



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 4, 1986

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Docket No. 50-530

Arizona Nuclear Power Project
ATTN: Mr. E. E. Van Brunt, Jr.
Executive Vice President
P. O. Box 52034
Phoenix, AZ 85072-2034

Gentlemen:

SUBJECT: CONSTRUCTION APPRAISAL TEAM INSPECTION 50-530/86-03

Enclosed is the report of the Construction Appraisal Team (CAT) inspection conducted by the Office of Inspection and Enforcement (IE) on January 13-24 and February 3-14, 1986, at the Palo Verde Unit 3 site. The Construction Appraisal Team was composed of members of IE, Region V, and a number of consultants. The inspection covered construction activities authorized by NRC Construction Permit CPPR-143.

This inspection is the fifteenth in a series of construction appraisal inspections conducted by the Office of Inspection and Enforcement. The results of these inspections are being used to evaluate the management control of construction activities and the quality of construction at nuclear plants.

The enclosed report identifies the areas examined during the inspection. Within these areas, the effort consisted primarily of detailed inspection of selected hardware subsequent to quality control inspections, a review of selected portions of your Quality Assurance Program, examination of procedures and records, and observation of work activities.

Appendix A to this letter is an Executive Summary of the results of this inspection and of conclusions reached by this office. The NRC CAT noted no pervasive breakdown in meeting construction requirements in the samples of installed hardware inspected by the team or in the licensee's project construction controls for managing the Palo Verde Unit 3 site.

The NRC CAT identified a number of deficiencies which warrant additional management attention. The most significant of these involves the adequacy of the design and construction for masonry block walls which provide support for and are in proximity to safety-related components. Because these walls were not assigned proper quality classification, inspections were not performed as intended and the existence and location of reinforcing steel is in question. Our concern is that the masonry walls as constructed may not meet their design intent.

We understand that the findings of this inspection will be evaluated to determine the effects on Palo Verde Units 1 and 2.

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Copy to RCPB, IE

April 4, 1986

Appendix B to this letter contains a list of potential enforcement actions based on the NRC CAT inspection. These are being reviewed by the Office of Inspection and Enforcement and the NRC Region V Office for appropriate action. In addition, Region V will be following your corrective action for deficiencies identified during this inspection.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosures will be placed in the NRC Public Document Room. No reply to this letter is required at this time. You will be required to respond to these findings after a decision is made regarding appropriate enforcement action.

Should you have any questions concerning this inspection, please contact us or the Region V Office.

Sincerely,



James M. Taylor, Director
Office of Inspection and Enforcement

Enclosures:

1. Appendix A, Executive Summary
2. Appendix B, Potential Enforcement Actions
3. Inspection Report

cc w/enclosures:
See next page

April 4, 1986

cc w/enclosures:

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APPENDIX A

EXECUTIVE SUMMARY

An announced NRC Construction Appraisal Team (CAT) inspection was conducted at Arizona Public Service Company's Palo Verde Nuclear Generating Station (PVNGS) Unit 3 during the period January 13-24 and February 3-14, 1986.

OVERALL CONCLUSIONS

Hardware and documentation for construction activities were generally in accordance with requirements and licensee commitments. However, the NRC CAT did identify a number of hardware deficiencies that in most cases have resulted from construction program weaknesses. These include:

1. Masonry walls which support and are adjacent to safety-related components were found by the NRC CAT to have the reinforcing bars not placed in accordance with the design drawings. In addition, prescribed inspection records were not available to document the adequacy of the masonry wall construction process and to support design analysis assumptions. This was due in part to the fact that the original quality classification of the masonry walls was incorrect. The masonry walls were classified as Class S which requires no special quality requirements beyond industry standards. This area will require further review by the NRC.
2. In the mounting of electrical components, 6 of 11 pieces of QC accepted equipment and 5 of 32 QC accepted cable tray hangers were found with weld configurations that did not match specified requirements. In addition, the cable tray hangers had been subject to plant wide reinspection programs for previously identified attachment design deficiencies.
3. Based on field observation of work activity, discussions with site engineering and Westinghouse personnel, and a review of data which describes failures and detector leakage experienced on PVNGS Units 1 and 2, NRC CAT inspectors concluded that the existing quality verification program was not adequate to assure that critical ex-core termination activities are satisfactorily accomplished. Based upon NRC CAT concerns, the applicable QC procedure was revised to specifically detail those steps for which QC inspection is required.
4. Several deficiencies in vendor equipment were identified. These were vendor deficiencies related to terminations in the diesel generator control panels and soldered connections in the 125V DC battery chargers and had not been identified during source inspection, receipt inspection, or field installation activities. In addition, vendor weld deficiencies were found in instrument racks.

AREAS INSPECTED AND RESULTS

Electrical and Instrumentation Construction

In general, the electrical and instrumentation installations examined were found to conform to applicable design and installation requirements. However, several areas with hardware deficiencies were identified.

A number of raceway installations were found not meeting the required separation criteria. However, the major efforts of the licensee's inspection program for separation of Class 1E raceway installations is not yet complete. This area will require additional NRC and licensee attention.

Configuration deficiencies were identified in some cable tray hanger connections and the mounting welds for some electrical panels. Five QC accepted cable tray hangers were found with weld connections not matching the configuration of approved designs. A large percentage (6 of 11 panels inspected) of QC accepted equipment was found to exhibit deficient mounting configurations. The mounting weld configurations were not in accordance with the approved design documents.

The quality of vendor terminations in the diesel generator control panels and 125V dc battery chargers was found to be inadequate.

The field QC verification of in-process excore terminations was found to be inadequate and requires additional licensee attention.

The status of qualification for several components of the diesel generator control panels and some wire types in motor operated valves requires additional NRC and licensee review.

Mechanical Construction

Preventive maintenance of mechanical equipment was found to be in conformance with requirements and good maintenance practices. Heating, ventilating and air conditioning hardware (supports/restraints, duct sections, fire dampers) were generally found to be installed in accordance with requirements or the deficiencies found by the NRC CAT had been previously identified. However, deficiencies were identified in three areas: piping, pipe supports/restraints, and mechanical equipment. In the area of piping, improper material was used for flange bolting. Undersized beam attachment load pins were used on pipe supports/restraints. Mounting hardware and foundations on some HVAC equipment were found to be fabricated and installed improperly. These areas of concern require further licensee evaluation.

Welding and Nondestructive Examination

Welding and nondestructive examination activities were generally found to be conducted in accordance with the governing codes and specifications. However, several examples were found in which completed structural welds in pipe supports/restraints were smaller than that specified in the design drawings. Some vendor supplied tanks and heat exchangers were found to have undersized weld reinforcement in "nozzle to shell" and "manway to shell" joints. In addition, deficient welds were found in vendor supplied instrument racks.

The NRC CAT inspectors also found a number of vendor radiographs which did not have the required film quality. In the area of Preservice Examination activities, the NRC CAT identified welds which had indications that had not been recorded as required by the licensee's program.

In the review of some welding procedures, timely information was not provided to adequately determine whether the procedures properly addressed ASME Code provisions in the areas of impact tests of the heat affected zone, the identification of non-essential welding variables, and the prohibition of peening in certain situations.

Civil and Structural Construction

In the area of masonry block walls, the NRC CAT identified that prescribed in-process inspections had not been performed. It was also identified that reinforcing bars were not positioned as required by the design drawings. The design and construction adequacy of the block walls will require further review by the NRC.

Structural steel installation was determined to be generally adequate. Deficient bolted connections were found by the NRC CAT in containment column splice connections. Design considerations for thermal loading on structural steel members will require further review by the NRC.

QC documentation for concrete placements, mechanical splices of reinforcing steel, containment post-tensioned tendons, and structural backfill were generally determined to be adequate.

Material Traceability and Control

The material traceability and control program is considered to be satisfactory. No significant deficiencies were identified in the sample of items selected for review by the NRC CAT. Documentation was available to indicate that materials were installed as specified.

Design Change Control

Design change control was determined to be generally in conformance with applicable requirements. The most significant findings were the lack of documented, auditable justification for some safety-related design changes and failure to assure that design changes were made to all affected design documents in a timely manner.

Corrective Action Systems

In general the licensee's corrective action program was found to be acceptable. However, in the area of cable tray support attachment configuration the licensee's program has not been effective as evidenced by additional examples of configuration deficiencies found by the NRC CAT after several licensee reinspection programs.

APPENDIX B

POTENTIAL ENFORCEMENT ACTIONS

As a result of the NRC CAT inspection of January 13-24 and February 3-14, 1986 at the Palo Verde site, the following items are being referred to Region V as Potential Enforcement Actions. Section references are to the detailed portion of the inspection report.

1. 10 CFR 50, Appendix B, Criterion III, as implemented by Arizona Public Service (APS), Palo Verde Nuclear Generating Station Final Safety Analysis Report (FSAR) Section 17.1A.3, requires that measures shall be established to assure that applicable regulatory requirements and design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, at the time of this inspection, the licensee's program was not adequately implemented in that masonry block walls were incorrectly classified as Quality Class S for which no special quality requirements beyond industry standards are needed. Partially due to the "S" quality classification, in-process inspections were not accomplished. As a result, reinforcing steel was found to be located not in accordance with the design drawings and also inspection records were not available to support design analyses assumptions. Therefore, masonry walls may not meet their design intent. (Section V.B.1)

2. 10 CFR 50, Appendix B, Criterion VII, as implemented by the APS FSAR Section 17.1A.7, requires in part that measures shall be established to assure that purchased material, equipment, and services conform to purchase documents.

Contrary to the above, at the time of this inspection, the NRC CAT inspectors found several deficiencies in vendor supplied components as follows:

- a. Several installed Class 1E components exhibited poor workmanship and inadequate vendor product quality. These include inadequate solder connections in the dc battery chargers and damaged and broken terminal lugs in the diesel generator control panels. (Sections II.B.2.b(4) and II.B.3.b.(6))
 - b. Instrument racks had various weld deficiencies such as incomplete fusion, missing or undersized welds, and weld spatter. (Section IV.B.5)
 - c. Some vendor supplied radiographs did not have the required film quality. (Section IV.B.11)
3. 10 CFR 50, Appendix B, Criterion X, as implemented by the APS FSAR Section 17.1A.10, requires that a program for inspection of activities affecting quality be established and executed to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity.

Contrary to the above, at the time of this inspection, the licensee's inspection programs were not effectively implemented in that:

- a. Four instances of undersized beam attachment load pins were identified on two ASME Class 1 pipe supports and two Class R pipe supports contrary to design drawings and vendor catalogs. (Section III.B.2)
- b. Improper bolting materials were identified on flange connections in piping installations. (Section III.B.1)
- c. Six of eleven pieces of QC accepted Class 1E equipment mounted by welding had mounting configurations which were not in accordance with the applicable design or specified installation requirements. In addition, 5 of 32 QC accepted cable tray hangers were found with welded connection configurations that were not in accordance with the applicable installation requirements. (Sections II.B.1.b.(3), II.B.3.b.(4), (6) and (7))