FACTS

BROOKHAVEN NATIONAL LABORATORY

One of 10 national laboratories overseen and primarily funded by the Office of Science of the U.S. Department of Energy (DOE), Brookhaven National Laboratory conducts research in the physical, biomedical, and environmental sciences, as well as in energy technologies and national security. Brookhaven Lab also builds and operates major scientific facilities that are available to university, industry, and government researchers.

Brookhaven Lab is operated and managed for DOE's Office of Science by Brookhaven Science Associates, a company founded by Stony Brook University, the largest academic user of Laboratory facilities, and Battelle, a nonprofit, applied science and technology organization.

For more information about Brookhaven Lab go to www.bnl.gov.

For more information on the HFBR decommissioning, please contact:

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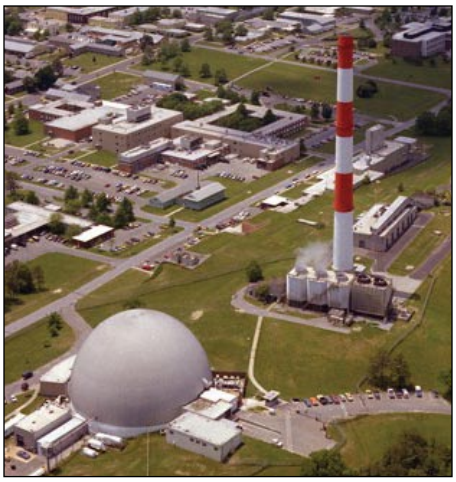
Cleanup Options for the High Flux Beam Reactor

The U.S. Department of Energy (DOE) and Brookhaven National Laboratory (BNL) have developed a plan for decommissioning the High Flux Beam Reactor (HFBR) and associated ancillary buildings. This plan is known as *The Proposed Remedial Action Plan for the High Flux Beam Reactor.*



The purpose of the Proposed Remedial Action Plan (Proposed Plan) is threefold: to describe the preferred remedial alternative for decommissioning the HFBR, to explain the reasons this remedy is preferred over the other alternatives considered, and to encourage public comment before a final remedy is selected.

The public is invited to review the Proposed Plan and to send comments on it to DOE during the formal comment period, which runs from Thursday, January 10, 2008 through Monday, March 17, 2008.

After the comment period ends, DOE will carefully consider the public's input. DOE will then select a final remedy with the approval of the U.S. Environmental Protection Agency (EPA) and the concurrence of the New York State Department of Environmental Conservation (NYSDEC).

Based on comments received, the proposed remedy may be changed. The final decision will be detailed in a Record of Decision (ROD), which will include DOE's response to community comments in a "Responsiveness Summary."

One way to learn more about the Proposed Plan is to attend one of the following meetings:

Information Sessions

Tuesday, March 4, 2008
Noon - 2 PM
Berkner Hall, Room D
and
7 - 9 PM
Berkner Hall, Room B
Brookhaven National Laboratory

Public Meeting

Thursday, March 6, 2008
7 - 9 PM
Large Conference Room
Medical Department, Building 490
Brookhaven National Laboratory

Please note: All visitors to Brookhaven National Laboratory age 16 and older must present photo identification for admission to the Laboratory.

(12-07)

INTRODUCTION

The HFBR was a research reactor that operated at BNL between 1965 and 1996. Used solely for scientific research, the HFBR provided neutrons for experiments in materials science, chemistry, biology, and physics. During a routine maintenance shutdown in 1996, radioactive tritium was found in groundwater south of the reactor at levels well above drinking water standards. Investigations revealed that the source of the tritium was a small leak in the pool where spent reactor fuel was stored. HFBR operations were suspended, and in 1999, DOE announced the reactor would be permanently closed.

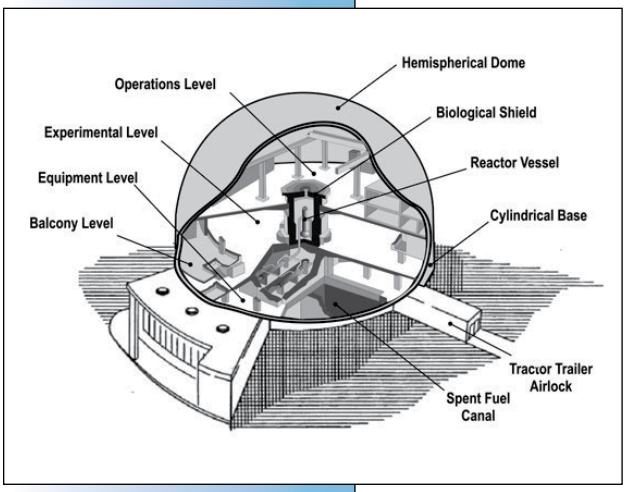


Figure 1. Confinement Building

During its operation, the HFBR used uranium fuel to create the chain reactions necessary to perform research. The chain reactions occurred within the reactor vessel, located inside Building 750, the domed confinement building. (Fig. 1)

In addition to the confinement building, the HFBR complex includes several other structures and systems that were used for operations and maintenance, including several smaller ancillary buildings and the distinctive red-and-white striped stack. Portions of the confinement building structures, systems, and components are still contaminated.

A thick biological shield, which minimized radiation within the confinement building, surrounds the reactor vessel (Fig. 2). Deuterium, or "heavy water" flowed through the reactor core and removed heat from the fuel. The deuterium in this water also slowed down the fast-moving neutrons created by the nuclear chain reaction. The neutrons then traveled out through the surrounding beam tubes and interacted with the atoms in experimental samples, permitting scientists to probe materials on an atomic scale. Spent fuel was transferred to the spent fuel storage pool before being disposed of at a licensed facility off Brookhaven's site.

WHY CLEANUP IS RECOMMENDED

As a result of past operations, some parts of the reactor equipment and structures, such as the control rod blades within the reactor vessel, remain activated. The HFBR complex currently contains approximately 65,000 curies (Ci) of radioactive material; primarily isotopes such as iron-55, cobalt-60, nickel-63, europium-154 and europium-155. Most of this radioactive material is contained in the metal and concrete of the reactor's internal structures, the control rod blades, the vessel, and the thermal and biological shields. The confinement building's piping systems, tanks, soils under the building, ancillary structures, and isolated pockets of soil within the complex contain smaller amounts of radioactive materials.

INTERIM STABILIZATION AND CLEANUP ACTIONS

Many actions have been taken since 1998 to prepare the HFBR for permanent decontamination and dismantling. Hazards identified and removed during the stabilization process included the removal of spent fuel elements from the spent fuel pool. These elements, along with the primary coolant (heavy water) from the spent fuel

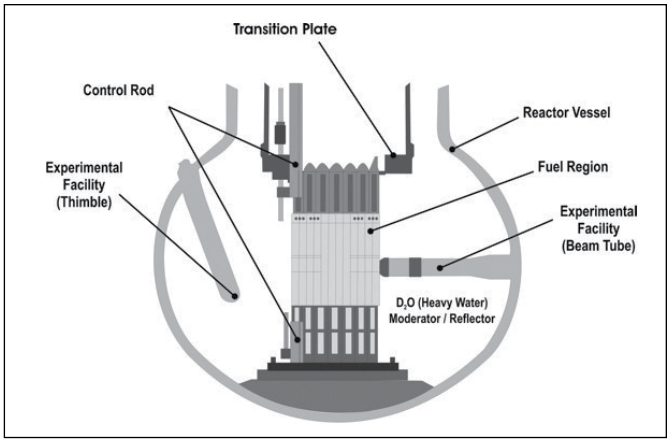


Figure 2. Reactor Components

pool, were shipped to an off-site facility for disposal. The confinement structure and the spent fuel canal were modified to meet ***Suffolk County Article 12*** requirements. Scientific equipment was removed and is being reused or has been sent to an off-site disposal facility. Shielding and chemicals were removed, and the cooling tower superstructure was dismantled and disposed of as waste.

In 2006, ancillary buildings in the HFBR complex including the stack monitoring facility, the cooling tower basin, the water treatment house, pump house, switchgear house and the guard house were dismantled and removed. The cold neutron facility was decontaminated and cleaned for reuse.

HFBR CLEANUP ALTERNATIVES

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that the cleanup remedy that is selected protect human health and the environment.

The four cleanup alternatives for the HFBR complex described in the Proposed Plan were developed by DOE with input from the EPA, the NYSDEC, NYS Department of Health, and the Suffolk County Department of Health Services. They can be summarized as follows:

Alternative A calls for no additional action. It is used as a baseline alternative and is required to be considered under CERCLA. The removal of radioactive materials would be limited to those actions already taken. Surveillance and maintenance would be relied upon to maintain the structures. The current radiological inventory of 65,000 curies would remain in place and any future reductions would be the result of natural radioactive decay. It is not possible to estimate the cost of this alternative, as the surveillance and maintenance and land use institutional controls would be in place for an indefinite period of time.

Alternative B provides for phased decontamination and dismantlement. The HFBR reactor complex, with the possible exception of the subsurface building "base mat" and stack foundation, would be completely removed in a phased manner. In the near-term, the ancillary buildings, underground ducts and piping and contaminated pockets of soil would be cleaned up. After a period of radioactive decay not to exceed 65 years following the finalization of the HFBR ROD, the highly radioactive components -- the control rod blades, the reactor internal structures, the vessel, and the thermal and biological shields -- would be removed and the remaining structures and systems would be dismantled and disposed of. (The 65-year decay-in-storage period will allow the dose rate at one foot from the activated components to fall below the high radiation area threshold of 100 mrem/hr. The reduction in radioactivity from natural decay will permit removal of the components using conventional demolition techniques.) The remaining accessible contaminated soils would be cleaned up. The projected cost of this alternative is $142 million.

Alternative C consists of a combination of phased decontamination and dismantlement with near-term removal of the highly activated control rod blades. As in Alternative B, the ancillary buildings, underground ducts and piping and contaminated yard soils would be cleaned up in the near-term. In this alternative, the control rod blades and beam plugs which contain 35 per cent of the current HFBR radioactive materials inventory would also be removed by 2020. The remaining activated components and contaminated soils would be removed after a period of radioactive decay not to exceed 65 years following the finalization of the HFBR ROD. Near-term removal of the control rod blades and beam plugs would cost an additional $2 million, bringing the cost of this alternative to $144 million.

Alternative D calls for decontamination and dismantlement of the entire HFBR complex by 2026. As with Alternatives B and C, the ancillary buildings, the underground ducts and piping and the contaminated yard soil would be removed. Alternative D would also include segmentation, removal, and disposal of the reactor vessel, the control rod blades, the thermal shield, the bioshield, and the confinement building. This alternative is estimated to cost $205 million.

Suffolk County Sanitary Code - Article 12: *regulates toxic and hazardous materials storage and handling to abate, control, and prevent pollution of the county's water resources.*

THE PROPOSED ALTERNATIVE

After evaluating the alternatives, Alternative C, Phased Decontamination and Dismantlement with Near-term Control Rod Blade Removal, is proposed as the alternative that best meets the CERCLA criteria.

The CERCLA criteria for which relative ratings were established are: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long- term effectiveness; short-term effectiveness; and implementablility.

Alternative C rated high in all five of the criteria and achieves the remedial action objectives described in the Proposed Plan.

COMMUNITY RELATIONS OFFICE

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BROOKHAVEN NATIONAL LABORATORY

THE COMMUNITY'S ROLE IN THE SELECTION

The community has played and continues to play an important role in selecting cleanup alternatives. To ensure that community expectations are considered in making the decision on the remediation of the HFBR complex, DOE encourages the public to submit its input on the Proposed Plan during the formal public comment period, which runs from Thursday, January 10, 2008 through Monday, March 17, 2008.

To submit your comments before the end of the comment period, please do one of the following:

e-mail: tellDOE@bnl.gov

fax: (631) 344-3444

mail: Mr. Michael Holland, Site Manager
U.S. Department of Energy
Brookhaven Site Office
Attn: HFBR Decommissioning Project
Building 464
P. O. Box 5000
Upton, New York 11973

WHERE TO FIND THE PROPOSED PLAN

The Proposed Plan and an accompanying Feasibility Study are available at http://www.bnl.gov/hfbr, and at the following libraries:

BNL Research Library
Building 477
Brookhaven National Laboratory
Upton, NY 11973
(631) 344-3483

Mastics-Moriches-Shirley Community Library
301 William Floyd Parkway
Shirley, NY 11967
(631) 399-1511

U.S. EPA Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007
(212) 637-4296