U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/84-61, 50-529/84-40 and 50-530/84-29

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

License Nos. CPPR-141, 142 and 143

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

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

Inspection at: Palo Verde Construction Site, Wintersburg, Arizona

Inspection conducted: December 3-7, 1984

Inspectors: Daniel P. Hollenbach for
R. C. Sorensen, Reactor Inspector — 1/3/85 Date Signed

Daniel P. Hollenbach
D. Hollenbach, Reactor Specialist — 1/3/85 Date Signed

Approved by: L. F. Miller, Jr.
L. F. Miller, Jr., Chief
Reactor Projects Section 2 — 1/4/85 Date Signed

Summary:

Inspection on December 3-7, 1984 (Report Nos. 50-528/84-61, 50-529/84-40 and 50-530/84-29)

Areas Inspected: Routine unannounced inspection by regional based inspectors of IE Circulars, 50.55(e) items, previously identified open items, and implementation of Three Mile Island Lessons Learned actions in Unit 1, with some examinations carried over into Units 2 and 3. The inspection involved 65 inspector-hours onsite by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

## DETAILS

1. Persons Contacted

a. Arizona Public Service Company (APS)

*R. Hamilton, Quality Monitoring Supervisor
*D. Karner, Assistant Vice President Nuclear Production
*E. Van Brunt, Jr., Vice President Nuclear Production
*R. Kimmel, Transition
*J. Gross, Construction
*E. Sterling, Nuclear Engineer
*W. Ide, Corporate QA/QC Director
*J. Bloom, Licensing Engineer
*J. Smith Jr., Compliance Engineer
*D. Zeringue, Technical Support
*J. Allen, Operations Manager
*C. Russo, QA Audits/Monitoring Manager
*R. Ozment, Start-Up Admin. Tech Support Manager
*R. Ferguson, Lead Startup Engineer
*R. Bernier, Operations Support Supervisor
*L. Papworth, Operations Engineering Manager
*W. Roman, Lead Operations Engineer
*M. Karbassian, Operations Engineer
C. Crane, Startup Engineer
R. Zering, Maintenance Supervisor, HVAC
G. Olson, Maintenance Supervisor, Electrical

b. Bechtel

*D. Hawkinson, QA Manager
*P. Haber, Project Quality Coordinator
M. Patel, Civil Structural Engineer
A. Garza, Lead Engineer, Pipe Supports
J. Sabal, Engineer, Civil
J. Gray, Lead QC Engineer, Support

c. Waldinger

B. Strait, Project Engineer

* Denotes those persons attending Exit Meeting, November 2, 1984.

The inspectors also talked with other licensee and contractor personnel during the course of the inspection.

2. Licensee Action on 10 CFR 50.55(e) Construction Deficiencies (DERs)

The following potential 50.55(e) items were reviewed by the inspectors for reportability and to determine the thoroughness of the licensee's

corrective action. The items marked with an asterisk (*) were judged by the licensee to be reportable under the 10 CFR 50.55(e) criteria; the others were considered not reportable.

a. (Closed)* DER No. 83-83, Incorrect Sway Struts Supporting Class Q1A Piping

While replacing an undersized strut with the correct strut the licensee discovered the strut assembly consisted of an ITT Grinnell end bracket with a C&L body on pipe clamp. WPP/QCI 201.1, Nuclear Pipe Flanges and Supports Installation, states "individual items for sway struts are not interchangeable". The inspector asked the licensee if this is a significant safety problem and if this mixing of components could be present throughout the plant.

The licensee indicated there is no safety concern with interchanging components as long as they can carry the required load. The specification is only in place because the supplier will not give a warranty on a strut assembly containing mixed components.

The licensee also feels this is an isolated incident of mixed components used on a strut assembly. A review of the historical documentation of this strut assembly shows the pipe clamp was lost during installation. A material change notice (MCN) was written to transfer the assembly from Unit 3 to Unit 2. After the rear bracket was welded in place the original assembly was located. The remainder of the original assembly was installed with the rear bracket of the replacement assembly. The unused portions of the two assemblies were sent to the warehouse as spare parts and a new strut assembly was ordered for Unit 3. Normally strut assemblies are received and installed as a unit and no interchanging of parts occur.

Based on the lack of safety significance and the unique circumstances surrounding the installation of this assembly this item is considered closed.

b. (Open)* DER 84-54: Containment Sump Isolation Valve Could Not Be Electrically Opened After Being Manually Closed

During startup testing, containment sump isolation valve 1JSIAUV673 could not be opened electrically after being shut manually due to overtorque on the limitorque motor. The problem was identified on Startup Field Report (SFR) 1SI-723 and documented on NCR SM-4609. The valve is a 24" motor operated butterfly valve that is required to open on a Recirculation Actuation Signal (RAS) to enable the HPSI pumps to draw a suction on the containment sump. Seven other valves in each unit have been identified with similar characteristics. This deficiency has been dispositioned by Bechtel as reportable. Work to correct the deficiency on all three units per DCPs 1SE, 2SE and 3SE-SI-500 was authorized via a Startup Work Authorization (SWA).

The inspector verified that work has been completed and accepted by QC in Unit 1. Work on Units 2 and 3 is being tracked on the appropriate documentation. However, retests for the above work which would demonstrate the effectiveness of the corrective action have not been completed for the valves in Unit 1. Additionally, there was no provision in the retest procedure for shutting the valves manually and re-opening them electrically which was the originally identified problem.

The cognizant start-up engineer agreed to shut the valves manually and open them electrically in a test work order and document this in the work order package. The inspector personally witnessed this cycling procedure for 1JSIAUV673, which tested satisfactorily.

This DER will remain open until all retesting is complete and a final report is issued by APS.

3. Licensee Action on Previously Identified Items

a. (Closed) Violation (50-528/83-34-08) Loose Structural Steel Bolted Connections

Previous Inspection

During a previous inspection, the inspector found six loose critical bolted connections. All the connections had been inspected and accepted by Bechtel Quality Control personnel.

This Inspection

The licensee reinspected 100% of the critical friction type high strength connectors in the Containment of Units 1, 2 and 3. The reinspection consisted of 617 connections containing a total of 3,972 bolts and is documented on WPP/QCI 551.0. The results of the reinspection are: 91% (3,627) of the bolts experienced zero rotation or rotation less than 30 degrees, 2% (85) of the bolts were not torque-inspected due to inaccessibility, and 7% (260) of the bolts experienced rotation greater than 30 degrees and were therefore reworked.

The inspector examined the documentation used by the licensee to track this violation. WPP/QCI 551.0 was completed and signed off by Bechtel QC as complete. The NCRs (Nonconformance Reports) were also complete and signed off. The inspector also examined a letter from Bechtel Power Corporation to Arizona Nuclear Power Project (ANPP) dated May 9, 1984. The letter states the conditions discovered by the reinspection would not have affected the safe operation of the plant.

Based on the reinspection and the non-safety significance of the discrepancies identified this item is considered closed.

b. (Closed) Violation (50-528/84-25-01) Pipe Supports Not Seismically Analyzed for Longitudinal Loads

Previous Inspection

The inspector asked the appropriate licensee representative if the seismic analysis of the Fire Protection Sprinkler System (FPSS) considered longitudinal loads. The cognizant licensee engineer stated that no complete analysis of the FPSS was found and it appears the FPSS supports had not been adequately analyzed for longitudinal loading.

This Inspection

The licensee had a seismic analysis of the FPSS done to verify its operability during an SSE (Safe Shutdown Earthquake). The analysis consisted of two parts. The first part is a hand calculation, Calculation No. 13-MC-ZZ-004, done by Bechtel Power Corporation (BPC). This calculation consists of an analysis of the most heavily loaded longitudinal support shown on each drawing.

The second part of the analysis consists of a computer analysis of one part of the FPSS, Bechtel Log No. 13-10407-M650-824-1, "Seismic Analysis-Verification of Sprinkler Piping Pipe Support System." This is a computer simulated three dimensional dynamic analysis of the part of the FPSS located at the 160 foot level of the upper cable spreading room in the control building. This section of the FPSS was chosen for analysis because it contains the largest accelerations during an SSE.

The inspector examined both the hand calculation and the computer analysis of the FPSS. Both documents shown the FPSS will stay in place during an SSE. Based on these analyses this item is closed.

c. (Closed) Unresolved Item (50-528/84-10-01) Seismic Qualification of the Fire Protection Sprinkler System

Previous Inspection

This item had been previously followed up in report 50-528/84-25. In this report the inspector asked several questions concerning the ability of the Elcen Type 231 C-Clamps to hold the FPSS up during an SSE, which the licensee was unable to answer at that time.

This Inspection

The licensee has issued Revision 4 of Specification M650-200. This revision contains an extensive report by Twining Laboratories concerning the type 231 Elcen C-clamp. The report consists of test data showing the force required to slide the C-clamp along the beam and off the beam. The tests were done for hanger arrangements utilizing only one C-clamp. These tests show the load required to pull the C-clamps off the I-beams are much larger than the loads the C-clamps will experience during an SSE. Also, the C-clamps are now

required to be installed to a specific torque using a calibrated torque wrench. This ensures the installed C-clamps and the tested C-clamp can carry the same loads.

The inspector examined Specification M650-200, Rev. 4 to see if it answered all the remaining questions concerning Elcen Type 231 C-clamps. The specification shows the C-clamps, if properly installed, will support the FPSS during an SSE. Also, Viking Fire Protection, the subcontractor installing the hangers, has ensured the hangers will be properly installed by requiring compliance with Standard Practice, SP-69. This procedure requires the C-clamps be torqued in place to 60 inch-pounds for 3/8 inch set screws and 125 inch-pounds for 1/2 inch set screws.

This item is closed.

d. (Closed) Unresolved Item (50-528/84-25-02) Fire Protection Sprinkler System (FPSS) Hangers Attached to Cable Tray Supports

Previous Inspection

During a review of the FPSS the inspector noted that some of the FPSS hangers are attached to unistruts supporting Q class cable trays. The inspector asked the licensee if these supports were seismically analyzed and if the loads from these supports and the pipe they supported were considered during the seismic analysis of the cable tray supports.

This Inspection

The licensee had their Fire Protection System subcontractor (Viking Fire Protection Co.) do a seismic analysis of the loads the pipe supports would transfer to the cable tray supports during an SSE. The maximum loads the cable tray supports will experience is 10 lbs. horizontally and 71 lbs. vertically.

The calculations of the loads experienced by the cable trays (calculation no. 13-CC-ZS-005) were examined to see what affect these added loads would have on the system. Based on these calculations it was determined that the added loads from the FPSS have no impact on the structural integrity of the cable tray supports.

This item is closed.

e. (Closed) Followup Item (50-528/84-08-01) HVAC Craft Training

Previous Inspection

During an examination of the Control Room Ventilation System the inspector discovered a duct support welded to the embedment plate with undersized welds. The weld had been recently reworked and had not yet been accepted by QC. This condition apparently indicated a need to retrain craft.

This Inspection

The Waldinger Company has instituted a program to retrain all their welding craft personnel. The retraining consists of a classroom lecture on the proper installation of the HVAC system and a welding test. A list is kept of all personnel completing the course. Also all new personnel are required to attend the course.

This item is closed.

f. (Open) Open Item (50-528/83-34-17) Cable Tray Support Discrepancies

Previous Inspection

The inspector examined 60 raceway supports for conformance to design drawings. The inspector found the bolted connection attaching the cable tray to the hanger disconnected.

This Inspection

The licensee issued a Corrective Action Report, CAR-C-83-148D, to walk down portions of the cable tray raceway. This walk down included an inspection of 464 tray hold-down clamps. Twenty-nine discrepancies were identified. A review of the discrepancies shows only one finding similar to that identified in the previous inspection. All the discrepancies were documented on Nonconformance Reports (NCRs EA-3644 and EJ-3646) and reworked.

A review of the two NCRs showed nine missing tray hold-down clamps that were reworked. The inspector asked the licensee if there was an engineering analysis which determined the significance of 9 missing clamps out of 464 inspected. The licensee indicated no such analysis was ever considered. If the as found condition is determined to be unacceptable then additional inspection and corrective action may be required. This item remains open pending an engineering analysis to determine the significance of the missing clamps.

g. (Closed) Deviation (50-528/84-25-04) Fire Protection Hangers Designed to Seismic Category IX Vice Seismic Category I

Previous Inspection

Fire Protection Sprinkler and Spray System pipe supports have been designed to Seismic Category IX criteria. This allows the Fire Protection system to malfunction after a Safe Shutdown Earthquake (SSE), but it must experience no structural failure that might result in the malfunction of adjacent Seismic Category I (Safety-related) structures or components.

Conversely, Table 3.2-1, footnote 7(h) of the FSAR commits to designing supports and hangers for non safety-related systems to Seismic Category I requirements when failure of the equipment or piping could adversely affect a safety-related system. This is a

more restrictive requirement. Thus the design of Fire Protection Sprinkler system pipe supports represents a deviation from FSAR commitments.

This Inspection

The inspector reviewed FSAR change #1209 which has been reviewed and issued by the licensee and submitted to NRR. It incorporates a change to footnote 7(h) of Table 3.2-1 and reads as follows: "Non-safety portions of structures, systems or components whose failure could reduce the functioning of any safety-related structure, system or component are designed and constructed such that an SSE would not cause such failure."

This change closely resembles the wording of Regulatory Guide 1.29, Position C.2, which the licensee has committed to and on which the definition of Seismic Category IX is based.

The Fire Protection Sprinkler and Spray system is a non-safety related quality class "R" system with portions located near safety-related quality class Q systems. This is the type of system for which guidance in Position C.2 of Reg. Guide 1.29 was intended. Thus Seismic Category IX is the proper criteria for design of Fire Protection pipe supports, and per Specification 13-M-650, this is the way they have been designed.

In a telephone discussion with the NRR Project Manager, the Project Manager stated that this FSAR change would probably be acceptable.

Therefore, this deviation is closed based on the submitted FSAR change and the above mentioned discussion with NRR.

h. (Closed) Followup Item (50-528/84-38-03) Maintenance Training

Previous Inspection

The inspector noted the program currently in use for establishing the qualifications of maintenance personnel needs to be revised to reflect actual practice, including definition of records storage requirements.

In addition, the licensee committed to drafting a procedure outlining the basis for the qualification of maintenance personnel.

This Inspection

Maintenance Department Directive #17 has been issued and approved and establishes the minimum requirements for selection and qualification of all Maintenance personnel in accordance with current practices. It also provides guidance for the storage of test records and training records.

The inspector verified that the requirements of Directive #17 are being adhered to. Test records are stored in each Superintendent's

office and are currently being consolidated into one central location in the Maintenance Administration Office.

The inspector reviewed a sample of test records for practical and written examinations and found no deficiencies.

This item is closed.

4. Followup on IE Circulars

IE Circular 80-10: Failure to Maintain Environmental Qualification of Equipment (Closed)

There are 3 aspects associated with this circular and they include:

1) Administrative controls to ensure qualified equipment is identified prior to maintenance.

2) Procedures to ensure qualification of equipment is not degraded when maintenance is completed.

3) Adequate training for maintenance personnel concerning environmental qualification requirements and the potential for equipment degradation from improper maintenance.

The licensee utilizes an Equipment Qualification List. Any equipment on this list is included in equipment listed as Q class. A maintenance work order is generated from the Station Information Management System (SIMS) data base which is automatically flagged as Q class if it involves equipment on the Equipment Qualification List. Thus it is identified prior to maintenance activities being conducted.

Procedures 30AC-9ZZ01, Work Control; 30AC-9ZZ02, Preventive Maintenance; and 30PR-9ZZ01 have been revised to include the requirements of the Qualification Maintenance Program. The revisions generally deal with tighter QC oversight in maintaining equipment qualification.

Applicable maintenance supervisors, engineering personnel, management personnel and training instructors have been trained in the requirements of the Qualification Maintenance Program. This PVNGS program involves the maintenance of equipment qualification during construction, operations and maintenance activities.

The inspector concluded that this circular had been acceptably addressed. This item is closed.

5. Implementation of Three Mile Island Lessons Learned

The inspector reviewed the below listed items which represent a portion of a comprehensive and integrated plan to improve safety following the events at Three Mile Island, Unit 2 in March, 1979. (The item numbers are from Enclosure 2 of NUREG-0737).

II.D.3 Direct Indication of Relief and Safety Valve Position (Closed)

The licensee satisfactorily completed the calibration of the acoustic monitors of the 4 pressurizer safety valves. The work was performed in accordance with Work Order #64877. Although only 3 of the acoustic monitors passed the functional test, the applicable requirement of the Palo Verde SER has been met. Work Request #075028 has been submitted to troubleshoot the failed channel. The licensee was reminded at the Exit Interview that all 4 channels must be operational per the Technical Specifications for plant operations in Modes 1, 2 and 3.

This item is closed.

II.F.2 Instrumentation for Detection of Inadequate Core Cooling (Open)

The licensee has not completed the preoperational test of the QSPDS. However, per Supplement 6 to the Palo Verde SER, implementation of a fully operational final ICCI system for Unit 1 prior to exceeding 5% power is acceptable.

Additionally, prior to reaching initial criticality on Unit 1, those emergency procedures that incorporate the use of the Reactor Vessel Level Measurement System should be modified to include comments made in Supplement 6 to the SER.

Finally, the Technical Specifications have been revised to include operability limits for the ICCI system.

This item has been acceptably resolved for issuance of an operating license but remains open pending completion of the above actions.

II.E.4.2 Containment Isolation Dependability (Closed)

The inspector verified that Post Accident Sampling Valves HPA-UV-023 and HPA-UV-024 have been satisfactorily stroke time tested in accordance with procedure 73ST-9ZZ05. In addition, valve HPA-UV-023 has been included in the Technical Specifications as a containment isolation valve with its applicable stroke time acceptance criteria. The licensee has also committed to include HPA-UV-024 in Technical Specifications as a containment isolation valve. In addition, the licensee has committed to perform the applicable Local Leak Rate Test (LLRT) of HPA-UV-024.

The licensee was asked at the Exit Interview if they had assured themselves that all containment isolation valves have been included in Table 3.6-1 of the Tech Specs. The licensee responded that they felt confident that they had.

All aspects of this TMI item have been acceptably addressed, and therefore, this TMI Action Plan Item is considered closed. However, inclusion of HPA-UV-024 in the Technical Specifications and the satisfactory completion of an LLRT will be carried as a followup item (84-61-01).

II.K.1.5 Review of ESF Valves (Closed)

The remaining open aspect of this TMI Action Plan item was issuance and transmittal of a Lessons Learned Implementation Report revision to delete the commitment for a special periodic audit. The licensee has issued the LLIR revision referred to in inspection report 84-47, and forwarded it to NRR for review.

This acceptably resolved this item, and this this item is closed.

5. Exit Interview

An exit interview was conducted with the licensee personnel indicated in paragraph 1 on December 7, 1984. The scope and findings of the inspection as described in this report were discussed.