U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 70-33/79-09

Docket No. 70-33

License No. SNM-23 Priority 1 Category UR

Licensee: Texas Instruments Incorporated

34 Forest Street

Attleboro, Massachusetts

Facility Name: HFIR Project

Inspection at: Attleboro, Massachusetts

Inspection conducted: June 26-28, 1979

Inspectors: W. W. Kinney, Project Inspector — 8/20/79 date signed

date signed

date signed

Approved by: J. Rott for R. W. Crocker, Chief, Fuel Facility Projects Section, FF&MS Branch — 8/20/79 date signed

Inspection Summary:

Inspection on June 26-28, 1979 (Report No. 70-33/79-09)
Areas Inspected: Routine, unannounced inspection by a region based inspector of nuclear safety, radiation detection instruments, packaging of radioactive material for transport, and maintenance. The inspection involved 22 inspector-hours on-site by one region based inspector.
Results: No items of noncompliance or deviations were identified.

1176 350

Region I Form 12
(Rev. April 77)

7910180525

DETAILS

1. Persons Contacted

*D. H. Conroy, Metal Systems Department Manufacturing Manager
*F. L. Sherman, HFIR Project Manager
*C. M. Hopper, Nuclear Safety Manager
*D. B. Talan, Nuclear Materials and Safety Officer

The inspector also contacted two maintenance managers during the course of the inspection.

*denotes those present at the exit interview.

2. Nuclear Safety

Immediately after meeting with HFIR management, an inspection of the HFIR area was performed.

The inspector noted that the work stations and storage locations were posted with Maximum Safe Quanity (MSQ) signs, and the amount of material in the various zones was in accordance with the posted MSQ signs.

The inspector noted that the four criticality monitors appeared to be functioning and the power lights were on. The alarm set points were at 15 mR/hr.

3. Radiation Detection Instruments

According to the currently approved license, the licensee must have the following radiation detection instruments available.

Geiger Counters, Eberline Model E112B-1 (0-20 R/hr)	2
Cutie Pies, Nuclear - Chicago Model 2586 (0-250 R/hr)	2
Jordan Radector (.0005-500 R/hr)	1
Fast-Slow Neutron Survey Meter	1
Alpha Survey Meters, Eberline Model PAC-3G	3
Multichannel Analyzer	1

The inspector inventoried the licensee's radiation detection instruments and found the following:

GM Survey Instruments, Eberline Model 112B-1	2
CP Survey Instruments, Nuclear Chicago	2
Jordan Radector	1

Victoreen Radector III	1
Fast-Slow Neutron Survey Meter	1
Alpha Survey Instruments, Eberline RM-3A	2
Ludlum α, β, and γ detector, Model 2200	1
Ludlum α, β, and γ detector, Model 2100-1	1
Baird Atomic Multichannel Analyzer*	1

According to the licensee, the usefulness of the neutron survey meter is questionable, and the instrument is not used for any purpose by the licensee. The radiation detection instruments available satisfy the licensee requirements.

4. Packaging of Radioactive Material for Transport

a. Initial Use of Packaging

Currently, the licensee is awaiting the certification of a new shipping container for box type fuel elements. The container certified by Certificate of Compliance No. 5274, which was used for packaging the Oak Ridge ORR and the Brookhaven HFBR box type elements for shipment, was taken out of service by the Department of Energy. The last shipment of ORR elements to Oak Ridge National Laboratory was made on June 15, 1979, and the last shipment of HFBR fuel elements to Brookhaven National Laboratory was made on June 13, 1979. The next packaging of either the ORR or HFBR elements for shipment will probably be the initial use of a new shipping container.

b. Routine Use of Packaging

The licensee performs the packaging of fuel elements under the direction of personnel from the Oak Ridge and Brookhaven National Laboratories, since Oak Ridge National Laboratory packages the HFIR and ORR fuel elements for shipment and Brookhaven National Laboratory packages the HFBR fuel elements for shipment.

(1) HFIR Elements

The inspector reviewed the licensee's records for the packaging of HFIR elements performed during the period from October 5, 1978, through June 28, 1979. The HFIR elements were packaged in packages certified by the Oak Ridge Operations Office of

*Coupled with Baird Atomic α scintillation counter

the Department of Energy in Certificate of Compliance number 5797-A, Revision 1, dated September 19, 1977. For the outer element it is stated in (b) Contents (2) that, "Maximum quantity of uranium not to exceed Type B quantities of radioactive material consisting of not more than 6.8 kg of U-235." According to the licensee's records, each of the eleven outer HFIR elements packaged during the period contained between 6,808 and 6,811 grams of U-235. These quantities are within the limit of 6.8 kg of U-235, as would be any quantity of U-235 up to (but not including) 6.85 kg of U-235.

The licensee's records showed that each of the HFIR shipping containers were inspected prior to each use in accordance with a written procedure. The inspector noted that the Oak Ridge representative had not signed the route card indicating that he had "directed" the pre-use inspection of the HFIR shipping container. The licensee indicated that a place for a signature would be provided on the route card. According to the completed route cards, the HFIR elements were loaded into the shipping containers properly. The ORNL representative signed the route card indicating that the containers were closed and seals were in place. The licensee's records also showed that each of the packages was surveyed for external beta and gamma radiation at one inch and one meter from the container. The containers were also smeared and the removal alpha contamination was also determined. A "Radioactive Material Shipment Approval" showing the results of the above surveys and other pertinent information was completed for each shipping container and was signed by the Nuclear Materials and Safety Officer.

(2) <u>ORR Elements</u>

The inspector reviewed the licensee's records for the packaging of Oak Ridge Reactor fuel elements during the period from October 5, 1978, through June 28, 1979. During this period, the licensee packaged 147 ORR fuel elements for shipment under the direction of an ORNL representative. There were six shipments made with five to seven loaded shipping containers prepared for each shipment. The same seven shipping containers were used for the different shipments. Five shipping containers were used in all the shipments; one container was used in four of the shipments; and another container was used in three of the shipments.

The licensee's records showed that the route cards for the loading of the elements in the shipping containers were filled out. For the preparations for first shipment made during the period, the ORNL representative only signed that he had witnessed the sealing of the containers with the tamper-safe seals. The representative did not sign that he witnessed that: all bolts were in the cover and tight; the tamper-safe seal was in place on the cover; the radioactive labels were in place; and the shipping label and shipping papers were securely attached to the packages. During the preparations for the second shipment, the ORNL representative signed the route card showing he had witnessed the tamper-safe sealing of the containers and the final check of the shipping containers. During the preparations for the third through sixth shipment, the ORNL representative signed that he had witnessed the pre-use checks of the containers, the closing of the containers, the tamper-safe sealing of the containers, and the final closure checks of the containers.

The licensee's records included a "Radioactive Material Shipment Approval" for each of the six shipments. These records showed that the loaded containers were surveyed for external radiation and radioactive contamination. Each of the approvals was signed by the Nuclear Materials and Safety Officer.

(3) HFBR Elements

During the period from October 5, 1978, through June 28, 1979, the licensee packaged 160 HFBR fuel elements for shipment under the direction of a Brookhaven National Laboratory (BNL) representative. There were four shipments made with ten shipping containers prepared for each shipment.

The licensee's records included filled out route cards for the packaging of the HFBR elements in the shipping containers. During the preparations of the containers for the first two shipments, the BNL representative signed the route cards indicating they witnessed the tamper-safe sealing of the containers and the final checks of the containers. During the preparation of the containers for the last two shipments, the BNL representatives signed the route cards indicating they had witnessed the pre-use checks of the containers, the closures of the containers, and the final closure checks of the containers.

The licensee's records included properly filled out and signed "Radioactive Material Shipment Approvals" for each shipment.

c. Compliance with DOT Requirements

The inspector had to rely on licensee records to learn if DOT requirements were met by the licensee in preparing the package for shipments under the direction of representatives of Oak Ridge National Laboratory and Brookhaven National Laboratory.

According to the licensee records, all of the shipments of fuel elements were transported by Department of Energy (DOE) couriers using DOE equipment except one shipment to Oak Ridge National Laboratory, which used a common carrier on an exclusive use basis. The inspector also reviewed the records of the packaging of waste for shipment to Barnwell, South Carolina, and Richland, Washington, for burial. These packages were transported by a common carrier that transports much radioactive materials.

According to the licensee records, the radioactive material shipped was identified by nuclide and curie quantities. The packages were also labeled with Radioactive - White I, Radioactive - Yellow II, or Radioactive - Yellow III labels as required by the package and its contents.

The licensee had a "Radioactive Material Shipment Approval" for each shipment of material. These approvals gave the information described in the previous paragraph. They also supplied external beta and gamma radiation levels measured at one inch and one meter from the container. The removable alpha contamination in desintegration per minute per one hundred square centimeters was also supplied. In all instances the removable alpha contamination was found to be at background levels. The labels placed on the containers was listed and the labels were consistent with the radiation levels of the packages.

The transport indexes of the containers were listed. Shipment of fuel elements were all done with exclusive use vehicles. The number of packages on a vehicle was within the DOT requirements.

5. Maintenance

Maintenance of the HFIR area not performed by the HFIR project personnel is performed by two different groups, the Facility Maintenance group and the Repair and Maintenance of Equipment group. The inspector interviewed the managers of these two groups.

The Facilities Maintenance people maintain the structures, ventilation systems, electrical systems, and various alarm systems. The equipment repair and maintenance people maintain the equipment inside the structures on which the various manufacturing operations are performed.

Discussions with the maintenance personnel disclosed that both groups have people who have experience in working with potentially contaminated equipment. However, the maintenance people stated that they rely on the HFIR Project people to provide the control necessary to provide the needed protection of their personnel from radiation and radioactive contamination when the maintenance people perform work in the HFIR Project area. The licensee currently issues a memorandum detailing precautions to be taken when working with potentially contaminated systems. The licensee indicated that a Radiation/Contamination Work Permit system will be instituted in the future which will formalize this system.

The licensee has a Facility Standard dated May 15, 1979, with the subject "Cutting and Welding Permit". According to this standard, a Cutting and Welding Permit is required any time a cutting or welding job causing hot slag must be done outside of a designated cutting and welding area. A permit is required for any job that may produce a spark, arc, or open flame in a combustible storage and/or dispensing area, or in or on tanks used for inflammable liquids or gas, or in areas containing gas or dust, and for any job in warehousing operations.

The permit system uses a card which has the following precautions which must be taken before cutting or welding in an area is permitted.

NECESSARY PRECAUTIONS

Before signing this card authorizing the job, the Firesafety Supervisor should inspect the proposed work area and check below precautions taken:

-- Sprinklers are in service.

-- Cutting and welding equipment is in good repair.

<u>Precautions within 35 ft. (10 m.) of work.</u>

-- Floors swept clean of combustibles.

-- Combustible floors wet down, covered with damp sand or metal or asbestos sheets.

-- Flammable liquids removed; other combustibles protected with asbestos tarpaulins or metal shields.

-- All wall and floor openings covered.

-- Fiberglass tarpaulins suspended beneath work.

Work on walls or ceilings

-- Construction is noncombustible and without combustible covering or insulation.

-- Combustibles moved away from other side of wall.

Work on enclosed equipment

-- Enclosed equipment cleaned of all combustibles.

-- Containers purged of flammable liquids.

Fire watch

-- Fire watch will be provided during and for 30 minutes after work.

-- Fire watch is supplied with extinguishers, small hose.

-- Fire watch is trained in use of this equipment and in sounding alarm.

After the precautions are taken, the "Fire Safety Supervisor" may sign the permit for the work to be performed. According to the standard, the supervisor of the area must be aware of the job and approve it. However, there is no place on the permit card for the signature of the area supervisor.

The licensee indicated they have a "lock and tag" procedure for work on electrical systems and acid tankage and piping systems. The system is used; however, the system has not been documented in a Facility Standard as the "Cutting and Welding Permit" system has been documented.

6. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on June 28, 1979. The inspector presented the scope and findings of the inspection.

The inspector noted that the route card for the packaging of the HFIR elements had not been revised, as the route card for the box type elements had been revised, to show that the ORNL and BNL representatives had directed the pre-use check of the shipping containers. The licensee indicated that the route card would be revised. (Paragraph 4.b)