

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-443/81-09
50-444/81-08

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-October 2, 1981

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

10/9/81
date signed

date signed

date signed

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

10/26/81
date signed

Inspection Summary:

Unit 1 Inspection on August 24-October 2, 1981 (Report No. 50-443/81-09)

Areas Inspected: Routine inspection by the resident inspector of work activities relative to pipe and pipe support installation, NSSS supports, containment structural connections, electrical raceway support inspection and tray qualification, and the containment liner dome lift. The inspector also reviewed licensee action on previously identified items and 50.55(e) reports and performed plant inspection-tours. The inspection involved 97 inspector-hours, including twelve off-shift hours by the NRC resident inspector.

Results: Of the six areas inspected, one item of noncompliance was identified in each of the following areas: Failure to install adequate structural support welds (paragraph 5), and Failure to preclude installation of NSSS supports with nonconforming, undersized welds (paragraph 6).

Unit 2 Inspection on August 24-October 2, 1981 (Report No. 50-444/81-08)

Areas Inspected: Routine inspection by the resident inspector of work activities relative to the placement and inspection of containment concrete and cable tray qualification. The inspector also performed plant inspection tours and reviewed licensee action on a 50.55(e) report. The inspection involved ten inspector-hours, including one off-shift hour, by the NRC resident inspector.

Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

Yankee Atomic Electric Company (YAEC)

F. W. Bean, QA Engineer
D. L. Covill, QA Engineer
J. DeVincentis, Project Manager (Framingham)
D. E. Groves, QA Engineer (Framingham)
R. E. Guillette, QA Engineer (Framingham)
J. H. Herrin, Site Manager (PSNH)
H. E. Lupton, QA Engineer
G. F. McDonald, Jr., QA Manager (Framingham)
W. T. Middleton, QA Engineer
C. J. Moynihan, QA Engineer
J. F. Nay, Jr., QA Engineer
W. K. Peterson, QA Engineer (Framingham)
S. B. Sadosky, QA Engineer
J. W. Singleton, Field QA Manager
R. Tucker, Engineer (Framingham)

United Engineers and Constructors (UE&C)

R. H. Beaumont, QA Engineer
J. D. Bray, Facilities Superintendent
J. C. Gries, QA Engineer
A. A. Haldar, Structural Liaison Engineer
R. J. Hauser, Field Superintendent
D. C. Lambert, Field Superintendent of QA
D. E. McGarrigan, Project QA Manager (Philadelphia)
J. J. Murphy, Field Engineer
R. A. Rebel, Resident Construction Manager
H. E. Shellehamer, QA Engineer
R. D. Tancibok, QA Supervisor
T. P. Vassallo, QA Liaison Engineer
L. A. Wiggins, Structural Liaison Engineer

Perini Power Constructors (PPC)

P. G. Bouthillette, Structural Engineer
J. D. Pattison, Supervising QA Engineer
J. Rogero, QA Welding Inspector
R. J. Vachon, Chief QA Area Inspector

Pittsburgh DesMoines Steel Co. (PDM)

W. A. Stiger, QA Manager

Fischbach-Boulos-Manzi (FBM)

L. A. Shea, Project QC Manager
M. A. D'Orsay, QA Document Specialist

Royal Insurance

J. C. Anzivino, Authorized Nuclear Inspector
G. Voishnis, Authorized Nuclear Inspector

Pullman-Higgins (Pullman)

R. G. Davis, Field QA Manager
R. R. Donald, Field QA Supervisor
D. R. Geske, QC Supervisor
P. Grasewicz, Lead Hanger Engineer
D. B. Hunt, QA Records Supervisor
R. M. Johnson, QA Process Engineer
C. Scannell, Chief Field Engineer
R. G. Wise, QC Inspector

Westinghouse

J. Ellis, Welding Engineer
R. Powell, Project Manager
C. Rausch, Project Engineer
C. E. Walker, Liaison Engineer

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

The inspector observed work activities in-progress, completed work and plant status in several areas of the plant during general inspections 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 checked the bolting and pad configuration for some rotary fan unit supports at elevation 50 in the Unit 1 Control Building against applicable drawing requirements. The removal of concrete for the addition of embedded plates, expansion anchored to existing concrete in the Unit 1 RPV cavity around soffit elevation (-31) was reviewed for approval and procedural control over the handling of exposed rebar. The inspector also visually examined an arc strike in the Unit 1 containment liner caused by a defective weld cable and evaluated planned licensee corrective actions to include inspection and disposition of any damage caused by a small construction fire resulting from paint thinner contact with the defective weld lead.

Licensee actions to identify those nonsafety-related components whose failure might adversely impact safety items was reviewed. Commitment to Regulatory Guide (RG) 1.29 has resulted in an ongoing A/E review program intended to identify NNS components which are seismically supported or isolated from safety-related components. Discussion with licensee QA personnel reveals that this review program, which is expected to be completed in April 1982, will culminate in an evaluation of the inspection program for those NNS items falling under the criteria of RG 1.29, position C.2 and for which additional inspection in line with the existing YAEC "Construction Follow Along Program" may be justified. The inspector evaluated the intent, timeliness, and structure of the ongoing review program and has no present questions concerning licensee direction or proposed future actions on this issue.

The inspector also examined the installed supports for the 4-ton cranes over the Unit 1 emergency diesel generators and for the 2½-ton hoist over a Unit 1 centrifugal charging pump. Governing UE&C specification 257-5 (Revision 6) and procedure QAS-4 (Revision 1) were reviewed for applicable installation and inspection criteria and field support configurations were spot-checked against UE&C design and supplier fabrication drawings and tolerances. Certain connection details were reviewed for adequacy utilizing the design criteria of the AISC tables for welded and bolted Framed Beam Connections. Inspection coverage of these crane and monorail items, as well as generic items in the NS category, were discussed with QA and contractor engineering personnel with reference to Perini Field General Construction Procedure, FGCP-304.

No items of noncompliance were identified.

3. Licensee Action on Previous Inspection Findings

- a. (Closed) Infraction (443/80-07-01): Deficient stud weld conditions. The

inspector reviewed the dispositions to Perini nonconformance report (NCR) 1021 and Pullman NCR 339. Repair actions or acceptance of existing conditions based upon engineering evaluation of conservative assumed failure rates were noted. A new UE&C procedure (WS-7) currently in review cycle, provides guidelines for the visual inspection of stud welds to include acceptance criteria illustrated by pictorial examples. The inspector has examined embed and structural steel stud welds, both field and shop fired, during recent plant inspections without adverse findings and he has no further questions on the status of licensee corrective action.

- b. (Closed) Unresolved item (443/80-10-02): Use of closed valve as purge dam. UE&C has reaffirmed the Specification 248-51 requirement that valves be off their seats during welding of the body into piping runs. Pullman NCRs 469 and 543 were written to document cases where the specification had been violated. The disposition to NCR 469 for the Tuflin valves, which are most susceptible to heat damage, indicates that under the vendor's recommendation, the questionable valves were manually operated by Engineering and QA personnel and no evidence of heat damage was apparent. The inspector noted written instructions to craft personnel in the field emphasizing the proper position of valves during their welding and confirmed this understanding in discussions with several pipefitters. This item is considered resolved.
- c. (Closed) Infraction (443/80-10-03): Pipe support weld deficiencies. The inspector reviewed and discussed with the responsible training and QA contractor personnel training activities covering weld symbols, tolerances, and inspection criteria with emphasis upon ASME Section III, subsection NF code requirements. The reinspection of all installed pipe hangers with the resulting documentation of unacceptable welds on Pullman NCRs 465, 466, 467, and 468 was verified, as was the intended disposition to repair welds, as required. The inspector spot-checked the use of Hold Tags in the field to identify the nonconforming status of those hangers awaiting repair. A sample audit of current pipe support installation, documented in this report in paragraph 7c, revealed no recurrent problems or questions on this issue. Licensee corrective action appears adequate.
- d. (Closed) Noncompliance (443/81-03-01): Questionable bolt length allowances and plug weld practices. The inspector verified a full reinspection of all previously accepted Tension Set Bolts. He reviewed Interim Procedure Change IPC No. 3 to Perini Quality Assurance Procedure QAP 10.8, Revision 3, establishing visual inspection criteria for high-strength structural bolts which assure that torqued connections have neither nuts that have shanked out, nor bolt threads extending into the connection shear plane.

For the identified cases of plug welding in structural beams contrary to AWS criteria, an engineering evaluation of the affected beams' design and loadings, in conjunction with magnetic particle examination of the plug weld surfaces, has established the acceptability of the existing field conditions. Future handling of mislocated structural steel bolt holes has been procedurally defined by UE&C Engineering Change Authorization ECA 01/2702A. Commitment has also been made to qualify a new procedure for the base metal repair of structural steel in accordance with AWS requirements.

For both the bolt length and plug weld deficiencies noted by this noncompliance, licensee corrective action has adequately addressed existing conditions and procedurally provided for proper, code qualified work in the future.

- e. (Closed) Unresolved item (443/81-07-01): Conformance of crossover leg welding to AWS prequalification criteria. The inspector confirmed that revision 2 to Pullman welding procedure AWS-I-2 includes the applicable prequalified joint configurations (eg: TC-U4c) from AWS Standard D1.1-75, figure 2.9.1. While final welding of the crossover support pieces has not yet commenced, qualification and procedural fit-up and welding controls are being closely monitored by UE&C home office welding personnel. No further questions remain on the prequalification issue raised by NRC concerns over the crossover support welding.

4. Evaluation of 50.55(e) Reports and Actions

The following item reported by the licensee as potentially reportable under 10CFR50.55(e) was subsequently evaluated as either not "significant" or not capable of having "adversely affected the safety of operations" and therefore as not reportable under those regulatory requirements.

- A YAEC audit of Hilti Kwik-Bolt installations revealed that a high percentage of bolts had undergone a preload torque relaxation below the values required by UE&C Specification 16-17, when checked some period of time after the initial installation. A stop work order was issued, an engineering evaluation of the worst-case torque relaxations was accomplished, and procedural controls over Kwik-bolt installations, torque safety margins, and inspection checks were improved. A YAEC re-audit of noted deficiencies verified effective corrective actions; while an investigation by Hilti, UE&C, and YAEC revealed that at no time did the identified torque relaxations cause the bolt preloads to drop below actual, minimum design load requirements.

The inspector reviewed licensee and A/E reports on the above issue and specifically evaluated the justification for the eventual decision of non-reportability with regard to 10CFR50.55(e). He has no further questions on this aspect of this item.

5. Containment Structural Connections (Unit 1)

The inspector witnessed in-process work or examined as-built details relative to the safety-related structural steel connections noted at the following approximate locations within Unit 1 containment.

- Azimuths 10,20,40, and 340 at Elevation (-15)
- Azimuth 200 at Elevation (-12)
- Azimuths 40 and 80 at Elevation (+13)
- Azimuth 320 at Elevations (0 and +25)

UE&C drawings, ECAs, and Specification 12-2 (Revision 1); applicable Perini NCRs with their disposition and Welding Procedure Specifications; Cives structural field assembly drawings; and general construction practices delineated in the AISC Manual and AWS Standard D1.1-75 -- all provided criteria, as applicable, for the evaluation of the adequacy of each connection.

At elevation (-15) several welded connections were found to have the weld lengths interrupted by one or two nailer holes. The existing, governing criteria (ECA 01/1367A) for nailer hole interference on clip angle welds provided no specific guidance for field modification of the welded connections in these specific cases. Consequently, Perini nonconformance reports were written to document the identified losses of weld capacity.

At elevation (-12) on azimuth 200, two structural connections were noted where plates were welded to concrete embeds. While the full length of each side of the plate to embed interface had been welded with the properly sized weld, this resulted in a field condition with a total of approximately 9" of 5/16" size fillet weld for each connection. The connections were inspected and accepted by QC personnel. However, Section 102326J on UE&C drawing F-102326 (Revision 5) illustrates, by means of the noted drawing elevations, design weld lengths for each of these connections of over 17" of 5/16" size fillet weld. Additionally, the existence of a nailer hole interrupting the weld in each connection was in one case dispositioned to accept-as-is without consideration of an actual weld length substantially less than that called for by the drawing and in the other case, not identified or dispositioned at all. This further reduced the existing weld capacity.

While this problem was further complicated by three different drawing reference elevations for the same embed and thus imply different interfacing weld length criteria, engineering analysis by the licensee has determined the existing welded connections to be inadequate. The inspector thus informed the licensee Field QA Manager and Site Manager during an exit interview on October 2, 1981 that this failure to install adequate structural support welds represented a noncompliance with regard to 10 CFR 50, Appendix B, Criterion V (443/81-09-01). He also asked the licensee to establish whether the root cause of the noncompliance could be attributed to an improper inspection or to incomplete acceptance criteria as provided by the design drawings. The inspector indicated that determination of the primary program failure leading to this noncompliance was necessary to provide a basis and direction for adequate corrective action.

6. Steam Generator Lower Lateral Supports (Unit 1)

The inspector examined field conditions for the NSSS lower lateral supports for the Unit 1 steam generators. Embedded anchor bolts were checked for size, length, and thread configuration relative to the following UE&C drawing requirements, as revised by ECA 01/1556A.

- F101406 (Revision 7)
- F101410 (Revision 6)
- F101413 (Revision 9)
- F101415 (Revision 5)

Bolt material was traced through its heat number ID to certifications of the

proper ASTM types. The design allowance for threads in the connection shear plane was confirmed with A/E engineering personnel.

The fabricated lower lateral support pieces were inspected for conformance to the Westinghouse design drawings and Equipment Specification (G-952628, Revision 1). While Westinghouse drawing 1186F51 (Revision 7) illustrates the assembly of wide flange beam pieces to base plates with specific sized fillet welds (eg: $\frac{1}{2}$ " or $\frac{3}{4}$ "), the inspector noted that these weld sizes were not fully attainable since the plate overhang did not allow for the specified size on one leg of the fillet weld. The inspector confirmed that this was a generic condition on all the pieces supplied by Teledyne-Brown to Westinghouse for Seabrook. The applicable Teledyne-Brown fabrication drawing (21919) erroneously represented the undersized as-built welds to be full size in accordance with the Westinghouse design details. Furthermore, an engineering analysis by the licensee of minimum required throat dimensions for the questioned welds has revealed that a weld of acceptable strength may not be achievable with unequal-leg fillet welds given the present configuration.

The inspector informed the licensee Field QA Manager and Site Manager during an exit interview on October 2, 1981 that the installation of NSSS support components with undersized fillet welds represented a noncompliance not only with regard to 10 CFR 50, Appendix B, Criterion V, but also Criterion VII for failure of the program and measures established to assure conformance of purchased material to the procurement documents (443/81-09-02). In addition to technical concerns, the licensee agreed to investigate the breakdown of the supplier and/or vendor inspection program and to evaluate this issue.

7. Unit 1 Piping, Welding, and Supports

a. Reactor Coolant Pressure Boundary

The inspector observed in-process welding on the backing ring and spacer block installation for the Class 1, Loop 3 steam generator to crossover leg pipe fit-up (ISO RC-8-01, Field Weld F0104). Pullman Welding Procedure Specification WPS 27-III-8-0B-12 was reviewed for general applicability of essential variable limitations, as was Pullman Field Instruction FI-132 (Revision 1), governing the conduct and sequence of work.

The inspector verified proper inspection sign-off and use of hold points on the Pullman Field Weld Process Sheet and examined the temporary spacer-block material for identification of heat mark traceability and procurement requirements (UE&C Specification 248-34, Revision 3). He also discussed preheat temperature controls with the responsible craftsmen foreman.

On a separate Class 1 spool piece (1-RC-58-1-2501-12"-1) which had not yet been installed, the inspector checked material, configuration, and NDE against the applicable Draw Sketch (E2936-608) and ASME Section III, subsection NB.

No items of noncompliance were identified.

b. Safety-Related Piping

The inspector observed in-process welding on the following pipe spools:

- 1-SI-201-02, Field Weld F0203
- 1-CC-827-01, Field Weld F0102

Field Weld Process Sheets, Weld Rod Stores Requisitions, and the applicable Pullman WPS were checked to verify identification, documentation, and inspection of criteria procedurally required for quality welding. QC inspection verification of hold point items on the weld process sheets was noted.

For safety injection valve SI-V-3 being welded into its pipe line, the inspector reviewed the UE&C isometric drawing (D800201), the Westinghouse M.O. gate valve certification package, the Dravo Sketch (E2936-1132) for the interfacing pipe spool, and the governing UE&C Specification 248-1 and Pullman inspection procedure X-9. Weld prep configurations on the valve and pipe spool were checked for conformance to the drawing details of UE&C drawing 805000.

The inspector also checked the following pipe spool pieces against their applicable Dravo sketches for ID, material, weld locations and NDE.

<u>Spool Piece</u>	<u>Dravo Sketch</u>
1-SI-201-2-2501-10"-5	E2936-1136
1-RH-180-2-2501-8"-1	E2936-1127
1-RH-155-5-2501-6"-1	E2936-165

Standard weld bosses of various sizes on these spool pieces were spot-checked for size, weld configuration and quality, and drilled opening dimensions in accordance with Dravo Sketches ES-3 and ESM-DB-1.

No items of noncompliance were identified.

c. Pipe Supports

The inspector checked the in-place condition, either final accepted or still in process, of the following pipe supports and compared them with their Pullman detail drawings, as amended by the listed UE&C Engineering Change Authorizations:

<u>Hanger</u>	<u>ECA</u>
MS-301-A-13	25/372B and 503A
1206-SG-9	25/508A
775-RG-4	25/554A
332-SG-06	25/495A
540-SG-23	25/642A
428-A-02	25/446A
412-SH-3	25/454A

Pullman Hanger Field Weld Process Sheets were examined for documentation of the correct weld joint status, to include hold point inspections. The inspector checked hanger material and weld dimensions, identification, and configuration. Concrete embed plates, interfacing with hanger items, were examined for proper size, thickness, and location. The inspector discussed several matters relative to the implementation of the ECAs, the status of the field document packages, and use of temporary material and welds with licensee and contractor QA and engineering personnel.

No items of noncompliance were identified.

8. Electrical Supports and Tray Qualification (Units 1 and 2)

- a. The inspector examined the condition of the following Unit 1 conduit supports, listed by FBM identification numbers:

-- 3000	-- 3115
-- 3001	-- 3132
-- 3026	-- 3139
-- 3083	

FBM Quality Control Inspection Reports QCIR for Exposed Conduit Supports and for Structural Welds were reviewed for documentation of the support status and inspection of applicable quality criteria. FBM Quality Control Procedure QCP-502 (Revision 2) and the following UE&C drawings were examined to spot-check support location, supported conduit identification, and general installation instructions.

-- L310994 (CASP)	-- F310576 (Rev 4)
-- M300228 (Rev 3)	-- F310594 (Rev 2)
-- F310565 (Rev 6)	-- F310595 (Rev 1)

No items of noncompliance were identified.

- b. The inspector randomly selected some installed cable tray and its associated UE&C Receiving Inspection Report, RIR 2120, to verify inspection coverage and attributes consistent with specification requirements. UE&C Specification 109-1 (Revision 2) governs cable tray procurement and requires seismic biaxial loading tests on the ladder and solid bottom tray types for data input into the seismic design and analysis of the raceway supports. The inspector reviewed the on-site, test report data package (UE&C Foreign Print 31346) for the cable tray seismic tests and evaluated the information relative to the commitments in the Seabrook Station FSAR, section 3.10 (B).3.2 and the technical requirements in IEEE Standards 323,344, and 422.

While no items of noncompliance were identified, certain questions arose relative to the completeness of the on-site data package, the test tray configurations, and the assumptions made in the analysis. The licensee has directed these questions to the A/E and the responses will be reviewed during the next report period. This matter is unresolved pending NRC review of licensee responses. (443/81-09-03)

9. Witness of Concrete Placement (Unit 2)

The inspector witnessed a portion of concrete placement 2-CI-2 for a structural wall and slab in the Unit 2 reactor pit. The Pe ini Concrete Pour Card, Preplacement and Placement Inspection Reports, and Installation of Reinforcing Steel Inspection Report were all reviewed for sign-off authority and inspection criteria. The inspector noted the presence of QC inspectors and discussed with them their general coverage, method of checking for the maximum liquid concrete head, and partial sign-off of embed installations. The use of grout, concrete drop height, form clearances, weather protection, rebar cleanliness and lap splicing were visually spot-checked by the inspector and the conduct of required ASTM tests for fresh concrete was verified at both the truck discharge and pump discharge points.

The inspector later reviewed the concrete record package for the above placement. Concrete records for the Units 1 and 2 condensate storage tank concrete foundation placements to date were also reviewed to confirm classification and inspection of these facilities under safety-related provisions. The inspector observed the installation of rebar and anchor bolts in the Unit 1 tank foundation structure.

No items of noncompliance were identified.

10. Containment Liner Dome Lift (Unit 1)

The inspector witnessed preparations, to include the temporary re-rating of the crane used in the special lift, for the final lift and placement of the assembled Unit 1 containment liner dome onto the existing, erected liner structure. Crane monthly maintenance check records were verified, and load test data and requirements were discussed extensively with licensee and A/E personnel. The inspector reviewed the PDM Lifting Procedure, LP-1 (Revision D), discussed weather constraints on the lift with the PDM site QA manager, and considered ambient temperature conditions on the lifting crane pedestal. A QA hold on the final lift pending additional load testing in accordance with PSAR commitments was noted.

The inspector evaluated the above special lift with regard to criteria delineated in the following documents:

- UE&C Procedures FGCP-10 (Rev 6) and FCTP-6
- ANSI Standard M45.2.2
- USNRC Regulatory Guide 1.38

No items of noncompliance were identified.

11. Management Meetings

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.