

2021 Site Environmental Report

VOLUME 1



The cover for this year's 2021 Site Environmental Report recounts the removal of the High Flux Beam Reactor (HFBR) Stack. The Stack served as an exhaust for the Brookhaven Research Reactor (BGRR), from 1950 to 1968 and for the HFBR from 1965 to 1999. Historical operations from both facilities resulted in radiological contamination of the interior of the Stack.

Under the direction of the Department of Energy (DOE), the U.S. Army Corps of Engineers oversaw the demolition and decommissioning of the HFBR Stack at BNL. Olgoonik-FPM Joint Venture was contracted to plan the work, safely dismantle the HFBR Stack, and properly dispose of all waste.

The HFBR Stack demolition involved significant challenges such as ensuring careful demolition, transport, and disposal of contaminated materials, as well as creating little to no vibrations that could affect extremely high-value, sensitive research equipment located nearby on the Lab site. Despite these challenges, the demolition was performed safely and was completed in February 2021, followed by soil and below ground structure removal and a final status survey.

The photo story of this complex project begins on the back cover of this year's SER and shows the Stack just before the demolition project started, then wraps around to the front cover showing the green field at the completion of the project. The photos in the honeycomb follow the progression of demolition starting with paint removal which abated lead and asbestos, to placement of

the MANTIS™ system which was used to remove roughly 4'x4' sections of the stack, to the final disposition, represented by the flower, of the green field.

The photo below represents the Stack's use for both the BGRR (tan building to the left of the Stack) and the HFBR (domed structure to the right of the stack). The stack was first used with the BGRR. The BGRR was the first peace-time reactor constructed after World War II specifically for the purpose of peaceful study of nuclear physics. It was modelled after the X-10 Reactor located at Oakridge National Laboratory in Tennessee. Construction started in 1948 with operation commencing in 1950. The BGRR operated until June 10, 1968.

By 1958, scientists realized that the neutrons generated within the nuclear reactions of the BGRR were not readily available for many of the research aspects they were conducting. They therefore began to design a reactor that would produce a neutron flux that would be concentrated and available on the outer fringes of the nuclear reactor. The development was a first of its kind, using a water-moderated and cooled reactor specifically designed for nuclear research. Construction of the HFBR began in 1960 and the reactor came online in 1965. As noted above, the Stack served both reactors, concurrently from 1965 to 1968. The HFBR operated from 1965 to 1997 and was permanently shut down by the DOE in December 1999. The HFBR internals were removed, and the vessel now sits allowing decay of the activated vessel until it can safely be removed sometime in the future.

The Brookhaven National Laboratory Site Environmental Report is a public document that is distributed to various U.S. Department of Energy sites, local libraries, and local regulators and stakeholders.

The report is available to the general public on the internet at <http://www.bnl.gov/ewms/ser/>.

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