

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

Region I

Report No. 50-443/81-07
50-444/81-06

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: May 26-June 26, 1981

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

7/7/81
date signed

J. E. Tupp
for S. D. Reynolds, Reactor Inspector

7/15/81
date signed

J. E. Tupp
for W. F. Sanders, Reactor Inspector

7/15/81
date signed

J. E. Tupp
for A. A. Varela, Reactor Inspector

7/15/81
date signed

V. L. Ortin G., Mexican National
Nuclear Inspector (Visiting)

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

7/16/81
date signed

Inspection Summary:Unit 1 Inspection on May 26-June 26, 1981 (Report No. 50-443/81-07)

Areas Inspected: Routine inspection by the resident inspector and three regional based inspectors of work activities relative to pipe and pipe support welding, pipe storage, electrical supports and components, and followup of Part 21 diesel generator problems. The inspectors also performed plant inspection-tours and reviewed licensee action on previously identified items. The inspection involved 127 inspector-hours, including five off-shift hours, by four NRC inspectors. A visiting Mexican National Nuclear Inspector accompanied an NRC regional based inspector during a portion of the inspection period.

Results: Of the four areas inspected, one item of noncompliance was identified in one area--failure to install properly supported electrical boxes within containment (paragraph 10).

Unit 2 Inspection on May 26-June 26, 1981 (Report No. 50-444/81-06)

Areas Inspected: Routine inspection by the resident inspector and three regional based inspectors of work activities relative to the Reactor Pressure Vessel storage and inspection and followup of Part 21 diesel generator problems. The inspectors also performed plant inspection-tours and reviewed licensee action on previously identified items. The inspection involved 19 inspector-hours by four NRC inspectors.

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
W. J. Gagnon, QA Engineer
D. E. Groves, QA Engineer (Framingham)
R. E. Guillette, QA Engineer (Framingham)
J. H. Herrin, Site Manager (PSNH)
H. Lupton, QA Engineer
G. F. McDonald, Jr., QA Manager (Framingham)
W. T. Middleton, QA Engineer
W. J. Miller, QA Consultant (Framingham)
W. K. Peterson, QA Engineer (Framingham)
J. A. Philbrick, Project Engineer (PSNH)
J. W. Singleton, Field QA Manager
H. E. Wingate, Project Engineer (Framingham)

United Engineers and Constructors (UE&C)

A. H. Ayers, QA Engineer
R. H. Beaumont, QA Engineer
R. L. Brown, Supervising Piping Engineer
M. A. Edgar, Resident Construction Engineer
J. A. Grusetskie, Assistant Liaison Engineer
A. J. Hulshizer, Supervisory Structural Engineer (Philadelphia)
K. M. Kalawadia, Structural Engineer (Philadelphia)
R. A. Kountz, Welding Superintendent
D. C. Lambert, Field Superintendent of QA
R. A. Mills, Assistant Liaison Engineer
L. S. Nascimento, Chief Structural Engineer (Philadelphia)

Fischbach-Boulos-Manzi (FBM)

L. A. Shea, Project QC Manager
A. H. Clements, QC Supervisor

Perini Power Constructors (PPC)

S. M. Bednar, Chief Cadweld Inspector
P. E. Bruce, Site QA Manager
A. G. Schroeder, Lead Structural Inspector

Royal Insurance

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

Pullman-Higgins (Pullman)

R. G. Davis, Field QA Manager
R. R. Donald, Field QA Supervisor
C. Gaskell, QA Welding Engineer
D. R. Geske, QC Supervisor
J. Godleski, QA Records Supervisor
M. MacCrae, NDE Supervisor
C. Scannell, Chief Field Engineer

Westinghouse

R. Powell, Project Manager
C. E. Walker, Liaison Engineer

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

The inspectors observed work activities in-progress, completed work and plant status in several areas of the plant during general inspections of the plant. The inspectors 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 inspectors interviewed craft personnel, supervision, and quality inspection personnel as such personnel were available in the work areas.

Specifically, an inspector checked the installed condition of the seismic restraints for the Unit 1 pressurizer, witnessed the rigging and movement into place of some RCPB cold leg piping, and reviewed the field controls over structural steel repair welding to include documentation of a beam burn-thru condition. Inspectors also witnessed demonstrations of a developmental procedure for the location of subsurface reinforcing bars in concrete by a HF induction heating technique, splicing of #18 rebar by means of a swaged mechanical coupling process, and test use of a superplasticizer concrete additive for increased concrete workability in congested areas. Licensee evaluation of a potential problem of concrete voids in Unit 1 containment wall pour (1-CS-1h-1) caused by a breakdown of a concrete placement pump was discussed with QA and inspection personnel. The disposition of PPC Nonconformance Report (NCR) 1918, Revision 1, was reviewed for consideration of the worst-case effect upon containment design.

No items of noncompliance were identified.

3. Licensee Action on Previous Inspection Findings:

- a. (Open) Unresolved item (443/80-12-01): Justification for multiple cadweld splices in series - Reference: NRC Report 81-02, paragraph 3. The inspector reviewed a UE&C document providing a technical evaluation of the subject multiple cadweld issue. While the inspector's concern for excess strain accumulation in multiple cadweld areas appears to have been adequately addressed by the A/E evaluation, licensee concurrence in this conclusion was not yet substantiated. Pending the final licensee position and further NRC technical review with regard to the potential effect multiple cadwelds, as located, have upon the containment shell, this item remains unresolved.
- b. (Closed) Unresolved item (443/80-12-05): Potential significant deficiency regarding concrete cover on rebar in the cooling tower beams. This issue, reported to the NRC as a potentially reportable item under 10CFR50.55(e), was subsequently evaluated after testing to not represent a reportable deficiency. The inspector reviewed the test reports, engineering evaluation, and other UE&C documentation supporting the licensee position. The results of testing a sample

beam with as little as $\frac{1}{4}$ " cover over the shifted rebar stirrups confirms the structural adequacy of the beams without adverse impact upon the concrete. This item is resolved and effectively closes NRC action on the potential 50.55(e) report.

- c. (Closed) Noncompliance (443/81-01-01): Undersized AWS structural fillet welds. The inspector reviewed the NCR (1447) and its disposition regarding the specific weld cited. He verified repair and existing weld adequacy through visual examination. Licensee actions to address the generic aspects of this issue were reviewed. This item is considered closed.
- d. (Closed) Unresolved item (443 and 444/81-02-01): Supervisory Support Program (SSP) status and follow-up of Perini QA program effectiveness. The inspector reviewed a SSP Status Report dated March 17, 1981 relative to all open items from the August, 1980 report. He noted that licensee follow-up actions had closed all previously SSP opened items in the cadweld area and that four SSP group recommendations concerning Perini's internal audit program had been favorably acted upon. The inspector verified those completed actions during field observation of QC cadweld inspection activities and through interviews with craftsmen, QC inspectors, field engineers and supervisory personnel and a review of revised QC procedures. This item is closed.

4. Automatic Orbiting GTAW Butt Welding (Units 1 & 2)

The licensee intends to utilize the machine orbiting pulsing gas tungsten arc welding (ME-GTAW-P) procedures for some safety-related and non safety pipe welds. The power source, controls, and welding device will be the same type as has been used at other construction sites for specific welds (eg: field RPV safe end modification). The NRC inspector reviewed specific WPS, PQR, WPO, and welding technique sheets and witnessed welding setups for training purposes in the welder training area. The licensee will use the Dimetrics Gold Track 2 automatic equipment and intends to weld both P1 and P8 piping. The following Pullman Power Products WPS documents which will be used in conjunction with GWS-I and III were reviewed:

- 150-I-1-KI-A1
- 150-I-1-BR-A1
- 150-I-8-KI-A1
- 150-I-8-BR-A1
- 150-III-1-KI-A1
- 150-III-1-BR-A1
- 150-III-8-KI-A1
- 150-III-8-BR-A1

The welding operators for the machine welding will be qualified by welding 8" schedule 80 carbon steel pipe with austenitic filler metals (including an SFA 5.30 Class 3 - "K" type - Group C austenitic consumable insert) to Pullman Power Products SWT #25 S-25 (5/1/81) standard welding test

(WPQ). The WPQ documents for two qualified operators were reviewed.

The applicable PQR documents are 047A (no PWHT) and 047B (PWHT) for P1 to P1 joints and 126 for P8 to P8. The PQR documents currently limit the procedure utilization to P1 joints where there are no HAZ toughness requirements.

The welding operators will utilize the General Welding Specifications GWS-I and GWS-III and the aforementioned WPS documents for approved welding parameter ranges. In addition, they will receive more explicit additional information on pendant settings from the Welding Technique Sheets.

No items of noncompliance were identified.

5. Unit 2 Reactor Pressure Vessel (RPV) Nozzle Damage

Following a report from the licensee of damaged weld joint preparations on the subject RPV nozzles, the NRC inspectors visually inspected the nozzles on the RPV in a temporary storage building at the job site.

The weld joint preparation is coated with a corrosion inhibitor and covered with sheet metal type pipe cap which was taped to the nozzle prior to shipment by the RPV fabricator. The covers for the nozzles are removed for an annual cleaning procedure and a quarterly inspection of one nozzle. The covers were removed in November 1980 to metallurgically inspect the weld joint preparations for sufficient amount of Ni-Cr-Fe "buttering" as indicated in Westinghouse Electric Corporation Inspection Report PE-RPV-3507. At that time, four areas of the weld preparation on nozzle stenciled 301-121B (Loop 4-hot leg) were inspected by the NRC inspector as reported in Combined Inspection Report 50-443/80-12 and 50-444/80-12 paragraph 6.

Viewed from the top end of the RPV, the nozzles are oriented (in the storage area) as follows:

<u>Nozzle (1)</u>	<u>0'Clock Location</u>	<u>Loop</u>	<u>Leg</u>
a	1200	2	hot
b	130	3	hot
c	300	3	cold
d	430	4	cold
e	600	4	hot
f	730	1	hot
g	900	1	cold
h	1030	2	cold

(1) NRC identification for report purposes only.

The results of a cursory visual inspection are as follows:

- Nozzle (a) - Minimal mechanical damage marks noted in root face area.
- Nozzle (b) - Considerable mechanical damage by indentations and plastically deformation (bending) to root face area. No weld beads noted in root face area.
- Nozzle (c) - Clamp or round hammer mark noted at 035° in weld joint bevel. Damage to root face area for a length of approximately 10 inches at 270°.
- Nozzle (d) - Area 10" long appears to be ground below tolerance for consumable insert root pass welding.
- Nozzle (e) - Plastically deformed area of root face approximately 6 inches long. Apparent weld bead (spot) noted. This is the nozzle inspected at four locations in November 1980 by an NRC inspector. The damage to the root face area was not noted at the November inspection.
- Nozzle (f) - Apparent weld bead noted on root face area. Mechanical damage to root face area.
- Nozzle (g) - No apparent damage.
- Nozzle (h) - No apparent damage.

The mechanical damage noted was for the most part in the root face area and consisted of mechanical indentations made by a blunt instrument (unlike a welder's scaling hammer) and plastically deformed (bent) root face nose. The damage to the root face areas would render the joint unweldable by consumable insert techniques.

The licensee, in conjunction with the NSSS (Westinghouse) and the RPV fabricator (CE), plans to develop repair procedures for the damage to nozzle weld joint preparations. The inspector has no further questions on the RPV status or licensee intent for repair. No items of noncompliance were identified.

6. Pipe Storage (Units 1 & 2)

The NRC inspectors visually examined stainless steel pipe spools in the West Tract and South Tract Lay Down areas for pipe cap installation and for visual examination of the surface condition of welds for future liquid dye penetrant (PT) examination. All spools observed had pipe caps installed and the weld surface condition appeared to be acceptable for PT examination.

No items of noncompliance were identified.

7. Welding Documentation (Unit 1)

The NRC inspector reviewed the documentation for the following welds:

- a. CO-4059-04 F0402: 36"OD x 0.750, P1 to P1 welded in accordance with WPS 150-I-1-KI-A1 with a 1/16" x 3/16" E70S-3 "K" type insert and 0.035" E70S-3 filler. This weld was accomplished with the Dimetrics

equipment and was not a safety related weld. Results of radiography indicated areas of side wall lack of fusion. This weld was also visually inspected.

- b. SI-250-01-Rev0, F0101, F0102, and F0103 Class 2 (Safety Injection Line) 4" OD x 0.337 austenitic stainless steel pipe welded in accordance with WPS 24-III-8-KI-12.
- c. CBS-1214-05-Rev9, F0501 Class 2 (Containment Spray) 8" OD x 0.332" austenitic stainless steel pipe welded in accordance with WPS 24-III-8-KI-12 for joining spools E2936-1351 to E2936-1352.

The filler metal and consumable inserts for the above stainless steel welds were reviewed. The WPS documentation permits the use of regular and low carbon grades of filler metal.

No items of noncompliance were identified.

8. Cross over Pipe Supports (Unit 1)

A visual inspection was made in the primary containment of the installation and fit up of the various weldments that comprise the full network of RCPB pipe supports. The weldments, fabricated from heavy plate, SA588 Grades A and B, were made in sections by a contractor off site and will be joined by welding. Reviews were made of the Pullman-Higgins Weld Procedure AWS-1-2, the general welding standard GWS-1 and the Performance Qualification Tests SWT-21. It was noted that the Prequalified Weld Joints Fig.2.9.1, TC-U9a and TC U5b selected from AWS D1.1 structural welding code did not provide complete coverage for all of the weld joint configurations that will be used. A commitment was made prior to the completion of the inspection to reissue AWS-1-2 by the addition of Fig.2.9.1, TC-U4c. This item is considered to be unresolved pending a subsequent review of the revised procedure (443/81-07-01).

A review of the material requirements (SA-588 Grades A and B), the nature of the material, thickness of the weldments (3"+) and the susceptibility for laminar defect problems (ie: high restraint stresses relative to the material 50 Ksi yield strength) raises questions as to the extent that existing welding controls will address these concerns.

UE&C Procedure 9763-WS-3 describes a weld metal butter layer applied to the weld joint bevel faces, with a magnetic particle examination (MPT) prescribed for the butter layer. The closing weld is made and followed by a final MPT. This procedure also provides an option to eliminate the initial magnetic particle examination. Since present plans opt for waiver of the butter layer MPT, defects associated with the buttering would be undetected at this stage. A review of the certifications for SA-588 material indicate the calculated carbon equivalents as 0.43% and 0.51% with carbon contents ranging 0.13% and 0.15%. The material properties indicate relatively poor toughness and a tendency for lamellar defects. While the referenced procedure specifying the application of buttering

and magnetic particle inspection indicates good engineering practice to identify any lamellar tearing potential, the waiver of the MPT generates a concern as to how any initiation and propagation of lamellar tears would be identified or handled. It was also noted that the recommended preheat of 200°F is marginal for the heavier thickness when considering the requirements of table 4.2 of AWS D1.1.

These concerns were communicated to the licensee for additional engineering evaluation. Pending NRC review of the results of the evaluation and inspection of the final welding and NDE process, this item is unresolved (443/81-07-02).

Both unresolved items documented above were discussed with the licensee Site Manager and Field QA Manager at an exit interview on June 11, 1981.

9. Safety Related Piping (Unit 1)

a. Welding

The inspector observed welding of the following pipe spool and containment penetrations:

- 1-SI-203-02, Field Welds F0202 and F0203
- Penetrations X26 and X34, Process pipe to end plate welds

Field Weld Process Sheets and Weld Rod Stores Requisitions were checked to verify identification, documentation, and inspection of criteria procedurally required for quality welding. Actual welding conditions and conduct, the sequence of operations, and the use and documentation of purge dams were all spot-checked. The inspector noted the presence or availability of QC welding inspectors and checked their inspection verification of hold point items on the weld process sheets. The following Welding Procedure Specifications (WPS) were reviewed for conformance of the actual welding parameters and to verify qualification of the essential welding variables in accordance with the ASME B&PV Code, Section IX.

- WPS 24-III-8-KI-12 (Revision 3)
- WPS 81-III-8/1-OB-12 (Revision 2)

The specified NDE methods were also checked against the ASME B&PV Code, Section III for the applicable class of piping and against Regulatory Guide 1.19 for the containment penetration boundaries.

Certification of the penetration plate material was verified, to include material type, heat normalization, and ultrasonic examination in accordance with the requirements of UE&C Specifications 248-1 and 248-43. Material Test and NDE Reports were not immediately available on site for penetration X26. Traceability of the plate being welded was verifiable only to a proper heat of material and the supplier

was contacted to transmit other required quality documentation to the site. The licensee initiated YAEC Deficiency Report (DR) 093 to identify procedural problems which resulted in the field welding on a component lacking complete documentary evidence of conformance to procurement specifications. The inspector had no further questions on this issue.

No items of noncompliance were identified.

b. 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:

- 4374-SH-7
- 4427-SG-1
- 798-SV-11
- MS 827-02-777-SV-19

Pullman Hanger Field Weld Process Sheets and Weld Rod Stores Requisitions were examined for documentation of the correct weld joint status and usage of specified weld material. The inspector checked hanger material and weld dimensions, identification, and configuration. Weld design for certain hangers was verified to be in accordance with ASME Section III, Appendix XVII requirements.

No items of noncompliance were identified.

c. Piping Components

The following vendor pipe spool pieces, located in the field but not yet installed, were checked against their applicable Dravo sketches.

<u>Spool Piece</u>	<u>Dravo Sketch</u>
-- 1-CS-360-1-2501-3"-3	E2936-831
-- 1-CC-798-1-152-24"-3	E2936-372
-- 1-CC-777-10-152-24"-4	E2936-1077

Identification, material, wall schedule, and weld locations were all checked against the applicable UE&C material specifications. The inspector verified documentation of the proper NDE in accordance with ASME Section III.

The inspector also examined code data reports, test and NDE reports for safety injection valve (V-36) in accordance with UE&C Specification 248-1 (Revision 4) and Westinghouse Equipment Specification G-578853 (Revision 2). A valve in the CVCS line (V-193) was also checked for conformance to Specification 248-37 requirements, quality documentation,

and field welding quality and records, with particular emphasis upon the ASME criteria for the weld transition zone between the spool pieces and the valve. Required radiographic testing reports were examined.

No items of noncompliance were identified.

10. Electrical Components and Supports (Unit 1)

The inspector checked the general layout of equipment (Motor Control Centers, Switchgear, Motor-Generator Sets) in the Control Building at elevation 21. The physical separation of redundant train equipment and bolted and welded supports for the MCC and Control Rod Drive M-G sets were specifically examined. Temperature and humidity chart monitors and controlled access provisions were noted for this area. Authorization for modification of a structural column (ECA 01/1860 A) to permit passage and clearance of a non-segregated bus duct was reviewed. FBM inspection report documentation (IR 20-003) of Hilti bolt placement inside a cable tray run was noted. The inspector verified licensee QA action to assure that damage to cable during future cable pulling operations would not occur.

The inspector also discussed the bolting details of UE&C drawing M300229, SH.3B for various cable tray splice connections with QA personnel and examined the authorization (ECA 01/2244D) for core drilling of 4" diameter holes in the battery room slab for future battery rack support anchor bolt installation. A review of UE&C drawings F111393 (Revision 4) and F310431 (Revision 9) indicated that additional rebar had been placed in the slab at elevation 21 to account for the worst-case cutting of reinforcing steel by the core drilling.

In the Primary Auxiliary Building around elevation 14, the inspector verified details for cable tray strut bracing welds to concrete wall embeds in accordance with UE&C drawing F310792 (Revision 6). At approximately elevation -21 inside containment, the inspector noted several electrical junction or terminal boxes (eg: box X07) mounted on the interior walls by means of power struts, expansion anchor-bolted to the concrete. The size and length of the Hilti anchors were verified to be correct and the spacing was in accordance with a note on UE&C drawing M300228, SH. C-22 (Revision 2) depicting the details for mounting electrical boxes on concrete. However, unlike the drawing's pictorial representation for the anchor bolt location, the field mounted bolts had been placed such that the box loads were attached to unanchored, cantilever extensions of the strut material. The unacceptability of this method of mounting was confirmed with QA and engineering personnel.

Discussion with the responsible FBM foreman indicated his belief that the subject boxes had been mounted in accordance with the given criteria. Although these box installations had not yet been QC inspected, the inspector was not provided any assurances that inspection to the criteria provided by the mounting details would have identified the deficient condition. The inspector informed the licensee Site Manager, Field QA Manager and Project Engineer during exit interviews on June 18, 1981 and June 26, 1981

that the failure to install properly supported electrical boxes within containment represented a noncompliance with regard to 10CFR50, Appendix B, Criterion V (443/81-07-03).

Subsequent to the identification of this noncompliance by the inspector, the licensee took action in the form of Interim Change Approvals (ICAs) 23/0012B and 23/0016A to clarify the subject drawing details to avoid both positioning of the Hilti anchors such that strut cantilever extensions greater than 6" exist and attachment of any loads to these extensions. These changes in conjunction with a documented requirement to reinspect all installed boxes to the new criteria represent corrective action commensurate with the noncompliance. The inspector determined upon review of the above documentation and interviews with licensee QA, UE&C engineering, and FBM QC personnel that full compliance with Appendix B in this regard was achieved on June 26, 1981 and he has no further questions on this issue.

11. Part 21 Report Follow-up (Units 1 and 2)

During 1980, Colt Industries reported two Part 21 deficiencies on their emergency diesel generators (DG) relative to failure of the crankshaft thrust bearing for inadequate clearance and omission of plugs in the oil supply system. During this inspection, the inspector verified, through discussion with QA personnel and review of Colt inspection reports, that corrective action to insure both proper thrust bearing clearance and oil supply has been accomplished on the two diesel generators currently in place in the Unit 1 DG building.

While the two diesel generators in storage on site and intended for installation in Unit 2 have not yet received inspection and repair, if necessary, the inspector confirmed that these items are noted as open on the licensee "Future Verification Items" list dated May 27, 1981. This list was established to track Part 21 and other long term follow items by means of formal documented mechanism, as was committed to and discussed in the NRC 80-07 inspection report.

The noted inspection and repair corrective actions and the introduction of the subject Part 21 DG issues into a formal licensee follow-up program provide sufficient assurance not only that the technical concerns relative to the diesel generators have been addressed, but also that the licensee is adequately tracking such items to complete resolution. The inspector has no further questions and considers these Part 21 issues closed at Seabrook Station.

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraph 8.

13. 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.