



**CONNECTICUT YANKEE ATOMIC POWER COMPANY**

**HADDAM NECK PLANT**  
362 INJUN HOLLOW ROAD • EAST HAMPTON, CT 06424-3099  
DEC -2 2004

CY-04-246

License No. DPR-61  
Docket No. 72-0039

Re: 10 CFR 72.75(g)

Director, Spent Fuel Project Office  
Office of Nuclear Material and Safeguards  
U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

Haddam Neck Plant  
60 Day Written Follow up to Event Number 41089

In accordance with the requirements of 10 CFR 72.75(g), Connecticut Yankee Atomic Power Company (CYAPCO) submits the attached report as a follow up to the 10 CFR 72.75(c)(2) notification, Event Number 41089, dated October 4, 2004.

CYAPCO is in the process of decommissioning the facility and has constructed an on-site Independent Spent Fuel Storage Installation (ISFSI). As of November 29, 2004 twenty five of forty spent fuel Transportable Storage Canisters (TSC) have been loaded and placed within the ISFSI protected area.

On October 4, 2004, CYAPCO pursuant to 10 CFR 72.75(e) notified the USNRC that the first 18 TSCs had been dewatered using multiple blowdowns of the TSCs while in the dewatering time clock. CYAPCO determined that this is contrary to the time-to-boil thermal analyses, which assume a water environment during the entire dewatering period. This condition is not consistent with current analysis assumptions and was therefore reported as a potential unanalyzed condition in accordance with 10 CFR 72.75(c)(2).

Subsequent to the report, NAC International, Inc., the Certificate of Compliance No. 1025 holder for the NAC-MPC system, performed an additional analysis which demonstrated the thermal limits for fuel and other TSC components were

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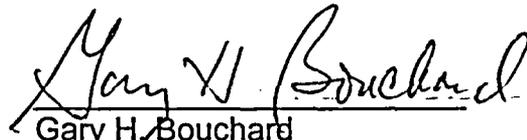
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not exceeded, and the integrity of the fuel cladding had not been adversely affected.

This event was of low safety significance and resulted in no adverse consequences to the health and safety of the public.

Should you require additional information, please contact Mr. Gerard van Noordennen at (860) 267-3938.

Sincerely,



Gary H. Bouchard

Director, Nuclear Safety and Regulatory Affairs

12-2-04

Date

Attachment: 20 CFR 72.75(g) 60 Day Written Follow up to Event Number 41089

cc: S. J. Collins, NRC Region I Administrator  
T. B. Smith, NRC Project Manager, Haddam Neck Plant  
R. R. Bellamy, Chief, Decommissioning and Laboratory Branch,  
NRC Region I

ATTACHMENT  
10 CFR 72.75(g) 60 Day Written Follow up to Event Number 41089

Abstract

Pursuant to 10 CFR 72.75 (c) Connecticut Yankee Atomic Power Company (CYAPCO), on October 4, 2004, informed the USNRC of a potential for a significant reduction in the effectiveness of a spent fuel confinement system in use at the Haddam Neck Plant (Event No. 41089). This potential reduction in effectiveness resulted from loading operations which deviated from the assumptions of the licensing basis thermal analyses for the NAC International Multi-Purpose Canister (MPC) System, Certificate of Compliance (CoC) No. 1025.

At the time of discovery, CYAPCO had loaded 17 canisters and was in final vacuum drying evolutions on the 18<sup>th</sup> spent fuel canister.

NAC International, the CoC holder, was advised of this condition and began analyzing the actual loading conditions to determine if there were adverse consequences for this condition. This analysis determined that the thermal limits for fuel and components had not been exceeded and the integrity of the fuel cladding had not been adversely affected. This analysis also supported a determination that the 18 loaded canisters were operable.

Changes were made to the loading procedures to assure consistency with the assumptions of the original thermal analyses for the 18<sup>th</sup> and subsequent canister loading.

CYAPCO concluded, as a result of the final operability determination and the supporting analyses that this event was of low safety significance and resulted in no adverse consequences to the health and safety of the public.

Narrative

Event Description

This report addresses a potentially degraded condition of Transportable Storage Containers (TSC), which are loaded with Spent Nuclear Fuel (SNF). Specifically, this report applies to TSC Nos. 1-3, 8, 9, 12, 16, 18-23, 26, 27, 31, 35, and 36 which have been placed within the protected area of the ISFSI constructed at the Haddam Neck Plant between May 5, 2004 and October 5, 2004.

The potentially degraded condition is a loss of confinement capability that could affect the operability of a TSC to prevent releases exceeding regulatory limits. The integrity of each TSC is dependent, in part, on the integrity of the SNF clad and the TSC internal component. SNF integrity is assured by keeping clad temperatures within the limits specified in the Certificate of Compliance, No. 1025, issued to NAC International, Inc. Clad and internal component temperatures are affected by changes in the TSC internal environment that take place during fuel transfer operations. In order to maintain temperatures within safe limits, durations for three critical fuel transfer activities are limited. These activities are:

- Time-in water phase (This phase is also referred to as the time-to-boil FSAR Limit).
- Time-in-vacuum drying phase - when the free water has been removed from inside the TSC (Technical Specification limit)
- Time-in-helium phase

Time limits for these activities are stipulated in the fuel transfer procedures, which were prepared exclusively for the Haddam Neck Plant.

It is the practice to perform a series of blow-downs using nitrogen to maximize the elimination of liquid-phase water prior to vacuum drying. During the loading of the above listed TSCs this time period had been considered to be part of the time-in-water phase.

A CYAPCO operations support engineer, recently assigned to the fuel transfer project, based on his experience with another licensee's fuel transfer campaign, questioned the time accountability for the blow-down evolutions. CYAPCO personnel conferred with NAC International, reviewed the analytical assumptions, and confirmed that the multiple nitrogen blow-down process should have been accounted for in the time-in-vacuum drying phase to be consistent with the (CoC) thermal analyses.

NAC International was requested to analyze each loaded TSC using actual SNF positioning, heat output, and loading times to determine theoretical maximum SNF clad and critical TSC component temperatures. NAC consolidated the evaluations into four bounding cases. Their conclusion is that at no time during the fuel transfer operations for all 18 TSCs did the fuel clad or component temperatures exceed the limitations specified in the MPC FSAR.

The extended vacuum drying times did not create a reduction of confinement capability in any dry storage component nor has the integrity of the fuel cladding been adversely affected.

### Cause

A root cause investigation was conducted to identify the reason for and the extent of the procedure deviations from the assumptions of the thermal analyses.

The investigation concluded that the root cause of the condition was that the information in the NAC-MPC FSAR and the Operations Manual, which were the basis for procedure development, did not accurately or completely reflect all of the assumptions of the thermal analysis.

A contributing factor was that CYAPCO did not require HNP procedures and procedure changes to be reviewed by NAC, the CoC holder. NAC reviews might have identified the discrepancies between the thermal analyses assumptions and the HNP procedures.

### Corrective Actions

A number of corrective actions have been implemented to insure the procedures used by the Fuel Transfer Project are consistent with the assumptions of the design and licensing analyses for the NAC-MPC System. These corrective actions are documented in the root cause analysis report.

### Analysis/Safety Significance

There are two GTCC canisters at the ISFSI which are not affected by this condition.

Each of the NAC-MPC fuel canisters loaded and placed on the ISFSI pad within the protected area contain 24 or 26 spent nuclear fuel assemblies. The loaded assemblies were manufactured with either stainless steel or zirconium alloy cladding. Each of the assemblies had been in wet storage for at least five years, most upwards of 15 years, prior to loading in the NAC-MPC canisters.

CYAPCO concluded, as a result of the final operability determination and the supporting analyses, that this event was of low safety significance and resulted in no adverse consequences to the health and safety of the public. There was no increase in radiological exposure to the public or in occupational exposure to the Fuel Transfer personnel.

Fuel Transfer procedures have been reviewed and revised to assure consistency with the assumptions of the thermal analyses to preclude similar events from occurring in the future.