

OCT 16 1984

Docket Nos. 50-528, 50-529, 50-530

Arizona Public Service Company  
P. O. Box 21666  
Phoenix, Arizona 85036

Attention: Mr. E. E. Van Brunt, Jr.  
Vice President, Nuclear Production

Gentlemen:

Thank you for your letter dated September 26, informing us of the steps you have taken to correct the items which we brought to your attention in our letter dated August 8, 1984. Your corrective actions will be verified during a future inspection.

Sincerely,

*Original signed*

T. W. Bishop, Director  
Division of Reactor Safety & Projects

cc w/ltr dated 9/26/84:  
Ms. Jill Morrison  
Lynne Bernabei, GAP  
Arthur C. Gehr, Esq.

bcc w/ltr dated 9/26/84:  
Project Inspector  
Resident Inspector (2)  
Mr. Martin  
pink/green/docket file copies  
RSB/Document Control Desk (RIDS)

RV *TDJ*  
Narbut

10/12/84

*Miller*  
Miller

10/15/84

*K*  
Kirsch

10/15/84

*B*  
Bishop

10/15/84

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Arizona Public Service Company

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September 26, 1984  
ANPP-30672-TDS

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: Unresolved Items (50-528/84-10-01 and 50-528/84-25-02)  
File: 84-019-026; D.4.33.2

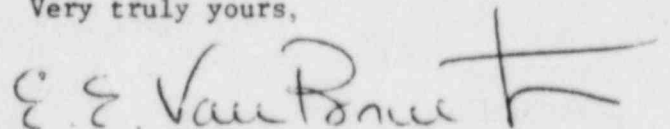
Reference: NRC's Letter from T. W. Bishop to E. E. Van Brunt, Jr., dated  
August 8, 1984

Dear Sir:

This letter refers to the inspection conducted by Messers P. Narbut,  
C. Clark, R. C. Sorensen, and D. Hollenbach between July 9-13, 1984. Our  
responses to the Notices of Violation and Deviations were transmitted  
under separate cover (Reference ANPP-30484-EEVB/WEI).

The additional information requested concerning the related unresolved  
items is contained in the attachment.

Very truly yours,



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

EEVB/TDS/nj

Attachment

cc: See Page Two

COPY

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Mr. T. W. Bishop  
ANPP-30672-TDS  
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  
J. R. Bynum  
J. Vorees  
J. M. Allen  
D. Canady  
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. Woods  
T. J. Bloom

UNRESOLVED ITEM (50-528/84-10-01)  
SEISMIC QUALIFICATION OF THE  
FIRE PROTECTION SPRINKLER SYSTEM

- 2.a.(1) The horizontal seismic loading on Elcen C-clamps does not appear to have been considered

NRC Inspection 50-528/84-10

One of the hanger components used in the F.P. system is the Type 231 Elcen C-Clamp. The analysis of the Elcen C-clamp given in Specification M650-200-1, dated October 20, 1980, only addresses the maximum vertical force allowed. There was no analysis on the ability of the clamp to withstand horizontal loads which would tend to pull the clamp off a beam.

NRC Inspection 50-528/84-25

On June 18, 1984, Revision 2 of Specification M650-200 was issued. This revision contains a report by Twining Laboratories regarding the Type 231 Elcen C-clamp.

This report was presented to the Inspector by the Bechtel Resident Engineer to resolve the C-clamp horizontal loading capacity question. It does not appear that the report's technical merit (to resolve the C-clamp question) was considered prior to giving the information to the inspector. The report consists of test data showing the force required to slide a C-clamp configuration along a beam. The report did not resolve the inspector's questions for the reasons provided below:

NRC Concern

The test data obtained was not compared to the loading expected in service nor were conclusions drawn as to the adequacy of the clamps for service.

APS Response to Concern

Additional tests were conducted at the Twining Laboratories to determine the holding strength of the Type 231 Elcen C-clamps, considering the in-service loading expected in the two horizontal and one vertical directions. The clamps were mounted on beams having tapered and flat flanges and subjected to forces acting to slide the clamps along the flanges of the beams and to pull the clamps horizontally from the edges of the flanges of the beam. The test data is given in the Twining Laboratories Project Report (84-5039M, dated August 10, 1984, (Revision 3 of M650-200) and shows the maximum loading the clamps can withstand.

Computer analysis performed by Viking to verify the adequacy of the pipe support system for the sprinkler piping shows that the loading expected in service by C-clamps in any of the three orthogonal directions is below its allowable limits as determined from the Twining Laboratories test. This computer analysis was for one of the sprinkler systems in the upper cable spreading room, which is located in the Control Building at elevation 160 feet. Since the acceleration response spectrum for this area shows the maximum acceleration, it follows that this is the "worst case" for analysis and verification of the adequacy of the C-clamps for services.

NRC Concern

The test was performed with the C-clamp set screws torqued to either 60 inch-pounds or 125 inch-pounds, depending on their size, either 3/8 inch or 1/2 inch, respectively. No correlation was shown between the test torque settings and the "wrench tight" torquing requirement used during field installation.

APS Response to Concern

All C-clamps are in the process of being torqued to the required value in accordance with Standard Practice SP-69 (Manufacturer's Standardization Society 1976). Torque of 60 inch-pounds will be applied to C-clamps with 3/8-inch diameter set screws and a torque of 125 inch-pounds to the 1/2-inch diameter set screws.

Inspection and verification records of the torqued C-clamps will be maintained by the Subcontractor (Viking).

NRC Concern

The hanger configuration used in the test consisted of an assembly of two C-clamps holding a U-bolt to an I-beam. A more typical field condition (and a more severe test) would appear to be a hanger configuration using only a single C-clamp.

APS Response to Concern

Testing has been completed for a single C-clamp configuration as referenced in Twining Laboratories Project Reports 84-5039B and 84-5039M (Revision 3 of M650-200). This test data, when compared with the expected loading in the vertical and two horizontal directions, proves the adequacy of the C-clamps for service.

NRC Concern

Loading tests were done only longitudinally along the beam and not traverse to the beam. Alternately, a rationale for only performing longitudinal tests was not provided.

APS Response to Concern

Determination of the C-clamp load-carrying capacities in the longitudinal direction, along the beam and also in the transverse direction, have been made as referenced in the Twining Laboratories Project Report 84-5039M, dated August 10, 1984 (Revision 3 of M650-200).

- 2.a.(3) Not all hanger types in use in the field appear to be analyzed

NRC Inspection 50-528/84-10

The inspector had identified that not all hanger types in field use had been analyzed in the calculations submitted by Viking to Bechtel.

NRC Inspection 50-528/84-25

The inspector found additional hanger types that were not analyzed in the Viking calculations including miscellaneous combinations of angle iron welded to Unistrut tray supports. The licensee had not completed their analysis of this item and it remains open.

APS Response

Viking has submitted Revision 3 to M650-200 which incorporates all hanger types supplied and installed by them. Viking calculations would not include miscellaneous combinations of angle iron welded to Unistrut tray supports since this is within Bechtel's scope of work.

- 2.a.(4) The seismic analysis of the fire protection system did not include all buildings containing safety-related hardware

NRC Inspection 50-528/84-10

The inspector identified that the fire protection system seismic analysis did not include all buildings containing safety-related hardware.

NRC Inspection 50-528/84-25

The inspector noted that the Fuel Building had been added to the Viking calculations. The inspector did not assess the adequacy of this action during this inspection. This item remains open.

APS Response

With the addition of the Fuel Building, all the fire protection piping installations in the power block buildings containing safety-related equipment and components now meet the Category IX requirements.

2.a.(5) FPSS hangers attached to cable tray supports

During the review of the seismic qualification of the FPSS, the inspector noted that some of the FPSS hangers are attached to Unistrut supports for Q-Class cable trays.

The inspector was unable to confirm during the inspection that:

1. The FPSS support, the attached miscellaneous steel, and the Unistrut support had been seismically analyzed for the fire protection system (50-528/84-10), and
2. The cable tray support analysis had been modified to reflect the added fire protection system loading. The inspector will examine these items in a future inspection (unresolved item 50-528/84-25-02).

APS Response

A computer analysis has been performed by Viking which includes the FPSS restraint attached to the cable tray supports. The maximum loading imposed by the sprinkler piping restraint on the cable tray supports in the horizontal and the vertical directions has been obtained from the computer analysis. Its effect on the cable tray support system has been analyzed by Bechtel and the results show that the added loads will not have any impact on the structural integrity of the cable tray supports.

In addition to the actions described herein, all analyses and evaluations will be submitted to ANPP Nuclear Engineering for concurrence by October 15, 1984. Should changes to any actions be required, APS will notify the NRC.