

U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-443/82-10
50-444/82-10

Docket No. 50-443
50-444

License No. CPPR-135
CPPR-136

Priority --

Category A

Licensee: Public Service Company of New Hampshire

1000 Elm Street

Manchester, New Hampshire 03105

Facility Name: Seabrook Station, Units 1 and 2

Inspection at: Seabrook, New Hampshire

Inspection conducted: August 24-September 30, 1982

Inspectors: AC Cerne
A. C. Cerne, Sr. Resident Inspector

10/8/82
date signed

date signed

date signed

Approved by: Robert M. Gallo
R. M. Gallo, Chief, Projects Section 1A,
Division of Resident and Project
Inspection

10/19/82
date signed

Inspection Summary:

Unit 1 Inspection on August 24-September 30, 1982 (Report No. 50-443/82-10)

Areas Inspected: Routine inspection by the resident inspector of work activities, procedures, and records relative to pipe penetrations; pipe welding, supports, and whip restraints; design issues; and corrective action. The inspector also reviewed licensee action on previously identified items and performed plant inspection-tours. The inspection involved 57 inspector-hours, including four off-shift hours, by the NRC SRI.

Results: Of the four areas inspected one violation was identified in each of the following areas--Failure to assure that the pipe whip restraint design documents specify the appropriate material requirements and quality standards associated with the design intent for high-strength bolting applications (paragraph 4b), and Failure to implement prompt and effective corrective action in the resolution of an issue involving questionable pipe erection clearances (paragraph 3d).

Unit 2 Inspection on August 24-September 30, 1982 (Report No. 50-444/82-10)

Areas Inspected: Routine inspection by the resident inspector of work activities, procedures, and records relative to design issues, corrective action and other licensee action on previously identified items, and plant inspection-tours. The inspection involved eleven inspector-hours by the NRC SRI.

Results: No items of noncompliance were identified.

DETAILS

1a. Persons Contacted during 82-10 Inspection

Yankee Atomic Electric Company (YAEC)

- *P. L. Anderson, Systems Engineer (Framingham)
- F. W. Bean, Lead Electrical QA Engineer
- D. L. Covill, Lead Civil QA Engineer
- R. E. Guillette, QA Engineer (Framingham)
- J. H. Herrin, Site Manager (PSNH)
- G. F. McDonald, Jr., QA Manager (Framingham)
- J. F. Nay, Jr., Lead Mechanical QA Engineer
- S. B. Sadosky, Lead Start-up/Test QA Engineer
- J. W. Singleton, Field QA Manager
- R. Tucker, Engineer (Framingham)

United Engineers and Constructors (UE&C)

- R. H. Bryans, Site Engineering Manager
- T. R. Frolo, Welding Engineer
- J. A. Grusetskie, Engineering Manager Assistant
- R. A. Kountz, Welding Superintendent
- D. C. Lambert, Field Superintendent of QA
- R. A. Rebel, Resident Construction Manager

Fischbach-Boulos-Manzi (FBM)

- G. W. Breeden, Project QC Manager

Hirsh-Arkin-Hershman (HAH)

- R. E. Scott, QA Supervisor

Johnson Controls, Inc. (JCI)

- H. E. MacNeil, Support Engineer
- R. G. Walter, Project Engineer

Perini Power Constructors (PPC)

- R. D. Hart, Site QA Manager

Pullman-Higgins (Pullman)

- R. G. Davis, Field QA Manager
- R. P. Donald, QA Supervisor
- D. B. Hunt, QA Records Supervisor
- D. Kelley, QA Welding Engineer

USNRC

- *R. K. Anand, Auxiliary Systems Branch, NRR

*indicates telephone communication

b. Persons Attending Management Meeting on September 15, 1982 (See paragraph 8b).

YAEC

W. P. Johnson, Vice President
A. M. Shepard, Director of Quality Assurance
G. F. McDonald, Jr., Construction QA Manager

USNRC - Region I

R. C. Haynes, Regional Administrator
R. Starostecki, Director, Division of Project & Resident Programs
T. T. Martin, Director, Division of Engineering & Technical Programs
S. D. Ebner, Chief, Engineering Programs Branch
J. P. Durr, Chief, Materials & Processes Section
A. C. Cerne, Sr. Resident Inspector, Seabrook

2. Plant Inspection-Tours (Units 1 and 2)

The inspector observed work activities in-progress, completed work and plant status in several areas of the plant during general inspection of the plant. The inspector examined work for any obvious defects or noncompliance with regulatory requirements or license conditions. Particular note was taken of the presence of quality control inspectors and quality control evidence such as inspection records, material identification, nonconforming material identification, housekeeping and equipment preservation. The inspector interviewed craft personnel, supervision, and quality inspection personnel as such personnel were available in the work areas.

Specifically, the inspector reviewed the qualified welder list for the HVAC contractor (HAH), also checking the qualifying welding procedure specification (WPS), test requirements, and procedural commitment to the prequalified weld joint criteria of AWS D1.1. The inspector raised a question regarding the handling of skewed fillet welds and learned that licensee QA personnel were adequately tracking this issue.

The inspector also examined the in-place storage conditions for several spools of medium voltage power cable, checking the storage position and cable seals relative to the governing instructions. In the Unit I Control Building he witnessed a preventive maintenance check for the specific gravity of the electrolyte in the cells of 125V station control battery "D" and reviewed in-process repair work and part replacement for 480V Bus E52. He noted a manufacturer's representative (Brown-Boveri) to be present and substantially involved in the repair operations. Certain electrical strut configurations using atypical thru-wall bolting details were checked for approval and reviewed for conformance to Engineering Change Authorization (ECA) 54/2841B.

Protective coating material for the large NSSS components (eg: steam generators) was examined to include the flexible nozzle protection material and the black high temperature Carboline paint. Westinghouse Process Specifications for the application of protective coatings and general painting and the Technical Manual for the steam generators were reviewed for conformance to the material requirements inside containment, as specified in the Seabrook FSAR.

The inspector examined the reinforcing steel grid for the Unit 1 auxiliary feedwater building roof prior to concrete placement, particularly noting rebar spacing and a number non-contact lap splices. Handling and documentation of such splices in accordance with the requirements of ACI Standard 318 and UE&C Specification 14-3 were confirmed. With regard to concrete operations using a superplasticizer mix additive, the inspector questioned the classification of this high-range water reducer as an ASTM C494-71 Type A admixture when its properties are better defined by a Type F classification, as defined in a more recent standard, ASTM C494-80. The licensee agreed to revise the FSAR discussion of concrete admixture usage to clarify the water reducer classification in terms of current ASTM definitions.

During a Unit 1 plant inspection-tour, the inspector noted a grinding gouge, associated with the removal of a temporary attachment, on a structural embed supporting a permanent, installed, safety-related pipe support. While final inspection for the removal of temporary attachments is procedurally required (eg: Pullman Document X-4), the program for such inspection, to include assignment of responsibility and criteria, has not been clearly delineated. YAEC QA surveillance inspectors had documented the identification of similar deficiencies in July, 1982 (YAEC DR213) and corrective action was in progress. The inspector reviewed the deficiency report, Pullman nonconformance report (NCR) 2598, Pullman interoffice correspondence, and the minutes of a UE&C meeting on this subject and determined that the licensee, A/E, and contractor planned further action to include issuance of specific instructions and that the problem was being adequately addressed.

With regard to all of the above plant tour, independent inspection items, the inspector has no further questions. No violations were identified.

3. Licensee Action on Previously Identified Items

- a. (Closed) Unresolved item (443/81-12-02): A/E control and review of structural beam loadings. During previous inspections (443/82-01 and 82-08), certain aspects of this item were reviewed. Currently the status of controls to assure that structural beams are adequate to carry attached loads and that the design review will interface with field conditions is as follows:
- UE&C Administrative Procedure (AP-39) for control of "As-Built Documents" is published.
 - Directions for off-center beam connections have been provided to affected contractors by means of Engineering Change Authorizations.
 - A UE&C Technical Procedure on component clearances, currently under review, will be required to additionally address structural steel.
 - Plans for the conduct of an engineering beam design verification program are in progress.

This item is considered closed based upon the comprehensive program planned to identify and correct any actual field problems in this area. However, it is intended that future NRC inspection effort will be devoted to this issue to verify the effectiveness of the program implementation.

- b. (Closed) Unresolved item (443/81-13-01): Weld trending and licensee evaluation of weld problems. A welder performance trending, retraining, and upgrading program is in effect and was reviewed by the NRC Construction Assessment Team (CAT). Control of machine orbiting GTAW, in general,

was inspected by a CAT welding specialist without identification of further problems. While ultrasonic (UT) baseline examinations are neither being conducted nor planned for the immediate future, the SRI did witness on various routine inspections the use of UT to clarify and better discriminate welding defects identified by radiography (RT). With regard to the RT itself, evidence is available of continued improvement in the radiographic techniques used, particularly with regard to difficult configurations and special applications.

Based upon the implementation of the above programs and techniques to not only complete the Reactor Coolant Loop pipe welding, but also improve general site pipe welding practices, this item is closed.

- c. (Closed) Unresolved item (443/81-14-02): Design verification for minor design changes. The handling of changes, both major and minor, with regard to the review and approval of Engineering Change Authorizations has been procedurally defined in UE&C Administrative Procedure (AP-15, latest revision 15 on 9/29/82). Site Engineering authority and requirements for Home Office concurrence are discussed. Design verification issues appear to have been adequately addressed by the current edition of AP-15. This item is closed.
- d. (Closed) Unresolved item (443/82-01-01): Guidelines required to address general clearance concerns. At the conclusion of NRC Inspection 443/82-01 on February 12, 1982, an item remained unresolved regarding the practice of routing piping across supports, the design of either which had not accounted for loading from the other component. An example of such a "phantom" pipe (CS-327 line) and affected supports (MS-332-RG-5) was documented in the report. Since construction tolerances had not been considered generically in the design criteria, the need for general clearance guidance became evident, to address not only this issue, but also other clearance and construction tolerance questions. The licensee indicated, at that time, that UE&C was working toward the issuance of a general clearance directive to resolve all the relevant concerns.

During this inspection, the inspector reviewed a preliminary issue of the UE&C Technical Procedure (TP) which is intended to serve as the awaited general clearance directive. He also reinspected the CS-327 piping line as it crossed over multiple support, MS-332-RG-5. In the preliminary TP is a note: "Clearances specified or inferred in other design documents take precedence over those specified here". With regard to "phantom" pipes, the relevant pipe support drawings (UE&C drawing M8003325, Sheet 10, for the given example) "specify or infer" clearances because of the illustrated elevations of piping vs. support steel. However, the construction tolerances of either the pipe, the support, or both can wholly or in part negate these clearances. In fact, for the given example, the reinspection revealed that this had occurred since the CS-327 line was in contact with MS-332-RG-5.

While the subject TP certainly provides valid direction to resolve certain clearance problems, the specific "phantom" pipe concern

initially identified by the NRC over seven months earlier would not have even been addressed by the TP. The inspector therefore informed the licensee Site Manager and Acting Field QA Manager during an exit interview on September 30, 1982 that this failure to effect prompt and effective corrective action with regard to the "phantom" pipe issue represented a violation with regard to 10CFR50, Appendix B, Criterion XVI(443/82-10-01). The original unresolved item is closed based upon this finding of violation.

The inspector also discussed with licensee engineering personnel other perceived shortcomings in the TP in its present form (eg: clearances with regard to structural steel are not addressed; backfit inspection requirements are not outlined). He was assured that the TP or an equivalent document in its final approved form would address these additional issues.

- e. (Closed) Unresolved item (443/82-08-01): Adequacy of liquid penetrant examination (LPT) on certain RPV internal welds. The inspector witnessed an additional LPT of one of the welds in question, as performed by Magnaflux personnel, and surveyed by YAEC QA personnel. Magnaflux Test and Inspection Procedure, 23.A.1 - Summer 81 for Penetrant Examination using Visible Dye was reviewed. Conduct of the LPT revealed that despite the as-welded surface roughness, a meaningful NDE evaluation could be obtained using a water-washable technique. This item is closed.
- f. (Closed) IF Bulletin 80-11: Masonry Wall Design. A review of the FSAR and the NRR Draft Safety Evaluation Report (SER) reveals that there are no safety-related masonry walls at Seabrook. Drawing and field checks by the inspector, to include Control Building fire wall design, corroborate the nonapplicability of Bulletin 80-11 to Seabrook Station. This item is closed.

4. Safety-Related Piping (Unit 1)

a. Welding and NDE

The inspector observed in-process welding on the following pipe spools or components being installed in the field:

- 1-FW-4608-03, field weld F0301 (Repair 1)
- 1-MS-4000-11, field welds F1102 & F1103 (welding of MSIV-V86)

Pullman Field Weld Process Sheets were checked to verify identification, documentation, and inspection of criteria procedurally required for quality welding. QC inspection verification of hold point items was noted and welders were interviewed regarding techniques and in-process controls. On the main steam isolation valve (MSIV) welding, special preheat and interpass temperature hold points checks were verified and the inspector reviewed the governing procedures for qualified thickness range, ASME code NDE requirements, and the minimum preheat temperature. On the feedwater (FW) line weld, a process sheet error involving the

nondocumented use of the GTAW process for the initial pass on the repair weld was discussed with contractor and licensee personnel. Corrective action was effected immediately and the inspector had no further questions.

No violations were identified.

b. Pipe Supports and Whip Restraints

The inspector checked the in-place condition, either final accepted or still in process, of the following pipe supports and compared them with the details of the applicable UE&C or Pullman drawings:

-- 4606-RG-6

-- 251-SG-14

Hanger material, identification, configuration, and weld dimensions were spot-checked and relevant ECAs and NCRs were reviewed to establish the acceptability of the installed supports. Actual contact between the 251 line support and a neighboring structural steel member was brought to the attention of licensee personnel, since the applicable drawing doesn't illustrate such interface. This case is part of the larger general clearance issue discussed in paragraph 3d and will be generically addressed in a procedural sense as noted at the end of that paragraph.

The inspector also examined certain items, such as bolting and slotting of holes, relevant to the installation of a main steam pipe whip restraint, PW-4001-4. Review of the applicable UE&C drawing (F104043, Revision 3) revealed the slotted hole dimensions to be questionable with regard to minimum edge distance. Also, while other pipe whip restraints in the main steam system were designated for installation with ASTM A-325 high-strength bolts, the details for PW-4001-4 indicated the use of only heavy hex head bolts and nuts. An interview with the installation contractor's lead hanger engineer revealed that their interpretation of the drawing included plans to install standard ASTM A-307 bolts using standard AISC practices. However, further discussion with licensee engineering personnel revealed that the design criteria for PW-4001-4 were unclear. **Actually, A-325 high-strength bolts and installation practices in line with the AISC high-strength bolting standard may be required.**

The question of the slotted hole minimum edge distance is being pursued by site engineering in line with an existing ECA and review of the direction of loading on the slot. This question also relates to the applicability of slotted-hole practices governed by the AISC. The other question relating to bolting material and installation practices has resulted in the conclusion that the design details for PW-4001-4 were unclear and an NCR has been issued.

The inspector informed the licensee Site Manager and Acting Field QA

Manager during an exit interview on September 30, 1982 that the failure to specify appropriate bolt material requirements and bolting installation standards in the design documents for PW-4001-4 represented a violation with regard to 10CFR50, Appendix B, Criterion III (443/82-10-02).

5. Pipe Penetrations (Unit 1)

The inspector examined certain containment moderate energy piping penetrations to include both single and multiple penetration assemblies. Welding, to include the control of bimetallic welds and qualification of the procedures (WPS), was checked and material conformance to the governing UE&C drawings and FSAR was spot-checked.

Specifically, penetrations X-38, X-60, and X-61 were inspected and certain records reviewed. Engineering shop drawings for the encapsulation tanks (CBS-TK-101A&B) housing the isolation valves on the piping penetrating containment to the recirculation sumps were also reviewed and compared to the requirements of UE&C Specification 248-47. The inspector examined the manufacturer's records for the encapsulation tanks, verifying code data information, code NDE, and heat treatment of the material in line with design requirements.

The status of code boundary changes on the designation of penetration sleeve/plate welds and plate/pipe welds (reference: UE&C Memo MM9197A) was discussed with licensee QA and engineering personnel. An ECA has been issued and the subject changes will affect weld NDE, weld code data reporting, material NDE, and weld and material impact test requirements.

No violations were identified.

6. Design Issues (Units 1 and 2)

- a. In reviewing a licensee response to NRR for the FSAR review and SER issuance, the inspector noted a discussion of the redundancy provided by the thermal barrier heat exchanger cooling and the seal water injection flow cooling to the lower radial bearings of the reactor coolant pumps. A further review of the Component Cooling Water (CCW) P&I drawings revealed that the Loop "A" CCW train not only provided cooling to two RC pump thermal barrier heat exchangers, but also to the single Seal Water Heat Exchanger. Thus, loss of Loop "A" CCW could have some effect upon two redundant systems.

The inspector discussed the significance of this design issue with a YAEC systems engineer and was informed that a design change was forthcoming to provide separate, redundant "A" and "B" train CCW to a closed loop thermal barrier heat exchanger cooling system within containment. Such a design would provide total protection to thermal barrier cooling for all RC pumps upon loss of either train. The inspector confirmed that NRR would be officially notified of this proposed

change and had no further questions on this issue.

No violations were identified.

- b. During the inspection of pipe whip restraints discussed in paragraph 4b, the inspector noted the installation of stiffeners to structural members in such a manner that the stiffener weld abutted an existing "Tee" weld from two directions. No coped holes ("Snipes") had been provided in the stiffener plate to allow the unrestrained passage of the existing weld. Although Pullman QC personnel had noted this condition on an NCR (3541), the inspector was later told the NCR had been withdrawn and was shown an internal letter documenting the acceptability of field welding over vendor welds. This allowance had been cleared with UE&C welding engineers.

However, the inspector's discussion with the responsible welding engineer indicated that approval for such welding was intended for planar welds and did not consider cases where triaxial stresses could concentrate (ie: the point at which the weld is fused from three orthogonal directions). Although "snipes" were pictorially represented on the stiffener pieces in several pipe whip drawings, they had in certain cases been eliminated by disposition to an earlier NCR (1732) which specified the "snipes" to be "construction considerations, not a design requirement".

The inspector noted, however, that the disposition to this NCR covered cases where triaxial stress risers were not a problem and he suggested that "snipes" were in fact a design consideration where such stress risers might in fact be installed. Pending determination by engineering personnel as to whether the elimination of "snipe" holes can be generically approved in the cases where triaxial stress concentrations may be present, this issue is unresolved (443/82-10-03).

- c. The inspector witnessed the in-process installation of channel supports for instrument racks (IR 49 & 50) in the Auxiliary Feedwater Building. He confirmed the design adequacy of the method of attachment of the channels to the anchor bolts. Conversation with a field engineer revealed that these bolted connections either were or would be torqued in accordance with the criteria provided by a general ECA on embedded anchor bolt tightening.

The inspector reviewed ECA 01/1875D and determined that it had been written and approved to provide torque criteria for anchor bolts supporting mechanical equipment erection only (reference: Specification 263-02). Its applicability to the subject instrument racks is therefore in question, particularly since the A/E is considering relaxation of the torque values to preclude overstressing of the bolts in certain analyzed situations.

Pending determination of the proper tightening or torque criteria for all equipment, not currently addressed by ECA 01/1875D, this issue is unresolved (443/82-10-04).

7. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 6b and c.

8. Management Meetings

- a. At periodic intervals during the course of this inspection, meetings were held with senior plant management to discuss the scope and findings of this inspection.
- b. On September 15, 1982 a management meeting with senior licensee personnel (See Attendance List in paragraph 1b.) was held at licensee request at the Region I office in King of Prussia, PA. to discuss recent NRC findings by the regional Construction Assessment Team (CAT), as documented in Inspection Report (IR) 443/82-06. The licensee representatives presented their position with regard to the conclusions and significant program weaknesses identified in the CAT report. This position will be documented in the required licensee response to IR 443/82-06. The regional staff acknowledged the licensee comments and the information provided as a useful feedback mechanism. Further clarification of the NRC position, if required, will be documented in the Region I letter acknowledging the licensee's response to the CAT inspection.