



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-160/84-01

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

Docket Nos.: 50-160

License Nos.: R-97

Facility Name: Georgia Institute of Technology

Inspection at Georgia Institute of Technology site in Atlanta, Georgia

Inspectors: A. K. Hardin 3/29/84
A. K. Hardin Date Signed

for Frank Jope 3/29/84
P. T. Bunnett Date Signed

Approved by: Paul R. Bemis 3/29/84
Paul R. Bemis, Section Chief Date Signed
Project Branch No. 1
Division of Project and Resident Programs

SUMMARY

Inspection on March 13-15 and March 21, 1984

Areas Inspected

This routine, unannounced inspection involved 29 inspector-hours on site in the areas of organization, logs, and records, review and audit, requalification training, surveillance testing, procedures, experiments, observation of operations, plant tours of the GTTR and AGN-201, open items and previous items of noncompliance.

Results

Of the ten areas inspected, no violations or deviations were identified in eight areas; two apparent violations were found in two areas (Review and Audit - Paragraph 7; and Procedures - Paragraphs 5 and 6).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

R. A. Karam, Director, Nuclear Research Center
*R. S. Kirkland, Associate Director, Nuclear Research Center
L. D. McDowell, Senior Reactor Operator
W. H. Downs, Reactor Operator

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 21, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the findings summarized by the inspectors and detailed in the following report.

3. Licensee Action on Previous Enforcement Matters

(Closed) Infraction, 160/80-01-03 - In IE Report 50-160/80-01 the licensee was cited for failure to provide a QA review of experiments prior to implementation. Procedure Nos. 3102 - "Quality Assurance for Experiments," 3103 - "Operation of Experimental Facilities," 3104 - Biomedical Facility Operation," were issued on October 28, 1981, and appear to be adequate to resolve the above concern.

(Closed) Severity Level IV violation, 160/82-01-04. The licensee was cited for failure to make heat balance versus channel checks for certain periods when the reactor was operated at levels of one megawatt. The licensee's response dated August 20, 1982, was deemed to be adequate to resolve the noncompliance item.

4. Unresolved items

Unresolved items were not identified during this inspection.

5. Procedure Review

The following procedures were reviewed:

- a. Procedure 2015, Reactor Power Calibration was issued on September 28, 1982. The procedure is performed weekly at a nominal power level of one megawatt. Total thermal power is the sum of the heat removed from the core and heat removed from the reflector. Turbine meters are used to measure the two flow rates. According to conversations between the licensee and an engineer working for the manufacturer of the turbine meters, no recalibration of the meters is necessary when used in filtered demineralized systems. The RTDs used to measured the

temperature changes through the core and reflector are recalibrated annually. Given the apparent stability of the instrumentation used on the thermal power measurement, the procedure appears adequate for calibrating the nuclear instrument.

- b. Procedure 7207, Control Rod Drop Time, was issued on July 17, 1981. The acceptance criterion of a maximum of 500 milliseconds drop time satisfies Technical Specification (TS) 3.2.c. In addition, the acceptance criteria for a minimum drop time of 430 msc and a maximum change from the previous monthly test of 20 msc assure that preventive maintenance is performed in a timely manner.

The measurement of drop time is dependent on special timing equipment. The setup and adjustment of that equipment is not a part of the procedure. Those instructions, which have not been reviewed as a part of the procedure, are on a card filed with the test data cards. Failure to have a complete, reviewed procedure for rod drop time measurement is another example of a failure to have an adequate procedure as required by TS 6.4.b, and is an apparent violation of that specification. This violation is identified as 160/84-01-01, the same as the violation cited in paragraph 6 as it is one of two examples of failure to have an adequate procedure.

- c. Procedure 7244, Reactor Controls - Shim Safety Blade Drive Maintenance, was issued on July 17, 1981. No questions arose from review of the procedure.
- d. Procedure 7245, Reactor Shutdown Margin Determination, was issued on July 17, 1981. The procedure provides only for the collection of flux decay data as a function of time following a reactor scram. Management then analyzes the data according to an empirical formula. The most recent results of this annual test gave a shutdown margin greater than the total shim-safety rod worth. It was pointed out to management that procedure 7207 for rod scram time measurement could be altered to perform a more straight-forward measurement of shutdown margin, if the drop time measurement is performed in the xenon-free condition with the regulatory rod withdrawn. Prior to dropping the highest worth rod, it will be fully withdrawn with all other shim-safety rods inserted and the reactor subcritical. Partial withdrawal of a second, calibrated shim-safety rod could then demonstrate an adequate shutdown margin.
- e. Procedure 7246, Control Element Reactivity Worth was issued on July 17, 1981. Review of the records confirmed that the measurements have been performed with acceptable frequency since 1980 and that the reproducibility of results during that time period was good (the largest standard deviation was 8% of the average for rod 4).

TS 4.1.a requires that prior to calibrations, the reactor be confirmed to be subcritical in the cold xenon-free condition with any single blade fully withdrawn and all other shim-safety blades fully inserted. The specification provides no time limit for performing the

confirmation of subcriticality. Procedure 7246 does not address the requirement. The licensee's position is that the monthly rod-drop time measurements provide the confirmation of subcriticality prior to the annual measurement of reactivity. Given the lack of specificity in TS 4.1.a, the licensee's position appears to be acceptable.

6. Surveillance Testing

Selected surveillance tests were reviewed by the inspector. These included:

- Air Lock Doors
- Droptime and Withdrawal of Shim-Safety Rods
- Emergency Core Cooling System Tests
- Flow to Each Fuel Element
- Containment Integrated Leak Test
- Reactor Safety System Surveillance

During review of the Master Copy of Procedure No. 4000 entitled, "Containment Building Pressure Test" for the periods 1981, 1982, and 1983, the inspector identified that several pen and ink changes had been made to the 1981 test procedures, changes had not been made in the 1982 procedure, but similar changes were found to have been made to the 1983 test procedure. The licensee stated the changes had been made by the Reactor Supervisor as permitted by TS for non-substantive changes.

TS 6.4.b requires certain procedures be provide for Operation of GTTR. The TS requirement implies complete and adequate procedures. Notwithstanding that the several changes to the procedures were nonsubstantive, a procedure is not adequate that requires similar pen and ink changes over a three year period to complete the test. The finding is noncompliance with TS 6.4.b(7) and is identified as 160/84-01-01.

7. Review and Audit

Nuclear Safeguards Committee meeting minutes were reviewed for frequency of meetings, attendance, subjects reviewed, audits, and distribution of minutes as specified in the TS. Five meetings of the committee which was held in 1982, were reviewed and four meetings were reviewed which were held in 1983. Two areas of noncompliance were identified. These were (1) failure to meet quarterly (at least once very 3± one month) and (2) failure to transmit minutes of the meetings to the President of the Georgia Institute of Technology. These items are required by TS 6.2.c. As of March 15, 1984, the last Nuclear Safeguards meeting had been held on October 17, 1983, a five month period between meetings, and minutes of meetings held since July 1983 had not been sent to the President of the Georgia Institute of Technology. These occurrences constitute noncompliance with TS 6.2.c and are designated 160/84-01-02.

8. Requalification Training

The licensee's program for requalification training was reviewed against the program approved by NRR in 1974. Three personnel are active in the program and a fourth, the Associate Director of the Nuclear Research Center, who holds an SRO license is the Test Administrator. Three personnel hold SRO licenses and one holds an RO license.

The scope of the test and each licensee's test grades were reviewed and found to meet the requal program requirements. The records for radio-activity manipulations required of each reactor operator were reviewed as were the records of performance and competency evaluations for the calendar year 1983. These items were found to meet requal program requirements.

No deviation or noncompliance was identified.

9. Experiments

During calendar year 1983, thirty-seven experiments were conducted in the GTTR. The inspector reviewed the paperwork for these experiments. All appeared to be a minor nature, not requiring Nuclear Safeguards Committee approval other than as a class of experiments. No deviation or noncompliance was identified in this area.

10. Organization, Logs, and Records

a. Console Log

Reactor Console Logs for the period January 1983 to December 1983 were reviewed. Routine logging of operating information was considered satisfactory. The inspector verified that problems encountered on surveillance tests or during maintenance were logged with sufficient information to define the problem and its resolution. One discrepancy was identified to the licensee. When no actual reactor operation is conducted, the log entries even though entries may be significant, do not show who made the entries. Examples of this are for the dates July 11, 12, 13, 14, 18, 19, 21, 22, 25, 28, and 29, 1983. The licensee committed to initialing the log at completion of the shift or day, if entries are made, even though no reactor "on" time occurred. The inspector observed that the console logs had been audited by a member of the Nuclear Safeguards Committee on December 1, 1983.

b. Organization

The inspector verified that the organization for the Georgia Tech Reactor met the TS requirements.

c. Records

TS 6.5.a and 6.5.b requires that certain records be retained for five years and other records be maintained for the life of the facility. The inspector selected one (old) record in each of these categories and requested the licensee to retrieve the record. The licensee demonstrated the records were on file and readily retrievable.

d. Annual Report - GTTR

The annual report for the GTTR was reviewed and found to meet the requirements of TS 6.7.a.

11. Open Items

(Closed) IFI 160/82-01-01. The licensee had identified a procedural problem of taking a "stamp reading" subsequent to every startup whenever the desired power level was reached. Because many experiments required operation at the desired power level for less than 2 minutes, there was insufficient time to record the 22 items required for the "stamp reading." The licensee has revised Procedure 2000 so that for operation in which thermal equilibrium is reached a complete set of data will be recorded, otherwise the 22 readings have been reduced to 11 to be logged in immediately on reaching the desired power level.

(Closed) IFI 160/82-01-02. The licensee committed in 1982 to generate an approved procedure for operation of the reactor in Mode 1 or Mode 2. On April 1, 1983, the licensee issued approved procedure No. 7250 which specifies how this mode change is to be made.

(Closed) IFI 160/82-01-03. A conflict existed between TS 4.2.b and Procedure No. 2015 regarding the time interval for a weekly channel check. The channel check was being done at the proper interval. Procedure No. 2015 was revised on September 28, 1982. Item III.A. now requires a power calibration of linear power channels and power trip channels every week.

12. AGN 201, License No. 111, Docket No. 50-276

The license for this 100 milliwatt reactor was issued on April 19, 1968, and is due to expire on February 27, 1988. The inspector made the following findings relative to the AGN 201.

- a. The reactor has not been operated since June 1979.
- b. There is no one currently licensed to operate the reactor.
- c. The reactor core and source is still in place in the reactor.
- d. Security for the reactor appeared adequate.
- e. Housekeeping in the reactor storage area is poor.
- f. Water is still contained in the reactor vessel.

The licensee was informed of the above findings during the inspection, and on March 22, 1983, the licensee was informed by telephone that no personnel are authorized to work with the reactor fuel or operate the reactor until licensed or relicensed.

In regard to the water in the vessel, the licensee agreed to sample the water to aid in ascertaining the condition of the vessel. The licensee also recognizes the inadequate housekeeping but did not commit resources at this time to improve the situation. In regard to the long term plan for the AGN-201, the licensee has stated that pending the outcome of studies related to operation of the GTTR, a decision on the final disposition of the AGN-201 will be made. These studies are scheduled to be completed by December 1984. This is an inspector followup item (160/84-01-03).