U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/87-13, 50-529/87-14, 50-530/87-15

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

License Nos. NPF-41, NPF-51, CPPR-143

Licensee: Arizona Nuclear Power Project
P. O. Box 52034
Phoenix, Arizona 85072-2034

Facility Name: Palo Verde Nuclear Generating Station Units 1, 2 and 3

Inspection Conducted: March 16-30, 1987

Inspector: S. Richards FOR C. Clark, Reactor Inspector — 4/16/87 Date Signed

Approved by: S. Richards, Chief, Engineering Section — 4/16/87 Date Signed

Summary:

Inspection During the Period March 16-30, 1987 (Report Nos. 50-528/87-13, 50-529/87-14 and 50-530/87-15)

Areas Inspected: Routine unannounced inspections of Units 1, 2 and 3. Areas examined included licensee action on 10 CFR Part 21 Reports, Deficiency Evaluation Reports and IE Information Notices. Inspection Procedures 30703, 92700 and 92701 were covered during this inspection.

Results: In the areas inspected, no violations of NRC requirements were identified.

DETAILS

1. Persons Contacted

*J. Bynum, Plant Manager
*D. Wittas, Quality Systems and Engineering Manager
*G. Sowers, Operations Engineering Manager
W. Ide, Corporation Quality Assurance Manager
*O. Zeringue, Technical Support Manager
*J. Vorees, Nuclear Safety Manager
*T. Shriver, Compliance Manager
B. Craig, Procurement Quality Manager
R. Baron, Compliance Supervisor
T. Bradish, Compliance Supervisor
*J. Sills, Sr. Compliance Engineer
S. Penick, Quality Assurance Supervisor
J. Minnicks, I&C Superintendent
R. Meyer, Fire Protection Supervisor
D. Le Boeuf, Corporate QA/QC Transition Representative
D. Larkin, QA Engineer
*J. Quan, Licensing Engineer
J. B. Kriner, Licensing Engineer

2. Licensee Action on 10 CFR Part 21 Notifications

A. (Closed) 86-14-P, Automatic Sprinkler Model C Deluge Valves Failed to Open - Units 1, 2 and 3

The Automatic Sprinkler Corporation of America has identified that their model 'C' deluge valves used in deluge, pre-action and foam-water deluge fire protection sprinkler systems, may fail to open and prevent the fire protection system from operating. Under certain situations the valve clapper has stuck to the latch, preventing the valve from opening.

The licensee had received IE Information Notices (IEN) No. 84-16 (failure of automatic sprinkler system valves to operate) dated March 2, 1984 and No. 86-17 (update of failure of automatic sprinkler system valves to operate) dated March 24, 1986, which address operational failure of 6-inch deluge and pre-action fire protection water control valves.

The licensee closed out IEN 84-16 per document ANPM-27276-WFQ/JBK/98.05, dated June 2, 1986, based on the following positions:

(1) The licensee does not utilize Automatic Sprinkler, Model C valves, but rather utilizes Viking preaction and deluge valves. The design of the Viking valves is not similar to the Automatic sprinkler valves. Rather than utilizing a mechanical release mechanism to actuate the sprinkler valves, the Viking sprinkler valves actuate on a combination electric and differential pressure signal. Because of this, the binding and friction

problem which were experienced at Grand Gulf will not be experienced at the licensee facility.

(2) Also, all automatic sprinkler valves for the safety related areas are tested at least once every 18 months. This test verifies that the automatic valve actuates to the correct position when an electric signal from the local thermal detector is actuated.

Although the licensee has not closed out IEN No. 86-17, based on the onsite inspection and review of licensee's documents, the inspector concluded that the licensee has taken appropriate actions on the problem identified in this Part 21, and in IEN Nos. 84-16 and 86-17.

This item is closed.

B. (Closed) 86-14-P1, Automatic Sprinkler Corporation Mercury Check Device Leakage and Update on Model C Valve Units 1, 2 and 3

In a 10 CFR Part 21 notification letter dated December 1, 1986, the Automatic Sprinkler Corporation provided an update on model C valves and discussed a problem with mercury check devices. The mercury check device is a component of most Rate-of-Rise Sprinkler Systems. This device is made up of two molded plastic parts which are bonded together. A number of these mercury check devices have developed a leak in the bond area, which could allow air to escape from the device. This air lost could affect the devices acceptable operation. This condition may take years to develop, if at all. To be conservative, the manufacturer recommended that all existing plastic mercury check devices be replaced.

This letter also identified that mercury check devices were used in the actuation setup for Carbon Dioxide systems, Dry Chemical systems and other special application equipment manufactured by other companies, such as Ansul, Chemetron (Cardox and Safety First), Norris, American LaFrance and Rockwood.

Although the licensee had identified that a majority of the fire protection systems at this facility were provided by Viking, rather than the Automatic Sprinkler Corporation, there are some Chemetron systems installed. The licensee's Fire Protection and Instrument and Control groups reviewed the existing fire protection systems and identified to the inspector that none of the subject mercury check devices are installed in their fire protection systems.

Based on the results of the licensee review of fire protection systems for mercury check devices and the actions taken for Part 21 item 86-14-P for model C valves, the inspector concluded that the concerns of this Part 21 notification have been resolved.

This item is closed.

C. (Closed) 86-15-P; Limitorque Corporation - Degraded Motor Leads in DC Motor Operators - Units 1, 2 and 3

On May 6, 1986, Portland General Electric Company submitted a 10 CFR 21 report identifying limitorque valve DC motor operator failures at the Trojan Nuclear Power Plant. The failures involved shorting of motor leads due to a breakdown of the internal motor lead insulation. It appears movement of the leads during maintenance can cause cracks in the brittle insulation. The weakened insulation would then be subject to failure under the normal vibration and operating environment of the motor actuator.

The licensee has received IE Information Notice (IEN) No. 87-08 (Degraded Motor Leads in Limitorque DC Motor Operators) dated February 4, 1987, which covers this same subject. This notice identified that DC motors manufactured at H.K. Porter (now Peerless-Winsmith) between December 1984 and December 1985 were fitted with Nomex-Kapton insulated leads that were susceptible to insulation degradation and subsequent short circuit failure. The Nomex-Kapton leads were different than the leads tested and reported in Limitorque Qualification Report B-0009 dated April 30, 1976. The leads attached to the tested motors, were insulated with Nomex plus an epoxy impregnated braided fiber glass sleeve, which is an insulation assembly six times the thickness of the failed leads.

The IE Notice identified certain letters in the serial number data code found on motors, that could identify motors likely to contain the Nomex-Kapton leads. This notice also identified that Limitorque was developing a sleeving system for the subject leads and expected to have this system tested for environmental qualification by the third quarter of 1987.

Per licensee Reportability Evaluation Report (RER) No. QSE-87-08 (Rev. No. 1), the licensee has performed a walkdown inspection of all installed QR(SR) limitorque valve motor actuators containing DC motors, and confirmed that the motor serial data codes preceded the subject December 1984 to December 1985 time period. Further, warehouse material has been placed in quarantine to ensure that no Limitorque (Peerless) DC actuator (QR/SR) motors with the applicable manufacture serial data codes are released for installation, until qualification of the new wire can be substantiated and/or the corrective action identified in the 10 CFR 21 report has been incorporated. The licensee closed-out their action on the information notice on March 12, 1987, based on the results of this RER.

Based on the onsite inspection and the review of the available documentation, the inspector concluded that the licensee has taken appropriate action for this item and IE Information Notice No. 87-08.

This item is closed.

D. (Closed) 86-21-P, Qualification Status of AB 40 Voltmeters and Ammeters Provided by Yokogawa of America is Unknown - Units 1, 2 and 3

Approximately January 1, 1985, Yokogawa of America purchased a portion of the General Electric instrument line, which included the AB40 voltmeters and ammeters. Apparently, General Electric continued to manufacture these items in Somersworth, New Hampshire under the Yokogawa name during the early parts of 1985.

Some time later in 1985, Yokogawa started manufacturing these items at their own facilities near Atlanta, GA. Also, inventories from General Electric were transferred to Yokogawa sometime during 1985. During this time period Yokogawa apparently made some design changes to the instruments without changing the catalog numbers.

The type AB 40 voltmeters and ammeters had been used previously in Class 1E switchgear applications by BBC Brown Boveri for original equipment and as spare parts.

BBC Brown Boveri records indicated that ten (10) of the subject meters were delivered to the licensee as class IE spare parts. Additional information on Brown Boveri was provided in Deficiency Evaluation Report 85-43.

Per Corrective Action Report (CAR) No. CP-86-0085, the meters supplied were not installed and all ten were returned to BBC Brown Boveri under shipping notices 006444 and 006715. Per review of applicable documentation, the inspector concluded that the licensee has taken appropriate action.

This item is closed.

E. (Closed) 86-23-P, Atwood and Morrill Main Steam Isolation Valve (MSIV) Stationary Sleeve on Thrust Bearing Required Machining to Prevent Galling - Units 1, 2 and 3

During this inspection the licensee identified to the inspector that these Atwood and Morrill MSIV's had not been installed in this facility, therefore this Part 21 is not applicable.

This item is closed.

F. (Closed) 86-26-P, G.A. Technologies Identified Sorrento Electronic Model RD23 High Level Radiation Monitors Cable Resistance Varied at High Temperatures - Units 1, 2 and 3

During this inspection the licensee identified to the inspector that G. A. Technologies had not provided any Sorrento Electronic Model RD23 high level radiation monitors for installation at this facility, therefore this Part 21 is not applicable.

This item is closed.

G. (Closed) 86-29-P, ITT Air-Motor Operated Diaphragm Valves With Extended Structures Have Natural Frequencies Less than 33 Hertz - Units 1, 2 and 3

In a 10 CFR Part 21 notification of deviation dated October 10, 1986, ITT Fluid Technology Corporation valve division identified that the air-motor operated diaphragm valves (with extended structures) supplied to the licensee by ITT Engineered Valves (formerly DIA-Flo Division of ITT Grinnell Valve Co., Inc.) have natural frequencies less than 33 hertz. The original design requirement for the subject valves required that the extended structures have natural frequencies equal or greater than 33 hertz.

ITT Grinnel also identified in this notice, that testing had identified that there were no detrimental effects on valve operability until equivalent acceleration levels significantly in excess of contract specified levels were reached. In addition to valve considerations, it was identified that piping systems containing these valves and the associated piping supports could be affected by the change in frequency.

The licensee had also received a related IE Information Notice (IEN) No. 87-02 (Inadequate Seismic Qualification of Diaphragm Valves by Mathematical Modeling and Analysis) dated January 13, 1987, which identified that safety-related diaphragm valves were furnished as seismically qualified by mathematical analysis, based on an inadequate model. The results of later tests showed that the actual lowest natural frequency of the valve may be less than the 33 hertz required by the purchase specification.

This notice also identified that in addition to valve considerations, the piping systems containing these valves and the associated piping supports could also be affected by the change in frequency and that an evaluation of the analysis methods used to qualify the valves and the potential impact on a system may be required.

In response to the concerns addressed in the ITT October 10, 1986 notification, Bechtel performed an analysis of the affect of the revised valve frequencies on associated piping and pipe support systems, and all conditions were found acceptable. This information was provided to the licensee in Bechtel letter No. 3/ANPP-Q-156707 dated November 17, 1986. This Bechtel response appears to address all the concerns of IEN No. 87-02.

Based on the onsite inspection and review of licensee's documents, the inspector concluded that the licensee has taken appropriate actions on the concerns identified in this Part 21 and IEN No. 87-02.

This item is closed.

H. (Closed) 87-04-P, NEI Peebles - Electric Products, Inc. and Cooper Energy Services - Defect in Rotor Pole of Class IE Diesel Generator - Units 1, 2 and 3

A 10 CFR 21 notification issued November 24, 1986, identified that a manufacturing defect existed in the rotor of the train B of the Class 1E emergency standby diesel generator installed in Unit 3 of the licensee facility. This equipment was manufactured by NEI, Parsons Peebles - Electric Products, Inc. and shipped to Cooper Energy Services in July and August of 1980.

During normal maintenance of this diesel generator, rotor unbalance was detected. It was discovered that the copper windings on one of the rotor poles were loose. The defective rotor pole was replaced with a spare rotor pole.

The evaluation by NEI Peebles was that a manufacturing defect, identified as a substandard bond of the polyester resin encapsulant on the field coil conductor, exists in certain localized areas of the wire-wound rotor pole. NEI Peebles did not consider voids to be unusual. Therefore, these localized areas of substandard bonds were not to be misconstrued as voids.

Centrifugal force apparently broke the resin bond, and the wires separated from each other and from the coil. NEI Peebles has confirmed that resin degradation does not occur over a period of time; therefore, aging is not a concern.

The root cause attributed to the pole winding separation was a manufacturing defect resulting from improper application of resin and/or poor workmanship.

Since this happened at the licensee facility, a Deficiency Evaluation Report (DER) 86-31 was issued to document the failure of the rotor and corrective actions taken. A final report of this DER issued February 5, 1987, also identified that during rework of the defective pole it was discovered that pole piece fasteners were loose. The loose pole pieces are not part of this Part 21 concern and will be addressed only in the close out of the DER.

The DER confirmed that polyester resin from the same batch was used on the Unit 3 Train A and Train B diesel generator rotors and the spare rotor pole pieces. Train A diesel generator was successfully operated for over 140 hours both loaded and unloaded. Although the Train B diesel generator had been run for only three hours unloaded at the licensee facility, it had been run both loaded and unloaded at 100% speed for 10 hrs. as a part of the extended engine running time test at Cooper Energy Services. Both Unit 3 diesel generators have been subjected to overspeed trip verification. The Train A rotor poles, the remaining Train B rotor poles and the spare rotor poles were inspected by the vendor at the jobsite and checked for pole winding alignment and any obvious damage. No deficiencies were noted.

Per the licensee, the Units 1 and 2 NEI Peebles diesel generators have approximately 700 hours and 300 hours of operation respectively. The successful operation of both A and B trains of diesel generators in Units 1 and 2 during testing and normal operation provide additional assurance that the two reported deficient conditions were isolated cases of these types of failures. Since there was no evidence that the Units 1 and 2 diesel generators were affected by these defects, their continued use has been evaluated by the licensee as not posing a hazard to the safe operation of Units 1 and 2.

A random inspection performed to determine whether voids existed in the other operating units, verified voids also to be present. The licensee was unable to analyze the extent of those voids, but their existence did confirm that operability with voids has been demonstrated.

Based on the onsite inspection and review of available licensee's documents, it appears the licensee has taken appropriate actions on the original concern identified in this Part 21. The concern about loose pole piece fasteners, which was identified in the DER as an isolated case of deviation from specified torque valves used at the factory prior to shipping, will be addressed in the close out DER 86-31. At the time of this inspection, the licensee had not completed their inspection of the Unit 3 Train A diesel generator for loose pole piece fasteners.

This item is closed.

3. Licensee's Method for Processing 10 CFR Part 21 Reports of Defects and Noncompliance, Received from Outside the Licensee Organization

During this inspection the inspector identified the following concerns:

A. The licensee stated that they did not have a formal documented program for tracking reports of defects, with procedures outlining the responsibilities and methods for evaluating and processing 10 CFR Part 21 reports received from outside the licensee organization.

B. There appeared to be 10 CFR Part 21 notifications, that were issued by other licensees and vendors in September 1985, and July 1986, that were not identified in the licensee informal 10 CFR Part 21 tracking system. In the case of the one report (85-20-P) on undervoltage trip devices on type AK and AKR low-voltage power circuit breakers, issued by General Electric Company on September 13, 1985 (with a copy addressed to the licensee), the licensee informal program could not identify if it had been evaluated and processed. Followup investigation by a licensee representative during this inspection identified that it appeared that the licensee electrical group may have performed corrective actions for this item in Units 1 and 2, but they were not sure about Unit 3. During this inspection, the licensee could not provide documentation on what actions had been taken in any unit. It appears an improved system

is warranted to ensure appropriate corrective action is taken for 10 CFR Part 21 notifications.

C. There were some 10 CFR Part 21 notifications that had been assigned to individual licensee groups, as either the original Part 21 notification or through the IE Information Notices (issued after the initial issue of the 10 CFR Part 21 document), that had requested response dates several months overdue. There were no indication that these items had received any initial timely evaluation for affects (if any) on the operability of plant equipment. In that a 10 CFR Part 21 notification may affect an operating unit, it appears that an initial formal documented review of each 10 CFR Part 21 notification by the applicable licensee personnel would be prudent, to determine if immediate corrective actions are required for safe unit operation.

After identifying the above concerns to the licensee, the licensee provided the following information.

- The licensee stated that under the construction program, Bechtel had handled the 10 CFR part notifications. The licensee stated that they need to issue/initiate a formal licensee 10 CFR Part 21 program. The licensee has committed to have a procedure for establishment of this program issued by May 15, 1987, to resolve the concerns identified during this inspection.

- The licensee also identified that they were already concerned that they might not be receiving all the applicable 10 CFR Part 21 notifications from their suppliers/vendors, so they were working on a letter that will be issued to all existing and past suppliers/vendors. This letter will be issued at least once each year to the applicable suppliers/vendors, directing them to send each applicable 10 CFR Part 21 notification to one group within the licensee organization. This group will distribute the 10 CFR Part 21 notifications to the applicable licensee representatives, for action. The first letter is scheduled to be issued April 10, 1987.

The licensee's program to track and act on reports of defects received from outside organizations will be further reviewed during a future inspection (50-528/87-13-01).

4. Exit Meeting

The inspector met with licensee management representatives denoted in paragraph 1 on March 20, 1987. The scope of the inspection, observations and findings as noted in this report were discussed.