Connecticut Yankee Atomic Power Company

Date of Distribution: 12/8/11

Notice of Receipt of **Haddam Neck ISFSI Updated Final Safety Analysis Report (UFSAR)**

Change No.: 11-01

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Please revise your controlled copy per instructions below:

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REPLACE the applicable pages per the attached instructions of your copy of the Updated Final Safety Analysis Report dated December 2011

This acknowledges receipt of the revisions listed above. In addition, all superseded pages have been removed and destroyed.

Signature: _____ Date: _____

Please Return This Sheet to the Connecticut Yankee, 362 Injun Hollow Road, East Hampton, CT 06424 Within Thirty (30) Days.

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CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD • EAST HAMPTON, CT 06424-3099

December 1, 2011
CY-11-034
Docket No. 50-213

Re: 10 CFR 50.71(e)

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555-0001

Biennial Update of the Updated Final Safety Analysis Report

Connecticut Yankee Atomic Power Company (CYAPCO) hereby submits a revision to the Updated Final Safety Analysis Report (UFSAR) for the Haddam Neck Independent Spent Fuel Storage Installation (ISFSI) for your information. This revision is provided in Attachment 1 and consists of replacement pages to the UFSAR. The changes are clarifications to reflect the completion of decommissioning at the former Haddam Neck Plant and to describe how the Part 50 requirements for fire protection and criticality are implemented at the Haddam Neck ISFSI. A change is also provided to reflect the pending merger of Northeast Utilities with NSTAR. Once the merger is complete, Northeast Utilities will retain ownership and control of CYAPCO.

Pursuant to 10 CFR 50.71(e)(2)(i) and (e)(4), this revision accurately presents changes completed since our previous submittal, Letter CY-09-018, dated 12/1/2009, that are necessary to reflect the current status of the Haddam Neck ISFSI.

As stipulated in 10 CFR 50.71 (e)(2)(ii), none of the changes provided herein were made under the provisions of 10 CFR 50.59 not previously submitted to the Commission. The last 10 CFR 50.59 annual report was submitted on February 28, 2011[1] pursuant to 10 CFR 50.59 (b).

[1] J. M. Lenois Sr. (CYAPCO) letter to the U. S. Nuclear Regulatory Commission Document Control Desk, "10 CFR 50.59 Summary Report," dated February 28, 2011.

If you should have any questions regarding this submittal, please contact me at (860) 267-6426.

Sincerely,

W. A. Norton
President and CEO

12/1/11
Date

Subscribed and sworn before me

This 1st day of December, 2011

James M. Lenois Sr.
Notary Public

My Commission Expires: 10/31/2012

Attachment:

1. Updated Final Safety Analysis Report Replacement Pages with Insert Instructions
2. Updated Final Safety Analysis Report Full Copy

Enclosure:

CD with Copy of Connecticut Yankee Updated Final Safety Analysis Report

cc: W. M. Dean, NRC Region I Administrator w/o enclosure
J. Joustra, Chief, Decommissioning Branch, NRC Region I w/o enclosure
J. Goshen, NRC, Project Manager w/o enclosure
Dr. E. L. Wilds Jr., CT DEEP, Director, Monitoring and Radiation Division w/o enclosure

Haddam Neck ISFSI
Final Safety Analysis Report

December 2011 Update

Insert Instructions – Page 1 of 1

Please revise your controlled copy per the instructions below:

Remove Pages	Effective Date	Insert Pages	Effective Date	Justification
List of Effective Pages LEP-1 through LEP-6	May 2007	List of Effective Pages LEP-1 through LEP-3	December 2011	Administrative
2-12	September 2006	2-12	December 2011	LBDCR # 11-01
3-1	July 2000	3-1	December 2011	LBDCR # 11-01
3-2 and 3-3	December 2007	3-2 and 3-3	December 2011	LBDCR # 11-01
3-5	July 2005	3-5	December 2011	LBDCR # 11-01
8-1	July 2005	8-1	December 2011	LBDCR # 11-01
11-2 and 11-3	July 2005	11-2 and 11-3	December 2011	LBDCR # 11-01
13-1	December 2007	13-1	December 2011	LBDCR # 11-01

CY-11-034
Docket No. 50-213

Attachment 1

Haddam Neck ISFSI
Updated Final Safety Analysis Report
Replacement Pages with Insert Instructions

December 2011

HADDAM NECK PLANT UFSAR

LIST OF EFFECTIVE PAGES

Page, Table or Figure	Front Matter	Revision Date
Page LEP-1 through LEP-3		December 2011
Title Page		December 2007
Table of Contents		December 2007
List of Tables		December 2007
List of Figures		December 2007

Page, Table or Figure	Chapter 1	Revision Date
Pages 1-1 through 1-2		December 2007
Page 1-3		July 2005
Page 1-4		December 2007

Page, Table or Figure	Chapter 2	Revision Date
Page 2-1 through 2-2		December 2007
Page 2-3		September 2006
Figure 2.1-1		July 2002
Figure 2.1-2		December 2007
Figure 2.1-3		December 2007
Figure 2.1-4		April 2003
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Page 2-26 through 2-32		January 1998
Page 2-33 through 2-36		September 2006
Page2-37 through 2-41		December 2007
Tables 2.1-1 through 2.5-3		January 1998
Figure 2.4-1		January 1998

HADDAM NECK PLANT UFSAR

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Page, Table or Figure	Chapter 3	Revision Date
Pages 3-1 through 3-3		December 2011
Page 3-4		September 2006
Page 3-5		December 2011

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Page 4-1		July 2002
Page 4-2 through 4-3		January 1998
Page 4-4		January 2000
Page 4-5		January 1998
Pages 4-6 through 4-8		January 2000
Figure 4.2-1 (Sheets 1, 2 and 3)		December 2007
Figure 4.2-2 (Sheets 1 and 2)		December 2007
Figure 4.2-3 (Sheets 1 and 2)		December 2007
Figure 4.2-4 (Sheet 1)		December 2007
Figure 4.2-5 (Sheets 1, 2 and 3)		December 2007

Page, Table or Figure	Chapter 5	Revision Date
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Page, Table or Figure	Chapter 6	Revision Date
Deleted		

Page, Table or Figure	Chapter 7	Revision Date
Deleted		

Page, Table or Figure	Chapter 8	Revision Date
Page 8-1		December 2011

Page, Table or Figure	Chapter 9	Revision Date
Page 9-1		September 2006
Page 9-2		May 2007

HADDAM NECK PLANT UFSAR

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Page, Table or Figure	Chapter 10	Revision Date
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Page, Table or Figure	Chapter 11	Revision Date
Page 11-1		December 2007
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Page 16-1		September 2006

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Page 17-1		July 1998

The site wells are located to the rear of the former Emergency Operations Facility (EOF) and near the ISFSI support building.

The ISFSI well is used for drinking water and supplying sanitation facilities. The ISFSI well is tested annually.

The groundwater table general gradient slopes downward toward the river. Water in the saturated zone under the flood plain occurs as free groundwater or in a leaky aquifer between alluvium on top and bedrock below, or both. Groundwater on the hillsides occurs under a mixture of perched conditions and in minor quantities in cracks in the rocks. The unsaturated zone on the hillsides is relatively thin. Groundwater loading conditions developed at or near grade are conservatively used for design purposes.

Rains or spills on the ground surface eventually arrive at the river by overland flow or as groundwater movement at velocities from a few to several hundred feet per day. No changes since decommissioning have occurred to alter the drainage system in such a way as to create local flooding.

2.4.2 Floods

2.4.2.1 Flood History

Since the current site elevation is approximately 21 ft above mean sea level (MSL), and since some means of high water protection had to be provided, knowledge of flood flows and elevations at the site was particularly important. Table 2.4-1 gives data for historic floods from 1814 through 1984. The two greatest flows over the past 325 years occurred 30 months apart, on March 21, 1936, and September 23-24, 1938. Computed flood stages and discharges at Bodkin Rock were 28.2 and 25.75 ft MSL, and 267,000 and 239,000 cfs, respectively. The August 1955 hurricane produced a 20.44 ft MSL flood stage and a 177,000 cfs discharge. Since 1936, the potential for reaching similar flood levels has been decreased by the construction of a number of reservoirs in the river basin which were constructed specifically for flood control.

In the years since the plant began operation, no floods have exceeded the levels of the 1936 flood at the plant site.

2.4.2.2 Flood Design Considerations

The ISFSI flood design considerations are contained within Reference 2.4-1. The flooding design basis is 19.5 ft. MSL.

2.4.2.3 Effects of Local Intense Precipitation

Average annual rainfall increases from about 38 in. in the northern part of the drainage area to about 47 in. in southern Connecticut. Runoff averages about 60% of the total rainfall but varies seasonally and can be as low as 25% in the summer. Spring runoff may be high because of melting snow cover and heavy rains; this combination caused the 1936 flood. Reference 2.4-1 provides a detailed discussion with respect to the effects of local probable maximum precipitation and drainage characteristics for the site.

CHAPTER 3

DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT AND SYSTEMS

3.1 CONFORMANCE WITH NRC GENERAL DESIGN CRITERIA

3.1.1 Summary Discussion

The General Design Criteria (GDC) for Nuclear Power Plants as listed in Appendix A to 10 CFR 50 were effective May 21, 1971 and subsequently amended July 7, 1971. There are 55 total GDCs, divided into six groups; these are intended to establish minimum requirements for the design of nuclear power plants.

The full term operating license (FTOL) was issued December 27, 1974 and the provisional operating license (POL) for the Haddam Neck Plant (HNP) was issued June 30, 1967, thus the plant was designed and licensed prior to the issue of the Nuclear Regulatory Commission (NRC) GDCs. The HNP is not obligated to comply with the GDCs. The HNP was originally evaluated on a plant-specific basis, determined to be safe, and licensed by the Commission, Reference 3.1-1.

However, in support of the application for a full term operating license, Reference 3.1-2, the design of the HNP was analyzed and compared with the 21 proposed August 1968 IEEE Criteria for Nuclear Power Plant Protection Systems and the 70 proposed July 1967 GDC for nuclear power plants issued by the AEC.

The analysis made by Connecticut Yankee Atomic Power Company (CYAPCO) at that time (December 1969) concluded that the plant design did meet most of these criteria. In cases where the criteria were not met, it was concluded the design was such that safety of the plant was adequate. The NRC staff stated in its July 1971 review of the analysis that the HNP conforms with the intent of the GDC proposed in July 1967, Reference 3.1-3.

However, it should be noted that this comparison and conclusion is not a commitment to meet the current GDCs. Instead, the Reference 3.1-2 comparison determined the degree of compliance with the GDCs at that time.

In December of 1996, CYAPCO certified to the NRC of the permanent cessation of operations of the HNP and that all of the fuel assemblies have been permanently removed from the reactor vessel and placed in the Spent Fuel Pool, Reference 1.1-1. Following this certification, CYAPCO decommissioned the HNP. As part of the process, the Systematic Evaluation Program (SEP) Topics, Reference 3.1-4, Three Mile Island Lessons Learned Items, Reference 3.1-5, the GDC, and the Regulatory Guides applicable to the HNP were assessed for their applicability to the HNP as decommissioning proceeds. The SEP Topics, TMI Items, and Regulatory Guides applicable to the HNP are documented in Reference 3.1-6. This section reflects the applicability of the GDCs to the CY ISFSI.

The GDC were not written specifically for a nuclear power plant that is permanently defueled or being decommissioned. When the HNP was an operating plant, CYAPCO made statements in this document of conformance to only GDC 3, 19, 60, 62, 63 and 64. The remaining GDCs are either not applicable to the ISFSI, or if they are, the respective sections of this document address the degree of conformance to the intent of the criteria. Although not committed to meet the listed GDCs, CYAPCO's conformance is summarized below.

3.1.1.1 Criteria Conformance

3.1.1.1.1 Fire Protection (Criterion 3)

Criterion

"Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat-resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Fire fighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems and components."

Design Conformance

The regulatory requirements for the Connecticut Yankee ISFSI Fire Protection Program (Reference 3.1-7) are set forth in 10 CFR 50.48(f). In accordance with 10 CFR 50.48(f), the ISFSI Fire Protection Program shall establish the fire protection policy for the protection of structures, systems and components from fires which could cause the release or spread of radioactive materials from the time that the plant ceases operation until the plant is completely decommissioned. This includes the personnel, procedures and equipment required to implement the program. Subject to the requirements of 10 CFR 50.48(f), the licensee may make changes to the ISFSI Fire Protection Program without prior NRC approval provided the changes do not reduce the effectiveness of fire protection for structures, systems and equipment that could result in a radiological hazard, taking into account the plant conditions and activities during decommissioning.

3.1.1.1.2 Prevention of Criticality in Fuel Storage and Handling (Criterion 62)

Criterion

"Criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations."

Design Conformance

The NAC MPC storage system uses geometrically safe configurations to prevent criticality as described in the NAC MPC FSAR (Reference 3.1-8).

3.1.1.1.3 Monitoring Fuel and Waste Storage (Criterion 63)

Criterion

"Appropriate systems shall be provided in fuel storage and radioactive waste systems and associated handling areas (1) to detect conditions that may result in loss of residual heat removal capability and excessive radiation levels and (2) to initiate appropriate safety actions."

Design Conformance

Criterion 63, with respect to monitoring fuel, is no longer applicable to the HNP since all the Spent Fuel have been removed from the Spent Fuel Pool and transferred to the ISFSI.

ISFSI radiation levels are periodically measured as described in ISFSI RP procedures.

REFERENCES

3.1-1 SECY-92-223, "Resolution of Deviations Identified During the Systematic Evaluation Program," from J. M. Taylor to the Commissioners, June 19, 1992.

3.1-2 Letter from D.C. Switzer (CYAPCO) to USAEC, Connecticut Yankee Full Term Operating License Application and Attachment entitled, "Conformance to General Design Criteria", dated December 31, 1969.

3.1-3 US Atomic Energy Commission Safety Evaluation by the Division of Reactor Licensing, Docket No. 50-213, Connecticut Yankee Atomic Power Company, Haddam Neck Plant, July 1, 1971.

3.1-4 NUREG 0826 Integrated Plant Safety Assessment Systematic Evaluation Program, Haddam Neck Plant, June 1983.

3.1-5 NUREG-0737, "Clarification of TMI Action Plan Requirements", USNRC, dated November 1980.

3.1-6 Chapter 14, Regulations and Programs, Haddam Neck Plant Licensing Basis/ Design Basis Document.

3.1-7 Procedure FP-1, ISFSI Fire Protection Program.

3.1-8 NAC-MPC Final Safety Analysis Report (FSAR), Docket 72-1025.

3.3-1 Letter from W.G. Counsil to D.L. Ziemann dated September 7, 1979, Subject "SEP Structural Topics." Docket No. 50-213.

3.3-2 Letter from W.G. Counsil to D.M. Crutchfield dated December 14, 1981, Subject: "SEP Topic III-2, Wind and Tornado Loadings, Haddam Neck Plant." Docket No. 50-213, B10273.

3.3-3 Letter from W.G. Counsil to D.M. Crutchfield dated April 6, 1982, Subject "SEP Topic III-2, Wind and Tornado Loading, Haddam Neck Plant." Docket No.50-213 B10465 N.U. Uniqueness No. 91440033.

3.3-4 Letter from D.M. Crutchfield to W.G. Counsil dated September 2, 1982, Subject: "SEP Topic III-2, Wind and Tornado Loadings Haddam Neck Plant." Docket No. 50-213 LS05-82-09-013 N.U. Uniqueness No. 91740015.

3.3-5 Letter from the NRC to CYAPCO dated August 2, 1982, "SEP Topic III-4.A, Tornado Missiles - Haddam Neck".

HADDAM NECK PLANT UFSAR

CHAPTER 8

ELECTRIC POWER

8.1 ISFSI and Monitoring Station 120/240V System

Power to the ISFSI Electrical Equipment Enclosure (EEE) Building, ISFSI Monitoring Station and Guard House is supplied from a 23 kV overhead utility line that feeds a 23 kV to 120/240V, single phase transformer located near the ISFSI Monitoring Station. The system provides power to ISFSI loads.

In addition, a diesel generator is located at the ISFSI to provide backup power when offsite power is unavailable.

11.3 GASEOUS WASTE MANAGEMENT SYSTEM

Radioactive gases are no longer generated at the HNP since the cessation of power operations. At this time all spent fuel has been removed from the reactor and spent fuel pool and is maintained in storage at the Independent Spent Fuel Storage Installation (ISFSI). Therefore the Gaseous Waste Management System is no longer required. All gaseous radioactive waste systems have been classified as Abandoned and have been decommissioned. Their components have been removed and disposed. Therefore, no residual radioactive noble gas is available for release at the site.

11.4 SOLID WASTE MANAGEMENT SYSTEM

The function of the solid waste program is to receive, package, collect and store radioactive wastes that result from ISFSI operation, maintenance and decommissioning activities.

With the completion of plant decommissioning and the storage of spent fuel and GTCC waste at the ISFSI, there is only a small potential to generate radiological material that will have to be managed as radioactive waste until decommissioning of the ISFSI. If it becomes necessary to process radioactive waste, then all applicable regulatory commitments will be met using programmatic controls and licensed contractors for handling, shipping and disposal.

The estimated volumes and the activities and isotopic contents of solid wastes are given in Reference 11.2-1, the Annual Radioactive Effluent and Waste Disposal Report.

The ISFSI contains selected equipment and storage capacities which meet the ISFSI solid waste processing requirements.

Three canisters of Greater Than Class C (GTCC) radioactive waste in three concrete casks are stored on the ISFSI pad.

11.4.2.1 Handling of Spent Resins - Deleted

11.4.2.2 Handling of Dry Solid Wastes

Contaminated DAW and metallic materials are placed into suitable transport packages, for storage and transport to a waste processor and/or disposal. Equipment too large to be handled in this way are first cut into small pieces before placement in the packages.

11.4.2.3 GTCC Waste Storage

The GTCC waste is stored in three stainless steel canisters which have been evacuated of water, filled with helium and welded shut. Each canister is stored within a concrete cask on the ISFSI pad. The GTCC waste is stored in accordance with 10 CFR 30.

11.5 PROCESS AND EFFLUENT RADIOLOGICAL MONITORING - DELETED

CHAPTER 13

CONDUCT OF OPERATIONS

13.1 ORGANIZATIONAL STRUCTURE

Connecticut Yankee Atomic Power Company (CYAPCO) is the NRC Licensee and provides those required activities to support operation of the ISFSI. CYAPCO is owned by the following electric utilities in New England:

(1) The Connecticut Light and Power Company (Northeast Utilities (NU) subsidiary)
(2) New England Power Company
(3) Boston Edison Company (NSTAR subsidiary)
(4) United Illuminating Company
(5) Western Massachusetts Electric Company (WMECO) (NU subsidiary)
(6) Central Maine Power Company
(7) Public Service Company of New Hampshire (PSNH)(NU subsidiary)
(8) Cambridge Electric Light Company (NSTAR subsidiary)
(9) Central Vermont Public Service Company

Northeast Utilities currently owns 49 percent of the Haddam Neck ISFSI as the parent company of the subsidiaries shown above. Northeast Utilities is in the process of merging with NSTAR and the new company will retain the name of Northeast Utilities. When the merger is completed, Northeast Utilities will own 63 percent of the Haddam Neck ISFSI as the parent company of the NU and NSTAR subsidiaries shown above. The remaining 37 percent ownership of the ISFSI will be held by the other New England electric utilities shown above.

13.1.1 Organization

The management and technical support organization is provided by CYAPCO. CYAPCO is responsible for the spent fuel storage activities. These activities are coordinated between the support organizations with CYAPCO having lead responsibility for an activity. CYAPCO is committed to ensuring that it maintains an organization and adequate resources from both onsite and offsite sources to support the storage spent fuel and GTCC waste. The organization is maintained in accordance with the Connecticut Yankee Quality Assurance Program and the Operating License.

13.2 TRAINING PROGRAMS

Formal training programs have been established to train and qualify the personnel who support ISFSI operations.

13.3 EMERGENCY PLANNING

The Connecticut Yankee Atomic Power Company Emergency Plan describes CYAPCO's plan for responding to emergencies that may arise while spent nuclear fuel and GTCC waste are stored at the ISFSI.

13.4 REVIEW AND AUDIT

On-site reviews, independent reviews and audits of activities shall be implemented in accordance with the Connecticut Yankee Quality Assurance Program (CYQAP) for ISFSI.