

# cleanupdate

U.S. DEPARTMENT OF ENERGY/BROOKHAVEN NATIONAL LABORATORY/BROOKHAVEN SCIENCE ASSOCIATES

ENVIRONMENTAL RESTORATION DIVISION — VOL.4/NO.3/DECEMBER 1999



Aquifer cleanup continues

Roger Stoutenburgh

*Elected officials joined community members to celebrate the startup of the first groundwater treatment system located off Laboratory property. At the ribbon cutting are (from left): Scott Mallette, U.S. Department of Energy; Michael Schlender, Brookhaven National Laboratory; Suffolk County Legislator Mike Caracciolo; Mike Giacomaro, East Yaphank Civic Association; and, Jack Ames, Congressman Michael Forbes' aide. See full story on page 2.*

## inside

Community input on graphite reactor project

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## DOE, Lab reach milestone in on-site soil cleanup

### *EPA and State agree to cleanup plan*

The U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the New York State Department of Environmental Conservation (DEC) have agreed to a cleanup plan for contaminated soils at Brookhaven National Laboratory (BNL).

DOE, EPA and DEC have signed the Operable Unit I Record of Decision (ROD). This document describes the final plan to address Operable Unit I, which includes soils at the Lab that contain radioactive materials.

The approval of the ROD represents a significant milestone in the Brookhaven Lab cleanup. It clears the way for the final soil cleanup to begin.

*(see Soil cleanup, page 8)*

## *Peconic testing complete, cleanup options offered*

The U.S. Department of Energy (DOE) and Brookhaven National Laboratory (BNL) are proposing to move ahead with the Operable Unit V cleanup project, now that all environmental investigations are complete. Operable Unit V (OU V) is the administrative name referring to an area in the eastern-central portion of BNL. This area includes the Lab's sewage treatment plant, as well as areas of the Peconic River that have been impacted by past Laboratory operations (see map on page 6).

*(see River, page 6)*

## ***First off-site groundwater system begins cleaning aquifer***

In September 1999, the first groundwater treatment system located off of Lab property became operational. On September 23, the U.S. Department of Energy and Brookhaven National Laboratory held a ceremony marking the startup of this system. A number of key individuals attended this ceremony, including Suffolk County Legislator Mike Caracciolo, Brookhaven Town Supervisor Felix Grucci, a representative from Congressman Michael Forbes' office, and leaders of local civic and community groups.

This new treatment system, located in an industrial park just south of the Lab and the Long Island Expressway, uses a cutting-edge technology called "in-well air stripping." This technology treats water within the wells to remove chemicals such as the degreasing agent carbon tetrachloride. The clean water is then returned to the ground. Each of the seven wells in this system treats 60 gallons of water per minute.

"The commissioning of this facility marks another positive step in BNL's commitment to environmental stewardship," said Michael Schlender, Assistant Laboratory Director of Environmental Management. "It is the result of cooperation between state, county, local and community groups, all of which banded together to make it happen."

This groundwater treatment system is the first of several that will be constructed in locations south of the Lab over the next several years. Four treatment systems on Lab property are already operational. All groundwater treatment systems are planned to be operational by 2006. ■

## ***On-site water cleanup continues***

In early October, a new groundwater treatment system began operating on Lab property. This system will remove a solvent called carbon tetrachlo-



Roger Stouenburgh

*From left: Jan Schaefer, President of the Mastic Beach Property Owners' Association; Brookhaven Town Supervisor Felix Grucci; Michael Schlender, BNL's Assistant Director for Environmental Management; Carlee Beecher, a BNL field engineer. Ms. Schaefer and Mr. Grucci learned how the new treatment system operates from Mr. Schlender and Ms. Beecher.*

ride from groundwater near the center of the Lab. This contamination entered the groundwater in 1998 from a leaking tank during the tank's excavation. The carbon tetrachloride is confined to a small area because the leak occurred so recently. The new treatment system was installed during the summer of 1999. The rapid installation of this system ensured that the groundwater contamination would not spread to drinking water wells on or off Lab property. ■

**cleanupupdate** A newsletter from the Environmental Restoration Division ([www.oer.dir.bnl.gov](http://www.oer.dir.bnl.gov)) at Brookhaven National Laboratory, *cleanupupdate* is part of an on-going effort to inform people about environmental restoration issues and activities at the Lab. If you would like to be on the Environmental Restoration Division mailing list, or if you have any questions about the cleanup, please contact:

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## ***Community input received on graphite reactor project***

Input from local community members continues to be a valuable resource in the decision-making process for the Brookhaven National Laboratory (BNL) cleanup. As a result of community and regulator input, the U.S. Department of Energy (DOE) has re-examined the priorities of the Lab's next major cleanup project — the decommissioning of the Brookhaven Graphite Research Reactor (BGRR).

The Brookhaven Graphite Research Reactor was the world's first reactor constructed solely for peaceful scientific research. It operated from 1950 to 1969. During its operation, this reactor contributed to many scientific and technical advances in fields such as medicine, biology, chemistry, physics and nuclear engineering.

Two series of roundtable meetings were held this year. Participants included members of the Community Advisory Council, civic organizations, environmental groups, representatives of regulatory agencies and elected officials, Laboratory employees, businesses, and the general public. Aside from representatives of DOE, BNL, or the project staff, 56 people participated in the first series of meetings this summer, and 42 people participated in the second series of meetings this fall.

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**It is through dialogue with the BGRR cleanup project's stakeholders that the concerns of all interested parties can be addressed.**

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### **The community shares its concerns**

One ongoing area of stakeholder interest is funding. Members of the public are concerned about the length of the project, and wonder what procedures are in place to provide funds throughout the project duration. The cleanup schedule is ambitious — work is scheduled to be completed in 2005 — and DOE has committed to funding the work. In fact, DOE has committed to a nation-wide cleanup of legacy wastes; the BGRR decommissioning is part of that national commitment.



Peter Horton

*This fan is one of five that will be removed as part of the graphite reactor cleanup.*

An interest that was raised at both series of roundtable meetings was the prevention of any further contamination while the cleanup project is underway. Because of the importance of this community value, which parallels federal cleanup requirements, BNL has decided to remove two above-ground cooling-air ducts as a "time-critical" removal action. This action is discussed in greater detail below.

A related concern was the potential for further contamination to the environment if some portions of the cleanup were delayed while the entire project site was being characterized, as was originally planned. (The process of characterization involves the discovery and analysis of the materials — including those that may be hazardous — in and around the area being studied.)

This concern to prevent further contamination is shared by DOE, BNL and regulators. Therefore, rather than wait until the entire site is characterized before beginning work, DOE and BNL divided the project into seven sub-projects that can occur in succession. Each of these sub-projects will be characterized, then cleaned up. This division of work allows the sub-projects with the greatest potential for impacting the environment to be completed quickly, thus removing that potential.

*(continued on next page)*

## Graphite reactor...

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### "Time-critical" actions are a priority

Federal regulations designate projects with the greatest potential for impacting the environment to be "time-critical." Such projects are given first priority in the cleanup process.

For instance, in 1996, BNL investigators determined that rainwater was leaking into the Pile Fan Sump, an area of known contamination. This rainwater had the potential to leak from the sump into the surrounding soil. Removing this sump, a sub-project that is already underway, eliminates the possibility of more rainwater intrusion (see sidebar on page 5).

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### Community input persuaded the Department of Energy to accelerate the removal of above-ground ducts.

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After community input from the first series of roundtable meetings earlier this summer, DOE and BNL concluded that the removal of the above-ground ducts also needed to be performed as a time-critical removal action. The concrete outer surface of the ducts is deteriorating — through age and exposure to weather — creating a potential for small pieces of concrete to flake off. Not only could this become a potential hazard to workers, but it also opens another potential source for rainwater intrusion. Removing the above-ground ducts as a time-critical action will greatly reduce the potential for rainwater leakage into the ductwork, as well as provide greater protection for project workers.

There are additional benefits to dividing the graphite reactor cleanup into a succession of smaller projects. For example, if additional funds become available as the cleanup proceeds, then

the rate of work on the sub-projects could be accelerated.

### Waste characterization and disposal

BNL has developed estimates of the types and amounts of contaminants that are likely to be encountered during this project. These estimates will be confirmed by additional characterization as the project proceeds.

The main contaminants of concern for this project are radioactive elements. The BGRR was in operation from 1950 until 1969, and the radioactive materials that have been found so far are the normal by-products of that operation.

The research reactor pile, or core, is a key area of concern due to the expected presence of radioactive materials. The pile is made of graphite, and is surrounded by a five-foot thick biological shield wall to protect workers. BNL expects to find very small amounts of fuel and fission products, in spite of the fact that the fuel elements were removed from the pile 30 years ago. These materials are expected because 28 fuel elements are known to have failed during the early years of the research reactor's operation. Because of these failures, small amounts of the fission products and fuel



*In late November 1999, Laboratory workers began removing the graphite research reactor's cooling fans. These fans will be shipped off site for disposal.*

material contained in the fuel elements are believed to remain in the pile. Characterization of the pile is scheduled to begin in late 1999, and should take several months to complete.

The Lab will ship materials removed during this project using containers approved by the U.S. Department of Transportation (DOT). These containers will be shipped either by rail or on trucks whose drivers are professionally licensed and certified to transport hazardous materials, and using DOT-approved routes.

## Opportunities for you to provide input

While many decisions about the decommissioning of the BGRR are yet to be made, it is through dialogue with the project's stakeholders that the concerns of all interested parties can be addressed. The next opportunity for public input in the decision-making process will be after the release of the *Removal Action Alternatives Study*. This study is expected to be released in early 2000. Current information about the project's status and schedule — as well as announcements of upcoming public meetings and roundtables — can be found on the Brookhaven Graphite Research Reactor Decommissioning Project's web site at <http://www.bgrr.bnl.gov>. ■

## Progress on the BGRR Cleanup

BNL has begun removing the Pile Fan Sump, an underground concrete structure weighing about 27,000 pounds. This sub-project is being performed as a "time-critical" removal action because the sump is a known pathway for rainwater intrusion. In 1996, during a Laboratory-wide environmental investigation, rainwater from surrounding pavement was found to be collecting in the sump. This water was completely filling the sump, allowing penetration to the surrounding soils, where the water then escaped to the environment. In addition to the sump itself, contaminated soils and about 250 feet of associated piping will be removed.

Currently, the Pile Fan Sump is scheduled to be removed in December 1999. BNL has sent initial sludge and soil samples to an off-site laboratory for analysis to determine what contaminants might be in the materials surrounding the sump. Project workers have securely covered the area where work is being conducted while the analysis is being performed. Only after the level of contamination has been determined will the work plan describing this removal be finalized.

## Remediation roundup

The Laboratory currently has six treatment systems on and off site operating 24 hours a day to clean up groundwater. The following is an update of groundwater treated and amount of contaminants removed.

- **Operable Unit I South Boundary Pump-and-Treat System - formerly RA V (operating since 12/96):**
  - 900,000,000 gallons of groundwater treated by air stripper and recharged
  - 180 pounds of VOCs removed
- **Operable Unit III Pump-and-Treat System (operating since 6/97):**
  - 750,000,000 gallons of groundwater treated by air stripper and recharged
  - 1012 pounds of VOCs removed
- **Tritium Remediation System (operating since 5/97)**
  - 116,000,000 gallons of water treated by carbon filters (to remove VOCs) and recharged
  - 53 pounds of VOCs removed
- **Operable Unit IV Air Sparging/Soil Vapor Extraction System (operating since 11/97)**
  - 24 pounds of VOCs removed by carbon filters
- **Operable Unit III Off-site In-Well Air Stripping System (operating since 9/99)**
  - figures not yet available
- **Carbon Tetrachloride Groundwater Removal Action System (operating since 10/99)**
  - figures not yet available

To date, more than 1.7 billion gallons of groundwater have been treated, and more than 1,200 pounds of contaminants have been removed from the sole source aquifer.

# River...

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## River investigations

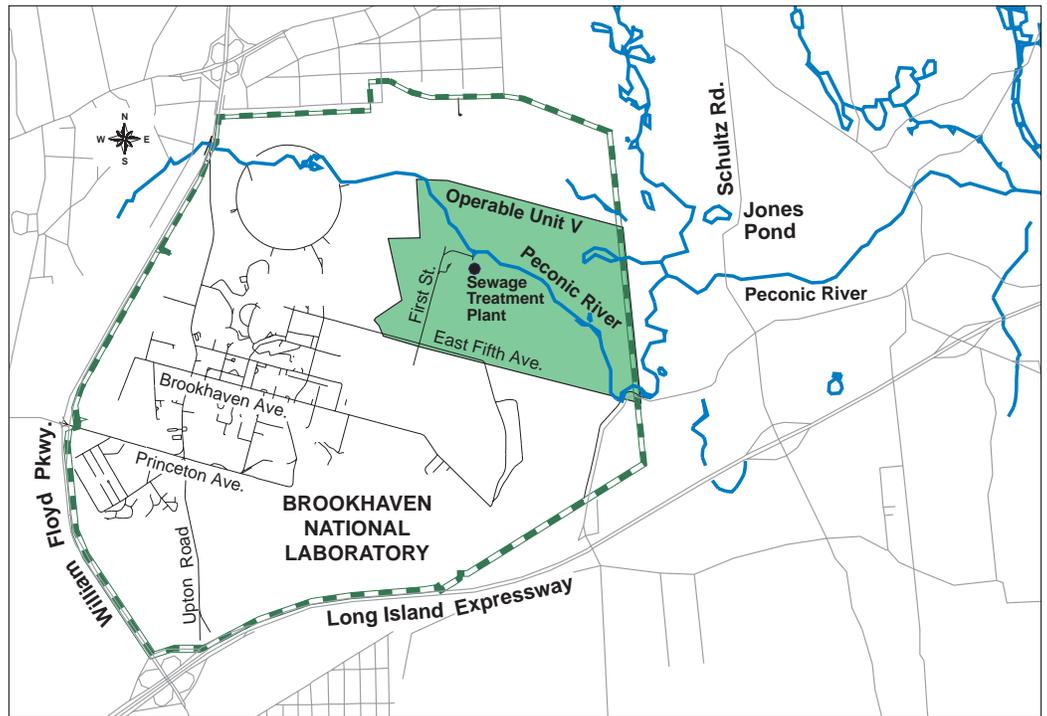
In 1997, BNL completed sampling Peconic River sediments for the OU V Remedial Investigation. A remedial investigation takes place to determine what materials are present, and in what amounts, so that an appropriate cleanup can be planned. The river sediments were tested for a number of materials.

The results showed that Peconic River sediments on the Lab site contain heavy metals such as mercury, and organic chemicals such as PCBs. Levels of these materials on Lab property are below those that could pose a threat to the public's health. However, they could pose an ecological risk to fish and other river creatures.

Contaminant levels off Lab property were below those that would pose a risk to the public's health or to aquatic life.

In May 1999, the Lab conducted a comprehensive investigation of the Peconic River to look for plutonium and other radioactive materials. The Connetquot River was also sampled as a control, or comparison, location. The Lab released the results of this sampling in October.

These results show that average plutonium levels in the Peconic River on Lab property, as well as portions of the Lab's sewage treatment plant, are slightly higher than reference levels. However, the plutonium levels are well below those that pose a risk to the public's health or to aquatic life. The elevated average plutonium levels are most likely the result of past pro-



Operable Unit V and the Peconic River

cessing of waste from the Brookhaven Graphite Research Reactor. This reactor ceased operation in 1969.

Average levels of plutonium in the Peconic River, off Lab property, are comparable to levels in the Connetquot River, a reference location which is unaffected by Lab operations. The levels of plutonium found in off-site Peconic River sediments are similar to those expected to be found due to fallout that occurred in the 1950s and '60s.

Plutonium was not detected in Peconic River fish or surface water samples.

A brochure on these results was distributed to residents on the Environmental Restoration Division mailing list, as well as all Laboratory employees. Copies of this brochure are available by calling (631) 344-7459. The Lab also held three information sessions during October to discuss these results with the community.

## Your role in the Peconic River cleanup

Public comments will be key to the final cleanup decision for Operable Unit V. The Lab will hold information sessions and a public meeting to inform residents about the cleanup and gather their comments. Interested parties are invited to attend one of these meetings to learn more about this cleanup project. Meeting dates and times will be announced in a later mailing.

All comments received by DOE will be reviewed and considered. A final cleanup decision will be made by DOE, with the concurrence of the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation. This decision will be documented in the *Operable Unit V Record of Decision*. After these agencies agree on the cleanup plan, the remedy will be designed and implemented. ■



## Cleanup alternatives examined

After completing the investigation of OU V, the Lab released the *Operable Unit V Feasibility Study Report* on November 1, 1999. This report describes planned and completed cleanup actions for areas at the Lab's sewage treatment plant. It also evaluates five cleanup alternatives for the Peconic River: In all of these alternatives, levels of heavy metals and organic chemicals in the river sediments will determine the areas requiring cleanup.

*Alternative 1* - Take no action, although monitoring would continue. This alternative is required by law to be evaluated for comparison with the other alternatives.

*Alternative 2* - Excavate all sediments with contaminant levels higher than cleanup goals. Dry them and dispose of them off site. Remove approximately 8,300 cubic yards of sediments.

*Alternative 3* - Excavate the two areas of the Peconic River containing sediments with the highest levels of contamination. Dry the sediments and dispose of them off site. Minimize disturbance of wetlands through this

limited excavation. Place a silt curtain near the Laboratory's boundary to prevent remaining sediments from travelling off site. Remove approximately 6,600 cubic yards of sediments.

*Alternative 4* - As in Alternative 2, excavate all sediments with contaminant levels higher than cleanup goals. Dry them, and consider them for beneficial reuse either on or off site. Potential uses have not yet been identified.

*Alternative 5* - As in Alternative 2, excavate all sediments with contaminant levels higher than cleanup goals. Place the sediments in drying beds and prepare them for planting by adding fertilizers and lime. Grow plants in the prepared sediments to absorb the contaminants (in a process called "phytoremediation"). Harvest these plants every six to nine weeks and dispose of them off site. Reuse the treated sediments.

The U.S. Department of Energy (DOE) and Brookhaven Lab will select their preferred alternative for the river cleanup and report it in the *Operable Unit V Proposed Plan*, which is expected to be released in early January 2000. ■

## cleanupdate

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## Soil cleanup...

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### Community input

DOE held three information sessions and a public meeting on Operable Unit I in April of 1999. Participants were asked to provide comments on the proposed cleanup, as described in the Operable Unit I Proposed Plan. Public comments from these meetings, as well as comments from EPA and DEC, supported the proposed cleanup. Therefore, DOE adopted the proposed cleanup plan in the ROD.

"To reach this milestone, many people and organizations worked very closely and diligently," said George Malosh, manager of the Department's office at Brookhaven. "The community, our environmental regulators, and the Laboratory deserve a lot of credit. Congratulations and let's get this cleanup going."

### Next Steps

The first priority in this cleanup is the removal of landscaping soils that contain low levels of cesium-137. Plants that grow in these soils can absorb the cesium,

thereby becoming contaminated. These plants may be consumed by deer on Lab property. The Lab plans to remove the radioactively contaminated soils, thereby removing the source of plant contamination. This cleanup should be completed by the summer of 2000.

Following the landscaping soils, the Lab will excavate and remove the other areas of radioactively contaminated soils in Operable Unit I. All of these areas are on Lab property. They include the Lab's former Hazardous Waste Management Facility, the Waste Concentration Facility, the Reclamation Facility sump and sump outfall, and tanks at Building 811.

In addition, areas on Lab property with low concentrations of metals will be addressed. An area that was used to dispose of incinerator ash will be capped with soil and monitored. Two basins that are used by tiger salamanders, a state endangered species, will be excavated and restored.

The Department expects to complete the Operable Unit I cleanup by 2005. ■