

U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-443/83-01
50-444/83-01

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: January 17-21, 1983

Inspectors: Samuel D. Reynolds Jr. 2/15/83
S. D. Reynolds Jr. Lead Reactor Engineer date

Approved by: J. Durr 2/17/83
J. Durr, Chief, Materials and Processes Section date

Inspection Summary: Unit 1 Inspection on January 17-21, 1983 (Report No. 50-443/83-01)

Areas Inspected: Routine, unannounced inspection by a regionally based Lead Reactor Engineer of work activities, procedures and records relative to pipe support installation. The inspection was also conducted in conjunction with NRC Office of Investigations Region I Investigation Number 1-83-001 to evaluate the technical significance of allegations concerning welding aspects of hanger (supports) fabrication. The technical areas of concern were return end (boxing) welding, and welding on the radius between web and flanges, for NF Class 2 hanger welds. These and other areas are addressed in the inspection report. The inspector also reviewed licensee action on previously identified items and performed plant inspection-tours. The inspection involved 37.0 inspector-hours, including 5 off-shift hours, and 8 hours at regional headquarters by the NRC inspector.

Results: No violations were identified.

DETAILS

1. PERSONS CONTACTED

YANKEE ATOMIC ELECTRIC COMPANY (YAEC)

*J. Singleton, Const. Field QA Manager
R. Tucker, SB lead Mechanical Engineer
*S. Sadosky, Const. Field QA Engineer
J. Herrin, Site Manager (PSNH)
C. Moynihan, Const. Field QA
*R. Julian, Const. QA Engineer
*G. McDonald, Const. QA Manager
*R. Boyle, Const. Field QA Engineer
*B. Mizzan, Field QA Engineer
*R. Guillette, Const. Field QA Engineer
*W. Middleton, QA Supervisor

UNITED ENGINEERS AND CONSTRUCTORS (UE&C)

*D. Lambert, Field Supt. QA
*R. Kourtz, Welding Superintendent
T. Frole, Welding Engineer

PULLMAN HIGGINS (P-H)

R. Davis, Field QA Manager
R. Donald, Assistant Field QA Manager
J. Godfrey, QC Inspector
J. Braun, QA Supervisor
D. Hunt, QA Supervisor Documentation Control
C. Steere, Welder
D. McLemore, Pipe Support Engineer
R. Dube, Pipe Support Engineer
A. VanPatten, Welding Foreman
D. Turgeon, Welder

2. Licensee Action on Previously Identified Items

(Closed) Violation (442/82-06-06) This violation concerned the failure of the P-H system to adequately provide "directions to the welder" as required by ASME Section IX QW100.1 and QW200.1(a) and Section III NA-4133.9. Training has been conducted on the variables in the applicable Welding Procedure Specifications (WPS) and is now an ongoing process. The inspector reviewed the applicable classroom training records. This item is closed.

(Closed) Unresolved Item (443/82-06-08) This item concerns the lack of an adequate UE&C document stating their explicit limiting controls to inhibit sensitization. UE&C Document WEJ-2 Rev. 0 dated January 10, 1982 has been reviewed and meets the intent of R.G.1.44. This item is closed.

*"denotes attendees at exit meeting"

3. Allegations of Hanger Welding Deficiencies

Information which had been received by Region I and which is under investigation by NRC Region I Office of Investigations included allegations of the following deficiencies in hanger welding.

- a. Welding around the radius of a wide flange in conflict to P-H JS-IX-6 paragraph 7.3.11B.
- b. The use of a support repair order (SRO) rather than a nonconformance report (NCR) for repair of a weld that had been signed off on the field weld process sheet. Although not stated as such, the allegor indicates there should be understandable definition of what constitutes "in process repairs" and "final inspections" with regard to hanger erection.
- c. Clarification of the weld size required for the length of fillet welds in excess of minimum length requirement stated on drawings.
- d. Procedural methods where "voiding" an NCR is permissible.
- e. Lack of return end (boxing)

The technical significance of the allegations were addressed as discussed in Section 4.

4. Hanger Welding Inspection (Related to Allegations)

- a. The NRC inspector discussed with the licensee and P-H the specification requirement to prohibit welding in the radius between web and flange stated in JS-IX-6 paragraph 7.3.11B. The technical justification for this prohibition is unclear. The inspector also discussed the technical merits of this prohibition with the NRR representative on American Society for Mechanical Engineers, Boiler and Pressure Vessel Code Section III, NF (SCIII, NF) and with the American Welding Society (AWS) staff expert on D1.1. There is apparently no "Codes and Standards" justification or technical justification to prohibit welding in the radius. The licensee indicated that P-H will revise paragraph 7.3.11B as follows:

Weld symbols pointing to the side of a member, without a length note, shall be welded the full length of that side. If the side has a transition (radius) portion welding is not required (nor is it prohibited).

As the licensee has committed to correct this technically ambiguous requirement, this item is not considered to be an unresolved item.

- b. A meeting was held on January 20, 1983 with the licensee to discuss ambiguities in interpretation of P-H procedure VI-4 paragraph 8 and the proper definition of "final inspection" of a specific weld on a safety-related hanger or support. Representatives of YAEC QA, P-H QA, PSNH Construction and UE and C construction were present for the meeting. The licensee indicated that his interpretation of the current system was that the field weld process sheet inspection was the final inspection of a specific weld on a support. The inspector concurs with this interpretation which would not permit "in process repairs" following the sign off on the field weld process sheet; however, there is not a clear interpretation on the part of P-H and UE&C to disallow "in process repairs" following the weld inspection. The NRC inspector acknowledged that a major revision of P-H JS-IX-6 was under way at this time, which may impact on this question. ECA 25037A, which addresses the lack of return end welds due to a deficiency in UE&C engineering specification and requires reinspection and rewelding, also affected the "in process rework" question. This item will be considered an unresolved item pending written clarification of what constitutes "final" inspection. (UNR 443/83-01-01)
- c. The NRC inspector requested clarification of the size requirements for hanger and support fillet welds that exceeded the length specified on the drawing. The licensee, UE&C and P-H concurred that if the fillet size was adequate for the minimum length specified that the fillet size at the extremities in excess of the minimum length need not be full size and would be of better quality if the weld size tapered in these areas. This interpretation meets ASME NF (XVII-2452.3(a)) and AWS D1.1 requirements.
- d. The NRC inspector raised a question on the practice of voiding NCR documents. The licensee indicated that this question had previously been initiated by YAEC and was adequately addressed in ECA 100105B dated (issued) December 17, 1982. The inspector reviewed the subject ECA and concurred with the reply.
- e. The NRC inspector reviewed the return end (or boxing) requirements of ASME Section III NF and AWS D1.1 and discussed the technical intent of these requirements with the NRR ASME Section III NF representative and the AWS Staff expert on D1.1. The function of the return end welds is to prevent premature tearing of the ends of fillet weld under ultimate failure conditions (as discussed in paragraph 8.8.6 of the Commentary Section of the 1980 D1.1 document.) The loading conditions may negate the technical requirements for many return end welds. The 2X minimum length requirement is secondary in technical importance to the existence of the weld end corner closure. UE&C did not initially recognize the return end weld requirement in their specifications and Engineering Change Authorization (ECA) 250372A was written on February 27, 1981 to address this question based on a Request for Information (RFI) initiated by YAEC. The ECA

required that inspection be made of all P-H field welds and shop welds and additional weld be added if required. All future field welds are to be made with return welds (where applicable). The licensee indicated that consideration may be given to an engineering evaluation calling for return end repair welds on an "as required" basis based on loading conditions (directions) rather than 100% of all fillet welds on supports identified by the subject ECA. This could minimize additional quality problems associated with repair welding.

The technical significance of the above areas of concern of hanger fabrication has been addressed in this inspection report by inspections conducted without direct or indirect reference to the existence of the allegation. The allegor identified areas which were confirmed as being not addressed in an explicit manner which lead to specification or procedural ambiguities. The inspection indicated that some of these areas were under review prior to the time of allegation. As a result of ECA 250372A (dated February 27, 1981) resulting from an RFI initiated by the licensee, all support fillet welds are required to be reinspected for return end welds.

No violations were identified.

5. Hanger Inspection (Unrelated to Allegations)

- a. The NRC inspector visually inspected and observed welding on support 797SG05 which contains 549 welds. The welds inspected met acceptance criteria. Welds FW155, 156, and 157 were classified as "limited accessibility" and were specially noted as such on the field weld process sheet. Welding of these joints was conducted by one of the roving welding Foreman (who are more highly qualified than the average welder). These joints had not been cleaned for inspection or inspected. The NRC inspector reviewed the FSAR commitment to R.G.1.71 and requested clarification of what additional inspection or special welding techniques would be used to inspect FW 155, 156, and 157 to satisfy the FSAR commitment to "thoroughly NDE all limited accessibility areas". The inspector acknowledged that the FSAR commitment did not require generic limited accessibility welder performance qualification, but did require addressing each case individually. The licensee committed to address this subject and it will not be classified as an unresolved item.

During the inspection of the subject hanger, it was observed that most of the welding was being performed with 3/32" diameter electrodes. When asked why so much fillet welding with 3/32" electrodes was being performed on structural members (some of which were considerable heat sinks), the welders stated that the undercut requirement of 0.010 inch maximum limited the use of larger electrodes. The requirement for 0.010 inch undercut comes from an AWS D1.1 requirement (e.g., paragraphs 3.6.4 and 9.25.1.5) which is intended to limit stress concentrators (undercut) on transverse welds on flanges with a flange face in tension (transverse to primary tensile stress).

The 0.010 inch undercut limitation is not incorporated in ASME Section III NF. The inspector asked the licensee if the excessive use of 3/32" diameter electrodes on fillet welds with relatively high heat sinks could result in higher HAZ hardnesses, could promote lack of fusion defects, and could result in cracked welds where the joint is in a high level of restraint or bending stress. These technical concerns come from review of the D1.1 document (paragraph 2.7.1), ASME Section III NF document and discussions with technical experts in the field. Section III NF limits undercut to 1/32" maximum and AWS D1.1 limits undercut to 0.010 inch only where the weld is transverse to the primary tensile stress. The licensee is asked to address the potential for increased metallurgical and welding defects caused by the excessive use of low heat input electrodes. This item is considered unresolved pending a technical evaluation by the licensee and review of this evaluation by the NRC. (UNR 443/83-01-02).

- b. The NRC inspector discussed with the licensee and UE&C personnel the practice of requesting interpretations of AWS D1.1 directly from Dr. M. Davis (AWS Staff) (e.g., UE&C letter dated August 23, 1982). The AWS is currently developing a policy requiring a consensus (committee) answer to interpretative inquiries.

Direct answers will no longer be given by Dr. Davis unless the question resulted from incomplete reading of the existing documents.

No violations were identified.

6. 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 4 and 5.

7. Exit Interview

The NRC inspector met with the licensee's representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 21, 1983. The inspector summarized the findings of the inspection. The licensee acknowledged the inspectors comments.