

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-199/90-02

Docket No. 50-199

License No. R-94

Licensee: Manhattan College Corporation  
Mechanical Engineering Department  
Riverdale, New York 10471

Facility Name: Zero Power Reactor

Inspection At: Riverdale, New York

Inspection Conducted: December 10-12, 1990

Inspectors:

M. Austin  
M. A. Austin, Radiation Specialist,  
Effluents Radiation Protection Section  
(ERPS), Facilities Radiological Safety  
and Safeguards Branch (FRSSB)

12/21/90  
date

Approved by:

R. J. Boes  
R. J. Boes, Chief, ERPS, FRSSB, Division  
of Radiation Safety and Safeguards

12/21/90  
date

Inspection Summary: Inspection on December 10-12, 1990 (Report No. 50-199/90-02)

Areas Inspected: Routine, announced inspection by a region-based inspector of the licensed program including organization, review of operations, radiological controls, transportation, procedures, and reviews and audits.

Results: Within the areas inspected two apparent violations were observed. Violations: Failure to calibrate the two radiation monitoring channels of the Radiation Monitoring System annually (paragraph 4.1); failure of the ROC to conduct independent audits or have independent audits conducted biennially (paragraph 8.0). In addition, several weaknesses were identified in the conduct of your Radiological Protection and Measurements Programs (paragraphs 4.2, 4.3, 6.2 and 7.0).

## DETAILS

### 1.0 Individuals Contacted

- V. Antonetti, Chairman, Mechanical Engineering Department
- \*R. Berlin, Reactor Administrator
- \*\*W. Duggan, Chief Reactor Supervisor

\*denotes those who attended the exit interview on December 11, 1990

\*\*denotes those who attended the exit interview on December 11 and 12, 1990

### 2.0 Organization

The inspector determined that the organization for the management of the reactor facility was structured as required by Technical Specification (TS) 6.1.1. At the time of the current inspection, the Reactor Administrator was the only licensee employee on site who was authorized to operate the reactor. An individual was hired in August 1990, to fill the position of Chief Reactor Supervisor, but he does not have a Senior Reactor Operator (SRO) license as required by TS 6.1.2.F.

The minimum staffing when the reactor is not secured, as required by TS 6.1.3, includes in part, a licensed Reactor Operator (RO) in the control room and a licensed SRO present in the Leo Engineering Building, which houses the reactor facility. The Reactor Administrator stated that the individual who had previously been the Chief Reactor Supervisor still had a valid SRO license and was available to assist in reactor operations until the individual recently hired in the Chief Reactor Supervisor position has successfully completed the SRO examination.

### 3.0 Facility Tour

The inspector toured the various rooms within the reactor facility, accompanied by the new Chief Reactor Supervisor. The inspector observed that the doors that served as the entrance to the reactor facility were locked, but they were not posted with signs "Caution - Radioactive Materials" as required by 10 CFR 20. The licensee was aware of this situation and explained that the signs had been inadvertently painted over by outside contractor personnel who had been hired to paint the hallways of the Leo Engineering Building. The licensee stated that replacement signs had been ordered. The inspector stated that the required postings must be in place before any fuel handling, core loading or reactor operations were performed.

The inspector observed that a cabinet in the counting room being used for the storage of radioactive sources was maintained in a locked condition, but it was not posted with a "Caution - Radioactive Materials" sign. The inspector examined several of the sources, and this partial examination indicated that the cabinet did not contain a total quantity of radioactive materials that would require the posting described in 10 CFR 20. However, the licensee stated that such a posting would be placed on the storage cabinet as a good health physics practice.

#### 4.0 Radiological Controls

##### 4.1 Radiation Monitoring Systems

The inspector observed that the licensee had installed gamma radiation monitors in compliance with the design requirements of TS 3.7.3. The inspector determined that the licensee can perform operability tests of these gamma radiation monitors by using the check sources built into the detector units. However, the inspector determined through review of logs and discussions with the licensee, that calibration of these radiation monitors had not been performed for at least the last three years. TS 4.7.3.A. requires that these monitors be calibrated annually. Failure to calibrate annually is an apparent violation (50-199/90-02-01).

##### 4.2 Health Physics Logbook

The inspector reviewed a Health Physics Logbook used by the licensee to document health physics surveillance activities performed in support of reactor operations. This logbook was a poorly maintained, untidy record, consisting mainly of handwritten information on tablet paper, which had been stapled onto the bound pages of a hardcover record book. The handwritten information was very difficult to read, and the data were entered in an inconsistent and confusing manner. For example, the result of the semi-annual pool water sampling analysis, dated October 11, 1989, required by TS 4.3.3.B., was recorded as less than 0.0001 microcuries per "100 cm<sup>2</sup> removable." Air sample results, dated November 9, 1987, were recorded as less than "0.0005 microcuries/60,000 ft<sup>3</sup>", whereas, air sample results, dated May 6, 1988, were recorded as less than "0.0001 microcuries/1200 ft<sup>3</sup>". Based upon this review of the logbook, the inspector could not identify the specific radioisotopes of concern and could make no comparisons between these analytical results and the applicable limits in Appendix B of 10 CFR 20. The inspector stated that the documentation in the Health Physics Logbook needed substantial improvement. The licensee representative stated that they would work with the health physics consultant to upgrade the quality of recordkeeping (50-199/90-02-02).

### 4.3 Radioanalytical Methods

The licensee periodically has collected samples of reactor facility air, reactor pool water and reactor demineralizer resin, and has submitted these samples to a health physics consultant for radiological analyses. All records reviewed by the inspector indicated that this health physics consultant consistently reported that the samples had less than detectable activity. The health physics consultant also collected and analyzed smear samples for removable surface contamination within the reactor facility, and "less than detectable" results were typically recorded in the Health Physics Logbook. In July 1990, the health physics consultant sent the smear samples to a commercial lab for radioanalysis. The results from the commercial lab ranged from approximately two to six times greater than the detectable level of the results typically reported by the health physics consultant. Additionally, many of the sample results (about 70%) reported by the Commercial Lab were positive results greater than the "detectable" limit (0.0001 microcurie) recorded by the consultant in the Health Physics Logbook for past smear sample results. The manner in which the sample results were reported by the health physics consultant did not provide sufficient information to determine the actual sensitivity of the radioanalytical method being used. The inspector stated that an evaluation of the adequacy of the radioanalytical methods used by the consultant was needed, and that the sensitivity of these methods must be determined to assure that the radioactivity in collected samples of reactor facility air, pool water and demineralizer resin is accurately identified and quantified, such that appropriate handling or treatment of these media can be ensured. The licensee representative stated that he would work with the health physics consultant to perform these necessary evaluations. This item would be reexamined during a future inspection (50-199/90-02-03).

### 5.0 Operations

The Reactor Administrator informed the inspector that the high-enriched uranium (HEU) fuel had been removed from the reactor pool in November, 1989. Reactor maintenance activities were then conducted and completed in April, 1990. The reactor had been maintained in a shutdown condition, without fuel, since the completion of maintenance. At the time of the current inspection, the licensee expected to receive a new core of low-enriched uranium (LEU) fuel by the end of January, 1991.

### 6.0 Transportation

#### 6.1 Fuel Shipment

The inspector reviewed the quality assurance (QA) program, approved by the NRC in a letter dated February 26, 1990, for the shipment of HEU fuel elements from the licensee's reactor facility to Oak Ridge

National Laboratories. The inspector noted that the QA program approval, which authorizes the licensee to use only the DOT-6M Type B container, had an expiration date of January 31, 1991. The inspector also noted that the QA program contained explicit requirements for internal inspections and audits to be performed for this HEU fuel shipment, and it specified the types of QA records that must be maintained by the licensee. The inspector stated that these QA records would be reviewed during a future inspection and noted that the QA program approval would need to be renewed if the HEU fuel shipment could not be made before the end of January 1991. The licensee acknowledged the inspector's comments.

## 6.2 Demineralizer Resin Disposal

The inspector was informed by the licensee that spent demineralizer resin, which had been used to process the reactor pool water, was disposed as non-radioactive waste. The licensee did this based upon radioanalytical results from the health physics consultant, who reported that no detectable radioactive contamination was present in the collected samples of spent demineralizer resin. Based upon the questions that had been raised regarding the adequacy and sensitivity of the health physics consultant's radioanalytical methods, as described in Section 4.3 of this inspection report, the inspector questioned the validity of the determination that the spent resin was non-radioactive waste. On December 14, 1990, NRC Region I management contacted the licensee via telephone and requested that the licensee suspend any further disposal of spent demineralizer resin until the adequacy of the methods used for the radioanalysis of this material had been evaluated and upgraded, if necessary, to obtain a reliable determination. The licensee agreed to suspend disposal of the spent resins until these actions had been completed.

## 7.0 Procedures

The inspector reviewed a typed, first draft of the licensee's Reactor Operations Manual. This manual appeared to incorporate the licensee's previous Radiation Safety Manual and consolidate many of the procedures required by TS 6.3. However, at the time of this inspection, the Reactor Operations Manual had not been reviewed by the Reactor Operations Committee nor approved by the Reactor Administrator, as required by TS 6.3, and was not being fully implemented. The inspector stated that, in the licensee's review of this manual, the licensee should assure that its requirements are consistent with license, Technical Specifications and actual practices within the reactor facility. The licensee representatives stated that their review would include these items.

## 8.0 Reviews and Audits

The inspector examined records of the Reactor Operations Committee (ROC) and interviewed the Reactor Administrator regarding the review and audit of the safety aspects of the reactor facility operation by the ROC, as required by TS 6.2. The inspector was not able to verify that the ROC was performing the audit function required by TS 6.2.4. Based on discussions with the licensee and review of available documentation, the inspector determined that the ROC had essentially not performed the biennial audit activities required by TS 6.2.4 of those items TS 6.2.4.1 through TS 6.2.4.4, for at least three years. Failure of the ROC to function as required by 6.2.4 is an apparent violation (50-199/90-02-04).

## 9.0 Exit Interview

The inspector met with the personnel denoted in Section 1.0 at the conclusion of the inspection on December 11 and 12, 1990. The scope and findings of the inspection were presented at that time.

OUTSTANDING ITEMS FILE SINGLE DOCKET ENTRY FORM

REPORT HOURS

- |                  |          |                                      |       |
|------------------|----------|--------------------------------------|-------|
| 1. Operations    | _____    | 7. Outages                           | _____ |
| 2. Rad-Con       | <u>X</u> | 8. Training                          | _____ |
| 3. Maintenance   | _____    | 9. Licensing                         | _____ |
| 4. Surveillance  | _____    | 10. QA                               | _____ |
| 5. Emerg. Prep.  | _____    | 11. Other                            | _____ |
| 6. Sec/Safegrds. | _____    | 12. Fire Protection/<br>Housekeeping | _____ |

Docket No. 101510119191

Originator AUSTIN

Reviewing Supervisor [Signature] BORES

Item Number	Type	SALP Area	Area	Action Due Date	Updt/Clsout Rpt/	Date O/ <del>11/21/91</del>
Originator/Modifier		Resp Sec		MM DD YY	MM DD YY	MM DD YY
<u>90-02-01</u>	<u>SIL14</u>	<u>RADICION</u>	<u>RIDIP</u>	<u>11-11-11</u>	<u>11-11-11</u>	<u>1121-1121-1910</u>
<u>AUSTIN</u>		<u>I</u>				
<u>Descriptive Title</u>						
<u>FAILURE TO CALIBRATE GAMMA MONITORS</u>						

Item Number	Type	SALP Area	Area	Action Due Date	Updt/Clsout Rpt/	Date O/ <del>11/21/91</del>
Originator/Modifier		Resp Sec		MM DD YY	MM DD YY	MM DD YY
<u>90-02-02</u>	<u>IFI</u>	<u>RADICION</u>	<u>RIDIP</u>	<u>11-11-11</u>	<u>11-11-11</u>	<u>1121-1121-1910</u>
<u>AUSTIN</u>		<u>I</u>				
<u>Descriptive Title</u>						
<u>ADEQUACY OF HP LOGBOOK RECORDS</u>						

Item Number	Type	SALP Area	Area	Action Due Date	Updt/Clsout Rpt/	Date O/ <del>11/21/91</del>
Originator/Modifier		Resp Sec		MM DD YY	MM DD YY	MM DD YY
<u>90-02-03</u>	<u>IFE</u>	<u>RADICION</u>	<u>RIDIP</u>	<u>11-11-11</u>	<u>11-11-11</u>	<u>1121-1121-1910</u>
<u>AUSTIN</u>		<u>I</u>				
<u>Descriptive Title</u>						
<u>ADEQUACY OF CONSULTANT RADIOANALYTICAL METHODS</u>						

