

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Docket No: 50-223  
License No: R-125

Report No: 50-223/96-02

Licensee: University of Massachusetts

Facility: Lowell University Research Reactor

Location: 1 University Avenue  
Lowell, Massachusetts

Dates: October 7-10, 1996

Inspector: Thomas F. Dragoun, Project Scientist

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

## EXECUTIVE SUMMARY

Control and monitoring of effluent releases were good. The radiation protection program was effective. Correction of recordkeeping weaknesses is expected after filling the full-time HP technician position.

## Report Details

### Summary of Plant Status

Tours for high school students were held. The reactor water cleanup demineralizer was regenerated. Surgical apparatus was sterilized by exposure to the cobalt 60 source.

### **R1 Radiological Protection**

#### **R1.1 Implementation of Revised 49 CFR Parts 100-179 and 10 CFR Part 71**

##### **a. Inspection Scope (Temporary Instruction 2515/133)**

The inspector reviewed:

- Training and qualification of personnel preparing or overseeing radioactive materials shipments,
- Implementation of SI units and revised A1/A2 values
- Completed shipping documents

##### **b. Observations and Findings**

Interviews and a review of records indicated that shipments of radioactive material are infrequent and one-of-a-kind. The RSO stated that updated regulations are reviewed prior to each shipment and separate procedures are unneeded. He is the only person authorized to package, prepare the documentation, and arrange the transport of any shipment. Records of a September 1996 shipment of U-233 indicated that regulatory requirements were met.

##### **c. Conclusions**

Revised DOT and NRC transportation regulations effective April 1, 1996, were properly implemented.

#### **R1.2 Effluent and Environmental Monitoring**

##### **a. Inspection Scope (Inspection Procedure 80745)**

The inspector reviewed:

- Control of effluents,
- Calibration, maintenance, and setpoints of gaseous and liquid effluent monitors,
- Location and maintenance of environmental monitors, and
- Effluent release and environmental monitoring data and calculations

b. Observations and Findings

The inspector walked down the liquid waste processing system, accompanied by the HP technician. One of the 2,000 gallon waste holdup tanks was lined up for recirculation. A simulated sample was taken and analyzed in accordance with procedure S.P.10 (pH, gross beta, gamma activity). The RSO stated that solubility requirements in 10 CFR 20.2003 for discharges to the sewer were assured by HP control of material dumped into the radwaste system. However, the control procedure will be changed to require that samples be passed through a micron filter, recounted, and compared to acceptance criteria to ensure solubility before the tank is released. These changes will be made by November 30, 1996. This matter will be reviewed in a future inspection (Inspector Follow Item 50-233/96-02-01). Records indicated that liquid releases were properly controlled and below the concentration limits specified in 10 CFR 20 Appendix B.

Doses to the public resulting from releases of argon 41 in the reactor stack were calculated as 3.06 mrem per year using a balloon model. Estimates using the EPA COMPLY computer code at level 4 projected 0.2 mrem per year public dose.

The municipal water supply drawn from the river adjacent to the facility is analyzed for activity bimonthly. Particulate samples taken from a continuous air monitor on the Pinanski Building roof are analyzed weekly. Twenty one environmental TLDs located in occupied office areas are exchanged quarterly. All data indicated that the exposure to the public was below regulatory limits.

The inspector noted that some periodic environmental sample data and quality control checks on laboratory counting equipment appeared to be missing. However, there are no specific regulatory requirements for these checks. The licensee stated that the individual responsible for this program had unexpectedly retired in August and a change in the oversight of these activities will prevent similar occurrences in the future. Further improvement is expected when the HP technician position, discussed in a June 3, 1996 letter to the NRC, is filled. The status of this position will be reviewed in a future inspection (Inspector Follow Item 50-233/96-02-02).

c. Conclusions

Effluent releases and doses to the public were properly controlled and monitored.

### R1.3 Radiation Protection

#### a. Inspection Scope (Inspection Procedure 83743)

The inspector reviewed:

- Radiation Safety Guide,
- Radiological controls,
- Protective clothing use,
- Personnel dosimetry and exposure records,
- Routine area and personnel exit surveys,
- Personnel training,
- Calibration of portable survey instruments,
- Control of doses to embryo/fetus,
- Audits and oversight

#### b. Observations and Findings

Calibration records for certain portable survey instruments could not be located although the instruments had updated stickers indicating the calibration was current. The part-time HP technician stated that the previous staff technician stored records at different locations and the replacement will be tasked with consolidating instrument records.

Performance in the other areas reviewed was satisfactory.

#### c. Conclusions

The radiation protection program was maintained in accordance with regulatory requirements and licensee commitments.

### X1 Exit Interview (Inspection Procedure 30703)

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on October 10, 1996. The licensee acknowledged the findings presented.

## PARTIAL LIST OF PERSONS CONTACTED

Licensee

- \* L. Bettenhausen, Reactor Supervisor
- \* W. Church, Radiation Safety Officer
- \* G. Kegel, Director, Radiation Laboratory
- R. Wagner, Provost and Vice Chancellor for Academic Affairs

\* Denotes those present at the exit meeting.

## INSPECTION PROCEDURES USED

IP 30703: ENTRANCE AND EXIT INTERVIEWS  
 IP 80745: CLASS I NON-POWER REACTORS EFFLUENT AND ENVIRONMENTAL  
 MONITORING IP 83743: CLASS I NON-POWER REACTORS RADIATION  
 PROTECTION  
 TI 2515/133 IMPLEMENTATION OF REVISED 49 CFR PARTS 100-179 AND 10 CFR PART  
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## ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-233/96-02-01	IFI	Ensure solubility of liquid discharges to the sewer
50-233/96-02-02	IFI	Fill the permanent staff HP technician position

Closed

None

## LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DOT	Department of Transportation
EPA	Environmental Protection Agency
HP	Health Physics
NRC	Nuclear Regulatory Commission
RSO	Radiation Safety Officer
SI	International System of Units
TLD	Thermoluminescent Dosimeter
TS	Technical Specifications