



Public Service of New Hampshire

NEW HAMPSHIRE YANKEE DIVISION

SEABROOK STATION  
Engineering Office:  
1671 Worcester Road  
Framingham, Massachusetts 01701  
(617) - 872 - 8100

September 28, 1984

SBN- 718  
T.F. B4.2.7

United States Nuclear Regulatory Commission  
Region I  
631 Park Avenue  
King of Prussia, PA 19406

Attention: Mr. Richard W. Starostecki, Director  
Division of Project and Resident Programs

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket  
Nos. 50-443 and 50-444  
(b) USNRC Letter, dated August 29, 1984, "Construction  
Appraisal Team Inspection 50-443/84-07", R. W. Starostecki  
to R. J. Harrison

Subject: Response to Construction Appraisal Team Inspection 50-443/84-07

Dear Sir:

We have attached our responses to the violations reported in the subject inspection.

We plan to forward, in the near future, a response to your Executive Summary wherein you delineated "program weaknesses that imply management deficiencies".

Very truly yours,

John DeVincentis, Director  
Engineering and Licensing

Attachment

cc: Atomic Safety and Licensing Board Service List

Director, Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

8412170335 841211  
PDR ADOCK 05000443  
Q PDR

William S. Jordan, III  
Diane Curran  
Harmon, Weiss & Jordan  
20001 S Street N.W.  
Suite 430  
Washington, D.C. 20009

Robert G. Perlis  
Office of the Executive Legal Director  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Robert A. Backus, Esquire  
116 Lowell Street  
P.O. Box 516  
Manchester, NH 03105

Philip Ahrens, Esquire  
Assistant Attorney General  
Department of the Attorney General  
Augusta, ME 04333

Mr. John B. Tanzer  
Designated Representative of  
the Town of Hampton  
5 Morningside Drive  
Hampton, NH 03842

Roberta C. Pevear  
Designated Representative of  
the Town of Hampton Falls  
Drinkwater Road  
Hampton Falls, NH 03844

Mrs. Sandra Gavutis  
Designated Representative of  
the Town of Kensington  
RFD 1  
East Kingston, NH 03827

Jo Ann Shotwell, Esquire  
Assistant Attorney General  
Environmental Protection Bureau  
Department of the Attorney General  
One Ashburton Place, 19th Floor  
Boston, MA 02108

Senator Gordon J. Humphrey  
U.S. Senate  
Washington, DC 20510  
(Attn: Tom Burack)

Diana P. Randall  
70 Collins Street  
SEabrook, NH 03874

Donald E. Chick  
Town Manager  
Town of Exeter  
10 Front Street  
Exeter, NH 03833

Brentwood Board of Selectmen  
RED Dalton Road  
Brentwood, New Hampshire 03833

Edward F. Meany  
Designated Representative of  
the Town of Rye  
155 Washington Road  
Rye, NH 03870

Calvin A. Canney  
City Manager  
City Hall  
126 Daniel Street  
Portsmouth, NH 03801

Dana Bisbee, Esquire  
Assistant Attorney General  
Office of the Attorney General  
208 State House Annex  
Concord, NH 03301

Anne Verge, Chairperson  
Board of Selectmen  
Town Hall  
South Hampton, NH 03842

Patrick J. McKeon  
Selectmen's Office  
10 Central Road  
Rye, NH 03870

Carole F. Kagan, Esq.  
Atomic Safety and Licensing Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Angie Machiros  
Chairman of the Board of Selectmen  
Town of Newbury  
Newbury, MA 01950

Town Manager's Office  
Town Hall - Friend Street  
Amesbury, Ma. 01913

Senator Gordon J. Humphrey  
1 Pillsbury Street  
Concord, NH 03301  
(Attn: Herb Boynton)

Richard E. Sullivan, Mayor  
City Hall  
Newburyport, MA 01950

1. Contrary to 10CFR50, Appendix B, Criterion II, and the Seabrook Station Final Safety Analysis Report (FSAR), Section 17.1.1.2, the applicant's quality assurance program has not effectively provided control over activities involving seismic cable tray support installations. The applicant's programs have not assured that these installations are in accordance with the applicable design documents. This condition appears to exist because design activities are not appropriately coordinated with engineering and construction organizations (Section II.B.1).

#### RESPONSE

Comprehensive improvements in project organization have been underway since March 1984. The project organization has been integrated within a clearly defined structure which establishes singular responsibility for each project function. This new management direction has successfully improved communications between engineering and construction.

As part of the reorganization, all electrical installations are performed by direct force account of labor and no longer by construction management of a contractor. The elimination of the construction management interface has also contributed to improved communication.

Engineering will specifically define all design requirements for installation and inspection of all seismic cable tray supports. Design requirements for all seismic cable tray supports will be organized into an explicit, systematic package consisting of the following documents:

1. Electrical System Drawings (sectional views)
2. Electrical Support Drawings (unique support configuration)
3. Plan and Elevation Drawings (axial bracing supports)
4. Cable Tray Notes and Details (Drawing 300229)
5. "Bill of Material" (Drawing 300220)
6. Engineering Change Authorizations

All seismic cable tray supports will be inspected by Quality Assurance to the above referenced document package to assure installations are in accordance with the design requirements.

The engineering program described is currently in place. Issuance of document packages is scheduled to commence January 1985.

2. Contrary to 10CFR50, Appendix B, Criterion III, and the Seabrook Station FSAR, Section 17.1.1.3, design control has not been maintained as the applicant has:

2.a.1 Failed to properly review design changes relative to instrument tubing installations in a manner commensurate with the original design review. This is illustrated by a number of instances in which deviations from specified slope criteria have been authorized by the construction manager, rather than the responsible design organization (Section II.B.5).

RESPONSE

Deviation from specified slope criteria can no longer be authorized by the construction manager. ECA 05/1206A has been voided to reflect this.

Specification for Instrumentation Installations (9763-006-46-1) will be revised to include specific slope criteria that will address the majority of instances where the present minimum slope of 1/4" per foot cannot be achieved. Deviations from the revised criteria that are required for construction will be addressed in accordance with our design control procedures that meet the requirements of 10CFR50, Appendix B.

Documentation of safety-related construction activities conducted after ECA 05/1206A was approved on April 23, 1984, will be revised to assure that all deviations from the slope criteria are identified, dispositioned and properly documented. This review is expected to be completed by December 31, 1984.

2. Contrary to 10CFR50, Appendix B, Criterion III, and the Seabrook Station FSAR, Section 17.1.1.3, design control has not been maintained as the applicant has:

2.a.2 Failed to ensure that materials specified for foundation attachments for the Primary Component Cooling Pumps were similar to those used in the Seismic Analysis (Section III.B.4).

#### RESPONSE

The anchor bolts specified for the Primary Component Cooling Water Pumps were designed to be consistent with the results of the Seismic Analysis.

UE&C is responsible to design the anchor bolts using results of seismic analysis performed by the vendor. The UE&C evaluation of the vendor seismic report revealed an overly conservative approach in determining anchor bolt loads. The vendor had summed absolutely the components of anchor reactions due to earthquake acting simultaneously in three orthogonal directions. This resulted in unrealistically high anchor bolt loads. UE&C chose to utilize the SRSS (Square Root of Sum of the Square) method of combining seismic anchor reaction components to determine anchor bolt loads. This resulted in lower anchor bolt loads than those calculated by the vendor and allowed the use of ASTM-A36 steel bolting material.

The anchor bolt locations for the PCCW Pumps is the same as specified by the vendor. The vendor's seismic qualification analysis was used to calculate anchor bolt loads. Therefore, the integrity of the PCCW Pump foundation is maintained, and the vendor's seismic qualification remains valid.

2. Contrary to 10CFR50, Appendix B, Criterion III, and the Seabrook Station FSAR, Section 17.1.1.3, design control has not been maintained as the applicant has:
  - 2.b Not properly translated design drawings into fabrication and installation drawings in the area of rebar details around openings. Vendor rebar detailing errors have occurred and have not been identified during the drawing review or construction process (Section IV.B.1).

RESPONSE

We have reviewed the rebar detailing inconsistencies identified by the NRC Construction Appraisal Team and have concluded that the structural adequacy has not been adversely affected by the inconsistencies.

A program has been implemented to review additional vendor rebar drawings on a sampling basis to assure that the vendor drawings are consistent with the design drawings. We expect this program to be completed by December 31, 1984.

2. Contrary to 10CFR50, Appendix B, Criterion III, and the Seabrook Station FSAR, Section 17.1.1.3, design control has not been maintained as the applicant has:
  - 2.c Not properly considered design loading conditions for four hot leg restraints and one cross-over leg restraint. The seismic loading from an attached pipe support had not been considered as a separate loading case without other pipe breaks (Section IV.B.2).

#### RESPONSE

Seabrook primary coolant loop is provided with hot leg and cross-over leg restraints in each of the four loops. These restraints are massive steel structures designed to resist very heavy pipe whip loads. During the course of plant design, pipe supports were attached to four hot leg and one cross-over leg restraint. Since the loads were small, they were inadvertently not documented in the design calculations. A preliminary review of these cases where loads were not accounted for was made subsequent to the NRC Construction Appraisal Team audit, and the result showed that the integrity of the restraints is maintained. The loading condition for these and all future load cases will be properly documented in calculation sets to avoid similar occurrences. However, these calculation sets will not be updated until the NRC responds to our request (SBN-703) for exemption from General Design Criteria 4 regarding postulation of Reactor Coolant System pipe breaks. This exemption will eliminate the requirement for the primary coolant loop restraints.

3. Contrary to 10CFR50, Appendix B, Criterion V, and the Seabrook Station FSAR, Section 17.1.1.5, the applicant has failed to effectively perform instructional and procedural activities in that several pieces of ASME III "safety-related" equipment were installed without instructions, procedures and quality control documentation. In addition, the procedure regarding the handling and installation of safety-related equipment did not contain adequate guidance or instructions to ensure appropriate qualitative and quantitative acceptance criteria and documentation.

#### RESPONSE

The violation occurred due to a conflict between the FSAR and UE&C specifications. UE&C Specification 263-2 has been revised, via an Engineering Change Authorization to correctly reference the equipment contained in Tables 3.21 and 3.22 of the Seabrook FSAR. Pullman-Higgins' Procedure IX-39 will be similarly revised to reflect UE&C requirements. Additional changes to the P-H procedure require that installation records include documentation of alignment, indication whether alignment is initial or final, referencing of calibrated equipment utilized and reference to the installation instructions used.

Corrective action will be completed by December 31, 1984.

4. Contrary to 10CFR50, Appendix B, Criterion X, and the Seabrook Station FSAR, Section 17.1.1.10, the program for inspection of activities affecting quality was not effectively implemented in that inspection programs have not assured that high strength structural steel bolted connections have the proper tension (Section VI.B.2). In addition, structural steel shop weld inspections were found to be deficient with respect to the specified acceptance criteria (Section C.B.7).

#### RESPONSE

##### Structural Steel Bolted Connections

Inspection of Structural Steel Bolts for installation preload was performed using the following approaches:

1. Visual inspection to assure that the bolts were properly tightened.
2. Bolt torque verified based on a random and independent torquing of installed bolts.

A program has been initiated to determine the design adequacy of the existing installation by determining the actual preload in the bolts identified by the NRC Construction Appraisal Team as having low torque values. This program will also attempt to identify the cause for the relaxation of the tension. Appropriate corrective action will be taken, if required, to meet the design/code requirements. This program will be completed by March 31, 1985.

##### Structural Steel Welds

Twenty (20) structural steel welds identified by the NRC Construction Appraisal Team as deficient have been evaluated. The connections were determined to be adequate taking no credit for the area of the deficient weld.

A program has been initiated to review all other similar connection welds. We expect to complete our total evaluation by March 31, 1985.

5. Contrary to 10CFR50, Appendix B, Criteria XV and XVI, and the Seabrook Station FSAR, Sections 17.1.1.15 and 17.1.1.16, the applicant's program has failed to assure that nonconforming conditions have been properly identified. Reviewed, resolved and evaluated for corrective action in accordance with documented procedures in that:

5.a The program for inspection of construction activities failed to identify a number of cable installations that did not meet established criteria for physical independence of redundant electrical divisions. Most of the deficiencies identified involved cables and control panels transferred to "startup" jurisdiction.

#### RESPONSE

The concerns identified in the Main Control Board (MCB) by the NRC Construction Appraisal Team were in areas of ongoing field modification work and have been corrected while completing the work or will be corrected when the modification package is completed.

Additional training sessions covering separation criteria will be conducted to instruct inspectors to look for separation violations and to identify those that are not part of ongoing modification work.

YAEC QC will conduct a final inspection of the MCB for separation violations at the time of Conditional Acceptance Turnover.

5. Contrary to 10CFR50, Appendix B, Criteria XV and XVI, and the Seabrook Station FSAR, Sections 17.1.1.15 and 17.1.1.16, the applicant's program has failed to assure that nonconforming conditions have been properly identified, reviewed, resolved and evaluated for corrective action in accordance with documented procedures in that:

- 5.b Nonconforming conditions on piping and pipe supports/restraints were documented on informal reports or memoranda, and on Engineering Change Authorizations. In addition, nonconforming conditions on pipe support/restraints were improperly corrected/resolved on Support Rework Orders and Engineering Change Authorizations.

#### RESPONSE

A review of applicable Pullman-Higgins (P-H) procedures determined that they contain adequate instructions relative to the reporting of deficient conditions. Since P-H will now be performing the as-building of piping installations, deficiencies will be marked on the drawings and will eliminate the use of speed-memos. Engineering will review the drawings and determine the adequacy of as-built conditions.

An NCR was initiated to document the incorrect attachment location which had been originally reported in a memo, and the situation has been satisfactorily resolved.

Corrective action in the above items was completed on September 18, 1984.

P-H is evaluating the zero-gap relative to cold-springing. The gap was verified and recorded on the erection drawing. Corrective action for this item will be completed by December 31, 1984.

5. Contrary to 10CFR50, Appendix B, Criteria XV and XVI, and the Seabrook Station FSAR, Sections 17.1.1.15 and 17.1.1.16, the applicant's program has failed to assure that nonconforming conditions have been properly identified, reviewed, resolved and evaluated for corrective action in accordance with documented procedures in that:

5.c Corrective measures were taken in order to maintain proper torque on Hilti concrete expansion anchor bolts. However, a significant number of mechanical and electrical anchor bolts were found to be below the minimum specified torque values (Section IV.B.4).

#### RESPONSE

The NRC Construction Appraisal Team Report indicates that 92% of the Hilti Kwik-Bolts they inspected meet QA torque check values. We have considered the reduction in torque for the remaining 8% of the bolts and have concluded that our existing Hilti anchor installation procedure is adequate.

Due to the non-homogeneous nature of the concrete materials it is impractical to maintain the minimum specified torque values for 100% of the bolts.

The affect of preload on anchor bolt performance has been examined in two (2) independent tests which have been submitted to the NRC. The results of these tests are as follows:

1. Teledyne Report #TR3501-1, Revision 1, Summary Report - Generic Response to USNRC IE Bulletin Number 79-02, Base Plate/Concrete Expansion Anchor Bolts.

This test demonstrates that cyclic loading does not decay the ultimate capacity of non-preloaded expansion anchors.

2. Hanford Engineering Development Laboratory, Final Report, USNRC Anchor Bolt Study, Data Survey and Dynamic Testing, NUREG/CR-2999, HEDL-MISC 7246.

This test demonstrates there is no significant difference in anchor deflections under dynamic loads at 50 percent and 100 percent preload.

These tests support our conclusion that the initial setting of the anchor to a torque equal to 1.5 to 1.7 times the maximum allowable design load ensures the load carrying capability of the Anchor System. We therefore consider our procedure for installation of Hilti Kwik-Bolts to be adequate.

5. Contrary to 10CFR50, Appendix B, Criteria XV and XVI, and the Seabrook Station FSAR, Sections 17.1.1.15 and 17.1.1.16, the applicant's program has failed to assure that nonconforming conditions have been properly identified, reviewed, resolved and evaluated for corrective action in accordance with documented procedures in that

5.d Measures were not taken to identify nonconformances and take corrective action to provide for control of cable identification and markings in accordance with FSAR commitments and specification requirements.

#### RESPONSE

As the result of a YAEC Management Action Request, UE&C contacted each supplier of cable to the Seabrook Project. Vendors responded with a listing of cable by reel number, length, footage range and serial number. This data will be utilized for comparison with future shipments. Cable with duplicate markings has been identified and controlled under UE&C NCR No.74/2551A.

Cable pull slips have been marked to notify installers when overlapping footage marking exists.

YAEC surveillance personnel will continue to monitor these controls on a continuing basis and will keep the NRC site inspector cognizant.