



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30325

Report No.: 50-160/92-01

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

Docket Nos.: 50-160

License No.: R-97

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

Inspection Conducted: February 12 - 14 and 21, 1992

Inspector: *P. T. Burnett*  
 P. T. Burnett

*3/26/92*  
 Date Signed

Accompanying Personnel: T. A. Peebles (February 12, 1992)

Approved by: *R. V. Crljenjak*  
 R. V. Crljenjak, Chief  
 Operational Programs Section  
 Operations Branch  
 Division of Reactor Safety

*3/26/92*  
 Date Signed

SUMMARY

Scope: This announced inspection addressed the routine areas of the operations inspection of Class I research reactors and closeout of open items from previous inspections.

Results: Several operating and surveillance procedures were found to be extensively revised and improved. The licensed operator requalification program has been upgraded to satisfy the pertinent requirements of 10CFR55.59. Logbook entries and records made during surveillance tests have improved in content and clarity relative to observations made in earlier inspections.

Facility repair and cleanliness were generally acceptable, but extensive dust, from handling of concrete shielding blocks, was observed on the main floor of the containment building. The dust would exacerbate control of contamination in the event of a spill of radioactive material.

No violations or deviations were identified.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- W. Downs, Senior Reactor Operator
- \*R. Karam, Director Neely Nuclear Research Center
- B. Revsin, Associate Director, Neely Nuclear Research Center
- \*B. Statham, Manager of Reactor Operations

Other licensee employees contacted included office personnel.

\*Attended exit interview on February 21, 1992.

A list of acronyms and initialisms used throughout this report is provided in the final paragraph.

### 2. Organization, Logs, and Facility Tour (39745)

#### a. Organization

The facility management organization of the NNRC was as described in TS Figure 6.1. The Manager, Office of Radiation Safety resigned, and currently the Associate Director is filling that position again.

One licensed operator was released as the result of an Institute-wide reduction in force.

#### b. Review of Operations Logs

The reactor operations logs maintained at the reactor console were reviewed for the period from June 22, 1991 to January 7, 1992. The content and clarity of the entries were improved over that observed during previous inspections. Scrams and some of the more significant surveillance activities were described in sufficient detail for the reader to understand the sequence of events and results. Most of the scrams were caused by failure of non-redundant instruments in the scram circuits.

#### c. Facility Tour

Shortly after arrival at the NNRC, a tour of the GTRR was conducted with the director of the NNRC to assess visually the condition of the facility and equipment. The facility appeared to be well maintained, with no obvious fire hazards. Housekeeping was acceptable in most areas, but considerable concrete dust was observed on the main floor of the containment building. The dust was the result of relocating concrete shielding blocks from a beam tube area to a storage location. The inspector voiced a concern that the dust would make contamination control more difficult in the event of a spill of radioactive material.

No violations or deviations were identified.

### 3. Nuclear Safeguards Committee Review and Audit Activities (40745)

The minutes of the NSC for the period from July 19, 1990 to December 19, 1991, were reviewed. TS 6.2.c requires that the committee meet at least quarterly. Because of the many major procedure revisions and new procedures to be reviewed, meetings were held at nearly twice the required frequency.

The 1990 audit of 1989 operating records concentrated on records created by procedures, only minor data-entry errors were identified, and the status of IFIs and violations. Operations logbooks were not audited.

The 1991 audit of 1990 operating records was similar to the above in the review of procedures and was extended to logbooks numbers 35 and 36. Logbook 35 began on May 1, 1990. Only minor data-entry errors were identified. This audit also addressed the operator requalification training program. Several weaknesses were identified in the audit against the 1974 program description. However, the requalification program was revised in its entirety in 1991, see paragraph 4, making some of the observations moot.

The documentation of NSC activities indicates that the committee is performing its review and audit function well.

No violations or deviations were identified.

### 4. Training (41745)

In response to observations made during inspection 90-03, the licensee revised the requalification training program for operators and senior operators to meet the pertinent requirements of 10 CFR 55.59, as they apply to research reactors. A revised licensed operator requalification program was submitted for review by the NRR staff on January 2, 1991. The staff approved the new program in a letter dated August 26, 1991, and, in a letter dated November 4, 1991, affirmed that the new starting date for the two year requalification cycle was the program approval date, August 26, 1991. Training under the new program is currently in progress.

As discussed in paragraph 3, above, the NSC had conducted an audit of the retraining and requalification program in early 1991, but it preceded implementation of the new program.

No violations or deviations were identified.

## 5. Procedures (42745)

## a. New Procedures

Since the last operations inspection, the licensee has written five new response procedures, which were reviewed by the inspector, and are listed below:

- (1) 2601 (June 26, 1991), Response to a Reactor Scram, addresses ATWS events and failures of the ECCS to operate when called upon.
- (2) 2602 (June 27, 1991), Response to an Alarm Annunciator, addresses 20 different annunciator alarms.
- (3) 2603 (August 1, 1991), Response to Loss of Electric Power.
- (4) 2604 (August 1, 1991), Response to Inoperable Control Element, was technically acceptable, but was administratively weak in that it did not specifically require a root cause analysis or address potential reporting requirements.
- (5) 2605 (August 1, 1991), Response to Leaks in Heat Exchanger.

These procedures created by licensee initiative are an asset to the safe operation of the facility.

- b. Procedure 2002 (January 31, 1991), Weekly Precritical Startup Checklist, was extensively revised since the last operations inspection, partly in response to comments made in inspection report 90-03. However, the licensee took the initiative to completely reorganize the procedure for completion by control room and outside operators. The duties of the outside operator are further organized by area.

Step 5.2.2.1 now requires that for normal operation each SSB shall be positioned at or above the minimum angle, which would generate a negative period trip should the SSB fall freely into the core. This is responsive to violation 50-160/89-02-02. Samples of the procedure completed for both initial weekly startups and subsequent daily startups were reviewed by the inspector. No questions were raised by the review.

- c. Procedure 2006 (September 27, 1990), Reactor Shutdown Checklist, was revised in a manner analogous to procedure 2002. This procedure also schedules the weekly power calibration (procedure 2015), weekly measurement of upper reflector drain time, and monthly verification of ECCS flow rate required by TS 4.5a. Review of completed copies of the weekly version of this procedure for August, September and October 1991, confirmed that these surveillances had been performed with acceptable frequency and results during that period.

- d. Procedure 2015 (August 1, 1991), Reactor Power Calibration, was revised to require that the heat balance be performed on the secondary side, which has a calibrated flow venturi tube. The accompanying data sheet includes the correct constants for light water. This revision is responsive to IF 50-160/90-03-02. Review of completed procedures confirmed that reactor power calibrations were performed with acceptable frequency throughout the period examined during this inspection.
- e. Procedure 7245 (August 1, 1991), Reactor Shutdown Margin Demonstration, was revised in response to observations made during inspection 90-03. It now assures that SDM is measured with a method consistent with the requirements and definition of TS 3.1.a.

No violations or deviations were identified.

6. Surveillance Procedures and Records (61745)

The following completed surveillance procedures were reviewed:

- a. 7202 (December 12, 1985), Control Rod Drop Time, was performed monthly. Review of the data sheets for the period from December 1989 to December 1991, confirmed that the drop times were acceptable in all cases. Furthermore, there was no trend apparent for any SSB, nor were there extreme variations in results from test to test.
- b. 7203 (approval date not recorded), ECCS Monthly Surveillance, does not have a data sheet as part of the procedure. The test results were recorded on the work request with cryptic notes, but with adequate information to assure that the test results were acceptable. The period reviewed was from September 1991 to February 1992.
- c. 7211 (February 10, 1989), ECCS Fuel Element Flow Verification, confirms ECCS flow by observation of the response of the thermocouple for those fuel assemblies with operative thermocouples or, otherwise, by visual observation of flow through the vertical port. This surveillance was performed four times between February 1990 and September 1991. Eleven or twelve of the fuel assemblies had responding thermocouples. The remaining six or five locations were verified by visual observation.
- d. 7220 (August 25, 1989), Containment Building Isolation Test, was performed with acceptable results at approximately six months intervals during 1990 and 1991.
- e. 7246 (October 30, 1987), Control Element Reactivity Worth Measurement, was performed on September 25 - 26, 1990 and September 11, 1991. The individual SSB worths changed little from measurement to measurement and the observed changes were qualitatively consistent with the expected changes in core burnup.

All of the surveillance procedures reviewed were performed with acceptable frequency and results during the periods reviewed. No violations or deviations were identified in the inspection of surveillance activities.

7. Experiments (69745)

Procedure 3100 (August 8, 1989), Instructions for Preparation of GTRR Experiment Approval Form, includes Appendix A, Experiment Approval Form. Review of the completed forms for experiments performed between August 1990 and September 1991, revealed that all but two were minor experiments, which had been performed without incident many times in the past. The two major experiments were also new, and each received appropriate safety analysis and review. The fast shutdown system experiment used He<sup>3</sup> in a series of three tests, which were completed successfully. The experiment to produce Pu<sup>238</sup> from Np<sup>237</sup> was also completed successfully and without difficulty.

No violations or deviations were identified in the inspection of licensee experiments.

8. Followup of Open Items (92701)

- a. (Closed) Violation 50-160/89-02-02: Procedures did not assure that any shim blade not fully inserted was withdrawn sufficiently to cause a negative rate trip when released into the core, as required by TS 3.1.d.

Procedure 2002, Reactor Operation - Precritical Startup Checklist, was revised on January 30, 1992. It now contains a requirement that each SSB be positioned at or above the minimum angle to generate a negative period trip should it fall freely into the core.

- b. (Closed) IFI 50-160/90-03-01: Revise the operator requalification program to conform to 10CFR55.59 as appropriate for research reactors.

As discussed in paragraph 4 above, an appropriately revised operator requalification training program was approved by the NRR staff on August 26, 1991. Training under this program is in progress.

- c. (Closed) IFI 50-160/90-03-02: Operate by the secondary side heat balance.

Procedure 2015 was revised on August 1, 1991, to require that the thermal power be determined using the heat removal rate of the secondary side coolant. The revision includes a data sheet, which uses secondary side values and provides the correct H<sub>2</sub>O constants.

## 9. Exit Interview

The inspection scope and findings were summarized on February 21, 1992, 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 inspectors during this inspection.

## 10. Acronyms and Initialisms

CFR	Code of Federal Regulations
ECCS	Emergency core cooling system
GTRR	Georgia Tech Research Reactor
IFI	Inspector followup item
NNRC	Neely Nuclear Research Center
NRC	United States Nuclear Regulatory Commission
NRR	NRC Office of Nuclear Reactor Regulation
NSC	Nuclear Safeguards Committee
SDM	Shutdown Margin
SSB	Shim Safety Blade
TS	Technical Specification(s)