

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No: 50-199

License No: R-94

Report No: 50-199/96-01

Licensee: Manhattan College Corporation

Facility: Zero Power Reactor

Location: Riverdale, New York

Dates: December 9-12, 1996

Inspector: Thomas F. Dragoun, Project Scientist

Approved by: John R. White, Chief, Radiation Protection Branch
Division of Reactor Safety

EXECUTIVE SUMMARY

Loss of all licensed staff by the end of the current academic term was likely. The reactor core will be placed in storage pending management decisions on the future of the facility. Three violations of license requirements were observed.

Report Details

Summary of Plant Status

The reactor was fueled but the control console and facility were shut down. The security system was active. The pool water purification system cycled automatically and water clarity was good. Repair of the cathodic protection system was effective and no corrosion of pool liner or reactor structure was evident.

O1 Conduct of Operations

O1.1 Organization and Operations and Maintenance Activities

a. Inspection Scope (Inspection Procedure 40750)

The inspector reviewed:

- organization and staffing,
- administrative controls, and
- the MCZPR Operations and maintenance logs.

b. Observations and Findings

The previous Reactor Administrator, who is the current Radiation Safety Officer, retired during this inspection. The current Reactor Administrator (RA) indicated that he will act as RSO until a replacement is identified by the Reactor Operations Committee. However, the current RA stated that he also is leaving the college at the end of the academic year. The Chief Reactor Supervisor (CRS), an adjunct professor, also stated that her teaching contract expires at year-end and therefore could not continue to fulfill her reactor operations responsibilities. Loss of these personnel constitutes loss of all licensed reactor operators and would prohibit manipulation of fuel.

On December 10, 1996, the inspector met with the Provost, Dean of the School of Engineering, RA, and CRS to discuss this situation. The licensee stated that all fuel would be removed from the core, placed in the original shipping containers, and stored by December 22, 1996. This matter will be reviewed in a future inspection (Inspector Followup Item 50-199/96-01-01). The licensee also stated that the NRC would be informed of the future uses of the facility as soon as the upper management internal discussions were complete.

Many entries in the console log were recorded as student experiments. Some TS surveillance requirements are completed as part of these experiments. To assist the inspector in determining the surveillance schedule, the CRS provided a useful cross-reference relating conduct of an experiment to a particular surveillance.

Maintenance log entries indicated that safety equipment was repaired as necessary.

c. Conclusions

Loss of all licensed operators within six months was probable unless new operators are trained and qualified. Administrative controls of reactor operations were appropriate.

02 Operational Status of Facilities and Equipment

02.1 Surveillance

a. Inspection Scope (Inspection Procedure 40750)

The inspector reviewed:

- surveillance data, and
- limiting conditions of operation

b. Observations and Findings

The new LEU core was loaded in April 1995. The reactor was operated periodically over the next few months and the core parameters were measured. Control rod worth and reactivity insertion rates were within the values given in TS. However, excess reactivity was determined to be between 0.73% and 0.78% $\Delta k/k$, which exceeds the limiting condition for operations specified in TS 3.1.3(A). Subsequent operation of the reactor without adjusting excess reactivity constitutes an apparent violation of TS requirements (Vio 50-199/96-01-02).

In addition, TS 2.2 states that the limiting safety system setting shall be on reactor maximum power level not exceeding 0.125 watt or 1.25% of full power. The facility operating license number R-94, condition 2.C (1) states "The licensee may operate the reactor at power levels not in excess of 0.1 watt (thermal)". However, reactor power was not determined during characterization and subsequent operation of the new core. Failure to determine reactor power constitutes an apparent violation of a license condition (Vio 50-199/96-01-03).

Most surveillances on safety systems were performed at the required intervals and the results were satisfactory. However, TS 4.2.3 states, in part, that rod drop times shall be measured semi-annually. Records indicated that this was last done in April 1995. The RA stated that the data for later measurements was kept on loose paper and inadvertently not entered into the console log. He also demonstrated that the testing apparatus was still in place from the last test. The records could not be located by the end of the inspection. Failure to measure rod drop times once in 1995 and twice in 1996 constitutes an apparent violation of TS requirements (Vio 50-199/96-01-04).

c. Conclusions

Certain limiting conditions for operation and surveillance requirements were not satisfied.

O5 Operator Training and Qualification**a. Inspection Scope (Inspection Procedure 40750)**

The inspector reviewed:

- active license status,
- written examinations, and
- medical evaluations

b. Observations and Findings

An accelerated requalification program was completed in 1995 prior to load of the new core. For 1996, the program elements were routine. Use of the reactor for periodic student training courses during the year provided an opportunity for the staff to satisfy the requalification requirements. Records indicated that console manipulations, written examinations, and medical evaluations were conducted as required.

c. Conclusions

Conduct of the operator requalification program was satisfactory.

P1 Conduct of EP Activities**a. Scope (Inspection Procedure 40750)**

The inspector reviewed:

- facilities, equipment, supplies, and
- offsite support

b. Observations and Findings

The emergency plan is not a separate document but is included as chapter 7 of the Reactor Laboratory Manual. The supply of protective clothing and radiation monitoring equipment was adequate for emergency response. Off-site support was available as required. No periodic drills are specified in the plan and none were conducted.

c. Conclusions

The emergency plan was acceptably implemented.

R Radiological Protection and Chemistry Controls

R1.1 Radiation Protection

a. Scope (Inspection Procedure 40750)

The inspector reviewed:

- radiological signs and postings,
- routine radiation surveys,
- instrument calibration, and
- personnel exposure records,

b. Observations and Findings

The RA stated that the 1996 annual review of the HP program was due and would be used by the outgoing RSO (Dr. Berlin) to brief his replacement (Dr Luckett). Routine surveys were completed on schedule and recorded. Exposure data indicated that personnel and public area exposures were not detectable.

Laboratory analysis capability has improved due to equipment acquired with government grants. A sensitive sodium iodide detector attached to a personal computer for spectrum analysis was acquired for water sample analysis. In addition, portable radiation survey meters were replaced with new, reliable models.

No radioactive materials were transferred or waste shipped from the facility since the last inspection.

c. Conclusions

The facility radiation protection program has been maintained in accordance with regulatory requirements and licensee commitments.

X1 Exit Meeting Summary (Inspection Procedure 30703)

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on December 12, 1996. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Berlin, RSO
 W. Duggan, Reactor Administrator
 W. Jackson, Provost
 J. Patterson, Dean of the School of Engineering
 C. Stanton, Chief Reactor Supervisor

INSPECTION PROCEDURES USED

IP 30703: ENTRANCE AND EXIT INTERVIEWS

IP 40750: CLASS II NON-POWER REACTORS

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-199/96-01-01	IFI	Off-load the reactor core and place it in storage.
50-199/96-01-02	VIO	TS reactivity LCO exceeded during operations.
50-199/96-01-03	VIO	Determine reactor power.
50-199/96-01-04	VIO	Conduct rod drop times measurements.

Closed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CRS	Chief Reactor Supervisor
EP	Emergency preparedness
HP	Health Physics
NRC	Nuclear Regulatory Commission
MCZPR	Manhattan College Zero Power Reactor
RA	Reactor Administrator
RSO	Radiation Safety Officer
TS	Technical Specifications