



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

Report No.: 50-238/94-01

Licensee: State of South Carolina
 Patriot's Point Development Authority
 Post Office Box 986
 Mount Pleasant, SC 29464

Docket No.: 50-238

License No.: NS-1

Facility Name: N. S. Savannah

Inspection Conducted: May 10-12, 1994

Inspector: CB Bassett 5/24/94
 C. H. Bassett, Senior Radiation Specialist Date Signed

Approved by: E. J. McAlpine 5/25/94
 E. J. McAlpine, Chief Date Signed
 Radiation Safety Projects Section
 Nuclear Materials Safety and Safeguards Branch
 Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection involved onsite review of radiation protection program activities, tour of the reactor space, and survey of the vessel prior to movement for dry dock repairs and relocation to the James River Reserve Fleet.

Results:

The licensee has continued to control access to the restricted areas of the vessel as required and has maintained these areas posted and secured. The required radiation surveys and radiological environmental surveillances have been performed as well. No problems were noted with radiation levels or contamination in unrestricted areas. Review of the records maintained by the licensee indicated that the required committee meetings, surveys, and periodic inspections and tests were being performed as required.

One non-cited violation, however, was identified as follows: failure to maintain the intrusion alarm system in a condition such that the audible signal could be heard by the security guard as required by Technical Specification 3.3 (Paragraph 2.e).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- M. Bagley, Marine Surveyor, Southeast Region, Maritime Administration (MARAD), Department of Transportation (DOT)
- J. Flatley, Chief Executive Officer, Patriots Point Development Authority (PPDA)
- *V. Fletcher, Director of Engineering (Acting), PPDA
- A. Jordan, Vessel Operations Specialist, MARAD, DOT
- E. Koehler, Marine Surveyor, MARAD, DOT
- Z. Levine, Senior Technical Advisor, MARAD, DOT
- *W. Miller, Maintenance Supervisor, PPDA
- *C. Waldrop, Executive Director, PPDA

Other licensee employees contacted included security force personnel, ships maintenance personnel, and office personnel.

State of South Carolina Department of Health and Environmental Control (SC DHEC) Employees

- V. Autry, Director, Division of Radioactive Waste Management, Bureau of Solid and Hazardous Waste, SC DHEC
- H. Mathis, Assistant Bureau Chief, Bureau of Solid and Hazardous Waste, SC DHEC
- H. Truesdale, Bureau Chief, Bureau of Solid and Hazardous Waste, SC DHEC
- M. Plemmens, Survey Team Member, SC DHEC
- H. Porter, Survey Team Member, SC DHEC
- J. Stephens, Survey Team Member, SC DHEC
- R. Wingard, Survey Team Member, SC DHEC
- M. Yeager, Survey Team Leader, SC DHEC

Contractor Employees

- J. Eccles, Port Engineer, American Foreign Shipping

*Attended the exit interview on May 12, 1994.

2. Class III Operations - Restricted and Unrestricted Areas (40755)

a. Unrestricted Areas

Technical Specification (TS) 3.3.1 defines areas that are accessible to the general public and employees as unrestricted areas. TS 3.3.1 also requires that radiation levels from reactor generated radioactive materials in unrestricted areas be less than 5 microroentgen per hour ($\mu\text{R/hr}$) above natural background as measured at one meter from any surface.

A radiation level survey of areas open to contractor personnel who were readying the vessel for relocation was conducted on May 11

and 12, 1994. The survey, which was performed using an NRC portable survey instrument, included readings from the A through D decks, the promenade deck, the boat deck, and the navigation bridge. No radiation levels greater than 0.1 milliroentgen per hour (mR/hr) above natural were detected in the areas open to the contractors. SC DHEC personnel also performed radiation level surveys of these areas and found no levels greater than 5 μ R/hr above background.

b. Restricted Access Areas

TS 3.3.1 states that areas with radiation levels in excess of 5 μ R/hr but less than 250 μ R/hr (or 0.25 milliroentgen per hour [mR/hr]) as measured at one meter from any surface are restricted areas. Access to these areas is restricted to only employees, contractor personnel, escorted guests, and official visitors. Such restricted areas may be entered without health physics supervision provided a health physicist has determined that potential exposures to any individual will not exceed five percent (5%) of 10 CFR 20 exposure limits and the Review and Audit Committee has reviewed and accepted the proposed use of the space.

The inspector performed radiation level surveys of selected areas which were restricted from access by contractor personnel but which were accessible by employees without health physics supervision. Several areas with radiation levels between 5 and 250 μ R/hr at one meter from the surface were detected. It was noted that these areas were posted and access to these areas was restricted.

The inspector also reviewed the program which had been implemented by supervision to ensure that exposures to an individual would not exceed 5% of the 10 CFR 20 exposure limits. This was accomplished by using a log and requiring each person entering the area to log in and out and record the actual amount of time spent in the area. This log was then reviewed by SC DHEC personnel. The log used to limit exposure by tracking stay times appeared to be adequate.

c. Radiation Control Areas

TS 3.3 defines a radiation control area as an area of the ship with radiation levels from reactor generated radioactive materials in excess of 0.25 mR/hr (or 250 μ R/hr) above natural background as measured at one meter from any surface. TS 3.3 also requires that entrances to such areas be posted with appropriate warning signs, locked and secured with chains, and sealed with numbered seals.

During a previous inspection, an area near the aft starboard bulkhead of Cargo Hold 4 at the D deck level was noted to have radiation levels in excess of 0.25 mR/hr. The inspector verified that the radiation levels had not increased but remained at approximately the same levels as had been noted during past

inspections. The inspector noted that the lead shielding which the licensee had placed on the deck and along the bulkhead (to reduce the general area radiation levels from 400 $\mu\text{R/hr}$ [0.4 mR/hr] to around 50 $\mu\text{R/hr}$) was still in place. The inspector verified that, after the survey of the area was completed, the area was locked and secured as required and a seal was affixed to the locking mechanism of the door to the area. The area was also noted to be posted with appropriate warning signs.

Approximately half of the other areas with radiation levels above 0.25 mR/hr were surveyed during this inspection by the NRC inspector and were also noted to be posted, locked and sealed as required. All these areas were surveyed by SC DHEC personnel and not problems or levels above those noted in the past were noted.

d. Contamination Control

TS 3.3.1 requires that all surfaces in radiation control areas and in unrestricted areas be maintained with contamination levels less than those described in Table 1 of NRC Regulatory Guide 1.86. Table 1 of Regulatory Guide 1.86 states that removable surface contamination for beta-gamma emitting radionuclides shall be less than 1,000 disintegrations per minute per one hundred square centimeters (dpm/100 cm^2).

Five smear samples were taken at locations where access was unrestricted and five smear samples were taken at locations which were restricted from use by contractor employees but not from access by employees. The samples were analyzed on a proportional counter in the Region II office for gamma and gross beta isotopic activity. The results showed no detectable activity on any smear above background.

e. Entry into the Reactor Compartment

TS 3.3 stipulates that an intrusion alarm with an interlock will be maintained on the B Deck entry door into the reactor compartment with audible and visual signals located at a manned security guard post. The signals shall be both seen and heard by the security guard on duty.

TS 3.7.6 requires the licensee to conduct an annual inspection to determine any degradation of the primary and secondary systems of the ship.

On May 10, 1994, the inspector, PPDA personnel, SC DHEC personnel, and MARAD personnel made an entry into the reactor space surrounding the reactor vessel. The inspection was made to ascertain the condition of the primary and secondary reactor systems that were located in the space and ensure that there were no apparent problems with or degradation of these systems. All

systems appeared to be in a stable condition with degradation no worse than would be expected for the given situation. A minor accumulation of standing water was noted in the forward part of the compartment but no other problems were apparent. A radiation level survey performed by the inspector and SC DHEC personnel identified a pipe located near the entry to the bottom level of the reactor space with a radiation level of nearly 400 mR/hr at contact. The general area radiation level in the space was approximately 1-2 mR/hr.

During this entry, the PPDA personnel tested the intrusion alarm on the door to the reactor compartment and the associated audible and visual signals. The visual signal, a flashing red light mounted on top of the Pilot House/Navigation Bridge, operated properly. However, the audible signal, a horn or speaker also mounted on top of the Pilot House/Navigation Bridge, did not sound. Upon investigation of the problem, the licensee found that the speaker had been removed by contractor personnel. This had apparently been done the morning of May 10 during preparations to weld metal covers over openings in the ship to make it ready to be towed to dry dock. The licensee subsequently acquired the speaker that had been removed, re-installed it on the top of the Pilot House/Navigation Bridge, and retested the system. The speaker operated properly and could be heard by the security guard on duty at the main gate.

The licensee was informed that failure to comply with the requirement of maintaining the audible signal in a condition such that it could be heard by the security guard on duty was an apparent violation of TS 3.3. However, this violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B of the NRC Enforcement Policy (50-238/93-01-01).

f. Thermoluminescent Dosimeters

TS 3.7.2.4 requires that, in addition to the periodic radiological surveys, thermoluminescent dosimeters (TLDs) shall be placed at strategic locations throughout the vessel to monitor the radiation from reactor generated materials. The TS also requires that the State of South Carolina process the TLDs at least semi-annually.

A review of the 1993 annual report indicated that the TLDs were maintained and changed out semi-annually by SC DHEC personnel. Also, the radiation levels reported were similar to the levels noted in past years. During this inspection the SC DHEC personnel indicated that they intended to remove the TLDs at that time, with the concurrence of the NRC. After consultation, it was agreed that the TLDs should remain in place until the vessel is towed away. The SC DHEC personnel indicated that they would wait until the day before the vessel is to be moved from the pier to remove and process the TLDs.

One non-cited violation was identified.

3. Class III Operations - Record Review (40755)

a. Review and Audit Committee Meetings

TS 3.6 stipulates the composition of the Review and Audit Committee, details its audit functions, outlines the issues to be reviewed during its meetings, and requires that the Committee meet at least annually.

The inspector reviewed the minutes from the February 4, 1994, committee meeting and determined that the committee meetings were being held at the required frequency. It was also noted that there were sufficient participants to conduct a meeting as required by the TS. The issues that were discussed included: TS changes; reported violations of the TS; and plans to move to N. S. Savannah to the James River Reserve Fleet following dry dock repairs of the vessel.

b. Semi-annual Radiological Surveys and Annual Inspections

TS 3.7.2.2 and 3.7.6 require that annual radiation surveys of the ship be made and that semi-annual environmental surveillances be conducted by the SC DHEC, Bureau of Radiological Health.

The inspector reviewed the results of the radiological surveys performed for the licensee by SC DHEC personnel that were documented in the annual report dated April 25, 1993. These surveys appeared to be adequate and reflected radiation levels that were noted by the inspector during tours of the ship. The results of the semi-annual harbor water and sediment analyses were also reviewed with no problems noted.

c. Quarterly Intrusion Alarm and Seal Inspections

TS 3.7.2.1 requires that periodically and at least once per quarter, PPDA personnel will inspect the seals on the control area doors and test the intrusion alarm.

The inspector reviewed the inspection log sheets documenting the inspections of the seals and the tests of the intrusion alarm. The inspector verified that the seals on the control area doors were being checked and that the intrusion alarm was tested at least once per quarter.

d. Security Patrols

TS 3.3.2 requires that the vessel be positioned along side a pier with controlled access. The pier entrance is required to be under 24 hour security and surveillance. Security personnel shall patrol and visually inspect the vessel at the close of each day,

and ensure that areas not in use are secured. The security personnel are also required to patrol and inspect the vessel at least once each shift for possible fire, flooding, other abnormal occurrences. TS 3.7.1.6 requires that at night, on weekends, and holidays, and after normal museum hours, security personnel will patrol the vessel at least once during a twenty-four (24) hour period.

Through discussions with licensee personnel and a review of the security patrol logs, the inspector determined that these requirements were being met. The vessel was positioned along side the licensee's pier with controlled access. The pier entrance and the vessel were under 24 hour security and surveillance and the security patrols were being conducted as required.

e. Cathodic Protection System

TS 3.7.4 requires that a cathodic protection system be provided and properly maintained to protect the underwater areas of the vessel's hull to minimize corrosion damage.

Following problems with the cathodic protection system in 1993, the licensee brought in a contractor to review the system. Wiring problems had caused the system to give erroneous readings, indicating that the system was functioning when it was not. The contractor helped correct the problems and the system was returned to normal operation.

During this inspection, the licensee noted that the cathodic system had been secured, apparently by the MARAD personnel, in preparation for moving the vessel. The licensee turned the system back on and indicated that the system would remain operational until the vessel left their pier.

4. Exit Interview

The inspection scope and results were summarized on May 12, 1994, with those persons indicated in Paragraph 1 above. The licensee was informed that no problems were noted with the exception of the non-cited violation discussed in Paragraph 2. Also, the matter of a license amendment and amendments to the Technical Specifications were discussed. The initial submittals have apparently been sent to NRC Headquarters by MARAD personnel.

<u>Item Number</u>	<u>Description and Reference</u>
50-238/94-01-01	NCV - Failure to maintain the intrusion alarm in a condition such that the audible alarm signal could be heard by the security guard force as required by TS 3.3 (Paragraph 2.e).