U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-213/85-17

Docket No. 50-213

License No. DPR-61

Licensee: Connecticut Yankee Atomic Power Company

Facility Name: Haddam Neck Plant

Inspection At: Berlin, CT and Haddam Neck, CT

Inspection Conducted: August 1 and 2, 1985

Inspectors: P. K. Eapen — 8/26/85
P. K. Eapen, Chief, Quality Assurance Section — date

L. H. Bettenhausen — 8/26/85
L. H. Bettenhausen, Chief, Operations Branch — date

Approved by: S. D. Ebneter — 8/23/85
S. D. Ebneter, Director, Division of Reactor Safety — date

Inspection Summary: Special announced inspection (Report No. 50-213/85-17) to review the status of the licensee's actions in response to the NRC order dated December 13, 1985. The inspection involved 30 inspection hours at Northeast Utilities office in Berlin, Connecticut and 6 inspection hours at Haddam Neck Plant.

Areas Inspected: Plant Design Change Requests (PDCRs), PDCR Task Group reviews, and Plant Operations Review Committee's PDCR reviews.

Results: No violations or deviations were identified. The licensee's actions in response to the NRC order dated December 13, 1985 were being implemented adequately.

DETAILS

1.0 Persons Contacted

Northeast Utilities
Plant Design Change Task Group Members

*G. E. Cornelius
*R. A. Crandall
*D. G. Diedrick
*M. S. Kai
*R. J. Schmidt, Chairman
*B. A. Tuthill

Others

R. Test, Director, Nuclear Training
S. Scace, Manager, Safety Analysis

Haddam Neck Plant

W. Bartron, Maintenance Supervisor
R. Brown, Operation Supervisor
**R. Graves, Station Superintendent
**J. Ferguson, Unit Superintendent

*Denotes those present at the Berlin, Connecticut Exit Meeting.

**Denotes those present at the Haddam Neck Plant Exit Meeting.

The inspector also interviewed other management and technical personnel in the course of this review.

2.0 Background

An Order Modifying License and a Notice of Violation were issued to Connecticut Yankee Atomic Power Company on December 13, 1984 as enforcement actions in response to the failure of the reactor cavity seal at the Haddam Neck plant on August 21, 1984. The licensee's response to the Order, dated January 28, 1985 described in detail the method of conducting a review of the plant design change process and historical records related to Haddam Neck, the external oversight of the review effort, the management attention and safety ethic training being given and the revisions to upgrade the plant design change request procedures. In addition, the licensee described interim actions taken to improve the design change process in a letter dated March 22, 1985.

3.0 Scope of Inspection

This inspection assessed conformance to the commitments of the January 28, 1985, and March 22, 1985 responses to the NRC order. It included review of the Plant Design Change Task Group's (PDCTG) activities, the oversight exercised by the Plant Design Change External Review Group (ERG), the training and management direction on safety ethic, the adoption and incorporation of upgraded plant design change procedures at Northeast Utilities and at Haddam Neck, progress and plans in upgrading such design basis documents as drawings, and Material Equipment and Parts List, and performance of integrated safety evaluations in accordance with revised procedures.

4.0 Implementation of Interim Action Commitments

The licensee documented in his March 22, 1985 response to the NRC order those interim actions that would be implemented prior to completion of the other actions called for in the order. In addition, several commitments were made in other correspondence such as the response to order dated January 28, 1985 which committed to providing safety ethic training to all Nuclear Engineering & Operations (NE&O) Group personnel by the end of 1985. These interim actions and commitments were reviewed by the NRC staff to verify the commitment had been met and actions were implemented.

4.1 Plant Design Change Procedure Upgrades

Two commitments were made in this area. One was to review and upgrade procedures associated with the implementation of plant design changes and to have the upgraded procedures approved by November 1, 1984. Some of these procedures were revisions of existing procedures, while others were newly developed to meet identified deficiencies. Fifteen Nuclear Engineering and Operations (NE&O) procedures were involved; all were approved on November 1, 1985. The inspector reviewed the procedure changes discussed below.

The licensee stated in his response that all safety evaluations are performed in accordance with NE&O Procedure 3.12. The commitment discussed the use of integrated safety evaluations (ISEs) to supplement discipline specific safety evaluations.

Revision 1 to NE&O 3.12, Safety Evaluations dated November 1, 1984 incorporated detailed guidance to the evaluator which include examples of 10 CFR 50.59 considerations, typical safety limits, accident classifications and a decision tree based on 10 CFR 50.59. The procedure was explained to Northeast Utilities (NU) staff by a Senior Vice-President's memorandum dated November 9, 1984. This memo transmitted the procedure, explained the background and noted the NU staff's responsibility for accomplishing integrated safety evaluations. The section on design verification in Procedure NE&O 03.03 was revised to state that the

review shall also consider the potential consequences of any failure associated with the proposed modification. The normal design verification is performed in accordance with NE&O 5.05, Design Inputs and Design Verification, Rev. 0, dated November 1, 1984. In NE&O 5.05, Figure 7.1 is a series of questions similar to those questions posed in American National Standard ANSI N45.2.11-1974, Quality Assurance Requirements for the Design of Nuclear Power Plants.

The NRC staff interviewed the Manager of Safety Analysis, Task Force members, and Haddam Neck personnel in relation to ISEs. All agreed that communications, relating to design changes, among various interfacing groups had significantly improved. In addition an increase had been experienced in the number of PDCRs submitted for ISE.

The second commitment was to implement the upgraded procedures at Haddam Neck by February 28, 1985. The inspector reviewed the current plant procedures manual at Haddam Neck and found that the appropriate NE&O procedures had been implemented at the plant by replacing, or adding to, the existing administrative procedures and following the normal review and approval cycle for plant procedures. This was accomplished by February 28, 1985. Some difficulties were encountered in the adaptation of the company-level procedures to specific situations at the plant. In several instances these difficulties were surmounted by issuing Temporary Procedure Changes to clarify portions of a procedure or to extend the scope of the procedure to other plant activities. One procedure, NE&O 8.01, Jumper, Lifted Lead and Bypass Control, has required revision and problems are still being encountered in implementation. The plant is developing case histories to show that further changes to this procedure are needed.

The inspector had no further questions. Commitments regarding upgrading of design change procedures were met.

4.2 Safety Ethic Training

The licensee's response dated January 28, 1985 to the NRC order identified in several places the need to "reprogram" the licensee staff and redirect the thought process related to safety evaluations. As part of this, the licensee committed to provide safety ethic training to all NE&O personnel by the end of 1985. The NRC staff reviewed progress on this item.

The Senior Vice President, during January and February 1985, conducted four (4) safety ethic sessions at the Millstone site, two at the Haddam Neck site and three at the Berlin offices which were directed at supervisory and senior level staff. The Training Department conducts a 4 hour Safety Ethic course for other personnel.

The NRC staff reviewed the Senior Vice President presentation which addressed NE&Os commitment to excellence, safety ethic, plant modifications and corporate goals.

The approximate status of attendance at either one or the other safety ethic presentations to date is:

Millstone Unit 1	85-90% of station staff
Millstone Unit 2	85-90% of station staff
Haddam Neck	85-90% of station staff

Betterment Construction - 100% of staff
Engineering/Design - 65-70% of staff

The Training Department is tracking attendance and notifies organizations of those who have not attended one of the presentations so that they can be scheduled for one of the courses. The licensee expects that the commitment that all NE&O persons receive safety ethic training by the end of 1985 will be met.

4.3 Material Equipment and Parts List (MEPL)

The licensee's actions to improve the MEPL were reviewed. In response to the order and a violation identified in NRC inspection 50-213/84-26, the licensee instituted several measures to improve the MEPL and to provide better control for activities supporting the MEPL. These measures were discussed in the licensee letter dated February 25, 1985. Each of these measures and its status are given below.

The inspector noted that the licensee has completed the review and the updated MEPL was issued on March 3, 1985. This update incorporated several new components, such as FO-LCV-1700 A&B valves which were inadvertantly left out from the previous MEPL. It also added Appendix D to address the quality assurance requirements for fire protection equipment. Additionally, the corporate engineering staff reviewed the existing Process and Instrumentation diagrams (P&IDs) to assure that all identified components were incorporated in the MEPL. The inspector reviewed the P&IDs for the RHR and Main Steam systems with the cognizant engineers and noted that components such as RH-V-25A, 26A, 27A and 28A and BD-V-507A, 508, and 531 were identified as being omitted during the licensee review and were incorporated in the MEPL on March 5, 1985.

The licensee has also recognized the need for updating the P&IDs to reflect as-built system configurations. For this effort, the licensee has retained a consultant to perform the as-built system walkdowns. The licensee's representatives stated that these walkdowns are presently scheduled for completion by January 1988. Upon completion of the as-built system walkdown, MEPL will be reviewed and updated to incorporate any additional components identified during such walkdowns.

NE&O Procedure 6.01 (November 1, 1984) provides assurance that safety related components will be identified properly. The inspector reviewed NE&O 6.01 and noted that the procedure identifies responsibilities for the maintenance and upkeep of the MEPL. Section 6.1.1 of this

procedure requires a MEPL evaluation for a component prior to its modification or repair if that component is not in the MEPL but it belongs to a system identified in the MEPL. As a result of this procedure, MEPL evaluations and the safety classification determination of the components are more rigorous and conservative. Additionally, in April 1985, the licensee established a list of non-category I systems at Connecticut Yankee Plant to further ease the component classification burden during modification/repair activities at the plant.

NUSCO QA Audit A60222 on April 2-16, 1985 was performed to assess the impact of the use of the previous MEPL on Purchase Requisitions and Work Orders written during 1983 and 1984. This audit identified that 10,000 non-QA work orders and 5,500 QA work orders were issued during the 1983-84 time period. A total of 225 work orders from the non-QA category and 370 work orders from QA category were considered to be significant as they involved material replacement, repair or modification. The audit team sampled 90 significant work orders from the non-QA category and 250 significant work orders from QA category for detailed review. Eight (8) non-QA work orders were improperly classified and 5 QA work orders contained improper material classification. The audit team issued two findings to address these concerns. The response to these concerns was timely and effective. The response indicated that a detailed review of all 1984 non-QA work orders was conducted and less than one percent of such orders were noted to be classified improperly. The improper material classifications in QA work orders were stated to be caused by inadequate guidance in the governing procedures. The corrective actions included revisions to three procedures to provide specific guidance.

The inspector found the above actions to be consistent with the licensee's statements in letters dated March 22, 1985 and February 25, 1985. These actions adequately address the Concerns identified in NRC letter dated December 28, 1984. Therefore, violation 84-26-01 is closed. The effectiveness of the activities to update the P&IDs to reflect as-built configurations will be reviewed in future NRC inspections. There were no further questions.

5.0 Status of Plant Design Change Task Group (PDCTG)

The NRC staff met with the members of the PDCTG and discussed the status of the group's independent review of previous Haddam Neck Plant design changes.

The PDCTG has essentially completed the review and assessment and has submitted a draft report dated July 26, 1985 to the independent External Review Group (ERG) and licensee management. The NRC staff interpretation of the order is that any submittal of draft reports to licensee management should be simultaneously submitted to the Regional Administrator, NRC Region I.

The Task Group (TG) was charged with reviewing all Plant Design Change Requests (PDCR) made at Haddam Neck between January 1, 1979 and December 31, 1984. This review evaluated the PDCR's for potential problems or unreviewed safety issues and further evaluated flawed PDCR's to identify deficiencies

in the design change process and procedures. Early in this review, the PDCTG recognized that work done under plant Work Permits potentially might result in modifications to the plant; a contractor was hired to screen Work Permits and similar work controls for potential design modifications.

The PDCTG screened 355 PDCR's. Thirty-five (35) of these resulted in detailed evaluations. From one of these evaluations, it was concluded that an unanalyzed minor leakage path for radioactive coolant could result following an accident; this was reported in accordance with 10 CFR 50.72 on August 2, 1984. Several other evaluations will lead to reanalysis or confirmation of design or test information, but no substantial design oversights were identified from this detailed, thorough, multi-disciplinary evaluation of these 35 PDCR's. The 35 PDCR's resulting from the screening and 5 more test cases, including the reactor cavity seal design, were used to examine the design change process as defined by the procedures in place subsequent to November, 1984. The PDCTG preliminary conclusion is that no substantive changes are required in the process. The deficiencies identified were the result of either procedural nonadherence (it must be recognized that many of the procedures did not exist when the PDCR was done) or inadequate design basis such as accident analysis details, incomplete drawings and fully documented Materials Equipment and Parts List.

The PDCTG developed a manual of procedures to control their work and added procedures to control the contractor review of work requests. The NRC staff reviewed these procedures and discussed their implementation with the PDCTG members. The NRC staff independently reviewed 8 PDCR's selected by the PDCTG, 5 PDCR's and 2 of the 12 jumpers reviewed and not selected for future evaluation by the PDCTG. The method of review, the questions asked and resolved by the TG and the conclusions reached on each PDCR were documented in the review packages. PDCTG members were knowledgeable of the selection process, the questions resolved and the issues involved. In one case examined, a PDCTG member was involved in the original PDCR review; he disqualified himself and an alternate TG member participated in this evaluation.

The Plant Design Change Request (PDCR) is the basic means to implement a design change to the plant. The licensee recognized that another plant change process, the maintenance work order, could potentially inadvertantly effect a design change to plant hardware and not be subject to safety review.

The Impell Corporation, under contract to NUSCO, reviewed over 21,000 Haddam Neck Work Permits (WP) and Automated Work Orders (AWO) covering the time period from January 1, 1979 to December 31, 1984. The contractor review was performed in accordance with documented procedures approved by PDCTG and audited by PDCTG. Sixty five (65) of the WPs/AWOs received additional detailed review. Of these, nine (9) require additional engineering evaluation. Another subset of 24 will be reviewed when the affected hardware is accessible during the next outage. Impell made 11 recommendations/ observations which are under review by PDCTG. There were no negative findings with safety significance.

The NRC staff performed a confirmatory review of three categories of the WP/AWOs and had no questions.

The PDCTG Draft Report contains 18 recommendations in five categories. Basically, the Task Group concluded that sufficient controls are in place and that the present system meets or exceeds the INPO Good Practice TS-402 (INPO 85-013) May 1985, "Plant Modification Control Program." The recommendations, if adopted by the ERG, will improve interfaces, procedures, definitions and clarify the procedural relationships which will enhance adherence to procedures and communications.

The progress of PDCTG is within the schedule established by the NRC order. The PDCTG Draft Report will be reviewed by ERG and discussed at a joint PDCTG/ERG meeting during the week of August 5, 1985.

6.0 Haddam Neck Plant

The NRC staff reviewed the Haddam Neck Plant procedures and PORC documents to confirm that commitments to implement interim action were accomplished. Section 4.1 discusses procedure changes at the plant.

The plant has implemented additional changes related to PDCRs that will focus attention on design changes and improve the quality of design changes. These are the separation of PDCR review by PORC from other PORC responsibilities and the imposition of restraints related to design changes.

The plant now holds two distinctly different types of PORC meetings, one for normal PORC topics and a separate PORC meeting dedicated to the consideration of PDCRs. The PORC meeting for PDCRs requires the same committee membership plus attendance by appropriate technical expertise. In addition, the PDCR PORC meeting is dedicated to the PDCR, i.e., no "walk-in" topics are allowed. This concept focuses management attention on the PDCRs. Additionally, to eliminate "rush" reviews of PDCRs, the approval of all outage PDCRs will be onsite and ready for PORC review 2 months prior to the outage and ready for installation one month prior to the outage (Memos US-85.291, US-85-267 and NO-85-CY-539).

NE&O management has placed constraints on the station staff in relation to design changes. Only minor items involving design change can be performed by the station staff. All other designs must be accomplished by the corporate design/engineering groups. The NEO procedure 3.12 (see Section 4.1 of the report) requires that the Station Superintendent (or designee) discusses all plant design changes with the Manager, Safety Analysis (or designee) to determine if an integrated safety evaluation is required.

The NRC staff toured the turbine building, control room, auxiliary feedpump area, and the emergency diesel generators room. Control room operators were knowledgeable of the current jumper/lifted lead status and could recall and describe the prior jumper installations reviewed by the inspector.

The inspector had no further questions.

7.0 Exit Meetings

The NRC Staff met with the licensee representatives identified in paragraph 1 separately at Berlin, Connecticut and the Haddam Neck Plant on August 2, 1985 to discuss the inspection findings as detailed in this report. The licensee representatives acknowledged the NRC Staff's statements. At no time during this inspection, was written material provided to the licensee by the NRC staff.