

# cleanup date

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

ENVIRONMENTAL RESTORATION DIVISION — VOL.5/NO.2/SEPTEMBER 2000



Joseph Rubino

Senator Charles Schumer (left) and Energy Secretary Bill Richardson address the media following a meeting with community members.

## Secretary, Senator and community meet to discuss accelerated cleanup

U.S. Senator Charles Schumer and U.S. Energy Secretary Bill Richardson came to Brookhaven Lab on August 11 to meet with the accelerated cleanup subcommittee of the Community Advisory Council (CAC).

The CAC is asking the Department of Energy to accelerate the completion of environmental cleanup work at the Laboratory by three years.

Under the present schedule, all groundwater cleanup systems will be in place and all contaminated soils will be removed from the site by 2006, at a cost of \$178 million. If the cleanup is accelerated, systems will be in place and soils will be excavated by 2003, at a cost of \$160 million.

Senator Schumer said the community group has made a strong case for accelerated cleanup of the Lab's contaminated areas. He cited environmental protection, rapid growth in Brookhaven Town and a savings of \$18 million as compelling reasons for accelerating the cleanup.

Secretary Richardson said that the Laboratory "has become a much better neighbor on Long Island." He also outlined the steps he will take in considering the request for accelerated cleanup: reviewing funding options, looking at innovative technologies, considering incentives, and exploring ideas for ecological protection of the BNL site.

Following the meeting, Senator Schumer and Secretary Richardson toured the Brookhaven Graphite Research Reactor complex, where decommissioning is under way (see stories on pages 4-5). ■

## Groundwater remedy gets regulators' OK

On June 20, the U.S. Environmental Protection Agency approved the *Operable Unit III Record of Decision*. With this approval, the Laboratory will begin designing and installing new treatment systems for on-site groundwater containing tritium and strontium-90, and on- and off-site groundwater containing volatile organic compounds (VOCs). The U.S. Department of Energy and the N.Y. State Department of Environmental Conservation had previously approved this decision.

### Milestone achieved

The approval represents an important milestone in the Laboratory's groundwater cleanup program. It allows the Lab to install additional treatment systems at nine locations on and off the Laboratory site. Brookhaven is currently operating six systems, five on site and one off site.

This milestone was achieved through the cooperation of the Department, regulatory agencies and the community. All worked together to ensure that the selected remedies would protect the public's health and the environment.

"We are excited to have reached this point in the Operable Unit III

(see *Remedy approved*, page 8)

### inside

Contaminated soils removed  
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Manorville cleanup modified  
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River decision deferred  
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## Cleanup system starts up

This spring, a new groundwater removal system was installed just south of the Laboratory's High Flux Beam Reactor. Between June 26-29, the low-flow extraction system removed 4,800 gallons of tritiated water from the aquifer at a rate of about five gallons per minute.

The extracted water was pumped into a tank that was loaded onto a truck and shipped off site to a licensed disposal facility.

### Tritium plume shrinking

The Laboratory installed this system as one of the provisions of the recently-approved *Operable Unit III Record of Decision* (see story on page 1). The system extracts water from the aquifer very slowly. The slow extraction removes the water containing the highest levels of tritium with minimal dilution. This reduces the amount of water that must be disposed of, thereby reducing cleanup costs.

Groundwater monitoring over the past three years shows that the tritium plume has shrunk. This reduction will continue due to dispersion and radioactive decay. The low-flow system will enhance this process by ensuring that the highest levels will not migrate further, allowing the plume to continue dissipating.

### More pumping planned

The Laboratory, in cooperation with the Department of Energy and regulators, will evaluate the system's efficiency and will continue to implement low-flow pumping as necessary. It is likely that more wells will be added and that additional pumping will take place.

A second extraction system is planned for installation on Temple Place, one block south of the first system. The Temple Place system is still being designed.

Current groundwater monitoring data indicates that, even without these two systems, tritium will not reach the site boundary at levels above the drinking water standard. These systems provide further assurance of meeting cleanup goals, which include protection of the public's health and timely cleanup of the aquifer. ■

## The survey says ...

Overall, *cleanupupdate* readers are happy with this publication, according to a survey sent to 500 households on our mailing list in June. Respondents also gave some good suggestions for changes.

Many acknowledged our cleanup efforts, but voiced concern about how we have changed our operations to keep things clean. The Department of Energy and the Laboratory take pollution prevention very seriously. For just one example, see "Groundwater protection a priority" on page 6. We will include similar articles in future editions.

Most replies indicated that readers are satisfied with the quarterly publication schedule and article length and technicality. Some would prefer we use less technical language. We do strive to refrain from using "jargon" that makes articles more difficult to read, and will continue to work in that direction.

Readers also suggested using more photos and providing better summaries so they can get the information they need without reading entire articles. We will implement both of these suggestions.

Respondents requested more information on groundwater, the Peconic River, and air quality. We will continue to feature these topics in future issues.

We thank everyone who took the time to reply, and encourage anyone who has questions or comments on *cleanupupdate* to contact the people listed below. ■

## Division implements standard

This fall, the Environmental Restoration Division (ERD) expects to achieve registration under the international environmental standard known as ISO 14001. Last fall, the Relativistic Heavy Ion Collider Project became the first Office of Science and first Long Island-based organization to obtain third-party registration to the ISO 14001 standard.

Registering under ISO 14001 demonstrates ERD's commitment to protecting the environment. It is also an important step toward the goal of registering the entire Laboratory to this standard by the end of 2001.

Look for an update in our next issue. ■

**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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# On-site soil cleanup advances

Since this spring, the Environmental Restoration Division (ERD) has made visible progress in cleaning up contaminated soils on Lab property. Landscape soils containing low levels of radioactive cesium have been excavated from several areas and transported off-site to a licensed disposal facility in Utah.

## Key step taken

The project marks the first soil cleanup to begin after the *Operable Unit 1 Record of Decision* was approved last fall. It is also significant because it removes a source of possible cesium exposure to deer and other wildlife. Although the state Department of Health has assured residents that there is little health risk from consuming deer hunted in areas surrounding the Laboratory (hunting is not allowed on the site), removing this cesium source is an important part of Brookhaven's commitment to protecting the environment.

"The excavation of these landscape soils is a key first step in our soil remediation project," stated ERD manager John Meersman. "We are encouraged by the progress we have made, and look forward to completing the balance of this important project."

This project involved the removal of over 2,500 cubic yards of contaminated soil, or enough to fill 40 railcars. Now that all the excavations are complete, an independent sampling team from the Oak Ridge Institute for Science and Education will verify that all soil containing cesium levels above cleanup goals has been removed. Then, the excavated areas will be filled with clean soil and reseeded. This process is expected to be completed by the end of September.

## New technology tested

The Department of Energy and the Laboratory are committed to



Roger Stoutenburgh

*The landscape soils excavations began in May and were completed in August. Here, Project Manager Jim Brower (far right) and Field Engineer Tom Doyle (far left) review the day's plans as Christine Lafon (ERD) and Steve Townsend (Radiological Control Division) look on.*

using emerging technologies whenever possible. For this project, a "segmented gate system" was tested for soil sorting. This system separated contaminated soils from clean soils, and, if successful, would have reduced the volume of soil for disposal and associated disposal costs.

Unfortunately, this system was less effective than anticipated. Frequent rain rendered the excavated soils clumpier than expected and more difficult to sort. Of the 625 cubic yards of soil processed by the

system, only 95 cubic yards tested clean due to mixing during the excavation process. In addition, the overall sorting process was not as efficient as expected, leading to reduced cost savings.

The segmented gate system trial demonstrates the challenges in implementing these innovative solutions. Nevertheless, DOE and BNL will continue to both test new technologies that are compatible with local site conditions and strive to improve remediation efficiency. ■

## Treatment to speed off-site cleanup

The Department of Energy has proposed modifying the cleanup plan for contaminated groundwater in western Manorville. After reviewing several years of groundwater monitoring data and receiving additional comments from regulatory agencies, the plan has been changed to employ carbon filtration to clean up this localized area of groundwater contamination, as mentioned in a July mailing to residents.

Groundwater just southeast of the Laboratory's boundary contains the once-commonly used pesticide ethylene dibromide (EDB) at levels well above drinking water standards. The original cleanup plan involved monitoring the EDB as it degraded over time. Observations indicated, however, that the EDB was not degrading as quickly as expected. In addition, treatment technologies have improved over the past several years.

As a result, the Department is recommending installation of a groundwater treatment unit in an undeveloped area of Manorville near North Street. A 30-day public comment period on the proposal was open from July 24 to August 24. Comments were also recorded during an August 8 information session in Manorville. All written comments will be considered before a final decision is rendered. For more information, go to [www.oer.dir.bnl.gov/water/ou6/ou6-facts.html](http://www.oer.dir.bnl.gov/water/ou6/ou6-facts.html) ■

# Visible progress made as BNL's skyline changes

In July, the first sections of above-ground ductwork were removed from the Brookhaven Graphite Research Reactor, signalling the start of a second major phase in the decommissioning effort.

The U.S. Department of Energy (DOE) recently issued an Action Memorandum that documented the decision to remove the above-ground ducts. The Action Memorandum is available in local libraries and on the web at <http://www.bgrr.bnl.gov/docs.html>.

These concrete ducts have deteriorated since their construction in the late 1940s, necessitating their removal. The ducts were erected during the complex's original construction, and are showing the effects of more than 50 years of aging and weathering. Small, fist-sized chunks of concrete have flaked off, and there is evidence of previous rainwater intrusion into the ducts. Moreover, the original exterior coating contains lead, asbestos, and PCBs.

## Preparations ensure safety

Brookhaven National Laboratory requested bids for the removal project earlier this year. Contract bids were evaluated for their safety procedures and operating techniques, as well as cost. The Laboratory awarded the contract to URS/US Ecology, and initial preparations began in May 2000.

Before actual work could begin, contract workers had to complete the Laboratory's training requirements. The contractors also had to submit formal written plans for environment, health, and safety protection, as well as technical work documents for cutting and segmentation of the concrete ducts, containment of contamination, lifting



Peter Horton

*Here, the first 160,000-pound segment of the above-ground ducts is maneuvered away from the fan house and lowered to the ground.*

the duct segments using an overhead crane, and waste management and disposal.

An Operational Readiness Review, including DOE, Suffolk County Department of Health Services and the BGRR Decommissioning Project team, was completed before work began. Laboratory personnel from Plant Engineering, and the Environmental Safety, Health & Quality Directorate were also involved in this review.

## The ducts come down

After all plans and training were completed and equipment and materials collected, work began. Two diamond-wire saw stations were set

up on top of the fan house, and barriers were installed to isolate the above-grade ducts. Workers applied a fixative to the expansion joints and a strippable fixative to the duct interior surfaces to prevent the spread of radiological contamination during cutting, lifting, and transport of the concrete. Then, the methodical process of cutting the ductwork apart with diamond-wire saws began.

As the sections above the fan house were cut free, they were lowered by crane to a staging area. There, they will be cut into thirds and securely sealed and packaged before being shipped off site for

*(continued on next page)*

decontamination, waste volume reduction and disposal.

The decontamination will be performed at a licensed off-site facility using a chemical/vacuum extraction process. This three-part process is particularly effective with

hard, porous materials such as bricks and concrete. A base, then an acid, and then a cleaner will be applied to the surface of the concrete. The chemicals draw the radionuclides to the porous surface of the concrete, where they are vacuumed out. The

small volume of chemicals containing the radionuclides will be sent for hazardous materials processing.

After decontamination, the concrete should be clean enough to meet release criteria and be sent to an industrial landfill. ■

## Graphite reactor sampling continues

Even as work continues on the dismantling of the above-ground ductwork outside the graphite reactor, sampling activity has moved underground and inside the reactor building. In particular, sampling and analysis of the primary air cooling filters located in the sections of the ducts below ground level were recently completed.

During construction, 32 filter panels were installed in two "banks" in the below-ground ducts. Each filter panel consists of 320 filter "cells" that are two feet on a side and four inches thick. A filter cell is made of a bonded or woven glass cloth.

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*The graphite reactor project team is now focusing on studying the reactor's graphite pile, or core.*

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The filters were found to be intact, although the metal frames of the filters have deteriorated significantly over the 30 years since the reactor ceased operation. There are no visible breaks in the filter material or frames. Radiation measurements at the general area of the south filter bank are approximately 800 millirem (mrem) per hour and approximately 400 mrem per hour on contact. (For comparison, natural background radiation is about 300 mrem per year.) While the levels warrant special handling and

controls, they are substantially lower than originally anticipated by the project team. The north filter bank measurements are approximately one-half of the south filter bank measurements.

Filter samples were taken and have been sent to an off-site laboratory for radiological and hazards analysis. The results should be available this fall.

### Cooling coils studied

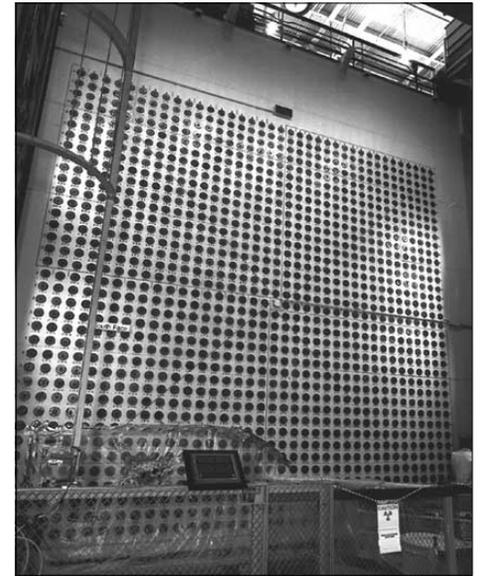
The primary air cooling coils have also been studied. The air coolers are located in the underground air ducts "downstream" of the air filters. They were used to cool the exhaust air from the graphite reactor. Cold water was circulated through the cooling coils, and the exhaust air was blown over the coils. Coil samples were taken through openings on the north and south sides of the duct structure just as it surfaces from below ground.

The cooling coils have deteriorated due to corrosion. The radiation levels were in the 5 to 10 mrem per hour range. Samples of the cooling coil materials have been removed and sent off site for laboratory analysis. The results should be available sometime this fall.

Both the filters and the cooling coils are planned to be removed and disposed at a licensed disposal facility in 2002.

### Future studies planned

The BGRR project team is now focusing on studying the reactor's graphite pile, or core. Initial radiation measurements from the experimental ports, those running in the



*Sampling and characterization of the graphite reactor pile has begun, and is being carried out by remotely-operated cameras and monitoring devices.*

east-west direction, found radiation levels of 200 to 400 mrem per hour, or about half what was measured in the south filter banks. The team found most of the plugs used to seal the pile in place. As a result, special tools had to be fabricated to remove the various types of plugs and spacers to take samples. This information will be used to update the Brookhaven Graphite Research Reactor *Auditable Safety Analysis*, which establishes appropriate safety measures for decommissioning work.

The canal and water treatment houses, equipment, and associated soils characterization sampling and analysis plan has been completed and reviewed by the Department of Energy and regulators. Sampling and analysis activities are expected to begin shortly and conclude this fall. ■

# Manager's Message: Groundwater protection a priority



From John Meersman, Environmental Restoration Division Manager

Protecting Long Island's groundwater continues to be a top priority at Brookhaven National Laboratory. In support of this priority, the Laboratory has maintained a program to monitor groundwater quality and rapidly address any problems that arise. I would like to tell you about two recent examples of this program's effectiveness.

## Monitoring detects tritium

The first example was identified by routine groundwater monitoring that Brookhaven conducts throughout the site. In February 1998, a monitoring well near the Brookhaven Linac Isotope Producer (BLIP) detected elevated levels of tritium and sodium-22. Additional soil and groundwater samples confirmed the presence of these contaminants. On- and off-site drinking water were not affected.

The BLIP facility is a national resource for producing radioactive iso-

topes that are crucial to nuclear medicine for both research and clinical use. Routine BLIP operations generate particles called neutrons that pass through the soil beneath the BLIP building. These neutrons "activate" the soil by reacting with atoms already present in the soil to form radioactive elements.

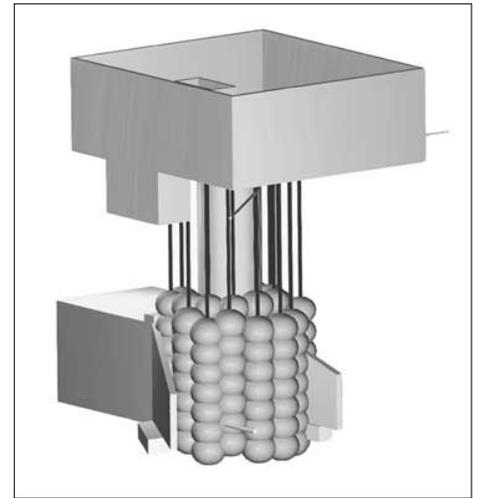
As reported in the June 1999 *cleanup*, Brookhaven has taken a number of steps to address this area and prevent additional groundwater contamination. In 1999, the Laboratory re-routed rainwater downspouts on the BLIP building and placed a "cap" over the area of activated soil. Both actions prevent rainwater from entering the soil and moving contaminants into the groundwater.

In May and June of this year, the Laboratory completed its groundwater protection activities at BLIP by injecting silicon grout into the area of activated soil. This grout, which solidifies over the course of a few hours, "locks" contaminants in place so that they can't migrate into the groundwater.

## Enhanced monitoring succeeds

The second example also was identified through routine groundwater monitoring. In 1999, as part of the Laboratory's enhanced groundwater protection program, 84 new groundwater monitoring wells were installed near active facilities.

Last November, a testing laboratory reported detecting tritium in a groundwater sample taken in October near one of these facilities,



The silicon grout injections form "bulbs" at several depths to encapsulate the contaminated soil. Above, the corn-cob-like area shows the final placement of the grout. The blocks at top and left and the central column show existing portions of the BLIP building.

the g-2 (pronounced "gee minus two") experiment. Sampling determined that tritium above the drinking water standard extended 250 feet from the g-2 experiment. This tritium was also created by soil activation. On- and off-site drinking water were not affected.

When the tritium detection was confirmed, the Laboratory told the community and regulators. Also, extensive sampling was done to define the extent of the contamination.

The Laboratory has now "capped" this area to prevent rainwater from percolating through the contaminated soil. Also, the g-2 experiment has been re-designed to reduce soil activation. Continued groundwater monitoring will be used to assess the effectiveness of these actions. More information is available at [www.esh.bnl.gov/esd/gw.htm](http://www.esh.bnl.gov/esd/gw.htm)

## Efforts continue

These two examples illustrate the effectiveness of the Laboratory's groundwater protection program for early identification of potential hazards. Brookhaven is continuing to work hard to control or eliminate potential sources of groundwater contamination in order to protect Long Island's sole-source aquifer. ■



Workers conducted several test injections of silicon grout outside of the BLIP building. To encapsulate the contaminated soil, grout was injected via holes drilled through the floor from inside the building.

# Peconic River cleanup decision deferred

In response to comments and concerns expressed by community members and regulatory agencies, the U.S. Department of Energy has decided to re-examine its plans to clean up contaminated Peconic River sediments.

This spring, the U.S. Department of Energy asked residents to comment on a proposed cleanup plan that included some Peconic River sediments on and just beyond the Laboratory's boundary. Many of the comments received expressed concern about the potential impact of sediment removal on the Peconic wetlands and wildlife. As a result, the Department is deferring its decision on how to address the pockets of contaminated river sediment.

The Department is still seeking regulator approval of a cleanup plan for other parts of this project, such as the removal of contaminated soils from the Laboratory's sewage plant. In comments received, the community has shown support for this proposal, as well as those for the Laboratory's sewer lines and area groundwater.

## Path forward is clearer

The Department and the Laboratory received several hundred comments on the proposed plan for the Peconic River. As described in the Department's June 2, 2000 letter to the community, many people expressed strong opinions that were often mutually exclusive, making resolution difficult.

The Department believes that the best way to respond to comments received is to conduct further evaluation and community involvement. Specifically, the Department is committed to:

- Further consideration of sediment cleanup alternatives that will minimize disruption of wetlands. This review will include additional evaluation of phytoremediation – the use of plants to absorb contaminants from the ground.
- Further evaluation of the extent of sediment contamination. This evaluation will allow a more exact delineation of the locations and amounts of sediments that may be removed.
- Additional opportunities for the community to be involved. These opportunities may include public roundtables or workshops.

"Input from the community has been and continues to be a key factor in the Peconic River cleanup," states Frank Crescenzo, acting manager of the Department's Brookhaven Group. "We will incorporate the comments we have received into the final decision as much as possible. We encourage interested community members to continue to participate in this decision."



*Peconic River sediments from the Laboratory downstream to Riverhead were sampled extensively in 1999.*

After the additional evaluations are complete, the Department plans to release a new recommendation for cleanup of the Peconic River. After conducting a public comment period and considering all comments received, a final decision would be made.

## Working with Suffolk County

The Laboratory will work to coordinate its Peconic River activities with those of our environmental regulators, elected officials, and other stakeholders. Brookhaven will also be working closely with a special panel of scientific experts created earlier this year by the Suffolk County Legislature, as well as the Brookhaven Community Advisory Council, which has shown a continuing interest in the river cleanup project.

Brookhaven is currently developing a schedule for the release of the next proposed plan. As in the past, the Department and the Laboratory will encourage public comments on the new proposal. ■

## Remediation roundup

The Laboratory currently has six treatment systems on and off site operating 24 hours a day to clean up groundwater.

To date, more than **2.1 billion gallons** of groundwater have been treated, and more than **1,700 pounds** of contaminants have been removed from the sole source aquifer.

## cleanupupdate

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Check out the new, easier-to-use Environmental Restoration Division web site at <http://www.oer.dir.bnl.gov>

## Remedy approved...

*(continued from page 1)*

program," stated Scott Mallette, senior environmental advisor for the Department's Brookhaven Group, located on the Laboratory site. "We look forward to getting these additional groundwater treatment systems operating."

### Next steps

Construction of a groundwater treatment system for VOCs on site at a former drum storage area is already under way. The design of a VOC-removal system to be located on Lab property at Middle Road is also under way.

A system at the Laboratory's southwestern boundary will be designed next. Additional design work remains for a tritium extraction system that will be installed on site at Temple Place. All groundwater treatment systems will be operating by 2006.

"The Department wishes to thank all community members who participated in the Operable Unit III project and commented on the proposed remedies," said Mallette.

The Record of Decision and Responsiveness Summary can be found online at [www.oer.dir.bnl.gov/water/docs.html](http://www.oer.dir.bnl.gov/water/docs.html)