STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

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August 6, 2009

Mr. Mark L. Driscoll, Director
Radiation Safety Service/OSEH
The University of Michigan
1239 Kipke Drive
Ann Arbor, Michigan 48109-1010

Dear Mr. Driscoll:

During our inspection of state-regulated radioactive material at the University of Michigan on December 3, 2008, we received notice that the cyclotron, vault, and associated rooms located in the basement of the Kresge Medical Research III building were going to be decommissioned in preparation for the demolition of the building. On March 26, 2009, we received the "CS-130 Cyclotron Characterization Plan" dated March 19, 2009. On June 29, 2009, we received the "CS-30 Cyclotron Decommissioning Work Plan, Revision 2." We reviewed these plans and discussed concerns with staff from the University of Michigan and the decommissioning contractor.

On August 5, 2009, we received the Final Status Report (FSR) dated August 4, 2009, for the decommissioning of the Cyclotron Corporation CS-30 cyclotron, vault, and associated rooms located in the basement of the Kresge Medical Research III building on Zina Pitcher Drive in Ann Arbor, Michigan. The cyclotron was used to produce short-lived positron-emitting radionuclides for research and for patient diagnosis involving positron emission tomography (PET).

According to the FSR, the university has scheduled the Kresge Medical Research III building for demolition. The building is currently vacant, the six-foot thick cyclotron vault door has been closed, and the electrical, plumbing, and ventilation have been disconnected from the cyclotron vault. Inadvertent entry into the vault by trespassers or university staff is not deemed feasible.

Due to the upcoming demolition of the Kresge Medical Research III building, the credible scenario to predict future doses due to the residual radioactive material in the vault walls, floor, and ceiling is a disposal scenario. The FSR used NUREG-1640, "Radiological Assessments for Clearance of Materials from Nuclear Facilities" to develop an upper bound of potential future doses from disposal of this material. The FSR demonstrates that the potential dose to an average member of the critical group will be less than seven millirem per year.

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Since the predicted dose to an average member of the critical group is less than 25 millirem, the university is requesting that the facility be released for unrestricted use and landfill disposal of building demolition debris.

Cyclotron

The cyclotron and equipment were transferred to Anazao Health Corporation in Tampa, Florida which has a state of Florida license for radioactive material.

Cyclotron Vault

The contractor surveyed the walls, ceiling, and floor of the cyclotron vault to map the radiation readings inside the vault. Two core samples of the concrete walls were taken and sent for laboratory analysis. One core was taken of the wall behind the target panel. The second was taken at the midway point of the wall where the "store for decay" equipment was located. The analyses detected sodium-22, manganese-54, cobalt-60, cesium-134, europium-152, and europium-154 which are activation products. The analyses of the concrete also detected naturally occurring radioactive material that included potassium-40, radionuclides from the radium-226 chain, and radionuclides from the thorium-232 chain.

Based on the radiation survey readings and laboratory report, 365 cubic feet of concrete were removed from the interior of the vault and shipped for disposal. Radiation surveys inside the vault after this remediation show relatively uniform radiation levels from the walls, floor, and ceiling. The average dose rate inside the vault is about 23 microrem per hour at one meter from the wall, floor, and ceiling surfaces. The average dose rate from a reference background area is about 9 microrem per hour. An individual would need to spend about 1,800 hours inside the vault to receive an external dose of 25 millirem. However, the interior of the vault is not accessible since the six-foot thick vault door has been closed and electrically disconnected.

Associated Laboratories, Offices, Utility Areas, and Storage Areas

These rooms are adjacent to the cyclotron vault. These areas were decommissioned using the guidance in NUREG-1757, "Consolidated Decommissioning Guidance," and in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)." The FSR demonstrates that the decommissioning criteria have been met for these areas.

Conclusion

Based on the facts that the university will be demolishing the Kresge Medical Research III building and that the FSR demonstrates that the potential dose to a member of the critical group will be less than 25 millirem per year, we approve the associated laboratories, offices, utility areas, and storage areas for unrestricted release and the cyclotron vault demolition debris for landfill disposal. The debris from the concrete vault may be disposed in a Type I, Type II, or Type III landfill in Michigan.

Since the U.S. Nuclear Regulatory Commission (NRC) begins its regulatory authority for accelerator-produced radioactive material in Michigan on August 7, 2009, we discussed the conclusions of the FSR with NRC Region III staff and are sending a copy of this letter to them.

If you have any questions, please contact me.

Sincerely,

Robert D. Skowronek, Chief
Radioactive Materials Unit
Radiological Protection Section
Waste and Hazardous Materials Division
517-241-1253

RDS:JK
cc: Mr. Dennis Palmieri, University of Michigan
Mr. James Lynch, NRC Region III
Ms. Christine Lipa, NRC Region III