

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.: 91-03
Docket No.: 50-213
License No.: DPR-61
Licensee: Connecticut Yankee Atomic Power Company
107 Selden Street
Berlin, Connecticut 06037-0218

Facility Name: Haddam Neck

Inspection At: Haddam, Connecticut

Inspection Conducted: January 22-24, 1991

Inspector: A. Finkel
A. Finkel, Senior Reactor Engineer

February 8, 1991
date

Approved by: N. Blumberg
N. Blumberg, Chief Operational Programs
Section, Operations Branch, ORS

2/11/91
date

Areas Inspected: Routine announced inspection by one region-based inspector of compliance with the Anticipated Transients Without Scram (ATWS) rule (10 CFR 50.62) including design implementation verification, surveillance test procedures and results review, quality verification measures evaluation and review of licensed operator training.

Results: The ATWS mitigating system installed at Haddam Neck was determined to be in accordance with the design described in the Final Safety Analysis Report (FSAR) and reviewed in the NRC Safety Evaluation Report (SER). The quality assurance program applied to these systems complies with the requirements of 10 CFR 50, Appendix B. Operating procedures and licensed operator training have been appropriately revised to reflect the plant modification made to comply with the ATWS Rule. A surveillance program has been developed and implemented to assure that the system will perform in a reliable manner. No violations or deviations were identified.

DETAILS

1.0 Persons Contacted

Connecticut Yankee Atomic Power Company

- *G. Bouchard, Nuclear unit Director
- *C. Gladding, Engineering Manager
- *D. Ray, Director Nuclear Services
- *J. Stetz, Site Director

United States Nuclear Regulatory Commission

- A. Asars, Resident Inspector
- *T. Shedlosky, Senior Resident Inspector

* Denotes those present at the exit interview.

The inspector also held discussions with managers, supervisors and other licensee employees during the course of the inspection, including operations, technical and administrative personnel.

2.0 Compliance with 10 CFR 50.62. Anticipated Transients Without Scram (ATWS) Rule

2.1 Inspection Scope

The objective of the inspection was to determine if the design of the ATWS mitigating system for the Haddam Neck site, as described in their Final Safety Analysis Report (FSAR) and reviewed in the NRC Office of Nuclear Regulation Safety Evaluation (Letter, A. B. Wang, [USNRC] to E. J. Mroczka [Connecticut Yankee Atomic Power Company]), "Exemption To 10 CFR 50.62 - Anticipated Transients Without Scram Haddam Neck Plant (TAC No. 62290)," March 12, 1990, has been implemented. The inspection also sought to determine that the quality verification functions for design, installation, maintenance and testing of the ATWS mitigating systems comply with NRC Generic Letter 85-06, "QA Guidance for ATWS Equipment that is Not Safety-Related", or with 10 CFR 50, Appendix B. In addition, the inspector reviewed the training program developed on the ATWS systems for licensed personnel.

2.2 Design Implementation Verification

2.2.1 ATWS Design

The inspector reviewed the documents listed in Attachment A of this report and performed a walkdown of the system to verify the installation configuration was in accordance with the design drawings and the description discussed in the SER.

The Code of Federal Regulations in 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light Water-Cooled Nuclear Power Plants" requires: Each pressurized water reactor must have equipment from sensor output to final actuation device that is diverse from the reactor trip system, to automatically initiate the Auxiliary (or Emergency) Feedwater system and initiate a turbine trip under conditions indicative of an ATWS." The inspector verified that the present design meets all of the above criteria with the exception of the turbine trip. This plant design did not include a Turbine Trip Signal; the NRC granted an exemption from the ATWS rule for this requirement based upon the requirements of 10 CFR 50.12 (a) and the guidance provided in SECY 83-293 dated July 19, 1983. To support his exemption to the ATWS Rule, the licensee committed to maintain the moderator temperature coefficient at hot, full power, with equilibrium xenon, no more positive than -5.5×10^{-5} delta K/K°F for every fuel cycle.

The licensee performed a reload and safety analysis checklist (RSAC) for cycle 16R in a March 29, 1990 report NE-90-R-152. The data for this report was derived from a Technical Report Supporting Cycle 16 Operation dated June 1989 (NUSCO #167). This type of report and analysis is submitted to the NRC prior to each refueling cycle by the licensee to support their commitment to control the moderator temperature coefficient no more positive than -5.5×10^{-5} delta K/K°F for each fuel cycle. This value has been maintained by the licensee as documented in their engineering program reports.

The Haddam Neck plant Anticipated Transient Without Scram (ATWS) system, because of its age and design, is not like a Westinghouse Generic ATWS Mitigation System Actuation Circuitry (AMSAC) design. However, the inspector verified that the ATWS design of the Haddam Neck Plant meets the following conditions of the NRC Safety Evaluation Report dated March 12, 1990.

- Safety-Related - The system is not required to be maintained safety-related, but only not to affect the ability of the Reactor Protection System (RPS) to meet safety-related criteria. The Auxiliary Feedwater System meets those criteria in that it is independent from the RPS and, therefore, does not affect the ability of the RPS to meet its design criteria. The inspector's walkdown of selected portions of the feedwater system verified that the installation was like the design documentation. In addition, the inspector verified that the Auxiliary Feedwater System is maintained safety grade.
- Redundancy - The Auxiliary Feedwater initiation is a two train redundant system. The inspector also verified the system redundancy during the walkdown inspection.

- Diversity From Existing RPS - The diversity design consists of eight level transmitters (two per steam generator) that provide input to the Auxiliary Feedwater initiation system. This system is separate and independent from the RPS. These eight level transmitters use the steam generator wide-range taps, whereas the steam generator narrow-range taps are used for the Reactor Protection System and the Level Control System. These eight level transmitters do, however, provide high-level override logic (1 of 2 per generator) to close the Main Feedwater Regulating Valves.
- Electrical and Physical Independence - Each train of the Auxiliary Feedwater system is supplied by vital power and is isolated from the safety-related systems. The criteria do not require physical separation from the existing RPS, only that existing separation for the RPS is not violated. The Auxiliary Feedwater System is independent from the RPS and does not violate existing separation for the RPS. During the system walkdown the inspector verified that the following components complied with both the separation and electrical independence requirements of the design.
 - Auxiliary Feed Control Valves -FW-HICV-1301, 1302, 1303 and 1304.
 - Main Feedwater Isolation Valves-FW-MOV 11, 12, 13, and 14.
 - Valves Requiring Operator Action-CD-AFW A and B.
- Testing - Each train of the Auxiliary Feedwater System has the ability to be placed in "trip" and tested while the plant is on-line. The logic for Auxiliary Feedwater initiation for each train through the final actuation device is tested monthly with the exception of the Main Feedwater Pump trip logic (2 of 2). The Main Feed Pump trip logic comes directly off the breaker contacts and is tested each refueling. Monthly surveillance testing is performed per the following procedures:
 - Surveillance Procedure 5.1-13A and 5.1-13B, "Auxiliary Feed Pump," (P-32-1A and P-32-1B) "Functional Test."
 - Surveillance Procedure 5.2-65, "Automatic Initiation of Auxiliary Feedwater -Analog Channel Operational Test."

The refueling testing of the Feedwater System is performed per the following procedures:

 - Surveillance Procedure - 5.1-141. "Functional Test for Auto Initiation Scheme For Auxiliary Feedwater".
 - Surveillance Procedure -5.2 -71.1, "Steam Generator Wide Range Level Train "A" Channel Calibration ("Aux. Feedwater Auto Start")."

The inspector verified that monthly and refueling testing of the system has been performed as described in the above referenced surveillance procedures and corrective actions had been taken to address the findings identified during the test programs.

2.3 Operations Procedures and Licensed Operator Training

The inspector reviewed the valve lineup procedures, operating procedures and alarm response procedures listed in Attachment A to verify that they had been appropriately revised to reflect the plant design to comply with the ATWS rule. The inspector also reviewed the training program provided to licensed operators to verify that they received appropriate training on the ATWS Mitigation systems.

The inspector determined that the plant procedures have been issued and revised to reflect the present ATWS system design. The licensed operator systems training program incorporates appropriate information on the ATWS mitigation systems. The inspector verified that the simulator reflects the ATWS design and that ATWS training is demonstrated during simulator training.

2.4 Quality Verification for ATWS Installation

The installation of the automatic initiation Auxiliary Feedwater design was started in 1980 by plant design change request (PDCR) No. 384. The Inspector verified that the PDCR No. 384 information, retrieved from the data base system contained the correct quality classification for this modification and that the testing of the completed work was documented and verified by the licensee. The inspector verified that the testing of the ATWS components was performed which also included the annunciators in the control room.

2.5 Conclusion

The inspector's review of the ATWS installation at Haddam Neck determined that it is in accordance with the design described in the FSAR and reviewed in the NRC Safety Evaluation Report. The quality assurance program applied to these systems complies with the requirements of 10 CFR 50, Appendix B. A surveillance program has been developed and implemented to ensure that the system will perform in a reliable manner. Operating procedures and licensed operator training have been appropriately revised to reflect the plant modifications made to comply with the ATWS Rule. Cycle specific operating limits have been removed from the Technical Specifications following the guidance specified in NRC Generic Letter 88-16 "Removal of Cycle-Specific Parameter Limits from Technical Specifications." A technical report supporting each cycle operation has been provided to the NRC as specified in the NRC SER, which complies with the Generic Letter 88-16 criteria. No violations or deviations were identified.

3.0 Exit Meeting

Licensee management was informed of the scope and purpose of the inspection at an entrance meeting conducted on January 22, 1991.

The findings of the inspector were periodically discussed with licensee representatives during the course of the inspection. An exit was conducted on January 24, 1991 (see Paragraph 1 for attendees), at which time the findings of the inspector were presented.

At no time during the inspection did the inspector provide written material to the licensee nor did the licensee indicate that areas covered by this inspection contained proprietary information.

Attachment A
Documents Reviewed

Surveillance Procedures

SUR 5.1-141	Functional Test for Auto Initiation Scheme for Auxiliary Feedwater
SUR 5.2-71.1	Steam Generator Wide Range Level Train "A" Channel Calibration (Aux. Feedwater Auto Start)
SUR 5.1-13A	Auxiliary Feed Pump (P-32-1A) Functional Test
SUR 5.1-13B	Auxiliary Feed Pump (P-32-1B) Functional Test
SUR 5.2-65	Automatic Initiation of Auxiliary Feedwater Analog Channel Operational Test
SUR 5.1-14	Auxiliary Feed Pump Flow Capacity Test

Technical Specifications

T.S. 4.3.3.5	Accident Monitoring Instrumentation
T.S. 4.7.1.2.1	Auxiliary Feedwater System
T.S. 4.3.2.1	Engineered Safety Features Actuation System Instrumentation, Table 4.3-2 Item 3a

P and ID Drawings

P&ID 16103-26012	Main, Auxiliary, and Extraction Steam
P&ID 16103-26013	Condensate, Feedwater and Heater Drain Lines
P&ID 16103-26012 (SHI)	Steam Systems, Steam Generator To Trip Valve

Material, Equipment and Parts List (MEPL)

Auxiliary Feed Control Valves	Components FW-HICV-1301, 1302, 1303, 1304
Main Feedwater Isolation Valves	Components FW-MOV 11, 12, 13, 14
Valves Requiring Operator Action	CD-V-632, 633
Auxiliary Feedwater Pumps Automatic Start Relays	4-AFW A,B

Licensee Correspondence to NRC

Connecticut Yankee Atomic Power Company (B12175)	August 19, 1986	"Request for Exemption"
Northeast Utilities (B12930)	May 27, 1988	"Additional Information Regarding Exemption From 10 CFR 50.62 (ATWS Rule) (TAC No. 62290)."
Northeast Utilities (B13055)	October 26, 1988	"Anticipated Transient Without Scram, Response to Request for Additional Information"
Northeast Utilities (B13418)	December 21, 1989	"Additional Information ATWS/Auxiliary Feedwater System (TAC No. 62290)"

NRC Correspondence to Licensee

USNRC Project Manager to Licensee July 20, 1988 - "Environmental Assessment For Proposed Exemption from Certain Requirements of 10 CFR 50.62-Haddam Neck Plant"

USNRC Project Manager to Licensee March 2, 1989 - "Haddam Neck Plant Request For Additional Information Regarding Conformance With Anticipated Transients Without Scram For The Auxiliary Feedwater System (TAC No. 62290)"

USNRC Generic Letter 88-16 October 4, 1988 - "Removal of Cycle-Specific Parameter Limits from Technical Specifications,"