U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement

Region V

Report No. 50-528/81-14
50-529/81-11
50-530/81-11

Docket Nos. 50-528, 50-529, 50-530 License Nos. CPPR-141, CPPR-142, CPPR-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: July 8-30, 1981

Inspectors: T.W. Bishop for
L. E. Vorderbrueggen, Senior Resident Inspector — 11/16/81 Date Signed

Approved by: T.W. Bishop
T. W. Bishop, Chief, Reactor Projects Section 1 — 11/16/81 Date Signed

Summary:

Inspection on July 8-30, 1981 (Report Nos. 50-528/81-14, 50-529/81-11, and 50-530/81-11)

Areas Inspected: Routine, unannounced inspection by the resident inspector of construction activities associated with: protection of installed reactor vessels (Units 1 and 2); reactor vessel internals (Units 1 and 2); Unit 1 containment post-tensioning; reactor coolant and other safety related piping installation; containment structural concrete; containment dome liner segment welding; structural steel installation; pressurizer anchor bolt installation; pipe restraint embed bolt installation; core and preservation of equipment; and general activities in progress at the plant site. The inspection involved 80 inspector hours on-site by one NRC inspector.

Results: No deviations or items of noncompliance were identified.

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DETAILS

1. Persons Contacted

a. Arizona Public Service Company (APS)

*E. E. Van Brunt, Jr., Vice President, Nuclear Projects Management
*D. B. Fasnacht, Site Construction Manager
*W. E. Ide, Site QA Supervisor
*R. J. Kimmel, Field Engineering Supervisor
G. Pankonin, QA Engineer
R. Forrester, QA Engineer

b. Bechtel Power Corporation (Bechtel)

*W. J. Stubblefield, Field Construction Manager
*S. M. Nickell, Project Superintendent
A. K. Priest, Project Field Engineer
*D. R. Hawkinson, Project QA Supervisor
*R. M. Grant, Project QC Engineer
J. E. Pfunder, QA Engineer
F. Teighman, Boilmaker Superintendent - Unit 3
O. Ostereich, Welding Engineer - Unit 2
W. Futrell, Lead Civil Engineer
V. Hester, Civil Engineer
A. Robertson, QC Engineer
V. Neinstedt, QC Engineer

c. Combustion Engineering (CE)

S. Mager, Site Manager
P. De Greef, Internals Installation Superintendent

d. Western Concrete Structures, Inc.

K. Guffey, Site Superintendent

Other persons contacted during the inspection period included construction craftsmen, inspectors, and supervisory personnel.

*Management Meeting attendees.

2. Protection of Installed Reactor Vessels (Units 1 and 2)

Guarded access control to the Unit 1 reactor pool area continues to limit the entry of personnel, equipment, tools, and materials to only those authorized. When there is no work activity inside the vessel, a plastic cover is kept in place over the vessel flange to prevent the entry of foreign objects and debris. During most of

this reporting period, the vessel head was in place to permit initial work on the control element drive mechanism electrical harness and cooling equipment.

The Unit 2 reactor vessel has a heavy structural cover across the vessel flange to keep out foreign objects and debris. The work platforms and ladders inside the vessel are metallic or made of treated wood to minimize fire hazards.

The inspector verified that the procedures for protection of the installed reactor vessels were being implemented.

No deviations or items of noncompliance were identified.

3. Reactor Vessel Internals (Units 1 and 2)

In Unit 1, the final alignment measurements made with the internals and head set in place disclosed out-of-tolerance clearances between the components. This required the removal of the machined shims from the four barrel guide lugs and remachining or replacement of the shims. While this activity progresses, the internals assembly was "packed" on its storage stand in the refueling pool, and installation of the accelerometers and pressure transducers on the internals for the vibration monitoring system was started. The assembly was fully draped with a heavy plastic cover to prevent the entry of dust and debris. Clean room type procedures are followed when work is being performed.

The Unit 2 vessel internal components remained in storage in their respective storage areas in the refueling pool. The inspector verified that the protective covers were properly in place on the components.

It appeared to the inspector that the procedures for protection of the vessel internals were being followed, and no deviations or items of noncompliance were identified.

4. Containment Post-tensioning - Unit 1

Installation of two long U-tendons, each of which function as two verticals and a dome tendon, was observed by the inspector. They were tendon No. V3, entering the sheath at gallery azimuth 57° and emerging at azimuth 233; and tendon No. V47, azimuths 143° and 327°. Although mechanical problems with the electro-hydraulic winch and associated cable, and some minor interference difficulties at sheathing splice points were encountered, the tendons were installed satisfactorily. Both tendons were seen to be free from nicks, kinks, and corrosion, and to carry a metal tag identifying their intended location. The installation sequence and technique was in accordance with WCS procedure No. PTP-6 and No. QCP-4.

The inspector also observed the tensioning of the first U-tendon to be tensioned. It was No. V90 extending from gallery azimuths 189° and 281°. This operation was intended to provide function and elongation data for procedure refinement purposes; therefore, the responsible engineers from WCS and Bechtel were present to observe and guide the operation. The data obtained from this and the next vertical tendon tensioning will enable accurate elongation predictions to govern the tensioning of the remaining tendons. The installation crew managed to complete the operation satisfactorily even though delays were encountered from hydraulic system maintenance requirements and hydraulic ram/tendon head coupling difficulties. The measuring equipment was seen to be of the proper range, accuracy, and in calibration. The shims were of the specified size and material.

The inspector observed greasing operations for horizontal series-4 and --6, three tendons in each series. The grease was the type specified and the supplier had furnished the designated chemical test report to substantiate it. The temperature and pump pressure were appropriately controlled, and the fill/venting steps were such that the sheaths were completely filled. When the operation was completed, the grease cap connections were properly closed and torqued. The entire operation was well-organized, clean, and in accordance with WCS procedure No. PTP-9 and No. QCP-7.

In all the activities discussed above, the installation crews demonstrated appropriate knowledge of the equipment and the procedural steps, and good communications were maintained. Also, qualified QC inspectors were present documenting the required data on the inspection report forms.

No deviations or items of noncompliance were identified.

5. Reactor Coolant Pressure Boundary and Safety-Related Piping Installation

   a. Component Installation Activities

      Handling and installation of piping components in Unit 2 containment building were observed to ascertain compliance with the ASME code, specification 13-PM-204 and PSAR requirements. The systems involved were the reactor coolant system pump suction piping, safety injections, and shutdown cooling systems. Particular attention was directed to correctness of configuration, handling and supporting of components, absence of defects on component surfaces, control of weld filler material, control of welding records in the work area, use of specified materials, and inspection performance by qualified personnel.

      No deviations or items of noncompliance were identified.

6. In-Process Welding Activities

Two in-process welds were examined in order to ascertain compliance with the requirements of the ASME Code (Section III-1974 edition), Specification 13-PM-204, and Bechtel installation/inspection procedures WPP-QCI 100.0, 101.0, and 202.0. The welds were:

1. Weld W-003 joining closure pool S-002 to reactor coolant pump No. 2A suction elbow (spool S003), line RC-073-30".

2. Weld W-002 joining 12-inch spool S001 (line SI-E-203-12") to reducing tee in spool S002 (line SI-E-207-14") - safety injection pump discharge to reactor coolant loop 1A.

For the first weld, the applicable drawing was 13-P-ZCG-103. Weld filler metal had been deposited to the 1/4 t point (approximately 3/4-inch) and processing of the confirmatory radiograph was in progress. The workmanship appeared very good. The welding procedure specification was PI(G2)-AT-LH-(ITP).

The for second weld, the applicable drawing was 13-P-SIF-103. The inspector observed the first hot pass being applied (SMAW process). The welding procedure specification was P8-AT-Ag and the workmanship looked very good. The welding machine settings of current and voltage were checked and found to be within the specified ranges.

For both welds, a properly filled out Field Welding Check List (WR-5 Form) was present at the work location. Filler metal issue records (WR-6 Form) which identified the welders were also present. The WR-5 Forms were seen to identify the weld number, the system, and the applicable drawing number. Also specified were the welding procedure to be used, the material specification, preheat and interpass temperatures, and NDE requirements. The inspector verified that the WR-5 provisions were in accordance with the requirements of the ASME Code, Section III, 1974 edition. The qualification records of the welders involved were examined and found to be acceptable. The inspector observed that quality control inspection and supervisory surveillance were being performed to an appropriate degree.

No deviations or items of noncompliance were identified.

7. Containment Structural Concrete

Work activities associated with Unit 3 containment shell placement No. 3C109 were examined to ascertain compliance with the requirements of the applicable specifications, drawings, and WPP/QCI documents. The placement extended from el. 166-ft. to el. 176-ft. and involved approximately 780 cubic yards of concrete. Final cleanup of the construction joint at el. 166-ft. had been completed and workmen were readying the concrete pumping lines and equipment. The Quality Control inspector was observed performing the final acceptance inspection in accordance with the pre-placement checklist.

The size, grade, and spacing of the reinforcing steel was as specified, and appeared free of any surface materials that would adversely affect the concrete bond. The formwork appeared clean and the joints tight. Formwork anchoring appeared to be adequate to preclude movement during concrete placement and to obtain the specified cover for the reinforcing steel. Embeds were adequately fastened in place, and tendon sheaths were clean, free of damage, and securely fastened in the specified locations. The junctions of the trumpet extensions and the tendon sheaths appeared to be covered sufficiently to prevent the entrance of mortar. It was verified that the reinforcing steel Cadwelds had been inspected and found acceptable. Trumplate openings in the buttresses were plugged to prevent the inadvertent entry of concrete.

When concreting operations began, the inspector observed the batch plant activities. Technicians were observed making measurements of concrete slump, temperature and air content, and casting the cylindrical specimens for subsequent compression strength testing. The calibrations for the batching scales were noted to be current, and the concrete being delivered by the automatic batching equipment was observed to be the specified Class E-1 design mix (6000 psi @ 91 days).

Concrete placement activities were also observed. The crew size appeared adequate and appropriate supervision was in evidence. Concrete consolidation by the vibrator personnel appeared adequate and quality control inspection personnel were exercising appropriate surveillance. Technicians were observed making slump, temperature, and air content measurements at both pump locations. The concrete had a good appearance when discharged from the trucks and when deposited in place. The quality control records were later examined and found satisfactory.

The governing specifications were 13-CM-365, -371, and -375. The applicable drawings were 13-C-ZCS-108 through -123, and 13-C-ZCS-175 through -181. Inspection and documentation requirements were specified in WPP/QCI 52.0, 53.0, and 54.0.

No deviations or items of noncompliance were identified.

8. Unit 3 Containment Dome Liner

The inspector observed the handling and placement of one of the 1/4-inch thick curved segments which makeup the first dome liner section that is being preassembled at the site fabrication yards. The fit of the segment was good and the edges were acceptably straight. On two other curved segments, the welding attaching the backing bar was examined and was seen to be free of visible defects and good workmanship was evident. Subsequently, the inspector examined approximately 20 tack welds fastening two adjacent curved

segments, and approximately 30 linear feet of completed weld-segment to backing bar. The tack welds had been made using welding procedure specification PI-A-Lh (SMAW process), and the finished welds using specification PI-F (FGAW process), both as specified. The welder qualifications were verified to be current, and the specified weld filler metal had been used. The weld contour and general workmanship appeared good. Inspection and supervisory personnel were present at the work location. The filler metal issue room was examined and rod storage conditions were found satisfactory. The governing documents were Specification 13-CM-370 and WPP/QCI 60.0 and 61.2.

No deviations or items of noncompliance were identified.

9. Structural Steel Installation

Installation of structural steel in the Unit 3 control building which supports the 120 ft. elevation floor was examined to verify compliance with the drawing and specification requirements. Approximately 20 bolts were examined and it was apparent that the torquing requirement by the turn-of-the-nut method had been satisfied. Clip angle welds were in accordance with AWS standards and the workmanship appeared satisfactory. Materials, installation details, and tolerances were as specified in the governng documents (Specification 13-CM-320, Drawings 13-C-00A-001 and -ZJS-510). Quality Control inspection requirements were identified in WPP/QCI 58.0.

No deviations or items of noncompliance were identified.

10. Unit 3 Pressurizer Anchor Bolts

The 18 two-inch diameter, ASTM A540, Grade 1323, Class 1 bolts being installed in the Unit 3 pressurizer foundation were examined by the inspector. The bolts had been set in position but had not yet been firmly anchored in their exact position. The threads of the bolts were adequately protected. The certified material test report furnished by the bolt supplier was examined and the physical/chemical test results were within the limits specified in the ASTM A540 standard. The governing specification was 13-CM-125 and the applicable drawing was 13-C-ZGS-604.

No deviations or items of noncompliance were identified.

11. Unit 3 Pipe Restraint Embed Assemblies

The embed plates being installed in the south secondary shield wall (placement 3C045) and the pool cavity wall (placement 3C042A) (steam generator #2 cavity area for both walls) were examined to verify that the associated bolts were of acceptable material. The bolts are specified to be ASTM type A354 BD, 1 and 1-½ inch diameter, and the licensee recently discovered that some bolts supplied to

the site failed to meet the hardness requirements. (Ref: IE Report 50-530/81-08, paragraph No. 11). The inspector observed that all bolts had the ends color-coded to show that they had been tested with the Equotip Portable Hardness Test unit. All bolt ends were colored white (acceptable) except for four of six bolts in one plate and three of six bolts in one other plate. These bolt ends (all one-inch diameter) were colored red indicating they were not acceptable. A review of the test records disclosed that these bolts were out of specification on the "soft" side (hardness test value below the acceptable value range of 570 to 620). These bolts had been identified on Bechtel NCR C-G-2724. This NCR had been dispositioned by Bechtel Engineering to use "as-is" on the basis those bolts would satisfactorily carry the loads that would be imposed in service. The inspector was informed that instructions had been issued to change the bolt end color from red to white.

The inspector had no further questions on this installation.

12. Inspection Tours of Plant Site

At various times during this inspection period, the inspector toured the plant site in order to observe general housekeeping conditions, care and preservation of equipment, handling of heavy components, tagging and identification of materials, adequacy of caps over pipe openings not being worked on, and presence of cribbing under stored pipe spools, valves, and other components. No welding electrode stubs were observed lying around the various work areas.

No deviations or items of noncompliance were identified.

13. Management Meetings

A meeting was held on July 30, 1981. Licensee and Bechtel representatives in attendance at the meeting are identified in paragraph 1. During the meeting, the inspector summarized the scope of the inspection activities and reviewed the inspection findings as described in this report.