

Arizona Public Service Company

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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 Reactor Safety and Projects

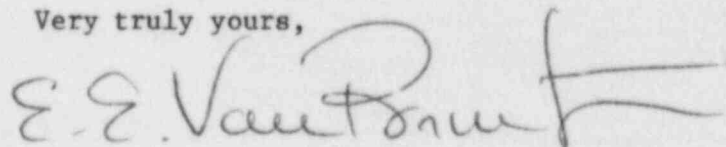
Subject: Final Report - DER 84-37
A 50.55(e) Reportable Condition Relating To Unqualified
Sealant In Essential HVAC Ductwork.
File: 84-019-026; D.4.33.2

Reference: A) Telephone Conversation between P. Narbut and T. Bradish on
May 10, 1984
B) ANPP-29724, dated June 12, 1984 (Interim Report)
C) ANPP-30350, dated August 29, 1984 (Time Extension)
D) ANPP-30565, dated September 19, 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/LBS/nj
Attachment

cc: See Page Two

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Mr. T. W. Bishop
DER 84-37
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. Vorees
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. Woods
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 84-37
DEFICIENCY EVALUATION 50.55(e)
ARIZONA PUBLIC SERVICE COMPANY (APS)
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

Sections of the HVAC ductwork are connected together at joints by bolted flanges which are welded to the ducts. Specification MM-598 Exhibit D, Section D.6.3.14 requires that neoprene gaskets be used at all connections between duct and equipment (dampers, air handling units, etc.) and between duct joints having flanges. The specification also states that sealants may be used only on duct joints which do not have gaskets. The Waldinger Corporation (TWC), the HVAC subcontractor, has verified that all duct joints at PVNGS have gaskets. The specification does not address the use of sealants for other purposes.

The specification requires that all duct systems be pressure tested under positive pressure for adherence to maximum leakage requirements (D.6.3.3). Before the actual test was performed, TWC Q/A personnel pressurized the duct systems to verify conformance to the leakage requirements, and found that certain sections of the ducting systems would not meet these requirements. To reduce leakage to the specified maximum limits, various sealants were applied by TWC construction personnel under the direction of a TWC construction foreman. TWC Q/A personnel accepted the use of these unqualified sealants without questioning the qualification or correct uses of the sealants. These sealants were used in over 100 different locations in Units 1, 2, and 3 Fuel, Control, Diesel Generator and Auxiliary Buildings. At variance to the specification, sealant was applied to gaps in the gasket-metal seal, in abandoned screw holes, around instrumentation and fire damper electrothermal link penetrations, and around sheet metal screws used in securing fire damper flashing. These applications of sealant were not included in the specification nor addressed in any TWC documents submitted for acceptance. The use of unauthorized sealant was discovered by NRC inspection on January 29, 1984 and a Nonconformance Report (NCR #798F) was issued. The NRC inspector inquired about the environmental qualification of the sealants used, and it was determined that there was no existing qualification report.

TWC was requested to identify the type and number of sealants used. This was done via a walkdown and inspection of HVAC systems in Units 2 and 3. This inspection identified 21 types of sealants available for use at the jobsite (Reference letter F-TWC-BCI-84-258, September 5, 1984) and by comparing color and texture, eighteen different types of sealants were found to have actually been used (see Letter F-TWC-84-314, October 5, 1984). This inspection also determined the locations of their use. To date, Unit 1 inspection and walkdown has revealed that no additional sealants were used.

According to Final Safety Analysis Report (FSAR), Section 1.8 and Regulatory Guide 1.52, sealants must be qualified for their post-accident environments. FSAR Section 1.8 states that the design for essential atmosphere cleanup system air filtration and absorption units shall comply with Regulatory Guide 1.52. This guide applies to Essential Safety Features (ESF) Ventilation Systems. (The Diesel Generator, Control, Fuel and Auxiliary Buildings all have ESF Ventilation Systems.) Section C.2(e) states that all materials used in ESF Ventilation Systems should effectively perform their intended function under the postulated radiation levels. There is no qualification documentation for these sealants. The sealants must be qualified in accordance with the post-accident environmental conditions as stated in Specification MM-598 (Reference letter B/ANPP-M-114879, May 14, 1984). There are no post-accident qualification requirements for non-ESF equipment since this equipment performs no post-accident functions.

Evaluation

TWC has constructed test assemblies to duplicate the duct configuration for the various applications of sealant (i.e., if an abandoned hole was found filled with sealant, a hole was drilled in the test assembly and filled with the type of sealant used). The test assemblies consist of 2 - 12" x 12" ducts gasketed together and with sealant applied. These assemblies, along with samples of sealant, were sent to a qualification test lab for testing (see letter F-TWC-BCI-84-258, September 5, 1984). Chemical analysis of the sealants have been completed. Environmental analysis was completed on the assemblies as outlined in the Environmental Qualification Program (M598-2125). The qualification report (Reference Report No. 84-1871, September 27, 1984) received by TWC on October 4, 1984 is proprietary and will be retained by TWC. TWC has informed Bechtel that all test assemblies, samples, and sealants passed the Environmental Qualification Program. This program consisted of an aging test, a radiation exposure analysis, a positive pressure/leakage test, and a deflection (elasticity) test. The program qualifies the sealants for a 5-year life (Reference F-TWC-BCI-84-308, October 4, 1984).

Additionally, Bechtel is directing TWC to proceed with the test program to environmentally qualify the sealants for a 25-year life.

The root cause of this deficiency is the failure of the TWC craftsmen to follow the TWC HVAC installation procedures, and the failure of TWC inspection personnel to detect this deviation from procedure.

Since TWC had an approved QA/QC program, their inspection personnel had the responsibility for inspection of the systems installed by TWC.

II. Analysis of Safety Implications

The sealants are qualified for a period of 5 years, while the gaskets are qualified for 9 to 25 years depending upon their location (Reference M598-1990, Table I, page 7b). Therefore, sealant qualification would expire prior to gasket replacement. Additionally, there are some locations where sealant was used (abandoned screw holes, etc.) in which, had this deficiency gone uncorrected, the sealant may never have been replaced. Therefore, in this situation, operation of the Control, Auxiliary, Diesel Generator, and Fuel Buildings HVAC systems may be suspect and would constitute a possible safety hazard.

Therefore, this condition is evaluated as reportable under the requirements of 10CFR50.55(e), since it also represents a significant breakdown in the quality assurance program.

This condition is evaluated as reportable under 10CFR Part 21, since the defect exists in a basic component.

III. Corrective Action

All unauthorized and/or unqualified sealants used in the ESF Ventilation Systems installed by the Waldinger Corporation in the Control, Diesel Generator, Fuel, and Auxiliary Buildings have been identified. The various sealants have been applied to duct test samples and tested under an environmental qualification program consisting of aging, elasticity, and leakage tests, and a radiation exposure analysis. The Waldinger Corporation has received the test report (Report NO. 84-1871, September 27, 1984) certifying that the sealants have passed the Environmental Qualification Program. The Waldinger Corporation has supplied documentation stating that the sealants used in the ESF Ventilation Systems installed in the control, Fuel, Diesel Generator, and Auxiliary Buildings are qualified for the environmental conditions that the sealants may be exposed to for a life of 5 years (see letter F-TWC-BCI-84-308, October 4, 1984). A matrix giving the locations of the sealant applications for each unit will be supplied by TWC for incorporation into the plant maintenance program. Also, TWC will submit a Supplier Deviation Disposition Request (SDDR) to document their use of sealants in the ESF HVAC systems. The location matrix and SDDR will be reviewed to ensure that all instances of sealant use have been identified and addressed.

The Waldinger Corporation initiated a retraining program for craft, engineers, and QC inspectors on April 19, 1984. This includes the proper uses of sealants in ESF Ventilation Systems (Reference F-TWC-BPC-84-114).

All sealants have been removed to a central location under the direct control of the Waldinger Project Engineer and are being surveyed by Waldinger quality control (Reference B/ANPP-M-116507, June 22, 1984).

Additionally, the following corrective actions have been instituted to intensify control of HVAC installation:

1. Bechtel Construction QC surveillance of "Q" subcontract documentation and work activities are conducted on a daily basis. When a subcontractor is actively involved in "Q" work, a QCE will be assigned to survey the activities.
2. The Field Subcontracts organization has been instructed to direct the subcontractors to submit and document, via the Supplier Deviation Disposition Request (SDDR) process, all requests for deviations from specifications.
3. A process has been instituted to review subcontractor documentation for completeness and compliance to the subcontract for all work performed.
4. More emphasis has been placed by QA on surveillance of hardware installations.
5. All new construction subcontract personnel are required to attend a Quality Orientation Program.