



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

May 21, 1985

Docket No. 50-423

Northeast Nuclear Energy Company
ATTN: Mr. John F. Opeka
Senior Vice President - Nuclear
Engineering and Operations Group
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Gentlemen:

SUBJECT: CONSTRUCTION APPRAISAL TEAM INSPECTION 50-423/85-04

Enclosed is the report of the Construction Appraisal Team (CAT) inspection conducted by the Office of Inspection and Enforcement on February 19-March 1 and March 11-22, 1985 at the Millstone Unit 3 site. The Construction Appraisal Team was composed of members of IE, NRC Region I and a number of consultants. The inspection covered construction activities authorized by NRC Construction Permit CPPR-113.

This inspection is the eleventh of a planned series of construction appraisal inspections 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 Millstone Unit 3 project.

However, deficiencies noted by the NRC CAT indicate that a number of construction program weaknesses exist which warrant additional management attention. The major areas of concern to the NRC CAT are: (1) ineffective implementation and control of work on systems and components subsequent to turnover from construction to the testing organization and (2) need to improve interface actions and communications among the design, construction, and inspection organizations.

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Appendix B to this letter contains a list of potential enforcement actions based on the NRC CAT inspection observations. These are being reviewed by the Office of Inspection and Enforcement and the NRC Region I Office for appropriate action. In addition, Region I 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 I Office.

Sincerely,

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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

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APPENDIX A

EXECUTIVE SUMMARY

An announced NRC Construction Appraisal Team (CAT) inspection was conducted at Northeast Nuclear Energy Company's Millstone Unit 3 during the period February 19-March 1 and March 11-22, 1985.

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 construction program weaknesses that require additional management attention. These include:

1. Control of work on systems and components subsequent to turnover from Construction to the testing organization requires improvement. This is indicated by the deficiencies found in the control of wiring changes, and preventive maintenance deficiencies found in the mechanical and electrical areas subsequent to turnover to the startup organization. Additional attention is needed to ensure that missed maintenance activities are evaluated as to the potential damaging effects on the components. These findings indicate the need to reevaluate the controls applied to activities subsequent to system turnover from Construction to Operations.
2. A number of hardware deficiencies were identified which appear to have been caused by a lack of effective communications between the design, construction, and inspection groups. Design parameters were in some cases not properly translated into inspection criteria. For example, pipe supports had been installed and accepted by QC with dimensional tolerances not in accordance with the design calculations. In addition, a lack of thoroughness on the part of the design organization was identified. Examples identified include: omission of the Residual Heat Removal System from the pipe support "lugs-in-contact" review; wiring termination changes made to drawings without the issuance of the necessary documents to control the actual construction work; inadequate technical justification for the acceptance of unmarked fasteners in certain motor control centers; and conflicting details for a structural steel end connection.
3. A significant number of document control errors were found at both the Quality Control and Construction drawings stations. This is of particular concern in that the deficiencies in document control had been identified previously, and the number of audits increased to monitor the situation. In fact, a 100% audit of all drawing stations had been performed just prior to the start of the NRC CAT inspection. The corrective actions taken had not been effective, however.

4. A number of findings indicate that the effectiveness of Quality Control inspection activities needs to be improved. These findings include the area of piping as-built drawings, mechanical equipment foundation anchorage, structural steel connections (welded and bolted), piping support welding (pipe straps and skewed fillet welds), and pipe support miscellaneous hardware (lock nut tightness, cotter pin installations, etc.). Also, vendor deficiencies were identified in the areas of tank and heat exchanger fillet welds (pressure boundary and supports), performance of load indicating washers, and marking of fasteners.

The foregoing identified weaknesses require additional management attention to assure that completed installations meet design requirements.

AREAS INSPECTED AND RESULTS

Electrical and Instrumentation Construction

The electrical and instrumentation samples inspected generally met the applicable design requirements and installation specifications. Several discrepancies were identified including some that will require additional management attention.

Numerous electrical separation discrepancies were identified in the Main Control Board wiring installed by the vendor and as modified by design and construction activities. Several areas were noted in which redundant electrical division wires were in contact with each other.

Electrical separation criteria detailed in the Millstone Unit 3 FSAR had not been met in many raceway and cable installations. However, lesser separation may be acceptable based on recent tests. This matter is considered open pending NRR review and evaluation.

During examination of Class 1E cable ends, a number of terminations were identified that were not in accordance with current design drawings. One group of discrepancies pertains to incomplete implementation of design changes. The second group relates to inadequate documentation of post-turnover wiring changes.

Mechanical Construction

HVAC restraints, concrete expansion anchor installations, pipe wall thickness and piping hydrostatic test records were found to be in general conformance to design and procedural requirements.

Numerous discrepancies were identified in pipe support/restraints and mechanical equipment foundation installations. A number of discrepancies were observed between as-built drawings and piping configurations. Greater attention to detail during QC inspections appears necessary.

A need for more thorough engineering review activities, and additional reinspection and/or reanalysis was observed. This need was indicated by: unclear inspection criteria and inadequate engineering interface for pipe support/restraint attachment locations; inadequate review of attachment lug contact criteria; and a number of drafting errors.

The NNECO maintenance program and maintenance activities performed after equipment turnover from Construction were considered to be inadequate. This item had been previously identified, but corrective actions taken had not been effective or timely.

Welding and Nondestructive Examination

Welding and nondestructive examination activities were generally found to be conducted in accordance with the governing codes and specifications. However, a number of examples were identified where completed structural welds in pipe supports involving skewed welded connections did not have the weld sizes specified by the Architect-Engineer. These undersized welds in skewed connections should have been identified during the weld inspection process, and their existence indicates a program weakness. The licensee has performed an engineering evaluation concerning this problem and concluded that most of these welds are adequate for the intended application. In the area of vendor supplied tanks and heat exchangers a number of tanks were found to have undersized weld reinforcements in nozzle and manway welded joints. In addition, some tank supports were found to have deficient welds.

Civil and Structural Construction

In general, concrete quality, cadwelding and concrete material certification were found to be acceptable. Rebar appeared to be placed in accordance with the design drawings. However, the NRC CAT inspectors identified unauthorized material in the building isolation joints (rattle spaces).

Structural steel member size and configuration were generally found to be acceptable. A number of steel connections in the Main Steam Valve Building were found to be not in accordance with the design drawings. Based on testing by the NRC CAT, problems were identified in the performance of load indicating washers.

Material Traceability and Control

The licensee's material traceability and control program was found to be acceptable, except for certain fastener hardware. Significant lack of traceability was found for vendor fastener materials, including bolts for mounting large pump motors, bolts for battery racks and bolts for inter-connecting adjacent motor control center cabinets.

Design Change Control

Design change control was determined to be in accordance with site procedures with the exception of timely updating of design documents with the latest change information. A number of drawings were found to be overdue for updating to include the latest design change requirements. In the area of design document control, a significant number of document control errors were found at site drawing stations used for construction work and QC acceptance. Weaknesses were also identified in the use of yellow drawings and document control audits. In addition, four cases of apparent inadequate corrective actions were noted in both the document control and design change control areas.

Corrective Action Systems

A weakness was found in the corrective actions taken to control preventive maintenance after components had been turned over for testing/operation. In addition, corrective actions applied to design change controls and document control deficiencies had not been effective. Also, an increasing number of unresolved nonconformances was found after turnover of system packages for testing/operation. These matters require additional management attention.

APPENDIX B

POTENTIAL ENFORCEMENT ACTIONS

As a result of the NRC CAT inspection of February 19 - March 1 and March 11-22, 1985 at the Millstone Unit 3 site, the following items are being referred to Region I 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 Northeast Utilities Quality Assurance Program (NUQAP), QAP 3.0, requires that measures shall be established to assure that applicable regulatory requirements are correctly translated into specifications, drawings, procedures and instructions.

Contrary to the above, at the time of this inspection, the licensee's program for design control has not been adequate to assure that Class 1E wiring configurations are in accordance with applicable design. As a result of incomplete control of electrical termination changes, a number of existing installations may not perform their intended function (Section II.B.2.b.(6)).

2. 10 CFR 50, Appendix B, Criterion V, as implemented by NUQAP, QAP 5.0, requires that activities affecting quality shall be prescribed by documented instructions, procedures or drawings which include appropriate quantitative or qualitative acceptance criteria.

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

- a. Failed to adequately implement their post-turnover test and inspection program to assure that wiring changes were documented in accordance with applicable procedures. (Section II.B.2.b.(6)).
 - b. Failed to identify conflicting allowable acceptance criteria between the design organization and the inspection organization for pipe supports/restraints (Section III.B.2).
3. 10 CFR 50, Appendix B, Criterion VI, as implemented by NUQAP, QAP 6.0, requires in part that measures be established to control issue and distribution of document changes to the prescribed locations.

Contrary to the above, during this inspection, the SWEC design document control procedures were not adequately implemented in that numerous errors in distribution, filing and updating of document record cards, design change documents, drawings and specifications were found to exist in site drawing stations used for plant construction and Quality Control inspection (Section VII.B.1).

4. 10 CFR 50, Appendix B, Criterion VII, as implemented by NUQAP, QAP 7.0, requires that measures be established to assure that purchased material, equipment and services conform to the procurement documents.

Contrary to the above, at the time of this inspection, the implementation of SWEC's procedures were found to be ineffective in that vendor procured tanks and heat exchangers were accepted and installed with deficient welds (Section IV.B.1).

5. 10 CFR 50, Appendix B, Criterion VIII, as implemented by NUQAP, QAP 8.0, requires that measures be established for the control of materials, parts and components to prevent the use of incorrect or defective items.

Contrary to the above, at the time of this inspection the material traceability and control of some fasteners, including bolts for mounting large pump motors, have not been adequate to assure the use of correct materials.

6. 10 CFR 50, Appendix B, Criterion X, as implemented by NUQAP, QAP 10.0, requires that a program for inspection of activities affecting quality be established and executed to verify conformance with design documents.

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

- a. Failed to ensure that safety-related pipe supports/restraints were constructed in accordance with design requirements in that support attachment locations were not installed as shown on design drawings (Section III.B.2).
 - b. Did not assure that equipment foundation bolting connections were installed in accordance with specified acceptance criteria and requirements (Section III.B.5).
 - c. Have not assured that the specified weld sizes in skewed structural pipe support connections have the required weld sizes (Section IV.B.1).
7. 10 CFR 50, Appendix B, Criterion XVI, as implemented by NUQAP, QAP 16.0, requires that measures be established to assure that conditions adverse to quality are promptly identified and corrected, including action to avoid repetition.

Contrary to the above, at the time of this inspection, the licensee's program of Quality Control Inspection had not provided adequate procedural controls in that there was:

- a. Failure to promptly identify and correct numerous separation deficiencies in vendor or modified vendor wiring installations within the main control boards (Section II.B.2.b(2)).
- b. Failure to promptly perform effective corrective action to prevent recurrence of nonconformances (Section VIII.B.1.b(1)).
- c. Inadequate control of preventive maintenance after turnover for testing/operating (Section VIII.B.1.b.(2)).
- d. Failure to apply effective corrective actions for document control deficiencies (Section VIII.B.1.b.(4)).