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1985 MAR 11 AM 8:40

ANPP-32088-EEVBJr/WEI/WFQ
March 7, 1985

U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane - Suite 210
Walnut Creek, California

Attention: Mr. D. F. Kirsch, Acting Director
Division of Reactor Safety and Projects

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. 50-528 (License No. NPF-34)/529/530
Investigation of Allegation
NRC Concern RV-84-A-087; No. 154
File: 85-019-026; D.4.33.2

Reference: NRC Letter from D. F. Kirsch to E. E. Van Brunt, Jr., dated January 31, 1985

Dear Sir:

As requested in the referenced letter, ANPP has investigated the concerns expressed by a confidential alleger. The results of this investigation are attached. Several of these concerns had previously been investigated by ANPP. However, based on our review, further investigation is required on the first concern. This investigation is expected to be completed on April 15, 1985.

If there are questions regarding these investigations or the results, please contact us.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/WEI/dlm

Attachment

cc: L. F. Miller
R. P. Zimmerman
E. A. Licitra
A. C. Gehr

IE-28

ATTACHMENT A

Downgrading of Test Equipment Specifications
(RV-84-A-87; No. 154; Concern 1)

Concern:

Test equipment specifications were arbitrarily modified (e.g., rod oven thermometers, micrometers, Holiday detectors, and Ashcroft pressure gauges).

Investigation Results:

Work Plan Procedure, WPP/QCI 7.0, entitled, "Calibration and Control of Construction Measuring and Test Equipment", allows the Instrument Control Lead Engineer (ICLE) to establish accuracies for Measuring and Testing Equipment based on Project requirements. This accuracy may be different than that specified by the manufacturer, depending on the use of the Measuring and Test Equipment. A review was conducted of the equipment specified in this concern to identify if the accuracy specified by the ICLE was different than that specified by the instrument and manufacturer. The results of that review indicate the following:

a. Rod Oven Thermometers:

The manufacturer's specified accuracy is ±10°F. The accuracy specified by the ICLE for use at PVNGS was ±20°F. Given the broad acceptable range of temperatures at which weld rod can be stored; i.e., 200°F-350°F, the range specified by the ICLE appears prudent. However, as a result of this investigation, it appears that, in the worst case, rod oven temperature could be allowed to drop below 200°F. Therefore, this matter is currently being investigated.

b. Micrometers:

Micrometers are calibrated utilizing gauge block sets traceable to the National Bureau of Standards. In reviewing this concern, calibration records associated with five (5) micrometer sets were reviewed. It appears that, in one case, an error which exceeded the manufacturer's tolerance was accepted. Additional investigation is required to determine if and why this error was accepted.

c. Holiday Detectors:

Holiday detectors do not require rigorous calibration. Rather, detectors are field adjusted. The field adjustment is clearly defined in the Project Specifications 13-PM-204 and 13-PM-205. Discussions were conducted with cognizant personnel and provided assurance that personnel understood the procedure. No discrepancies were noted.

d. Ashcroft Pressure Gauges:

Ashcroft Pressure Gauge Model 1320A has a manufacturer's specified accuracy of ±1/2%. The required accuracy at PVNGS has been specified by the ICLE as ±1%. Based on the use of this type of gauge in hydrostatic testing, this accuracy appears acceptable. However, this evaluation is not complete considering the potential uses of these gauges.

Based on the initial results of this investigation, a more detailed investigation is necessary and will be conducted. The scheduled completion date for this investigation is April 15, 1985.

Weld-AMP Monitors
(RV-84-A-87; No. 154; Concern 2)

Concern:

The use of Weld-AMP Monitors was arbitrarily suspended and the Weld Monitors were not calibrated when they were used.

Investigation Results:

Procedure Change Notice (PCN) No. 27 was approved July 30, 1979 and deleted the requirements of Paragraph 11.0, WPP/QCI No. 101.0. The PCN deleted the procedural requirement for checking voltage and amperage during in-process welding operations on material requiring Charpy "V" Notch (CVN) testing. The monitoring of voltage/amperage is not a Code requirement and is not an essential welding performance variable. The reason for deletion, stated on the PCN is as follows:

> "Current and voltage variables do not require measurement or recording based on their self limiting nature and the insensitivity of P-1 and P-3 materials to the reduction of notch toughness properties with increasing heat input."

Further investigation for the procedural change was established by Bechtel Research and Engineering, Materials and Quality Services Department in their report, "Technical and ASME Code Considerations For Notch Toughness Tested Welding Procedure Qualifications", dated May 1978. Their data showed that for all likely conditions of welding, toughness was not diminished and that specific values of voltage, amperage or travel speed are not critical in developing acceptable toughness. M&QS also concluded that the materials of interest in the temperature range of interest are not toughness sensitive to welding variables.

Prior to the deletion of the voltage/amperage check, a calibrated Neoweld Model No. 38005 current/voltage monitor was utilized to check in-process welding operations. The instruments were maintained and calibrated by the Measuring and Test Equipment Lab (M&TE) until they were decontrolled on February 12, 1981.

Based on a review of ASME Section IX and the M&QS technical report, the suspension of voltage/amperage monitoring was not arbitrary, but rather justified and can be substantiated.

Welding Oxygen Monitors
(RV-84-A-84: No. 154; Concern 3)

Concern:

Welding oxygen monitors were not properly calibrated.

Investigation Results:

Welding oxygen indicators utilized at the Arizona Nuclear Power Project are Bacharach Instrument Company's Model K525. The Measuring and Test Equipment Lab (M&TE) performs maintenance on these instruments which includes reactivation of the oxygen cells and replacement of batteries. M&TE also performs a functional check of each unit prior to its leaving the Lab. Actual adjustment of the instrument is performed by the user in the field. Operation of the instrument is normal if the meter can be set to read 21% in atmospheric air (atmospheric air is the adjustment standard). The manufacturer's operating procedure is attached to the side of each unit and is self-explanatory. The program described above complies with the manufacturer's instructions.

Vendor Calibration
(RV-84-A-87; No. 154; Concern 4)

Concern:

Test equipment vendor calibration standards were not traceable to the National Bureau of Standards.

Investigation Results:

A review of the calibration standards used by the Bechtel Metrology Laboratory was conducted to investigate the referenced concern.

The scope of the review consisted of the following:

1. A review of the calibration log to identify those items used as standards.

2. From a review of the standards, identify those calibrated by an outside source.

3. Review the calibration certificates received to assure items were calibrated with traceability to NBS.

The investigation revealed:

1. All certificates reviewed, with the exception of two (2), either stated that the calibration was traceable to NBS or listed an NBS traceability number.

2. In the case of the two (2) exceptions, one (1) of the items was calibrated by another Calibration Lab prior to use by BPC. The Calibration Lab that did calibrate the item, did state the calibration was traceable to NBS. The other item has not been used as of this date. Calibration by an approved source with traceability to NBS will be required prior to use.

Based on the review of on-site documentation, it appears that vendor calibration standards are traceable to NBS. Audits of calibration vendors which have been conducted in the past have verified calibration standards traceable to NBS. Future audits of calibration vendors will verify the traceability of calibration standards to NBS.

Based on the investigation conducted as a result of this concern, additional questions were developed unrelated to this concern. These additional questions will be resolved in accordance with our quality program.

Field Test Instrument Request - Multiple Use Log (RV-84-A-87; No. 154; Concern 5)

Concern:

The Field Test Instrument Request-Multiple Use Log did not accurately record how test equipment was used by Bechtel or APS personnel.

Investigation Results:

This concern had previously been investigation by ANPP. Previous reviews of the Measuring and Test Equipment (M&TE) program had revealed concerns related to the subject documents and their use. ANPP Audit C-83-3 conducted in February and March, 1983 noted deficiencies in the completion of the FTIR. As a result of the audit, the procedures were revised to include the Multiple Use Log (MUL).

A more recent investigation revealed that during the last Quarter of 1983, a significant portion of the entries on the FTIR-MUL had to be corrected before they were acceptable administratively. A similar review for July, 1984 indicated a significant improvement in the Log. Additionally, it was found that in June/July, 1984, there were some minor problems in the issuance of M&TE when Calibration Lab personnel were not available. This has been determined to have been caused by unfamiliarity with a procedure change issued in June, 1984. More recent implementation has been acceptable.

A more recent sample of sixty-six (66) instruments used for acceptance was conducted by reviewing whether the instruments indicated as used on acceptance work documents were so indicated on the FTIR-MUL. No discrepancies were noted. Additionally, nine (9) activities involving the use of M&TE were monitored in October, 1984. The use of the FTIR-MUL was observed to be proper for all of the monitored activities.

In summary, ANPP's review of this area had previously noted problems in the use of the FTIR-MUL. Corrective action was taken. More recent reviews of the FTIR-MUL have indicated that the system has improved significantly and is working effectively.

Corroded Structural Bolts
(RV-84-A-87; No. 154; Concern 6)

Concern:

Some corroded structural bolting may have been used in structures at Palo Verde.

Investigation Results:

This concern had been thoroughly investigated prior to receiving the NRC concerns. A search into the specific issue of possible usage of rusted bolts and the adequacy of bolting, in general, at PVNGS revealed the following:

Prior to October 3, 1984, there were not specific instructions on WPP/QCI No. 58.0 (Structural Steel Installation) concerning cleanliness and thread adequacy for bolted connections. Bolts were installed to standard industry practice with Craftsmen being instructed to only install clean and lubricated bolts (Reference: CAR CA-84-0343, Corrective Action Item 3). An Interoffice Memorandum had been generated on March 15, 1983 by the Bechtel Construction Manager reminding the Crafts of the importance of proper storage, preparation and installation of structural bolts.

On November 30, 1984, CAR CA-84-0343 was issued due to discovery of some rusty bolts in Unit 3 storage (outdoor) area during an ANPP investigation. At this point, it should be noted that discovery of rusted bolts in storage implies the possibility only, but does not necessarily mean that rusted bolts have been used.

Assuming a worst case scenario with the Crafts not taking any steps to clean the bolts before usage, the implication is that exerted torque may not induce the required tension in the bolt. This was examined by Bechtel under a more general scope of bolting adequacy with bolts being tested under various thread conditions and various lubricants used. It was discovered that even a light coating of rust does not prevent the bolts from being tensioned to acceptable values.

A secondary implication is that the bolt cross section is reduced due to rust. However, this is of no significance because properly torqued bolts experience the higher stress during installation due to: (a) Combination of tensile and torquing induced shear stresses; and (b) Subsequent time dependent relaxation of the induced stress. If the bolt "survives" installation, it will present no problems in the future.

In addition, as a result of NRC's Construction Assessment Team (CAT) inspection during September of 1983, all Accessible Critical Friction type connections were re-torqued. (Inaccessible connections were determined that they will function satisfactorily per Reference B/ANPP-E-114700 letter, dated May 9, 1984. Also see NCRS CC-4689, 4690 and 4691).

The response to CAR CA-84-0343 also stated that (a) a search for identification of any other rusted bolts was made, and (b) there are no prior audits, surveillances or inspection reports identifying problems with installations of rusty bolts. In addition, Bechtel conducted a review of the Civil NCR Log to determine if such a concern had been identified in the past. This review, consisting of roughly 5,000 NCR's, identified only two (2) NCR's with the same concern (CC-2277, Steam Generator Anchor Bolt, dated November 18, 1980 and CY-4876, Spare Start-Up Transformer Foundation Anchor Bolts, dated September 14, 1984) which (a) is not considered a significant number, and (b) demonstrates the availability and usage of proper nonconformance and correcting mechanisms where bolt corrosion is considered significant.

Additionally, an independent assessment of bolting adequacy was conducted for ANPP entitled, "An Assessment of Bolting Integrity at PVNGS Units 1, 2 and 3", by Structural Integrity Associates, Incorporated. This Report evaluates the use of rusted fasteners. It noted that visible surfaces of bolts observed were clean. The failure mechanisms for both overtorqued and undertorqued fasteners was examined. The Report concluded that because of the conservative design and correction of noted deficiencies in critical connections, bolting joint integrity at PVNGS is acceptable. This Report was forwarded to NRC Region V by Letter ANPP-31904-EEVB/WEI-WFQ on February 11, 1985.

Based on the evidence presented, as well as examination of design practices followed and resulting ample design margins, it is concluded that the concern of possible usage of rusted bolts presents an insignificant possibility and, furthermore, the implied resulting undertorquing poses no concern to the safe operation of the plant.

Tie Wraps, Bolt Lubricant, Cable Stripping (RV-84-A-87; No. 154; Concern 7)

Concern:

Cable Tie Wraps were tightened sufficiently to damage plant cabling, "WD-40" was inappropriately used for bolt lubricant, and pocket knives were inappropriately used to strip cable insulation.

Investigation Results:

These concerns had previously been identified to ANPP and addressed. Each concern is addressed separately below:

a. Cable Tie Wraps:

A review of project specifications/procedures produced no evidence of restrictive measures that require the control of installation of cable ties. A recent Corrective Action Report (CAR) identified the concern. The engineering response to the subject explains that the cable jacket is a protective dielectric covering for the inner, insulated conductors and fillers. The primary purpose of the outer jacket is to protect the insulation of the inner conductors from damage throughout the life of the cable. Tie wraps may indent or extrude the outer jacket, but due to the inherent design pliability/durability of the cable jacket, insulation damage of the inner conductors will not occur. To ensure a quality cable installation, cables are required by specification to be sufficiently secured in vertical tray sections to prevent droop and sag. Technical guidance and surveillance is provided to prevent damage to the cable jacket and/or inner conductors. There has not been any conductor insulation failures at ANPP due to cable tie installation.

b. "WD-40" was inappropriately used for bolt lubrication:

A review of procedures, specifications and Quality Assurance concerns revealed that the subject use of WD-40 has been previously addressed. Evaluation and acceptance of the construction practice has been a part of a Corrective Action response. There was no evidence found to indicate that WD-40 was used for other than the structural applications where WD-40 was approved for use. No safety concern was substantiated during the investigation.

c. Pocket knives were inappropriately used to strip cable insulation:

A review of project specifications/procedures and Corrective Action Reports produced supporting evidence that recommends the use of knives and/or various other tools for wire/cable insulation stripping. A guide for performance of cable terminations in Specification No. 13-EM-306, Section 4.6, suggests that knives be used, particularly when types of insulation render stripping tools ineffective such as coaxial, triaxial, braided jacket, and heat/trace protective cables. Knives may also be used for the stripping of smaller gauge solid wire, if used properly. Inspection criteria is clearly defined in procedures/specifications. Individuals responsible for cable installation quality confirmed that the wire stripping level of acceptance is understood and imposed as required.