University at Buffalo Material Research Center

Client	State University of New York
Location	Buffalo, NY
Completed	December 2013 (D&D)
NRC	Termination of License No. R-77 Pending.
Health & Safety	Zero NRC Violations or OSHA Recordable Injuries

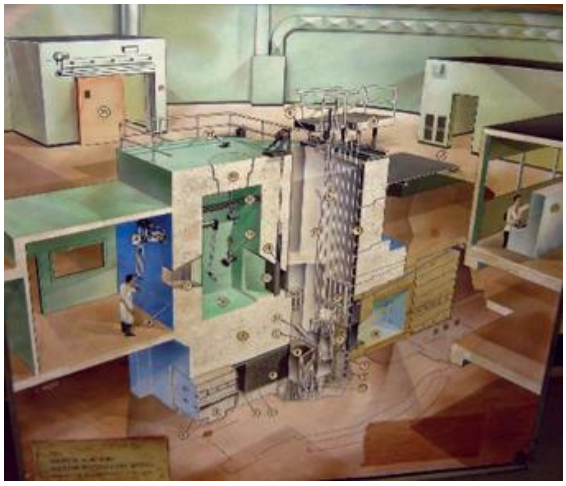
Nuclear Reactor Facility Decontamination & Decommissioning

NorthStar completed the decontamination and decommissioning (D&D), complete demolition, disposal and site restoration of the University at Buffalo's Material Research Center (BMRC), which housed a high dose rate nuclear reactor.

The BMRC was a reactor facility with a pool-type reactor. The reactor operated until 1994. Fuel was shipped from the facility in 2005. The facility was comprised of a tri-level containment building and a 5,500 square foot tri-level laboratory wing.

Radiological Waste Removal and Management

Working within the regulatory framework of the Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Department of Labor (DOL), and NY State Department of Health, contaminants were removed and included neutron-activated aluminum, steel, and concrete.

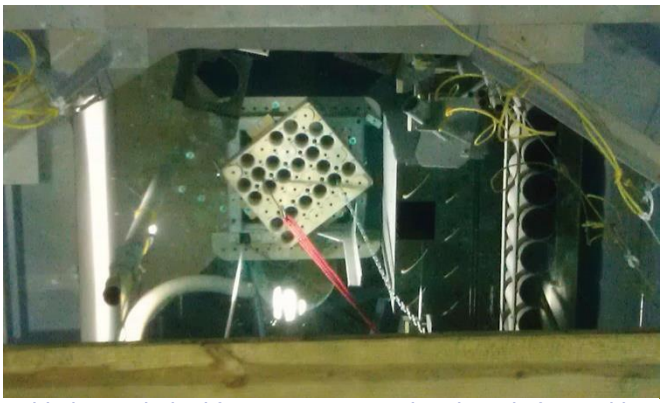


Reactor Component Removal

NorthStar removed the control blade drive mechanisms, control blade guide tubes, irradiation and experimental standpipes and devices, reactor bridge, fuel racks, reactor instrumentation, reactor tank ancillary items, such as lighting and miscellaneous items that were stored in the tank. The reactor components were removed in phases.
The 500 R/hr control blades were loaded, underwater, into a specially fabricated, shielded, storage container, which reduced the dose rate

to project staff. After being placed into a shipping box and grout macro-encapsulated the waste was ready for disposal.

The reactor grid plate, with a dose rate of 40 R/hr, was unbolted and packaged into a specially-fabricated shielded container, placed in temporary storage. NorthStar also removed several components and bolts measuring up to 8 R/hr and placed those items in shielded packaging and temporary storage.



Grid plate unbolted from support stand and ready for packing

NorthStar then removed the remaining fuel storage racks, thermal column nose piece, dry chamber nose piece, the core support plenum, and ancillary components. The 28-foot-deep pool was drained in phases, dependent upon dose rate levels. NorthStar removed thermal column graphite, several one-ton lead shutter plates, hot cell interferences, and ancillary systems.
All reactor tank and cutting recycle water was containerized, filtered, sampled, and released

Activated & Contaminated Concrete Removal

Wire saw cutting was used to remove the surface contaminated Hot Cell concrete, the upper portions of the Bioshield, and the lower portions of the Bio-shield to remove activated concrete. Approximately 600 tons of concrete were cut and removed in 10-ton maximum size blocks. The blocks were segregated into 3 different waste streams, dependent upon radioactivity levels. The cutting water was recycled to minimize waste volume.

Following Bioshield removal, a remotely-operated BROKK, equipped with an impact hammer, was used to break and remove the activated concrete from the tank bottom, below the reactor. A containment, portable HEPA ventilation, and a light water mist was used to control dust levels.

Facility Systems Removal

NorthStar removed the remaining contaminated systems from the building structure, including the primary and secondary coolant piping, drain lines, several large liquid waste tanks, several underground waste storage tanks, radioactive exhaust ventilation systems, hot cell components, and other items.

Facility Decontamination

The reactor room floor, pipe trenches, tank vaults, and other facility surfaces were decontaminated. NorthStar performed asbestos abatement and hazardous material removal prior to facility demolition.

Radiological Waste Transportation and Disposal

NorthStar dispositioned all radiologically contaminated waste as BSFR and LLRW. In addition, NorthStar completed the package, transport, and dispose of the 500 R/hr Class B, mixed low-level radiological waste control blades and the depleted uranium (DU) at the Nevada National Security Site.

Facility Demolition and Site Restoration

NorthStar demolished and removed the 10,000 square foot footprint structure, foundations, and tank vaults. The building debris was appropriately dispositioned.