Department of Energy
Office of Science
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

May 13, 2022

Ms. Adriana Morocho
Federal Facilities Section
U.S. EPA - Region II
290 Broadway – 18th Floor
New York, New York 10007-1866

Mr. Brian Jankauskas
New York State Department of
Environmental Conservation
Division of Environmental Remediation
625 Broadway -12th Floor
Albany, New York 12233

Dear Ms. Morocho and Mr.Jankauskas:

SUBJECT: BROOKHAVEN NATIONAL LABORATORY (BNL) INTERAGENCY AGREEMENT (IAG) - LAND USE CONTROLS MANAGEMENT PLAN (LUCMP), REV 5 – RESPONSE TO EPA AND NYSDEC COMMENTS

References:
1. Email from A. Morocho (EPA) to R. Howe (BSA), RE: BNL - IAG Annual Land Use and Institutional Controls Evaluation, and Revised Land Use Controls Management Plan, dated May 3, 2022

2. Letter from B. Jankauskas (NYSDEC) to R. Gordon (BHSO), Subject: Brookhaven National Laboratory Site ID: 152009, dated March 4, 2022

Attached are the responses to comments provided in the referenced correspondence. Also attached is the Land Use Conctrols Management Plan, revised to address the comments. If you have any questions please contact Caroline Polanish, of my staff, at (631) 344-5224.

Sincerely,

Robert P. Gordon
Site Manager

Attachment:
1. Land Use Controls Management Plan Response to Comments
2. Land Use Conrols Management Plan, Rev 5

cc:
W. Parish, NYSDEC
A. Rapiejko, SCDHS
C. Polanish, SC-BHSO
S. Coleman, BSA
W. Dorsch, BSA
T. Green, BSA
R. Howe, BSA
E. Kramer, BSA
J. Milligan, BSA
D. Paquette, BSA
V. Racaniello, BSA
L. Singh, BSA

Comment Number	Section/ Page	Comment	Response
NYSDEC Letter from B. Jankauskas to R. Gordon, dated March 4, 2022.			
The New York State Department of Environmental Conservation and the New York State Department of Health (Departments) have reviewed the Brookhaven National Laboratory (BNL) Annual Land Use and Institutional Controls Evaluation and Land Use Controls Management Plan, Rev 5, submitted February 22, 2022. The Departments provide the enclosed comments.			
1	Annual LUIC, Page 2 and Land Use Controls Management Plan, Section 4.2.1	The Annual LUIC page references an unexploded ordnances that were identified in August and November 2021 near supply well 12. Review of Land Use Controls Management Plan did not include a fact sheet for unexploded ordnance. Based on the identification and future potential for additional discoveries of unexploded ordnances, it is recommended that a fact sheet be developed that discusses unexploded ordnance and includes the ordnance areas map. Additional discussion regarding munitions can be added as a sub-section to Section 4 that includes discussions regarding the unexploded ordnance but also lead contaminated soils at a shotgun range and live fire range.	The purpose of the Land Use Controls Management Plan and the fact sheets are to summarize the land use and institutional controls (LUICs) that are being deployed at BNL to prevent exposure to environmental contamination and to ensure the long-term effectiveness of the environmental cleanup remedies. Unexploded ordnance (UXO), although a significant safety concern, is not itself an environmental cleanup area. Section 4.2.1 has been updated to include a brief discussion on the concern with UXO's and the review/notification process.
2	Annual LUIC, page 4, BGRR	This discussion indicates that two steel sea land containers will be placed on the roof of the BGRR for a proposed science research project. Is this research project pertaining to the BGRR or is this regarding another project?	The quantum network research project is not related to the scope of the former BGRR. Scientists hope to take advantage of the clear line of sight from the roof of the BGRR

Comment Number	Section/ Page	Comment	Response
			to the Health Sciences Tower at Stony Brook University to send single particles of light in open air as a proof-of-concept demonstration for quantum communication.
3	Land Use Controls Management Plan, Section 1	Suggest including unexploded ordnances within this section since they are a concern and a potential hazard.	Section 1.1 now includes a statement regarding the potential risks relating to UXO's.
4	Land Use Controls Management Plan, Section 1.3	Update operable unit numbers.	Section 1.3 references the approved CERCLA Records of Decision for the BNL site. Future updates to the operable unit (OU) numbers will be made following EPA concurrence on the September 2021 OU Crosswalk.
5	Land Use Controls Management Plan, Section 3.2, first bullet	Remove extra comma prior to rail yard.	Change made.
6	Land Use Controls Management Plan, Section 4.2.2, bullet #7, last sentence	Revise to indicate that properties outside the hookup area and new buildings within the hookup area, since public water was extended as indicated in bullet #5, are eligible for private well testing for a fee through the SCDHS.	Change made.

Comment Number	Section/ Page	Comment	Response
EPA Email from A. Morocho to R. Howe, dated May 3, 2022.			
EPA has reviewed the Revised Land Use Controls Management Plan and has the following comments			
1	1.1 Background, last paragraph and 4.2.1 Site-Specific Controls for Areas on BNL Property	There should be some mention of the 3Rs (Recognize, Retreat, Report) in either section.	The 3Rs process is now referenced in Section 4.2.1
2	1.3 DOE Commitment	Currently the paragraph states that DOE will make sure the buyer of the property conducts all the LUC requirements. But falls short at stating that ultimately the LUC responsibility falls to the DOE. A sentence similar to the following should be included, *"Although the DOE may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DOE shall retain ultimate responsibility for remedy integrity."*	The following sentence was added to the section. "DOE will comply with Section 120(h) of CERCLA regarding transfers of land by a federal agency".
3	4.2 Overview of Site-Specific Controls	There are several factsheets that EPA does not have access to, can these also be shared through the Teams page?	Outside access to the BNL LUIC website was discontinued several years ago due to BSA's Cyber Security Program policies. However, BNL is currently evaluating having outside access reinstated. If there are specific factsheets that EPA is interested in, as requested, they can be emailed as a pdf. The

Comment Number	**Section/ Page**	**Comment**	**Response**
			factsheets do get updated, therefore adding them to the Teams site is not recommended.
4	4.1.2 Management Systems and Procedures, Facility Use Agreements (FUA)	There's a typo for health. Currently written as "heath".	Change made.

BROOKHAVEN NATIONAL LABORATORY

LAND USE CONTROLS MANAGEMENT PLAN

February 22, 2022
Revision 5

Prepared by
Brookhaven Science Associates
Upton, NY 11973

Under Contract with the United States Department of Energy
Contract No. DE-AC02-98CH10

Prepared for
U.S. Department of Energy
Brookhaven Site Office
Building 464
53 Bell Avenue
Upton, NY 11973

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.
Revision 4 (Final)	April 4, 2013	Routine Updates to Plan
Revision 5	March 10, 2022	Routine updates, added new AOCs 33 and 34, and changes based on 2021 Five Year Review.

TABLE OF CONTENTS

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 Facilities Agreement
FUA	Facility Use Agreements
GIS	Geographic Information System
GPG	Groundwater Protection Group
IAG	Interagency Agreement
ISM	Integrated Safety Management
LUCMP	Land Use Controls Management Plan
LUICSs	Land Use and Institutional Controls
M&O	Management and Operating
MSDs	Management System Descriptions
NEPA	National Environmental Policy Act
NPL	National Priorities List
NYCRR	New York Codes, 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
USEPA	U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

The purpose of this plan is to summarize the land use and institutional controls (LUICs) that are being 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, are 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 is 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 5 of the Plan includes the following:

- Updated list of fact sheets.
- Updated status of the Brookhaven Graphite Research Reactor (BGRR) and High Flux Beam Reactor (HFBR) Stack and Grounds
- General updates

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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-four areas of concern (AOCs) have been or will be remediated as part of this cleanup program. AOC 33 (PFOS and PFOA Groundwater and Soil Contamination) and AOC 34 (1,4-Dioxane Groundwater Contamination) were added in 2021.

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 BNL 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

Although not an environmental concern, the potential for finding unexploded ordnance (UXO) is a significant safety concern to workers performing excavations in specific areas of the BNL site. Through the use of the digging permit process and the LUIC map, the potential for unearthing UXO's in these areas is conveyed to the cognizant project manager performing the work.

1.2 Purpose of Plan

The purpose of this plan is to summarize, in one document, land use and other controls that are 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 provide input on future revisions of this plan, for as long as the IAG remains in effect.

1.3 DOE Commitment

In situations where release of the property for unrestricted use is not desirable, practical, or possible, LUICs are necessary for 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, are 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 LUICs on transferred property consistent with applicable law. DOE will coordinate and assist subsequent owners with the transfer of institutional controls. DOE will comply with Section 120(h) of CERCLA regarding transfers of land by a federal agency.

2.0 DRIVERS, ROLES, AND RESPONSIBILITIES

BNL's LUIC 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 CERLA, including the requirements for LUICs.

In December 2012, the second in a series of guidance documents was issued by the U. S. Environmental Protection Agency (EPA) on the use of institutional controls (ICs), *A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites,* OSWER 9355.0-89 EPA-540-R-09-001 (EPA, 2012). The maintenance and enforcement of institutional controls at BNL is consistent with this guidance.

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 430.1C *Real Property Assessment Management*

- DOE Order 436.1, *Departmental Sustainability*
- DOE Order 458.1, *Radiation Protection of the Public and the Environment*

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.

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 *Department of Energy Laboratory Plan For the Office of Science's Brookhaven National Laboratory (FY2021 to 2030)* (BNL, 2021). 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 has been replaced by the *BNL Land Use Plan* (BNL, 2014). This Plan discusses the 2014 land use categories and presents the projected land use in 2017. *BNLs Site Implementation Plan* (BNL, 2015) provides a map of the planned campus infrastructure investments (projected in 2024) that will promote and support the scientific initiatives and the wide range of facilities that enable BNL's core capabilities.
BNL has five general land use categories:

- Industrial/commercial – research and development facilities, offices, 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. 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 Standards Based Management System (SBMS) procedures (Digging Permit, Work Permit, and Project Environmental, Security, Safety & Health Review) have been modified to ensure that proposed land and facility activities are considered for consistency with LUICs. These revised procedures require an LUIC review by the Groundwater Protection Group (GPG) 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 BSA GPG Manager are responsible for ensuring that LUICs are deployed and maintained as described in this LUCMP.

The BSA GPG Manager can be reached as follows:

Mr. William Dorsch
Groundwater Protection Group Manager
Brookhaven Science Associates
Building 462
Upton, NY 11973
Phone: 631-344-5186
E-Mail: dorsch@bnl.gov

The BHSO contact can be reached as follows:

Ms. Caroline Polanish
U.S. Department of Energy
Brookhaven Site Office
Building 464
Upton, NY 11973
Phone: 631-344-5224
E-Mail: caroline.polanish@science.doe.gov

4.1.2 Management Systems and Procedures

DOE O 436.1, Departmental Sustainability, 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 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 Communications, Government, Community Relations and Education, 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. This program description was updated in February 2022.

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:

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.

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 for Experiments and Operations – 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 and Penetration Safety - This subject area provides for a review of LUICs as part of the planning process for any excavation work at BNL. The Digging Permit system includes a mandatory review by the GPG 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 430.1C requires that BSA 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 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 500A review form for the GPG to verify that any potential changes in land use due to the planned work 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). Work performed by BSA and contractors both on and off-site include activities such as well installation and sampling, well and treatment system maintenance and carbon change-outs. Use of land offsite will also follow the pertinent property access agreement for the area of interest. All offsite 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 (i.e., maintenance) will be strictly controlled and workers will be appropriately trained and briefed about health and safety requirements. 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 are posted by BSA as necessary to denote any restricted areas.

Partial fencing and locked gates on the access roads in accordance with the operation and maintenance (O&M) manual limit access to the Current Landfill. The landfill access controls are maintained according to the O&M manuals. A fence and locked gates restrict access to the former Hazardous Waste Management Facility.

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 and the Peconic River. 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 off-site groundwater treatment system buildings are fenced, with locked gates and doors.

  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 and monitoring outside BNL property has been completed. However, environmental surveillance monitoring of fish on the BNL site will continue as river conditions and fish population assessment results allow. The New York State general advisory on the consumption of freshwater fish caught from New York freshwaters (no more than one-half pound meal of fish per week) currently applies and will remain in effect for the Peconic River.

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 only available to internal BNL users.

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 internal website located at https://luic.bnl.gov/Default.aspx

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
TCE Spill Area
Building 479 Spill Areas
AGS Storage Yard 2
Central Steam Facility Storm Water Outfall Lead Contaminated Soils
West Water Tower Lead Contaminated Soils
Building 650 Reclamation Facility Sump and Sump Outfall
Landscape Soils
AGS Storage Yard 1
Low Mass Criticality Facility
Building 830 Facility, Pipe Leak and USTs
Old Firehouse Area
Sewage Treatment Plant
Chemical/Animal Pits and Glass Holes
Former Hazardous Waste Management Facility and Waste Loading Area
Building 96 PCB Soil Contamination
Bubble Chamber Spill Area
Building 208 Vapor Degreaser and Warehouse Area
Peconic River Remediation Areas
Building 811 Waste Concentration Facility Remediation Areas
Building 464 Area Mercury Contaminated Soils
Building 920 Soil Contamination
811 Waste Transfer Lines (A/B Waste Lines with Co-Located Piping)
Former Landfill Area
Current Landfill
Ash Pits

Brookhaven LINAC Isotope Producer (BLIP)
Alternating Gradient Synchrotron (AGS) g-2/VQ12 Source Area
Accelerator Facility Beam Loss Areas
Old Incinerator Facility
Brookhaven Graphite Research Reactor – Engineered Cap
Shotgun Range Lead Contaminated Soils
Live Fire Range Lead Contaminated Soils
Building 197 Mercury Contaminated Soils
C-A Department Lead Storage Yard
Building 463 (Greenhouses)
Former Hazardous Waste Management Facility (Perimeter Soil Contamination)
Former Warehouse Area (Post NSLS-II Construction)
Groundwater Contamination Areas
Brookhaven Graphite Research Reactor
High Flux Beam Reactor
Brookhaven Medical Research Reactor
Nuclear Waste Management Facility Building 830
Former Reclamation Facility Building 650
High Flux Beam Reactor Grounds (including Stack, Fan Houses and Underground Utilities areas)
Upland Recharge/Meadow Marsh
Former Hazardous Waste Management Facility (HWMF) Wetland Area
Recharge Basins
Upton Ecological Reserve
Peconic River Corridor
Ecologically and Culturally Sensitive Areas
Wooded Wetlands by Current Landfill Area
Current Firehouse PFAS Contamination
Former Firehouse PFAS Contamination

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
- Use of and compliance with O&M and Surveillance and Maintenance (S&M) manuals for capping/containment systems to ensure their long term performance
- Maintain reactor facilities in accordance with S&M plans to isolate residual contamination and prevent further release to the environment and exposure to personnel.

Site-specific groundwater monitoring, prescribed in the BNL Environmental Monitoring Plan (EMP), 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. The fact sheets are reviewed and updated if necessary annually during the field inspections performed under Section 5.0 below.

Although not an environmental concern, the potential for finding UXO is a significant safety concern to workers performing excavations in specific areas of the BNL site. Through the use of the digging permit process and the LUIC map, the potential for unearthing UXO's in these areas is conveyed to the cognizant project manager performing the work so all workers are aware of the risk. The digging permit has a section to identify whether the work is planned in an area that has potential UXO's. There is a specific map layer on the LUIC website that identifies areas known to or potentially contain UXO's or buried munitions. The map, which is updated as needed, was developed based on a search of historical records and actual field identification of UXO's or munitions. The Excavation and Ground Penetration Subject Area has a process to follow when unexpected utilities or hazards are discovered, which includes pausing the work and contacting the cognizant subject matter expert. In the case of UXO's, that includes the Laboratory Protection Division. This process follows the 3Rs of explosives safety: Recognize, Retreat, Report.

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 BSA's EMP.
- 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 employed at BNL supply wells as necessary.
- 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 https://www.dec.ny.gov/lands/117175.html new water supply wells (other than public water supply) on site or off site that pump more than 45 gallons per minute require well permits from the NYSDEC. The permit review process will consider BNL groundwater contamination.
- The Suffolk County Sanitary Code regulates the installation of private drinking water wells. It prohibits the installation of new private wells without approval from SCDHS 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. DOE provided public water to areas where groundwater may have been contaminated as a result of BNL activities. DOE currently has a program for four homes within the hookup area that are not connected to public water to have their private water tested (on request) free of charge on an annual basis. This program was instituted to satisfy the requirements of the OU III (03) ROD. Properties outside the hookup area and new buildings within the hookup area, since public water was extended as indicated in the fifth bullet above, are eligible for private well testing for a fee through SCDHS.

- BSA maintains an internal Water and Sanitary Planning Team 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 pumping changes planned in the vicinity of BNL) to determine if they will affect the BNL groundwater remedies. 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 BSA Water and Sanitary Planning Team. Information is shared to minimize the shifting of contaminant plumes located in the central, developed portion of the site (g-2 tritium, BGRR Sr-90, Building 650 Sr-90 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.
- 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 GPG 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 for surface water, sediment and fish was conducted between 2004 and 2015. As noted in Section 4.1.3 above, on-site environmental surveillance fish monitoring will be performed, as conditions allow. 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 (OU XI, EPA designation is 07) was signed in 2005 and decontamination and dismantlement of the facility was completed in 2012. Specific LUIC requirements can be found on the LUIC website fact sheets for this area. These requirements include restrictions on activities that would compromise the integrity of the impermeable engineered cap and storm water runoff controls, vehicle restrictions near geomembrane access points, facility access controls, and radiological postings. The procedures for surveillance and maintenance of this cold and dark facility are detailed in the BGRR Surveillance and Maintenance Manual.

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

A ROD for the remediation of these areas (OU VIII, 08) was signed in 2007. 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.

4.2.6 Controls for the High Flux Beam Reactor (HFBR)

A ROD for the cleanup of the HFBR was signed in 2009 (OU IX, 09). In 2010, the HFBR building and activated components (reactor internals, reactor vessel, thermal shield, and biological shield) were placed in a safe configuration for a 65 year period of decay in storage. Final decommissioning of the HFBR confinement building will be performed at the completion of the decay period. The HFBR stack was dismantled in 2021. Specific LUIC requirements can be found on the LUIC website fact sheet for this area. These requirements include facility access controls, radiological postings, and monitoring and maintenance of the HFBR building for containment. A detailed HFBR Surveillance and Maintenance Manual provides guidance on surveillance and maintenance activities.

The HFBR is managed under the BNL Nuclear/Criticality Safety Subject Area and all operations within the confinement dome are maintained under a DOE Approved Safety Authorization Basis as a radiological facility by analysis. As such, any activities must be vetted using the Nuclear Unreviewed Safety Issue (NUSI) Process. This process screens any activities that may introduce unallowable quantities of materials or otherwise endanger the conditions of the safety authorization basis.

4.2.7 Controls for Soil Areas and Landfills

Cleanup of several contaminated soil areas have been completed, as well as capping of the three Landfill Areas. A Soil and Peconic River S&M Plan, and O&M Manuals for the Landfills are in place to monitor and maintain these areas. Specific LUIC requirements can be found on the LUIC website fact sheets for these areas. These requirements include maintenance of required caps and covers over residual soil contamination, fencing of certain areas, point of contact signs.

5.0 MONITORING, REPORTING, AND INSPECTIONS

Monitoring of cleanup areas that require LUICs will be performed by BSA in accordance with the RODs and BNL's Environmental Monitoring Plan (EMP). This plan is updated annually, and made available to DOE, USEPA, and NYSDEC. Groundwater data are reviewed continuously by BSA's GPG and compiled into a report with assessment and conclusions on an annual basis. This report is published annually as Volume II of the *Site Environmental Report*. The annual monitoring reports are used in preparation of the Five Year Review to evaluate the effectiveness of the remedies. Groundwater data obtained as part of characterization efforts during the year are communicated to the IAG via a monthly teleconference.

An annual letter report is submitted to the regulatory agencies by BSA each March to provide an evaluation of the status of the LUICs during the previous calendar year and describe how any LUIC deficiencies or inconsistent uses have been addressed. The letter report also provides a certification that institutional and engineering controls remained in place and were unchanged during the previous year for the High Flux Beam Reactor (HFBR), the Brookhaven Graphite Research Reactor (BGRR), and the g-2 and Brookhaven Linac Isotope Producer (BLIP) source area caps.

BSA conducts and documents field inspections at least annually to assess the conditions of all sites subject to LUICs. These inspections are conducted to determine whether the current land use and controls remain protective and consistent with all remedial action objectives. The inspections are conducted as per the Soil and Peconic River Long-Term Monitoring and Maintenance Plan and the BGRR and HFBR Long-Term S&M Manuals. The results are summarized in the annual letter report.

The areas requiring LUIC inspections and their frequency are as follows:

Inspection Area	Inspection Frequency	Inspection Focus
Former HWMF (incl. wetlands) and Waste Loading Area	2/year, rain*	Fence, gates, signs, cover erosion, unauthorized access/work
Former HWMF Perimeter Soils	2/year, rain*	Soil cover erosion, unauthorized work
Former Bldg. 811	2/year, rain*	Snow fence delineating AGS yard, signs, erosion, unauthorized access/work
Chem/Animal Pits, Glass Holes	2/year, rain*	Signs, erosion, unauthorized work
Sewage Treatment Plant (STP), including sewer line	2/year, rain*	Erosion, unauthorized work
Bldg. 650 Sump/Sump Outfall	2/year, rain*	Signs, erosion, unauthorized work
Landscape Soil Areas	2/year, rain*	Erosion, vegetation, unauthorized work
Ash Pits	2/year, rain*	Cover erosion, sign, unauthorized work
Meadow Marsh Area	2/year, rain*	Sign, unauthorized work
Peconic River	2/year, rain*	Haul roads, access paths, unauthorized work
Bldg. 96 Former Scrapyard (PCBs)	2/year, rain*	Cover erosion, vegetation, signs, unauthorized work
Former A/B Waste Transfer Lines	2/year, rain*	Cover erosion, unauthorized work
Current Landfill (incl. Wooded Wetland)	monthly	Fence, gates, signs, cover erosion, animal burrows, rip-rap, access roads, gas vents, unauthorized access/work
Former Landfill Area (incl. Interim LF)	monthly	Signs, cover erosion, animal burrows, rip-rap, gas vents, 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 Incinerator	Annual	Soil cover erosion, unauthorized work
BLIP and g-2 Source Area Caps	2/year	Concrete, cement, asphalt caps, stormwater controls, unauthorized work
BGRR Engineered Cap	2/year**	Cap integrity, stormwater controls, signs, vehicle barriers, unauthorized work
BGRR Building, Grounds, Deep Pit	4/year**	Annual for structure. Signs, erosion, water accumulation, unauthorized work
BGRR Below Ground Ducts	1/year**	Signs, structure, unauthorized work, water accumulation
HFBR Confinement, Ancillary Rooms, Grounds	4/year**	Annual for structure. Signs, erosion, water accumulation, unauthorized work

* Rainfall in which the depth of precipitation is 5 inches or greater in 24 hours.
** And after significant weather events (5 inches of rain or greater in 24 hours or 12 inches of snow).

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 and serve as a planning tool for site work activities.

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 maintenance plan is in place that includes a maintenance schedule to ensure that the site contains the most current information. The website links this key information together:

- Facility Use Agreements
- Fact sheets on each cleanup area summarizing history, cleanup actions, cleanup status, and LUICs
- Project Closeout Reports
- Inspection frequencies
- Links to other planning and environmental information
- GIS maps

Both the website and FUAs are currently available only within the BNL intranet due to BNL/DOE cybersecurity requirements. 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 currently only available to internal BNL users at BNL's website from the "EPD" menu, or directly at http://luic.bnl.gov/luic.

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, 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 superseded 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.
- Damage to or removal of LUIC postings from formerly contaminated sites.
- 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 USEPA 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. 5 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 defined and as lessons learned are incorporated into this LUCMP.

10.0 REFERENCES

BNL, 1996. *Operable Unit IV Record of Decision*, Brookhaven National Laboratory, Upton, New York, March 1996.

BNL, 1999. *Operable Unit I Record of Decision*, Brookhaven National Laboratory, Upton, New York, August 1999.

BNL, 2000. *Operable Unit III Record of Decision*, Brookhaven National Laboratory, Upton, New York, June 2000.

BNL, 2001. *Operable Unit VI Record of Decision*, Brookhaven National Laboratory, Upton, New York, March 2001.

BNL, 2002. *Operable Unit V Sewage Treatment Plant Record of Decision*, Brookhaven National Laboratory, Upton, New York, January 2002.

BNL, 2005. *Operable Unit V Peconic River Record of Decision*, Brookhaven National Laboratory, Upton, New York, January 2005.

BNL, 2005. *Brookhaven Graphite Reactor Record of Decision*, Brookhaven National Laboratory, Upton, New York, March 2005.

BNL, 2007. *Record of Decision For Area of Concern 16T, g-2 Tritium Source and Groundwater Plume, Area of Concern 16K Brookhaven LINAC Isotope Producer, Area of Concern 12 Former Underground Storage Tanks*, Brookhaven National Laboratory, Upton, New York, April 2007.

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

BNL, 2021. *Department of Energy Laboratory Plan For the Office of Science's Brookhaven National Laboratory (FY2021 to 2030),* July 2021.

BNL, 2021. *High Flux Beam Reactor Hazard Assessment Document Revision 5*, November 2021

DOE 2016. DOE Order 430.1C, *Real Property Asset Management*, August 2016

DOE, 2011. DOE Order 458.1*, Radiation Protection of the Public and the Environment,* February 2011.

DOE, 2011. DOE Order 436.1: *Departmental Sustainability*, May 2011.

EPA, 1992. *Brookhaven National Laboratory Federal Facilities Agreement under CERCLA Section 120, Administrative Docket Number II-CERCLA-FFA-00201*, February 28, 1992.

EPA, 2012. *A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites,* OSWER 9355.0-89 EPA-540-R-09-001, December 2012.

U. S. Code of Regulations Title 10 CFR 851 *Worker Safety and Health Program*

6 NYCRR Part 602, Environmental Conservation Law, Applications for Long Island Wells, July 1995.