Brookhaven National Laboratory

SUMMARY SHEET:

HIGH FLUX BEAM REACTOR STACK (BUILDING 705) DEMOLITION AND DECOMMISSIONING PROJECT

What is the High Flux Beam Reactor Stack?

The U.S. Department of Energy's (DOE) Brookhaven National Laboratory (BNL), located on Long Island, New York, conducts research in physical, biological, and environmental sciences, as well as in energy technologies, computation, and national security. The High Flux Beam Reactor (HFBR) Complex at BNL operated for research purposes from 1965 to 1996, with the Brookhaven Graphite Research Reactor (BGRR) utilized the stack from 1950 to 1968. The BGRR was an air-cooled system that resulted in radiological material being exhausted through the stack. In 2009, the DOE and the U.S. Environmental Protection Agency signed the Final Record of Decision for the HFBR Complex. The Record of Decision documented the agreement, with which the New York State Department of Environmental Conservation also concurred, for remedial actions to prevent potential releases of hazardous substances from the HFBR Complex that could present a threat to public health, welfare, or the environment. Several buildings and structures have already been removed from the retired HFBR Complex. Dismantling the HFBR Stack, disposing of debris, and remediating surrounding soils is one of the remaining remedial actions documented in the 2009 Record of Decision.

The HFBR Complex, including the red-and-white stack

In November 2018, DOE requested that the U.S. Army Corps of Engineers (USACE) oversee the HFBR Stack remedial actions. In January 2020, USACE awarded a contract to Olgoonik-FPM Joint Venture to plan the work, dismantle the HFBR Stack, and properly dispose of the waste.

What are some of the challenges of dismantling the HFBR Stack?

Due to the nature of the contamination associated with the HFBR Stack and BNL conditions, the following challenges are associated with conducting the remedial action:

- The Stack and associated systems contain radiological contamination from the HFBR and the Brookhaven Graphite Research Reactor that requires careful consideration of demolition, transport, and disposal methods.
- The exterior of the Stack is coated with paint that contains asbestos and lead.
- Stack demolition must induce little-to-no vibration to the extremely sensitive, high-value research equipment located in nearby buildings.

What are some solutions the contractor will put in place to mitigate the challenges?

The contractor will perform the stack demolition with debris being contained inside the stack as it is methodically taken down using the patented MANTIS™ system. The MANTIS™ system sits on top of the stack surface and only requires use of a crane for initial installation and final removal after the stack demolition work is complete.

MANTIS™ system removing a stack similar to the HFBR Stack

All work will be performed in accordance with plans reviewed and approved by USACE, DOE, and regulators. Work is estimated to begin late summer 2020. Examples of the controls that will be applied are described below.

Radiological Contamination Control: The contractor will conduct radiological operations in a manner that ensures the health and safety of all its workers, BNL employees, and the general public. The contractor submitted a Radiation Protection Plan and an As Low As Reasonably Achievable Plan to

USACE to ensure all activities meet or exceed the applicable requirements for radiation protection.

Asbestos and Lead Removal: Asbestos and lead-containing paint will be removed using a hydro-blasting technique, using high-pressure water to remove paint from the stack concrete. This method uses vacuum equipment to collect and contain material as the coating is removed. This procedure, described in the Demolition Plan, minimizes release of hazardous materials while maximizing efficiency– the one-step process eliminates the need to handle multiple waste streams.

Hydro-blasting technique will contain asbestos and lead paint as it's removed

Dust Suppression: The demolition approach will incorporate dust and emission controls. Water sprays will be used to suppress dust. Spray nozzles will be mounted on the MANTIS™ system and on the stack structure to prevent generation of concrete dust. In addition, water sprays will be used to prevent dust generation from soils disturbed around the stack. The project team will conduct air sampling during all site preparation, abatement, demolition, excavation, and load-out activities. Air monitoring systems will check for particulate matter and other contaminants of concern, as described in the approved Community Air Monitoring Plan.

Water Run-off Control: Control measures will be employed to minimize water runoff, erosion, and sediment leaving the work area. Silt fencing will be installed as a temporary barrier around the excavation work area to intercept and retain sediment-laden runoff from the disturbed area. Any accumulated rainwater that remains after 24 hours will be pumped into suitable containers and stored, sampled, managed, and disposed of in accordance with the approved Waste Management Plan.

Soil Excavation: Contaminated soil will be excavated and packaged for off-site disposal. Upon completion of the excavation, sampling will be performed by an independent third-party contractor to confirm that all contaminated soil has been removed, in accordance with the Field Sampling Plan and Quality Assurance Project Plan. The excavation area will undergo an independent verification by a DOE approved contractor to ensure soil remaining in place meets the release criteria established in the approved Record of Decision. The site will be restored to its original grade conditions, with backfilled soil sourced from outside BNL and certified as clean for this use.

Disposal of Contaminated Materials: All demolition debris and materials will be loaded into hard lid intermodal containers, and soil will be loaded into Super Sacks. The intermodal containers and Super Sacks will be staged at the BNL rail transfer area and loaded onto railcars for transportation off Long Island to a DOE-approved waste disposal site.

Contacts and Libraries

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Reports on the activities of BNL's environmental cleanup are available at the reference desks at:

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