Upcoming Decommissioning Activities at the Buffalo Materials Research Center

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BMRC History

- Designed by AMF Atomics
- Built by J. Fructbaum Engineering, John W. Cowper General Contractor and Ferguson Electric
- Initial Criticality: March 24, 1961 (with Gov. Nelson A. Rockefeller as guest Reactor Operator)
Buffalo Materials Research Center (BMRC)

- Former nuclear research reactor. Built in 1959.
- Mainly used for research, isotope production, and materials testing.
- Facility has been maintained since that time under licenses from federal and state agencies.
Fuel Removal

- All of the Reactor Fuel was safely removed in 2005.
- This removed the largest amount and most hazardous portion of the radioactivity from the facility.
Decommissioning

- Now at the point where the facility and site must be decommissioned before it can be released for general use.
- This must be performed under an approved and detailed written Decommissioning Plan.
Basic Steps of the Decommissioning Process

- Historical Site Assessment - completed
- Site Radiological Characterization - completed
- Environmental Report - completed
- Submission and approval of Decommissioning Plan - completed
Basic Steps of the Decommissioning Process

- Physical Decommissioning and Dismantlement
- Final Site Release Survey and Report
- Regulatory Confirmation of Site Release Survey
The Nature of the Radioactive Material Still in the Facility

- Confirmed by the Historical Site Assessment and the Site Radiological Characterization
- Materials that are contaminated with radioactive material as result of physical contact.
- Materials that are radioactive as a result of having been exposed to neutrons emitted by the reactor’s core during the operation of the research reactor.
The Nature of the Radioactive Material Still in the Facility

- Site Radiological Characterization indicated that there is not radioactive contamination in soils or water around the site.

- History and Site Characterization indicates that water does not infiltrate the subsurface soils or bedrock.
Water in Tanks on Site

- There are several waste water holding tanks on site.
- These tanks will be drained, removed, and the tanks will be disposed of as radioactive waste.
- The contamination in the water in these tanks is very low level.
Water in Tanks on Site

- Levels low enough that the water can be safely and legally discharged to the sanitary sewer system.
- The water is tested prior to release to ensure that it meets local, State, and Federal standards for release to sanitary sewer.
- The University has a permit with the Buffalo Sewer Authority to perform these releases.
- In addition, the water is filtered at the point of release.
What is the End Result of Decommissioning?

- All of the physical structures will be removed.
- The entire site (including grounds) is “cleaned” to the regulatory radiological release levels.
- The radioactive materials licenses are terminated.
- The site is at the state of “green grass”.
Nuclear Facility Decommissioning

- The Decommissioning process is about protecting the workers, the public, and the environment.

- We are following an established, comprehensive, federally and state approved process that was designed to protect the public (and the site workers) during the entire process and to leave a site that is clean from radioactivity such that an individual living on the site afterwards would never be exposed to hazardous levels of radioactivity.
Nuclear Facility Decommissioning

- This process has been performed successfully many times before.
- The University has on staff several individuals with specific expertise in this facility and in radiation safety.
- The University has hired a Project Consultant and Contractor with specific and extensive expertise in this field. Including experience at other such facilities on college campuses.
Decommissioning

- “designed to protect the public (and the site workers) during the entire process and to leave a site that is clean from radioactivity such that an individual living on the site afterwards would never be exposed to hazardous levels of radioactivity.”
- That would include any person walking by the facility at any point.
- The process ensures the above result by following the basic principles used for radiation safety and radiation protection:
Radiation Safety and Radiation Protection

- **Time** - Minimize time
- **Distance** – Maximize Distance
- **Shielding** - Use appropriate shielding when necessary
- **ALARA** - _As Low As Reasonably Achievable_
Radiation Safety and Radiation Protection

- As part of the Decommissioning Plan and ALARA, radiation dose estimates are performed.
- Radiation dose off site should be zero.
- This zero dose is easily achieved through the use of planning, procedures, and the application of Time, Distance, and Shielding principles.
- This will be verified throughout the process using Radiation Monitoring Instrumentation.
Multiple layers of oversight are in place

- Decommissioning Project Contractor
- Decommissioning Project Consultant
- University at Buffalo personnel
- Several regulatory agencies license, oversee, and inspect throughout the process:
  - N.R.C. - Nuclear Regulatory Commission
  - NYS D.O.H. - New York State Dept. of Health
  - NYS D.E.C. - New York State Dept. of Environmental Conservation
Government Regulation and Oversight

- The US Nuclear Regulatory Commission (NRC) approves the decommissioning plan, inspects the facility and approves the final release from the federal license.

- The NYS Department of Health (DOH) also licenses and inspects the facility.

- The NYS Dept. of Environmental Conservation (DEC) approves that the final release criteria meet the New York State requirements.
UB Safety and Compliance Oversight

- UB bears ultimate responsibility for safety and compliance with all regulations as the licensee and owner.
- Final decisions on all work activities are the responsibility of designated University Personnel.
- UB EHS will review and approve work packages.
UB Safety and Compliance Oversight

- UB Radiation Safety Officer manages all personnel radiation exposure monitoring and radiation protection.
- UB RSO manages and approves Radiation Work Permits for the project.
- All activities are also subject to oversight by Reactor Decommissioning Safety Committee (members with expertise from outside of UB).
Radiation Control and Monitoring

- Apply those radiation protection principles (Time/Distance/Shielding) to all work packages to ensure the radioactivity is minimized and contained.
- Materials are handled, removed, shielded, and packaged to reduce the potential for radiation exposure or contamination.
- Radiation monitoring is performed ‘live time” during work to confirm the controls are working.
- Monitoring is also in place to confirm off site conditions.
University Personnel

- Rob Weller, P.E. – UB Project Manager, Facilities Planning & Design
- Ken Bujnicki – UB Site Representative, UB Environment Health and Safety
University Personnel

- **Joe Raab**, C.I.H.  UB EH&S Director
- **David Vasbinder**
  - BMRC Director; UB EH&S Associate Director
- **Jeff Slawson**, C.H.P.
  - UB/BMRC Radiation Safety Officer (RSO)
- **Mark Adams**, P.E.
  - BMRC Ops Manager; EH&S Safety Engineer
Consultant and Contractors

- Decommissioning Project Consultant – **Enercon Services**
- General Contractor - **LVI Services**
- Demolition Contractor - **American DND**
Decommissioning Project Consultant - Enercon

- Assist in writing the Decommissioning Plan.
- Perform engineering analyses.
- Prepare work packages and radiation work permits for University review and approval.
- Supervise the Contractors work.
Decommissioning Project Consultant - Enercon

- Radioactive waste management
  - Packaging
  - Disposal
- Assist in performing final release survey
- Prepare final report for license termination
Decommissioning Contractor
LVI Services

- Perform the physical decommissioning and engineering work.
- Safely remove materials from the building and package for proper disposal.
- Safely demolish the building structure.
Emergency Planning

- Emergency planning is a requirement of the Decommissioning Plan.
- This plan is a sub-set of the University at Buffalo All Hazard Emergency Plan.
- Emergency scenarios and responses have been evaluated.
What to Expect

- Much of the work will be done inside the building first and then eventually move outside.
- Eventually will be tearing down the building and digging up soil on the site.
- Will see people at times in and around the facility wearing protective suits.
- The underground waste tank farm outside the building will be dug up and removed.
Interior Building Work

- Removal of those materials that are more highly radioactive because they were in close proximity to the core of the reactor.
- These will be removed, transferred into appropriate containers, and packaged properly for radioactive disposal.
- Then brought out of the building, loaded onto trucks, and sent to designated radioactive disposal sites.
Physical Dismantlement of Building

- After all the radioactivity inside the building has been removed.
- Radiation Surveys will be performed that verify this has been completed successfully.
- Only then will we take the building itself down.
- Therefore there is not a risk of radiation exposure to the public from the building structure dismantlement.
Where do we Stand and Expected Time Frames

- Very recently received approval of our Decommissioning Plan from the NRC.
- Physical work beginning in December.
- Early phases of work will take place entirely inside the building.
- Expect outside work (including building tear down) to be performed mainly over the summer months.
- Anticipated completion of project by spring 2014.
The Site and Security

- Site Boundaries
- Fencing to define the site and prevent unauthorized access.
- Security provided by University Police
What Things May Look Like Outside at Times?
Final Survey

- The final survey will conducted in accordance with NUREG-1575, MARSSIM
- The NRC will hire a third party contractor to conduct a confirmatory survey of the site.
- Once confirmed, the NRC and NYSDOH will terminate our licenses.
A Big Hole in the Ground

- While we are awaiting the final survey results and the regulators to approve release of the site (which could take a few months) ......... It could look something like this:
Other Possible Areas of Concern

- **Noise** - at times during certain work.
- **Traffic disruptions** – at times. These will be confined to the campus.
- **Vibrations** – at times during certain work.
Methods to minimize Noise and Vibrations

- Procedures and equipment will be utilized to minimize noise and vibration throughout the process.
- We do not anticipate excessive noise or vibrations that would affect the surrounding community.
- However, UB is hiring an expert on vibration to evaluate this.
Questions / Comments?

- Frequently Asked Questions document:
  
  http://www.buffalo.edu/news/13836

- What haven’t we answered?