U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-443/84-04
50-444/84-02

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: March 13 - May 7,1984

Inspectors: A C Cerne — A.C.Cerne, Sr. Resident Inspector — 5/15/84 date signed

H. M. Wescott — H.M.Wescott, Resident Inspector — 5/15/84 date signed

J C Beall — J.Beall, Project Engineer — 5/16/84 date signed

J C Beall for — J.M.Grant, Reactor Engineer — 5/16/84 date signed

Approved by: Robert M Gallo — R.M.Gallo, Chief, Projects Section 2A, Division of Project and Resident Programs — 5/21/84 date signed

Inspection Summary:
Unit 1 Inspection on March 13-May 7,1984 (Combined Report No.50-443/84-04 & 50-444/84-02)
Areas Inspected: Routine inspection by resident and regional inspectors of work activities, procedures,and records relative to diesel generator testing activities;main control board modification controls;Refueling Water Storage Tank erection records;pressurizer relief valve and associated piping installation;other piping and pipe support erection;the issuance of new UE&C Instrumentation and Control procedures;and general housekeeping and storage of equipment and material. The inspectors also reviewed licensee corrective actions on previously identified items and performed plant inspection-tours. The inspection involved 268 inspection-hours,including 27 off-shift hours,of Unit 1 activities and 19 inspection hours of Unit 2 activities.
Results: One violation(Unit 1) was identified in the diesel generator testing area where an inadequate design and inspection of the diesel generator exhaust silencer installation resulted in the damage to the component support pedestals during in-progress testing.

The requirement to treat the diesel generator exhaust system as a safety-related system, even though ANSI B31.1 standard criteria were accepted for design and manufacture (Reference: SER Section 9.5.8, NUREG-0896), was first identified as a potential NRC concern in May,1983 (Inspection Report 83-06, paragraph 5a). NRC open item 83-05-02 generically tracked the licensee corrective action. The violation identified during this current inspection raises an additional concern that corrective action was applied in too narrow a scope to the originally identified concern (ie: piping and welding were covered under a new B31.1 upgraded inspection program, but component installation was not). Thus an additional review of the adequacy of the upgraded B31.1 program appears warranted.

DETAILS

1. Persons Contacted

P. B. Bohan, Turnover Manager, Public Service Company of New Hampshire (PSNH)
R. H. Bryans, Site Engineering Manager, United Engineers & Constructors (UE&C)
J. DeVincentis, Project Engineering Manager, Yankee Atomic Electric Company (YAEC)
J. J. Gramsammer, Project Engineering Manager (UE&C)
W. P. Johnson, Vice President (PSNH)
D. C. Lambert, Field Superintendent of QA (UE&C)
D. A. Maidrand, Assistant Project Manager (YAEC)
G. F. McDonald, Construction QA Manager (YAEC)
D. E. McGarrigan, Manager - Project QA (UE&C)
D. G. McLain, Startup Manager (PSNH)

Interviews and discussions with other members of the licensee and contractors' staff and management were also conducted relative to the inspection items documented in this report.

2. Plant Inspection-Tours (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 examined the in-process installation of certain cable tray supports for the cable to the control rod drive mechanisms on the RPV head. Design drawing details were spot-checked against installed conditions and field engineers, QC personnel, and welders were interviewed to determine the adequacy of in-process controls. The inspector questioned one noted variance from a specific design detail (drawing F310682, Detail T) and was informed of an Engineering Change Authorization (ECA 03/3401A) currently in-process, which would substantiate the acceptability of the noted field condition. The inspector reviewed the ECA and discussed with licensee QA personnel a concern regarding the conduct of work and QC acceptance of same to certain design criteria which had not yet been approved. A Fischbach nonconformance report (FBM-737) and inspection report (IR-38-187) were initiated. This issue was also documented as a deficiency in YAEC Audit Report SA825CS353, since a YAEC audit of Fischbach was in-progress concurrently at the time of the NRC inspector's identification of the design discrepancy. The inspector reviewed the recommendation for corrective action included in the Audit Report and has no further questions on this item.

The inspector also questioned the acceptability of some 13.8 Kv. associated cable runs from nonessential switchgear (ED-SWG-1 and 2) to the potential transformer compartments in the vital 4160 volt switchgear (EDE-SWG-5 and 6). The interconnection of these "B" train associated cables (A05-A64, A20-A65, A24-A66, A09-A70) with "A" train and "C" and "D" channel equipment appeared to violate the FSAR commitments and redundant division separation requirements

of Regulatory Guide 1.75 and IEEE-384. In response to a Request for Additional Information (RAI 430.44), the licensee had already documented this deviation in a letter to NRR (SBN-587), dated December 1,1983. The inspector reviewed the licensee analysis and evaluation and discussed it with the responsible NRR reviewer. Electrical one-line diagrams, F310004 and F310005, were examined,as was the NRC Safety Evaluation Report (SER) and it was noted that a Confirmatory Action Item (No.27) is still open regarding associated circuits at Seabrook. The inspector confirmed with the NRR reviewer that the subject deviation would receive the requisite licensing evaluation in conjunction with the resolution of NRR's Confirmatory Issues.

The inspector observed the testing of Hilti Kwik-bolts performed by factory representatives. Specifically, the inspector observed the setting of two 3/4" concrete anchor bolts embedded to a depth of approximately 7", at an angle of 45° to verify that the cones of influence did not interact. The tension pressure to pullout was approximately 17,000 psi. Test data and the resulting report will be reviewed, when available, to confirm the adequacy of Hilti bolt corner configurations and thus resolve, in part, NRC open item 82-03-07.

The inspector observed the hydraulic expansion of steam generator tubes to tubesheet, performed as a result of a Westinghouse Field Deficiency Report No.NAHM-10084 in accordance with Westinghouse Service Division Field Procedure No.FSP-FP-060, Revision 2. He also witnessed portions of the preservice inspection (PSI) of the RPV welds by remote Ultrasonic (UT) examination. Shift manning levels, during both regular and off-shift periods, were spot-checked and technicians were interviewed regarding the level of ASNT certification of the NDE personnel, recording and interpretation techniques, and the transducer, sound entry-path angles.

Reconduct of the pump performance head curve verification tests for Cooling Tower Unit 1 pump SW-P-110B, in conjunction with Preoperational Tests 1-PT-15.6 and 15.7 was noted. The tests had to be repeated after Unit 2 pump components were substituted for the original Unit 1 "B" pump because of a bent shaft problem. The inspector also verified that damage to a service water expansion joint (1-SW-EP-45) for piping to pump, SW-P-41D, had been identified by the start-up staff and a nonconformance report (NCR5627) was initiated for rework.

The following items, raised as potentially generic problems on the diesel generators supplied by Colt, and identified as applicable to other construction sites, were evaluated for applicability at Seabrook with the following results:

-- deficiency with check valves in the jacket water cooling system supplied by GPE Controls: subject check valves on the Seabrook diesel generators were supplied by TRW Mission Manufacturing Company.

-- failure of fuel oil filter differential pressure switches supplied by United Electric Controls Company: subject differential pressure switches on the Seabrook diesel generators are not the potentially problematic model.

The inspector was informed of new developments on issues which were discussed in earlier inspection reports. This has resulted in reopening two items which will be formally tracked to corrective action and closure, as follows:

(1) Inspection Report 443/83-22, paragraph 2 - question of pipe support design consideration of differential movement where connected across expansion - jointed structural steel members: This item was reported as a potential 10CFR50.55(e) design deficiency on April 5,1984 and will be tracked by open item, CDR 84-00-06.

(2) Inspection Report 443/84-01, paragraph 5 - closure of IE Bulletin 80-05 was based upon a new design which added a vacuum breaker to the Resin Sluice Tank and a pressure regulating valve to the Primary Drain Tank with two cover gas supply line valves locked open.

Based upon additional IE interest in Bulletin 80-05 closeout, the licensee was requested to evaluate the following items for compliance:

-- The vacuum breaker is covered by a surveillance program.

-- System design has been evaluated to ensure that cover gas can be admitted fast enough to keep up with the maximum rate of liquid removal from the volume control tanks.

-- Locked open valves are protected by means of permanent warning signs.

These issues will be tracked as an open item 80-BU-5A.

On April 18,1984 Public Service Company of New Hampshire announced a temporary suspension of Seabrook Station construction. With approximately 1,000 workers at the site, work has been limited to such activities as site security, preventive maintenance, QA/QC verification and records control, limited engineering, preoperational testing, and limited contract work. Since the suspension of work, the inspectors have routinely checked such areas as access control, records availability, material control and security, and QA/QC coverage of existing work. Discussions have been held with licensee management to verify adequate coverage of those limited activities in-progress and consideration of the QA, training, and support priorities required when the construction force is remobilized.

With regard to all of the above independent inspection areas and plant inspection-tours, no violations were identified.

3. Licensee Action on Previously Identified Items

a. (Closed) Unresolved item (443/83-06-01): Reactor Trip Switchgear qualification to account for welded mounting and use of stud welds for center support. Both ECA 03,'1022C and its incorporation into drawing F300208 authorize the noted revised mounting details to include welding and the use of studs. The inspector reviewed a Westinghouse Report, "Seismic Confirmation of Welded-Base Reactor Trip Switchgear and Static Invester for Seabrook Units 1 and 2 Application", and Westinghouse file letters, NAH-144 and NAH-2.2.277. These documents indicate that Westinghouse has performed an evaluation of welding vs. bolting for several

cabinet mounting applications and substantiate the position that the equipment qualification remains valid for the revised mounting design, to include the use of the 3/8" diameter stud welds.

b. (Closed) Violations (443/83-07-01 and 02): RPV internals work did not match Process Control Sheet (PCS) requirements and a supplemental sheet was not issued as required. Licensee correspondence indicated that an engineering change had been issued to authorize the work in progress. Since the current PCS had not been revised to reflect the new design, the discrepancies were identified and noted as the above violations. The licensee stated that the errors were corrected immediately and the applicable contractor (NISCO) initiated a Stop Work Order (4031-001) to implement longer term QA program corrective action.

The inspector reviewed Revision "B" to Process Control Sheet 4031-28-61, dated 5/26/83, and verified both that the questioned fillet weld procedure (WPS 80.2.3) had been specified and that NISCO Specification ES147 had been complied with by the issuance of the revised PCS. This item is closed.

c. (Closed) Violation (443/83-07-03): Inadequate controls of environmental conditions to protect NSSS equipment. The inspector reviewed YAEC's surveillance Report File No.02.2.6.22.4805, Deficiency (1330), stating that work was immediately stopped (Reference: Stop Work Order 4031-001). Work resumed after cleanliness conditions were met. The licensee stated that increased YAEC surveillance and NISCO retraining, in addition to the Stop Work Order, were also considered part of the corrective action.

d. (Closed) Unresolved Item (443/83-07-04): The PCS did not provide for documentation to verify that proper orientation of each lower control rod guide tube. The inspector reviewed documentation indicating that NISCO had revised procedure No.4031-PSCNH-17, dated 5/26/83. Also, attachment D to PCS No.4031-43B now requires sign-off by QC to verify that guide tube orientation is 90°. This unresolved item is considered to be closed.

e. (Closed) Violation (443/83-13-01) and Unresolved Items (443/83-12-03 and 443/83-15-02): Design Change program control problems. The licensee initiated several corrective action tasks,as follows, to define and better control design changes, particularly those accomplished by means of On-the-Spot (OTS) Engineering Change Authorizations (ECA).

-- Revised UE&C Administrative Procedure (AP-15) on 3/2/84 (Revision 20) to better define major/minor and generic/specific ECAs and the controls, including design concurrence, for each.

-- Conducted formal training for UE&C site engineering personnel on the changes and requirements of AP-15 (Revision 20).

-- Conducted a review of over 200 ECAs which might require contractor rework activity to establish confidence that such rework is being adequately performed.

-- Established a program for all site contractors to review generic design changes for impact upon previously completed work.

The inspector reviewed licensee records, documenting the above corrective actions, and discussed implementation of program changes with QA personnel. Specifically with regard to the violation, it was noted that the problematic design change (ECA 19/1591) was subsequently voided and a nonconformance report (NCR 4925) initiated to disposition the technical concern.

The inspector has no further questions on corrective actions, to date, on the design change control program, and considers the above items to be closed.

f. (Closed) Violation (443/83-15-01): Failure to consider the suitability of a specific welding process to all applications. The inspector reviewed UE&C memoranda (MM 16733A and SM 7454A) and licensee corrective actions on this issue, as follows:

-- re-examination of the accessible, subject knife-plate production welds with the identification of no lamellar tearing

-- re-issuance of ECA 25/2573B to control maximum plate thickness and the degree of restraint provided by the length of return welds

-- re-evaluation of contractor welding procedures to provide for a visual inspection requirement 48 hours after welding, bead sequencing, and consideration of preheat

The inspector considers the above good welding practices and re-inspections commensurate with the severity of the original lamellar tearing issue. Alternate clip angle (ie: knife-plate) connections, installed in consideration of the more rigorous controls which have been established, have been adequately addressed from the standpoint of both proper design control measure applicability and technical acceptability. This item is closed.

g. (Closed) Construction Deficiency Report (CDR/50.55(e)): Refueling Water Storage Tank (RWST) design deficiency. Based upon supporting documentation in licensee correspondence (SB-6830, SBP-83-375, CQA-SB-84-004) and Pittsburgh-Des Moines drawings (eg: Foreign Print, FP-52337) for the RWST, the design change which increased the tank volume from 375,000 gallon to 475,000 gallon capacity was verified to meet the design basis requirements. The inspector also noted consideration of the requirement to also increase proportionately the size of the Spray Additive Tank (SAT) to provide the correct amount of sodium hydroxide solution for pH control during and after Containment Spray activation. This CDR is considered closed.

4. Refueling Water Storage Tank Erection (Unit 1)

A regional inspector reviewed quality records for the Refueling Water Storage Tank (RWST) for completeness, control and status. At the time of inspection, all work contracted out to Pittsburgh-Des Moines Co. (PDM) for construction of the RWST had been completed and the RWST document package had been turned over to the licensee. The inspector reviewed both the hard copy package turned over by PDM and the microfiche file kept by the licensee in Document Control. Both contained the same documents, i.e., material and performance reports, NDE test reports, receipt inspection reports and specifications.

From the PDM drawings the inspector selected four weld seams (5V2, 3H3, P13, P24), reviewed applicable NDE requirements and verified that all required NDE had been performed for the four welds. NDE records were complete.

The inspector also reviewed the most recent licensee audits and surveillances (SA761CS300, SA757CS297, SA745CS288, ST720CS273) on PDM's RWST work activities. The scope and results were clearly defined. Audits and surveillances were performed by YAEC auditors. Follow-up action was required for only one audit and had been sent to PDM for reply. The inspector identified no discrepancies.

The inspector also reviewed the records system for PDM welder qualification. Records of qualification for five welders were reviewed and found to be adequate in that all five welders' records were in order and indicated each was qualified to perform the required welding on the RWST.

Based on the above review, the inspector found that PDM had an adequate system for maintaining records and documenting safety-related work activities on the RWST.

No violations were identified. However, examination of the as-built condition of the RWST in the field, conducted in conjunction with a regional/resident inspection-tour, resulted in the following unresolved item.

The inspectors noted the two 14" piping lines (CBS-1201 and 1202) exiting the RWST as suction for containment spray, residual heat removal, and safety injection pumps located in the equipment vault section of the Primary Auxiliary Building. Each line provides for flow to one of the two redundant ECCS trains. Discussion with engineering personnel revealed that pipe nozzle loading for each line was the same; however, the design details for the 1201 line (assembly "G") illustrated a reinforced nozzle with stiffener plates while the 1202 line (assembly "F") had no reinforcing or stiffening.

YAEC Blue Sheet 67 was issued to request an engineering evaluation of this apparent inconsistency. Pending engineering disposition and the presentation of data to the NRC, justifying the acceptability of the present configurations, this item is considered unresolved (443/84-04-01).

5. Pressurizer Piping, Valves, and Monitors (Unit 1)

The inspector examined in-process piping installation, and as-built valve and support conditions, for the two power operated relief valves (PORV), their corresponding block valves, and the three code safety valves venting the pressurizer steam space. The structural steel assembly, providing support for the valves on top of the pressurizer, was spot-checked against the design details (eg: F104059, F104010, F104011). Specification boundaries in the piping lines discriminating the ASME safety-related components from the nonsafety Seismic Category I (NNS-1) piping to the pressurizer relief tank were checked against FSAR commitments.

The Seabrook SER, Section 7.5.2.6, was reviewed and commitments regarding the placement of surface-mounted acoustic monitors on the safety valve discharge line and surface-mounted temperature elements (RTDs) on the PORV discharge line were verified thru the review of applicable drawings (M506316, D800074,75 and 76 and Foreign Print 53289).

The inspector specifically witnessed a weld repair operation (RC-80-07, weld F0704) in-progress; verified redesign of a socket weld connection to line RC-80-01 by checking control of the plug welding, cutting process, specified NDE, and Welding Procedure Specification applicability (reference: Pullman NCR 6184); and examined the as-built configuration of Class 1 pipe support, 80-SG-6, to the design details of drawing M8000805 (Sheets 8, 8a, 8b, and 8C).

With regard to FSAR commitments (Section 5.2.6.2), the response to NRR Request for Additional Information (RAI 440.134), and existing design, in-process, and as-built conditions, as noted above, no violations were identified.

6. Observation of Emergency Diesel Generator (EDG) Initial Testing (Unit 1)

The inspector reviewed the EDG start-up procedures and checklist, and observed the initial start-up of the Unit 1, "A" train EDG at idle speed, synchronous speed, initial generator loading and full loading. Several incomplete items/problems were noted by licensee representatives and are being tracked for corrective action.

Regarding the design of the EDG exhaust silencer forward sliding joint, the inspector determined that the clearances specified between the hold-down anchor bolt nuts and the shoe plate side rails were insufficient to allow for thermal expansion in the sliding joint. As a result, the sliding joint seized during testing, causing damage to both the forward and rear concrete mounting pedestals due to thermal growth of the silencer. Further inspection established that the work accomplished under ECA No. 73/5610A was identified by the ECA as safety-related. However, inspections required by 10 CFR 50, Appendix B had not been performed contrary to the commitment documented in Section 9.5.8 of the Seabrook SER.

The inspector considers the EDG exhaust silencer design problem and inspection omission to be a violation of 10 CFR 50, Appendix B, Criteria III and X (443/84-04-02).

The inspector also observed the full load testing of the Unit 1, "B" train EDG. The problems noted by licensee representatives are also being tracked (reference: Emergency Diesel Generator Testing Program Report, STD 84-233) in conjunction with the "A" train open items.

7. Supports, Whip Restraints & Snubber Assemblies for Piping (Unit 1)

The inspector examined the following different types of pipe support assemblies, either as-built or during the erection process, and compared the field conditions with the design drawing details:

-- ASME Support 1304-RG-44
-- NNS-1 Support 4626-RG-6
-- Whip Restraint PWO-4003-1
-- Spring Can 4606-SC-9A
-- Snubber Support Assemblies 7100-19, -20, -41

Field Weld Process Sheets, ECAs, Weld Rod Stores Requisitions, and supplier fabrication details were reviewed, as available and applicable, to confirm

proper installation controls and erection. Pullman procedure JS-IX-6 (Revision 11) was reviewed for specific installation requirements.

While no violations were identified, the following issues remain unresolved pending licensee clarification of their position with regard to the acceptability of the noted erection practices:

(1) The inspector noted on 3/24/84 in-process welding on certain field fillet welds on support 1304-RG-44 for which the tack welds and root passes had been installed on 7/25/83. No formal inspection of the tack/root welds had been accomplished, other than welder examination, prior to weld-out. While the licensee has recently committed to Code Case N-302 (endorsed by USNRC Regulatory Guide 1.84), which allows the welder to check fit-up and tack, the inspector questioned the advisability of incorporating a root pass (ie: a bead which in effect represents an undersized fillet weld) into the final weld after an almost eight month delay without more rigorous inspection. Since the applicable Pullman procedure, JS-IX-6, does not specifically address such conditions, YAEC Blue Sheet 69 was initiated to ascertain the acceptability of such installation from the standpoint of good welding practice (443/84-04-03).

(2) The inspector noted partially installed assemblies for the snubbers associated with the Steam Generator upper lateral supports. The structural pieces had been shimmed and torqued into position, but not yet grouted. The inspector noted the absence of plate washers over the long-slotted holes in the assembly. Since an earlier, similar question (reference: unresolved item 81-05-03) had been raised on the jurisdictional boundary and applicable code requirements for the regenerative heat exchanger, the inspector researched the resolution of that question (closed in the 81-12 Report). At that time it was determined that "the regenerative heat exchanger and any other potentially affected ASME Section III items which are supported by noncode anchor bolts, have been considered with regard to design torque and NF bolting requirements and installed accordingly."

Since the installation of plate washers over long-slotted holes (per NF-4720) is an ASME Component Support code requirement, the inspector questions whether the Steam Generator upper lateral supports (detailed on Foreign Print, FP50575) have been designed and installed with regard to all the relevant NF criteria. This remains an unresolved item (443/84-04-04).

8. Main Control Board Wiring & Terminations (Unit 1)

The inspector reviewed the licensee program for making modifications to the main control board. Currently there are two groups of ECA's, one group originated by UE&C home office in Philadelphia and the other initiated by on-site personnel. The site-originated ECA's are used to make changes to the home office ECA's without reissuing them. Startup Test Department (STD) work requests are used to ask the electrical contractor (FBM) to make the hardware changes using FBM Procedure FEP-205, which was reviewed by the inspector.

Three modification packages in use (Field Modifications 254,294 and 305) were reviewed by the inspector. The inspector noted inconsistencies in drawing revision numbers in the last two packages. In both cases the technician was using the latest revision while the associated work request and other materials referenced various earlier revisions. A review of the STD Test Program Instruction (TPI-11, Revision 6) revealed specific instructions "not" to include the ECA revision on the Work Request to avoid the confusion noted above. The inspector did verify that when work is performed to an ECA, the specific revision is documented on the work package to provide a record of the precise design which was implemented.

Since the intent of the work request program is to accomplish the work to the latest design and the records reflect the design to which the work was done, the inspector has no further questions on this issue.

No violations were identified.

9. Review of UE&C,I&C Procedures

The inspector reviewed the new UE&C Instrumentation & Control (I&C) QA program procedures, governing training and indoctrination, weld material control, welder and welding procedure qualification, document control, ordered items from storage, identification and control of items, area interfacing, weld inspection, NDE testing, and general welding requirements. The UE&C I&C program was initiated to replace the Johnson Controls (JCI) program in effect until 3/8/84, when a stop work order on all JCI work was issued. UE&C procedural issuance under the new program is approximately fifty percent complete.

No violations were identified.

10. Housekeeping and Material Storage

The inspector performed an inspection tour of housekeeping and material storage in Units 1 and 2. Installed cable tray in the cable spreading area appeared clean and incomplete,cable pulls were neatly coiled. Classes of ASME valves and fittings were properly segregated. Laydown areas for structural material and piping have been roped off and material properly stacked. The Emergency Diesel Generators and the reactor head have been covered to prevent damage. A general clean-up of Units 1 and 2 and grounds was evident.

No violations were identified.

11. 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 7.

12. 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.