UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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September 20, 2004

Mr. Wayne A. Norton
President
Connecticut Yankee Atomic Power Company
362 Injun Hollow Road
East Hampton, CT 06424-3099

SUBJECT: NRC INTEGRATED INSPECTION REPORT 05000213/2004001

Dear Mr. Norton:

On June 8, 2004, we completed an integrated inspection at your Haddam Neck reactor facility of activities authorized by the above listed NRC license. We discussed our findings with Mr. Gary Bouchard, and others on June 22, 2004. Subsequent telephone discussions were held with your staff during July, which resulted in a revised final report for the confirmatory survey of the open land areas, dated July 27, 2004. The enclosed report presents the results of this inspection.

During this approximately four-month inspection period, we evaluated selected aspects of three of your spent fuel transfer dry run demonstrations, including a full sequence of loading Greater Than Class C Waste, which was the observed NRC Dry Run. We concluded that you have adequate procedures, equipment, and appropriately trained personnel in place and are prepared to safely package, transport, and store spent nuclear fuel at your Independent Spent Fuel Storage Installation (ISFSI). The transfer of the first spent fuel from the spent fuel pool to the ISFSI was subsequently evaluated. We determined that the lessons-learned from the dry run demonstrations improved your spent fuel dry cask storage system. No safety concerns were identified during the spent fuel transfers.

In addition, we inspected your operations and maintenance, self assessment and quality assurance surveillance, and plant support programs through selective examinations of procedures and representative records, interviews with personnel, observations by the inspectors, and independent measurements conducted by our contractor, the Oak Ridge Institute for Science and Education (ORISE). We consider these programs to be appropriately implemented.

Based on the results of this inspection, the NRC determined that one Severity Level IV violation of NRC requirements occurred during this inspection period. This violation involved multiple examples of failures to follow the dry cask storage system handling procedure during the NRC Dry Run. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region I; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with Section 2.390 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations (CFR), a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

We appreciate your cooperation with us during this inspection.

Sincerely,

/RA/

Craig Gordon, Chief
Decommissioning Branch
Division of Nuclear Material Safety

Enclosure:
Inspection Report No. 05000213/2004001

Docket No. 50-213
License No. DPR-61
ISFSI Docket No. 07200039

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REGION I

INSPECTION REPORT

Inspection No.	05000213/2004001
Docket Nos.	50-213 & 72-039
License No.	DPR-61
Licensee:	Connecticut Yankee Atomic Power Company (CYAPCO)
Location:	P. O. Box 270 Hartford, CT 06141-0270
Inspection Dates:	February 7, 2004 through June 8, 2004
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Approved By:	Craig Gordon, Chief DB, DNMS, Region I

EXECUTIVE SUMMARY

Connecticut Yankee Atomic Power Company
NRC Inspection Report No. 05000213/2004001

This integrated inspection included aspects of licensee activities regarding the preoperational testing program (licensee trial dry runs and the final NRC Dry Run) for safely loading spent fuel from the spent fuel pool (SFP) into a dry cask storage system and transferring the spent fuel to the Independent Spent Fuel Storage Installation (ISFSI). The NRC Dry Run included the loading through placement of the cask to the ISFSI with Greater Than Class C (GTCC) waste. The first loading and transfer of spent reactor fuel was also observed, following adequate completion of the NRC Dry Run.

In addition, the operations and maintenance, self assessment, quality assurance, radiation protection with respect to survey activities, and radioactive waste transportation programs were inspected. The report covers approximately a four-month period of announced inspections by five regional inspectors, two inspectors from the Spent Fuel Project Office in NMSS, and two NRC contractors from the Oak Ridge Institute for Science and Education (ORISE). The final ORISE report for onsite activities conducted on March 17, 2004, will be forwarded as a supplement to this inspection.

Preoperational Test Program

Connecticut Yankee (CY) conducted appropriate written evaluations to demonstrate compliance with regulatory requirements in 10 CFR Part 72 and 10 CFR 50.59, and meet the licensing basis documents for spent fuel loading, transfer, and dry cask storage. Heavy loads were appropriately configured and successfully field tested at the rated load. An independent assessment of the licensee's operability determination of the ISFSI concrete pad concluded that there was reasonable assurance that the structural integrity of the concrete had not been compromised, and the pad was able to fulfill its intended design. No findings of significance were identified.

CY had a comprehensive surveillance plan in place, and surveillances appeared to be thorough and effective. Review and approval of open issues from the Readiness Reviews lead by the Quality Assurance organization were completed prior to loading of spent fuel. The Fuel Transfer Memorandum process efficiently generated improvements to procedures and processes

CY demonstrated its capability to safely load spent fuel from the SFP into the approved NAC International Multi-Purpose Canister (NAC-MPC) and Vertical Concrete Cask (VCC) and transfer the loaded canister in the VCC to the ISFSI. Procedures and administrative controls had been established to ensure compliance with the cask system's Certificate of Compliance requirements. The licensee shared capability including tools and processes for retrieving spent fuel from the ISFSI. During the NRC Dry Run, there were some examples for failure to follow procedures for activities affecting quality as required by 10 CFR Part 50, Appendix B, Criterion V. Because these procedure non-compliance findings were entered into CY's corrective action program and adequate corrective actions were taken, NRC considers this issue as a non-cited violation.

First Fuel Transfer to ISFSI

The licensee loaded spent fuel from the SFP into a NAC-MPC canister, transferred the canister into a VCC, and transferred the VCC to the ISFSI in a safe and compliant manner. The licensee conducted good investigations when abnormal conditions were encountered, which resulted in technically sound solutions and program enhancements and no significant safety concerns. Lessons-learned from the licensee's dry run demonstrations improved the dry cask storage system.

Operations & Maintenance

Maintenance activities were adequately revised to incorporate corrective actions pertaining to damaged main hoist drum bull/pinion gears and to reinforce the periodic inspections of the crane. The licensee followed appropriate regulatory guidance to upgrade the CR-3-1A yard crane to safely handle spent fuel. No findings of significance were identified.

The CY Plant Operations Review Committee (PORC) provided several improvements to the procedures important to safety. While the PORC provided an effective oversight review, the NRC concluded that the number and types of technical and editorial errors suggested that some procedure changes had not been properly developed and reviewed prior to presentation to the PORC. Corrective actions taken by CY resolved this concern.

Plant Support and Radiological Controls

Audits, self-assessments, and surveillances were performed in accordance with written procedures by appropriately trained personnel. Follow-up action, including re-audit of deficient areas, was taken where applicable.

Radioactive waste and material were properly processed, packaged, stored, and shipped in accordance with NRC and DOT regulations.

The results of the independent sampling and scanning in all selected survey areas confirmed that the radiological conditions of the open land area survey units met the approved site-specific Derived Concentration Guidelines Levels (DCGLs). These results also confirmed that the survey units had been classified correctly.

The Unconditional Release Survey (URS) procedure alone, because it relied on human factors, was not sufficient to provide guidance to perform surveys of secondary structures for unconditional release. From document reviews, field observations including side-by-side measurements with ORISE, and detailed discussions with cognizant individuals, the licensee had conducted an adequate survey for the unconditional release of the Administrative Building.

The licensee's actions to identify contamination on the steam chest mezzanine in the Turbine Building, document the results, conduct remediation activities in the area, and revise the survey plan for 100% scanning of the remediated area according to the URS procedure was appropriate.

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REPORT DETAILS

Summary of Facility Activities

Preparations for loading spent fuel from the spent fuel pool (SFP) to the NAC International Multi-Purpose Canister (NAC-MPC) dry cask storage system were initiated. After completion of the dry run demonstrations, in late April, the licensee began the transfer of spent fuel to the onsite Independent Spent Fuel Storage Installation (ISFSI). Dismantlement of the waste tank farm and removal of commodities in the loop areas were in progress. Characterization and Final Status Surveys (FSS) were ongoing. Unconditional release surveys of the administration and diesel generator buildings were completed. Remediation of the small areas within the Turbine Building were ongoing.

I. Decommissioning Operations

O1 Preoperational Spent Fuel Transfer Test Program (NRC Dry Run)

O1.1 Review of Evaluations

a. Scope (60856 and 60857)

The inspector evaluated the licensee's compliance with the requirements of 10 CFR 72.212, 10 CFR 72.48 and 10 CFR 50.59. The inspector also reviewed the licensee's evaluations regarding the control of heavy loads and the surface delamination of the ISFSI concrete pad. The inspector conducted interviews, inspected facilities, observed activities, and reviewed relevant documents. The inspector also reviewed the training records of the personnel qualified to perform 10 CFR 72.48 reviews and evaluations.

b. Observations and Findings

1. 10 CFR 72.212 Evaluations

Connecticut Yankee (CY) documented its written evaluation to confirm the ISFSI is within the licensed scope in "10 CFR 72.212 Evaluation Report", dated April 2004. The detailed and comprehensive report listed the specific requirements of 10 CFR 72 Subpart K, as well as the conditions set forth in Certificate of Compliance (CoC) No. 1025, Amendment No. 3, dated October 1, 2003, and the licensee's specific exemption for certain design features that was granted by NRC on February 26, 2004. These included evaluations of heavy loads, radiological effluents and direct radiation controls, review of site characteristics against the Safety Analysis Report (SAR), and the ISFSI's impact on existing site programs and requirements. The licensee's written evaluation provided a discussion of how each requirement was satisfied. The inspector reviewed selected referenced records and program procedure changes for security, emergency preparedness, training, health physics and quality assurance. During the dry run demonstrations, various procedure enhancements were identified by the licensee to ensure implementation of the criteria of the CoC Technical Specifications (TS). The inspector determined from a review of the completed training, procedure enhancements, and observation of the support staff that the ISFSI did not decrease the supporting

programs' effectiveness. Those regulatory or license requirements selected for review were found to be adequately addressed.

2. 10 CFR 72.48 and 10 CFR 50.59 Evaluations

In supporting the fuel transfer readiness, CY implemented seven design change packages to facilitate spent fuel loading, cask movement to the ISFSI, and spent fuel storage. The inspectors selected three of the completed seven packages for review based on the risk significance of the packages. The three packages were as follows: 24265-500-DCP-00004-001, "Spent Fuel Building Modifications for Transfer of Fuel"; 24265-500-DCP-00005, "Yard Crane Upgrade"; and CY-DCR-00-006-03, "Fuel Transfer Optimization." The three design change packages (DCP) were adequately prepared for compliance with 10 CFR 50.59 and regulatory guidance.

The inspector reviewed two completed 72.48 packages, SY-EV-03-002, Revision 0, and SY-EV-04-001, Revision 0, to determine whether the 72.48 screening, determination, and evaluation (SDE) were adequate. The inspector determined that the 72.48 packages were adequately screened and evaluated. The inspector determined through interviews and training records that the qualified personnel were knowledgeable on the 72.48 SDE process.

3. Control of Heavy Loads Evaluations

The inspectors reviewed the rigging configurations, observed the ongoing rigging operations, and verified the actual rigging configuration of the fuel transfers to determine whether rigging was pre-planned and coordinated for safe transfer of fuel. The inspectors reviewed GPP-GGFT-00307-000, "Rigging Plan," dated March 17, 2004, and the rigging calculation of eighteen configurations, 24265-000-C-C00021-005, "Rigging Evaluation: Fuel Transfer Project," dated March 16, 2004 to determine whether the rigging configurations were safe and valid.

The inspectors observed and verified that CY used tested and documented rigging configurations in the transfer of fuel. The inspectors observed the installation of the shield lid and the installation of the transportable storage canister (TSC-41) into a transfer cask (TFR). The inspectors determined the rigging calculations were valid and adequate. CY engineers stated that each of the 18 rigging configurations were field-tested at the rated load before being used for fuel transfers.

In addition, the inspectors walked down the metal platform that would be used during the placement of the TSC cover lid, and found the platform adequately constructed with access to minimize personnel radiation exposures. In Dry Run 3, a rigging configuration was adequate for the load, but it was five feet too short in a configuration for minimizing personnel radiation exposures. CY initiated a temporary procedure change to adapt the configuration. The inspectors determined that the procedure change was adequate and demonstrated that the licensee's cognizant rigging and crane engineers were knowledgeable and prepared to safely perform the fuel transfers.

4. Evaluation of Delamination of the ISFSI Concrete Pad

The scope of the review was to assess the degree, extent and mechanism of the surface delamination of the ISFSI storage concrete pad, and to evaluate the safety significance of such degradation. The documents reviewed included:

ENG-04-039; "Letter from M.A. Powers to R. M. Mitchell", dated May 13, 2004, and NCR No. 015; "Nonconformance Report and Attachments", dated November 18, 2002.

The inspector reviewed the assessment, analysis, and evaluation performed by the licensee that was included in the operability determination for the concrete pad. To determine the structural adequacy of the pad, the licencee had obtained several core samples from each concrete placement and had performed destructive tests. These tests indicated an average of 3580 psi compressive strength for nine samples. This correlated well with the original acceptance tests specified to meet design requirements. Pertographic analyses were in progress to assess the depth of the surface defoliation, and the concrete's resistance to further weathering and/or degradation. The licensee formulated a repair and restoration plan to mitigate and prevent the current and future weathering of the concrete. The available tests and analyses indicated that the rough surfaces of the concrete pad was structurally adequate to fulfill its design functions. No findings of significance were identified.

c. Overall Conclusions

CY conducted appropriate written evaluations in order to demonstrate compliance with regulatory requirements in 10 CFR Part 72 and 10 CFR 50.59, and the licensing basis documents for spent fuel loading, transfer, and dry cask storage. Heavy loads were appropriately configured and successfully field tested at the rated load. An independent assessment of the licensee's operability determination of the ISFSI concrete pad concluded that there was reasonable assurance that the structural integrity of the concrete had not been compromised, and the pad was able to fulfill its intended design. No findings of significance were identified.

O1.2 Quality Assurance (QA) Program and Implementation

a. Scope (60856 and 40801)

The inspector reviewed the CY Quality Assurance Program (QAP), selected procedures and documents, and interviewed the QA Manager with respect to implementation of the licensee's QAP for dry cask storage of spent fuel. The follow-up to the licensee identified deficiency from Quality Surveillance Report (QSR) 03–010-CY/YR, regarding procedural controls for maintaining license document configuration was also evaluated.

b. Observations and Findings

Improvements to the QAP were initiated, including the transfer of the Nonconformance Program from Administration to Nuclear Safety and the addition of QA staff in 2004. In

procedures sampled, Quality Control (QC) hold points were clearly marked and appeared adequate for the activities. A surveillance plan was in place to provide for comprehensive on-going surveillances. Surveillances were thorough and observations were being factored into subsequent activities. Quality Surveillance Report (QSR) 04-011-CY, "Fuel Transfer Readiness Assessment," evaluated the status and effectiveness of preparation and planning activities for the Fuel Transfer Project and ISFSI. The assessment was in-depth and provided numerous recommendations to CY management for consideration.

A Fuel Transfer Memorandum (FTM) process effectively and efficiently documented recommendations from the field to improve procedures and processes. The sample of FTMs reviewed indicated the FTMs were being evaluated by management, incorporated into the project as appropriate, and tracked to closure. The FTMs were screened for issues that should be processed under the Condition Resolution Program. Open condition reports (CR) were being tracked by QA, and QA Manager review and approval of their status was required and accomplished prior to loading of spent fuel. QA surveillances were listed to be conducted for every fuel transfer package.

The inspector assessed the licensee's follow-up to QSR 03-010-CY/YR, "Corrective Action Follow-up of NAC-International." This QSR identified a QA concern regarding procedural controls for maintaining transportation (10 CFR 71) license document configuration in addition to QCs required by 10 CFR 50 and 72. The licensee plans to participate in the NAC-International owners-group audit and follow-up on the NAC corrective actions associated with the deficiency. CY scheduled for June 2004, an audit to evaluate procedure changes, its tracking system, and training of staff. The NRC plans to review the audit results and implementation of the NAC identified corrective actions during a subsequent inspection.

c. Conclusion

CY had a comprehensive surveillance plan in place, and surveillances appeared to be thorough and effective. Review and approval of open issues from the Readiness Assessment lead by the QA organization were completed prior to loading of spent fuel. The FTM process efficiently generated improvements to procedures and processes

O1.3 Preoperational Test Program and NRC Dry Run Observations

1. Spent Fuel and Greater Than Class C (GTCC) Handling

a. Scope (60854)

The inspectors reviewed the licensee's preoperational test program and observed activities in progress relative to handling spent fuel to determine whether the licensee and contractor organizations were capable of safely loading spent nuclear fuel from the SFP into the NAC-MPC. The preoperational test program was examined during three dry run demonstrations to ensure that all conditions and requirements of the CofC for the NAC-MPC were being met and that the licensee was capable of safely retrieving spent fuel assemblies from the ISFSI. The NRC Dry Run evaluated actual loading of GTCC canisters. The inspector reviewed selected procedures including SNM1.4-5, "Transfer of Fuel Assemblies of Fuel Assembly Sized (FAS) Canisters in the Spent Fuel Pool", SNM1.4-11 "Special Nuclear Material and GTCC Waste Inventory", Revision 16, GPP-GGFT-00101-000, "Spent Fuel Transfer", and GPP-GGFT-00202-000, "Vacuum Drying Operations." The inspector also made several field observations including: the air pressure test for TSC-41, following welding of the shield lid, the loading of VCC-42 from the parking lot storage area onto the trailer in preparation for movement into the industrial area, and review of security during fuel movement and transfer evolutions. The inspector reviewed a video tape of a TSC lid cutting and removal demonstration applicable to the CY site.

b. Observations and Findings

The inspector observed spent fuel movement within the SFP and determined that the licensee was capable of safely selecting, latching, and moving spent fuel assemblies. The licensee's procedures for fuel movement provided adequate direction and instruction, which were performed by the Limited Certified Fuel Handlers and Fuel Handlers. Fuel move sheets were detailed and precise. The inspector observed that the licensee safely moved the designated spent fuel assemblies and repositioned them into a designated rack location in a dry run demonstration prior to movement of GTCC to a TSC.

Following placement of the GTCC FAS canisters into the TSC, the tops of the canisters were videotaped to record the numbers and locations of the canisters in the TSC. In accordance with step 6.6.1 of GPP-GGFT-0010, the sides of the FAS canisters were not videotaped. The oncoming shift Cask Loading Supervisor determined that the required videotaping had not been performed. The licensee determined that the requirement to videotape was in a Procedure Note rather than a sign-off step. The inspector had observed that a copy of the procedure was not available at the work site, and the reasons for videotaping the sides of the FAS canisters were not reviewed during the pre-job brief. A review of the videotape of the tops of the FAS cans revealed that not all can numbers could be read clearly. CY initiated a contingency plan to videotape the sides of the cans. CY reviewed the procedure and found other instances of actions

being included in Procedure Notes. CR 04-0545 was initiated to address the licensee-identified failure to follow procedure GPP-GGFT-0010.

The applicable steps in procedure GPP-GGFT-00202-000 required the TSC to be pressurized within a specified range and the pressure to be held for ten minutes with the final pressure to be equal to or greater than the initial pressure. The inspector observed that although the test pressure was achieved while at the procedure QC hold point, the fuel handlers observed that the pressure had fallen below the required range for the test. The inspector noted that the fuel handlers took actions not in the approved procedure by repositioning valves and operating the Vacuum Drying System (VDS) controls to raise the pressure in the TSC back within the test range. The initial attempt to raise the pressure was unsuccessful. The fuel handlers concluded the valve lineup they had established without an approved procedure was not correct, and determined that an additional valve had to be repositioned to achieve the pressure. Following the repositioning of that valve and operation of the VDS console, the required test pressure was achieved. The QC inspector read the initial test pressure on the Heise gauge and the test was commenced with the start of a stopwatch to record the elapsed time of the test. Approximately one or two minutes after the test was started, the QC inspector noticed that pressure readings from two digital indicators on the VDS console had not been recorded as required by the procedure. Each digital indicator (reading to three decimal places) was clearly showing a slow drop in pressure, but one fuel handler appeared to recall the two initial values from memory and the QC inspector, who had not witnessed the initial readings, entered the values in the procedure. When the stopwatch indicated ten minutes had elapsed, the Heise gauge and the VDS indicators were read and the values entered in the procedure. The QC inspector and the fuel handler signed the step. Following discussions with the NRC inspector and a review of the documentation, CY declared the results of the pressure test invalid. CR 04-0548 was initiated to address the licensee's performance of activities affecting quality, when they operated valves and equipment to repressurize TSC-41, not in accordance with procedure GPP-GGFT-00202-000.

The inspector also observed the loading of VCC-42 onto the trailer, and the as left condition of the loaded trailer in the parking lot until TSC-41 was ready for loading into the VCC. In accordance with the procedure, security personnel performed a visual inspection of the VCC inlet plenum and the lead seal on the concrete cask lid. Security personnel remained present during the time the inlet vent screens were not installed on the VCC. The VCC was moved onto the trailer without difficulty. After the VCC was positioned on the trailer and the inlet screens were reinstalled, security personnel installed security tape such that the inlet screens could not be removed without damage to the security tape, and then left the area. Due to the VCC resting on the deflated air pads while on the trailer, there was an unobstructed 3" by 12" opening into the plenum directly beneath each of two inlet screens. The loaded trailer was prepared to move with the tractor, and then staged till needed. Parking of the trailer, which required several steps such as deploying the trailer outriggers, was not written in the procedure. The inspector concluded from a review of the procedure that the intent of the procedure was to move the VCC into the industrial area without a delay after loading. While not specifically prohibited by the procedure, not moving the VCC directly into the industrial

area introduced activities not specified in the procedure. The inspector confirmed with security management, that the security inspection was essentially voided, when the VCC was left unguarded with the two openings into the plenum. The licensee revised the procedure to address the need for an additional security inspection, if the loaded trailer was staged outside industrial area.

Based on the above observations, the inspectors determined that there were multiple examples where approved procedures were not followed. These included: the failure to videotape the fuel assemblies as required by Procedure GPP-GGFT-00101-000; repositioning of valves into a lineup not addressed in procedure GPP-GGFT-00202-000; failure to properly document test data; and failure to have the test properly witnessed by QC personnel. The inspector determined that the licensee's failure to follow the approved procedures during the Dry Run was a violation of 10 CFR Part 50, Appendix B, Criterion V. However, because of the low safety significance and the timeliness and effectiveness of the licensee's corrective actions, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy **(NCV 50-213/04-01-01)**.

The demonstration of the TSC cutting had been performed at the Yankee Rowe site. The inspector noted that CY would be utilizing the same contractor and equipment in use at Yankee Rowe. The inspector verified that the TSC lid cutting equipment for use at the CY, Yankee Rowe and Maine Yankee sites will be stored at a location where it will be available if needed in the future. The inspector verified that the licensee can successfully cut the TSC lid weld, remove the TSC lid, and retrieve a spent fuel assembly if required.

2. Training and Qualifications

a. Scope (60854)

Training and qualification records were reviewed to determine if the fuel handling crew, welders, welding QA inspectors, support staff were properly trained and qualified to safely transfer spent fuel. The inspector discussed the safe load paths and heavy load operations with the cognizant fuel pool crane engineers. The inspector observed the pre-job briefings, shift turnover of the crews, and crane operations in the SFP.

b. Observations and Findings

The inspector noted that the training and qualification matrix identified the names and positions by evolutions such as preparing the cask for the SFP, moving the TSC into the SFP, maneuvering the lift yoke, placing a shield lid on a TSC, and recovering from a failed yard crane. The inspector verified that the spent fuel handlers were properly trained and qualified to perform assigned tasks. Turnover to the oncoming crews was orderly and informative. All crane operations over the SFP were conducted in accordance with Technical Specification 6.2.2 d and the Fuel Transfer Project Plan. The inspector determined from observations that the welders and weld OA inspectors

performing the visual and penetrant test verification examinations were experienced. No significant safety concerns were identified.

3. Welding Operations

a. Scope (60854)

The inspector observed welding of the shield lid, drain and vent port covers, and the structural lid for TSC-41 to determine if procedures and practices were adequate to ensure a proper canister seal. The welding work plan, documentation of weld attributes and the procedure for Helium Leak testing was reviewed and discussed with those performing the test. The inspector reviewed records of visual (VT), dye penetrant (PT), and Helium leak test to confirm adequacy of welds. The performance of the Quality verification inspectors was observed.

b. Observations and Findings

The results of the performance of VT, PT, and helium leak tests confirmed the effectiveness of the welds and the weld crews. The machine welds of the shield plug and the structural lid were of high quality and acceptable to the visual examination, penetrant testing, and helium leak testing requirements. The manual gas shielded tungsten arc welds of the vent and drain port covers were also acceptable to the visual examination, penetrant testing, and helium leak testing requirements. The documentation of the welding procedures, welding materials, welders, quality control examinations and work acceptances were well organized, complete, and concurrent with the work status. No safety concerns were identified.

c. Overall Conclusion

CY demonstrated its capability to safely load spent fuel from the SFP into the approved NAC-MPC and VCC and transfer the loaded canister in the VCC to the ISFSI. Procedures and administrative controls had been established to ensure compliance with the cask system's CofC requirements. The licensee shared capability including tools and processes for retrieving spent fuel from the ISFSI. During the NRC Dry Run, there were some examples of failure to follow procedures for activities affecting quality as required by 10 CFR Part 50, Appendix B, Criterion V. Because these procedure non-compliance findings were entered into CY's corrective action program and adequate corrective actions were taken, NRC considers this issue as a non-cited violation.

O2 First Spent Fuel Transfer

O2.1 First Fuel Transfer to ISFSI

a. Inspection Scope (60855)

The inspector observed and evaluated licensee activities during the first fuel movement from the SFP to the ISFSI. Compliance with the CofC, SAR, TS, licensee procedures, and 10 CFR 72 was evaluated. The inspector reviewed a video record of the final placement of designated spent fuel assemblies into the TSC and the vacuum drying of the loaded TSC.

b. Observations

The inspector discussed the move sheets with the cognizant supervisor and verified that each assembly was positioned in the proper grid location in the TSC. The inspector reviewed the nuclear parameters with a Certified Fuel Handler and cognizant supervisor and verified that the TSC contained the proper designated assemblies regarding limits on age, decay heat, surface dose rate, enrichment, and number of failures.

TS A.3.1.2, “Canister Vacuum Drying Pressure”, requires a vacuum of less than 10 TORR (mm of mercury) be maintained for at least 10 minutes. An administrative requirement was established at less than 3 TORR maintained for 30 minutes. If the licensee cannot achieve these limits in less than 72 hours, the vacuum drying process must stop and force air cooling initiated. The inspector verified that the licensee achieved the required administrative vacuum drying criteria (drying was achieved in 70 hours) prior to proceeding with welding the structural lid. The structural lid was welded in place using a remote two-head welder. The inlet and outlet vent ports were welded by hand. The inspector observed good dose control practiced by the welders during hand welding. The use of the remote welding machine significantly reduced personnel radiation exposure.

The inspector observed the transfer of the TSC into the VCC which was positioned on the Heavy Haul Trailer (HHT) in the alleyway outside the SFP building. Appropriate access controls were employed by health physics and security personnel to limit the number of workers. Radiation surveys were performed around the VCC once the TSC was loaded. Dose rates were obtained and compared to the NAC-MPC TS average dose rate limits. The inspector reviewed radiation survey data which indicated that the highest dose rate on the VCC was 4 mrem per hour at the bottom vent and that the average dose rates were well below the TS limits. Smear surveys were also taken on the outside surface of the TSC and the inside surface of the VCC. The inspector reviewed results of the contamination surveys and verified that the TS limits for beta/gamma and alpha were not exceeded. No safety concerns were identified.

The inspector accompanied the HHT enroute to the ISFSI pad. Appropriate security and radiation protection controls were observed. During the off-loading from the HHT, one of four air pads, used to elevate and move the 120 ton loaded VCC from the trailer

to the final location on the ISFSI pad, ruptured. The VCC was partially off the HHT and partially on the pad. The licensee immediately stopped all work and initiated an investigation. A recovery plan was prepared and engineering staff were contacted to evaluate the safety of the load. The inspector discussed the incident with plant and engineering management and verified that the VCC with its full load of spent fuel assemblies was stabilized while the recovery plan was reviewed and finalized. The inspector observed the recovery activities and identified no safety concerns. The VCC was safely off-loaded from the HHT onto the ISFSI pad. A condition report was written and entered into the licensee's corrective action program.

c. Conclusions

The licensee loaded spent fuel from the SFP into a NAC-MPC canister, transferred the canister into a VCC, and transferred the VCC to the ISFSI in a safe and compliant manner. The licensee conducted good investigations when abnormal conditions were encountered, which resulted in technically sound solutions and program enhancements and no significant safety concerns. Lessons-learned from the licensee's dry run demonstrations improved the dry cask storage system.

O3 Conduct of Operations

O3.1 Yard Crane Operability and Maintenance

a. Scope (62801)

The inspector reviewed maintenance procedure, "Yard Crane Inspection and Preventive Maintenance," Revision CY-001, dated March 11, 2004, to determine whether the licensee adequately incorporated corrective actions regarding bull/pinion gear damage identified in a nonconformance report (NCR) and CR-04-0275. The inspector also reviewed the DCP for the crane upgrade and the vendor data. In addition, the inspector reviewed CR-04-0085, regarding an inadvertent yard crane movement. The crane operator accidentally contacted the trolley joystick attached to his waist causing the TFR cask to contact the east wall of the SFP.

b. Observations and Findings

As described in NCR 2004-019, the teeth of the main hoist drum bull/pinion gears were found damaged, and in CR-04-0275, dry grease was found on the gears. The licensee initiated corrective actions to prevent recurrence by revising the maintenance procedure.

The revised maintenance procedure required daily and weekly inspections of the main hoist drum bull/pinion gears in addition to monthly and annual inspections. Other additional inspections were at the discretion of the project field engineer. The spent fuel dry cask loading supervisor was assigned the duty to ensure the required daily and weekly inspections were documented in Appendix G of the procedure. If more than two lifts of loads greater than 50,000 pounds were required in any given day, an additional

inspection was required after the second lift. The operating temperature range for the grease was verified with the crane vendor. The inspector determined that the revised maintenance procedure was adequate to prevent the recurrence of the damage.

DCP 24265-500-DCP-00005, "Yard Crane Upgrade," Reference 17.32, described upgrades to the yard crane required to safely handle spent fuel. The inspector reviewed the package and determined that the upgrades were adequately performed and reviewed.

The licensee reviewed the inadvertent yard crane movement event and concluded that no damage was done to the east wall of the SFP nor to the TFR. The inspectors determined that the licensee conducted a thorough and comprehensive assessment and completed adequate corrective actions to prevent future recurrence. No findings of significance were identified.

c. Conclusion

Maintenance activities were adequately revised to incorporate corrective actions pertaining to damaged main hoist drum bull/pinion gears and to reinforce the periodic inspections of the crane. The licensee followed appropriate regulatory guidance to upgrade the yard crane to safely handle spent fuel.

O3.2 Plant Operations Review Committee

a. Scope

The inspector observed on April 23, 2004, a PORC meeting to approve a change to GPP-GGFT-00202-000, "Vacuum Drying Operations." This procedure is required to ensure Technical Specifications are met for dry cask storage.

b. Observations and Findings

The procedure changes were considered to be necessary for the upcoming vacuum drying operations. Several committee members remarked as they arrived at the meeting that they had little time to review the procedure changes. The procedure was a lengthy document and there were numerous changes ranging from editorial to valve line-ups. As the changes were presented, committee members asked appropriate questions and corrected numerous mistakes, both technical and editorial. However, the pace appeared to be too fast because some members were obviously seeing the material for the first time. While one section was being discussed, one member was reading a previous section and pointed out errors that the others had missed. When reviewing a change that had moved a flushing step from the body of the procedure to an appendix, it was pointed out that there was no link or criteria in the procedure to invoke the appendix. When a valve manipulation change was presented, there was no system drawing available for review and no ready explanation that the process change had been proven. In another change in which the intent was to cycle a valve periodically, the procedure specified that the valve be closed, but did not specify that it be opened again. The

inspector noted that the PORC chair expressed his expectations for the quality of procedures to be brought before the PORC. The inspector attended other PORC meetings and noted that the licensee's staff and contractors were better prepared to discuss the proposed procedure changes.

c. Conclusion

The CY PORC provided several improvements to the procedures important to safety. While the PORC provided an effective oversight review, the NRC concluded that the number and types of technical and editorial errors suggested that some procedure changes had not been properly developed and reviewed prior to presentation to the PORC. Corrective actions taken by CY resolved this concern.

O3.3 Self-Assessment, Auditing, and Corrective Action

a. Scope (IP 40801)

The inspector assessed QA Audit and Surveillance reports to determine the licensee's capability to self-identify and resolve conditions adverse to quality, and to prevent problems. The scope of this inspection area included an evaluation of the following: (1) the status of two licensee identified findings regarding configuration management and document controls as result of 2002 Audit Report 02-A10-01, (2) the status of the apparent cause determination regarding CR-03-0766 and CR-03-0771, (3) the implementation of ADM 1.1-255, Self Assessment & Station Work Observation Program, and (4) the results of 2003 Audit Report 03-A11-01. The inspector conducted interviews with cognizant personnel and reviewed administrative controls, such as tracking and trending. Observations and document reviews were compared with the commitments and requirements contained in 10 CFR 50, Appendix B and the licensee's QA Program.

b. Observations and Findings

The QA finding concerning document controls had been closed and the issue appropriately addressed. However, the apparent cause related to the finding concerning configuration management remains open. The licensee expects to sign and close the apparent cause by June 2004.

The root cause analysis had been completed in a timely manner in November 2003, and included an independent evaluation. The licensee's analysis and the independent evaluation were thorough and appropriately captured the root cause. There are no further concerns regarding CR-03-0766 and CR-03-0771.

The inspector reviewed the licensee's implementation of ADM 1.1-255, Self Assessment & Station Work Observation Program, specifically the requirement for each department to conduct a self-assessment twice per year. The self-assessments from 2003 and 2004 were adequately performed and met the frequency required. There are no further concerns regarding this issue.

The inspector reviewed the results of the 2003 Audit (Report Number 03-A11-01). The audit was well planned and thorough. Deficiencies and observations were appropriate, a CR was generated for each deficiency, and each item was assigned to the appropriate department for corrective action. No findings were identified.

c. Conclusion

Audits, self-assessments, and surveillances were performed in accordance with written procedures by appropriately trained personnel. Follow-up action, including re-audit of deficient areas, was taken where applicable. No findings of significance were identified

II. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Solid Radioactive Waste Management and Transportation of Radioactive Materials

a. Scope (IP 86750)

The inspector reviewed the following areas: (1) the radioactive waste management program to ensure that low-level radioactive wastes were properly classified and characterized for disposal according to 10 CFR Part 61; (2) shipments to determine if radiation surveys and U.S. Department of Transportation (DOT) requirements were completed as required by 10 CFR Parts 20 and 71; and (3) waste manifests for aerated drain hold up tank (ADHUT) sludge and containment commodities (such as nozzles and concrete blocks). The inspector conducted performance observations for packaging condenser tubes and the shipment of a radwaste package containing nozzles. The inspector also reviewed the licensee's evaluation regarding the December 2003 accident in Virginia involving the transportation of a radwaste shipment.

b. Observations and Findings

The licensee periodically submitted waste stream specific samples to a vendor laboratory for total isotopic analysis and derived waste stream specific scaling factors. The licensee's program periodically verified the applicability of the scaling factors. The inspector reviewed the analysis results for various systems and associated procedures, and noted that the licensee's procedures were effective for the required waste form classification and characterizations when changes to the waste stream occur. The selected systems were properly characterized for disposal.

The inspector conducted performance observations of the handling and loading of inter-modals containing nozzles. The activity was clearly communicated and understood by the workers. The licensee's as low as reasonably achievable (ALARA) practices were appropriate. The licensee conducted required inspections, applied appropriate labels, markings, and placards, and ensured the shipping papers were correct.

The inspector reviewed the licensee's evaluation regarding the December 2003 accident in Virginia involving the transportation of a radwaste shipment. A CR was generated. The licensee's followup and corrective actions were appropriate.

c. Conclusions

Radioactive waste and material were properly processed, packaged, stored, and shipped in accordance with NRC and DOT regulations. No safety concerns or violations were identified.

R1.2 Inspection of Final Status Surveys and Unconditional Release Surveys (URS)

a. Scope (IP 83801)

The inspector and the NRC's contractor, ORISE, reviewed licensee activities associated with the planning and design of FSS for the purpose of determining compliance with the requirements of the License Termination Plan (LTP), Revision 1, dated October 2002, and to prepare for subsequent confirmatory inspections. ORISE conducted in process and confirmatory measurements in both open land areas and in the Administrative Building (AB). The inspectors conducted an independent review of the URS procedure for secondary side buildings, including the survey plan and associated survey maps for the AB. The inspector conducted performance observations of health physics technicians during surveys in the AB and remediation activities in the Turbine Building (TB). Information was also gathered through reviews of documents, including survey plans and interviews with cognizant personnel.

b. Observations and Findings

1. Final Status Survey of Open Land Area Survey Units

During the period of September 29 through October 1, 2003, the ORISE team performed independent radiological surveys in the Open Land Area Survey Units and reviewed the associated survey plans. The open land area survey plans included the survey units located north and east of the industrial area, alongside site roads leading to the ISFSI, construction debris piles, radioactive material storage area, permitted landfill area, and selected peninsula areas. Surface scans for gamma radiation were performed systematically in Class 2 and 3 survey units, as well as judgmental selected locations in non-impacted open land areas survey units where radioactivity may have concentrated during operations. Gamma scans were performed over approximately 50% of the soil surface area in Class 2 survey units, 10% of the soil surface in Class 3 survey units, and 1% of the surface soil area in non-impacted survey units. Seventy soil samples were

collected from 11 survey units. Soil samples were analyzed by gamma spectroscopy, and results were analyzed for Co-60, Cs-137, and for other gamma-emitting fission and activation products associated with the Haddam Neck facility.

During the period of March 16-17, 2004, the ORISE team conducted confirmatory survey activities in two survey units (Construction Pit - SU 9536-0000, and Permitted Landfill - SU 9537-0000) and reviewed the associated survey plans. A total of ten soil samples were collected from the two survey units. The team conducted surface scans of each survey unit (100%) and collected five surface soil samples. The team determined there was evidence that overburden soils had been placed in these locations, therefore five subsurface soil samples 1.5 meters deep were collected. Of the five subsurface soil samples, two were from SU 9536-0000 and three were from SU 9537-0000. The surface scan results identified no elevated areas. The surface and subsurface soil samples were analyzed and the results were below the site specific DCGLs for soils. Soil samples were analyzed by gamma spectroscopy, and results were analyzed for Co-60, Cs-137, and for other gamma-emitting fission and activation products associated with the Haddam Neck facility.

A complete listing of the survey units and the results are documented in the "ORISE Revised Final Report-Confirmatory of Open Land Area Survey Units at the Connecticut Yankee Haddam Neck Plant, Haddam, Connecticut (Docket No. 50-0213, RFTA No. 03-008)", dated July 27, 2004 [ADAMS Accession No. ML042170277]. Based on comparing the site-specific DCGLs as presented in Section 6 of LTP to the soil sample results, all survey units were classified appropriately.

2. Unconditional Release Surveys

During the evaluation of the URS procedure for secondary side buildings, the inspectors observed that the technicians did not make use of headphones to improve the ability to detect audible changes in count rate. However, the inspector noted that the technicians had the ability to perform direct (fixed) measurements and to discern audible changes in count rate. The licensee conducted side-by-side measurements with ORISE; the results were similar. During the discussions, the licensee described the survey plan and design, methods for biased scanning, methods for background measurements in areas that are not expected to be contaminated, and training of senior technicians. The inspectors reviewed the draft results for the ORISE confirmatory survey of the AB that was conducted on March 15 and 16, 2004. These results were in agreement with the licensee's conclusions of no detectable activity above background. A complete listing of the survey units and results will be documented in an ORISE Final Report, and will be forwarded as a supplement to this inspection.

On June 8, 2004, the inspector observed the licensee conduct remediation activities in the TB. Prior to the inspection, the licensee was implementing the URS procedure to prepare the TB for unconditional release and subsequently identified contamination on the steam chest mezzanine, also known as the turbine pedestal. The licensee determine the boundary of the area with elevated activity and documented the results on survey maps as required by the URS procedure. The survey results ranged from 900 cpm to

5000 cpm. The licensee implemented radiation control practices and conducted remediation activities according to the URS and associated procedures. The licensee generated a CR for documentation to the 10 CFR 50.75g file.

c. Conclusions

The results of the independent sampling and scanning in all selected survey areas confirmed that the radiological conditions of the open land area survey units met the approved site-specific DCGLs. These results also confirmed that the survey units had been classified correctly.

The URS procedure alone, because it relied on human factors, was not sufficient to provide guidance to perform surveys of secondary structures for unconditional release. From document reviews, field observations including side-by-side measurements with ORISE, and detailed discussions with cognizant individuals; the licensee had conducted an adequate survey for the unconditional release of the AB.

The licensee's actions to identify contamination on the steam chest mezzanine in the TB, document the results, conduct remediation activities in the area, and revise the survey plan for 100% scanning of the remediated area according to the URS procedure was appropriate. No significant safety concerns were identified.

V. Management Meetings

X1 Exit Meeting

The inspectors presented the inspection results to representatives of the licensee's staff at the end of each inspection visit during the inspection period. On June 22, 2004, a summary of the inspection findings for the entire inspection period was presented to Mr. Bouchard and others. Although proprietary items were reviewed during the inspection, no proprietary information is presented in this report. Licensee representatives acknowledged the inspection findings. During this exit meeting, the licensee identified the need to clarify its application of the site specific DGCLs and administrative DGCLs. As a result of further discussions, a final ORISE report dated May 2004 (ML041680162) was revised and reissued on July 27, 2004.

PARTIAL LIST OF PERSONS CONTACTED

Licensee and Contractor Staff

*J. Arnold, Staff Assistant
*G. Bouchard, Director, Nuclear Safety and Regulatory Affairs
S. Berger, Technical Support, Duratek
*J. Bourassa, Site Closure Manager
*P. Clark, Regulatory Affairs
E. Darois, Site Closure
H. Farr, Radiological Engineer
N. Fetherston, Director of Decommissioning
K. Gavin, Project Field Engineer
*B. Holgren, Dry Cask Storage Manager
J. McCann, Regulatory Affairs Manager
*M. Marston, Fuel Transfer Manager
*J. McCarthy, Engineer
R. McGrath, Site Release Manager
*R. Mitchell, Unit Manager
W. Norton, President
M. Powers, Engineer
D. Roberson, Health Physics Supervisor
G. Sergent, Nuclear Safety Engineer
*J. Tarzia, Radiation Protection Manager
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M. Williams, Site Project Manager, Framatome ANP
A. Yates, Chemistry Supervisor
B. Yetter, FSS Project Lead

State of Connecticut
M. Firsick, Connecticut DEP

* These individuals participated in the exit briefing held on June 22, 2004

INSPECTION PROCEDURES AND TEMPORARY INSTRUCTIONS USED

IP 40801	Self Assessment, Auditing, and Corrective Actions
IP 60854	Pre-operational Testing of an Independent Spent Fuel Storage Installation
IP 60855	Operation of an ISFSI
IP 60856	Review of 10 CFR 72.212(b) Evaluations
IP 60857	Review of 10 CFR 72.48 Evaluations
IP 62801	Maintenance and Surveillances
IP 83801	Inspection of Final Surveys at Permanently Shutdown Reactors
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials

ITEMS OPEN, CLOSED, AND DISCUSSED

Items Opened:

2004-001-01	NCV	Failure to Follow Procedures

Items Closed:

2004-001-01	NCV	Failure to Follow Procedures

Items Discussed:

None

LIST OF ACRONYMS USED

AB	Administrative Building
ADHUT	Aerated Drain Hold Up Tank
ALARA	As Low As is Reasonably Achievable
CDAC	Community Decommissioning Advisory Meeting
CoC	Certificate of Compliance
CR	Condition Report
CY	Connecticut Yankee
CYAPCO	Connecticut Yankee Atomic Power Company
DB	Decommissioning Branch
DCGLs	Derived Concentration Guideline Levels
DCP	Design Change Package
DNMS	Division of Nuclear Materials and Safety
DOT	Department of Transportation
DRS	Division of Reactor Safety
FTM	Fuel Transfer Memorandum
FSS	Final Status Surveys
GTCC	Greater Than Class C
HHT	Heavy Haul Trailer
HP	Health Physics
ICMs	Interim Compensatory Measures
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
LTP	License Termination Plan
NAC-MPC	NAC International Multi-Purpose Canister
NCR	Nonconformance Report
ORISE	Oak Ridge Institute for Science and Education
PDR	Public Document Room
PORC	Plant Operations Review Committee
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
QSR	Quality Surveillance Report
SAR	Safety Analysis Report
SDE	Screening, Determination, and Evaluation
SFP	Spent Fuel Pool
SNM	Special Nuclear Material
SSC	Structures, Systems, and Components
TB	Turbine Building
TI	Temporary Instruction
TS	Technical Specifications
TFR	Transfer Cask
TSC	Transportable Storage Canister
URS	Unconditional Release Survey
VCC	Vertical Concrete Cask