U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-443/83-14
50-444/83-11

Docket No. 50-443
50-444

License No. CPPR-135
CPPR-136 Priority -- Category B

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 15-19, 1983

Inspector: S. Richards, Reactor Engineer — date 10/5/83

Approved by: C. Anderson, Chief, Plant Systems Section — date 10/5/83

Inspection Summary: Inspection on August 15-19, 1983 (Combined Report No. 50-443/83-14 and 50-444/83-11)

Areas Inspected: Routine, unannounced inspection by a region-based inspector of procedures, work activities, and quality records related to the installation, routing, and termination of instrumentation and control cables. The inspection involved 34 inspector-hours onsite.

Results: One violation was identified for failure to properly inspect electrical terminations of small gauge conductors, Paragraph 3.

DETAILS

1. Persons Contacted

Yankee Atomic Electric Company (YAEC)

*F. Bean, Field Quality Assurance Engineer (FQAE)
*P. Bohan, Construction Manager (PSNH)
*J. Briasco, QAE
*G. McDonald, QA Manager
*W. Middleton, QA Supervisor
*W. Monteith, FQAE
*J. Singleton, Construction Field QA Manager
A. Wade, I&C Startup and Test Supervisor
T. Wiebold, Lead Auditor

United Engineers and Constructors (UE&C)

*J. Grusetskie, Engineering Manager Assistant
*D. Lambert, Field Superintendent - QA
*B. Pai, Electrical Engineer
R. Rose, Jr., Site Engineering

Fischbach-Boulos-Manzi (FBM)

M. D'Orsay, Document Control Supervisor
W. Heath, Lead Quality Control (QC) Inspector
D. Kester, Project Engineer
D. Manzi, Cable Engineer
P. Medeiros, Lead QC Inspector
J. Perkins, Training Specialist

*denotes attendees at the exit meeting on August 19, 1983.

2. Licensee Action on Previous Inspection Findings

(Open) Unresolved Item (443/83-03-01 and 444/83-03-01): Raceway cable fill may not meet FSAR commitments. The inspector discussed the capabilities of the licensee's computer cable routing system with on-site engineering personnel and determined that the system computes raceway fill for all raceways except "exposed paths," which are short wireways connecting tray sections at different elevations in a tray stack. Apparently the electrical contractor is responsible for calculating fill in these exposed paths, however the contractor maintained that an Engineering Charge Authorization (ECA) allowed the field to fill these exposed paths with as many cables as physically possible. The contractor was unable to produce the ECA before the end of the inspection. The inspector also reviewed an internal memorandum which identified instances where wireway

fill was as high as seven percent greater than that indicated by the computer system, possibly due to oversized cables. The memorandum addressed corrective action for wireways, however the inspector questioned whether similiar problems existed with trays and conduit. The licensee Quality Assurance group is closely following these and other concerns in the area of raceway fill. This item remains opens.

(Closed) Unresolved Item (443/83-03-02 and 444/83-03-02): Routing of safe shutdown cables. Once the safe shutdown cables are finalized, the licensee intends to suitably identify these cables on routing documents and then verify the actual cable routing to the design requirements for safe shutdown cables. The inspector discussed the requirements for routing of these cables with licensee personnel and concluded that the licensee action taken was appropriate. This item is closed.

(Closed) Unresolved Item (443/83-03-03 and 444/83-03-03): Comparison of actual cable length to scheduled cable length. The licensee has checked several cables at random and found that once terminated, the cable length is generally less than that predicted by their computer system. The length of cable pulled is apparently significantly longer because extra cable is normally coiled at each end of the cable to ensure adequate cable is available to properly terminate the circuit. The licensee is also committed in the FSAR to determining actual voltage losses during startup testing. This item is closed.

3. Instrumentation and Control Cable Installation

Installation of electric cable and wire at the Seabrook Station is controlled by Specification No. 9763-006-48-2, "General Electric Specification," UE&C Drawing 9763-M-300230, "Cable Notes and Details," and by the contractor's field construction and inspection procedures. The electrical contractor at the site is Fischbach-Boulos-Manzi (FBM). The inspector reviewed the various documents associated with electrical construction and discussed their content with representatives of the licensee and the contractor. The inspector then compared selected field installations with the program requirements.

While observing completed work, the inspector noted several resistors in the 7300 Series Protection Cabinets which were not connected directly to terminal points but rather were spliced to wires which were in turn terminated to a terminal board. The inspector questioned this arrangement because a splice or free air connection is normally not allowed under project specifications. The licensee determined that the resistors had been installed by the startup and test (SU/T) group to act as a temporary load on several circuits under their jurisdiction. SU/T procedure TPI-22, "Lifted Lead and Jumper Instruction," requires temporary jumpers to be indicated as such by a yellow tag. The jumpers were properly logged under Modification Number RC 382, however the yellow tags had not been placed on the jumpers when installed. The licensee immediately had the proper tags

placed on the jumpers. The inspector checked the control room area for other instances of lifted leads or jumpers not being properly identified and noted no other discrepancies. The inspector therefore concluded that the error in the identification of the resistors was an isolated case which was rapidly corrected.

The inspector checked the termination of instrument and control cables in the Unit 1 control room and vital switchgear area to ascertain whether proper crimping and landing of lugs was occurring. The following discrepancies were observed.

Node	Termination Point	Cable Identification	Problem
F-48	TS 65	B86-F48	Two lugs not landed back to back
F-37	TP 22	BL2-F37	Conductor strands not flush or extending beyond the lug barrel
F-71	TH 28	F71-GNO	
F-72	TE 28	AQ4-F72/2	
	TE 29	AQ4-F72/2	
	TE 30	AQ4-F72/2	
HR1	TB 51-6	A52-HR1	
	TB 51-10	A51-HR1	
GNO	TB 2-15	E88-GNO4	
F-36	TU 11	BB3-F36/1	Bad crimp
	TU 12	BB3-F36/1	

Of the eleven individual terminations, nine had been indicated as acceptable by QC as documented by a QC signature on the record copy of the termination slip. The terminations associated with cables A52-HR1 and A51-HR1 had been made during the week of the inspection and the termination slip had been issued to QC for inspection, however, the licensee was unable to determine whether QC had accepted the terminations by the close of the inspection. An FBM lead QC inspector concurred with the identification of the deficiencies and documented the various conditions on Inspection Report Nos. 25-077, 40-093, and 40-094. A review of the UE&C Wire Systems Notes and Typical Details and the QC Inspection Checklist for Cable Termination, FBM QC Procedure-505, Exhibit I, indicated that the deficiencies noted were specifically required to be checked by QC. The inspector informed the licensee that failure to adequately inspect the termination of the above listed safety-related cables was a violation of 10 CFR 50, Appendix B, Criterion X (443/83-14-01). The inspector had checked approximately 500 terminations and therefore felt that the deficiencies noted were not indicative of a programmatic breakdown, however, it did indicate that additional management and Quality Assurance involvement in the area may be warranted.

The inspector observed two cases where multiple conductors of a cable appeared to have been cut away from the termination lugs with the lugs left connected to the terminal board. The licensee determined that both cases were documented by rework notices and that the work to complete the rework was still in progress. The inspector reviewed rework notices #2497 and #2522, and concluded that the work was properly controlled.

Seven instrumentation and control cables were selected by the inspector and checked for proper identification, termination location, train separation and quality control inspection. The cables selected were associated with the Diesel Generator System, the Engineered Safeguard Features Actuation System, the Safety Injection System, and the Service Water System. No deficiencies were identified.

The inspector discussed the FBM program for terminating cable with the responsible personnel. UE&C determines the termination locations and supplies this information to FBM in the form of listings which are controlled as drawings. FBM in turn takes this information and uses a UE&C computer program to generate termination slips which are used by the field to perform the work. Of particular concern to the inspector was FBM's method for ensuring changes to the UE&C drawings are properly noted and conveyed to the field. FBM personnel explained how each revision of the UE&C termination list must be checked against the previous revision and how rework is conducted for completed work which later requires change. The inspector observed several examples of rework documentation and had no further questions.

Audits are performed by both an on-site group and an off-site group. The inspector discussed the conduct of audits with the personnel on-site. This group audits by criteria, not by specific area. The inspector was therefore unable to review documentation directed toward cable termination only. The on-site audit group has recently scheduled the most important construction procedures for specific auditing which include the electrical installation procedures, however these had not yet commenced. Surveillances are performed and documented for specific activities by the QA organization. The inspector reviewed four surveillances in the electrical area and observed that problems appeared to be adequately documented and a system existed to ensure followup action was effective when required. The licensee maintains a listing of open surveillance items which was reviewed by the inspector. Items covered on the list appeared to be broad in scope in that many facets of electrical construction were addressed although no items concerning electrical terminations were noted.

Training of FBM QC personnel is governed by FBM procedure QCP-104, "Quality Control Procedure for Training of QC Personnel." The inspector reviewed this procedure and discussed the program with an FBM Training Specialist. The training records of three QC inspectors were selected at random and checked for compliance with QCP-104 and ANSI N45.2.6. One inspector was noted to be overdue for an eye examination, however the

individual was scheduled to be examined the following day. The FBM Training Specialist stated that responsibility for scheduling of eye examinations had been shifted to the document control group because of previous problems and that the system now tracked inspector status more effectively. The inspector noted no further deficiencies with the records.

While inspecting field conditions, the inspector observed two cases where triplexed cables with #8 AWG conductor jackets colored red, white, and black were routed with the plant normal color coded cables. These instances existed in nodes F10 and F90 of the Unit 1 main control board. The cables had no identification tag and no visible means of identifying with which train they were associated. The inspector questioned these installations because one of the basic assumptions of the site's cable routing and train separation plan is that each cable may be readily identified as to its division by the color of the cable jacket and by the cable identification tag. The licensee determined that the cables were the permanent power feeds for the lighting system. They were installed under Engineering Change Authorization 542490B, which provided routing information to the field. The inspector noted that the Seabrook Final Safety Analysis Report, Section 8.3.1.4.f states that local lighting circuits will be enclosed in metal clad cable or rigid conduit. At the conclusion of the inspection, the licensee was still researching the acceptability of the two installations and the means by which they occurred. This item remains open pending further NRC review (443/83-14-02).

4. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, violations, or deviations. An unresolved item identified during this inspection is discussed in paragraph 3.

5. Exit Interview

The inspector met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection on August 19, 1983. The inspector summarized the scope and findings of the inspection. The NRC Senior Resident Inspector was cognizant of the findings, however, he was unable to attend the exit meeting due to committments of a higher priority. At no time during this inspection was written material provided to the licensee by the inspector.