The Proposed Remedial Action Plan for the

g-2 Tritium Source Area and Groundwater Plume, Brookhaven Linac Isotope Producer Soils, and Former Underground Storage Tanks

At Brookhaven National Laboratory

October 2006

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I. INTRODUCTION

The purpose of this Proposed Remedial Action Plan (Proposed Plan, or PRAP) is four fold: 1) to describe the preferred remedial alternative for the g-2 tritium source area and groundwater plume, 2) to explain the reasons the proposed g-2 remedy is preferred over other alternatives considered, 3) to describe the actions that have been taken for eight former underground storage tanks (USTs) and the activated soils at the Brookhaven Linac Isotope Producer (BLIP) and 4) to encourage public comment before the final remedies are selected. Engineered and administrative controls are in place to protect and manage the activated soils at BLIP and monitoring will continue. The eight USTs have been removed from the ground and no additional remedial actions are proposed for them.

This Proposed Plan is required as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In 1980, Brookhaven National Laboratory (BNL), which is owned by the U.S. Department of Energy (DOE), was placed on New York State's list of inactive hazardous waste disposal sites by the New York State Department of Environmental Conservation (NYSDEC). This designation was in response to contamination from earlier in the site's history, which stretches back to World War I. In 1989, BNL was listed by the U.S. Environmental Protection Agency (EPA) on the National Priorities List of sites to be cleaned. For these reasons, all cleanup projects at BNL comply with CERCLA under the dual oversight of EPA and NYSDEC, through an Interagency Agreement (IAG). Although not a formal signatory of the BNL IAG, Suffolk County Department of Health Services (SCDHS) also provides a key oversight role.

The community has played, and continues to play, an important role in selecting cleanup alternatives for BNL. Because the final remedies may be modified or a different alternative may be selected, based on public input, community members are encouraged to comment on all the alternatives, both pro and con. Written comments on the Proposed Plan will be accepted during a public comment period of 30 days, beginning October 12, 2006 and ending November 13, 2006. For your convenience in submitting written comments, an addressed comment sheet is included at the back of this document.

During the public comment period, community members are invited to attend an information session, to speak with project staff, and to learn more about the alternatives. DOE and BNL will also hold a formal public meeting on October 25, 2006 to present the conclusions of the g-2 Focused Feasibility Study (FFS), the work completed for BLIP and USTs, this Proposed Plan, and to receive public comments on the proposed remedies. For more information regarding the information session and public meeting, please see page 15.

After the public comment period DOE, along with EPA, will select a final remedy for the g-2 tritium source area and groundwater plume, BLIP, and the eight former USTs, with the concurrence of NYSDEC. The decisions will be formalized in a document called the Record of Decision (ROD). The ROD will contain a Responsiveness Summary, which will summarize all public

Inside This Plan

PLEASE NOTE:
Technical and administrative terms used throughout this Proposed Remedial Action Plan are provided in the margin.

Area of Concern (AOC) – A geographic area of BNL where there has been a release or the potential for a release of a hazardous substance, pollutant, or other contaminant. There are 30 areas of concern at BNL.

Administrative Record (AR) – A file that contains the documents, including technical reports, which form the basis for selection of a final remedy and acts as a vehicle for public participation.

Focused Feasibility Study (FFS) – A process for developing, evaluating, and comparing remedial alternatives, using data gathered during site characterization. It defines the objectives of the remedial action and analyzes in detail the remedial action alternatives.

Interagency Agreement (IAG) – A legally binding document established under the Comprehensive Environmental Response, Compensation, and Liability Act, that presents the framework for implementing the cleanup activities at a particular site. For BNL, the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the New York State Department of Environmental Conservation signed an IAG in 1992.

Institutional Controls (ICs) – Measures or restrictions established to prevent exposure of workers or the public to hazards. These may include the establishment of fencing, posting of signs, prevention of unplanned alteration of contaminant plume flow pathways, etc.

Maximum Contaminant Level (MCL) – A standard set by the U.S. Environmental Protection Agency, and the New York State Department of Environmental Conservation for contaminants in drinking water. These represent levels that the regulatory agencies believe are safe for people to drink.

PicoCurie Per Liter (pCi/L) – A unit of measure of radioactivity per liter of water.

Proposed Remedial Action Plan (PRAP) – A document requesting public input on a proposed remedial alternative (cleanup plan).

Record of Decision (ROD) – Documents the decision by the regulators on a selected remedial action. It includes the responsiveness summary and a bibliography of documents that were used to reach the remedial decision. When the record of decision is finalized, the remedial design and construction can begin.

Tritium – A radioisotope of hydrogen (H) with one proton and two neutrons. The standard chemical abbreviation is H-3. Tritium has a half-life of approximately 12.3 years.

comments and provide the responses to them. These documents will be available for public review at the Administrative Record repository locations, which are listed on page 16.

II. BACKGROUND

Established in 1947, BNL is operated and managed for DOE's Office of Science by Brookhaven Science Associates (BSA), a limited-liability company founded by Stony Brook University, the largest academic user of BNL facilities, and Battelle, a nonprofit, applied science and technology organization. One of the ten DOE national laboratories, BNL conducts research in the physical, biomedical, and environmental sciences, as well as in energy technologies and national security. The Laboratory also builds and operates major scientific facilities available to university, industry, and government researchers. For more information about BNL, go to http://www.bnl.gov on the World Wide Web.

The Laboratory is located in the Town of Brookhaven in Suffolk County on Long Island, approximately 60 miles east of New York City. Approximately 1.4 million people reside in Suffolk County, and slightly more than 450,000 reside in the Town of Brookhaven. The BNL site occupies about 5,300 mostly-wooded acres in central Suffolk County. Many of the Laboratory's facilities are near the center of the site, in a developed portion that covers about 1,700 acres. As shown in *Figure 1*, the g-2 experiment, BLIP, and eight former USTs are located within this central portion of the BNL property.

III. SITE CHARACTERISTICS

g-2 Source Area and Tritium Groundwater Plume

The Alternating Gradient Synchrotron (AGS) facility is located in the middle-western section of the BNL property, and is used to conduct accelerated particle beam experiments. The g-2 experiment was on an independent beam line originating from the AGS.

Radionuclides can be produced in some of the soil shielding used along accelerator beam lines and in soil below experimental buildings by the interaction of secondary particles (primarily neutrons) that are created when the beam strikes fixed targets and beam stops. The primary

FIGURE 1. Locations of the BLIP and g-2 facilities, and the former underground storage tanks.

radionuclides of concern in the soil are tritium, with a half-life of 12.3 years, and sodium-22, with a half-life of 2.6 years. The infiltration of precipitation and stormwater runoff through activated soil can transport tritium and sodium-22 to the groundwater. The g-2 experiment began operations in April 1997. At the beginning of the g-2 experiment, beam losses were expected to produce activated soil below the target building and the nearby beam stop. The building structure and the underlying concrete pad protect the activated soil below the target building, and an impermeable cap was constructed over the g-2 beam stop to protect the soil shielding from rainfall infiltration.

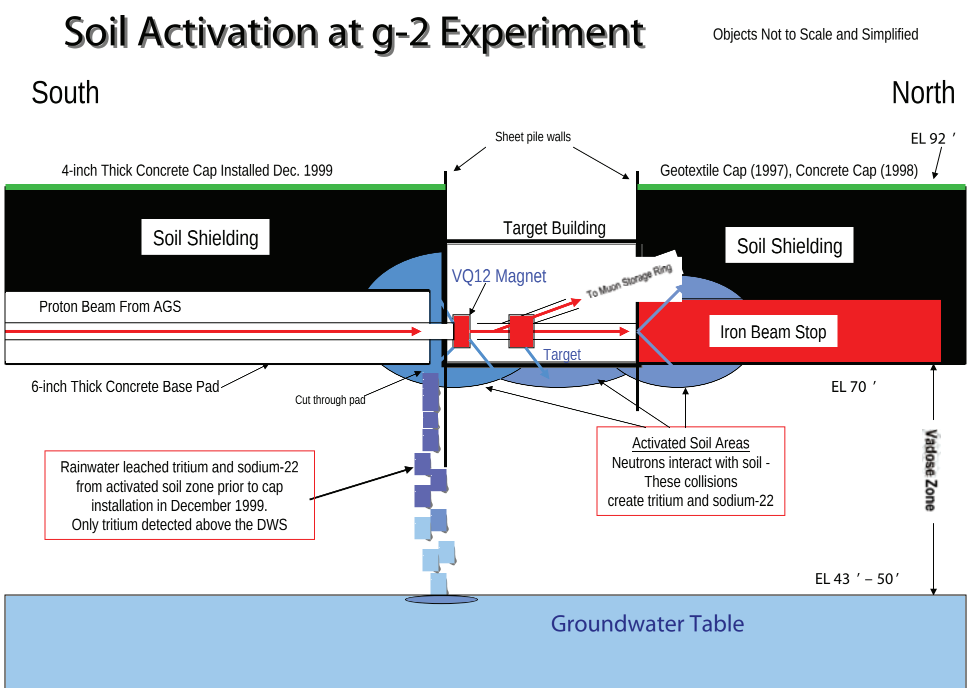

FIGURE 2. Simplified cross section view of the soil activation area at the g-2 experiment.

In November 1999, BNL detected tritium in the groundwater near the g-2 experiment at concentrations above the 20,000 pico curies per liter (pCi/L) drinking water standard, also known as the maximum contaminant level, or MCL (see Subpart 5-1 of the New York State Sanitary Code under NYCRR Title 10 for information on establishing MCLs). Following the discovery, an investigation into the source of the contamination revealed that the tritium originated from activated soil shielding located adjacent to the g-2 target building. The investigation determined that approximately 5 percent of the beam was inadvertently striking the experiment's VQ12 magnet (this magnet is located inside the g-2 target building). The previously installed concrete base pad and beam stop cap did not protect this new soil activation area. *Figure 2* is a simplified cross section view of the beam line and associated activated soil shielding. The highest tritium level detected in groundwater during the investigation was approximately 1.8 million pCi/L. Sodium-22 was also detected in the groundwater, but at concentrations well below the 400 pCi/L MCL. To prevent additional rainwater infiltration into the activated soil, a concrete cap was constructed over the VQ12 area in December 1999 (see *Figure 3*). Other corrective actions included beam tuning and beam loss monitoring to reduce additional soil activation, stormwater management improvements, and additional groundwater monitoring. The g-2 experiment concluded its operations in April 2001, and the facility is being maintained for possible future use.

Following the installation of the cap over the VQ12 source area, some of the tritium that was previously leached from the activated soil zone may have been trapped in the unsaturated zone soil directly above the water table, as shown in *Figure 2*. Monitoring data suggest that "slugs" of high concentrations of tritium have been mobilized into the groundwater during periods of high groundwater table elevations, which can occur following heavy seasonal rainfall. Since December 1999, this flushing mechanism has released three high-concentration slugs. The highest concentration was observed in July 2002, when one groundwater sample had a tritium concentration of 3.4 million pCi/L. With each water table rise, coupled with natural radioactive decay, it is expected that the amount of residual tritium in the unsaturated zone soil

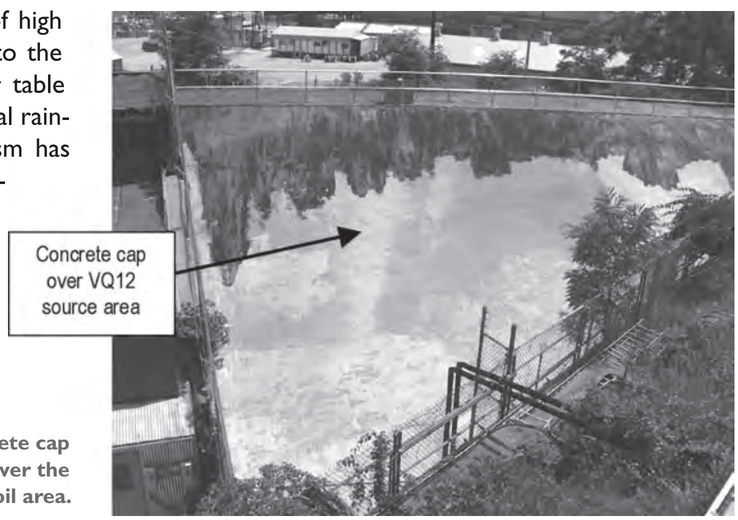

FIGURE 3. Concrete cap installed in 1999 over the VQ12 activated soil area.

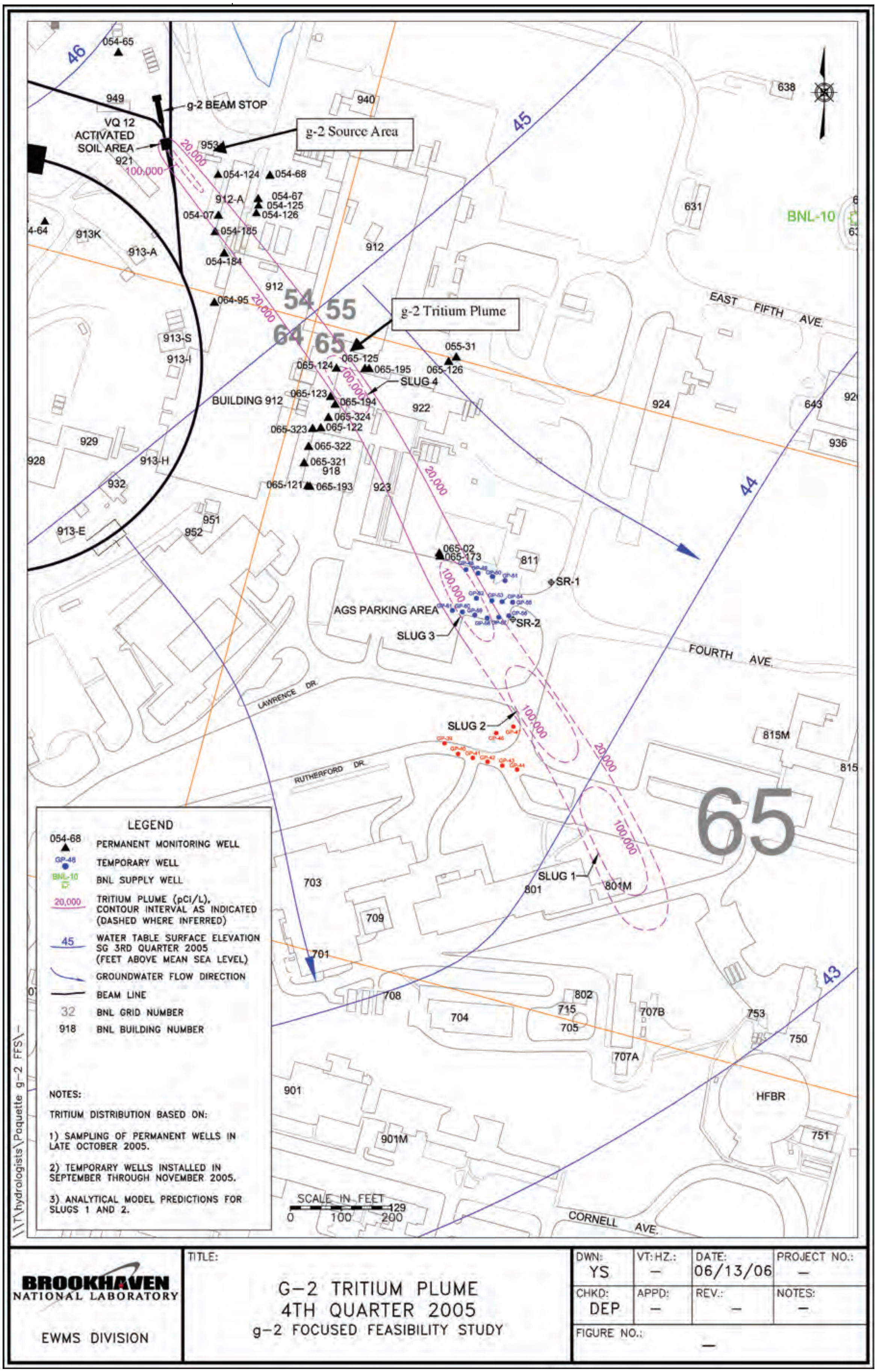

FIGURE 4. g-2 tritium plume location in late 2005.

will decrease. Since June 2004, tritium concentrations in wells directly downgradient of the source area have been less than 100,000 pCi/L during eight of the last nine quarterly monitoring periods. *Figure 4* presents the location of the plume in late 2005.

As with the other contaminant plumes at BNL, a computer model was used to predict the movement of the g-2 tritium plume and reductions in tritium concentrations due to natural radioactive decay and dispersion. Based on the model results, tritium concentrations in the g-2 plume are projected to decrease to less than the 20,000 pCi/L MCL between 2010 and 2015 by natural decay and dispersion in the aquifer, assuming that there are no additional significant releases from the VQ12 source area. At that time, the plume would still be over one mile north of the BNL southern property boundary line. This plume will not impact any public or private drinking water supply wells. As discussed in the Focused Feasibility Study, an analysis of model sensitivity/uncertainty suggests that the prediction of concentrations is accurate to a level of about +/-100 percent when the uncertainty in each of the key model parameters is combined. These model parameters include: dispersivity, initial tritium concentrations (which include sample analytical uncertainties), and groundwater flow rates.

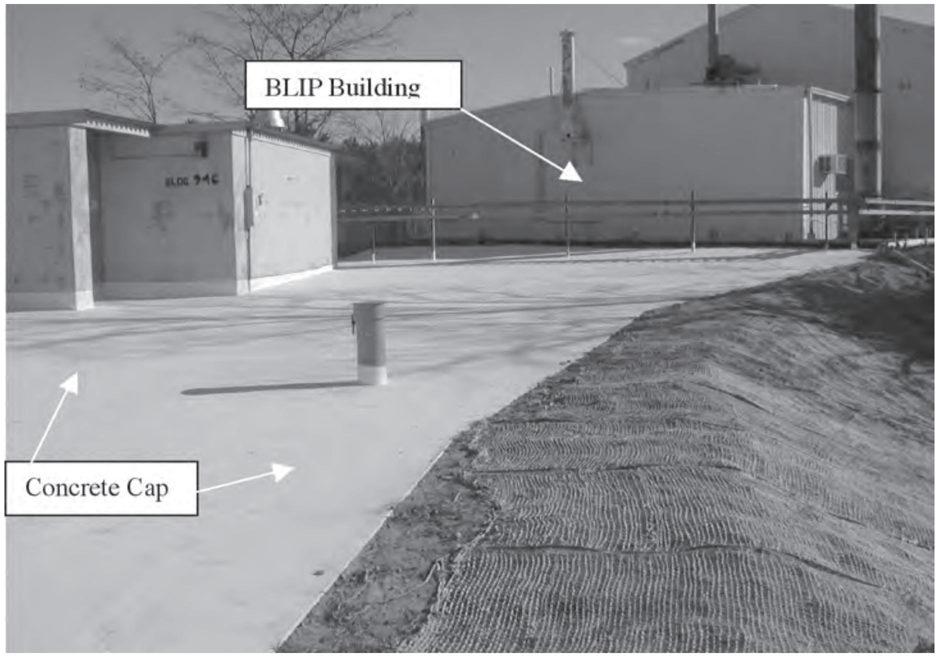

FIGURE 5. Concrete cap on the north side of the BLIP facility. Pipe is an upgradient monitoring well.

Further details of the groundwater characterization activities are discussed in the g-2 Source Area and Tritium Plume – AOC 16T Focused Feasibility Study (BNL 2006a).

Brookhaven Linac Isotope Producer

BLIP is an active accelerator facility also located in the central portion of the site *(Figure 1)*; it has been in operation since 1972. The facility is a national resource for producing the radioisotopes that are crucial in nuclear medicine for both research and clinical use. BLIP also supports BNL research on diagnostic and therapeutic radiopharmaceuticals. Beam line operations have resulted in the activation of soil that surrounds the BLIP target vessel. This activated soil is approximately 30 feet below the BLIP building, in a small zone surrounding the target vessel.

In February 1998, a sample from a groundwater monitoring well 300 feet south of BLIP contained tritium at a concentration of 14,000 pCi/L. To confirm the source and extent of the contamination, BSA installed a series of temporary wells and reviewed the operations of nearby facilities, including BLIP. The maximum tritium concentration detected was 53,000 pCi/L in a well approximately 40 feet downgradient (south) of the BLIP target. Sodium-22 was also detected in the groundwater, but at concentrations below the 400 pCi/L MCL. An inspection of the BLIP building revealed that the downspouts were not properly connected and that significant rainwater infiltration could occur along the building's foundation. When this water in-

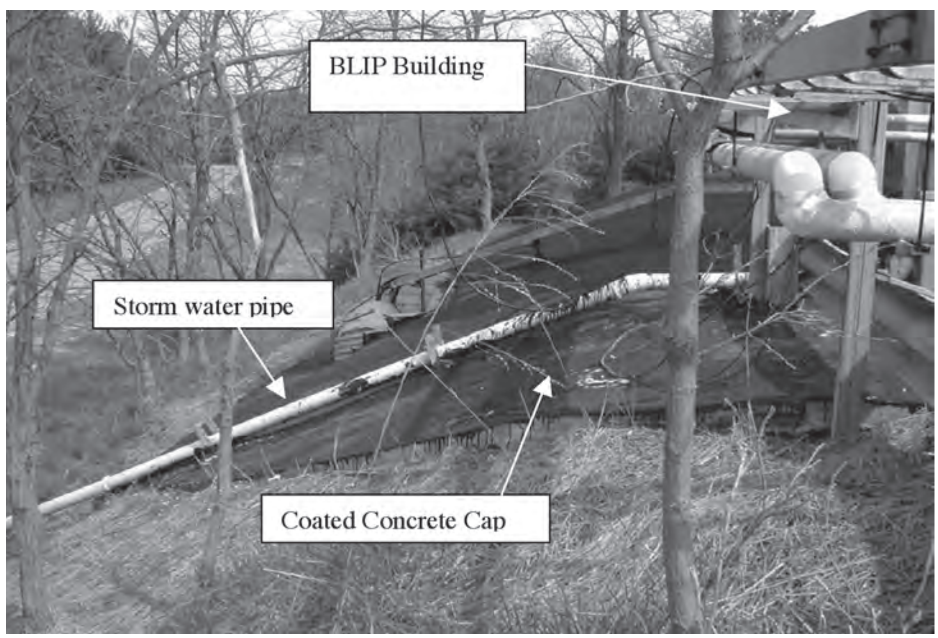

FIGURE 6. Concrete cap on the west side of the BLIP facility. White pipe conveys stormwater collected from roof drains away from the building.

filtrated the activated soil surrounding the target vessel, tritium and sodium-22 were leached from the soil and transported to the groundwater.

Once the source of the contamination was confirmed, a number of corrective actions were implemented in 1998 to prevent rainwater from entering the soil surrounding the BLIP building. These included repairing and reconfiguring the building's downspouts, re-sealing the paved areas south of the building, and installing a concrete cap in the remaining areas around the building *(see Figures 5 and 6)*. The activated soil at BLIP was designated AOC 16K.

Groundwater monitoring results for 1999 and 2000 revealed a significant reduction in tritium, indicating that these actions were very effective in controlling surface water infiltration into soil surrounding BLIP. In addition, an Engineering Evaluation/Cost Evaluation (EE/CA) (CDM Federal, 1999) was prepared that evaluated additional actions to address the activated soil. Alternatives were developed involving no action, upgrades to the existing cover, containment using cement grout, and containment using an innovative colloidal silica grout developed by DOE's Technology Development program and evaluated in the EE/CA. The EE/CA recommended installation of the colloidal silica grout, which would be injected into the activated soil in the unsaturated zone above the water table to further immobilize tritium and sodium-22. The EE/CA was issued for public review and comment in 1999. An Action Memorandum (BNL, 2000b), selecting the injection of the colloidal silica grout, was issued in April 2000 and the grout was installed during the summer of 2000. Monitoring conducted after the grout injection process identified a short-term release of tritium to the groundwater. An investigation into the cause of the release determined that tritium in the soil pore water near the target vessel was displaced by the grout. Tritium concentrations in the groundwater downgradient of this facility increased to a high of 61,000 pCi/L in 2001. Sodium-22 levels remained below the MCL.

Since 2001, the tritium concentrations in the groundwater have been generally declining, but have periodically increased to approximately twice the MCL. These periodic increases in tritium concentrations appear to be related to changes in the water table elevation as described previously for the g-2 source area. As the water table rises, residual tritium is flushed from the unsaturated zone close to the water table. The amount of tritium remaining in the unsaturated zone close to the water table is expected to decline over time due to the flushing mechanism from the rise and fall of the water table and by natural radioactive decay. Groundwater monitoring at this facility has continued, and the monitoring results are presented in the Annual Groundwater Status Report (available on the BNL web site, www.bnl.gov). The slugs of tritium from BLIP are small and narrow (approximately 20 feet long and within the upper 5 feet of the aquifer). It is projected that the tritium concentrations in groundwater will decrease via decay and dispersion to less than the MCL within 300 feet downgradient (south) of BLIP. During the most recent sample period in July 2006, the maximum tritium concentration detected in wells directly downgradient of BLIP was 12,300 pCi/L.

Underground Storage Tanks

A total of 16 USTs were included as area of concern (AOC) 12 in the IAG. These radioactive waste storage tanks were designated as AOCs due to the potential for environmental releases. Eight of them were previously removed and closed out in other RODs. These were: two tanks at Building 445 (Operable Unit [OU] I ROD), four tanks at Building 650 (OU IV ROD), and two tanks at Building 830 (OU III ROD).

The remaining eight USTs, one at Building 462, two at Building 463, one at Building 527, one at Building 703, one at Building 927, and two at Building 931, were registered with SCDHS and used to hold low-level radioactive liquid waste. These tanks were removed between 1988 and 1996. This removal process was performed under the requirements of Suffolk County Sanitary Code Article 12, which regulates the storage and handling of toxic and hazardous materials.

Confirmatory sampling was performed for the eight tanks, and they were all subsequently closed out under Article 12 as not being a further environmental concern. SCDHS was present for the removal of six of the eight tanks, and they were aware of the closure of the other two. As noted below, county field inspection forms and registration forms are available to document the closeouts. Tank 931B-02 was removed and determined to be suitable for reuse. It is currently in use at Building 931 (the BLIP facility).

Further details of the groundwater and other activities for BLIP, and investigation results for the USTs, are discussed in the Technical Memorandum and Supporting Documentation for the Proposed Plan and Record of Decision (BNL 2006b).

IV. SUMMARY OF ACTIONS TO DATE

g-2 Source Area and Tritium Groundwater Plume

Since detecting tritium in groundwater in November 1999, BSA has implemented a number of corrective actions to prevent rainwater from entering the activated soil at g-2 and has been tracking the movement of the tritium plume.

- 1999 – Installed concrete cap over soil activation area
- 1999 – Tuned particle beam and monitor to minimize soil activation
- 1999 to Present – Conduct routine groundwater monitoring to verify cap effectiveness and monitor tritium attenuation in groundwater. Continue to perform cap inspections and maintenance.

BLIP

BNL implemented a number of corrective actions since 1998 to prevent rainwater from entering the soil surrounding the BLIP building and to monitor the groundwater. These actions included:

- 1998 – Reconnected and rerouted the building's downspouts
- 1998 – Sealed existing pavement south of the building
- 1998 – Placed a concrete cap on the western, northern, and eastern sides of the building (Figures 5 and 6)
- 1998-1999 – Installed seven additional groundwater monitoring wells to allow BNL to verify that the stormwater controls are effective
- 1999 – Conducted EE/CA to evaluate additional actions to address the activated soil
- 2000 – Issued an Action Memorandum (BNL, 2000b) to select the injection of a colloidal silica grout into the activated soil
- 2000 – Injected the grout into the activated soil as part of a DOE innovative technology demonstration project (BNL 2001)
- 2004 – Capped the Linac-to-BLIP beam line
- 1998 to Present – Conduct routine groundwater monitoring to verify effectiveness of the stormwater controls. Continue to perform cap inspections and maintenance.

USTs

From 1988 to 1996, eight underground tanks were removed from the ground. Removal was performed under the requirements of Suffolk County Sanitary Code Article 12, which regulates the storage and handling of toxic and hazardous materials. The tank removals were coordinated with the Suffolk County Department of Health Services. Tank closeouts were documented through the BNL Facility Review Disposition Project (FRDP). The FRDP was started in 1998 to resolve all of the issues identified during the preceding Facility Review Project.

V. REMEDIAL ACTION OBJECTIVES

For the former USTs, there are no remedial alternatives and the work that has been completed is proposed as the final action. For BLIP, continued inspections and maintenance of the cap, groundwater monitoring, and institutional controls in addition to the previously completed work (i.e., installation of the cap, improved roof drains, and colloidal silica grout) are proposed as the final action. In addition, institutional controls are in place to prevent possible exposure to the contaminated soil and groundwater at BLIP. The contaminated soil is located approximately 30 feet below ground, and access to the adjoining Linac tunnel is controlled. Institutional controls are also in place to prevent the installation of any new drinking water wells in contaminated areas of the aquifer. Groundwater data will be evaluated and reported in the Annual Groundwater Status Report and during the CERCLA Five-Year Reviews.

BNL has prepared remedial action objectives for the g-2 source area and tritium plume. The remedial action objectives are based on the available contaminant data, the results of contaminant transport modeling, and the risk evaluation. The specific objectives of the remedial action for the g-2 tritium source area and groundwater plume include the following components:

- Minimize the potential exposure of BNL employees to the activated soil, and protect the activated soil from rainwater infiltration
- Minimize the current and potential future exposure of BNL employees to the tritium plume
- Minimize the potential for off-site migration of the tritium plume at greater than the MCL
- Reduce the level of tritium in the Upper Glacial aquifer to below the 20,000 pCi/L MCL

VI. REMEDIAL ACTION ALTERNATIVES FOR G-2

The FFS for g-2 evaluates reasonable alternatives and recommends actions, where appropriate, to meet the remedial action objectives previously stated. The five alternatives for the g-2 tritium source area and groundwater plume evaluated in this process include:

1. <u>Continued Maintenance of Source Controls</u> – This alternative represents no further actions beyond inspections and routine maintenance of the concrete cap installed over the activated soil source area and other stormwater controls. It allows for natural decay of the radioactivity in the soil shielding and natural radioactive decay and dispersion of the tritium plume. Final disposition of the activated soil will be addressed during facility decommissioning. This alternative does not include continued groundwater surveillance of the source area to verify that the stormwater controls continue to be effective or to verify the predicted reductions of tritium concentrations in groundwater.

- Cost over 30 years – $202,177

2. <u>Continued Maintenance of Source Controls and Groundwater Monitoring</u> – Similar to Alternative 1, this option requires continued routine inspection and maintenance of the concrete cap and other stormwater controls. In addition, this alternative requires continued groundwater monitoring immediately downgradient of the source area to verify the continued effectiveness of the stormwater controls, and to monitor the downgradient segments of the plume to verify that the tritium levels will decrease as predicted. Three trigger levels have been developed to require the evaluation of unexpected future releases from the source area or if the tritium plume does not attenuate as predicted. If one of these levels is reached, BNL's Groundwater Contingency Plan will be implemented and the need for additional corrective actions will be evaluated.

  - If tritium levels greater than 1,000,000 pCi/L are observed in wells immediately downgradient of the source area, actions will include an evaluation of the groundwater data and the need for additional characterization and/or monitoring, the immediate inspection of the existing stormwater controls, and implementation of improvements, as necessary. Tritium levels immediately downgradient of the source area (near Building 912A) have been less than 1,000,000 pCi/L since January 2003. The detection of such high levels of tritium would warrant further evaluation of the source controls.

■ If tritium concentrations greater than 2,000,000 pCi/L are observed in the area between AGS Building 912 and the western edge of the AGS parking lot area, actions will include an evaluation of the groundwater data and the need for additional characterization and/or monitoring. An assessment will be made as to whether active remediation, such as low-flow pumping, is needed to limit plume growth. Modeling results suggest that tritium concentrations of greater than 2,000,000 pCi/L in the AGS Parking Lot area could result in tritium concentrations greater than the 20,000 pCi/L MCL beyond the Brookhaven Avenue area.

■ If tritium levels near Brookhaven Avenue are found to exceed the 20,000 pCi/L MCL, actions will include an evaluation of the groundwater data and the need for additional characterization and/or monitoring. An assessment will be made to determine whether active remediation, such as a pump and recharge system, is needed to control plume growth. Brookhaven Avenue is located approximately one mile north of the BNL site boundary.

The regulatory agencies will make a decision on the need to implement active groundwater remediation measures after receiving DOE's assessment and recommendation in accordance with the Interagency Agreement.

Institutional controls are in place to prevent possible exposure to the contaminated soil and groundwater. The soil is located below ground, and workers cannot come into direct contact with the soil either from inside or outside of the beam line tunnel. Final disposition of the activated soil will be addressed during facility decommissioning. The tritium plume will not impact any of BNL's existing drinking water supply wells, and controls are also in place to prevent the installation of any new drinking water wells in contaminated areas of the aquifer. Groundwater monitoring data will be evaluated and reported in the Annual Groundwater Status Report and as part of the CERCLA Five-Year Reviews.

■ Cost over 30 years – $963,751

3. <u>High-Flow Pumping with On-Site Recharge/Recirculation, and Continued Source Area Controls and Groundwater Monitoring</u> – Alternative 3 would use hydraulic control using one or more groundwater extraction wells with pumping rates of 25–50 gpm to prevent downgradient migration of the tritium plume. The extracted groundwater would be transmitted via subsurface conduit to an existing on-site recharge basin. The recovery wells would be designed such that effluent tritium concentrations would not exceed the 20,000 pCi/L MCL. Due to the current close proximity of the g-2 tritium plume and the Waste Concentration Sr-90 plume, the extracted water might contain levels of Sr-90 that could require treatment prior to recharge. Institutional controls are in place to prevent possible exposure to the contaminated soil and groundwater. The soil is located below ground, and workers cannot come into direct contact with the soil either from inside or outside of the beam line tunnel. Final disposition of the activated soil will be addressed during facility decommissioning. The tritium plume will not impact any of BNL's existing drinking water supply wells, and controls are also in place to prevent the installation of any new drinking water wells in contaminated areas of the aquifer. Similar to Alternative 2, this alternative also requires continued routine inspections and maintenance of the cap, and continued groundwater monitoring. Groundwater monitoring data will be evaluated and reported in the Annual Groundwater Status Report and as part of the CERCLA Five-Year Reviews.

■ Cost over 30 years – $2,133,689

4. <u>Low-Flow Pumping with Off-Site Disposal, and Continued Source Area Controls and Groundwater Monitoring</u> – Alternative 4 would use low-flow pumping to extract three segments of the plume where tritium concentrations are currently greater than 100,000 pCi/L ("Slugs" 1, 2 and 3 presented in *Figure 4*). Extraction would continue until the tritium levels are reduced to approximately the 20,000 pCi/L MCL. If implemented, this action

would reduce the amount of tritium in the aquifer, and slightly reduce the amount of time needed for tritium levels in groundwater to decrease to less than the 20,000 pCi/L MCL. The groundwater would be pumped from the aquifer at a rate of approximately 5 gpm, placed into containers, and then disposed of off-site at an approved facility. Due to the current close proximity of the g-2 tritium plume and the Waste Concentration Facility (WCF) Sr-90 plume, the extracted water might contain levels of Sr-90 that could require on-site treatment prior to off-site disposal. Similar to Alternative 2, this alternative also requires continued cap maintenance and groundwater monitoring. Institutional controls are in place to prevent possible exposure to the contaminated soil and groundwater. The soils are located below ground, and workers cannot come into direct contact with the soil either from inside or outside of the beam line tunnel. Final disposition of the activated soil will be addressed during facility decommissioning. The tritium plume will not impact any of BNL's existing drinking water supply wells, and controls are also in place to prevent the installation of any new drinking water wells in contaminated areas of the aquifer. Groundwater monitoring data will be evaluated and reported in the Annual Groundwater Status Report and as part of the CERCLA Five-Year Reviews.

■ Cost over 30 years – $6,247,899

5. Source Removal, Plus Continued Source Area Controls and Groundwater Monitoring – This option would physically remove the activated soil and underlying leachate-contaminated soil at the VQ12 source area. Because of their close proximity, activated soil below the nearby g-2 target building and beam stop and below a nearby section of the RHIC tunnel would also need to be removed. Leachate-contaminated soil in the unsaturated zone would require excavation to a depth of approximately 20 feet below land surface. A section of the nearby RHIC beam line would have to be reconstructed after the excavation. Activated soil would be characterized and containerized for off-site disposal at an approved facility. Similar to Alternative 2, this alternative requires continued groundwater monitoring to verify that the tritium levels in groundwater decrease as predicted. Groundwater monitoring data will be evaluated and reported in the Annual Groundwater Status Report and as part of the CERCLA Five-Year Reviews.

■ Cost over 30 years – $11,896,681, plus a projected $80,000,000 in lost experiment and worker productivity for the RHIC experiment over a two-year period.

VII. EVALUATION OF ALTERNATIVES FOR G-2

The five remedial alternatives for the g-2 source area and tritium plume described above were evaluated using nine CERCLA evaluation criteria that must be considered in the selection of a remedial action alternative. The first two criteria, overall protection of human health and the environment, and compliance with applicable or relevant and appropriate requirements, are considered threshold criteria and must be met for the selected remedial action. The final two CERCLA criteria, state and community acceptance, are not included in the evaluation of alternatives at this time. Instead, these criteria will be evaluated after the comments received during the public comment period are evaluated. The middle five CERCLA evaluation criteria are considered balancing criteria. The seven evaluation criteria are discussed in the following paragraphs, and are also presented in a summary level in *Table 1* (see page 14).

Criteria 1: Overall Protection of Human Health and the Environment

Under current conditions, engineered and institutional controls prevent public and worker access to the activated soil shielding at VQ12. Access to all BNL radiological facilities is controlled such that access controls and physical barriers meet or exceed the requirements of 10CFR835 Occupational Radiation Protection, and all radiation workers have the proper radiological training and surveillance. Furthermore, the BNL digging permit process would prevent any unintended intrusive activities that might result in exposure to the activated soil. The g-2 tritium plume has not impacted any of the on-site drinking water supply wells, it is located more than 20 feet below land surface, and the plume will not discharge into any surface water bodies. The groundwater flow and transport model predicts that the g-2 tritium plume will naturally decrease to concentrations below the

SUMMARY OF CERCLA EVALUATION CRITERIA

Criterion 1: Overall Protection of Human Health and the Environment is the primary objective of the remedial action and addresses whether or not a remedial action provides adequate, overall protection of human health and the environment. This criterion must be met for a remedial alternative to be eligible for consideration.

Criterion 2: Compliance With Applicable or Relevant and Appropriate Requirements addresses whether or not a remedial action will meet all the applicable or relevant and appropriate requirements, and other federal and state environmental statutes, or provides grounds for invoking a waiver of the requirements. This criterion must be met for a remedial alternative to be eligible for consideration.

Criterion 3: Long-Term Effectiveness refers to the magnitude of the residual risk and the ability of a remedial action to maintain long-term, reliable protection of human health and the environment after remedial goals have been met.

Criterion 4: Reduction of Toxicity, Mobility, or Volume Through Treatment refers to an evaluation of the anticipated performance of the treatment technologies that may be employed in the remedy. Reduction of toxicity, mobility, and/or volume contributes to overall protectiveness.

Criterion 5: Short-Term Effectiveness refers to the evaluation of the speed with which the remedy achieves protection. It also refers to any potential adverse effects on human health and the environment during the implementation of the remedial action.

Criterion 6: Implementability refers to the technical and administrative feasibility of a remedial action, including the availability of the materials and services needed to implement the selected solution.

Criterion 7: Cost refers to an evaluation of the capital, operation and maintenance, and monitoring costs for each alternative.

Criterion 8: New York State Acceptance indicates whether or not New York State concurs with, opposes, or has no comment on the preferred alternative based on a review of the Feasibility Study and the Proposed Remedial Action Plan.

Criterion 9: Community Acceptance assesses the response of the general public to the Proposed Plan, based on a review of the public comments received during the public comment period, and at the information sessions and public meeting. The remedial action can be selected only after consideration of this criterion.

20,000 pCi/L MCL near Cornell Avenue by 2010–2015. Cornell Avenue is located more than one mile north of the BNL southern boundary. For Alternative 2, contingency trigger levels have been developed that would require the evaluation of unexpected future releases from the source area or if the tritium plume does not attenuate as predicted.

While Alternative 1 (Continued Maintenance of Source Controls) calls for the continued management and protection of the activated soil shielding at the VQ12 source area, it lacks verification monitoring of the plume. Alternative 2 (Source Control and Groundwater Monitoring) calls for continued management and protection of the activated soil shielding at the VQ12 source area, and a groundwater monitoring program to track the migration of the tritium plume until it can be verified that the tritium concentrations are decreasing as predicted. Alternative 3 (High-Flow Pumping) would require sufficient dilution at the wellhead to ensure that the tritium concentrations were below 20,000 pCi/L before being discharged to an on-site recharge basin. Implementation of Alternative 4 (Low-Flow Pumping) and Alternative 5 (Source Removal) would result in some radiation dose, with the highest doses to workers involved in the dismantlement of the beam line components and associated structures in Alternative 5. Doses to workers involved in the activated soil removal, packaging, and transportation activities are expected to be moderate.

Criteria 2: Compliance with Applicable or Relevant and Appropriate Requirements

Based on the groundwater model results, implementation of Alternatives 1 through 5 would result in plume concentrations that are predicted to naturally decrease to below the 20,000 pCi/L MCL by 2010–2015. The institutional controls implemented at BNL as part of the OU III ROD provide the same level of plume migration pathway control by managing water pumpage and recharge activities, including restrictions for the placement of any new water supply wells in the pathway of the plume. Alternative 3 (High-Flow Pumping) would require sufficient dilution at the wellhead to ensure that the tritium concentrations were below 20,000 pCi/L before being discharged to an on-site recharge basin. If Sr-90 were present in the pumped water at concentrations greater than the 8 pCi/L MCL, the water would have to be treated prior to recharge. Implementation of Alternative 4 (Low-flow Pumping) and Alternative 5 (Source Removal) would require compliance with all applicable transportation and disposal regulations. USEPA and NYSDEC guidance would be utilized to establish soil cleanup levels for Alternative 5.

Criteria 3: Long-Term Effectiveness and Permanence

Both Alternatives 1 and 2 would provide long-term effectiveness due to natural radioactive decay and dispersion of the plume over time. Alternative 2 provides for monitoring this attenuation process to assure that target concentrations will be met, and triggers for additional evaluations if unexpected conditions arise. Based on groundwater modeling results, tritium concentrations are predicted to decline to below the 20,000 pCi/L MCL by 2010–2015, due to natural radioactive decay and dispersion alone. It is estimated that the potential activity in the leachate after a cap failure will decline by a factor of two for every 12.3 years (the half-life of tritium) the cap remains intact. Based on soil activation calculations, the potential to exceed the MCL below the source area will exist for approximately 80 more years. Land use controls, as described in the BNL Land Use Controls Management Plan, will control access to contaminated soil and groundwater. BSA has established institutional controls to prevent the unplanned alteration of contaminant plume flow pathways and to prevent the future installation of any water supply wells in the projected plume pathway, and the BNL digging permit process would prevent any unintended construction or maintenance activities that might result in exposure to the activated soil. Facility Use Agreements establish acceptable operating conditions for the potable supply wells and recharge basins at BNL. In addition, a Water and Sanitary Planning Committee has been created to monitor water pumpage and recharge activities at BNL, and to make changes to these operations, as necessary.

Alternatives 3 and 4 provide contaminant concentration reductions over that contributed by natural processes alone, assuming that the defined contingency levels of contamination are observed. Alternative 3 provides the greatest degree of plume control, and uses dilution/dispersion to further reduce tritium concentrations, whereas Alternative 4 physically removes radioactivity from the aquifer. Alternative 5 physically removes the radioactively contaminated soil, and reduces the chances of future impact to groundwater quality if the engineered or institutional controls that protect the soil from rainwater infiltration were to fail.

Criteria 4: Reduction of Toxicity, Mobility, or Volume

Alternatives 1 and 2 reduce the toxicity and volume of contamination over the long term by natural radioactive decay and dispersion processes. Only Alternative 3 provides for potential hydraulic control of the leading edge of the plume, and would actively reduce the volume of water with concentrations greater than 20,000 pCi/L by dilution and recirculation. With the source controlled by capping, and most of the residual tritium flushed from the unsaturated zone, allowing for natural migration of the plume provides time for radioactive decay and dispersion to reduce concentrations and total radioactivity. Under Alternatives 1, 2 and 3, the total tritium content in the aquifer will only be reduced by natural radioactive decay. Alternative 4 would actively remove tritium from the aquifer, and Alternative 5 would physically remove the source soil.

Criteria 5: Short-Term Effectiveness

These alternatives would not pose short-term risks to the public or the environment. The soil contamination at VQ12 is isolated from direct human contact and there are no groundwater-to-surface-water discharge points or extraction wells in the immediate vicinity of the source or plume. Institutional controls are already in place to maintain consistent groundwater flow directions, and to prevent potential exposure to the contaminated groundwater. Monitoring results indicate that the concrete cap installed over the activated soil area is effectively preventing the infiltration of stormwater. Additional tritium production in the soil was eliminated with the completion of the g-2 experiment in April 2001. Implementation of Alternative 5 (Source Removal) would require the dismantlement of sections of the g-2 beam line, and a section of the adjacent beam line that leads from the AGS to the RHIC. As a result, there would be significant negative long-term impacts to BNL's ongoing accelerator physics program—a core research activity. It is estimated that it would take two years to remove the activated soil and rebuild the experiment beam lines.

Criteria 6: Implementability

Each alternative is technically feasible, and services, technology, and materials are readily available. Alternative 1 is the easiest to implement because it does not involve well installation and monitoring activities. Alternative 5 is the hardest to implement because it involves significant engineering (e.g., beam line and structure dismantlement and soil excavation) and health and safety monitoring. Implementation of Alternative 5 would also result in a significant negative disruption to BNL's ongoing accelerator science program, primarily the RHIC project. Alternatives 2, 3, and 4 require additional groundwater sampling and the installation of temporary and permanent monitoring wells to provide more precise characterization of the plume at key stages of slug migration. Drilling and sampling contracts and procedures are currently in place that allow for timely delivery of these services. None of the alternatives require special drilling techniques or conditions; however, accessibility to suitable drilling locations may be limited by existing and planned structures and underground utilities. During the planned well installation events, it may be necessary to close sections of roadways and parking lots. This will represent an inconvenience to some BNL workers, but should not create a significant problem. Longer monitoring programs are complicated by the narrowness of the plume, small sizes of the high concentration plume slugs, small-scale changes in groundwater flow directions, and plume dispersion effects.

Alternative 3 would be impractical to implement at the present time because of the close proximity of the g-2 tritium plume to the WCF Sr-90 plume. High-flow pumping of the tritium plume would result in the entrainment of Sr-90, and the extracted groundwater would probably have to be treated prior to recharging it on-site. Changes in groundwater flow patterns caused by g-2 extraction well pumping could also have a negative impact to the operation of the current Sr-90 extraction wells. Furthermore, computer model predictions indicate that the g-2 tritium plume will naturally attenuate to less than the 20,000 pCi/L MCL by 2010–2015 entirely in the center of the BNL site without any additional treatment. However, high-flow pumping can be maintained as a contingency action if the plume does not attenuate as predicted. Discharging the pumped water to a recharge basin would require a State Pollutant Discharge Elimination System (SPDES) permit equivalency application, and compliance with this program.

Alternative 4 (Low-flow Pumping) would be impractical to implement at the present time due to the need to pump and transport large volumes of water (estimated to be as much as 360,000 gallons), and the potential to pull in Sr-90 from the nearby WCF plume as the water is extracted from the aquifer. Computer model predictions indicate that that the g-2 tritium plume will naturally attenuate to less than the MCL by 2010–2015 entirely in the center of the BNL site without further treatment. If implemented, low-flow pumping procedures are well established from similar programs that were implemented for the High Flux Beam Reactor tritium plume, and are not expected to represent significant difficulties. All of the materials, equipment, and personnel required for the implementation of

Table 1: Comparative Analysis of Alternatives

	Threshold Criteria		Balancing Criteria					Modifying Criteria	
ALTERNATIVE	**Overall Protection of Public Health and the Environment**	**Compliance with ARARs**	**Long-term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, or Volume Through Treatment**	**Short-term Effectiveness**	**Implementability**	**Cost**	**State Acceptance**	**Community Acceptance**
Alternative 1: Continued Maintenance of Source Controls	Maintains source control, access control, protection of potable water supply. Tritium levels in groundwater should meet MCLs by natural attenuation and radiological decay. However, without groundwater monitoring, overall protection cannot be verified.	Meets ARARs, but does not provide for confirmatory groundwater monitoring.	Effective due to natural attenuation of the plume, and cap protects the activated soil. However, without groundwater monitoring, the effectiveness cannot be verified.	Does not actively reduce toxicity, mobility or volume in groundwater. Mobility in soil is reduced by source control (i.e. cap).	No short-term risks to public or environment. Contaminated soils are isolated from direct human contact, and plume will not impact drinking water supply.	No feasibiity issues, readily implemented. Services and materials readily available.	$202,177.00	To be determined after public comment period.	To be determined after public comment period.
Alternative 2: Source Control and Groundwater Monitoring	Maintains source control, access control, protection of potable water supply, and tritium levels in groundwater meet MCLs by natural attenuation. Groundwater monitoring will verify effectiveness. Trigger concentrations are in place for additional evaluations if conditions change.	Meets ARARs. Provides for confirmatory groundwater monitoring.	Effective due to natural attenuation of the plume, and cap protects activated soil. Groundwater monitoring will verify effectiveness. Trigger concentrations are in place for additional evaluations if conditions change.	Does not actively reduce toxicity, mobility or volume in groundwater. Mobility in soil is reduced by source control (i.e. cap).	No short-term risks to public or environment. Contaminated soils are isolated from direct human contact, and plume will not impact drinking water supply.	Structures and underground utilities may hamper well installations. No administrative feasibility issues. Services and materials readily available.	$963,751.00	To be determined after public comment period.	To be determined after public comment period.
Alternative 3: High Flow Pump and Recharge/ Recirculation	Maintains source control, access control, protection of potable water supply, and tritium levels in groundwater meet MCLs by active recirculation and natural attenuation	Meets ARARs. Provides for confirmatory groundwater monitoring.	Effective due to containment, dilution and attenuation processes, cap over activated soil. Groundwater monitoring is used to verify effectiveness.	Significantly reduces toxicity, and mobility in groundwater. Mobility in soil is reduced by source control (i.e. cap).	There is a potential for the entrainment of Sr-90 with high flow pumping. Contaminated soils are isolated from direct human contact, and plume will not impact drinking water supply.	Difficult to implement due to position of the g-2 plume and the WCF Sr-90 plume	$2,133,689.00	To be determined after public comment period	To be determined after public comment period
Alternative 4: Low Flow Extraction and Disposal	Maintains source control, access control, protection of potable water supply, and tritium levels in groundwater meet MCLs by mass removal and natural attenuation	Meets ARARs. Provides for confirmatory groundwater monitoring.	Effective due to mass removal and attenuation processes, cap over activated soil. Groundwater monitoring is used to verify effectiveness.	Moderately reduces mobility and toxicity by mass removal of high tritium levels in groundwater. Mobility in soil is reduced by source control (i.e. cap).	There is a potential for the entrainment of Sr-90 while pumping the tritium plume. Possible low level dose to workers involved in groundwater extraction activities. Contaminated soils are isolated, and plume will not impact supply wells.	Difficult to implement due to large volume of water to be extracted, the close proximity of the WCF Sr-90 plume, accessibility issues due to buildings and underground utilities.	$6,247,899.00	To be determined after public comment period	To be determined after public comment period
Alternative 5: Source Removal	Actively removes contaminated soils, protection of potable water supply, and tritium levels in groundwater meet MCLs by natural attenuation.	Meets ARARs. Provides for confirmatory groundwater monitoring.	Effective due to natural attenuation of the plume, activated soil removed. Groundwater monitoring is used to verify effectiveness of removal.	Reduces mobility of tritium in soils by active removal and off-site disposal in a secure landfill. Does not actively reduce toxicity, mobility or volume in groundwater.	Short-term issues include potential radiation doses to workers involved in beam line dismantlement and excavation. Excavation activities would result in a significant impact to the operations of RHIC.	Because some of the activated soil is below a section of the RHIC tunnel, excavation activities would disrupt the RHIC beam line operations for two years.	$11,896,681.00	To be determined after public comment period	To be determined after public comment period

either Alternative 3 or 4 are readily available. During any well installation or groundwater extraction event, it may be necessary to close sections of roadways and parking lots. This will represent an inconvenience to some BNL workers, but should not create a significant problem.

Alternative 5 requires special procedures to excavate and dispose of the activated soil. However, these procedures are well established from similar contaminated soil removal programs implemented at BNL, and are not expected to represent special difficulties. All of the materials, equipment and personnel required for the implementation of Alternative 5 are readily available.

Criteria 7: Cost

A comparison of the costs associated with the five alternatives is provided in Table 1. Alternative 1 represents the lowest total cost of $202,177, and Alternative 5 is highest, with a cost of $11,896,681. For cost estimating purposes, all five alternatives assume 30-year implementation periods, although it is acknowledged that cap maintenance activities may extend beyond 30 years.

VIII. PREFERRED ALTERNATIVE

g-2 Tritium Source Area and Groundwater Plume (AOC 16T)

After evaluating the alternatives against the CERCLA criteria, Alternative 2, Continued Source Area Controls and Groundwater Monitoring, is proposed as the preferred alternative to achieve the remedial action objectives described in this Proposed Plan. Alternative 2 met the two threshold criteria and provided the best balance when evaluating all the alternatives against the other five CERCLA criteria. The final two criteria, state and community acceptance, will be evaluated after the comments received during the public comment period are evaluated.

Alternative 2 requires continued routine inspection and maintenance of the concrete cap and other stormwater controls. In addition, this alternative requires continued groundwater monitoring immediately downgradient of the source area to verify the continued effectiveness of the stormwater controls, and to monitor the downgradient segments of the plume to verify that the tritium levels will decrease as predicted. Three trigger levels have been developed to require the evaluation of unexpected future releases from the source area or if the tritium plume does not attenuate as predicted. If one of these levels is reached, BNL's Groundwater Contingency Plan will be implemented and the need for additional corrective actions will be evaluated.

- If tritium levels greater than 1,000,000 pCi/L are observed in wells immediately downgradient of the source area, actions will include an evaluation of the ground water data and the need for additional characterization and/or monitoring, the immediate inspection of the existing stormwater controls, and implementation of improvements as necessary.
- If tritium concentrations greater than 2,000,000 pCi/L are observed in the area between AGS Building 912 and the western edge of the AGS parking lot area, actions will include an evaluation of the groundwater data and the need for additional characterization and/or monitoring. An assessment will be made as to whether active remediation, such as low-flow pumping, is needed to limit plume growth.
- If tritium levels near Brookhaven Avenue are found to exceed the 20,000 pCi/L MCL, actions will include an evaluation of the groundwater data and the need for additional characterization and/or monitoring. An assessment will be made to determine whether active remediation, such as a pump and recharge system, is needed to control plume growth.

The regulatory agencies will make a decision on the need to implement active groundwater remediation measures after receiving DOE's assessment and recommendation in accordance with the Interagency Agreement.

X. ADMINISTRATIVE RECORD LOCATIONS

The g-2 Tritium Plume AOC 16T Focused Feasibility Study, the Technical Memorandum and Supporting Documentation for the Proposed Plan, the Proposed Plan, and all Administrative Record documents can be found at the following locations:

U.S. EPA Region II
Administrative Records Room
290 Broadway, 16th floor
New York, NY 10007
(212) 637-3185

Brookhaven National Laboratory
Research Library, Bldg. 477
Upton, NY 11973
(631) 344-3483 or
(631) 344-3489

Mastic – Moriches – Shirley Community Library
407 William Floyd Parkway
Shirley, NY 11967
631-399-1511

For access to the records at BNL, please call 48 hours in advance.

Institutional controls are in place to prevent possible exposure to the contaminated soil and groundwater. These controls include physical barriers and work control procedures to restrict access to the activated soils near the VQ12 source area, operational restrictions on existing potable/process water supply wells within the vicinity of the plume's path, and controlling the future placement of pumping wells and recharge basins. If the former g-2 beam line were to be used in the future, institutional controls would also require procedures to limit the amount of beam loss, and further activation of the soil shielding. Final disposition of the activated soil will be addressed during facility decommissioning. Groundwater monitoring data will be evaluated and reported in the Annual Groundwater Status Report and as part of the CERCLA Five-Year Reviews.

A periodic certification will be prepared by a professional engineer or other such expert acceptable to the NYSDEC, until the NYSDEC notifies DOE in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls are still in place and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the BNL Land Use Controls Management Plan. The NYSDEC will have access to the site for inspections.

An environmental easement/restrictive covenant will be filed in the property records of Suffolk County at the time the Federal Government disposes of the property if residual contamination levels are present that do not allow for unrestricted use. This includes the completion and submission of periodic certifications to ensure that the institutional and engineering controls are in place.

Brookhaven Linac Isotope Producer (AOC 16K)

Continued inspections, certifications and maintenance of the cap; groundwater monitoring; institutional controls; and the previously completed work (i.e., installation of the cap, improved roof drains, and containment with colloidal silica grout) are proposed as the final action. Groundwater monitoring will verify that the cap and other stormwater controls are effective. Groundwater data will be evaluated and reported in the Annual Groundwater Status Report and during the CERCLA Five-Year Reviews.

An environmental easement/restrictive covenant would be filed in the property records of Suffolk County at the time the Federal Government disposes of the property if residual contamination levels are present that do not allow for unrestricted use. This includes the completion and submission of periodic certifications to ensure that the institutional and engineering controls are in place.

Eight Former Underground Storage Tanks (AOC 12)

For this AOC, the closure work that was already completed on these eight tanks under the requirements of Suffolk County Sanitary Code Article 12 is proposed as the final action under this Proposed Plan.

IX. COMMUNITY PARTICIPATION

To ensure that community expectations are considered in selecting the final remedy for the g-2 tritium source area and groundwater plume, BLIP, and the USTs, DOE encourages the public to submit its comments on the Proposed Plan during the formal public comment period, which runs for 30 days from October 12, 2006, through November 13, 2006.

If you wish to learn more about the Proposed Plan, to meet the project staff and ask questions, or to submit your written input on the plan in person, then please join us at one of the following sessions. At the public meeting, the conclusions of the g-2 Feasibility Study, the BLIP and USTs Technical Memorandum, and the Proposed Plan will be presented and community comments will be recorded.

Information Sessions
October 18, 2006, 12–2 p.m., 5–7 p.m.
Brookhaven National Laboratory
Berkner Hall, Room D

Public Meeting
October 25, 2006, 7–9 p.m.
Brookhaven National Laboratory
Medical Department, Building 490
Conference Room

To submit your written comments before the end of the formal public comment period on November 13, 2006, please do one of the following:

e-mail: tellDOE@bnl.gov
fax: (631) 344-3444
mail: Mr. Michael Holland
U.S. Department of Energy - Brookhaven Site Office
P.O. Box 5000
Upton NY 11973

For your convenience in mailing your comments, an addressed comment sheet is included at the back of this document.

XI. REFERENCES

BNL, 2006a. G-2 Tritium Plume – AOC 16T Focused Feasibility Study. BNL, October 1, 2006.

BNL, 2006b. Technical Memorandum and Supporting Documentation for the Proposed Plan. BNL, October 1, 2006.

BNL, 2006c. Brookhaven National Laboratory Environmental Monitoring Plan, 2006 Triennial Update. BNL.

BNL, 2001. Brookhaven Linac Isotope Producer (BLIP) Closeout Report Removal Action Area of Concern 16K. BNL, November 14, 2001.

BNL, 2000a. Facilities and Experimental Support (FES) Beam Cap Inspection Procedure A.14.0. BNL, May 5, 2000.

BNL, 2000b. Action Memorandum Brookhaven Linac Isotope Producer (BLIP) Removal Action. BNL, March 10, 2000. http://www.bnl.gov/erd/Surface/BLIP/blip-am.html

CDM Federal, 1999. Brookhaven Linac Isotope Producer Engineering Evaluation/Cost Analysis." September 17, 1999.

10 NYCRR 5. Subpart 5-1 of the New York State Sanitary Code, Public Water Systems, Effective Date May 26, 2004.

XII. FOR FURTHER INFORMATION

To ensure that you have the information that you need to understand the Proposed Plan for the g-2 tritium source area and groundwater plume, the Brookhaven Linac Isotope Producer (BLIP), and the final action for eight former underground storage tanks (USTs), and to submit your comments on it, you are invited to:

- Review the Focused Feasibility Study and other relevant documents in the Administrative Record at repository locations listed in Section X, above.
- Use the World Wide Web to access the Proposed Plan and other information about environmental restoration activities at BNL at http://www.bnl.gov/erd, as well as to find other information about BNL at http://www.bnl.gov.
- Call the Community Relations Office at BNL, (631) 344-2277, to ask questions, request more information, or make arrangements for a briefing.
- Attend one of the information sessions and/or the public meeting described in Section IX.
- Contact the project managers at the U.S. Department of Energy, U.S. Environmental Protection Agency Region II, and/or the New York State Department of Environmental Conservation, listed on page 18.
- Comment on this plan at the public meeting or submit your written comments by e-mail, fax, or mail to the addresses listed on the opposite page before the end of the formal public comment period on November 13, 2006.

For more information, contact:

JEANNE D'ASCOLI
Community Relations Office
Building 130
Brookhaven National Laboratory
P.O. Box 5000
Upton NY 11973
(631) 344-2277
dascoli@bnl.gov

XIII. CONTACT INFORMATION

UNITED STATES DEPARTMENT OF ENERGY

The U.S. Department of Energy (DOE) is one of the three agencies identified in the Interagency Agreement, which establishes the scope and schedule of remedial investigations at BNL. Correspondence with DOE staff concerning this project can be found in the Administrative Record.

JOHN CARTER
U.S. Department of Energy
Brookhaven Site Office
Brookhaven National Laboratory
P.O. Box 5000
Upton NY 11973-5000

(631) 344-5195
jcarter@bnl.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The U.S. EPA is one of the three agencies identified in the Interagency Agreement that oversees the scope and schedule of remedial actions at Brookhaven National Laboratory. For additional information concerning EPA's role in, please contact:

DOUG POCZE
U.S. Environmental Protection Agency
Region II
290 Broadway
New York NY 10007-1866
(212) 637-4432

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NYSDEC is one of the three agencies identified in the Interagency Agreement that oversees the scope and schedule of remedial actions at Brookhaven National Laboratory. For additional information concerning the state's role, please contact:

CHEK NG
New York State
Department of Environmental Conservation
625 Broadway
Albany NY 12233-7015
(518) 402-9620

BROOKHAVEN
NATIONAL LABORATORY

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a company founded by Stony Brook University and Battelle

Before mailing this comment sheet, please fold here and use clear tape to seal it closed. Thanks!

FROM:

Please place postage here and ensure that you mail your comments so that they are received before the end of the public comment period on November 13, 2006.

TO: Mr. Michael Holland
Site Manager
Brookhaven Site Office
U.S. Department of Energy
Brookhaven National Laboratory
P.O. Box 5000
Upton NY 11973-5000

Public Comment Period: October 12, 2006 to November 13, 2006

You Are Invited to Submit Your Comments

on the Proposed Remedial Action Plan for the G-2 Tritium Source Area and Plume, BLIP, and Former USTs

at Brookhaven National Laboratory

INSTRUCTIONS: To select the final remedy for the g-2 Tritium Source Area and Groundwater Plume, BLIP, and Former USTs at Brookhaven National Laboratory, the U.S. Department of Energy, U.S. Environmental Protection Agency, and the New York State Department of Environmental Conservation need your comments on the Proposed Plan discussed in this document. Please note your comments on this form (use additional sheets, if necessary) and return them by e-mail to tellDOE@bnl.gov, by fax to (631) 344-3444, or by mail to the address on the other side. Please sign and date the form and print your name and address at the bottom. However, you need not identify yourself for your comments to be considered. For consideration, your comments must be postmarked before the end of the formal public comment period on November 13, 2006. Thank you for your participation in this process.

please sign your name:

print your name:

street address:

town, state, and zip code:

date:

Submit your comments by • e-mail to tellDOE@bnl.gov • fax to (631) 344-3444 • or mail to the address on the reverse side