University of Washington Nuclear Reactor

Client	University of Washington
Location	Seattle, WA
Completed	November 2006
NRC	License Number R-73 terminated Aug. 29, 2007
Health & Safety	Zero NRC Violations or OSHA Recordable Injuries

Nuclear Reactor Facility Decommissioning

NorthStar served as the University of Washington's Decommissioning Operations Contractor (DOC) to decontaminate and decommission (D&D nuclear reactor. NorthStar removed and disposed of all hazardous and radioactive materials above unrestricted release limits to allow the University to terminate its Nuclear Regulatory Commission (NRC) License No. R-73.

The reactor operated for UW's Department of Nuclear Engineering from 1961 to 1988.

NorthStar's Scope of Work Included:

- NRC License Termination for Unrestricted Site Release
- Radiological Waste Removal and Management
- Reactor Component Removal
- Activated & Contaminated Concrete Removal
- Facility and Auxiliary Systems Removal
- Facility Decontamination & Demolition
- Hazardous Material Abatement

Safe Approach to D&D Near Occupied Facilities

The NorthStar team faced several challenges, from generating multiple sets of plans and procedures for the job in a short period of time, to dealing with a number of confined space issues and preventing disruption to adjacent occupied University facilities.

The More Hall Annex was situated in the heart of a major university with occupied facilities and buildings surrounding the Annex, including a nearby student union. Most of the work was performed while classes were in session, so the NorthStar team had to be sensitive not only to protecting the health and safety of the work force, but also sensitive to the

protection of the students, faculty and public, as well as the prevention of other adverse impacts to the University and its operations.

Radiological Waste Removal and Management

Working within the regulatory framework of the Nuclear Regulatory Commission (NRC) and Washington Department of Labor and Industries (DOLI), contaminants were removed inside the facility which included asbestos, lead-based paint, and radiological contaminants from the following radionuclides of concern: Cobalt-60, Europium-152 and -154, Helium-3, Carbon-14, Pluto- nium-239, -240, and -241. Plutonium contamination was present as a result of a plutonium foil failure that occurred during an oscillator experiment in 1972. As a result of this incident, NorthStar had to remove the ventilation system from the reactor building, as well as decontaminate surfaces in and adjacent to the reactor room. An above-ground radiological waste retention tank was also characterized, removed, and disposed.

Other hazardous materials such as lead and cadmium, which were necessary to support the dismantlement of the reactor and other related reactor components and systems, were re-moved. Activated concrete in the heavily reinforced bioshield area and the reactor pedestal were also removed.

Waste management responsibilities included the characterization, transportation and disposal of all hazardous, radioactive and mixed waste generated by project D&D activities. Waste minimization was a primary focus of the project. NorthStar's D&D approach effectively separated the activated concrete and metals from those materials that could be handled as construction debris.

> "NorthStar reacted quickly to all challenges and managed the work of subcontractors effectively, making every effort to accommodate the University's requests while accomplishing the project goals. I have found NorthStar to be a first rate contractor that I would highly recommend for future work at the University of Washington or to anyone that needs to have asbestos and hazardous material abatement or D&D work performed in a safe, cost effective and professional manner."
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> Jeff Angeley, Associate Construction Manager
> University of Washington – Capital Projects Office

The project's waste minimization efforts ultimately resulted in a 45% reduction to the anticipated volume of low level radioactive waste (LLRW). A total of 1,700 cubic feet of LLRW was generated and shipped offsite for disposal, as well as 32 cubic feet of mixed waste. Upon completion of D&D activities, a Final Status Survey was performed to verify that the endpoint criteria had been met to satisfy NRC license termination requirements.

Final Status Survey and License Termination

The Final Status Survey (FSS) Report was submitted to the NRC on October 9, 2012. Facility Operating License No. R-115 was terminated on January 17, 2013