

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.: 50-238

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Report No.: 50-238/98-201

Licensee: U. S. Maritime Administration
Washington, D. C. 20509

Facility Name: N. S. Savannah

Location: James River Reserve Fleet
Ft. Eustis, VA

Inspection Conducted: January 28-30, 1998

Inspector: C. H. Bassett, Senior Non-Power Reactor Inspector

Approved by: Marvin M. Mendonca, Acting Director
Non-Power Reactors and Decommissioning
Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

N. S. Savannah
NRC Inspection Report No. 50-238/98-201

The primary focus of this routine, announced inspection involved the on-site review of radiation protection and security control measures implemented for the N. S. Savannah at her anchorage alongside the decommissioned U.S. Army Corps of Engineers MH-1A Floating Nuclear Power Plant STURGIS in the James River Reserve Fleet, near Ft. Eustis, Virginia.

Staffing and Audits

- The licensee's staffing and auditing of activities remain in compliance with the requirements specified in the Technical Specifications.

Radiological Surveys

- Surveys were being completed as required.
- Doses to James River Reserve Fleet personnel were well within the NRC's regulatory limits.
- Thermoluminescent dosimeters were noted to be in place as required by the Technical Specifications (TS).
- Radiation levels in areas routinely entered by James River Reserve Fleet personnel were within those allowed by the TS.

Access Control and Security

- Access control and security was acceptable and being maintained as stipulated in the TS.

Surveillances

- In general surveillances were being completed acceptably and within the time frame requirements of the TS.
- Water and sediment samples had been taken and analyzed as required.

REPORT DETAILS

Summary of Plant Status

The N. S. Savannah was removed from service and mothballed in 1970. There is no reactor fuel on board and all primary and secondary systems have been drained. All radioactive resins were also removed from the ship and any remaining radioactive material is contained within the reactor vessel and its internal components. The vessel is currently moored port side to the MH-1A Floating Nuclear Power Plant STURGIS in the James River, Virginia. It is secured in place by nine anchors and ten mooring wire ropes. Access to the vessel and to the restricted areas of the vessel is being provided by James River Reserve Fleet (JRRF) personnel. Annual radiation surveys of the vessel are being completed by a contractor working for the Maritime Administration (MARAD).

1. Staffing and Audits (40755)

a. Inspection Scope

The inspector reviewed the following regarding the licensee's staffing and audits to ensure that the requirements of TS Sections 3.6 were met:

- staffing requirements for safe maintenance of the vessel,
- the composition of the Review and Audit Committee (RAC),
- RAC responsibilities and meeting minutes, and
- audits performed during 1995-1997.

b. Observations and Findings

Through observation of operations and discussions with licensee personnel, the inspector determined that the staffing was adequate to support the safe maintenance of the N. S. Savannah.

Through discussions with licensee representatives and record reviews, the inspector determined that the RAC was composed of those individuals stipulated in the TS. The RAC met once a year to review and discuss the status of the ship and the other issues outlined in the TS. Audits were conducted as required and findings resolved.

c. Conclusions

The licensee's staffing and auditing of activities remain in compliance with the requirements specified in the Technical Specifications.

2. Radiological Surveys (40755)

a. Inspection Scope

The inspector reviewed the following to verify compliance with 10 CFR 20 and the applicable licensee TS requirements:

- health physics survey and dosimetry records,
- radiological signs and posting,
- documentation of inspections of the ship, and
- annual reports.

b. Observations and Findings

(1) Tour of the Ship

Generally surveys were being completed and documented acceptably to permit evaluation of the radiation hazards that might exist. Postings met regulatory requirements. Personnel dosimetry, supplied by the Radiation Protection Officer (RPO) for Ft. Eustis, was being worn as required. Doses were well within the licensee's procedural action levels and the NRC's regulatory limits. Thermoluminescent dosimeters (TLDs) were noted to be in place at various locations on the ship as required by TS.

(2) Radiological Criteria for Unrestricted and Restricted Areas

TS 3.3.1 defines an unrestricted area as an area that is accessible to employees, contractor personnel, escorted guests, and official visitors. The radiation levels from reactor generated radioactive materials for unrestricted areas shall be less than $5\mu\text{R/hr}$ (microrem per hour) above natural background as measured at one meter from any surface. A restricted area is an area with radiation levels in excess of $5\mu\text{R/hr}$ but less than 0.25 mR/hr (millirem per hour). A restricted area may be entered without health physics supervision under the following conditions:

- (a) A health physicist has determined that potential exposures to any individual will not exceed five percent (5 %) of 10 CFR 20.101 (10 CFR 20.1301) exposure limits.
- (b) The Review and Audit Committee has reviewed and accepted the proposed use of the space.

A radiation level survey of selected areas on the vessel was conducted by the inspector using NRC portable survey instrumentation. The survey included readings from the engine room and A through D decks, the promenade deck, and the boat deck. Radiation levels greater than 5 μ R/hr above natural background were detected in some of these areas. In discussing this matter with the licensee, they indicated that these areas were areas that were not routinely entered by JRRF personnel.

The inspector requested to review the assessment made by the health physicist that indicated that any individuals entering these areas would not exceed the exposure limits specified in 10 CFR 20. The licensee stated that no written assessment had been made because JRRF personnel do not routinely enter areas with radiation levels in excess of 5 μ R/hr. However, the licensee indicated that an assessment would be made. Subsequent to the inspection, the licensee forwarded a copy of the assessment made by a health physics (HP) contractor on February 6, 1998. The conclusion of the assessment was that the maximum dose a person would receive if they were present for 2080 hours per year would be approximately 225 mR per year. This would be less than five percent of the 10 CFR 20.1301 limit.

c. Conclusions

Surveys were being completed as required. Doses to JRRF personnel were well within the NRC's regulatory limits. Thermoluminescent dosimeters were noted to be in place as required by TS. Radiation levels in areas routinely entered by JRRF personnel were within those allowed by the TS.

3. **Access Control and Security**

a. Inspection Scope

The inspector reviewed the following to verify that the licensee was providing adequate access control and security in compliance with TS 3.7.1 requirements:

- security logs,
- maintenance records,
- documentation of seal inspections, and
- inspection reports.

b. Observations and Findings

The inspector noted that all entrances to the ship were secured when not in use. The entrances to the reactor compartment were secured as required. Radiation control areas were posted, locked, and sealed. The entrance to the reactor compartment on B Deck was chained, posted, sealed, and double locked. Although there was a problem with the intrusion alarm at the time of the inspection, security personnel completed a patrol of the vessel at least once during every twenty-four hour period and JRRF personnel inspected the ship daily during the work week. A new cable was being purchased to correct the problem with the intrusion alarm. The licensee anticipated that the repairs would be completed in approximately two months.

c. Conclusions

Access control and security was acceptable and being maintained as stipulated in the TS.

4. **Surveillances**

a. Inspection Scope

The inspector reviewed the following to verify that the licensee was providing adequate access control and security in compliance with TS 3.7.2 requirements:

- contractor reports,
- maintenance records,
- documentation of inspections of the ship, and
- annual reports.

b. Observations and Findings

(1) General Surveillance Items

The inspector determined that JRRF personnel were checking the seals on the controlled area doors and testing the intrusion alarm once a quarter. Two draft level stripes were painted fore and aft as required, one just above the water level and the upper stripe one foot above the lower. The cathodic protection system was being maintained to protect the underwater areas of the vessel's hull. Underwater inspections of the hull were being conducted annually. Also, MARAD designated personnel were completing an annual inspection of the primary and secondary systems to check for any degradation that might have occurred.

(2) Semi-annual Sediment Samples

TS 3.7.2.5 requires that water samples and bottom sediment samples be taken semi-annually adjacent to the ship and analyzed by a qualified laboratory for radioactivity.

The inspector reviewed the annual reports submitted by the licensee for the past two years. The reports showed that water samples had been taken and analyzed but no results were present for any sediments samples. The licensee indicated that the results of the analyses of the sediment samples had inadvertently been left out of the annual report and that the data were available through the HP contractor. Subsequent to the inspection, the licensee forwarded a copy of the results of the analyses of the sediment samples. The results had been supplied to the licensee by the HP contractor on February 6, 1998. This met the TS requirements.

c. Conclusions

In general surveillances were being completed acceptably and within the time frame requirements of the TS. Water and sediment samples had been taken and analyzed as required.

3. Exit Interview

The inspection scope and results were summarized on January 30, 1998, with licensee personnel. The inspector described the areas inspected and discussed in detail the inspection findings.

No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector.

PARTIAL LIST OF PERSONS CONTACTED

Licensee Employees

M. Bagley, Fleet Operations and Maintenance Officer, JRRF, MARAD, Department of Transportation (DOT)
E. Koehler, Marine Surveyor, MARAD, DOT
Z. Levine, Senior Technical Advisor, MARAD, DOT
J. Seelinger, Chief, Division of Ship Maintenance and Repair, MARAD, DOT
P. Smith, Fleet Superintendent, JRRF, MARAD, DOT

Other Personnel

J. Davis, Certified Health Physicist, General Health Physics

INSPECTION PROCEDURE USED

IP 40755 Class III Non-Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DOT	Department of Transportation
IP	Inspection Procedure
JRRF	James River Reserve Fleet
MARAD	Maritime Administration
NPR	Non-Power Reactor
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
PDR	Public Document Room
RAC	Review and Audit Committee
RPO	Radiation Protection Officer
TLD	Thermoluminescent dosimeter
TS	Technical Specification