



## Management System: [Worker Safety and Health](#) Program Description: Integrated Safety Management System

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Subject Matter Expert: [Steven Coleman](#) | Management System Executive: [Steven Coleman](#) | Management System Steward: [Gail Mattson](#)

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### 1.0 Introduction

In accordance with the Brookhaven National Laboratory (BNL) operating Contract (DE-AC02-98CH10886) (DE-SC0012704) clause I.131, which implements DEAR Clause 970.5223-1 – Integration of Environment, Safety, and Health into Work Planning and Execution (Dec 2000), this program description describes Brookhaven National Laboratory's (BNL) approach to integrating Environment, Safety, Health, and Quality (ESH&Q) requirements into the processes for planning and conducting work at the Laboratory. It also describes BNL's programs for accomplishing work safely and provides the road map of the systems and processes that make up the BNL Integrated Safety Management System (ISMS).

This program description identifies the core requirements that provide the foundation for ESH&Q management at BNL. BNL used the cross-reference between the ISM Principles and Core Functions provided in the DOE Order 450.2, Integrated Safety Management and the Quality Assurance (QA) Criteria provided in the DOE Guide 414.1-2B, Quality Assurance Management System Guide to aid in developing the BNL ISMS Program. The ISMS Program continues to employ an integrated set of non-overlapping management systems that embody the requirements defined in DOE P 450.4A, Safety Management System Policy. These systems collectively form the Standards-Based Management System (SBMS) management systems, BNL's highest level of operating and business processes that define how work is conducted at the Laboratory. These management systems are defined via Management System Descriptions that identify each system's processes, standards of performance, external requirements, and the set of Laboratory procedures and guidelines (subject areas and other Laboratory-wide procedures) to carry-out the elements of each system. Management systems, program descriptions, and subject areas operate in an integrated fashion by providing programs and procedures that implement the Plan, Do, Check, Act framework. Within the context of DOE's ISMS language, this workflow process (called the Core Functions) is described by defining work scope, identifying and analyzing hazards and risks associated with the work, developing and implementing controls to mitigate hazards and risks, performing work within the controls, and providing feedback for continuous improvement.

The work controls approach to integrated ESH&Q management consists of three basic levels of work authorization: at the institutional, facility, and activity levels. At each level, work is authorized by the appropriate authority to proceed in accordance with a pre-agreed authorization basis. This program description describes the necessary requirements and controls provided to implement these authorizations.

Section 2.0 of this document summarizes the BNL SBMS. Section 3.0 describes the core functions, guiding principles, and subset of management systems that form the basis for the ISMS Program. Section 4.0 describes the BNL ISMS Program, including the conditions and agreements for operations and activities. Also described are the roles the management system and subject areas serve in satisfying the ISMS Core Functions and Guiding Principles. Section 5.0 describes the approach for achieving continuous improvement in the program, including identifying gaps and methods for addressing them. [Appendix A](#) defines terminology relevant to the ISMS program.

This document will be reviewed annually and updated as necessary. Safety performance objectives, measures, and commitments are reviewed and updated annually through the Integrated Planning Management System and through performance assessments conducted by line managers and Management System Stewards. Annual assessment schedules and performance metrics are developed with consideration of these objectives.

The ISMS Subject Matter Expert (SME) is responsible for maintaining stewardship over the ISMS program and maintaining its integrity.

## 2.0 BNL Standards-Based Management System

The SBMS provides a process for evaluating external requirements and providing policies, standards of performance (behavioral expectations), Laboratory-wide procedures, and guidelines governing the work that staff perform to implement the requirements. BNL developed the necessary policies, standards of performance, procedures, and guidelines that are sufficient to implement the applicable external requirements (e.g., DOE Directives, Federal, State, and local statutes, regulations, and permit requirements). [Figure 1.1](#) shows the information flow through the SBMS document hierarchy.

Information governing work is delivered to the staff performing work through the SBMS. This system provides a variety of documents that are tailored to the needs and hazards of the work. A principal operating philosophy for this system is to deliver standards and requirements to the workplace with a format and content sufficient to serve the needs of virtually all BNL work. This approach aids Science and Technology programs by reducing the need for facility-specific or organizational-specific internal operating/implementing procedures (also referred to as Standard Operating Procedures [SOPs]). The SBMS helps provide a common vocabulary for facility-specific or organizational-specific procedures and makes the Laboratory-level information more accessible. It also improves the efficiency and consistency, as facility- or organizational-specific documents do not need to repeat information from the institutional level documents.

## 3.0 Integrated Environment, Safety and Health Management

BNL's Integrated Safety Management System (ISMS) integrates Environment (such as environmental protection, pollution prevention), Safety, Health, and Quality management into the work of the Laboratory. BNL is serious about ISMS and to truly achieve integrated safety there must be an equal and thorough treatment of the concept of ESH&Q. A demonstration of that commitment is that the integrated safety processes discussed above are a prime contributor to BNL achieving ISO 14001 (Environmental Management System) and Occupational Health and Safety Assessment Series (OHSAS) 18001 registrations. However, to avoid confusing terms, the program will be referred to as ISMS herein. Similarly, whenever this document refers generically to the term "safety" the term should be interpreted as "environment, safety, health, & quality." The purpose of BNL's ISMS is to ensure that the way we work integrates the DOE's five Core Functions and seven Guiding Principles into BNL's work processes. [Table 1](#) shows the correlation of the ISM principles, core functions, quality assurance criteria, worker safety and health requirements (10 CFR 851), and EMS 14001 and OHSAS 18001 clauses.

The **five Core Functions**, as defined by DOE P 450.4A, Safety Management System Policy, are the following:

- Core Function 1:** **Define the scope of work:** Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.
- Core Function 2:** **Identify and analyze hazards associated with the work:** Hazards associated with facilities and work are identified, analyzed, and categorized.
- Core Function 3:** **Develop and implement hazard controls:** Applicable standards and requirements are identified and agreed-upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented.
- Core Function 4:** **Perform work within controls:** Readiness is confirmed and work is performed safely.
- Core Function 5:** **Provide feedback on adequacy of controls and continue to improve safety management:** Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and, if necessary, regulatory enforcement actions occur.

The **seven Guiding Principles**, as defined by DOE Policy 450.4A, Safety Management System Policy, are as follows:

- Guiding Principle 1:** **Line manager clearly responsible for ES&H:** Line management is directly responsible for the protection of the public, the workers, and the environment.
- Guiding Principle 2:** **Clear ES&H roles and responsibilities:** Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.
- Guiding Principle 3:** **Competence commensurate with responsibilities:** Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.
- Guiding Principle 4:** **Balanced priorities:** Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.
- Guiding Principle 5:** **Identify ES&H standards and requirements:** Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.
- Guiding Principle 6:** **Hazard controls tailored to work:** Administrative and engineering controls to prevent and mitigate hazards shall be

tailored to the work being performed and associated hazards.

**Guiding Principle 7:** **Operations authorization:** The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed-upon.

Some of these Guiding Principles map very strongly to individual Core Functions and some apply to all Core Functions. Combining Core Functions and applicable Guiding Principles simplifies the ISMS construct, because instead of having 35 ISMS "topics" (5 Core Functions X 7 Guiding Principles), ISMS can be framed in a logical progression of seven topics, which are as follows:

- **Core Function 1**, Define the Scope of Work and **Guiding Principle 4**, Balanced Priorities
- **Core Function 2**, Analyze the Hazards
- **Core Function 3**, Develop/Implement Hazards Controls, **Guiding Principle 5**, Identification of Safety Standards and Requirements; and **Guiding Principle 6**, Hazard Controls Tailored to Work Being Performed
- **Core Function 4**, Perform Work, **Guiding Principle 7**, Operations Authorization
- **Core Function 5**, Feedback and Improvement
- **Guiding Principle 1**, Line Management Responsibility For Safety, and **Guiding Principle 2**, Clear Roles and Responsibilities
- **Guiding Principle 3**, Competence Commensurate with Responsibility

### Safe Conduct of Research and Safety Culture Elements

A high-reliability organization (HRO) repeatedly accomplishes its mission safely, avoiding catastrophic events, despite significant hazards, time constraints, and complex technologies. Brookhaven Science Associates (BSA) has established Safe Conduct of Research (SCOR) and high-reliability principles needed for a strong safety culture. The SCOR and high-reliability principles necessary for a successful and sustainable ISMS program are as follows:

1. **Personal Responsibility:** Each BNL worker accepts personal responsibility and accountability for safe operations. A sustained ISMS program is not possible without employees at all levels being involved in the structure and operation of the environment, safety, health, and quality programs, and in decisions that affect employee health and safety. As described in more detail throughout this document and as specifically demonstrated in the procedures and guidelines published in SBMS, the BNL ISMS relies heavily on worker involvement and individual attitude and responsibility for safety. For example, SBMS provides the processes and support necessary to incorporate significant worker involvement to establish appropriate Laboratory-wide procedures and guidelines (Subject Areas) to control the hazards that are part of the BNL hazards baseline. The process results in procedures that the workers themselves have tailored to enable staff to accomplish their work safely, efficiently, and effectively. Other areas where worker involvement and individual attitude and responsibility for safety are key aspects of the ISMS are in the job risk assessments (JRA) and facility risk assessment (FRA) processes (see the section [Job Risk Assessment](#) in the [OHSAS 18001 Program](#) Subject Area and the [Facility Hazards Analysis and Risk Assessment](#) Subject Area), and in planning and controlling work. These BNL processes for work planning and control rely on strong worker involvement (including pre-job walk downs, pre-screening of work, input in the development of standard operating procedures, and hazard identification and mitigation in work planning and control processes) to insure that the staff involved with the activities understand the hazards, the specified controls (including required training), and expectations for working safely. Within the work processes, worker feedback is systematically solicited to continuously improve work performance. By encouraging worker involvement employees are mindful of work conditions that may affect safety, and are more likely to assist each other in preventing unsafe behavior.
2. **Leadership and Operational Excellence:** Leaders value the safety legacy they create in their discipline. BNL achieves sustained, high-levels of operational performance in environmental, safety, quality, and science and technology. High-reliability is achieved through open communication, deference to expertise, and a systematic approach to eliminating accidents, injuries, and errors. Attributes of this principle include:
  - Managers are in close contact with the front-line through safety and work observations; leaders pay attention to real-time operational information.
  - Operational anomalies receive prompt attention and evaluation.
  - Candid dialogue, debate, and a healthy skepticism are encouraged; and differing professional opinions are welcomed and respected.
  - Managers and supervisors regularly and promptly communicate important operational decisions, their basis, expected outcomes, and potential problems.
3. **Safety Concerns and Organizational Trust:** Staff are encouraged to raise concerns and report problems. Leaders create an environment of inquisitiveness as the norm to counteract the tendency of staff to view uncertainty as a sign of professional weakness. Anyone can respectfully challenge unsafe behavior regardless of his or her position in the organization, and challenges are accepted graciously as an opportunity to improve.

4. **Cutting-edge Science and Safety:** Cutting-edge science requires cutting-edge safety, where safety is viewed as integral to the research product and not simply as compliance. BNL processes and procedures apply a conservative posture when the impact of hazards is uncertain, and opportunities to research improvements in hazard controls are encouraged through collaboration with research, operations and support staffs, including pre and post job walk downs and reviews.
5. **Questioning Attitude:** Individuals demonstrate a questioning attitude by challenging assumptions, finding the facts for themselves and considering potential adverse consequences of planned activities. Managers and supervisors encourage opposing views and use such opportunities to advance everyone's understanding of assumptions and potential adverse consequences. Differing opinions are also welcomed and respected, but debate doesn't paralyze sound decision making. Additionally, at BNL, all staff is given "Stop Work Authority." Anyone observing a hazard that could result in death, serious injury, environmental impairment, or significant damage, and the condition requires immediate action, has the authority to stop the work. See the [Stop Work](#) and [Radiological Stop Work Subject Areas](#).
6. **Organizational Learning and Performance Improvement:** BNL demonstrates excellence in performance monitoring, problem analysis, and solution implementation. The organization embraces the concept that learning never stops and encourages continuous learning across all institutional levels (i.e., institutional, facility and activity-level work). Attributes of this principles are as follows:
  - Performance is monitored through a variety of indicators, including, management walk-arounds and worker observations, tri-annual performance reviews and trending, benchmarking, and self-assessments.
  - Operating experience is highly valued. Mistakes are treated as opportunities to learn.
  - Lessons learned generated by BNL and others are shared across organizational boundaries and with the DOE complex. The organization regularly examines and learns from operating experiences, both internal and in related industries. A Review of lessons learned is an integral part of BNL's work planning process.
  - Expertise in causal analysis is applied effectively to events and issues.
  - Performance improvement processes and post job reviews encourage workers to offer innovative ideas to improve performance and to solve problems.
  - Managers and workers are actively involved in all phases of performance monitoring, problem analysis, corrective action planning and implementation to resolve safety issues.
7. **Hazard Identification:** Hazards are identified and evaluated for every task, every time. Core Function 2, Identify and analyze hazards associated with the work, and Guiding Principle 5, Identify ES&H standards and requirements provide the framework for this safety culture element. BNL also utilizes a Hazard Validation Tool (HVT) as one of the tools to support hazard identification activities. The HVT is a database that has been developed to provide information on facility hazards and risk assessments. Work planning activities refer to the HVT as a source of facility hazard/risk information for developing and implementing controls for identified facility hazards.
8. **Healthy Respect and Oversight for Performance Assurance:** A healthy respect is maintained for what can go wrong, and competent and independent oversight is an essential source of feedback to management. The feedback verifies expectations are being met and identifies opportunities for improvement. Attributes of this principle include:
  - External reviews and management engagement are viewed as opportunities to challenge assumptions and reinforce expectations.
  - Small failures and mistakes are seen as clues to more consequential failures, and thus highlighted and shared across organizational boundaries.
  - Performance assurance programs are guided by self-assessment plans that ensure a base level of relevant areas are reviewed.
  - Efficient redundancy in monitoring is valued and accomplished through third-party peer reviews and independent oversight inspections.
  - Senior managers are periodically briefed on results of oversight group activities to gain insight into organizational performance and to direct needed corrective actions.
  - Periodic ISMS assessments are conducted, and process measures and outcome measures are analyzed and used as a basis for ISMS program adjustments and implementation improvements.

### 3.1 Overview

ESH&Q activities are integral to the work that is conducted by BNL. Management systems operate in an integrated fashion to ensure that work is accomplished in a safe and environmentally sound manner, achieving "defense in depth" by carefully applying work controls tailored to the work being performed. [Figure 2.1](#) shows three categories of work performed by BNL, which fall into functions that differ only in terms of scope or focus.

- The outer circle represents operating or managing BNL and is authorized by the operating Contract between BSA and DOE.
- The middle circle represents planning or providing facilities and equipment, and developing or maintaining the operating envelope of facilities to support the science and technology (S&T) mission of BNL.
- The inner circle represents the work on individual S&T activities (i.e., doing science), Operations, Maintenance, Construction and

Support activities (i.e., administration, building, maintaining and operating "real property"), and Large S&T "Machine" Operations and Maintenance activities.

Line managers are responsible and accountable for safety. Line management achieves integrated ESH&Q using approved work control processes provided through, or derived from, the SBMS tools, processes, and documents. Within the context of the three work process circles of the Integrated Safety Management System (see [Figure 2.1](#)), the work of the institutional-level (the outer circle) is largely carried out by the management system stewards. They maintain BSA's corporate authorization agreement (i.e., the operating contract) and ensure that requirements flow down to the facility level and operational processes. As such, they have line responsibility for this institutional work.

The work of the facility-level (the middle circle in [Figure 2.1](#)) is largely carried out and maintained by the BNL User Facility Managers. These responsibilities are documented in the various Facility Use Agreements (FUA) and/or authorization basis documents (i.e., safety assessment document, accelerator safety envelope, hazard assessment / facility categorization). The work performed within this circle consists largely of facility management and operations necessary to establish and maintain the facility operations envelope, and the strategic facility investment activities (i.e., those facility activities needed to maintain programmatic competitiveness and plan future improvements and facilities).

The inner circle represents either the activity-level work carried out within or on facilities, or individual Deactivation and Decommissioning (D&D), Environmental Remediation/Restoration projects. Activity-level work must typically consider two categories of hazards/risks. One category is, "What controls do we need to apply to protect the workers, public and the environment?" The second is, "Do the hazards associated with the planned work challenge the authorization/safety envelope of the facility in which it is performed, i.e., is it safe (or environmentally compliant) to do that particular activity in that particular facility?"

BNL managers defined the following three major categories of activity-level work that takes place at BNL:

- **Small Science and Technology (S&T) Activities**, which comprise the experimental activities carried out by BNL Scientific Organizations.
- **Operations, Maintenance, Construction and Support Activities**, which comprise the work necessary to administer, operate, maintain, and build BNL's research support infrastructure, including the "physical plant" and industrial type support processes.
- **Large S&T "Machine" Operations and Maintenance Activities**, which comprise the work necessary to both operate and maintain BNL User Facilities' "machines," and to ensure that the activities associated with the myriad of "machine" users are carried out in a safe and environmentally sound manner.

### 3.2 Key Elements, Processes, and Management Systems

As noted earlier, line managers are responsible for safety. Each manager responsible for work is expected to understand the ESH&Q hazards associated with the work being conducted and ensures that appropriate mitigation strategies are used to control the risks. A broad spectrum of support infrastructure, such as ESH&Q Subject Matter Experts (SME), ES&H Managers, Experimental Review Coordinators, Work Control Coordinators, Work Control Managers, Quality Representatives, F&O Facility Complex Core Team, Safety and Health Environmental and Facility Support Representatives, and Radiological Control Technicians are available to assist managers in carrying out these responsibilities. The entire spectrum of activities, from general administrative functions to operation of accelerator and radiological/nuclear facilities, currently exists within BNL. Work runs from bench-level activities to large S&T programs involving the use of highly radioactive or hazardous materials/devices. Work also includes paper studies conducted in general office environments; construction of new facilities; installation of new equipment; maintenance of existing facilities and equipment; environmental restoration projects; and delivery of core support services, such as dosimeters, environmental monitoring, instrumentation calibration, maintenance, grounds activities, and general administrative activities. These activities and associated outputs constitute the business of BNL.

External requirements, which these activities must address, are documented by agreement between BNL and DOE. Internal requirements and policies establish Laboratory-level standards of performance and flow down the information contained in external requirements in a BNL-specific fashion. The requirements apply to all work, regardless of who performs it, including subcontractors, guests, visitors, consultants, and co-occupants from other organizations, such as research partners, DOE, users, and post-docs. The Requirements Management office within the Business Services Directorate maintains the configuration of the requirements management system.

#### 3.2.1 BNL Institutional-level Work - The "Outer Circle"

The BNL Institutional-level work is the business of operating the Laboratory as defined by the operating contract. This is accomplished through the Laboratory Agenda. The work includes the Laboratory-level processes to

- Plan for BNL's future and establish BNL goals for nuclear physics, photon sciences, selected areas of energy science, data-driven computational science, and ESH&Q.
- Establish BNL operating/performance expectations (objectives, measures and commitments).
- Understand the suite of hazards present at the site and to establish Laboratory-level hazard identification/analysis/mitigation/control procedures and processes necessary to implement applicable external requirements.
- Establish Laboratory-level operations authorization procedures.

- Establish appropriate self-assessment processes to ensure work across the Laboratory meets performance expectations.
- Prioritize ES&H and operational issues.

### 3.2.2 Facility-level Work - The "Middle Circle"

"Facility" refers to the facilities and equipment infrastructure needed to support the S&T mission of BNL. Generally, the term "facility" and building are interchangeable. Occasionally, "facility" can represent a collection of buildings that comprise an S&T complex (e.g., National Synchrotron Light Source II, Accelerator Test Facility, Alternating Gradient Synchrotron, Relativistic Heavy Ion Collider, Computational Sciences, Center for Functional Nanomaterials, Interdisciplinary Science Building).

Facility work consists largely of facility management and operations necessary to establish and maintain the facility operations envelope, and the strategic facility investment activities (i.e., those facility activities needed to maintain programmatic competitiveness and plan future improvements and facilities). Both Facilities and Operations Directorate staff and line staff (e.g., Modernization Project Office managers, S&T User Facility managers, S&T facility operations staff, F&O Facility Complex Core Team and ESH&Q deployed staff) are central to integrating, coordinating, and controlling the various aspects of facility-related work. Procedures and administrative or operational limits (e.g., operational boundary items identified in Facility Use Agreements [FUA], Facility Risk Assessments [FRAs], Safety Analysis Reports [SARs], Safety Assessment Documents [SADs], and Documented Safety Analyses; see [Facility Hazard Analysis and Risk Assessment](#) Subject Area) encompass the requirements that govern facility operations, and the work products of this middle circle. The scope of strategic facility improvements is developed formally. The basic elements of the operational, maintenance, and strategic facility improvement processes are in the management systems for [Facility Operations](#), [Real Property Asset Management](#), [Science and Technology Program Management](#), and [Integrated Planning](#).

### 3.2.3 Activity-level Work - The "Inner Circle"

Three major categories of activity-level work take place at BNL. Each category is discussed below in the context of the ISMS framework. All processes described apply to BNL staff, users, guests, and contractors.

#### Small S & T Activities

Small S&T activities are the work of doing science. The S&T Departments (i.e., Biology, Chemistry, Physics, Environmental and Climate Sciences, Instrumentation, Nonproliferation and National Security, Nuclear Science and Technology, Condensed Matter Physics and Material Science, Sustainable Energy Technologies, Center for Functional Nanomaterials, and Super Conducting Magnet) carry out these activities. The work involving the life cycle of conceiving, carrying out, and evaluating the scientific missions of the Laboratory is primarily accomplished through the Experimental Safety Review process of the [Work Planning and Control for Experiments and Operations](#) Subject Area. Small S&T Activities encompass the following:

- Carrying out basic and applied research in long-term programs at the frontier of science that supports DOE missions and the needs of the Laboratory's users' community.
- Developing advanced technologies that address national needs and initiate their transfer to other organizations and to the commercial sector.
- Disseminating technical knowledge to educate new generations of scientists and engineers, maintain technical currency in the nation's workforce, and encourage scientific awareness in the general public.

#### Operations, Maintenance, Construction, and Support Activities

Processes for controlling construction are established through the [Real Property Asset Management](#) System. The Laboratory uses a formal process defined in the [Engineering Design](#) Subject Area to formally review construction designs through the lifecycle of the design process. The [Configuration Management Program Description](#) describes the integrated approach used for the identification and control of key structures, systems and components at BNL that are important to safety, environment, general public or Laboratory mission.

Operations, maintenance, and construction activities are governed by the [Work Planning and Control for Experiments and Operations](#) Subject Area, and the Job Risk Assessment (JRA) and the Facility Risk Assessment (FRA) processes. The subject area is implemented by organizational procedures using a graded approach that runs from worker planned work to the use of formal work permits and/or experimental safety reviews. The subject area requires a screening process (based on a formal graded approach). This process determines when a Laboratory-wide experimental safety review, standard operating procedure (prescribed work), or work permit is required or when worker planned work is appropriate. Regardless of the determination, a worker always has the right to request a formal work planning permit be developed to control the work. These processes supports the entire life cycle of operations, maintenance, construction, and support activities to incorporate the appropriate ESH&Q considerations and performance expectations.

The JRA process is implemented by breaking down tasks or activities into steps, identifying hazards associated with each step, and evaluating the controls in place. From this information risk is determined. If the risk is above the established threshold limits, then additional controls must be developed and put in place before the start of work. For work that is below the threshold limits, additional controls may be put in

place to reduce the risk (see [OHSAS 18001](#) procedures).

### Large S&T "Machine" Operations and Maintenance

Because of the significant differences in machines and user bases, Large S&T "Machine" operations (i.e., NSLS II, Accelerator Test Facility, Alternating Gradient Synchrotron, Relativistic Heavy Ion Collider) are primarily carried out through a formal conduct of operations program and facility-specific standard operating procedures (SOPs). The [Science and Technology Program](#) Management System provides the overall performance framework for user facilities and clear roles and responsibilities for all staff involved in managing the BNL User Facilities. The facility-specific planning and control processes ensure that the experimental activities performed within S&T User Facilities, whether performed by guests/users or BNL staff, conform to the requirements of the [Work Planning and Control for Experiments and Operations](#) Subject Area. Similarly, operational activities associated with the facilities' staff operating large S&T machines are controlled by the facility-specific implementation of [Work Planning and Control for Experiments and Operations](#) and Conduct of Operations Subject Areas.

### 3.2.4 Key Management Systems

Management systems that are key elements in integrating Environment, Safety, Health and Quality (ESH&Q) for all work categories at BNL are defined within the management system descriptions. A brief overview of the purpose of key ISMS systems follows:

#### [Acquisition Management](#)

The Acquisition Management System provides support for purchasing services, materials, equipment, and supplies for BNL operations and programs and managing government-owned property in the custody of contractor or subcontractors. The requisitioner identifies and defines the materials or services required, including the essential quality characteristics, safety, regulatory, and other requirements in consultation with other technical, quality and ES&H advisors as needed.

The pre-award/award phase begins with identifying and defining the goods and services required from external sources. Once the technical needs are determined and defined, they are forwarded to Procurement and Property Management with other supporting documentation as required (e.g., requisition, list of suggested suppliers, quality assurance requirements, ISM flow down, and other ESH&Q requirements). Using this information, a buyer/contract specialist solicits proposals from qualified suppliers. This buyer/contract specialist, with input from the cognizant technical representative as needed, reviews the responses against predetermined selection criteria, conducts negotiations, selects the successful offeror, and makes the award.

#### [Communications, Government, Community Relations and Education](#)

The purpose of the Communications, Government, Community Relations and Education Management System is to implement best-in-class services, programs, and products to

- Establish and sustain constructive relationships, including those with elected officials and other targeted stakeholders, to support the scientific and operational priorities of the Laboratory
- Advance the science mission of the Laboratory through promoting the Laboratory's accomplishments and managing potential issues
- Maintain and cultivate strategic partnerships
- Enhance the value of the Laboratory as a community asset
- Ensure that internal and external stakeholders are properly informed and have a voice in those Laboratory decisions that are of interest and importance to them.

#### [Emergency](#)

The primary function of the Emergency Management System is to support Laboratory management by providing the framework for developing, coordinating, controlling, and directing all emergency planning, preparedness, major response, and readiness assurance actions. The Emergency Management System also provides expertise for responding to, mitigating, and managing emergency events. These events include medical emergencies, fires, explosions, collapse, trapped personnel, and hazardous material releases.

#### [Environmental Management System](#)

The purpose of the Environmental Management System (EMS) is to achieve, maintain, and demonstrate environmental excellence by assessing and controlling the impact of BNL experiments, facilities, and operations on the environment. The EMS is designed to assist people who work at or for BNL in complying with environmental requirements, preventing pollution, minimizing waste, and continually improving environmental performance through all facets of the Laboratory's operations. EMS contributes to the work-planning process by identifying and implementing controls to protect the environment and public by eliminating, reducing, and mitigating hazards.

#### [Facility Operations](#)

The Facility Operations Management System (FOMS) provides the processes and services that ensure that BNL facilities are used, operated and maintained in a manner that protects the health and safety of Laboratory employees, users, visitors and guests, the public, and the environment. It supports Brookhaven Science Associates (BSA)/BNL values, carries out the strategic planning objectives specific to facility resources, and adopts the pertinent Laboratory Critical Outcomes and Objectives, as well as other defined operational performance objectives and measures in the BNL Laboratory Agenda.

The FOMS supports BNL Science and Technology (S&T) and the operation of BNL's S&T Machines, as well as other BNL support organizations, by providing the processes and services to achieve safe and efficient operation of the BNL facility infrastructure. The system helps ensure that safety and environmental services (i.e., occupational safety, fire protection, industrial hygiene, radiological control, environmental management, and waste management) are integrated into facility operations. Additionally, it provides building operating/support services (i.e., support to F&O Facility Complex Core Team and Space Management Program, and support to the Emergency Management Program).

This management system is also responsible for the implementation and stewardship of Conduct of Operations and FUAs throughout the Laboratory. FUAs define boundaries for operations and conditions in the facility; and interfaces between facility occupants and service providers. They formally capture the approved occupant mission for the facility, the capabilities of facility design, scope of occupant work, and the controls necessary to ensure that BNL's missions can be performed safely, effectively, and in compliance with operational and administrative expectations and requirements.

### **Facility Safety**

The program elements covered by the Facility Safety management system are guided by the philosophy of Integrated Safety Management that expects managers and workers to work in a manner that systematically addresses the five core functions of scoping work, analyzing the hazard, developing controls, performing work, and providing feedback. These program elements include review of facility safety projects, fire safety, safety analysis, peer review, and readiness review. The processes and services of this management system interface very closely with the management systems on Facility Operations, Worker Safety and Health, and Science and Technology Program Management. Facility Safety encompasses the development, maintenance, and operation of systems designed to support the effective and efficient implementation of facility safety requirements. The systems are designed to be used by a variety of customers and stakeholders, such as Laboratory staff, management, project personnel, DOE, other ES&H staff, and field personnel.

The technical support service is executed by a staff of fire protection, fire/rescue, safety analysts, a readiness evaluation (or review) coordinator, a plan review coordinator, and line staff, who assist the organizations they support. They assist in the following: planning pre-fire response; developing recovery plans; carrying out mitigating actions; developing work plans, procedures, and permits; developing and using strategies and techniques of hazard mitigation; analyzing regulations; developing standards; preparing and executing readiness reviews; determining design specifications and review; determining the safe configuration of facilities deactivated, shutdown or placed in standby; safety analyses; determining safety class; and developing safety limits (e.g., Operational Safety Limits [OSLs]).

### **Human Resources**

The Human Resources (HR) Management System supports BNL by developing and implementing human resource programs, processes, and policies that enable the Laboratory to attract, hire, develop, compensate, retain, and reward a highly qualified workforce within the guidelines of all applicable labor agreements, Federal and State laws and regulations. The HR Management System supports managers and staff by providing a system for identifying and communicating roles, responsibilities, authorities, and accountabilities (R2A2s) and assisting them to meet the strategic goals of BNL.

### **Integrated Assessment Program**

The functional elements of the Laboratory's Integrated Assessment Program are Self-Assessment (organizational and management system), Peer Review, Independent Assessment, Internal Audit, and external assessments. These elements generate information on performance, and results are used to encourage excellence in scientific, technical, Environment, Safety, Security and Health (ESS&H), quality, community involvement, business, and operational performance. Data Collected is transformed into information for the BSA Board, BNL Policy Council, organizational line managers, Management System Stewards and Executives, DOE, other stakeholders and customers, and/or regulators. This information is used to make decisions on performance and identify areas requiring improvement. Together these elements provide comprehensive and objective information used by the Laboratory in establishing strategic direction and improving performance.

### **Integrated Planning**

The Integrated Planning System (IPS) is the Laboratory's systematic approach to a holistic development and review of the Laboratory's goals, objectives, desired outcomes, and strategies for achieving these. The IPS facilitates the necessary decisions on resource allocation to achieve desired results. The IAP framework:

- Establishes strategic goals and annual performance expectations for the institution
- Aligns resources, personnel, and actions to desired goals and objectives

- Balances priorities across key functional areas
- Provides a framework for performance monitoring and feedback
- Systematically identifies enterprise risks
- Adapts objectives and targets in consideration of events/issues and feedback.

The Laboratory Director, with support and recommendations from the Policy Council, provides overall guidance on the Laboratory's priorities and strategy (i.e., Laboratory Agenda). Associate Laboratory Directors, Department Chairs, Division Managers and their teams develop the programmatic strategies and plans for each program area or user facility assigned to them, assessing and identifying the technical capabilities and requirements for staffing and support services to implement those strategies and plans.

## **Legal**

The Legal Management System supports the development and accomplishment of strategic goals, the creation of and compliance with processes and policies, and the successful implementation and performance of programs for Brookhaven Science Associates, LLC (BSA), and Brookhaven National Laboratory (BNL) to enable mission success. In addition, the Legal Management System is designed to ensure compliance with the BSA Prime Contract with DOE while appropriately managing risk, and complying with applicable Federal, State, and local laws and regulations. The Legal Management System accomplishes these purposes primarily by providing legal and risk management advice and assistance to management and staff on a full range of issues that may impact BSA and BNL and by assisting in the identification, protection, and transfer of intellectual property generated under our DOE Prime Contract.

## **Hazardous Material Transportation Safety**

The Laboratory's Hazardous Material Transportation Safety Management System (HMTSMS) serves the following several key purposes:

- Protects staff from unnecessary exposure to hazardous material during transport
- Protects facilities and equipment from contamination with hazardous materials
- Promotes compliance with applicable regulatory and contractual requirements
- Maintains exposures to hazardous materials As Low As Reasonably Achievable (ALARA)
- Provides links to appropriate subject areas and points of contact.

## **Occupational Medicine**

The Occupational Medicine Management System describes the services provided by the Occupational Medicine Clinic (OMC) in connection with the Laboratory's Integrated Environment, Safety and Health Management Program. Basic occupational medicine services include the following:

- Medical Surveillance
- Physical Examinations
- General Medical Services
- Fitness for Duty Evaluations
- Employee Assistance Program
- Health Promotion/Disease Prevention
- Health Surveillance
- Interpretation and Implementation of Legislation, Orders, and Guidelines
- Adherence to Professional Standards

## **Quality Management**

The purpose of the Quality Management (QM) System is to embed quality management principles and methodologies throughout the various Laboratory management systems and associated processes to

- Plan and perform Laboratory operations in a reliable and effective manner to minimize the impact on the environment, safety, and health of the staff and the public.
- Standardize processes and support continuous improvement in all aspects of Laboratory operations.
- Enable the delivery of products and services that meet customers' requirements and expectations.

The Quality Management System relies on both the integration of quality requirements throughout management systems to eliminate duplication, and to ensure their appropriate implementation. By using a systematic approach in performing the Laboratory's activities, established goals are met, and both the user and customer requirements and expectations are satisfied.

## **Radiological Control**

The Laboratory's Radiological Control Management System (RCMS) consists of the activities and support services established to support the line managers in achieving excellent performance in radiation protection and in ensuring compliance with BNL and DOE regulations. Key objectives are to

- Protect staff from unnecessary exposure to ionizing radiation.
- Protect facilities and equipment from contamination with radioactive materials.
- Promote compliance with applicable regulatory and contractual requirements.
- Maintain exposures to radiation and radioactive materials As Low As Reasonably Achievable (ALARA).
- Provide for the control, accountability, and management of nuclear materials.
- Provides Facility Authorization Basis requirements including Facility Hazard Categorization, Nuclear/Criticality Safety, and Accelerator Safety.

## **Real Property Asset Management**

The purpose of the Real Property Asset Management (RPAM) Management System is to establish and implement a corporate holistic, performance-based approach to real property asset management that links real property asset planning, programming, acquisition, budgeting, and evaluation to program mission outcomes. The RPAM Management System also encompasses the systems associated with project management, design, construction, configuration management, energy use, operation, and maintenance of the Laboratory's facilities and systems.

## **Science and Technology Program Management**

The Science and Technology (S&T) Program Management System describes the processes, systems, and structures that help enable researchers performing research at BNL and/or using BNL scientific user facilities to

- Carry out basic and applied research in long-term programs at the frontier of science that supports DOE missions and the needs of the Laboratory's user community.
- Develop advanced technologies that address national needs and initiate their transfer to other organizations and to the commercial sector.
- Disseminate technical knowledge to educate new generations of scientists and engineers.

## **Standards-Based Management System**

The Standards-Based Management System (SBMS) provides BNL staff with policies, standards of performance, and Laboratory-wide procedures and guidelines (subject areas) that are current, accurate, and relevant to their work. The Laboratory develops policies, standards of performance, and subject areas based on an evaluation of external requirements (i.e., Directives and Federal, state, and local laws) and BSA policies. While the SBMS does not deliver facility-, organization-, or program-specific operating procedures, guidance, and requirements, the SBMS provides the baseline BNL requirements for developing, delivering, and controlling such internal operating procedures and documents.

The SBMS Management System codifies the overall information hierarchy for the Laboratory. All work in the Laboratory must be completed following the minimum requirements as specified in the SBMS policies, standards of performance, and subject areas. Management system stewards follow the SBMS processes of Requirements Management and Information Development and Integration to develop their policies, standards of performance, and subject areas. The management system stewards follow the SBMS Operations and Administration process to communicate and ensure that their policies, standards of performance, and subject areas are current and accurate.

## **Strategic Partnership Projects**

The Strategic Partnership Projects system provides a process whereby Brookhaven National Laboratory obtains the necessary authorizations and funding to perform research and development services for non-DOE federal agencies and non-federal entities.

## **Training and Qualifications**

The Training and Qualifications (T&Q) Management System supports Laboratory management by ensuring that personnel working in Brookhaven National Laboratory (BNL) facilities are appropriately trained and qualified to achieve the highest level of performance; provide a safe and healthy workplace; and protect the environment.

The T&Q Management System provides the focus for establishing and maintaining Laboratory-wide policies, standards, procedures, and guidelines that ensure an integrated approach to training and qualification while allowing maximum flexibility to meet diverse organizational needs. The T&Q Management System supports Laboratory managers, other management system stewards, and training service providers

with training and qualifying BNL staff to accomplish their assigned work. Training requirements are identified and documented in other management systems in accordance with requirements and drivers, and communicated to the T&Q Management System for implementation. In addition, any facility- or task-specific, customer-driven training needs communicated by line managers, supervisors, and subject matter experts are incorporated into the T&Q Management System for implementation.

### Work Planning and Control

The purpose of this management system is to establish requirements at Brookhaven National Laboratory so that all work is properly managed by using a level of planning commensurate to the ESS&H hazards, job complexities, and work coordination needs. The management system establishes work control processes based on the Integrated Safety Management Core Functions of: defining the scope of work, identifying the hazards, developing controls, performing work within the controls, and providing feedback for continuous improvement. For this management system, "work" is defined as all physical activities that involve the design, set-up, operation, maintenance, servicing, material handling, remediation, installation, repair, modification, construction, demolition, decommissioning of facilities, systems, or experiments by BNL or non-BNL staff (contractors, visiting scientists, students, and minors). It should be noted that work not covered by this subject area must also be evaluated for potential ESS&H hazards and mitigative actions taken to prevent accidents, injuries and regulatory violations. For example, office work should be evaluated, as a minimum, against the requirements of the Ergonomics, Occupational Subject Area:

- Work Planning and Control for Experiments (e.g., Experimental Safety Review).
- Work Planning and Control for Operations (e.g., Work Permit).
- Worker Planned Work.
- Off-Site Work
- Standard operating procedures.
- Work Oversight
- Integration and use the Hazard Validation Tool (HVT) database, JRAs and FRAs.

### Worker Safety and Health

BNL's Worker Safety and Health (WS&H) Management System was established to assist line and operations management in ensuring that a safe and healthy workplace is provided to all employees, visitors, vendors, and subcontractors of the Laboratory. This management system addresses the identification, evaluation, and control of hazards in the workplace by providing direct technical assistance to those conducting work, including line, facility, and project managers, as well as staff, and by providing the opportunity for workers and their elected representatives to become involved in the development of the Worker Safety and Health Program goals, objectives, and performance measures. The objective of the system is to provide processes for identifying and controlling hazards that prevent work-related accidents, injuries, and illnesses involving Laboratory staff, guests, and contractors. This system manages the Integrated Safety Management program to align Worker Safety and Health with Work Planning and Control.

## 4.0 ISM Core Functions, Guiding Principles, and Work Categories

The remainder of this document describes how BNL's management systems work together to incorporate the Core Functions and Guiding Principles into the elements of the functional categories of work (i.e., institutional, facility, activity). Table 4.1 provides a road map to where the ISMS elements are discussed throughout this section. The table identifies the seven ISMS Core Function/Guiding Principle groupings, categories of BNL work and management systems used to frame the ISMS Program Description.

### 4.1.1 Define the Scope of Work (CF #1), Balanced Priorities (GP #4)

**BNL Institutional-level Work:** The "corporate" scope of work for BNL is established by the operating contract between BSA and DOE. The operating contract is considered the Laboratory-level authorization agreement.

Operationally, the Integrated Planning Management system is the primary vehicle for managing the evolution of the BNL Scope of Work. The system uses input from management systems to

- Establish the long-term BNL Scope of Work (Strategic Focus Areas, Business Plan, program letters),
- Provide the processes by which BNL and DOE annually establish the mutually agreed to Laboratory Goals, Objectives, Measures, and Targets (i.e., Laboratory Agenda and Performance Evaluation and Measurement Plan),
- Prioritize the improvement initiatives and budget levels for the annual budget cycle.

**Facility-level Work:** The scope of facility work is defined through individual FUAs. Building-specific FUAs are established and maintained to define

- The roles and responsibilities of the BNL agreement parties (i.e., facility occupant groups and F&O Facility Complex Core Team),
- The operating boundary specific to the design and mission of the facility.

The technical basis for the operating boundary (provided by the [Facility Operations](#) and [Facility Safety](#) Management Systems) is based on identified hazards and potential environmental impacts and requirements, the analyses of the hazards and impacts, and the facility level controls necessary to protect the workers, the public, and the environment. The operating boundaries identify hazardous material limits, applicable Federal, State, and Local permits, and any additional documentation required for facility operations. The FUA is the primary component of the facility operations envelope and acts as the facility-level authorization agreement for BNL.

Some facilities require additional documentation in the operating boundary that is approved by DOE. For example, the Relativistic Heavy Ion Collider, NASA Space Radiation Laboratory, Alternating Gradient Synchrotron, Booster, LINAC, and Tandem Van de Graaf/Tandem to Booster Transfer Line maintain an Accelerator Safety Envelope (ASE) and Safety Assessment Document (SAD). The ASE is approved by DOE.

The ESH&Q hazards associated with, or potentially impacting a facility's operating boundary are analyzed through the formal processes such as the work planning and control for experiments and operations, facility risk assessments (FRAs), documented safety analyses, safety evaluation reports, unreviewed safety question, and unreviewed safety issue determination processes.

**Activity-level Work:** The [Science and Technology Program Management](#), the [Real Property Asset Management](#), [Integrated Planning](#), and [Financial Management](#) Management Systems provide the processes to which BNL line managers establish scopes of work for BNL activities. The [Acquisition Management](#) System provides the processes and services to advertise, obtain bids, and establish the contract (including ESH&Q requirements) for construction activities.

The Science and Technology Program Management System provides the processes by which BNL line managers establish the scopes of work for BNL S&T activities. During the proposal phases of the S&T life cycle, the Financial Management and Work for Others Management Systems provide the processes for establishing funded experimental scopes of work. These proposal processes also provide high-level mechanisms via Proposal Information Questionnaires (PIQs) for considering the operational impacts (including security and ESH&Q) of the proposed scopes of work, and require the responsible Department Chair to certify that these considerations can and will be appropriately managed. Once a scope of work has been funded (via a Field Work Proposal or a contract) the Science and Technology Program Management System establishes that the Principal Investigator divides the funded work into discrete experiments. The Principal Investigator documents the hazards and associated controls for these experiments using formal experimental review processes provided through the Work Planning and Control Management System. Each Department/Division maintains organizational processes for implementing this Laboratory-wide requirement. The experimental scope of work is documented in sufficient detail in the form of an experimental safety review, which enables the experimental planning/review team to identify the related hazards, appropriate hazards controls, and ESH&Q performance expectations of the experimental staff.

The annual scope of work for operations, maintenance, construction, and support activities are primarily established through processes defined by the [Real Property Asset Management](#) System (to identify needs), the [Integrated Planning](#) Management System (to prioritize and establish annual overhead budget allocations), and the [Financial Management](#) System (to obtain direct funding from DOE for major site infrastructure projects via the mechanisms for construction budget). Once the annual budget levels are established, the processes of the Real Property Asset Management System establish the annual funded scope of operations, maintenance, construction, and support work. The [Acquisition Management](#) System provides the tools and processes for flowing appropriate requirements into subcontracts.

Operations, maintenance and support activities are governed by [Work Planning and Control for Experiments and Operations](#) Subject Area, JRAs and FRAs. The subject area describes worker planned work, work prescribed by procedures or work instructions, and permit planned work processes (based on a formal graded approach). The permit planned work process uses a Laboratory-wide Work Permit Form that supports the entire life cycle of operations and maintenance to incorporate the appropriate ES&H considerations and performance expectations into operational activities.

#### Prominent Subject Areas

<a href="#">Accelerator Safety</a>	<a href="#">Nuclear/Criticality Safety</a>
<a href="#">Engineering Design</a>	<a href="#">OHSAS 18001 Program</a>
<a href="#">Facility Hazard Categorization</a>	<a href="#">Project Management</a>
<a href="#">Facility Use Agreements</a>	<a href="#">Purchase Requisition Review for Quality-related Requirements</a>
<a href="#">Hazard Analysis</a>	<a href="#">Readiness Evaluations</a>
<a href="#">Inspections and Acceptance</a>	<a href="#">Roles, Responsibilities, Accountabilities, and Authorities (R2A2)</a>
<a href="#">Laboratory Directed Research and Development (LDRD) Program</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>

#### 4.1.2 Identify/Analyze the Hazards (CF #2)

**BNL Institutional-level Work:** Several management systems provide integrated processes for identifying and understanding the hazards and issues associated with facilities, equipment, and planned and on-going work at BNL. The predominant management systems that are used in identifying, evaluating, and mitigating hazards related to institutional-level work conducted at BNL include

- [Requirements, Graded Approach for](#)
- [Emergency Preparedness](#)
- [Environmental Management System](#)
- [Facility Operations](#)
- [Facility Safety](#)
- [Financial Management](#)
- [Integrated Planning](#)
- [Radiological Control](#)
- [Strategic Partnership Projects](#)
- [Work Planning and Control](#)
- [Worker Safety and Health](#)

**Facility-level Work:** The ESH&Q hazards associated with facility operations, maintenance, and strategic facility investment work are analyzed through formal processes, such as Safety Analysis Reports, Safety Assessment Documents, Unreviewed Safety Question Determinations (nuclear facilities), Unreviewed Safety Issues (accelerators), Work Permits, HVT database, Job Safety Analyses, and design reviews for facility modification or construction. These processes are maintained by the Management Systems for Real Property Asset Management, Facility Operations, Facility Safety, Work Planning and Control, and Worker Safety and Health.

**Activity-level Work:** The [Work Planning and Control](#) Management System's Laboratory-wide procedures in the [Work Planning and Control for Experiments and Operations](#) Subject Area provide an Experimental Safety Review section specifically devoted to supporting the identification and analysis of ESH&Q hazards/environmental concerns associated with a proposed experiment. The processes include a step to identify if the work impacts any operational boundary element in the FUA for the subject facility. The Principal Investigator supported by the line ES&H Manager and ES&H representatives working in the field, and other ESH&Q professionals as necessary, lead the identification of hazards utilizing various methods and tools (i.e., surveys, walkthroughs, work coordination, HVT database, and ES&H guides for non-regulatory guidance and recommendations).

The processes for identifying and understanding the hazards associated with the site infrastructure, and operations and maintenance are controlled by [Work Planning and Control for Experiments and Operations](#) Subject Area. The subject area establishes the processes for categorizing job hazards and the work planning level. The Work Control Coordinator, supported by ES&H representatives in the field (and other ES&H professionals as necessary), ES&H Managers, and workers, leads the process for identifying and analyzing hazards.

The [Science and Technology Program Management](#) System establishes the Laboratory-level framework for identifying and understanding all activities associated with operating and maintaining large S&T user facilities. User facility managers use facility-specific procedures for carrying out the system processes. However, in all cases the management system clearly establishes the expectation that user facility managers will ensure that the ESH&Q hazards associated with work performed by users are identified and understood before the user arrives at BNL. User facility managers have the same line responsibility as all other BNL managers for ensuring that the hazards associated with work performed by facility staff are identified and understood. Facilities' staff use facility-specific standard operating procedures tailored to the special needs of the user and facility, and the Work Planning and Control for Experiments and Operations Subject Area to identify and understand the hazards associated with planned large S&T machine operations and maintenance work.

The processes for identifying and understanding the hazards associated with environmental restoration, remediation, deactivation and decontamination activities are controlled through worker planned work or by standard operating procedures, technical work documents and work permits derived from the Work Planning and Control for Experiments and Operations Subject Area. The [Work Permit Form](#) contains a uniform checklist of ESH&Q hazards and concerns. The subject area also establishes the graded approach to be used in categorizing the job hazard level by analyzing the type of work, work coordination, and work complexity and uncertainty for the job. The Work Control Coordinator, supported by ESH&Q Representatives in the field such as ES&H Managers, Quality Representatives, Facility Support Representatives, F&O Facility Complex Core Team, and workers, leads the process for identifying and analyzing hazards.

**Prominent Subject Areas**

<a href="#">Accelerator Safety</a>	<a href="#">OHSAS 18001 Program</a>
<a href="#">Construction Safety</a>	<a href="#">Oxygen Deficiency Hazards (ODH), System Classification and Controls</a>
<a href="#">Emergency Preparedness</a>	<a href="#">Pollution Prevention and Waste Minimization</a>
<a href="#">Environmental, Safety, Security, Health and Quality (Tier I) Inspections</a>	<a href="#">Requirements, Graded Approach for</a>
<a href="#">Facility Hazard Analysis and Risk Assessment</a>	<a href="#">Radiological Control Procedures</a>
<a href="#">Facility Hazard Categorization</a>	<a href="#">Readiness Evaluations</a>
<a href="#">Facility Use Agreements</a>	

	<a href="#">Requirements Management</a>
<a href="#">Environmental Aspects and Impacts</a>	<a href="#">Suspect/Counterfeit Items</a>
<a href="#">Maintenance Management</a>	<a href="#">Training and Qualifications</a>
<a href="#">Natural Hazards In the Environment</a>	<a href="#">Waste</a>
<a href="#">NEPA</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>
<a href="#">Nuclear/Criticality and Safety</a>	

#### 4.1.3 Develop/Implement Hazard Controls (CF #3), Identification of Standards and Requirements (GP #5), Hazard Controls Tailored to Work Being Performed (GP #6)

**BNL Institutional-level Work:** The work of this element at the institutional level consists of establishing and maintaining the institutional systems and processes needed to support BNL's mission.

The requirements base, which forms the technical basis for the Laboratory's authorization agreement, is contained in Appendix I of the operating contract. The expectations and processes for managing this requirements base are contained in the Requirements Management portion of the Standards-Based Management System. The assigned Management System Stewards are responsible for interpreting this requirements base into policies, standards of performance, and Laboratory-wide procedures and guidelines that are documented and distributed to BNL staff through the SBMS.

To ensure that operations remain within the contractual authorization agreement, BNL established a set of management systems that provide and maintain an agreed-upon set of standards of performance and requirements, and associated operational practices for each subject functional area (e.g., Radiological Control, Environmental Management, Quality Management, Work Planning and Control, Worker Safety and Health, Facility Safety Management). These various management systems describe BNL's management constructs and are integrated to provide a complete and non-overlapping set of processes by which BNL controls all elements of its work. Each management system provides the appropriate standards of performance and more detailed Laboratory-level requirements, procedures, guidance, and training needed to implement the management system. The predominant management systems include

- [Acquisition Management](#)
- [Environmental Management System](#)
- [Facility Safety](#)
- [Occupational Medicine](#)
- [Quality Management](#)
- [Radiological Control](#)
- [Strategic Partnership Projects](#)
- [Training and Qualification](#)
- [Work Planning and Control](#)
- [Worker Safety and Health](#)

**Facility-level Work:** The Facility Use Agreement (FUA) establishes the facility operating boundary or envelope and the associated roles, responsibilities, accountabilities, and authorities required to ensure that work within the facility does not exceed the operating envelope. It is designed to ensure that 1) the facility ESH&Q systems are able to appropriately control or mitigate the hazard and 2) the facility meets any defined environmental regulatory requirements or permit conditions. The FUA will also include information for identifying the controls in place and the roles and responsibilities for individuals in maintaining these controls for mitigating the ESH&Q hazards.

**Activity-level Work:** The [Work Planning and Control for Experiments and Operations](#) Subject Area, specifically supported by the Experimental Safety Review process, establishes the mechanism for forming hazard controls (including staff qualifications, personal protective equipment) for proposed experiments. The Experimental Safety Review process assists the Principal Investigator in identifying the appropriate controls by defining the applicable Laboratory-wide procedures that cover the identified hazards. The Principal Investigator leads the process and is supported by the line's ES&H Manager and ES&H representatives. The ES&H representatives identify needs and advise and/or assist in obtaining Occupational Medicine services, radiological control, and Industrial Hygiene services for monitoring.

The processes for establishing appropriately tailored hazard controls for operations, maintenance, construction and support activities are controlled by the [Work Planning and Control for Experiments and Operations](#) and [Construction Safety](#) Subject Areas. The Work Control Procedure specifies a graded approach (tailoring) to the planning rigor and control applied to a low, moderate, or high hazard job. The Work Permit Form contains a checklist of work controls (including staff qualifications, personal protective equipment, monitoring) and safety permits that are cross-referenced to the appropriate subject areas. Furthermore, certain safety permits (e.g., confined space) tailor the level of control based on the degree of the hazard. The work controls process relies on the help of ESH&Q Representatives working in the field to identify the needs and assist in obtaining special services, such as radiological control services, Occupational Medical services, or Industrial

Hygiene services for monitoring as needed. The work control processes also includes reviews of construction health and safety plans, JRAs, FRAs, work permit hazards, controls, and plans by the facility "primary reviewer" and ESH&Q personnel to preclude any adverse impacts on the facility occupants and programs, as well as the workers. Pre-job screening is performed at the supervisor- and worker-level to determine the appropriateness of worker planned work performance. The final step, before authorizing the activities covered by the Work Planning and Control for Experiments and Operations Subject Area's work permit, includes a pre-job walk-down by the worker and supervisor to ensure they understand, agree with, and are trained on the hazards and controls necessary to work safely.

The [Science and Technology Program Management](#) System establishes the Laboratory-level framework for controlling hazards in all activities associated with operating and maintaining large S&T User Facilities. User facility managers use facility-specific procedures for carrying out the system processes. However, in all cases the management system clearly establishes the expectation that user facility managers will ensure that appropriate hazard controls are identified for work conducted by users. Facility managers have the same line responsibility as all other BNL Managers for assuring that the appropriate hazard controls for work performed by facility staff are established.

#### Prominent Subject Areas

<a href="#">Chemical Safety</a>	<a href="#">Lead</a>
<a href="#">Confined Spaces</a>	<a href="#">Lifting Safety</a>
<a href="#">Construction Safety</a>	<a href="#">Noise and Hearing Conservation</a>
<a href="#">Emergency Preparedness</a>	<a href="#">Personal Protective Equipment and Respirators</a>
<a href="#">Ergonomics, Occupational</a>	<a href="#">Requirements Management</a>
<a href="#">Excavation Safety</a>	<a href="#">SBMS Documents</a>
<a href="#">Exhaust Ventilation</a>	<a href="#">Training and Qualifications</a>
<a href="#">Fitness for Duty, Requesting the Determination of</a>	<a href="#">Waste</a>
<a href="#">Facility Use Agreements</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>
<a href="#">Laser Safety</a>	

#### 4.1.4 Perform Work Within Controls (CF #4), Operations Authorization (GP #7)

**BNL Institutional-level Work:** The work at the institutional level consists of maintaining the applicable institutional infrastructure (management systems and organization structures) needed to support BNL's mission.

The operating contract is the highest-level operations authorization document for BNL. The Requirements management processes within the Standards-Based Management System maintain the "DOE Directive" authorization basis for the Laboratory.

**Facility-level Work:** The processes governing the start-up review/authorization of new or significantly modified facilities are provided by the [Facility Safety](#) Management System. The readiness review/startup authorization provides a graded approach to formal operations authorization for turnover from modification/construction of a facility to formal operations for the entire spectrum of facilities operated by BNL. Once authorized for operations, the [Facility Operations](#) Management System provides the basis for establishing and maintaining the facility operations envelope through the Facility Use Agreements. The basic elements of performing work related to facility operations, maintenance, and strategic facility investments is specified in the management systems for [Facility Operations](#), [Real Property Asset Management](#), [Work Planning and Control](#), and [Science and Technology Program Management](#). The authorization process for nuclear facilities reside in the [Facility Safety](#) Management System.

**Activity-level Work:** The [Work Planning and Control](#) Management System provides the Laboratory-level procedures and expectations for formally authorizing the performance of work at the activity-level. This system provides work authorization for: Planning and Control of Experiments, Work Planning and Control for Operations, and a project management process to authorize formal project plans. In addition to providing an approval of activity controls and expectations, the processes also ensure that the staff involved clearly understands their responsibilities for conducting the work within the agreed-upon controls. This management system also provides all staff with "Stop Work Authority." The [Radiological Stop Work](#) and [Stop Work](#) Subject Areas describe the steps for staff to issue a Stop-Work Order when an unsafe act, activity, or condition creates an imminent danger situation. They also describe the processes for restarting work after an order has been issued.

The [Work Planning and Control for Experiments and Operations](#) Subject Area experimental safety review process requires the Department Chair (or designee) to approve the startup of all experiments. The level of ESH&Q approval necessary for experiments depends on the severity of the hazards and consequences. The Department Chair/Division Manager or designee determines the appropriate level of review required. The start-up approval is based on the recommendation of the Department's Experiment Safety Review Committee's review and concurrence with the hazard identification, analysis, and planned controls. The Experiment Safety Review Committee (Subcommittee) formally establishes appropriate controls/limits for the experiment and recommends these as a condition of start-up approval. The Experiment Safety Review Committee maintains documentation of all reviewed experiments, including minutes or actions taken by the Committee (Subcommittees) and the rationale for their recommended approval or disapproval. All experimental reviews are documented in writing; and

the Department Chair/Division Manager or designee's approval clearly states the controls/limits of the experiment. Approvals specify the duration of the approval; approval periods typically do not exceed one year, and new reviews are necessary before significant modifications are made.

The [Worker Safety and Health](#) Management System governs construction, operation, and maintenance. It provides processes for identifying and controlling hazards that prevent work-related accidents, injuries, and illnesses involving Laboratory staff, contractors, and visitors.

The Environmental Management System governs construction, operation, and maintenance. It provides processes for identifying environmental significant aspects associated with activities that, if mismanaged, could result in significant impacts to the environmental and/or our relationship with interested parties.

The processes for establishing appropriately authorized construction, operation and maintenance, and performing activities within the established controls are generally controlled either by the [Work Planning and Control for Experiments and Operations](#) Subject Area or formally controlled Standard Operating Procedures. The Work Planning and Control for Experiments and Operations Subject Area's work permit provides for line management's approval/authorization. The review/approvals ensure that the conditions are appropriate to start the job (work controls are in place and site is ready). The form also provides space for listing the training requirements specific to the job location.

**Prominent Subject Areas**

<a href="#">Confined Spaces</a>	<a href="#">Radiological Control Procedures</a>
<a href="#">Construction Safety</a>	<a href="#">Requirements. Graded Approach for</a>
<a href="#">Emergency Preparedness</a>	<a href="#">Requirements Management</a>
<a href="#">Environmental Monitoring</a>	<a href="#">Roles, Responsibilities, Accountabilities, and Authorities (R2A2)</a>
<a href="#">ESH Assessments and Management Review</a>	<a href="#">SBMS Documents</a>
<a href="#">Facility Use Agreements</a>	<a href="#">Training and Qualification</a>
<a href="#">Integrated Assessment</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>

**4.1.5 Feedback and Improvement (CF #5)**

**BNL Institutional-level Work:** Five primary management systems work together to provide for the lifecycle of the BNL feedback and improvement processes: [Integrated Planning](#), [Integrated Assessment Program](#), [Human Resources](#), [Quality Management](#), and the [Communications, Government, Community Relations and Education](#) Management Systems. The Integrated Planning Management System provides the strategic planning processes for establishing the Laboratory Agenda and improvement agenda and their associated performance objectives and indicators that provide mutually agreed-to measures of system performance (effectiveness, efficiency, etc.). The Integrated Planning Management System also provides the integrated information management system for monitoring and reporting status towards achieving goals, objectives, measures, and targets. The Integrated Assessment Program and Quality Management Management Systems provide the system and tools that assist line managers in critically reviewing performance as required for Contractor Assurance. The program includes an Institutional Risk Management Committee (IRMC), and tri-annual period performance summaries of contract performance measures, management system performance, and risk measures including ESH&Q goals and objectives. The results are analyzed and used to determine strengths and weaknesses in ISMS implementation as well as required corrective actions needed to improve management system performance.

The ISMS program, which is linked to the BNL business planning process through performance objectives and performance measures, relies on performance evaluations based primarily on organizational self-assessments. In judging effectiveness of the ISMS program, both process measures and outcome measures are analyzed and serve as input for developing annual performance objectives, measures and commitments. Corporate reviews, IRMC reviews, external oversight, independent oversight, internal audits, quarterly Tier I inspections, and Environmental and Occupational Safety and Health annual management reviews are used as additional sources for continual improvement. These assessment activities include staff identifying unsafe work conditions, line and management system self-assessments of compliance with requirements, lessons-learned from operating experiences, and ESH&Q program self-assessments.

Conditions, including findings are analyzed through the [Event/Issues Management](#) Subject Area, opportunities for improvement, and recommendations identified as a result of assessments and reviews are documented as appropriate, and the necessary corrective and preventive actions are identified. Corrective actions for Laboratory-level issues are appropriately tracked to closure using the Integrated Operational Performance System (IOPS) and Assessment Tracking System (ATS). Below the Laboratory-level, organizations use IOPS, ATS or organizational processes.

**Facility-level Work:** Self-assessment activities for facility-related work are carried out under the framework provided by the Integrated Assessment Program. Specific assessment requirements are identified through the management systems providing the subject matter expertise. The organizations operating the management systems associated with running and maintaining various aspects of facilities (Facility Operations, Real Property Asset Management, Science and Technology Management) use self-assessments to ensure that the facility services

meet the tenant users' expectations and needs; to identify opportunities for improvements and verify their implementation; and to ensure that their operations are within the facility authorization basis and conform to BNL standards and requirements. These self-assessment processes include developing an annual self-assessment plan, obtaining the necessary information (e.g., peer reviews, user surveys, compliance assessments, and worker surveys), and using the results to drive process improvements throughout the year, and to underpin a formal annual self-evaluation. As requested, a cadre of trained professionals within the ES&H Directorate supports the self-assessment activities of facility operations and management of staff doing the work.

**Activity-level Work:** [Work Planning and Control for Experiments and Operations](#) Subject Area integrates worker feedback into the work permit as the last step on the form, as well as through verbal communications with supervisors and managers. Information collected from post work reviews, the work permit form, verbal communications, and the organizational self-assessment processes provide the necessary feedback to improve the processes for work planning and control. Operating under the umbrella of the Integrated Assessment Program Management System, the Department/Division's self-assessments ensure that changes identified to improve the experiment safety review process and the safe conduct of experiments are continually fed back into the review process. These potential improvements include lessons learned from occurrences and good work practices, occupational injury/illness, and near misses.

- The Line Managers obtain feedback on the effectiveness of safety, health, environmental protection measures; quality and efficiency of work processes.
- Line managers (project managers, craft and site supervisors, work control coordinators, facility support representatives) are responsible for ensuring the implementation of all specified protective measures. Pre-job and safety briefings afford workers the opportunity to provide feedback and obtain clarification of hazards and protective measures. Line managers conduct regular project surveillance of work operations, post work reviews, and obtain feedback from the project team members on efficiency, effectiveness, quality, and cost aspects of their activities and/or projects.
- Organizations' Quality Representatives conduct self-assessments on program operations, including ESH&Q processes and effectiveness.
- Work operations are extensively monitored to ensure that environmental performance objectives are being met and that emissions and effluents are within applicable health, safety, and environmental standards.

**Prominent Subject Areas**

<a href="#">Awards and Bonuses</a>	<a href="#">Injury and Illness - Notification and Analysis</a>
<a href="#">Disciplinary Actions</a>	<a href="#">Lessons Learned</a>
<a href="#">Employee Performance</a>	<a href="#">Occurrence Reporting and Processing System (ORPS)</a>
<a href="#">Environment, Safety, Security, Health and Quality (Tier I) Inspections</a>	<a href="#">Project, Planning, Programming and Budgeting Process (3PBP) Program Description</a>
<a href="#">Environmental Monitoring</a>	<a href="#">Radiological Control Procedures</a>
<a href="#">ESH Assessments and Management Review</a>	<a href="#">SBMS Documents</a>
<a href="#">Event/Issues Management</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>

**4.1.6 Line Management Responsibility for Safety (GP #1), Clear Roles and Responsibilities (GP #2)**

**BNL Institutional-level Work:** The [Human Resources](#) Management System provides the processes for developing and maintaining formal Roles, Responsibility, Authority, and Accountability (R2A2s) documents for all staff. The R2A2s demonstrate that line managers have responsibility and accountability for ESH&Q and indicate how the responsibilities flow from the Laboratory Director to the workers. These R2A2s provide a clear baseline of individual responsibilities for all aspects of BNL's work, including ESH&Q. The institutional requirements are administered through the [R2A2](#) Subject Area. The subject area is designed to ensure managers consider an individual's roles and responsibilities for ESH&Q performance expectations commensurate with their work

Additionally, responsibilities specific to the management systems are also defined in Laboratory-wide SBMS documents (Management System Descriptions, Subject Areas, and Facility Use Agreements) and establish clear, context-specific roles and responsibilities for controlling hazards associated with all work.

**Facility-level Work:** The FUAs play the central role in carrying out these guiding principles by providing clear and unambiguous roles and responsibilities for facility operations/maintenance managers, S&T managers and their respective staff associated with their involvement in ensuring that all facility operation and maintenance work and S&T work controls conform to BNL standards and requirements, and remains within the facility operations envelope. The FUAs provide an integration/intersection point for the facility-level roles and responsibilities articulated in the [Science and Technology Program Management](#), [Facility Operations](#), [Facility Safety](#), and [Real Property Asset Management](#) System Descriptions.

**Activity-level Work:** The [Science and Technology Program Management](#) System defines clear responsibilities for the operations of the BNL Science and Technical programmatic activities. The [Work Planning and Control for Experiments and Operations](#) Subject Area, referred to in the [Work Planning and Control](#) Management System, establishes clear S&T activity-specific responsibilities for Associate Laboratory Directors, Department Chairs/Division Managers, Department/Division Experiment Review Coordinators, Lead Experimenter/Responsible Person, Department/Division Experiment Safety Review Committee (ESRC), ES&H Support Organizations/Staff, and the Associate Laboratory Director for ES&H.

The Work Planning and Control Management System establishes that Department Chairs are clearly responsible for providing the organizational processes and structure to ensure experiments are planned, controlled, and approved before their start. This management system also establishes that line staff (Principal Investigators) are clearly responsible for leading the hazard identification, assessment, and control activities, and that ESH&Q support staff are clearly established as part of the team.

The Science and Technology Program Management System Description clearly establishes the responsibilities for Large S&T "Machine" operations and maintenance, as well as ensuring the safety of user activities of each of BNL's S&T User Facilities. The Environmental Management System provides clear responsibilities for the operations of BNL's Environmental Restoration/Remediation activities. The Facility Operations Management System and the Real Property Asset Management System define clear responsibilities for BNL's operations, maintenance, and construction. The Work Planning and Control and Worker Safety and Health Management Systems provide specific responsibilities for operations and maintenance activities for the Associate Laboratory Director for Facilities and Operations (F&O), Department Chairs/Division Managers, F&O Complex Managers, Work Control Managers, and Work Control Coordinators. In all cases the line managers are responsible for the safe performance of work.

**Prominent Subject Areas**

- [Facility Use Agreements](#)
- [Integrated Assessment](#)
- [Roles, Responsibilities, Accountabilities, and Authorities \(R2A2\)](#)
- [Work Planning and Control for Experiments and Operations](#)

**4.1.7 Competence Commensurate with Responsibility (GP #3)**

**BNL Institutional-level Work:** The third Guiding Principle for Integrated Safety Management, Competence Commensurate with Responsibilities, focuses on the experience, knowledge, skills, and abilities necessary for personnel to carry out their assigned responsibilities. Within Brookhaven, this Guiding Principle is addressed by numerous processes that begin before selecting and hiring staff and continue during staff indoctrination and orientation, initial training and qualification, and throughout the staff's employment. The primary focus of these processes is to ensure that staff are technically competent to safely perform their assigned duties, which is the responsibility of line management and is supported by the Training and Qualification Management System and the Human Resources Management System.

**Facility-level Work:** Higher hazard facilities, such as accelerators and nuclear facilities, maintain formal, facility-specific standard operating procedures (and associated training requirements) for defending and operating within the DOE-approved authorization basis. However, the primary processes for assuring the staff's competence for ensuring that work remains within the operations envelope for BNL's general facilities are provided through the integration of work control processes defined by the [Work Planning and Control](#) Management System and the Facility Use Agreements. The Work Control for Experiments and Operations Subject Area includes a step to identify if the work impacts any operational boundary element in the FUA for the subject facility. Work Control Managers/Coordinators, F&O Facility Complex Core Team, and ESH&Q Subject Matter Experts are part of the team-based work-planning processes defined by the Work Planning and Control for Experiments and Operations Subject Area, and provide the necessary technical expertise to assist the line in ensuring the maintenance of the operational boundaries.

**Activity-level Work:** The [Work Planning and Control for Experiments and Operations](#) Subject Area requires that the competence required for hazards identification, analysis, and controls development is ensured by including ESH&Q representatives working in the field, other ESH&Q professionals, and the Departmental ES&H Manager on the work planning team. In addition, requirements for personnel qualifications related to hazards are part of hazards control processes and ensure that workers are competent to implement the established and formally approved hazard controls. For contracted work, using pre-qualification criteria for construction contractors, which includes safety performance and training requirements, supports competence of contractors. The Modernization Project Office maintains a contractor database on contractor evaluations. If a contractor is rated unsatisfactory, the company is disqualified from bidding on future BNL work. Contractor personnel can also be removed from the job site if warranted by inadequate safety performance on the job.

**Prominent Subject Areas**

<a href="#">Employee Performance</a>	<a href="#">Roles, Responsibilities, Accountabilities, and Authorities (R2A2)</a>
<a href="#">Facility Use Agreements</a>	<a href="#">Training and Qualifications</a>
<a href="#">Guests and Visitors</a>	<a href="#">Work Planning and Control for Experiments and Operations</a>

**Table 4.1, Road Map of Core Functions/Guiding Principles, Work Categories and Management Systems**

Section No.	ISMS Core Functions/Guiding Principles	Institutional Level (Management Systems)	Facility Level (Management Systems)	Activity Level (Management Systems)
4.1.1	<b>Define the Scope of Work (CF #1), Balanced Priorities (GP #4)</b>	<ul style="list-style-type: none"> <li>• Human Resources</li> <li>• Integrated Assessment Program</li> <li>• Integrated Planning</li> <li>• Project Management</li> <li>• Standards-Based Management System (SBMS)</li> <li>• Worker Safety and Health</li> </ul>	<ul style="list-style-type: none"> <li>• Facility Operations</li> <li>• Facility Safety</li> <li>• Integrated Planning</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Management System</li> <li>• Financial Management</li> <li>• Integrated Planning</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program</li> <li>• Strategic Partnership Projects</li> <li>• Work Planning and Control</li> </ul>
4.1.2	<b>Identify/Analyze the Hazards (CF #2)</b>	<ul style="list-style-type: none"> <li>• Emergency</li> <li>• Environmental Management System</li> <li>• Facility Operations</li> <li>• Facility Safety</li> <li>• Financial Management</li> <li>• Integrated Planning</li> <li>• Quality Management System</li> <li>• Radiological Control</li> <li>• Strategic Partnership Projects</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>	<ul style="list-style-type: none"> <li>• Facility Operations</li> <li>• Facility Safety</li> <li>• Worker Safety and Health</li> <li>• Real Property Asset Management</li> <li>• Work Planning and Control</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Management System</li> <li>• Radiological Control</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program</li> <li>• Work Planning and Control</li> </ul>
4.1.3	<b>Develop/Implement Hazard Controls (CF #3), Identification of Standards and Requirements (GP #5), Hazard Controls Tailored to Work Being Performed (GP #6)</b>	<ul style="list-style-type: none"> <li>• Acquisition Management</li> <li>• Emergency</li> <li>• Environmental Management System</li> <li>• Facility Safety</li> <li>• Legal</li> <li>• Occupational Medicine</li> <li>• Radiological Control</li> <li>• SBMS</li> <li>• Strategic Partnership Projects</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>	<ul style="list-style-type: none"> <li>• Facility Safety</li> <li>• Facility Operations</li> <li>• Hazardous Material Transportation Safety</li> <li>• Worker Safety and Health</li> </ul>	<ul style="list-style-type: none"> <li>• Acquisition Management</li> <li>• Hazardous Material Transportation Safety</li> <li>• Radiological Control</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program</li> <li>• Work Planning and Control</li> </ul>
4.1.4	<b>Perform Work Within Controls (CF #4), Operations Authorization (GP #7)</b>	<ul style="list-style-type: none"> <li>• Facility Operations</li> <li>• Facility Safety</li> <li>• Integrated Assessment Program</li> <li>• Integrated Planning</li> <li>• Work Planning and Control</li> </ul>	<ul style="list-style-type: none"> <li>• Facility Operation</li> <li>• Facility Safety</li> <li>• Integrated Assessment Program</li> <li>• Radiological Control</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program</li> <li>• Work Planning and Control</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated Assessment Program</li> <li>• Radiological Control</li> <li>• Science and Technology Program</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>

4.1.5	<b>Feedback and Improvement (CF #5)</b>	<ul style="list-style-type: none"> <li>• Communications, Government, Community Relations and Education</li> <li>• Human Resources</li> <li>• Integrated Assessment Program</li> <li>• Integrated Planning</li> <li>• Quality Management</li> <li>• Records Management</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated Assessment Program</li> <li>• Quality Management</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated Assessment Program</li> <li>• Quality Management</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>
4.1.6	<b>Line Management Responsibility for Safety (GP #1), Clear Roles and Responsibilities (GP #2)</b>	<ul style="list-style-type: none"> <li>• Human Resources</li> <li>• Science and Technology Program Management</li> </ul>	<ul style="list-style-type: none"> <li>• Facility Operations</li> <li>• Real Property Asset Management</li> <li>• Science and Technology Program Management</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Management System</li> <li>• Facility Operations</li> <li>• Science and Technology Program Management</li> <li>• Work Planning and Control</li> <li>• Real Property Asset Management</li> </ul>
4.1.7	<b>Competence Commensurate with Responsibility (GP #3)</b>	<ul style="list-style-type: none"> <li>• Human Resources</li> <li>• Training and Qualification</li> </ul>	<ul style="list-style-type: none"> <li>• Training and Qualification</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>	<ul style="list-style-type: none"> <li>• Acquisition Management</li> <li>• Training and Qualification</li> <li>• Work Planning and Control</li> <li>• Worker Safety and Health</li> </ul>

## 5.0 ESH&Q Continuous Improvement

The ISMS Program Description will be maintained to reflect the current status of the operating contract, system improvements, and changed conditions and requirements. It will be reviewed annually and updated as required. This affords the opportunity for Brookhaven National Laboratory (BNL) to demonstrate continuous improvement consistent with ISM Core Function Five and as required by the adoption of DEAR Clause 970.5223-1 into the BNL contract. This section describes the approach for achieving continuous improvement in ESH&Q processes for planning and conducting work at the Laboratory.

The principal tools to drive continuous improvement at BNL are the DOE-BHSO Performance Evaluation and Measurement Plan (PEMP) feedback processes, the Tri-annual Performance Review process, the Integrated Assessment Process, IRMC management system reviews, ISMS Effectiveness Review, and the Lab Agenda process. BNL meets the contract clause requirements via the implementation of the Laboratory agenda and Business Planning processes, which provides a structured framework for improvement initiatives required to support BNL's mission. [Figure 3.1](#) shows the general ISM process for continuous improvement in Operations and ESH&Q for the Laboratory.

The following are particularly applicable:

- **DOE-BHSO Evaluation and Feedback Process** – uses weekly leadership meetings and Tri-annual performance reviews to communicate key concerns, issues, and observations to Laboratory senior management. BHSO also evaluates BNL's (PEMP) - this is a fee-based standard for annual evaluation of contractor performance. It contains specific performance goals and objectives for excellence in science, operations, and ES&H.
- **Quarterly and Monthly Performance Review Process** - the Laboratory's Policy Council reviews contract measure performance, management system performance, and a set of other institutional performance measures at a minimum quarterly. Follow-up meetings are held between the Laboratory Director and PEMP owners or management system stewards reporting less than excellent performance. Where appropriate, resources are reallocated.
- **Integrated Assessment Process** – this process (contractor assurance) requires that Management System Stewards analyze internal and external assessments, contract measure performance, EMS and OSH management system reviews, incident/event investigations, quality program feedback mechanisms (e.g., lessons learned, nonconformance reporting), key performance indicators and risk metrics to identify deficiencies, and recommend improvement actions that are needed in the Lab Agenda for the current year. The elements described above are documented in the annual Year-end Self-Evaluation Report for the Laboratory.
- **ISMS Annual Effectiveness Review** – this process summarizes key Management System performance based on current institutional

processes. A narrative and dashboard approach is used to judge the effectiveness of Management Systems in delivering the Integrated Safety Management program.

- **Lab Agenda Process** – this process completes the ESH&Q continuous improvement cycle by providing improvement to Laboratory facilities, systems, and processes. It takes as its input, output of the “feedback processes,” the integrated assessment process, PEMP performance, Management System performance feedback, and other improvement actions that are rolled up from the various Laboratory organizations (see [Figure 3.1](#)).

Each year the Laboratory develops a detailed plan that describes the scientific, operational (including ESH&Q), and business actions that the institution will undertake in the Plan year, at a level below the Laboratory Agenda (i.e., Directorate Business Plans), and their associated priority. These lower level actions are typically established at the Department/Division or project level and are generated from three primary sources:

1. **Department/Division Plan Initiatives** – Laboratory organizations review the initiatives and determine support needed to ensure the initiative’s success. Each of these required support actions are scoped, scheduled, and resource loaded.
2. **Integrated Assessment and Year-end Self-Evaluation Reports** – these reports analyze and summarize identified deficiencies and recommend related improvement actions based on the previous year.
3. **Continuous Improvement Initiatives** – Laboratory organizations suggest opportunities to improve scientific output, safety or environmental performance, operational efficiency, or other performance parameters that exceed the organizations allocated resources.

Each of these Lab Agenda actions is scoped, scheduled, and resource loaded, and a risk reduction priority or business case is developed for each, as applicable. Management System Stewards do this for actions needed to address the IAP Report, and each Department/Division does it for their respective continuous improvement initiatives for which they are seeking institutional resources.

The Laboratory Policy Council and Laboratory Agenda initiatives champions review these various proposed actions, establish priorities, and make a commitment of resources. The Planning, Performance, and Quality Management (PPQM) Office performs the integrating function and publishes the Lab Agenda. This and all of the initiatives and actions are reviewed tri-annually as part of the performance management review process.

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