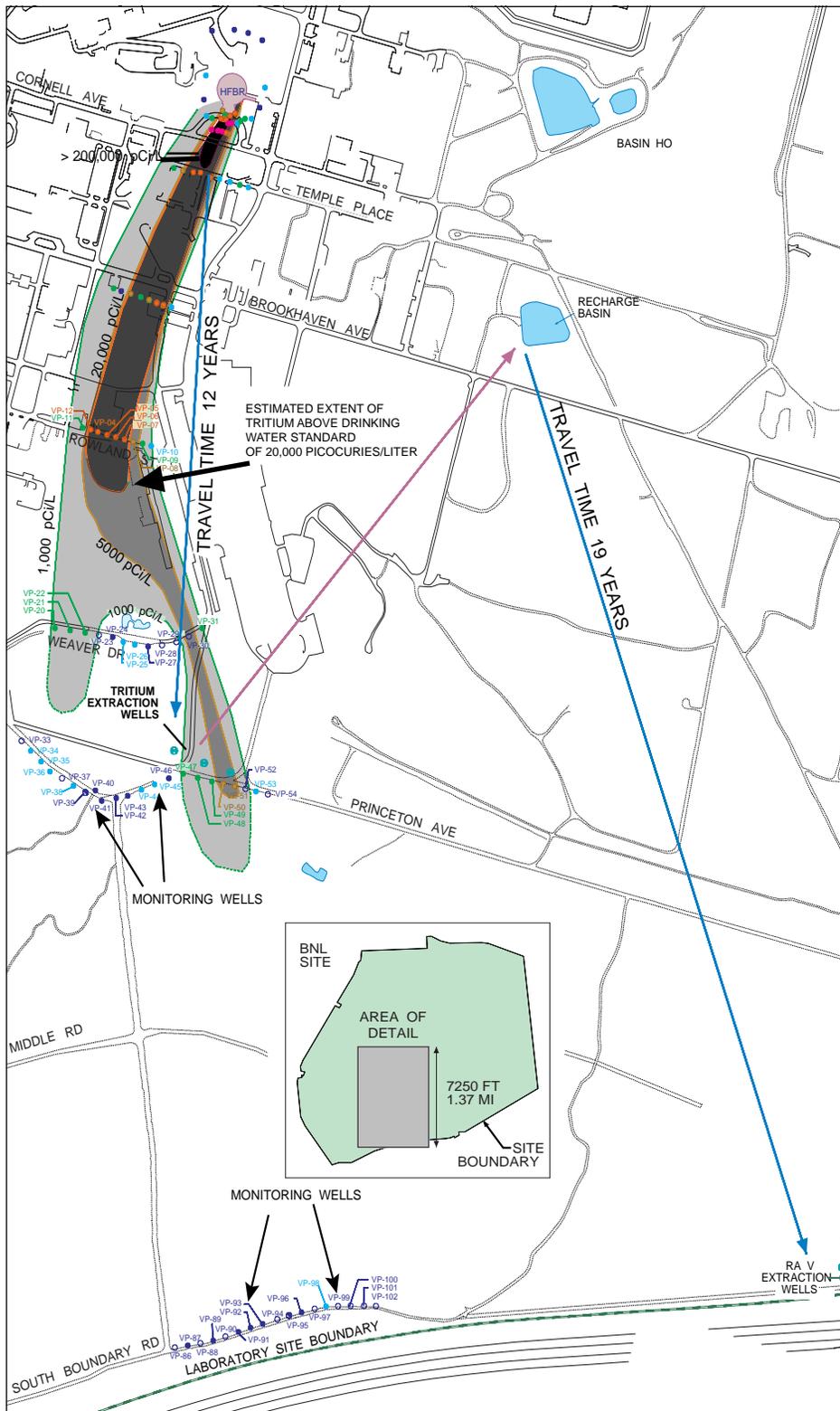


cleanup date

U.S. DEPARTMENT OF ENERGY/BROOKHAVEN NATIONAL LABORATORY/ASSOCIATED UNIVERSITIES INC.

THE OFFICE OF ENVIRONMENTAL RESTORATION — VOL.2/NO.1/SPRING-97



The southern edge of the plume (defined as the point where tritium levels are at the drinking water standard of 20,000 picocuries per liter) is more than two-thirds of a mile north of the Lab's southern boundary.

Interim tritium pump/recharge system set to go

With groundwater testing nearly complete and the extent of the tritium plume determined, the U.S. Department of Energy, Brookhaven National Laboratory and the Office of Environmental Restoration are prepared to begin operation of a groundwater remediation system.

BNL has completed the installation of an interim system designed to intercept the tritium plume, but, at the request of Suffolk County, will delay operation of the system until additional characterization

(continued on page 2)

CERCLA guides tritium project

From Bob Howe, Deputy Manager, Office of Environmental Restoration

The Office of Environmental Restoration (OER) has been a very busy place over the past three months, as the staff has played a major role in the tritium plume investigation while continuing work on several other projects.

In the long term, OER will have the responsibility for remediating the groundwater plume. The tritium plume has

(continued on page 9)

inside

BNL Superfund Schedule
See Pages 6 and 7

Pump/recharge

(continued from page 1)

and modeling are completed. This is expected to take approximately 2-3 weeks. The system uses a pump-and-recharge system to prevent tritium above the U.S. Environmental Protection Agency's drinking water standard of 20,000 picocuries per liter (pCi/L) from leaving the Lab site.

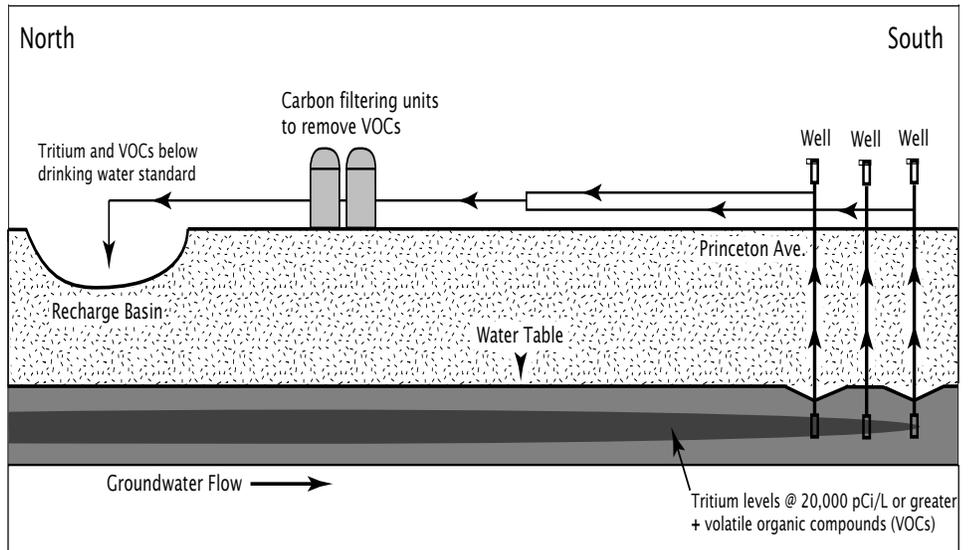
Pump-and-recharge

Under the plan, groundwater will be pumped from about 150 feet below the ground and piped 3,000 feet northward to an existing recharge basin within the BNL site. Three groundwater extraction wells have been installed 3,500 feet south of the High Flux Beam Reactor, where tritium concentrations are approximately 6,500 pCi/L. Each well will pump tritiated groundwater from the aquifer at a rate of about 40 gallons per minute.

Before being recharged, the water will pass through carbon filters to remove chemical contamination that is also present in groundwater in the area due to other past BNL activities. When the water enters the recharge basin, the tritium concentration is expected to be approximately 3,500 pCi/L, well below the drinking water standard. Samples will be analyzed on a regular basis to determine the tritium concentrations being recharged.

Dilution and decay

Once the water has re-entered the ground, it will flow southward, taking approximately 19 years to reach the BNL site boundary. By that time, natural decay and dilution will have diminished tritium levels to nearly undetectable levels. Monitoring wells located at the Lab boundary will assure that no tritium above the drinking water



Groundwater will be extracted by three wells, treated for organic contamination and recharged.

standard is leaving the BNL site.

The pump-and-recharge remediation is being conducted as a fast-track removal action to prevent tritium above the drinking water standard from moving further south. It also will give BNL and DOE time to study alternative remediation technologies and prepare a plan to address the high levels of tritium found immediately south of the HFBR.

The long-term treatment of the plume will be included in the Operable Unit III study, currently under way. The interim action has been reviewed by regulators at county, state and federal levels, and has been discussed with the community at four public information sessions and more than a dozen local civic meetings.

Understanding the plume

The tritium investigation began in January, when a monitoring well installed just south of the HFBR detected tritium at levels above the drinking water standard. The contamination's suspected source is the pool in the HFBR's lower level that is used to store the reactor's spent fuel rod assemblies.

After a three-month investigation

that included the installation of more than 100 monitoring wells and analysis of more than 1,400 water samples, BNL now has a comprehensive understanding of the tritium plume's extent and depth. The plume is completely within the BNL site, as confirmed by recent results from the site boundary that show no detectable tritium.

The portion of the plume where tritium concentrations exceed the drinking water standard extends about 2,200 feet south of the HFBR, at depths ranging from 40 to 150 feet below land surface (see illustration). Tritium concentrations range from 660,400 pCi/L immediately south of the HFBR down to about 6,440 pCi/L 3,585 feet south of the HFBR.

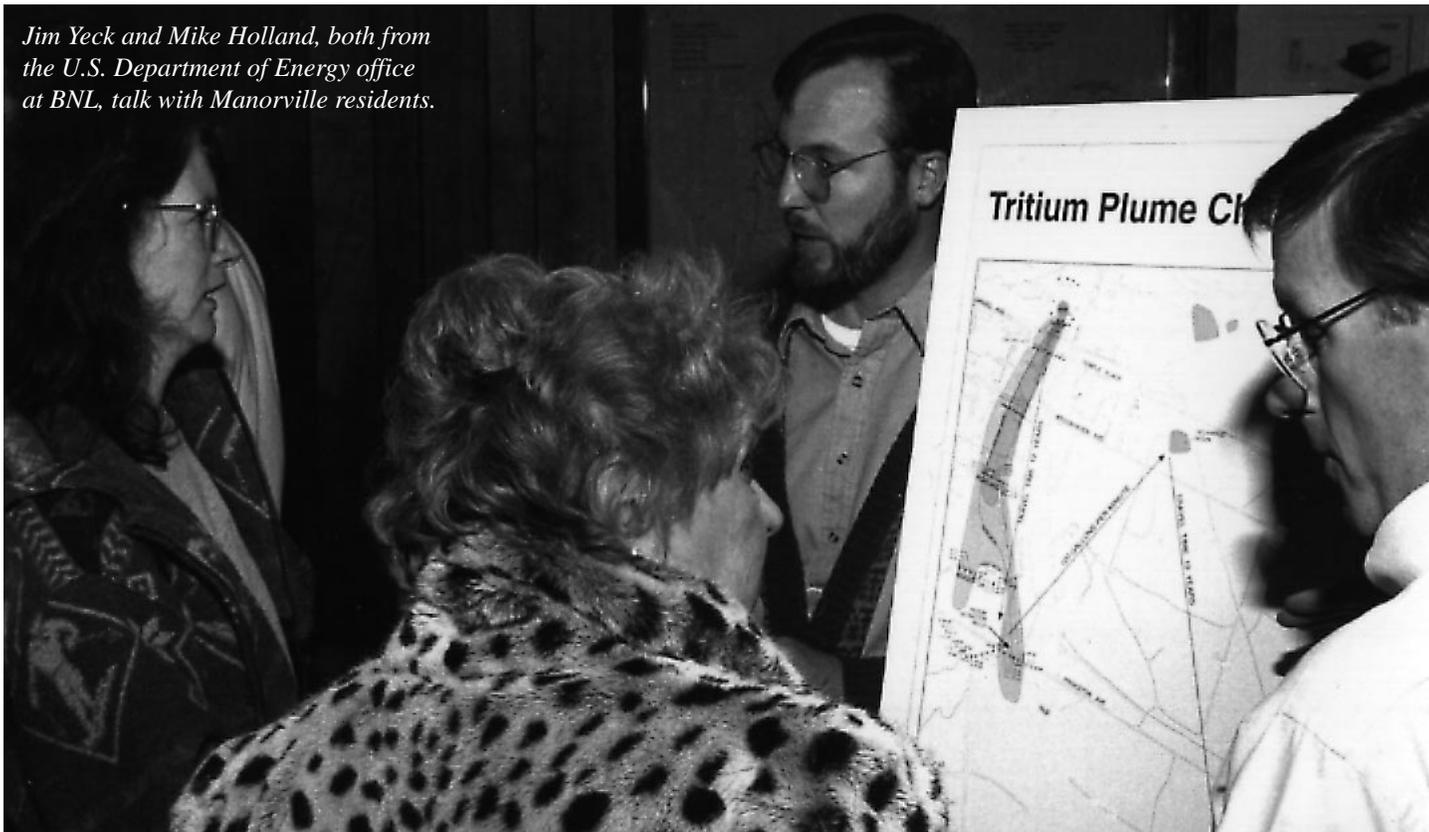
All the findings are consistent with general knowledge about groundwater in the area, which has a general southward flow rate of about a foot per day, with some downward movement and natural dilution as it moves. The decrease in concentration further from the HFBR is also partly due to tritium's natural radioactive decay, which cuts its concentration in half each 12.4 years. ■

cleanupupdate

A quarterly newsletter from the Office of Environmental Restoration 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 are not on the Office of Environmental Restoration mailing list and would like to be, or if you have any questions about the cleanup, please contact:

Bill Gunther	Bob Howe	John Carter, Mary Dernbach or Peter Genzer
Office Manager	Deputy Office Manager	Community Relations Coordinators
516-344-7961 (gunther@bnl.gov)	516-344-5588 (howe@bnl.gov)	516-344-5195 (o2b@bnl.gov), 344-6336 (derny@bnl.gov) 344-3174 (genzer@bnl.gov)

Jim Yeck and Mike Holland, both from the U.S. Department of Energy office at BNL, talk with Manorville residents.



Q&A summary mailed to area residents

Public input on tritium gathered during workshops in four local neighborhoods

As part of the U.S. Department of Energy and Brookhaven National Laboratory's on-going outreach effort, four tritium informational workshops were conducted in the past month to answer community questions, address concerns, and get feedback on proposed treatment strategies.

The sessions were held at the Dowling NAT Center in East Yaphank, the Dayton Avenue School in Manorville, the Manorville Firehouse and the Longwood Library in Middle Island. Each was attended by approximately 75 residents.

At the sessions, held March 24 and April 1, 8 and 12, residents viewed posters outlining what is known about tritium and the on-site tritium plume and describing site

hydrogeology and the planned pump-and-recharge option.

In an informal, one-on-one setting, Brookhaven National Laboratory, U.S. Department of Energy and OER representatives and engineers were on hand to answer questions and give residents an opportunity to express their concerns.

The issues raised were far-ranging in nature. Many attendees were strictly concerned with the quality of their drinking water and the potential health effects of tritium, while others wanted to discuss the purpose of the proposed pump-and-recharge option, or the reason it took so long for BNL to realize the reactor pool was leaking.

Other key community concerns included complaints about a reported decline in property values,

requests to extend the areas currently designated for public water hookup, and questions about which agencies oversee the Lab's operation. Attendees were encouraged to submit written comments and sign up for the community relations mailing list.

To ensure an open exchange of information, a display area was provided for citizens with differing views of the Lab and its research programs.

As a follow-up to the informational sessions and other community presentations, a written summary has been compiled to respond to many of the questions and concerns raised. This summary has been mailed to all on the community relations mailing list, including those who signed up at workshops. ■

How wells, sampling track contamination

Groundwater sampling and monitoring is an important part of both the Superfund investigation currently under way at BNL and the existing site environmental monitoring program.

More than 600 wells on- and off-site are sampled, many on a regular basis, providing detailed information on groundwater quality, flow directions and flow rates. These data allow BNL to both track contamination from known sources and investigate suspected sources.

The groundwater monitoring program at BNL is operated jointly by OER and the Safety & Environmental Protection (S&EP) division. OER is concerned with investigating and “characterizing” the distribution and movement of contaminants released to the environment as a result of past Laboratory operations, as well as long-term plume remediation system monitoring. S&EP routinely performs monitoring to satisfy environmental reporting require-

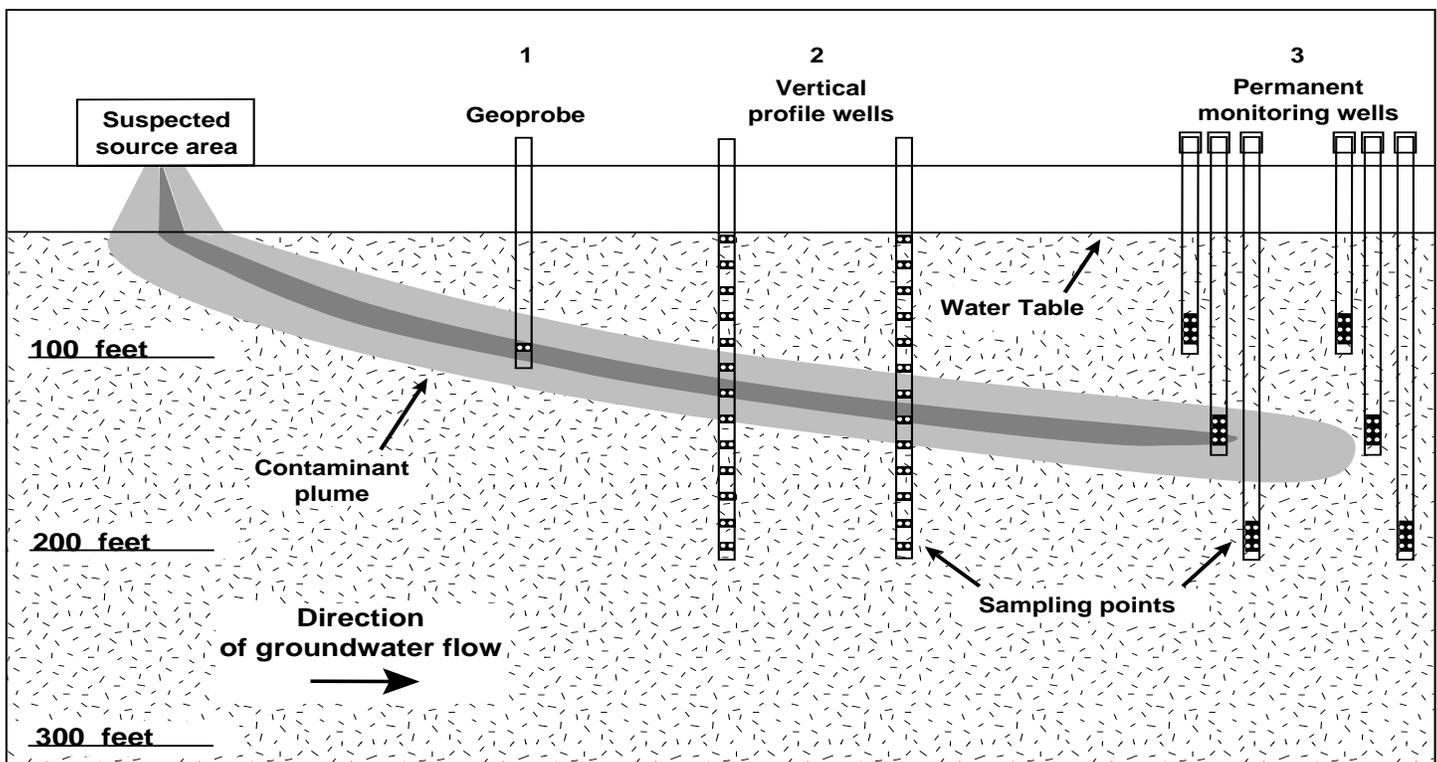
ments and N.Y. State permit requirements.

Types of wells

The two offices use three different kinds of wells to do their work. Permanent monitoring wells are PVC-cased wells that are used to take water samples on an ongoing basis. Ranging from 10 to 300 feet in depth, permanent wells make up the majority of wells found on- and off-site, and are the type used almost exclusively in the routine monitoring program. Piezometers are permanent monitoring wells that are primarily used to report groundwater elevation measurements and determine speed and direction of groundwater flow.

Vertical profile wells are temporary wells that are used mainly in the early phase of an investigation to locate areas of contamination. Ranging up to 300 feet in depth, these wells are typically drilled, sampled, and backfilled within a two-week period.

“GeoprobessTM” are a third way in which groundwater can be sampled. These highly-mobile truck-mounted



- 1) “Geoprobess” are used to investigate suspected contamination sources, and can take water samples as deep as 100 feet below ground.
- 2) Vertical profile wells take water samples every 10 feet to help delineate the vertical extent of contamination.
- 3) Permanent monitoring wells are installed to monitor groundwater quality over an extended period of time, and are generally installed in “clusters” that take samples at different depths.

(Figure not to scale, for illustrative purposes only)

probes are used mainly to investigate known or suspected source areas, and can take samples from depths up to approximately 100 feet below land surface. They are commonly used by OER to investigate suspected areas of contamination close to a potential source, and recently played a major role in the delineation of the tritium plume.

Sampling protocol

During 1996, approximately 200 permanent wells were sampled as part of the Routine Groundwater Surveillance Program, and approximately 200 permanent and 60 temporary wells were sampled as part of the Environmental Restoration program. The samples, taken from varying depths within the aquifer, are tested for a wide range of chemicals and radionuclides, including volatile organic compounds, tritium and other radionuclides such as strontium-90.

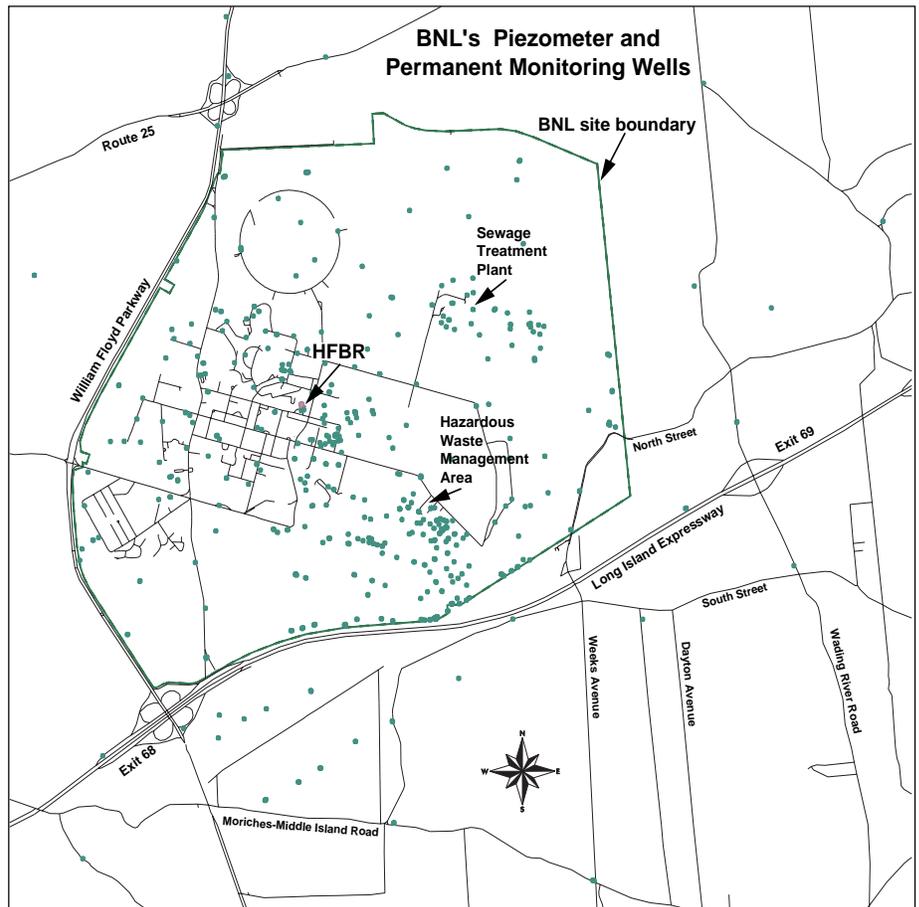
The selection of wells and sampling frequency is based upon knowledge of waste disposal practices, spill reports, existing groundwater data, regulatory requirements, contaminant mobility and site hydrogeology. Groundwater sampling schedules are documented both in the annual BNL Environmental Monitoring Plan and in Superfund-designated, Operable Unit-specific Remedial Investigation/Feasibility Study Work Plans prepared under the Interagency Agreement.

Program is growing

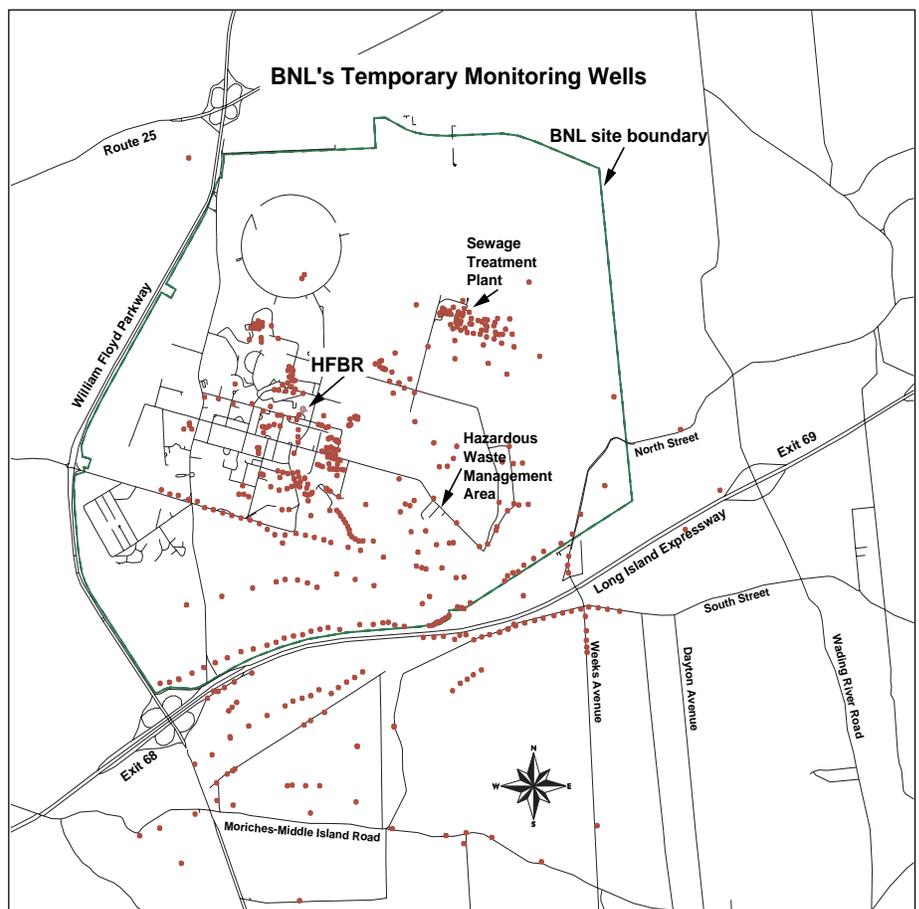
Over the past 20 years, the monitoring program has expanded significantly. In 1971, the Lab sampled approximately 60 wells as part of the program. By 1990, that number had climbed to more than 200, and today more than 640 wells are part of the program. Most of the wells are sampled twice a year, some are sampled quarterly and a few, located near the Lab's Central Steam Facility, are sampled on a monthly basis.

In response to concerns about potential contamination of off-site residential wells, dozens of temporary and permanent monitoring wells have been installed at the BNL boundary and off-site in the past two years. Since the

(continued on page 8)



More than 600 permanent monitoring wells and piezometers (above) dot BNL and the surrounding area. Temporary monitoring wells (below) help track contamination.



Lab's second pump-and-treat system readied for scheduled June start-up

With one system currently in full-scale operation, the construction of a second pump-and-treat-system at the Lab's southern boundary is expected to be completed this spring.

The two systems will work in concert to stop the migration of volatile organic compounds and remove them from groundwater near BNL's southern boundary.

How it works

Pump-and-treat systems work by extracting contaminated groundwater and pumping it to an "air stripping" facility, where volatile organic compounds (VOCs) are separated from the water. The clean water is recharged (returned to the ground) and the VOCs are released into the air at concentrations below state and federal emission standards.

Groundwater monitoring wells will be sampled and analyzed regularly to ensure the pump-and-treat systems are working effectively. The U.S. Environmental Protection Agency (EPA), N.Y. State Department of Environmental Conservation (DEC) and the U.S. Department of Energy (DOE) will oversee all monitoring.

Construction under way

Construction of the Operable Unit III system is on schedule for a planned June start-up. Access roads

have been cleared, and water piping, an electrical distribution system, six groundwater extraction wells and 16 additional monitoring wells are currently being installed. Work is also continuing on the treatment facility itself, with the air stripping unit scheduled to arrive in May.

The system is being constructed to treat a plume of VOCs moving south from an unidentified source (still under investigation) in the developed central portion of the Lab site. When complete, it will process approximately 600-700 gallons of water per minute. The treated water will then be discharged into a new recharge basin located approximately one mile north of the site boundary.

While the system is expected to operate for several years, the exact operating period will be determined in the OU III Feasibility Study, due out in spring 1998.

First system on-track

Meanwhile, the Operable Unit I/Removal Action 5 stripper has been running since the end of December, and is now treating 700 gallons of water per minute. Two wells located approximately 3,000 feet east of the OU III system are treating groundwater contaminated with VOCs emanating from the areas associated with a closed landfill and Hazardous Waste Management Facility area.

Project manager Michael Hauptmann said monitoring of the air and water emissions has shown they are within state and federal standards.

Brookhaven National Laboratory and the Department of Energy expect this system will operate from seven to 12 years before design goals are met. That is, it will have reduced the contamination to such low levels that no further remediation is practicable.

Additional use possible

The timetable could be extended, however, by current plans to use the basin to recharge water associated with the on-site tritium plume (see related story, page 1). Approximately 120 gallons per minute of tritiated water, at levels below state and federal drinking water standards, would be piped to the basin from the three tritium extraction wells located on Princeton Avenue (see map, page 1). It will then take this water approximately 19 years to reach the Lab's southern boundary.

If the DOE, EPA or DEC determines that the tritium has not decayed and diluted sufficiently, it may be recirculated using the system currently remediating groundwater associated with the closed landfill and hazardous waste management area. ■

Monitor/sample

(continued from page 5)

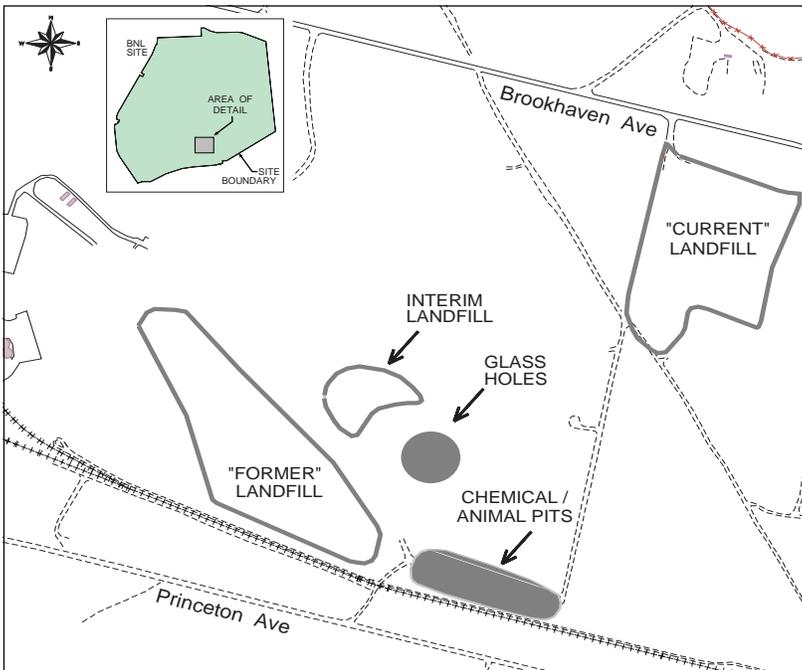
1980s, on-site facilities that have been regularly monitored include the Hazardous Waste Management Facility, two closed landfills, the Major Petroleum Facility, the Sewage Treatment Plant, Waste Concentration Facility and Alternating Gradient Synchrotron facility. Over the past six years, BNL has expanded the routine monitoring program at a number of active facilities, including the Sewage Treatment Plant and Peconic River areas, the Water Treatment Plant, the on-site gasoline station and the High Flux Beam

Reactor facility.

The surveillance programs are reviewed annually by S&EP and OER, and revised to reflect changes in monitoring requirements and to incorporate new wells installed as part of the environmental restoration program.

The program is also looking to the future. Wells are expected to be installed at the new Waste Management facility in 1997, and at the Relativistic Heavy Ion Collider in 1998. Both facilities are now under construction. ■

Waste pit cleanup planned to begin in June



This June, OER is expected to begin the excavation of 51 waste pits near the Lab's Former Landfill in Operable Unit I.

The Chemical/Animal Pits and Glass Holes were used from the mid-1950s to 1980 for the disposal of laboratory chemical containers, glassware and animal carcasses. Soil and groundwater contamination has been detected in the areas adjacent to the pits.

After the pits are excavated, the waste will be sorted and disposed of on- or off-site as determined by cleanup criteria.

A comparison of remediation alternatives considered for this area is documented in the Evaluation of Alternatives report, available in local repositories (for locations, see page 11). The public comment period on the report runs from April 23 to May 23, 1997. ■

Manager's message *(continued from page 1)*

been designated "Area of Concern 29" (AOC 29) and has been incorporated into the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) process. The Superfund investigation has been going on at the Lab since 1989, when BNL was added to the U.S. Environmental Protection Agency's (EPA) National Priorities List. While the Lab has been looking for contamination for a long time, OER was created in 1991 to formally carry out the cleanup, and its primary responsibility includes locating and remediating contamination found on- and off-site which could impact human health and the environment. We've been aggressively looking for contamination and we're still finding it.

New area of concern

The plume will be the fifth area to be added to the AOC list since January 1992, when the original 24 were designated in the BNL Site Baseline Report. The last time an area was added was back in 1994, when groundwater contaminated with ethylene dibromide was discovered in an undeveloped area of Manorville just south of the Lab's southern boundary.

The process by which an area is added to the Superfund list is relatively simple. When BNL/OER or an agency such as the Suffolk County Department of Health Services locates an area of contamination, a determination is made whether the discovery is significant enough for the area to be considered for inclusion in the CERCLA process.

There are situations at BNL where small, accidental spills are immediately cleaned up by Lab personnel (with appropriate regulatory oversight) and do not impact the soil or groundwater. These areas are not included in the CERCLA process.

If it is a significant find, one of the three agencies that are parties to BNL's Interagency Agreement (U.S. Department of Energy, EPA, and N.Y. State Department of Environmental Conservation) writes a letter to the others requesting that the discovery become a new area of concern. If no objection is made by any party within 15 days, the new AOC is created.

Process adds benefits

By designating the tritium plume as an AOC, it enters the normal timeline of the Superfund process. For the public, this is a benefit because it gives stakeholders opportunities to participate in review and comment on remediation plans. It is also good for the parties of the IAG overseeing the Lab's cleanup, because it institutes a formal procedure for oversight of the entire remediation process.

The pump-and-recharge system now under construction is being carried out as a time-critical "removal action," and four informational workshops were held in March and April to solicit the public's opinion on this proposed "interim" action. AOC 29 is being included in the ongoing Operable Unit III study, and final remediation alternatives for the tritium plume will be evaluated in the Operable Unit III Feasibility Study, expected to be released in the spring of 1998 for public review and comment. ■

Agency to assess local health concerns

As part of the ongoing Superfund cleanup at BNL, the U.S. Department of Energy asked the Agency for Toxic Substances and Disease Registry (ATSDR, described in story below) to conduct a health consultation for the site and area surrounding BNL.

After receiving an additional request from a community work group exploring site contamination, the agency is now looking at both air and groundwater quality to determine if exposure pathways do exist.

Expected to be released for public review and comment this summer, the groundwater quality consultation will include an examination of residential well monitoring results and a determination of potential impacts on local residents if they were to use private well water for potable (drinking) and non-potable purposes.

The air quality consultation, currently under way, will look at historic and current air emissions from BNL facilities and determine whether they present a potential health risk to the public and BNL employees.

A health consultation is a way for ATSDR to quickly respond to requests for information on toxic substances and to recommend actions to protect the public health. ATSDR staff evaluate information available about toxic substances and materials at the site, determine whether people might be or have been exposed to them, and report what harm exposure might cause.

The information ATSDR may consider includes: What the levels or concentrations of hazardous substances are; whether people might be exposed to contamination and how (through “exposure pathways” such as breathing air, drinking or contacting water, contacting or ingesting soil, or eating food); what harm the substances might cause to people (toxicity); and, whether working or living nearby might affect people’s health and other physical dangers including unsafe buildings.

After a draft version of the consultation is prepared, it will be released for public review and comment. Once complete, the consultation could lead to other actions, including a public health assessment, public health advisory or public health study. ■

“ATSDR” formed through, for Superfund

Formed in 1980 under the same legislation that created Superfund, the Agency for Toxic Substances and Disease Registry (ATSDR) plays a major role in assessing potential dangers to the public from exposure to contaminants from hazardous waste sites.

As the lead agency within the U.S. Department of Health and Human Services for implementing the health-related provisions of Superfund, ATSDR’s mandate is to assess the presence and nature of health hazards at specific Superfund sites, to help prevent or reduce further exposure and the illnesses that result from such exposures, and to expand the knowledge base about toxic substances and their health effects.

The agency has three primary goals: 1) Identify people at risk because of their exposure to hazardous substances in the environment; 2) evaluate relationships between hazardous substances in the environment and adverse effects on human health; 3) intervene to eliminate exposures of concern to health and prevent or mitigate health effects related to hazardous substances in the environment.

To accomplish these goals, ATSDR uses a series of studies to determine potential pathways of exposure and resulting health effects related to any given site. The most common include:

Public Health Assessments—Mandated at all National Priorities List sites, these are an integrated evaluation of environmental contamination data, community health concerns and health data. The purpose of the health assessment is to identify hazards posed by hazardous waste sites and affected communities for which public health actions are necessary.

Health Consultation—An ATSDR health consultation provides advice on a specific public health issue related to a real or possible human health exposure to toxic material.

Anyone can request a health consultation, but ATSDR receives the most requests from the U.S. Environmental Protection Agency and state and local health and environmental departments. A health consultation is currently under way at BNL, one of about 1,000 such studies done across the nation each year (see related story, this page). Once completed, these studies become public documents and include a public comment period.

(continued on page 12)



The U.S. Department of Energy announced in March that it would be offering approximately 500 Manorville property owners free hookup to public drinking water.

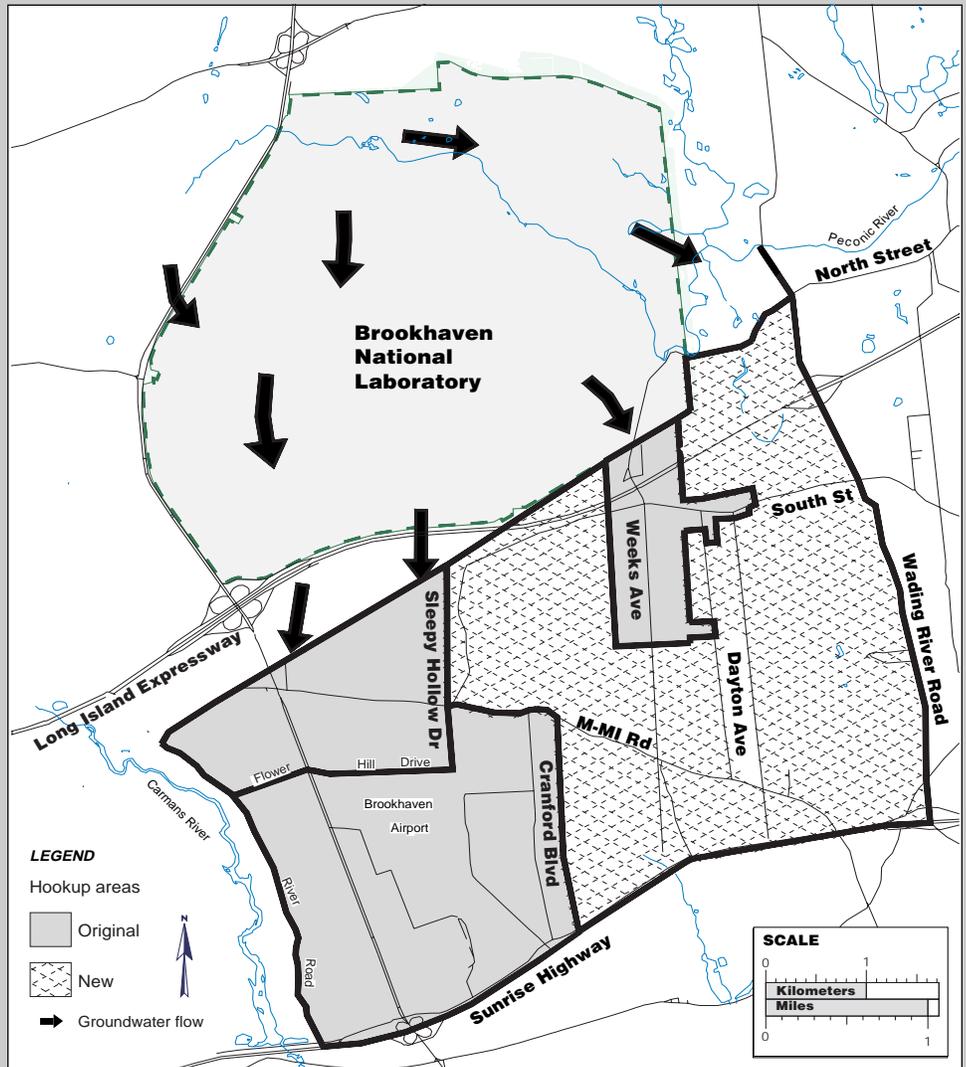
This action is being taken to give residents additional confidence in the quality of their drinking water, and is not related to the High Flux Beam Reactor tritium plume on the Laboratory site.

The new hookup area includes the area bounded to the north by North Street, on the east by Wading River Road, on the south by Sunrise Highway, and on the west by Sleepy Hollow Drive to Moriches-Middle Island Road to Cranford Boulevard.

As of April 11, 1997 the Suffolk County Water Authority had completed 34 private property connections out of approximately 500 in the new hookup area.

Applications have been mailed to all property owners within the hookup area, and work began earlier this month. The hookups are expected to be completed by the end of 1997.

There have been no additional hookups in Phases I, II, or III. However, DOE has continued to receive calls from those who, for whatever reason, have not completed application cards.



About 1,300 homes are being connected to public water.

Questions or concerns?

Anyone with questions or concerns regarding quality of work should contact the Suffolk County Water Authority at 516-288-1034. General questions or issues regarding the performance of the Water Authority should be directed to Rich Freeman of the U.S. Department of Energy at 1-800-369-6976.

Libraries — All reports from BNL's Office of Environmental Restoration are available at:

Longwood Public Library
800 Middle Country Road
Middle Island NY 11953
516-924-6400
e-mail:
helpdesk@suffolk.lib.ny.us

Mastics-Moriches-Shirley
Community Library
301 William Floyd Parkway
Shirley NY 11967
516-399-1511
e-mail:
hickling@suffolk.ny.us

BNL Research Library
Building 477A
Brookhaven Avenue
Upton NY 11973
516-344-3483
WWW: <http://www.bnl.gov>

U.S. EPA Region II Library
Administrative Records Room
290 Broadway
New York NY 1007-1866
212-637-4296

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Brookhaven National Laboratory
Office of Environmental Restoration
Building 51
Upton NY 11973

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What would you like to read in **cleanupdate** ?

cleanupdate's purpose is to provide you with information about Superfund cleanup activities at Brookhaven National Laboratory, and we'd like to know whether the newsletter is meeting your information needs. Is there something you'd like to see in *cleanupdate*, but haven't? Is there something that you've seen and of which you'd like to see more? Drop us a line at: cleanupdate, Brookhaven National Laboratory, Office of Environmental Restoration Newsletter, Bldg. 51, Upton NY 11973 (e-mail: o2b@bnl.gov).

ATSDR (continued from page 10)

Health Study—An in-depth research effort to determine whether known exposures have affected public health. Health studies can be divided into two basic types; those that are primarily exploratory in their approach (Type-1 studies), and those that use rigorous scientific methods to evaluate specific exposure-outcome relationships (Type-2 studies). Specific guidance and criteria are provided to determine when to do a health study, to determine what type of study to do, and to ensure that a study is of high quality. Health studies are not conducted at every site.

Public Health Advisories—Public health advisories are notices from the ATSDR to the EPA. They are only

generated when sites pose an immediate and significant threat to people.

In order to prevent or mitigate exposures, a public health consultation may lead to ATSDR recommendations for specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material. In addition, consultations may recommend conducting health studies or providing health education for community members and health care providers.

In addition to these studies, ATSDR maintains several databases of information on toxic substances

and releases that are available to the general public.

Accessible through the agency's web page at <http://www.atsdr1.atsdr.cdc.gov:8080/>, these include HazDat (provides access to information on the release of hazardous substances from Superfund sites or emergency events), Tox FAQs, (short, easy-to-read summaries about hazardous substances, excerpted from ATSDR Toxicological Profiles), and CLUSTER Version 3.1 (DOS software designed to help researchers determine if a disease cluster has occurred other than by random phenomena).

For more information about ATSDR, call: 404-639-6000. ■

First published in the summer 1996 edition of *cleanup*, this up-dated diagram shows Brookhaven National Laboratory's progress through the many steps of the Superfund cleanup. One chart is for "removal actions" (right) and the other for "operable units" (below).

The Lab's cleanup is organized into six administrative segments, each representing a geographic area of the Lab site. The soil and groundwater in the "operable units" are investigated to see if past Lab practices have left contamination with the potential to impact human health and/or the environment. If contamination is found, BNL's Office of Environmental Restoration works with the federal, state and local officials, and the public, to determine the appropriate cleanup remedy.

A "removal action" occurs if contamination is found that could pose a threat to public health or the environment. The action is taken as quickly as possible to eliminate the potential threat. Five removal actions are complete and two are underway.

In the cleanup process, completion of a given step usually means the issuance of a major report. These reports are listed in quotation marks across the top section. Below are the actual or anticipated dates when regulators release these reports to the public. Future dates are scheduled in the "Schedules Document" which proposes the timetable for each operable unit and removal action.

These schedules, approved by the U.S. Department of Energy, the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation, are updated at least annually and may change based on the time needed to review and finalize draft reports. Also listed above the columns are the cleanup-related activities that do not result in major reports—sampling, analysis and evaluation of data and public participation—but play major roles in the cleanup process.

The completed reports listed here, as well as the Schedules Document, are available for public review as part of the "Administrative Record" of the BNL cleanup. Complete sets of the Administrative Record are available at the Lab's four information repositories.

The Superfund Process at BNL

REMOVAL ACTIONS 	Investigation/Study				Decision	Design	Cleanup	Closure	
	"Work Plan" "Health & Safety Plan" "Sampling & Analysis Plan"	Field investigation, sampling & analysis data	"Engineering Evaluation/ Cost Analysis"	Public participation, press releases, public notices, information meetings	"Action Memorandum" (Includes comments & responses in "Responsiveness Summary")	Design phase of Remedial Action	Begin actual cleanup	"Closeout Report"	
Removal Action I D Tanks	completed 7/91	Field work and evaluation	completed 7/93	On-going	completed 9/93	completed 8/94	8/94	12/95 <i>DONE</i>	
Removal Action II 12 Underground storage tanks	completed 7/94		N/A		N/A	completed 3/95	7/95	4/96 <i>DONE</i>	
Removal Action III Cesspools	completed 7/91		completed 2/94		completed 3/94	4/94	7/95	8/97*	
Removal Action IV Bldg. 479 PCB soil remediation	completed 1/92		N/A		N/A	N/A	5/92	3/93 Immediate removal action	
Removal Action V OU I Groundwater removal	completed 9/92		completed 12/95		completed 12/96	completed 5/96	5/96 Initiated public water hook-up 12/96 Initiated ground-water cleanup	6/96 12/96 <i>DONE</i>	
Removal Action VI 1. Current landfill 2. Former landfill 3. Glass holes	completed 10/93		completed 4/95		Current & Former landfill closure	completed 12/94	completed 7/94	5/95	6/96 <i>DONE</i>
			completed 4/97		"Evaluation of Alternatives Report for Glass Holes"	completed 7/95	completed 8/95	5/96	3/97 <i>DONE</i>
		completed 5/97*		completed 11/96	completed 5/97*	1/98*			
Removal Action VII Bldg. 464 Mercury soil remediation	completed 7/94	N/A	completed 2/95	N/A	7/94	2/95 Immediate removal action			

OPERABLE UNITS 	Investigation/Study					Decision			Design	Action					
	"Scope of Work"	"Remedial Investigation/ Feasibility Study/Work Plan" (Include "Sampling & Analysis Plan" "Health & Safety Plan")	Remedial Investigation (Field work)	"Remedial Investigation/ Risk Assessment Report"	Feasibility Study	"Feasibility Study Report" & "Proposed Remedial Action Plan"	Public participation, press releases, public notices, information meetings	Public meeting	Record of public comments & responses in "Responsiveness Summary" (Included in ROD)	"Record of Decision" (ROD)	Begin design phase of remedial action	Begin actual cleanup			
Operable Unit I Hazardous Waste Management Facility (includes radiologically contaminated soils)	completed 2/92	completed 10/93 OU I 7/94 OU VI	Field work and evaluation	completed 7/96	Alternative methods of cleanup examined	Summer 97*	On-going	Summer 97*	Winter 97*	Winter 97*	Winter 97*	Summer 99*			
Operable Unit II Waste Concentration Facility, AGS scrap yards, former Low-Mass Criticality Facility, contaminated landscape soils	completed 12/94	completed 1/96		6/97*		Evaluation of alternatives and cleanup transferred to OU I**									
Operable Unit III HFBR Tritium Potable/supply wells, spills, sewer pipes (in the central area)	completed 3/93	completed 10/94		Fall 97*		Incorporates additional work on HFBR Tritium Plume		Spring 98*	Spring 98*	Summer 98*	Summer 98*	Summer 98*	Summer 98*	12/99* Interim groundwater cleanup planned for 6/97*	
Operable Unit IV Central Steam Facility, Reclamation Facility	completed 9/90	completed 12/91		completed 11/94 completed 11/95 addendum		completed 11/95		completed 12/95	completed 3/96	completed 3/96	5/96	10/97*	Interim soil cleanup completed 1994		
Operable Unit V Contamination related to Sewage Treatment Plant	completed 8/92	completed 3/94		Summer 97*		Incorporates additional sampling/study of Peconic River		Fall 97*	Fall 97*	Winter 98*	Winter 98*	Winter 98*	Winter 98*	3/99*	IMHOFF tank cleanup completed early 1996
Operable Unit VI Ethylene dibromide (EDB) groundwater contamination	reference with OU I	N/A		completed 10/96 "Focused" Feasibility Study		completed 11/96		5/97*	5/97*	5/97*	5/97*	8/96	Public water hookups initiated 8/96	<i>DONE</i>	

* Anticipated dates
** To allow for a consolidated effort to cleanup all site-wide radiologically contaminated soils.