

U. S. NUCLEAR REGULATORY COMMISSION

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Licensee: U. S. Department of Commerce

Facility: National Bureau of Standards Reactor

Location: National Institute of Standards and Technology
Gaithersburg, Maryland 20899

Dates: October 12-15, 1999

Inspector: Thomas F. Dragoun

Approved by: Ledyard B. Marsh, Director
Events Assessment, Generic Communications and
Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This special, announced inspection included onsite review of selected aspects of the use of the NAC spent fuel shipping casks, fuel movement, transportation program, in-transit security program, special nuclear material control and accountability program, and radiation protection program.

The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

USE OF THE NAC SHIPPING CASK

The regulatory requirements for use of the NAC spent fuel cask were met.

FUEL MOVEMENT

Fuel movement was conducted in accordance with regulatory requirements.

TRANSPORTATION

The program to prepare and deliver packages for transport met the regulatory requirements.

IN-TRANSIT SECURITY

The in-transit security program satisfied regulatory requirements.

SAFEGUARDS

Special Nuclear Materials were acceptably controlled and inventoried.

RADIATION PROTECTION

The radiation protection program satisfied NRC requirements.

Report Details

Summary of Plant Status

During the inspection, the reactor was initially secured and restarted after the fuel movement was completed. Spent fuel was loaded into baskets, which could hold up to seven fuel elements. The basket was lifted into a transfer cask, which was placed over the spent fuel pool. The transfer cask was then lifted on top of a NAC shipping cask, outside of containment, and the basket lowered into the shipping cask. Two shipping casks were used each containing six baskets. Shipment to DOE - Savannah River was scheduled for a future time.

1. USE OF THE NAC SHIPPING CASK

a. Scope (IP 86740)

The inspector reviewed selected aspects of:

- general license requirements
- management controls
- training
- quality assurance
- audit program

b. Observations and Findings

The licensee used the shipping cask under a general license in accordance with 10 CFR 71.12. The NRC had registered the licensee as a user of NAC cask #9225 on February 7, 1997. This type of cask was first used for a spent fuel shipment from this facility in October 1997. Copies of the Certificates of Compliance (COC), Safety Analysis Report, NAC procedures, applicable drawings, and records for the two casks on site (NAC-LWT-1 and -3) were readily available as required.

Six temporary operating instructions encompassing all transfer activities were formally issued in accordance with TS requirements. These instructions were derived from NAC procedures and provided adequate detail. Fuel loading operations were performed by licensed reactor operators and NAC personnel. Oversight was provided by one overall coordinator with local coordinators at the spent fuel pool and the outside yard area.

Training pertaining to transportation requirements was provided to the HP staff who provided oversight of these aspects. Decay heat load calculations by the HP staff using ANSI 5.1 methodology demonstrated that the spent fuel met specifications for the cask. These calculations were verified using Monte Carlo computer modeling.

The NRC approved the NIST Quality Assurance program for transport packages in September 1995, for a five-year term. This program is administered by the HP group and is documented in HP Procedure #14-12. Some QA requirements related to maintenance and inspection of the casks were delegated to NAC as permitted by 10 CFR 71.103(a). The remainder of the QA program was adequately implemented by the licensee. Documented audits of transportation activities were completed annually using a checklist.

c. Conclusions

The regulatory requirements for use of the NAC spent fuel cask were met.

2. FUEL MOVEMENT

a. Scope (IP 60745)

The inspector reviewed selected aspects of:

- fuel handling procedures
- radiological controls
- security

b. Observations and Findings

A temporary instruction was used for loading of spent fuel elements into baskets submerged in the spent fuel pool. After a basket was loaded, it was hoisted into the shielded transfer cask. All manipulations were done by licensed senior reactor operators as required by 10 CFR 50.54m. A "map" was provided for each of the twelve baskets giving the location of a fuel element in the pool storage rack and its placement in the basket. The identification number stamped on the element and its final location in the basket was independently verified by two operators. This identification was aided by the good clarity of the pool water. The licensee stated that all transferred fuel elements satisfied the minimum cool down time specified by COC specification 5(b)(1).

A HP technician provided full time job coverage. Radiological monitoring, controls, and ALARA practices were satisfactory.

Confinement building integrity was verified via radio contact with the control room prior to each fuel movement as required by TS 3.1.

Fuel remained in secured areas during all movement and storage..

c. Conclusions

Fuel movement was conducted in accordance with regulatory requirements.

3. TRANSPORTATION

a. Scope (IP 86721)

The inspector reviewed selected aspects of:

- preparation of packages
- shipping documents
- notifications

b. Observations and Findings

The spent fuel casks, transfer cask, and containers with support equipment were receipt inspected in accordance with the QA program. The results were reviewed by the QA Program Manager. No deficiencies were noted.

The staff indicated that transport index (TI) for the loaded casks, based on nuclear criticality control, was 0.0 in accordance with condition 5(c) of the COC. However, a higher TI may be assigned based on the radiation levels measured prior to shipment.

Initial indications were that all packages being prepared for shipment satisfied DOT radiation and contamination limits. The packages with spent fuel would be labeled as Yellow III and transported via exclusive use vehicle. Draft shipping manifests were properly completed. Required notifications had been made. A driver briefing outline was available. A checklist, previously used in 1997, was to be updated and used to guide the final radiation survey, package markings, and vehicle placarding.

c. Conclusions

The program to prepare and deliver packages for transport met the regulatory requirements.

4. IN-TRANSIT SECURITY

a. Scope (IP 81310)

The inspector reviewed selected aspects of:

- advance notifications
- route planning
- escorts

b. Observations and Findings

The licensee stated that calculations and measurements indicated that all spent fuel elements being shipped had unshielded radiation levels in excess of 100 rems per hour at three feet. This self protection satisfied the criteria for use of requirements in 10 CFR 73.37 for physical protection in transit.

Copies of letters indicated that State Officials and the NRC were provided the required information and notifications regarding the shipments.

The transit route was approved by the NRC on September 21, 1999.

Provisions for Escorts were arranged by the licensee where required by the States. However, all other in-transit security requirements were to be provided by the shipper (TriState). A few licensee staff members were designated to accompany the shipment and provide oversight of this program.

c. Conclusions

The in-transit security program satisfied regulatory requirements.

The inspector reviewed selected aspects of:

- radiological signs and posting
- surveys and monitoring
- dosimetry

b. Observations and Findings

Several Health physics personnel provided continuous oversight and monitoring inside and outside the confinement building while work was in progress. The radiological hazard of concern was radiation streaming from certain parts of the transfer cask and spent fuel cask during certain evolutions. Since the radiation protection program routinely deals with beam ports during reactor operations, the portable survey instrumentation and survey techniques were appropriate. Type and placement of personnel dosimetry was also appropriate for monitoring doses from beams. Caution signs and postings were satisfactory.

Work areas were scanned with sensitive detectors after each transfer. Equipment was frequently smear surveyed. No loose surface contamination was reported. A continuous air monitor with integral readout and alarm was in operation in the yard area. Exit frisking consisted of the use of the in-plant automatic monitors.

c. Conclusions

The radiation protection program satisfied NRC requirements.

6. SAFEGUARDS

a. Scope (IP 85102)

The inspector reviewed selected aspects of:

- nuclear material inventory and locations
- accountability records

b. Observations and Findings

Nuclear material accounting and inventory records (DOE/NRC Form 742) for the period October 1, 1997 to September 30, 1999 were complete. Nuclear material transaction reports (DOE/NRC Form 741) accurately recorded the periodic receipts of new fuel and the bulk shipment of spent fuel in October 1997. A draft transaction report for the current shipment had been prepared and appeared to be accurate.

Licensee management stated that these reports will continue to be filed in hard copy rather than the optional electronic format until all concerns regarding the security of electronic filings are resolved.

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

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7. EXIT INTERVIEW

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on October 15, 1999. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Brown, Nuclear Engineer
H. Dilks, Senior Reactor Operator
L. Lindstrom, Senior reactor Operator
T. Myers, Senior Reactor Operator
W. Mueller, Senior Reactor Operator
T. Raby, Chief, Reactor Operations and Engineering
J.M. Rowe, Director, Center for Neutron Research
L. Slaback, Supervisory Health Physicist
J. Tracy, Health Physicist

INSPECTION PROCEDURES USED

IP 60745	CLASS I NON-POWER REACTOR FUEL MOVEMENT
IP 81310	PHYSICAL PROTECTION OF SHIPMENTS OF IRRADIATED FUEL
IP 83743	CLASS I NON-POWER REACTORS RADIATION PROTECTION
IP 85102	MATERIAL CONTROL AND ACCOUNTING - REACTORS
IP 86721	TRANSPORTATION (BASIC)
IP 86740	INSPECTION OF TRANSPORTATION ACTIVITIES

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

COC	Certificate of Compliance
HP	Health Physicists
IP	Inspection procedure
NAC	a company name
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
QA	Quality Assurance
TS	Technical Specifications