

LAND USE CONTROLS MANAGEMENT PLAN

June 10, 2009
Revision 3 (Final)

**Prepared by
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**Prepared for
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Change Synopsis

Revision	Effective Date	Summary of Change
0	August 13, 2003	Initial Issue
1	August 26, 2005	Annual Update
2	June 21, 2007	Annual Update. Added g-2 and BLIP Record of Decision. References updated.
Revision 2 (Final)	July 25, 2007	Revised based on USEPA and NYSDEC comments on Rev. 2
Revision 3 (draft)	January 30, 2009	Annual Update – draft for EPA/DEC review.
Revision 3 (Final)	June 10, 2009	Revised based on USEPA and NYSEDEC comments and incorporation of HFBR ROD.

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AGS	Alternating Gradient Synchrotron
BGRR	Brookhaven Graphite Research Reactor
BHSO	DOE Brookhaven Site Office
BNL	Brookhaven National Laboratory
BLIP	Brookhaven LINAC Isotope Producer
BSA	Brookhaven Science Associates
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (Superfund)
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EMP	Environmental Monitoring Plan
EMS	Environmental Management System
ES	Environmental Surveillance
ES&H	Environmental Safety and Health
FFA	Federal Facility Agreement
FUA	Facility Use Agreements
GIS	Geographic Information System
IAG	Interagency Agreement
ISM	Integrated Safety Management
LTRA	Long Term Response Actions
LUCMP	Land Use Control Management Plan
LUICSs	Land Use and Institutional Controls
M&O	Management and Operating
MSDs	Management System Descriptions
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
NYCRR	New York Conservation Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
O&M	Operations and Maintenance
ORPS	Occurrence Reporting and Processing System
RODs	Records of Decision
RPAM	Real Property Assessment Management
S&M	Surveillance and Maintenance
SBMS	Standard Based Management Systems
SCDHS	Suffolk County Department of Health Services
SCWA	Suffolk County Water Authority
SER	Site Environmental Report

TYSP Ten Year Site Plan
USEPA U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

The purpose of this plan is to summarize the land use and institutional controls (LUICs) that will be deployed at Brookhaven National Laboratory (BNL) to prevent exposure to environmental contamination and to ensure the long-term effectiveness of the environmental cleanup remedies. There are two categories of LUICs: Laboratory-wide that apply to all of the cleanup areas, and site-specific, which have been designed for a particular area. This plan provides an overview of both types.

Land use and institutional controls, along with other mitigating or preventive measures as necessary, will be implemented to ensure that if one control temporarily fails, other controls will be in place, or actions will be taken, to mitigate consequences resulting from the failure. LUICs will be maintained for as long as necessary in order to ensure performance of the completed remedies as described and documented in the BNL Records of Decision (RODs).

This plan is a living document and will be periodically updated to stay current with evolving management techniques and the findings and recommendations of the Five-Year Review process under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This document was initially issued August 13, 2003 and was approved by the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation.

A summary of the significant changes in this Revision 3 of the Plan includes the following two items.

- Updated Management Systems and Procedures to reflect the LUIC review as part of the BNL Facility and Operations Project Environmental Security, Safety, and Health Review procedure.
- BNL performed a self assessment of the LUCMP and the LUIC website in September 2008. The recommendations from that assessment have been incorporated in both the Plan and various aspects of the website.
- The LUCMP has been revised to include the High Flux Beam Reactor as required by the final ROD.

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1.0 INTRODUCTION

1.1 Background

Brookhaven National Laboratory (BNL) is a U.S. Department of Energy (DOE) national laboratory located in Suffolk County on Long Island, New York. BNL is on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) National Priorities List (NPL) because of environmental contamination. Much of the environmental contamination is associated with past accidental spills and outdated historical practices for chemical and radiological materials storage and disposal.

BNL is undergoing a comprehensive environmental cleanup. This cleanup program includes the closure of landfills, soils remediation, groundwater treatment, sewage treatment plant remediation, Peconic River remediation, and decontamination and decommissioning of its former research reactors. Thirty contaminated areas or facilities have been or will be remediated as part of this cleanup program.

The cleanup process has been reviewed and approved by DOE, the U.S. Environmental Protection Agency (USEPA), and the New York State Department of Environmental Conservation (NYSDEC), under an Interagency Agreement (IAG). Under the terms of the IAG, which was finalized in 1992, DOE is required to conduct environmental cleanup in compliance with all applicable federal and state regulations, including CERCLA. The USEPA and NYSDEC review cleanup activities to ensure compliance. The public also has input into the cleanup decisions. As the owner of BNL, DOE is responsible for the cleanup. Brookhaven Science Associates (BSA), the contractor that operates the Laboratory on behalf of DOE, is responsible for managing and operating Brookhaven National Laboratory and implementing many of the land use and institutional controls for DOE. The DOE's Brookhaven Site Office manages and provides oversight of the BSA contract implementation.

Because some of the cleanup efforts involve the isolation of contamination in permanent storage (e.g. capped landfills or safe-storage of reactor components) and long-term treatment to achieve cleanup goals (i.e.: groundwater) land use restrictions are necessary to prevent human and environmental exposure to hazardous and radiological contaminants that remain above levels that allow unrestricted use.

Part of DOE's environmental stewardship responsibility at BNL is maintaining land use and institutional control (LUICs) over these areas and facilities to prevent exposure of workers and the public to unacceptable levels of contamination, both chemical and radiological. For the purposes of this plan, LUICs are defined as:

- Legal and/or administrative measures that limit human exposure by restricting activity, use, and access to properties with residual contamination
- Certain engineered restrictions or controls that limit the use of, and/or exposure to, any portion of the real property or associated resources, including water resources, together with mechanisms to monitor and enforce those restrictions

1.2 Purpose of Plan

The purpose of this plan is to summarize, in one document, land use and other controls that will be deployed at BNL to prevent exposure to environmental contamination and to ensure the long-

term effectiveness of the remedies. In addition, several of the Records of Decision (RODs) require a formal system to manage land use controls.

This plan is a living document and will be periodically updated to stay current with evolving management techniques and the findings and recommendations of the CERCLA Five-Year Review process. This document was initially issued August 13, 2003 and was approved by USEPA and NYSDEC as a primary document. It is anticipated that USEPA and NYSDEC will continue to review and provide input on future revisions of this plan, for as long as the IAG remains in affect.

1.3 DOE Commitment

In situations where release of the property for unrestricted use is not desirable, practical, or possible, land use and institutional controls are necessary for the DOE to fulfill its responsibilities to protect human health and the environment. Land use and institutional controls, along with other mitigating or preventive measures as necessary, will be implemented to ensure that if one control temporarily fails, other controls will be in place, or actions will be taken, to mitigate consequences resulting from the failure. LUICs will be maintained as long as necessary in order to ensure the performance of the completed remedies as described and documented in the BNL RODs. The BNL RODs are as follows:

Brookhaven National Laboratory Operable Unit IV Record of Decision, BNL 1996

Record of Decision, Operable Unit I and Radiologically Contaminated Soils (Including Areas of Concern 6, 8, 10, 16, 17, and 18), BNL 1999

Brookhaven National Laboratory Operable Unit III Record of Decision, BNL 2000

Brookhaven National Laboratory Operable Unit VI Record of Decision, BNL 2000

Brookhaven National Laboratory Operable Unit V Record of Decision for AOC 4 (Sewage Treatment Plant), AOC 21 (Sewer Lines), AOC 23 (Eastern Off-site Tritium Plume), BNL 2001

Brookhaven National Laboratory Final Operable Unit V Record of Decision for Area of Concern 30 (Peconic River), BNL 2004

Brookhaven National Laboratory Final Record of Decision for Area of Concern 9 Brookhaven Graphite Research Reactor (BGRR), BNL 2005

Brookhaven National Laboratory Record of Decision for Area of Concern 16T – g-2 Tritium Source Area and Groundwater Plume, Area of Concern 16K – Brookhaven LINAC Isotope Producer, and Area of Concern 12 – Former Underground Storage Tanks, BNL 2007

Brookhaven National Laboratory Final Record of Decision for Area of Concern 31- High Flux Beam Reactor, BNL 2009

In the event that DOE authorizes the transfer of BNL property that has been cleaned up pursuant to a final ROD and in which LUICs continue to be required, DOE will take the actions necessary to ensure that:

- All necessary LUICs will be maintained after the transfer

- The new owner (whether a DOE or non-DOE entity) understands and is capable of meeting its land use and institutional control requirements
- An environmental easement/restrictive covenant shall 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. Each transfer of fee title from the U.S. will include a CERCLA 120 (h)(3) covenant which will have, at a minimum, a description of the residual contamination on the property and any environmental use restrictions.

DOE will evaluate potential subsequent owners and evaluate whether they can maintain responsibility for required land use and institutional controls on transferred property consistent with applicable law. DOE will coordinate and assist subsequent owners with the transfer of institutional controls.

2.0 DRIVERS, ROLES, AND RESPONSIBILITIES

BNL's land use and institutional control strategy is in compliance with applicable laws, regulations and existing BNL specific cleanup agreements (e.g. RODs). Congress, the regulatory agencies and the DOE have responsibilities in the successful use of LUICs.

In 1980 Congress enacted CERCLA, commonly referred to as the Superfund law. The law authorizes the Federal government to respond directly to releases, or threatened releases, of hazardous substances that may endanger public health or the environment. In 1986, CERCLA was updated and improved under the Superfund Amendments and Reauthorization Act. The National Oil and Hazardous Substances Pollution Contingency Plan (Title 40, Code of Federal Regulations (CFR) Part 300) specifies the criteria and procedures for implementing the provisions of CERCLA, including the requirements for land use and institutional controls.

BNL is managed by Brookhaven Science Associates, LLC (BSA) for the DOE under a Management and Operating (M&O) contract. The day-to-day management and implementation of the LUICs is passed from DOE to BSA via the M&O contract. Specifically the M&O contract includes clauses H.23 *Allocation of Responsibilities for Contractor Environmental Compliance Activities*, I.79 *Laws, Regulations and DOE Directives*, I.86 *Integration of Environment, Safety, and Health into Work Planning and Execution*, and I.29 *Pollution Prevention and Right-To-Know Information*, which are applicable to LUIC implementation

The pertinent DOE requirements that BSA is required to follow in its contract with DOE include:

- DOE Order 430.1B *Real Property Assessment Management*
- DOE Policy 450.4 *Safety Management System Policy*
- DOE Guide 450.4-1B *Integrated Safety Management System Guide*
- DOE Order 450.1, *Environmental Protection Program*

3.0 BNL LAND USE PLANNING PROCESS

3.1 Site Description

BNL covers 5,000 acres of central Suffolk County on Long Island, New York. The Laboratory site currently supports an industrial core, with limited residential (or temporary lodging) uses, all surrounded by open space. Surrounding the Laboratory is a mix of land uses. A number of residential areas currently abut the Laboratory site or are projected to do so in the future.

3.2 BNL Land Use Planning

BNL is an active research facility, and there are no current plans to discontinue operations. The Laboratory has in place a coordinated, long-range planning process that identifies future programming and space requirements. Scientific initiatives and infrastructure requirements are identified in the BNL 10 Year Site Plan (TYSP) portion of the Annual Lab Plan. The DOE Real Property Asset Management (RPAM) Order requires that the TYSP be updated annually. Specific areas of the site have been designated and are held in reserve for future programmatic and infrastructure development initiatives. Planning efforts aim to optimize the physical plant to support the needs of BNL as a forefront scientific research institution. The planning process addresses the need for new facilities to meet emerging research needs while making maximum use of existing facilities and assets and protecting the environment.

BNL's 1995 Future Land Use Plan articulates the projected land use at the end of cleanup. The plan is comprehensive and long-term and provides the basis for making new cleanup decisions—and reviewing the existing ones. Development of the 1995 BNL Future Land Use Plan included extensive stakeholder participation.

The BNL Future Land Use Plan provides a long-term land use vision for the BNL site, both as an ongoing national research laboratory and under a BNL closure scenario. It was developed specifically to support the cleanup decision process. The Future Land Use Plan provides guidance for future development and considers use restrictions determined to be necessary to support response actions in their protectiveness of human health and the environment. The results of the BNL Future Land Use Plan have been incorporated into BNL's TYSP.

BNL has five general land use categories in its plans.

- Industrial/commercial – research and development facilities, offices, manufacturing plants, rail yards, staging areas, power plants, utility systems, and waste management facilities
- Residential – permanent and temporary housing, dormitories
- Agricultural – farming, grazing, and aquaculture
- Recreational – including passive and active uses
- Open Space/wilderness – including protected wildlife and critical habitats, scenic vistas

This land use setting is not projected to change significantly after DOE's environmental cleanup program is complete and the Laboratory continues to pursue world-class science. Since the development of the 1995 BNL Future Land Use Plan, no changes have occurred. Land use is evaluated annually during the update of the TYSP. The land use setting is projected to remain the same during a post-BNL era, as well. The timing of a post-BNL era is indeterminate. While there is no guarantee that the federal government will retain ownership forever, federal CERCLA and National Environmental Policy Act (NEPA) laws will govern any sale or transfer and subsequent use of the BNL property and ensure protection of public health and the environment.

3.3 BNL Land Use Procedures

Several existing SBMS procedures (Digging Permit, Work Permit, Engineering Evaluation) have been modified to ensure that proposed land and facility activities are considered for consistency with the TYSP and LUICs. These revised procedures require an LUIC review by the Groundwater Protection Group for the new or changed use of a BNL facility or land parcel and for conducting work on BNL property. These procedures, along with a web-based database of information and geographic data, will ensure that facilities or parcels of land on the BNL site evaluated for future use are the most appropriate and that any potential conflicts with LUICs are identified and resolved prior to any subsequent facility and/or land use decisions.

4.0 LAND USE CONTROL STRATEGY

This LUCMP was developed to assure the effectiveness and reliability of the required LUICs for as long as any LUICs continue to be necessary in order for the response action to remain protective. There are two categories of controls: Laboratory-wide that apply to all of the cleanup areas, and site-specific, which have been designed for a particular area. This plan provides an overview of both.

4.1 Laboratory-Wide Controls

4.1.1 Point of Contact

The DOE Brookhaven Site Office (BHSO) Manager and the BNL Groundwater Protection Group Manager are responsible for ensuring that LUICs are deployed and maintained as described in this LUCMP.

The BSA Groundwater Protection Group Manager can be reached as follows:

Mr. William Dorsch
Groundwater Protection Group Manager,
Brookhaven Science Associates
Building 51
Upton, NY 11973

Phone: 631-344-5186
Fax: 631-344-7776

E-Mail: dorsch@bnl.gov

4.1.2 Management Systems and Procedures

DOE O 450.1, Environmental Protection Program, requires that BNL have an Environmental Management System (EMS). BNL has an ISO 14001-registered EMS. An EMS ensures that environmental issues are systematically identified, controlled, and monitored. Moreover, an EMS provides mechanisms for responding to changing environmental conditions and

requirements and reporting on environmental performance, and it reinforces continual improvement.

The cornerstone of an EMS is an environmental policy. BSA's policy is to integrate environmental stewardship into all facets of the Laboratory's activities. The policy includes a commitment to comply with all applicable environmental requirements; and to define, prioritize, and aggressively correct and clean up existing environmental problems. Elements of EMS that are key to the management of LUICs include community outreach, monitoring and measurement of controls and performance, and regular management review of the EMS and self-assessment of overall Laboratory performance.

Under the oversight of DOE's Brookhaven Site Office, it is BSA's responsibility to ensure that LUICs are addressed by its programmatic infrastructure for managing the BNL site in accordance with DOE's regulations and policies and other applicable federal, state, and local regulations.

BSA implements these requirements in its Standards Based Management System (SBMS) for the Laboratory. Management System Descriptions (MSDs) contain information about the individual management system's purpose, ownership, requirements and drivers, customers, outputs, system operations, and responsibilities. For example, the Environmental Management System Description, Records Management System Description, and the Work Planning and Control Management System Descriptions capture many of BSA's LUIC responsibilities. Other MSDs that are applicable include External Communication, Real Property Asset Management, and Integrated Planning.

BSA developed a program description for LUICs under the Environmental Management System Description. The program description identifies and describes LUICs at a high level in the SBMS hierarchy and link to the BNL subject areas and departmental work procedures that contain LUIC reviews.

Using the requirements management process, the SBMS summarizes all requirements (e.g., federal, state, and local regulations; voluntary agreements, and BSA policies) into procedures called "subject areas." Subject areas are broken down into topics so that staff can easily determine which procedures apply to their work. This programmatic infrastructure for managing and operating the BNL site is made readily available by BSA to all DOE and BSA staff, and contractors who work at the Laboratory.

In the event DOE elects to transfer property under land use and institutional control, both CERCLA and DOE Order for Real Property Assessment Management (RPAM) requirements apply.

LUICs are deployed via Laboratory-wide management systems and area specific LUIC implementation plans. This section briefly discusses the Laboratory-wide management systems pertinent to LUICs.

Integrated Safety Management (ISM) - The core functions of DOE's system for integrated safety management are to define work, analyze hazards, implement hazard controls, perform the work within the controls and provide feedback for improvement.

Using the requirements management process, BSA's SBMS summarizes all requirements (e.g., Federal, state, and local regulations; voluntary agreements, and BSA policies) into procedures

called Subject Areas. Subject Areas are broken down into topics so that staff can easily determine which procedures apply to their work.

The following is a list of applicable Laboratory-wide subject areas:

Hazards Analysis – Post cleanup, the remediation areas were reevaluated following the Hazard Analysis subject area. Based on this review it was determined that none of the remediation areas or facilities required 10 CFR 830 authorization basis documents. Standard safety programs were established and are documented in the Facility Use Agreements.

Facility Use Agreements (FUA) – The FUA establishes the operating envelope and environmental, safety, and health (ES&H) requirements for each facility or area. The FUA is an integrating document that includes historical information and a summary of hazards and controls, with other pertinent information. All staff and facility users are required to conduct work within the facility-specific operational boundaries specified in the FUA. BSA has revised its Project Closeout Procedure to require the project manager to update the Facility Use Agreement (a hazard analysis is required to update an FUA) as part of the Project Closeout process. This FUA subject area provides guidance on how to update the FUA and change control.

Environmental, Safety and Health (ESH) Standards – These standards and subject areas establish guidance for ESH evaluations of work that may modify the use of a facility or parcel of land at BNL.

Work Planning and Control – This subject area establishes the work permit process that is based on the five key elements of ISM. It is used to limit worker and visitor exposure to cleanup areas under LUIC and to help prevent inappropriate use of facilities or land areas.

Occurrence Reporting and Processing System (ORPS) – This subject area provides the procedures for implementing the Occurrence Reporting Program Description and identifies the process for discovery, response, notification, investigation, and reporting of occurrences. All staff are required to appropriately report abnormal events or conditions that they perceive may:

- Endanger the health and safety of staff or the public
- Have an adverse effect on the environment
- Seriously impact the operations and intended purpose of BNL facilities
- Result in loss or damage of property
- Adversely affect national security or the security interest of DOE or BNL

This system will be used to report when a land use has changed and become inconsistent with the institutional control objectives and manage any necessary corrective actions.

Excavation Safety - This subject area was revised in September 2005 to provide for a review of LUICs as part of the planning process for any excavation work at BNL. The Digging Permit system was also modified in September 2005 to include a mandatory review by the LTRA Group to ensure that LUIC information and constraints have been incorporated into the permitting process for conducting excavation work at BNL.

Real Property Assessment Management (RPAM) – DOE Order 430.1B requires that BNL have a Real Property Assessment Management System. The purpose of this system is to link real property asset planning with budgeting and projections of the Laboratory mission. Under this Order, BSA is required to develop a Ten-Year Site Plan, maintain a Facilities Information Management System, develop five-year maintenance plans and budgets, and to follow procedures for the identification of excess property and its disposition. LUICs and long-term stewardship activities have been integrated into these efforts.

Project Environmental, Security, Safety, and Health Review – This Facility and Operations procedure provides for an environmental review for all construction and demolition projects at the site. A check-off box is included on the associated review form for the LTRA Group to verify that any potential changes in land use are consistent with the institutional controls for any former CERCLA site that may have been present in the area.

4.1.3 Access Control

Onsite/Offsite Workers – In accordance with procedures in place and maintained at BNL, use of all lands and waters on the BNL property shall be coordinated via the Work Planning and Control procedure and the Excavation Safety procedure. The Work Planning and Control procedure also applies to offsite work. No use of land onsite (i.e., excavation or any other land use) shall be undertaken without prior approval documented by a Work Permit and/or a Digging Permit. These permit processes are applicable to all activities and personnel on site (including subcontractors). Use of land offsite will also follow the pertinent land access agreement for the area of interest. All subsurface work will require the notification of the One-Call system for underground utility checks. In addition, all offsite work will be conducted according to DOE Worker Safety and Health Rule (10 CFR 851).

Any work proposed at a cleanup area will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements if work is deemed necessary for maintenance. To prevent unknowing entry and to ensure that unrestricted use of the cleanup areas do not occur while under the ownership of the government, informational signs will be posted by BSA as necessary to denote any restricted areas.

Fencing and a locked gate in accordance with the O&M manual restrict access to the Current Landfill. These landfill access controls are maintained according to the O&M manuals.

Trespassers – While under the ownership of the DOE, the BNL site will continue to be secured as necessary.

- Offsite – The only cleanup areas of concern off of the BNL site are the groundwater contamination plumes. Offsite access to groundwater is controlled by the Suffolk County Sanitary Code for the purposes of human consumption, which prohibits the installation of new private wells without approval from the Suffolk County Department of Health. Approvals are only granted for cases where public water is not available.

The New York State Department of Environmental Conservation requires a permit under 6 NYCRR Part 602 for all wells to withdraw water for any purpose other than public water supply (including irrigation) when the total capacity of any well or wells on such property is in excess of 45 gallons per minute (or 64,800 gallons per day).

- The Peconic River cleanup outside BNL property has been completed. The remediation objective for the Peconic River is to allow unrestricted use. However, the New York State general advisory on the consumption of freshwater fish caught from New York freshwaters (no more than ½ pound meal of fish per week) currently applies and will remain in effect for the Peconic River even after remediation.

4.2 Overview of Site-Specific Controls

LUICs and related requirements will be consistent with applicable decision documents and included on BSA's Land Use Controls website for Laboratory-wide information and use. This website is password protected and available for use by the regulatory agencies.

4.2.1 Site-Specific Controls for Areas on BNL Property

Site-specific institutional controls are detailed in area specific fact sheets which are provided on the BNL Land Use and Institutional Controls website located at <http://luic.bnl.gov/website/landcontrols/>.

Fact sheets have been developed for the following areas:

- Central Steam Facility 1977 Spill Area
- Central Steam Facility Off Load Area
- Paint Shop Soils Area
- Building 464 Mercury Soils Area
- Building 208 Area
- TCE Spill Area
- Building 479 Spill Areas
- Building 650 Sump and Sump Outfall
- Landscaping Soils
- AGS Storage Yards
- Low Mass Criticality Facility
- Building 830
- Old Fire House Area
- Waste Concentration Facility
- Sewage Treatment Facility
- Chemical/Animal Holes
- Former HWMF
- Building 96 PCB Soils Area
- Bubble Chamber Spill Area
- Former Landfill Areas
- Current Landfill
- Ash Pit Areas
- Accelerator Facility Beam Loss Areas
- Brookhaven LINAC Isotope Producer
- Alternating Gradient Synchrotron (AGS) g-2/VQ12 Source Area
- Brookhaven Medical Research Reactor

Groundwater Contaminant Plumes
Brookhaven Graphite Research Reactor
High Flux Beam Reactor
Upland Recharge/Meadow Marsh Area
Former HWMF Wetland Area
Recharge Basins HS, HW, HT, HN, HP
Peconic River Remediation Areas
Wooded Wetland

Examples of site-specific controls for areas of BNL include the following.

- Maintenance of postings to communicate potential hazards and aid in controlling access
- Maintenance of fencing around cleanup areas to aid in controlling physical access
- Maintenance of required caps and covers over residual soil contamination to aid in preventing the direct exposure of such contamination to site workers, visitors and wildlife
- Maintenance of engineered caps over residual contamination that serve as a barrier to groundwater contamination
- Radiological dose monitoring to determine that any residual contamination is attenuating as planned
- Use of and compliance with Operations and Maintenance (O&M) manuals for capping/containment systems to ensure their long term performance

Site-specific groundwater monitoring, prescribed in the BNL Environmental Monitoring Plan, is also used to confirm that a particular surface cleanup is performing as planned, and to maintain accurate information on the location of residual contamination and determine when LUICs may no longer be required.

4.2.2 Groundwater Controls

- Groundwater quality is monitored in the vicinity of each remediation system to evaluate its performance and to detect any change in conditions that might result in the system not meeting its stated objective or threatening a water supply source. The details of this monitoring are prescribed in BNL's Environmental Monitoring Plan.
- BNL potable water supply systems are monitored for contamination in accordance with the Safe Drinking Water Act. Monitoring results are provided to the Suffolk County Department of Health Services (SCDHS) on a monthly basis. Monitoring data is also provided via the annual *BNL Site Environmental Report* and to BNL employees in the Annual Consumer Confidence Report. Water treatment is in place at each BNL water supply well.
- The SCDHS performs outpost groundwater monitoring near Suffolk County Water Authority (SCWA) water supply well fields that are closest to the BNL plumes.
- SCWA potable water supply wells are monitored for contamination in accordance with the Safe Drinking Water Act and reported to the regulatory agencies and the public consumers.
- Public water has been extended to affected areas including North Shirley, East Yaphank, and Manorville as a precautionary measure to prevent any possible exposure to chemicals in the groundwater.
- In accordance with 6 NYCRR Part 602 (<http://www.co.suffolk.ny.us/Health%20Services/waterstds.pdf>), new public water supply

wells on site or off site require well permits from the NYSDEC. The permit review process will consider BNL groundwater contamination.

- The Suffolk County Sanitary Code prohibits the installation of new private wells without approval from the Suffolk County Department of Health Services when such wells are to be used for potable water supply; the code does not control “replacement” wells for existing houses or businesses, nor does it apply to wells used for irrigation, cooling water, or process water purposes. Approvals are only granted for cases where public water is not available. DOE provided public water to areas where groundwater may have been contaminated as a result of BNL activities. DOE currently has a program for seven homes within the hookup area that are not connected to public water to have their private water tested (on request) on an annual basis. This program was instituted to satisfy the requirements of the OU III ROD. Homes outside the hookup area are eligible for private well testing for a fee through the SCDHS. In addition, the SCDHS offers private well testing to homeowners with existing wells.
- BSA maintains an internal Pump and Recharge Committee to coordinate onsite operational activities that may impact the flow of contaminated groundwater as well as to track and evaluate changes in offsite groundwater management activities (i.e. SCWA and drainage changes planned in the vicinity of BNL) to determine if they will affect the BNL groundwater remedy. All current and future groundwater pumping and recharge activities at BNL that may impact contaminant plume migration or treatment system operations shall be evaluated by the BNL Pump and Recharge Committee. BNL Plant Engineering will maintain a potable/supply well pumping distribution of 75 percent or greater from the western well field and 25% or less from the eastern well field. This pumping distribution is necessary to prevent the shifting of contaminant plumes located in the central, developed portion of the site (g-2 tritium, BGRR Sr-90, HFBR tritium) outside of the established monitoring well networks. A groundwater FUA was also developed to document information on the location and characteristics of the various contaminant plumes on and off site.
- Property access agreements required for offsite groundwater treatment systems will transfer with the property, should it be transferred or sold. This will be recorded in the deed filed with Suffolk County for that particular property.
- The potential for soil vapor gas intrusion will be evaluated for any new buildings that are proposed above the volatile organic compound plumes. This review will be initiated under the EP-ES&H-500, Project Environmental, Security, Safety, and Health Review. Specifically, the ES&H 500A Evaluation Form that is included as part of this procedure requires that potential issues (such as potential soil vapor gas intrusion) be identified. The LTRA Group is a required reviewer on this form.

4.2.3 Controls for Onsite and Offsite Areas of the Peconic River

The Peconic River cleanup has been completed. A long-term monitoring program has been initiated to evaluate surface water, sediment, and fish. This data will be used to determine the success of the cleanup and the need for any follow-up actions. There presently are no use restrictions placed on the river other than the New York State advisory on the consumption of freshwater fish caught from New York freshwaters.

4.2.4 Controls for Brookhaven Graphite Research Reactor (BGRR)

A ROD for the cleanup of the BGRR was signed and planning is currently in process for the D&D of the facility. Specific LUIC requirements can be found on the LUIC website fact sheet for this area.

4.2.5 Controls for AGS g-2/VQ12 Source Area and BLIP

A final ROD has been completed for these areas. Specific LUIC requirements are detailed on the fact sheets covering each of these areas. These requirements include restrictions on activities that would compromise the integrity of the impermeable caps and storm water runoff controls. Future reuse of these facilities will be limited to commercial or industrial uses.

5.0 MONITORING, REPORTING, AND INSPECTIONS

Monitoring of cleanup areas that require LUICs will be performed by BSA in accordance with the OU I and OU III RODs and BNL's Environmental Monitoring Plan (EMP). This plan is updated annually and made available to DOE, USEPA, and NYSDEC each January. Environmental data are reviewed continuously by BSA's Long Term Response Actions (LTRA) Group and compiled into a report with assessment and conclusions on an annual basis. This report is published annually as the *Site Environmental Report*. The annual monitoring reports will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy.

An annual letter report will be submitted to the regulatory agencies by DOE to provide an evaluation of the status of the LUICs during the previous fiscal year and describe how any LUIC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed to such restrictions and controls. LUIC inspections are conducted as per the OU I Soils and OU V Long-Term Monitoring and Maintenance Plan, and for g-2/BLIP, the results of which are summarized in the annual letter report.

In addition, BSA will conduct and document field inspections at least annually to assess the conditions of all sites subject to LUICs. These inspections are to be conducted to determine whether the current land use remains protective and consistent with all remedial action objectives. The ROD requires that the BGRR inspection be certified to NYSDEC by a Professional Engineer. The mechanisms and methodology for the inspections will be established in the site-specific O&M and Surveillance and Maintenance (S&M) manuals. The areas requiring LUIC inspections and their frequency are as follows:

Inspection Area	Inspection Frequency	Inspection Focus
Former HWMF (incl. wetlands)	2/year, rain*	Fence, signs, cover erosion, rip-rap/hay, puddles, berms, animal burrows, unauthorized access/work
Bldg 811	2/year, rain*	Fence, postings, erosion, animal burrows, unauthorized access/work
Chem/Animal Pits, Glass Holes	2/year, rain*	Erosion, animal burrows, unauthorized work
STP	2/year, rain*	Erosion, animal burrows, unauthorized work
Bldg 650 Sump/Sump Outfall	2/year, rain*	Signs, erosion, animal burrows, unauthorized work
Landscape Soil Areas	2/year, rain*	Erosion, animal burrows, vegetation, unauthorized work
Ash Pits	2/year, rain*	Cover erosion, animal burrows, sign, unauthorized work
Meadow Marsh Area	2/year, rain*	Erosion, animal burrows, sign, unauthorized work
Peconic River	2/year, rain*, Sed Trap weekly	Haul roads/access paths, sediment trap, unauthorized work
Bldg. 96 Former Scrapyard (PCBs)	2/year, rain*	Cover erosion, animal burrows, vegetation, sign, unauthorized work
Current Landfill (incl. Wooded Wetland)	monthly	Fence, signs, cover erosion, animal burrows, rip-rap, access roads, unauthorized access/work
Former Landfill (incl. Interim Landfill)	monthly	Signs, cover erosion, animal burrows, rip-rap, unauthorized work
Low Mass Criticality Facility	Annual	unauthorized work
AGS Storage Yards	Annual	unauthorized work
Bubble Chamber	Annual	unauthorized work
Bldg. 830 USTs and pipe leak	Annual	unauthorized work
Old Firehouse	Annual	unauthorized work
BLIP and g-2 Tritium Plumes	2/year	Concrete cap, stormwater controls, unauthorized work

* And after significant rain events of >2"

6.0 INFORMATION MANAGEMENT

Information pertaining to areas subject to LUICs is currently distributed across BNL in databases, electronic documents, and paper reports. BSA maintains a LUIC website to link this information together.

The website provides a summary of information that is stored in many locations and formats, and managed by many data owners. It includes brief information on each of the BNL-contaminated sites and facilities, their cleanup status, contaminants of concern, and maps depicting land use and land use restrictions. The website defines the scope of activities intended within each contaminated area, so that stewards and stakeholders have a clear understanding of the restrictions and stewardship responsibilities. The ability to bring together and overlay multiple information sources in a graphical format enhances the ability to manage and communicate stewardship requirements. A BSA administrative procedure will be developed that includes a maintenance schedule to ensure that the site contains the most current information. The website links this key information together:

- 10 - Year Site Plan
- Facility Use Agreements
- Fact sheets on each cleanup area summarizing history, cleanup actions, cleanup status, and LUICs
- Project Closeout Reports
- Inspection and maintenance schedules
- CERCLA Five-Year Review Report
- Links to other planning and environmental information
- GIS maps

Both the website and FUA's are currently available only within the BNL intranet. The website can be made available to IAG members via a password that is provided upon request. In addition, the New York State Environmental Conservation Law requires DEC to make site specific information on engineering and institutional controls available to the public via its website (www.dec.ny.gov), and summarized LUIC information will be included in the NYSDEC database which is accessible to the public.

The website includes a glossary and a user guide. It is available at BNL's website from the "ES&H" pull down menu, from the primary environmental home pages or directly at <http://luic.bnl.gov/website/landcontrols>.

7.0 NOTIFICATIONS

7.1 Change in Land Use

Implementation of BSA SBMS planning procedures shall identify any anticipated significant changes in land use for cleanup areas subject to LUICs (i.e. new construction on an area cleaned to industrial use standards). BSA shall notify DOE in the event changes are anticipated. DOE shall evaluate such changes that impact RODs pursuant to 40 CFR 300.430(f)(3)(ii) and 40 CFR 300.435(c)(2).

DOE shall notify EPA and NYSDEC 45 days in advance of any proposed land use changes that are inconsistent with LUIC objectives or the selected remedy.

DOE shall not modify or terminate LUICs, implementation actions, or land use without approval by USEPA and NYSDEC. DOE shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUICs or any action that may alter or negate the need for LUICs.

7.2 Property Transfer

In the event that DOE determines to enter into any contract for the sale or transfer of any of the BNL property, DOE will comply with the requirements of CERCLA section 120(h), in effectuating that sale or transfer, including all notice requirements to ensure that future users are not exposed to unacceptable levels of contamination.

In accordance with the IAG agreement, DOE will provide a 90-day notification to USEPA and NYSDEC prior to any sale, lease, transfer, or other land use change that may influence LUICs. Any transfer or sale of BNL property will be done in accordance with the requirements of 120 (h) of CERCLA.

This requires that, prior to DOE transfer of real property to a nonfederal entity, a covenant be placed in the deed of transfer warranting that all remedial action necessary to protect human health and the environment with respect to any hazardous substances remaining on the property has been taken. In addition, under certain circumstances, CERCLA section 120(h)(3)(B) requires that a federal agency demonstrate to the USEPA Administrator that a remedy is “operating properly and successfully” before the federal agency can provide the “all remedial action has been taken” covenant. Under CERCLA section 120(h)(3)(C), the covenant can be deferred so that property may be transferred before all necessary remedial actions have been taken if regulators agree that the property is suitable for the intended use, and the intended use is consistent with protection of human health and the environment.

In addition to the land transfer notice and discussion provisions above, DOE further agrees to provide USEPA and NYSDEC with similar notice, within the same time frames (i.e. 90 days), as to federal-to-federal transfer of property. DOE shall provide a copy of executed deed or transfer assembly to USEPA and NYSDEC.

- a. **Environmental Easement:** An environmental easement/restrictive covenant shall 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 restricted use. This includes the completion and submission of periodic certifications to ensure that the institutional and engineering controls are in place. Each transfer of fee title from the U.S. will include a CERCLA 120 (h) (3) covenant which will have, at a minimum, a description of the residual contamination on the property and any environmental use restrictions.
- b. **Lease Restrictions:** During the time between the adoption of the applicable ROD and deeding of the property, equivalent restrictions are being implemented by lease terms, which are no less restrictive than the use restrictions and controls described above, in the applicable ROD. These lease terms shall remain in place

until the property is transferred by deed, at which time they will be superceded by the institutional controls described in the applicable ROD.

- c. Notice: Concurrent with the transfer of fee title from DOE to the transferee, information regarding the environmental use restrictions and controls will be communicated in writing to the property owners and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property.

7.3 Notification upon Discovery of LUIC Breach or Unauthorized Change in Land Use

BSA will notify DOE within 24 hours of the discovery of any breach in LUICs. DOE will notify USEPA and NYSDEC as soon as practicable but no later than 48 hours after discovery of any breach of the LUICs or unauthorized change of land use. A breach is defined as any instance which results in human exposure to residual contamination or compromises the integrity of a given remedy. Examples of breaches to the LUICs include but are not limited to:

- Damage to the structural integrity of a landfill liner.
- Improper maintenance of BNL sitewide supply well pumping distributions resulting in the alteration of groundwater flow directions and shifting of plumes.
- Moving soil containing residual contamination from its post-remediation location to another area on or off-site.

DOE will notify USEPA and NYSDEC regarding how the DOE has addressed or will address the breach within 10 days of sending USEPA and the NYSDEC notifications of the breach or unauthorized change in land use.

8.0 CONTINGENCY FOR LUIC BREACH

In addition to the commitment to notify USEPA and NYSDEC upon the discovery of a land use and institutional control breach, BSA and DOE will address any activity that is inconsistent with the LUIC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUICs. BSA will report and correct any LUIC deficiencies to DOE immediately using the ORPS and report any actions to US EPA and NYSDEC. DOE will take action as soon as practicable, but in no case will the process be initiated later than 10 days after BSA and DOE become aware of the breach.

9.0 EFFECTIVE DATE

The initial issue (i.e. Rev. 0) of this plan became effective on October 1, 2005. Rev. 3 will become effective upon submittal of this document to the regulatory agencies.

DOE and BSA understand the importance of environmental stewardship and LUICs, and are committed to supporting this effort. DOE and BSA believes that this Plan meets its stated objectives and that it describes a system to ensure that LUICs are properly implemented at BNL.

BSA's Environmental Management System seeks continual improvement. As such, it is likely that this plan will evolve as LUICs become more fully defined in areas where cleanup decisions are currently incomplete and as lessons learned are incorporated into this LUCMP.

10.0 REFERENCES

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