

**Brookhaven National Laboratory Environmental Clean-up and Facility D&D  
Completion Acceleration - 10537**

**Thomas J. Vero, Manager  
Brookhaven EM Site Office  
U.S. Department of Energy**

**Abstract**

The Department of Energy Environmental Management mission at the Brookhaven National Laboratory addresses the accelerated cleanup of contaminated legacy project areas including the remediation of soils, groundwater, and the Peconic River ensuring their stable condition and the decontamination and decommissioning of two dormant nuclear reactors. During the course of the last year and a half, there have been significant technical and management challenges at the Brookhaven National Laboratory – DOE Environmental Management (EM) Cleanup Projects. This paper will discuss the challenges posed by remediating a DOE-EM small site on an accelerated time frame, using multiple funding sources.

**Introduction**

Brookhaven National Laboratory (BNL) is a USDOE Office of Science (SC) owned multi-disciplinary scientific research center located in the center of Suffolk County on Long Island, about 60 miles east of New York City. The Atomic Energy Commission (AEC) established BNL on the site of the U.S. Army's former Camp Upton in 1947. The AEC's objective was to build a regional laboratory that could provide researchers with powerful tools too costly for their home institutions to build and maintain. BNL was added to New York State's list of Inactive Hazardous Waste sites in 1980 and to the federal National Priorities List in 1989 as a result of soil, groundwater, and surface water sediment contamination from past operations. A tri-party Federal Facilities Compliance Agreement, also known as the Interagency Agreement (IAG), was subsequently negotiated between the DOE, the United States Environmental Protection Agency (USEPA) Region II, and the New York State Department of Environmental Conservation (NYSDEC). This IAG integrates the requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the corrective action requirements of the Resource Conservation and Recovery Act, DOE cleanup authorities under the Atomic Energy Act, and any corresponding New York State regulations. The IAG became effective in 1992.

The EM mission at BNL addresses the accelerated cleanup of contaminated EM legacy project areas. The EM Brookhaven Site Office (BHSO) mission includes the remediation of soils, groundwater and the Peconic River, and ensure their stable condition. Currently sixteen long-term groundwater systems are in place, and are continuously maintained for proper operation. Other required activities include monitoring of three capped landfills and the Peconic River. The EM mission also includes the current legacy project scope for the decontamination and decommissioning (D&D) of several surplus nuclear reactor

## **WM2010 Conference, March 7-11, 2010, Phoenix, AZ**

and non-reactor facilities, and the disposal of legacy waste. It is planned to complete the legacy scope for the Brookhaven Graphite Research Reactor (BGRR) in 2010 and the High Flux Beam Reactor (HFBR) in 2011.

### **Challenges and Successes associated with the High Flux Beam Reactor Decontamination and Decommissioning Project**

In September 2008, a DOE operational readiness review (ORR) was conducted as part of the readiness process associated with the HFBR D&D project. This review identified a number of findings including deficiencies in the oversight, CONOPS, Radiological Protection, and Industrial Health and Safety Programs. Corrective actions to address the findings were developed and implemented; however, these took time to implement resulting in the expiration of the license for the transportation casks. An innovative plan to re-license the previously NRC licensed transportation casks under DOE authority was put into place saving the taxpayers millions of dollars in opportunity costs associated with utilization of different casks and eliminating the potential for increased radiation dose to the workers responsible for loading and unloading the different casks and the increased transportation risks associated with multiple shipments. This plan was a federal initiative requiring these casks to be shipped using Federal employee drivers. A strong team consisting of personnel from DOE Headquarters (HQ), DOE EM Consolidated Business Center, BNL, and Hittman Transport Services, and led by talented DOE waste management and transportation personnel from the Brookhaven Site Office, worked seamlessly to hire trained and qualified drivers in time to safely complete the three shipments on schedule in early Spring 2009.

With increased management attention and focus, the completed corrective actions were independently verified by a DOE-HQ team and authorization to commence control rod blades and beam plug removal operations at the HFBR was provided in January. Once started, technical challenges were encountered with the as-found conditions – increased corrosion/deposition, elevated radiation dose readings, need for modified tooling, and the need to size reduce one of the beam plugs to fit into its shipping cask. Each of these challenges was brilliantly handled by the project team with little impact to project schedule. Another challenge involved a violation of a technical safety requirement due to missed surveillances. This reinforced the need to expedite the downgrade of the hazard categorization of a facility after the material at risk is no longer a potential hazard. Another challenge involved the coordination of the shipments with local, regional, and state governments along the cask transportation route. This is an area where the project team excelled in coordinating the communications and the logistical requirements including obtaining the necessary permits and escorts.



**Figure 1 - Shipping Cask with Control Rod Blades Ready for the Road**

#### Challenges associated with the Brookhaven Graphite Research Reactor Decontamination and Decommissioning Project

The BGRR Project has experienced its share of challenges this year. After a significant slow down in late 2008 due to funding issues, the project reestablished its schedule and cost baseline in early 2009. Progress was once again being made with completion of design documents, engineered plans, and physical construction within the facility. Shortly after this restart, another challenge surfaced regarding project funding. Due to sizable increases in the project costs associated with both reactor D&D projects (as a result of realized risks), this lesser priority project was rapidly exhausting its remaining funding. In April 2009, on the brink of project cessation and the certain loss of jobs, American Recovery and Reinvestment Act (ARRA) funding became available to retain the current workforce and maintain the project's newly achieved progress.

With progress once again being made in the facility, another challenge quickly surfaced. Phase 1 construction completion had begun to once again experience schedule slippage. Originally scheduled to be completed in June, construction, functional testing, and acceptance did not actually occur until mid-August. This delay impacted planning and preparations for determining operational readiness. The subsequent reviews identified several areas for improvement related to the need for increased proficiency in the use of the equipment, weaknesses in engineering processes and configuration management, CONOPS vulnerabilities, and increased project execution risk. The management team aggressively addressed these issues and authorization to commence operations was provided at the end of 2009.



**Figure 2 Brookhaven Graphite Research Reactor Schematic**

#### ARRA Projects

In addition to retaining jobs associated with the BGRR D&D, ARRA funding has allowed BNL-EM to accelerate its efforts to demolish surplus ancillary facilities and address legacy contamination at the site. This funding allowed BNL-EM to create or retain over 100 jobs in order to remove contaminated underground piping and contaminated soils, isolation of the HFBR Building, and accelerate the demolition of two fan houses eight years earlier than originally planned. The project team took on this additional challenge in line with the administration's priorities and concurrent with other planned work. This was an incredible challenge given the limited staffing (both on the contractor and Federal staffs), the increased reporting and transparency requirements, and the already strained resources. The project team successfully met the challenge completing the soil remediation work on schedule and below cost while maintaining project cost and schedule with the other ARRA identified work scope.



**Figure 3 Cutting of Waste Transfer Pipes**

## **WM2010 Conference, March 7-11, 2010, Phoenix, AZ**

### Regulatory and Stakeholder Involvement

The relationship with the regulatory and stakeholders at the BNL remains a positive asset to achieving project completion. Under the Interagency Agreement, the US Environmental Protection Agency and the New York State Department of Environmental Conservation have been very supportive in providing the necessary reviews and approvals on work documents meeting the accelerated schedules associated with ARRA work. With their help and the support of other state and county agencies, a record of decision was issued in April 2009 specifying the path forward for the HFBR D&D.



**Figure 4 High Flux Beam Reactor Building and Stack**

### EM Legacy Completion

The DOE-EM goal is to complete the legacy scope at BNL in 2011. A plan to meet this aggressive goal has been developed which leverages the successes of this past year, the acceleration resulting from ARRA funding, and the support of the regulatory and stakeholder community. In 2010 and early 2011, efforts will be focused on graphite pile removal, bioshield demolition, and engineered cap placement at the BGRR; fan house and stack demolition and underground utilities removal at the HFBR complex; and soil excavation and groundwater and sediment cleanup at various areas in and around the BNL.

### Conclusion

At BNL-EM, there is much success to reflect on. A management team, an organizational structure, and a well conceived plan to accomplish completion of all EM-legacy scope at BNL in 2011 are now in place. A commitment and a new energy have allowed this project to achieve a significant amount of work completion this past year with no recordable injury and well within planned radiological exposures. With this focus, DOE-EM can continue to achieve its mission of reducing risk and addressing the environmental legacies of the past efficiently and safely.