will derate the fire rating of the fire rated wall or floor in which they are located. This may lead to a violation of separation criteria where two trains of a system are separated by a fire rated wall in which a damper is located. Therefore, this condition is evaluated as reportable under 10CFR50.55(e); since, if this condition were to remain uncorrected, it could pose a substantial safety hazard.

Ruskin has already reported this condition under 10CFR Part 21. Therefore, determination of 10CFR Part 21 reportability is not required.

III. Corrective Action

A. Vertical Dampers

Fire damper HJB-M11 has been reworked so that it now closes under design flow conditions. This has been accomplished by replacing the kinked negator spring (via Startup Work Authorization number 24939). This damper and all other vertical fire dampers will have their ETL conduits removed so that the dampers will close under design flow conditions. This work will be accomplished via Design Change Package (DCP) 10M, 2SM, 3CM-FP-131. Unit 1 will be completed prior to entry into Mode 6. Units 2 and 3 will be completed prior to issuance of an operating license.

B. Horizontal Dampers

All horizontal fire dampers will have new negator springs and modified locking mechanisms installed in order to insure that the dampers will close during design flow conditions. In addition, horizontal fire dampers with ETLs will also have their conduits removed. The changes will be accomplished in each unit under DCFs 10M, 2SM, 3CM-HA-040; HF-021; HJ-042; HR-007; HT-017. The scheduled completion dates are the same as those listed above.