



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

JUL 30 1986

Report No.: 50-160/86-02

Licensee: Georgia Institute of Technology  
225 North Avenue  
Atlanta, GA 30332

Docket No.: 50-160

License No.: R-111

Facility Name: Georgia Institute of Technology Research Reactor (GTRR)

Inspection Conducted: July 14-17, 1986

Inspector:

B. K. Revsin

7/29/86

Date Signed

Accompanying Personnel: F. N. Wright

Approved by:

C. M. Hosey, Section Chief  
Division of Radiation Safety and Safeguards

7/29/86

Date Signed

SUMMARY

Scope: This routine, unannounced inspection involved onsite inspection in the areas of radiation control, environmental protection and transportation of radioactive materials for the Georgia Institute of Technology Research Reactor (GTRR).

Results: No violations or deviations were identified.

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## REPORT DETAILS

## 1. Licensee Employees Contacted

\*R. A. Karam, Director, Nuclear Research Center  
\*R. M. Boyd, Radiation Safety Officer  
S. N. Millspaugh, Health Physics  
P. B. Sharpe, Health Physics  
S. Selman, Health Physics

\*Attended Exit Interview

## 2. Exit Interview

The inspection scope and findings were summarized on July 16, 1986, with those persons indicated in Paragraph 1 above. 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 materials provided to or reviewed by the inspector during this inspection.

## 3. Licensee Action on Previous Enforcement Matters

(Closed) Violation (85-160/85-03-01) Failure to sample liquid holdup tank during release to sanitary sewer. The inspector reviewed the licensee's response dated December 9, 1985, and verified that the corrective action specified in the response had been achieved.

## 4. Radiation Control (83743)

- a. 10 CFR 20.201(b) required that the licensee perform such surveys as may be necessary and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

The inspector reviewed the manual entitled "Radiation Safety Manual, 1984," Section E which specified that all laboratories and facilities where radioactive materials are used or stored shall be surveyed monthly where greater than exempt quantities of radioactive materials are present.

The inspector reviewed the monthly radiation and contamination surveys performed on the first, second and ground floors of the reactor facility for 1986. Records of daily Masslin smears of the facility were also reviewed. In general, both radiation and contamination survey results were found to be low, i.e., less than 0.5 mrem/hour and less than 100 disintegrations/minute removable.

No violations or deviations were identified.

- b. 10 CFR 20.202 required that appropriate personnel monitoring devices be worn by personnel likely to receive exposure in excess of 25 percent of the limits specified in 10 CFR 20.101 or who enter high radiation areas.

10 CFR 20.101 stated the quarterly radiation exposure limits to the whole body, skin of the whole body and extremities.

During tours of the facility, the inspector observed personnel monitoring devices being worn. The licensee used film badges supplied by a National Voluntary Laboratory Accreditation Program (NVLAP) approved contractor for measuring official dose. Beta, gamma and neutron radiation was measured by these devices. In addition, the licensee required personnel entering the reactor control zone to wear a  $\text{CaF}_2$  thermoluminescent (TLD) chip which was processed onsite by the licensee. Such devices were used to provide day to day dose control for personnel performing radiation work. Extremity rings were also provided by the licensee in the form of TLD chips which were processed onsite.

The inspector examined selected personnel exposure records from January 1, 1985, to April 30, 1986, and verified that exposures were being maintained below applicable limits. For 1985, the highest whole body exposure was 350 mrem, and for 1986, the highest whole body exposure through the month of April was 50 mrem.

During review of the licensee's Form NRC-5 equivalent records for 1985, the inspector noted and informed the licensee that these were not in agreement with the annual exposure report submitted by the licensee as required by 10 CFR 20.407. The licensee examined their records and discovered a clerical error as the source of the discrepancy. The inspector reviewed a revision of the 1985 personnel monitoring report, to be submitted by the licensee to correct the discrepancy, prior to the inspection exit meeting.

No violations or deviations were identified.

- c. 10 CFR 19.12 required that each employee who works in or frequents the licensee restricted area be given instruction in radiation protection commensurate with their duties and potential hazard.

The inspector reviewed the radiation worker course outline and hand-out material. Selected records of personnel training were also reviewed.

No violations or deviations were identified.

- d. 10 CFR 20.203 stated the requirements for posting radiation areas, high radiation areas and radioactive material areas.

During tours of the facility, the inspector noted the posting of radiological areas and material and verified by independent survey that such areas were adequately posted.

No violations or deviations were identified.

- e. 10 CFR 20.103(c) states that a licensee may make allowance for use of respiratory protective equipment in estimating exposures of individuals to radioactive material in air provided that the licensee maintains and implements a respiratory protection program that includes, as a minimum; surveys and bioassays as appropriate to evaluate actual exposures; written procedures regarding selection, fitting and maintenance of respirators, and testing of respirators for operability immediately prior to each use; written procedures regarding supervision and training of personnel and issuance records; and determination by a physician prior to initial use of respirators and at least every 12 months thereafter, that the individual user is physically able to use the respiratory protective equipment.

While touring the facility the inspector observed the storage facility for respirators. The licensee informed the inspector that while they did have an operational respiratory protection program, the actual use of respirators was infrequent and that protective factors had not been applied to concentrations of radioactivity in air for determining personnel exposure since 1975. The licensee also stated that while airborne radioactivity was seldom generated, they were prepared to apply protective factors should such a situation arise.

The inspector reviewed the respiratory protection program and informed the licensee that all of the elements required by 10 CFR 20.103(c)(2) and (3) had not been addressed, and if allowance was to be made for the use of respiratory protective devices in estimating personnel exposures to airborne hazards, these requirements must be met. Some of the missing elements included written procedures regarding selection, fitting and testing of respirators for operability immediately prior to each use, written procedures regarding supervision and training of personnel and issuance records, and a written policy statement on respirator usage. The licensee acknowledged the inspector's comments and stated that the respiratory protection program would be re-examined. The inspector informed the licensee that this area would be reviewed during future inspections (50-160/86-02-01).

No violations or deviations were identified.

## 5. Transportation (86740)

10 CFR 71.5 required that each licensee who transports licensed material outside the confines of its plant or other place of use shall comply with the applicable requirements of the Department of Transportation in 49 CFR Parts 170 through 189.

The inspector determined that the licensee generated only small amounts of waste from the reactor facility so that only 1-2 shipments are made each year for burial purposes. The licensee had contracted their waste disposal program with an offsite contractor who, upon arrival at the site, took possession of the waste and acted as shipper and classifier based on data provided by the licensee. The licensee provided data to the contractor regarding quantities of radionuclides using isotope accountability methodology. The inspector reviewed Waste Shipment No. A-1699, August 14, 1985, and No. A-1718, February 26, 1986. Both shipments had been determined to be Class A, and the waste manifests met the requirements as specified in 10 CFR 20.311.

In 1986, the licensee had made several shipments of fuel elements to the Department of Energy (DOE) in Oak Ridge, TN. Shipping papers for the following dates were reviewed:

Shipment No. A-1707, February 12, 1986

Shipment No. A-1712, February 13, 1986

Shipment No. A-1713, February 18, 1986

Shipment No. A-1714, February 19, 1986

Each shipment consisted of five, unirradiated fuel elements for the GTRR reactor. For these shipments, DOE was both the shipper and the receiver.

No violations or deviations were identified.

6. Environmental Protection (80745)

a. Liquid Effluents

- (1) Technical Specification 3.5 a.(1) specified that the concentration of gross radioactivity, excluding tritium and background, released to the sewer system from the reactor building shall not exceed  $3 \times 10^{-6}$  microcuries per milliliter unless the discharge was controlled on a radionuclide basis in accordance with the limits specified in 10 CFR 20, Appendix B.

Technical Specification 3.5 a.(2) specified that the concentration of tritium released to the sewer system shall not exceed  $1 \times 10^{-1}$  microcuries per milliliter.

The inspector reviewed the records of liquid releases from January 1986, to July 1986, and verified that liquid releases had not exceeded the above limits. As of July 1986, approximately 27 mCi had been released from the reactor facility to the sanitary sewer system compared to approximately 30 mCi released in 1985.

No violations or deviations were identified.

- (2) Technical Specification 3.5 a.(5) required that during release of liquid radioactive effluents, two independent samples of each tank be taken, one prior to release and one during release and an additional independent sample shall be taken from the discharge line during release.

A review of liquid effluent release records from January to mid July indicated that all of the required samples were properly taken and analyzed.

No violations or deviations were identified.

b. Gaseous Effluents

- (1) Technical Specification 3.5 b.(1),(2), and (3) specified gaseous effluent release limits and Technical Specification 6.5.b. specified the record requirements for gaseous effluents released to the environs.

The inspector determined that gaseous effluents from January to mid July 1986 were within allowable limits and properly documented.

No violations or deviations were identified.

- (2) Technical Specification 4.2.e. and 4.2.f. required that the charcoal cartridge sampler on the containment building exhaust have a radioisotopic analysis performed biweekly and that grab samples of the exhaust stack effluent be obtained and have a radioisotopic analysis performed monthly.

Technical Specification 4.4.d. specified that samples of the secondary coolant system shall be analyzed for tritium on a monthly basis.

The inspector reviewed the licensee records for the above samples from August 1, 1985, to July 1, 1986, and determined that timely samples had been obtained and analyzed as required.

No violations or deviations were identified.

7. Allegation Followup

In July 1985, NRC Region II was contacted by a former licensee employee who alleged that his dental problems were potentially related to an exposure he had received while working at Ga. Tech. He stated that in October 1985, he had machined some material on a lathe and that later the lathe was found to be contaminated.

Interviews with the licensee Radiation Safety Officer (RSO) revealed that on October 25, 1985, he had been notified of potential contamination in the

machine shop. He investigated and found that unknown to the faculty member involved, several students had taken a piece of depleted uranium to the machine shop for machining. A survey of the machine shop was performed by the RSO and his staff on October 25, 1986, who found that upon smearing, between six and 12 tools in the vicinity of the lathe were found to have loose contamination above background levels. The smears were counted in the low background beta counter and the highest level of contamination found was 161 counts per minute (cpm). The depleted uranium had been in the possession of a faculty member who was licensed by the State of Georgia to possess up to 10 kilograms natural or depleted uranium.

The RSO stated that the tools were decontaminated to background levels and that urine and sputum specimens had been taken from the alleged. No activity above background was detected in either sample type. The RSO stated that he explained to the alleged the risks associated with radiation exposure and informed him that the risk associated with the exposure he may have received was extremely small.

Since the material was licensed by the State of Georgia, this matter fell in their jurisdiction. The RSO stated that he had been contacted by the State of Georgia regarding this matter.

#### 8. Generic Letter Followup

Generic Letter 86-11, Distribution of Products Irradiated in Research Reactors, was discussed with the licensee to ensure that the licensee was aware of the requirement that the recipient of a product into which byproduct material has been introduced must hold a license unless the distributor has a specific license which permits such distribution. The licensee stated that they were aware of the requirement. It was also stated that gem irradiation was performed in the GTRR; however, gem irradiations were performed in gamma radiation fields only, which eliminated the problem of activation of the stones.

No violations or deviations were identified.