

[Search SBMS »](#)
[\[Add to Favorites\]](#)
[\[Introduction\]](#) [\[Contents\]](#) [\[Forms/Exhibits\]](#) [\[References\]](#) [\[Definitions\]](#) [\[Keywords\]](#) [\[Changes\]](#)
Management System: [Work Planning and Control](#)
Subject Area: [Work Planning and Control for Experiments and Operations](#)
 [VIEW/PRINT ALL \(No Exhibits and Forms\)](#)

 Effective Date: [Aug 4, 2016 \(Rev 10.9\)](#)
 Periodic Review Due: [Aug 15, 2017](#)

 Subject Matter Expert:
[Raymond Costa](#)

 Management System Executive:
[Raymond Costa](#)

 Management System Steward:
[Amy Nunziata](#)

Introduction

This subject area uses the Integrated Safety Management core functions and guiding principles to establish a process for ensuring all work, operational and experimental, is properly planned and implemented to prevent accidents, injuries, and regulatory violations. It establishes requirements at Brookhaven National Laboratory (BNL) so that all work is properly managed by using a level of planning and control commensurate to the Environment, Safety, Security, and Health (ESSH) hazards, job complexities, and work coordination needs.

Line management is directly responsible for the protection of the public, the workers, and the environment.

All work must be evaluated for potential ESSH hazards; those hazards must be analyzed and addressed appropriately to prevent injury to people or damage to assets by using a graded approach.

This subject area provides a graded approach to manage a wide range of operational and experimental activities from the routine to the highly complex, and integrates other safety practices and subject areas such as hazard analysis tools, training requirements, and environmental management into work planning. The Hazard Validation Tool (HVT) is one of the tools provided. The HVT is a database that has been developed to provide information on facility hazards and risk assessments on a room by room or operational area basis. All work planning should refer to the HVT as a source of facility hazard/risk information for developing and implementing controls for the facility hazards identified.

"Work" as defined in this subject area applies to 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 ESSH 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.

BNL uses four processes to plan and control work, depending on the hazards, complexities, and job coordination levels. The [Work Planning and Control](#) Management System Description describes these practices. "Experimental Safety Review (ESR)" and "Work Planning and Control for Operations," are covered in detail in this subject area. The others, "Project Management" and "Standard Operating Procedures," are covered in other subject areas.

When planning work, we incorporate the basic principles of HPI:

- People are fallible, and even the best make mistakes.
- Error-likely situations are predictable, manageable, and preventable.
- Individual behavior is influenced by organizational processes and values.
- People achieve high levels of performance based largely on the encouragement and reinforcement received from leaders, peers, and subordinates.
- Events can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past events.

The two processes contained in this subject area for planning and controlling work are as follows:

1. Experimental Safety Review - All organizations conducting experiments use this process to identify the hazards, plan the work controls, and authorize the experiment. The subject area allows a graded approach to determine the level of planning rigor. In some situations, such as setting up, operating or tearing down an experiment, the section [Work Planning and Control for Operations](#) may be a better process for addressing hazards and controls.

2. Work Planning and Control for Operations - All work is to be categorized according to all recognized hazards, including routine hazards, during all phases of the work, including estimating, planning, and pre-job briefs. This process allows three approaches for work planning and control: (1) worker planned, (2) prescribed, and (3) permit planned.

The "worker planned work" concept recognizes the skill levels and technical capabilities of the workers. Worker planned job activities do not require the level of rigor detailed in permit planned work. Worker planned work can only be performed when there are adequate barriers in place to reduce the hazards to acceptable levels in the areas of ESSH, work complexity, and work coordination as determined by the [Screening Tool for Worker Planned Work](#).

The "prescribed work" practice relies on instructional work documents (e.g., written and approved internal procedures, contractor health and safety plan, contractor procedure, and vendor operating or maintenance manuals).

The "permit planned work" practice requires use of a site-wide Work Permit Form when the ESSH, work complexity, **or** coordination do not have sufficient barriers to reduce the hazards to acceptable levels and the work is not covered by prescribed work documents.

Some work may require a combination of the processes; for example, a planned experiment will require an Experimental Safety Review, but may also need a work permit to assemble the experiment, an operating procedure (SOP) to provide instructions to operate the experiment, plus a work permit to safely dismantle the experiment. Regardless of the process, the scoping of work in any of the processes (i.e., experimental safety review, worker planned, prescribed, or permitted) must look at the entirety of work to be performed. For example, the vehicular movement of hazardous and radioactive materials, such as Sealed Sources, requires adherence to strict requirements provided in the [Transfer of Hazardous and Radiological Materials On-site](#) and/or [Transportation of Hazardous and Radiological Materials Off-site](#) Subject Areas, as they pertain to the work to be performed. All work planning must consider compliance with these requirements.

BNL's Training and Qualification Program provides the system and the requirements for staff to have the necessary training for work that is considered within their normal assignments. See the [Training and Qualifications](#) Subject Area and the [Training and Qualifications](#) website for more information. For individuals who do not possess a valid site-specific training qualification (e.g., Contractor Vendor Orientation [CVO]) and are under the supervision of a qualified escort, refer to the section [Using Escorts Instead of Providing Training](#) in this subject area.

Feedback and improvement is a key element within Work Planning and Control. For supervisors, one of the most important forms of obtaining feedback is through direct observation of work and interaction with workers (i.e., work oversight). The exhibit [Requirements and Expectations for Performing Work Oversight](#) provides the requirements and expectations for observing work as provided in supervisor training and the R2A2 for Supervisors and their Managers.

Graded Approach

The ISM Guiding Principles state that hazard controls shall be "tailored" to the work being performed. See the section [Application of the Graded Approach](#) in the [Graded Approach for Requirements](#) Subject Area for guidance.

Contents

Section	Overview of Content (see section for full process)
1. Experimental Safety Review	<ul style="list-style-type: none"> • Write Experimental Safety Review. • ESRC reviews experiments or significant modifications to experiments for ES&H concerns, appropriate controls, and approval. • Notify other Departments/Divisions, or their equivalent, about hazards associated with an experiment or significant modifications. • Approve experiment and document approval. • Monitor and assess experiments to ensure they are conducted safely. • Review long-term experiments; ensure design and operation experiment has not changed since its last approval. • Terminate experiment.
2. Work Planning and Control for Operations	<ul style="list-style-type: none"> • Select, train, qualify Work Control Managers/Coordinators. • Identify, analyze, and control hazards for prescribed work. • Develop and use Work Permit.

- Control work/job change.
- Post job reviews, feedback and improvement.
- Close out Work Permit.
- Complete ISM flowdown questions to contractors and suppliers through the web requisition process.
- Use Standing Work Permits as appropriate.

[3. Worker Planned Work](#)

- Identify, analyze, and control hazards for worker planned work.

[4. Work Observations](#)

- Determine time frame, scope, and resources for observing work.
- Categorize observations.
- Observe worker, and discuss observation with worker.
- Document observations.
- Send lessons learned to Lessons Learned Coordinator.

[5. Off-site Work](#)

- Determine how to approach tasks at different work sites.
- Follow procedures and safety requirements.
- Create off-site Radiological Work Permit (RWP), if required.
- Comply with requirements for shipping hazardous materials, if necessary.
- Determine if work permit is required.
- Review proposed experiment to determine if ESR should be written.

[Definitions](#)

Exhibits

- [BNL Working Alone Guidance](#)
- [ESH&Q Considerations When Designing an Experiment](#)
- [Experimental Safety Review Contents](#)
- [Guidance in Conducting Off-site Work](#)
- [Instructions for Filling out the Work Permit](#)
- [Job Safety Analysis](#)
- [Qualification Matrix](#)
- [Requirements and Expectations for Performing Work Oversight](#)
- [Security Checklist](#)
- [Using the Screening Tool for Worker Planned Work](#)
- [Work Planning and Control Operations Flowchart](#)

Forms

- [Experiment Safety Review Form](#)
- [Screening Tool for Worker Planned Work](#)
- [Work Permit Form](#)

Training Requirements and Reporting Obligations

This subject area contains training requirements associated with the following Job Training Assessments (JTAs) (see [Requirements of Each JTA](#)):

- GE-10A Operations and Experimental Work Control Manager
- GE-10B Operations and Experimental Work Control Coordinator
- GE-10C Operations and Experimental Primary Reviewer
- GE-11 Experimental Review Coordinator

This subject area does not contain reporting obligations.

External/Internal Requirements

Requirement Number	Requirement Title
10 CFR 830, Subpart A	Energy, Nuclear Safety Management, Quality Assurance Requirements
21 CFR 1300-1309	Controlled Substances
29 CFR 1910	Labor/Occupational Safety and Health Standards

40 CFR 82	Protection of Environment /Protection of Stratospheric Ozone
6 NYCRR 200 - 234	New York State Department of Environmental Conservation/Prevention and Control of Air contamination and Air Pollution
BSA Contract No. DE-SC0012704 - Clause F.4	Stop Work And Shutdown Authority
BSA Contract No. DE-SC0012704 - Clause I.131 (DEAR 970.5223-1)	INTEGRATION OF ENVIRONMENT, SAFETY, AND HEALTH INTO WORK PLANNING AND EXECUTION (DEC 2000)
NYS Title 10, Section 80	Controlled Substances
O 151.1C	Comprehensive Emergency Management System
O 414.1D Admin Chg 1 (May 8, 2013)	Quality Assurance
P 456.1	Secretarial Policy Statement on Nanoscale Safety

References

[Asbestos](#) Subject Area

BNL [Lessons Learned](#)

[BNL Hazard Validation Tool \(HVT\)](#)

[Beryllium](#) Subject Area

[Biosafety in Research](#) Subject Area

[Bloodborne Pathogens](#) Subject Area

[BNL Safety Observation Database](#)

[BNL Training and Qualifications](#) website

[Brookhaven Training Management System \(BTMS\)](#)

[Business Systems Division \(BSD\)](#) homepage

[Calibration](#) Subject Area

[Centers for Disease Control and Prevention \(CDC\)](#) website

[Chemical Management System](#)

[Chemical Safety](#) Subject Area

[Community Involvement and Communications in Laboratory Decision-Making](#) Subject Area

[Compressed Gas Cylinders and Related Systems](#) Subject Area

[Confined Spaces](#) Subject Area

[Construction Safety](#) Subject Area

[Cryogenics Safety](#) Subject Area

[Document Control](#) Subject Area

[Domestic Travel](#) Subject Area

[Drinking Water](#) Subject Area

[ESH Assessments and Management Review](#) Subject Area

[Electronic Work Permit](#)

[Engineering Design](#) Subject Area

[Environmental Aspects and Impacts](#) Subject Area

[Environment, Safety, Health and Quality \(Tier D\) Inspections](#) Subject Area

[Environmental Assessments and ESH Management Review](#) Subject Area

[Environmental Monitoring](#) Subject Area

[Ergonomics, Occupational](#) Subject Area

[Event/Issues Management](#) Subject Area

[Environmental Aspects and Impacts](#) Subject Area

[Exhaust Ventilation](#) Subject Area

[Facility Hazard Analysis](#) Subject Area

[Facility Support Standard Operating Procedures](#)

[Facility Use Agreements](#) Subject Area

[Fire Safety](#) Subject Area

[Fitness for Duty, Requesting Determination](#) of Subject Area

[Hazardous Waste Management](#) Subject Area

[Inspections and Acceptance](#) Subject Area

[Laser Safety](#) Subject Area

[Lead](#) Subject Area

[Lifting Safety](#) Subject Area

[Liquid Effluents](#) Subject Area

[Lockout/Tagout \(LOTO\) for Installation, Demolition, or Service and Maintenance](#) Subject Area

[Materials Requiring Special Handling \(Including Age Sensitive Material\)](#) Subject Area

[Mixed Waste Management](#) Subject Area

[Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) Subject Area

[Nanoscale Particle ESH](#) Subject Area

[National Environmental Policy Act \(NEPA\) and Cultural Resources Evaluations](#) Subject Area

[Natural Hazards in the Environment](#) Subject Area

[Noise and Hearing Conservation](#) Subject Area

[Non-ionizing Radiation Safety](#) Subject Area

[Non-Radioactive Airborne Emissions](#) Subject Area

[Occurrence Reporting and Processing System \(ORPS\)](#) Subject Area

[OHSAS 18001 Program](#) Subject Area

[Official Foreign Travel](#) Subject Area

[Online Experiment Safety Review \(ESR\) Form](#)

[Organizational Self-assessment](#) Subject Area

[Oxygen Deficiency Hazards \(ODH\), System Classification and Controls](#) Subject Area

[PCB Management](#) Subject Area

[Personal Protective Equipment and Respirators](#) Subject Area

[Personnel Monitoring \(PM\) Standard Operating Procedures, Radiological Control Division](#)

[Pollution Prevention and Waste Minimization](#) Subject Area

[Pressure Safety](#) Subject Area

[Project Management](#) Subject Area

[Purchase Requisition Review for Quality-related Requirements](#) Subject Area

[Radioactive Airborne Emissions](#) Subject Area

[Radioactive Waste Management](#) Subject Area

[Radiological Stop Work](#) Subject Area

[Readiness Evaluations](#) Subject Area

[Records Management](#) Subject Area

[Regulated Medical Waste Management](#) Subject Area

[Roles, Responsibilities, Accountabilities, and Authorities \(R2A2\)](#) Subject Area

[Signs, Placards, and Labels for Environmental, Safety and Health \(ESH\) Hazards](#) Subject Area

[Static Magnetic Fields](#) Subject Area

[Stop Work](#) Subject Area

[Storage and Transfer of Hazardous and Nonhazardous Materials](#) Subject Area

[Supplier Pre-Award Evaluation](#) Subject Area

[Suspect/Counterfeit Items](#) Subject Area

[Terms and Conditions Listing, Procurement & Property Management \(PPM\)](#) website

[Training and Qualifications](#) Subject Area

[Transportation of Hazardous and Radiological Materials Off-site](#) Subject Area

[Underage Workers \(Minors\)](#) Subject Area

[Underground Injection Control](#) Subject Area

[Using Controlled Substances in Research](#) Subject Area

[Work Control Managers/Coordinators List](#)

[Work Planning and Control](#) Management System Description

Standards of Performance

Managers shall analyze work for hazards, authorize work to proceed, and ensure that work is performed within established controls.

Managers shall ensure that work is planned to prevent pollution, minimize waste, and conserve resources, and that work is conducted in a cost-effective manner that eliminates or minimizes environmental impact.

All staff and users shall identify, evaluate, and control hazards in order to ensure that work is conducted safely and in a manner that protects the environment and the public.

All staff and guests shall comply with applicable Laboratory policies, standards, and procedures, unless a formal variance is obtained.

All staff and guests shall assure that only appropriately authorized individuals have access to facilities, information, resources, and assets.

All staff and users shall conduct work within the facility-specific operational boundaries specified in Facility Use Agreements.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Subject Areas](#) | [Changes](#) |

Questions/Comments

Disclaimer

Search...

Search SBMS »

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

1. Experimental Safety Review

Effective Date: **Aug 4, 2016**

Subject Matter Expert: [Ann Emrick](#)

Management System Executive: [Raymond Costa](#)

Applicability

This section applies to all existing or proposed experimental activities conducted under BNL control. The rigor of the review and documentation must be commensurate with the level of hazard. The overall goal is that all experiments operate in a way that ensures they are carried out safely and in an environmentally responsible manner.

This information applies to BNL staff and non-BNL staff planning, conducting, reviewing, and approving experiments.

Required Procedure

Safety is a line responsibility that starts with the Responsible Person for the experiment and goes up to the Department Chair/Division Manager, or their equivalent, and the Associate Laboratory Director (ALD).

The ALDs and Department Chairs/Division Managers, or their equivalent, are ultimately responsible for the safe conduct of experiments within their organizations.

The Responsible Person (RP) or Principal Investigator (PI) must ensure that the Experimental Safety Review (ESR) is maintained current.

In some situations, such as setting up, operating or tearing down an experiment, the section [Work Planning and Control for Operations](#) may be a better process for addressing hazards and controls. The ESR is typically the overarching document for the work when Work Permits are employed for an associated activity/job.

Note: Although this section has been designed as an implementing procedure, each Department/Division, or their equivalent, may choose to establish a specific procedure for their area if needed. If a specific Departmental/Divisional, or their equivalent, procedure is used, it must be maintained so that it is current with the contents of this subject area. Consult with your Department/Division, or their equivalent, management to determine appropriate use of procedures. Departments/Divisions, or their equivalent, may assign responsibilities and roles differently in their procedures versus the assignments indicated in this section. However, Departments/Divisions, or their equivalent, must ensure all responsibilities described in the steps are assigned to qualified people.

Experimental Safety Review contains seven subsections:

[1.1 Establishing an Experimental Safety Review Program](#)

[1.2 Initiating an Experimental Safety Review](#)

[1.3 Conducting an Experimental Safety Review](#)

[1.4 Authorizing the Experiment](#)

[1.5 Performing Work within Controls](#)

[1.6 Reviewing Long-term Experiments](#)

[1.7 Terminating Experiments](#)

1.1 Establishing an Experimental Safety Review Program

Step 1	<p>The Department Chair/Division Manager, or their equivalent, appoints an Experimental Review Coordinator (ERC). The Department Chair/Division Manager, or their equivalent, considers the following when selecting an ERC:</p> <ul style="list-style-type: none"> • Education: Degree in related field or equivalent experience; • Experience: 5 years at Brookhaven National Laboratory (BNL) or equivalent experience at a Department of Energy (DOE) or related facility; <ul style="list-style-type: none"> ◦ Knowledge of experimental work hazard identification and analysis (mechanical/electrical, biological, equipment hazards); ◦ Familiarity with regulations and subject areas; ◦ Good communication and technical writing skills.
Step 2	

	The Department Chair/Division Manager, or their equivalent, directs the Training Coordinator to assign the ERC Job Training Assessment (JTA) GE-11 to the Experimental Review Coordinator.
Step 3	<p>The Department Chair/Division Manager, or their equivalent, appoints members to the Experimental Safety Review Team (ESRT), or the ERC may choose team members for each experiment based on hazards that need to be reviewed..</p> <p>The suggested team members include the following:</p> <ul style="list-style-type: none"> • ERC (usually serves as Chairperson); • ESH Coordinator; • Safety and Health Services Representative (SHSD Rep); • Facility Support Representative (FS Rep); • Environmental Compliance Representative (ECR). <p>Note: Additional Subject Matter Experts (SMEs) may be consulted during reviews depending on the nature of the hazards (e.g., fire safety, cryogenics, pressure safety).</p>

1.2 Initiating an Experimental Safety Review

The Experimental Safety Review (ESR) identifies hazards, associated controls, and assesses risks. The [Online Experiment Safety Review \(ESR\) Form](#), or an equivalent form, may be used to document the review.

Step 1	The Responsible Person (RP) or Principal Investigator (PI) notifies the Experimental Review Coordinator (ERC) of his/her intent to conduct a new experiment or modify an existing one.
Step 2	<p>The ERC determines if a new ESR is required. If the proposed experiment falls within the controls of the previously defined envelope or the RP/PI's current ESR, then there is no need for a team review.</p> <p>Note: The BNL Hazard Validation Tool and the exhibit ESH&Q Considerations When Designing an Experiment may be used as guidance.</p>
Step 3	The RP/PI works with the ERC to prepare the ESR. See the exhibit Experimental Safety Review Contents , which describes the contents that must be addressed in the review.
Step 4	<p>The RP/PI and the ERC consider the following hierarchy of controls:</p> <ol style="list-style-type: none"> 1. Elimination – do you really need to introduce this hazard into the work? 2. Substitution – e.g., replacing one substance or activity with a less hazardous one. 3. Engineering – e.g., using a chemical fume hood, interlocks, shielding. 4. Administration – policies and procedures for safe work practices. 5. Personal Protective Equipment – e.g., gloves, earplugs.
Step 5	<p>The RP/PI and/or the ERC does the following:</p> <ul style="list-style-type: none"> • Address ESH concerns, including ensuring appropriate controls are established for all phases of the experiments; • Considers human factors/HPI concepts and incorporates appropriate barriers to reduce the likelihood of errors; • Works with the ECR to address any significant environmental aspects, ensure all wastes and disposal pathways are identified, verify requirement for a NEPA review, and conduct chemical screening for EPHA; • Works with the SHSD Representative to address Industrial Hygiene and Industrial Safety concerns; • Works with the Training Coordinator to identify training, and ensures that applicable JTAs are assigned/updated; • Works with the FS Rep to address radiological issues; • Works with Occupational Medicine Clinic (OMC) to identify any medical surveillance requirements; • Contacts the Transportation Safety Officer for questions related to transporting hazardous materials; • Notifies other Departments/Divisions, or their equivalent, about hazards associated with an experiment, e.g., Emergency Services, the Occupational Medical Clinic, F&O Complex Core Team, and building occupants of shared spaces. Notification is meant to communicate hazards, controls, and issues that may affect their work; • Provides feedback, including experiences or lessons learned; • Works with the person knowledgeable and responsible for the space to consider equipment and activities that can impact the space or other occupants, as well any existing location hazards/issue that need to be addressed. (e.g., oxygen deficiency, noise, space safety envelopes/thresholds) and to update the Hazard Validation Tool if necessary; • Considers work that might be conducted off-hours or alone and the need for any limitations or special instructions based on the hazard (see BNL Working Alone Guidance); • Determines if any facet of the research merits additional communications, internal or external; • Considers the protection of sensitive or classified data, critical/valuable equipment and incorporates necessary controls; • Incorporates worker input either by direct involvement in the planning process or a discussion during the briefing to ask for any initial comments or to inform them of their duty to provide feedback throughout the course of the experiment; • Provides a reviewed ESR to the Chairman/Manager, or their equivalent, or designee for approval/disapproval.
Step 6	The RP/PI evaluates the risks associated with the experiment using guidance on risk assessment in the OHSAS 18001 Program Subject Area.
Step 7	<p>The ERC consults with the following to determine if revised or additional documents are required:</p> <ul style="list-style-type: none"> • Facility Project Manager for the Facility Use Agreement (FUA), Facility Risk Assessment (FRA), or F/R Run Card; • Local Emergency Coordinator for the Local Emergency Plan; • Additional Protocol Coordinator for work involving research and development, manufacture, or the export or import of materials or components that would have an intended application to the nuclear fuel cycle; • The BNL Nuclear Safety Officer for review if it is a Radiological Facility to ensure that the isotope inventory limits are maintained.

	Note: This documentation can be in the form of a new or amended Experimental Safety Review.
--	--

1.3 Conducting an Experimental Safety Review

The Experimental Safety Review Team (ESRT) is responsible for reviewing experiments for the following:

- ES&H concerns;
- Ensuring that appropriate controls for each experiment are established for all phases included in the ESR (set-up, operations, and tear-down);
- Recommending approval or disapproval to the Department Chair/Division Manager, or their equivalent, or designee.

Step 1	The ERC forwards the final draft of the ESR to the ESRT if a team review is needed. If a team review is not needed, the ERC performs the actions in Steps 2, 3, and 4.
Step 2	The ESRT determines if the ESR documentation is adequate to ensure that all the hazards and controls are identified. Note: The BNL Hazard Validation Tool and the exhibit ESH&Q Considerations when Designing an Experiment may be used as guidance.
Step 3	The ESRT considers the potential for stakeholder concerns and may use the Checklist for Identifying Issues/Upcoming Decisions That May Require Community Involvement/Communications in the Community Involvement and Communications in Laboratory Decision-Making Subject Area for guidance. If a concern is identified, submit the completed form to the Community Involvement Office.
Step 4	The ESRT determines if additional Laboratory review is required, such as the Laboratory Environmental Safety & Health Committee, Pressure Safety Subcommittee, Electrical Safety Committee, or Institutional Biosafety Committee.
Step 5	The RP/PI completes actions required.
Step 6	The ERC documents the review and ensures all issues are resolved.
Step 7	The ERC and/or ESRT ensure that all pre-start conditions are met before the work begins, and conducts a walk through of the area to ensure that the controls specified in the ESR are implemented.
Step 8	After ESR reviewers, including the ERC, have approved, the ERC forwards the ESR to the Department Chair/Division Manager, or their equivalent, or designee for approval/disapproval.
Step 9	The ERC or designee maintains the ESR documentation according to the Records Management Subject Area.

1.4 Authorizing the Experiment

The Department Chairs/Division Managers, or their equivalent, are responsible for authorizing work and ensuring compliance with this subject area.

Step 1	Obtain approval from SMEs/Team/Committee as per the subject areas.
Step 2	The Department Chair/Division Manager, or their equivalent, or designee approves the experiment and documents that approval. The approval can be documented on the Online Experiment Safety Review (ESR) Form , Experiment Safety Review Form , or equivalent. Long-term experiments must be reviewed annually, or more often if required by Authorization Basis (e.g., ASE). Significant changes to hazards or controls require a new review and approval before their implementation. Upon the next annual review, changes that had been documented separately or as amendments/attachments will be incorporated into the revised ESR.

1.5 Performing Work within Controls

Work may begin once the ESR is authorized.

Step 1	All workers must be briefed on the requirements in the ESR to ensure their understanding of the work and hazards, control, and risks. Workers should provide feedback during the planning and conduct of the work. Workers consider the following: <ul style="list-style-type: none"> • What can go wrong (what keeps you up at night)? What measures or controls are in place to prevent that from happening? • How do (or which of) the most important controls depend on human (or personnel) actions or behavior? Where might an error or omission impair the effectiveness of an important control? • Error precursors are conditions or attitudes that increase the chances of an error during the performance of a specific task by a particular individual, such as time pressure or unfamiliarity with a task. Are there precursors that, if reduced or eliminated, would make the controls more likely to be effective? • Changes that can inadvertently introduce or increase risk in another area? Note: For additional information and guidance on error, error precursors, and human performance improvement, see the Human Performance Improvement webpage, Improving Defenses: http://intranet0.bnl.gov/oii/hpi/improve-defenses.php
Step 2	The RP/PI must notify the ERC of any changes that may be significant (e.g., new hazards or equipment) before implementation. The ERC will determine the level of review required.

	<p>Minor changes typically include adding materials, equipment, locations, or staff, and neither expands the safety envelope identified nor requires additional controls. Minor changes may be approved by the ERC and/or a subset of the Review Team. Minor changes must be documented, e.g., Amendments, Attachments, Track Change Form, or Note to File. Upon the next Annual Review, changes are incorporated.</p> <p>Major changes typically include addition of a new class of hazard, such as addition of a carcinogen, cryogen, or new location requiring a walk-down due to potential additional controls. Major changes require a full Team Review (refer to section 1.2), resulting in a revised or new ESR or other Work Planning document (e.g., SOP or Work Permit), and workers briefed on changes.</p> <p>Note: If the authorized work is not progressing as planned, new hazards are identified or introduced, or location and/or job complexity issues arise that need to be addressed, workers must contact the PI/RP or supervisor.</p> <p>If a staff member sees an unsafe act, activity, or a condition that creates imminent danger, then the staff member can exercise Stop Work authority (see the Stop Work Subject Area).</p> <p>Note: Minor changes or supplemental information can be added to the ESR package without additional review at the discretion of the ERC and/or ESRT.</p>
Step 3	Line management monitors experiments, via routine supervision/manager functions, work observation, the Tier 1, and self-assessment processes.

1.6 Reviewing Long-term Experiments

All experiments must be reviewed at least annually.

Step 1	The ERC/designee contacts the RP/PI to initiate the annual review.
Step 2	The RP/PI reviews the ESR and updates it to include changes in conditions or scope of the experiment.
Step 3	The ERC or designee reviews the ESR as described in the subsection Conducting an Experimental Safety Review and determines if further review is required. Attention must be paid to revised requirements that may impact the ESR
Step 4	<p>The RP/PI or ERC documents the annual review by doing one of the following:</p> <ul style="list-style-type: none"> • Modifying the existing ESR; • Adding an amendment/attachment to the ESR; • Creating a new ESR; • Denoting that nothing has changed. <p>Note: Until the Department/Division, or their equivalent, approves an updated ESR, the original ESR along with any letters, attachments, and amendments will be in effect.</p>
Step 5	<p>The workers incorporate any operational experience, opportunities for improvement, or lessons learned in the annual review.</p> <p>The annual review is documented and approved following the subsections 1.3 Conducting an Experimental Safety Review and 1.4. Authorizing the Experiment.</p>

1.7 Terminating Experiments

At the conclusion of an experiment, the experimental area must be left in a condition that is satisfactory to the host Department/Division, or their equivalent.

Step 1	The RP/PI informs the host Department/Division's Management that the experimental activities will soon terminate.
Step 2	<p>At the conclusion of an experiment the RP/PI ensures that the experimental area is left in a condition that is satisfactory to the host Department/Division, or their equivalent.</p> <p>This includes the following:</p> <ul style="list-style-type: none"> • Disposing of radioactive, industrial, hazardous, and mixed wastes; • Reconciling the chemical inventory; • Disposition of experimental equipment; • Appropriate chemical, biological, and/or radiological decontamination of the area; • Any type of area monitoring that may be required (i.e., lead, air, cadmium, beryllium, asbestos); • Housekeeping; • Postings are updated (Placards, User/Access Lists, Hazard Postings). <p>Line management designee conducts a walk through to verify the condition of the area. An Exit Readiness Evaluation may be requested (see the section Exit Readiness Evaluation (ERE) in the Readiness Evaluations Subject Area).</p>
Step 3	<p>Line management designee ensures that the following is reconciled, if needed:</p> <ul style="list-style-type: none"> • Documents updated (e.g., FUA, LEP, Run Cards); • Training and Qualifications updated (e.g., JTAs, Medical surveillance, JAFs); • Roles and Responsibilities updated (e.g., sealed source custodians, POCs); • Required equipment returned (e.g., TLDs, monitoring equipment, PPE).

References

[Biosafety in Research](#) Subject Area

[BNL Hazard Validation Tool](#)

[Community Involvement and Communications in Laboratory Decision-Making](#) Subject Area

[OHSAS 18001 Program](#) Subject Area

[Online Experiment Safety Review \(ESR\) Form](#)

[Readiness Evaluations](#) Subject Area

[Records Management](#) Subject Area

[Stop Work](#) Subject Area

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Top of Subject Area](#) | [Instructions](#) | [Changes](#) |

Questions/Comments

Disclaimer

[Electronic Work Permit](#)

[Event/Issues Management](#) Subject Area

[Facility Hazard Analysis](#) Subject Area

[Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) Subject Area

[Radiological Stop Work](#) Subject Area

[Records Management](#) Subject Area

[Stop Work](#) Subject Area

[Terms and Conditions Listing](#), [Procurement & Property Management \(PPM\)](#) website

[Training and Qualifications](#) Subject Area

[Work Control Managers/Coordinators List](#)

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Top of Subject Area](#) | [Instructions](#) | [Changes](#) |

Questions/Comments

Disclaimer

Search...

Search SBMS »

Management System: [Work Planning and Control](#)Subject Area: [Work Planning and Control for Experiments and Operations](#)**2. Work Planning and Control for Operations**

Effective Date: Aug 4, 2016

Subject Matter Expert: [Raymond Costa](#)Management System Executive: [Raymond Costa](#)**Applicability**

This information applies to BNL and non-BNL staff who conduct work, including contractors, vendors, and service providers.

Required Procedure

Line management is directly responsible for the protection of the public, workers, and the environment.

Departments/Divisions, or their equivalent, may assign responsibilities and roles differently in their procedures versus the assignments indicated in this section. However, Departments/Divisions, or their equivalent, must ensure that all responsibilities described in the steps are assigned to qualified people.

Note: For information and guidance on error, error precursors, and human performance improvement, see the Human Performance Improvement webpage, Improving Defenses: <http://intraneto.bnl.gov/oii/hpi/improve-defenses.php>.

Work Planning and Control for Operations contains nine subsections:

[2.1 Selection, Training, and Qualification for Work Control Managers and Coordinator, and Primary Reviewers](#)**[2.2 Defining/Determining the Work Planning Level](#)****[2.3 Prescribed Work Hazard Identification, Analysis and Controls](#)****[2.4 Permit Planned Work Hazard Identification, Analysis and Controls](#)****[2.5 Control of Work/Job Change Control](#)****[2.6 Post Job Review, Feedback and Improvement](#)****[2.7 Permit Planned Work Closeout](#)****[2.8 Integrated Safety Management \(ISM\) Flowdown to Contractors and Suppliers](#)****[2.9 Standing Work Permit](#)****2.1 Selection, Training, and Qualification for Work Control Managers and Coordinators, Primary Reviewers, and Work Supervisors**

Step 1	<p>The Department Chair/Division Manager, or their equivalent, appoints a Work Control Manager (WCM) to implement the work planning and control process for their operations in accordance with this subject area. When appointing a WCM, consider the following:</p> <ul style="list-style-type: none"> • Education: Degree in related field or equivalent experience; • Experience: Several years at BNL or equivalent experience at a DOE or related facility; • Functional Area Experience: <ul style="list-style-type: none"> ◦ Hazard identification and analysis; ◦ Application of requirements, standards, and regulations into work planning; ◦ Familiar with pre-job briefing and activity walk-down concepts; and ◦ Communication and writing skills.
Step 2	<p>The Department Chair/Division Manager, or their equivalent, or designee appoints Work Control Coordinators (WCCs) for each area or appropriate group within their Department/Division, or their equivalent, to fulfill the requirements of this subject area. When appointing WCCs, consider the following:</p> <ul style="list-style-type: none"> • Experience: Several years at BNL or equivalent experience at a DOE or related facility; • Functional Area Experience: <ul style="list-style-type: none"> ◦ Hazard identification and analysis within the assigned work environment; ◦ Application of requirements, standards, and regulations into work planning; ◦ Work screening requirements and knowledge of pre-job briefing and activity walk-down concepts; and ◦ Communication and writing skills.
Step 3	<p>The Department Chair/Division Manager, or their equivalent, or designee must ensure that WCCs are qualified to perform work commensurate with operations and hazards in their Departments/Divisions, or their equivalent. Requirements for qualifying WCCs must include one of the following methods:</p>

	<ul style="list-style-type: none"> On-the-job training (e.g., organizations' work planning procedure, work permit development and implementation, pre-job briefings); Demonstration (i.e., identification of hazards associated with planned work, hazard mitigation, activity planning, and implementation). <p>Forward a note to the Training and Qualifications Office to document the completion of the qualification.</p>
Step 4	<p>The Department Chair/Division Manager, or their equivalent, or designee appoints Primary Reviewer(s) for each area or appropriate group within their Department/Division, or their equivalent.</p> <p>When appointing a Primary Reviewer consider the following:</p> <ul style="list-style-type: none"> Education: Degree in related field or equivalent experience; Experience: Several years at BNL or equivalent experience at a DOE or related facility; Functional Area Experience: <ul style="list-style-type: none"> Hazard identification and analysis; Application of requirements, standards, and regulations in work planning; and Communication and writing skills. <p>The Primary Reviewer provides an independent review of the work permit. For each work permit they review and approve, the Primary Reviewer is responsible for ensuring that:</p> <ul style="list-style-type: none"> Review Team members were appropriate for the work that was planned and familiar with the risks the work may involve; Hazards and risks that could impact ESSH have been considered, identified, and addressed as needed to meet BNL requirements. <p>Note: When the "Screening Tool for Worker Planned Work" indicates that a work permit is not required and a work permit is used, the Primary Review is not required to review the work permit.</p>
Step 5	<p>After selections are made, assign the appropriate R2A2, and the appropriate Brookhaven Training Management System (BTMS) WCM/WCC Job Training Assessments (JTAs) from the following:</p> <ul style="list-style-type: none"> GE-10A Operations and Experimental Work Control Manager GE-10B Operations and Experimental Work Control Coordinator GE-10C Operations and Experimental Primary Reviewer <p>The Department/Division, or their equivalent, may create their own equivalent that includes the requirements of the appropriate JTA above and any additional requirements.</p>
Step 6	<p>Assign the following JTA to those who will be supervising work. "Work" is defined as the activities that involve the design, set-up, operation (including the handling of material), maintenance/servicing, modification, construction, demolition, or decommissioning of facilities, equipment, or experiments by BNL staff or non-BNL staff. Note: Excluded from this definition would be supervision of office workers who do not perform any work in the field:</p> <ul style="list-style-type: none"> JTA GE-108 Supervisor Work Oversight
Step 7	<p>The Department Chair/Division Manager, or their equivalent, or designee ensures that they maintain an up-to-date list of approved Primary Reviewers, WCMs, and WCCs.</p>

2.2 Defining/Determining the Work Planning Level

The [Work Planning and Control Operations Flowchart](#) depicts the flow of this process.

All work must be categorized according to all recognized hazards, including routine hazards, and during all phases of the work, including estimating, planning, and pre-job briefs.

This screening process provides the decision path for determining when worker planned work applies.

Step 1	<p>The Work Requestor provides a complete, accurate, and detailed description of the work or service required to the WCC. The following information must be included with the description of work:</p> <ul style="list-style-type: none"> Location of work to be performed; Any special instructions, considerations, known area hazards and controls, required training, and access requirements. <p>Note: For work performed off-site, refer to the section Off-site Work.</p> <p>Note: For work conducted in a designated security area (PPA area, CAA, Limited Area, VTR) or where enhanced security systems are deployed (card readers, CCTV, duress alarms, etc.), contact LP Security Operations (x7425) to determine the need for a work permit. Refer to the Security Checklist for additional information.</p>
Step 2	<p>The WCC, using the information provided by the Requestor in step 1 and gathering additional information as needed, ensures that they understand the full scope of work and ESSH impact to determine if worker planned work can be performed.</p> <p>If the job being screened could affect experimental operations, impact the hazard classification or safety envelope of the facility, or require equipment modification or installation, the WCC consults with the appropriate personnel (e.g., cognizant engineer or technical authority).</p> <p>The organization responsible for the project and/or managing the work is responsible for assigning the WCC. If the job being screened involves modification to facilities, structures, systems, etc., then the WCC consults the F&O Facility Project Manager or F&O Facility Complex Engineer.</p> <p>Note: The scoping of work must consider the entirety of work to be performed. For example, the vehicular movement of hazardous and radioactive materials, such as Sealed Sources, requires adherence to strict requirements provided in the Movement by Vehicle of Hazardous and Radioactive Materials On-site and/or Transportation of Hazardous and Radiological Materials Off-site Subject Areas, as they pertain to the work to be performed. All work planning must consider compliance with these requirements.</p> <p>Note: For unfamiliar facilities or rooms within a facility, the BNL Hazard Validation Tool should be consulted for the area to identify hazards, measures to mitigate the hazards, and procedures in-place to eliminate or control the risk, including engineering controls, work practices, and personal protective equipment. In addition, a review of work area placards, signs, tags, temporary barricades, and labels, the area should be walked down and the work discussed with people who are knowledgeable of the area, such as the FPM, Research Space Manager (RSM), Cognizant Space Manager (CSM) and/or ESH Representative/Coordinator.</p>

Step 3	<p>The WCC must screen work for each of the following attributes:</p> <ul style="list-style-type: none"> • ESSH; • Work Complexity; and • Work Coordination <p>The WCC uses the Screening Tool for Worker Planned Work or Department/Division approved documented screening process.</p> <p>Note: Department/Division approved documented screening process must meet the following conditions as a minimum for work to be classified as worker planned work:</p> <ul style="list-style-type: none"> • ESSH hazards are clearly understood; controls are established and implemented, and there are no security concerns. • For Work Complexity, all steps of the work to be accomplished are clearly understood by all workers involved and controls are established. • For Work Coordination, work does not involve a Credited Control; work can be accomplished without coordination with other groups in the work area or without coordination with ESH personnel during the job/activity. <p>Note: Instructions for using the Screening Tool for Work Planned Work can be found in the exhibit Using the Screening Tool for Worker Planned Work.</p>
Step 4	<p>The WCC determines the work planning mode (i.e., Permit Planned Work, Prescribed Work, or Worker Planned Work).</p> <p>If the screening tool results in sufficient questions being answered "YES" for each job attribute, then the work can be planned as worker planned work (proceed to the section Worker Planned Work).</p> <p>If one or more job attributes do not meet the required number of "YES" questions, then the work must be planned using one of the following the planning modes:</p> <ul style="list-style-type: none"> • Prescribed Work Hazard Identification, Analysis and Controls - proceed to subsection 2.3; or • Permit Planned Work Hazard Identification, Analysis and Controls - proceed to subsection 2.4. <p>Note: Any individual can request that a work permit be used to perform any job.</p>

2.3 Prescribed Work Hazard Identification, Analysis and Controls

The "Prescribed Work" mode of work relies on prescribed work documents that are a formal set of instructions or guidelines (e.g., standard operating procedure, contractor health and safety plan, contractor procedure, or operating/maintenance manual) for performing the work.

A prescribed work document identifies how the work is to be performed safely (hazards and controls are identified and controls implemented) and, it includes authorizations to perform the work. Prescribed work documents are usually prepared for repetitive work. Line Management ensures that a formal set of prescribed work documents are approved and meet the requirements of relevant subject areas, e.g., [Document Control](#) Subject Area, [Lockout/Tagout \(LOTO\) for Installation, Demolition, or Service and Maintenance](#) Subject Area, [Electrical Safety](#) Subject Area, and [Laser Safety](#) Subject Area.

The goal of prescribing the way the work will be performed is to control the work so that the levels of hazard for each of the job categories (i.e., ESSH, Work Complexity, and Work Coordination) are as low as reasonably achievable.

Step 1	<p>Line Management implements a process for the development, review and approval of a prescribed work document that considers the following</p> <ul style="list-style-type: none"> • Access requirements for the area where the work will be performed; • Any special instructions or considerations that may be applicable; • Changes impacting configuration management; • Hazards associated with the job (e.g., industrial hygiene, fall protection, electrical safety, etc.); • The controls necessary to prevent accidents, injuries, and environment or property damage; • Training requirements; • Verification that the prescribed work document fully and accurately addresses the scope of work to be performed; and • The person authorized to start the proposed work, and whether additional work start authorizations and notifications are needed before starting work.
Step 2	<p>Using the approved prescribed work document(s) the work reviewer, job supervisor, or designee, conducts a pre-job safety briefing with the worker(s) to review pre-planned work document precautions, pre-requisites, job hazards, and/or work coordination. Consider addressing the following at the pre-job briefing:</p> <ul style="list-style-type: none"> • Are workers aware that they must contact their job supervisor if the prescribed work document cannot be followed as written, the work is not progressing as planned, new hazards are identified or introduced, or location and/or job complexity issues arise that need to be addressed? • What are the hazards associated with the work? And are they properly controlled? • What are the critical steps to complete this work safely? • How can we make a mistake at those critical steps. • What is the worst thing that can go wrong? • What barriers or defenses are needed? • What actions are to be taken if new hazards are identified? • Have all the necessary permits been obtained and completed, and permit conditions met?

	<ul style="list-style-type: none"> • Are workers aware that if additional crew members arrive on the job after the original briefing, they must also be briefed before they can start work? <p>Note: Staff members can exercise Stop Work authority. See the Stop Work Subject Area.</p>
Step 3	<p>Work within the established controls.</p> <p>Note: If changes are needed in the prescribed work document, stop and contact the work planner, the jobs supervisors, or designee.</p>
Step 4	<p>At the completion of work, the job supervisor</p> <ul style="list-style-type: none"> • Ensures that the work site is left in a clean and safe condition; • Request feedback from the workers; and • Refers to subsection Post Job Review, Feedback and Improvement.

2.4 Permit Planned Work Hazard Identification, Analysis and Controls

The Work Permit Form is a means for each Department/Division, or their equivalent, to control work that does not meet the requirements for worker planned work. It may also be used for worker planned work. The form, which was designed around the ISM Five Core Functions, provides the scope of work, an ESSH hazard and control checklist, work plan, list of reviewers and approvers, and a mechanism for worker involvement and feedback. Additional safety permits, work instructions, and drawings are attached to the work permits as needed.

Note: Work permits are not required to stabilize emergency situations. An emergency is defined as an event or uncontrolled release of hazardous substances that require immediate response to prevent death or serious injury to BNL employees, visitors, and/or guests. However, the need for proper hazard recognition, use of ESSH principles, job planning, and notifications of facility personnel are still required. Once the situation is stabilized, formal work planning process (this section) applies.

Note: For projects involving a mix of subcontractor, BNL personnel, and/or scientific department personnel, the lead organization must ensure roles and responsibilities are clearly identified and documented for all project tasks, including change control, turnover, and project closure. This may be accomplished by establishing a specific written project management/execution plan (refer to the [Project Management](#) Subject Area) or by the use of a work permit. The plan/permit must clearly identify, as appropriate, owners of tasks, project scope, project responsibilities, actions resulting from routine and closeout inspections, and development/maintenance configuration management documents (electrical drawings, as-built drawings, and preventive maintenance checklists). The plan/permit must be updated as needed.

Step 1	<p>The WCC is responsible for generating the work permit, ensuring that the Work Permit Form or Electronic Work Permit is completed in accordance with the Instructions for Filling out the Work Permit, and following the steps in this subsection.</p> <p>The WCC, using the work information collected in the subsection Defining/Determining the Work Planning Level, documents the job information (i.e., date, work permit number, and short description of the activity) for the work permit.</p>
Step 2	<p>The WCC establishes a Review Team, considering the following as it applies to the work to be performed:</p> <ul style="list-style-type: none"> • ES&H professionals/SMEs • F&O Facility Project Manager • Research Space Manager • Operations professionals • Engineers • Quality Representatives • Service provider • Worker representatives.
Step 3	<p>The Review Team considers the following as it applies to the work to be performed:</p> <ul style="list-style-type: none"> • Visits the job site; • Reviews and identifies the impact to experimental operations, hazard classification, Human Factors/HPI considerations, safety envelope of the facility, and the Facility Use Agreement, consulting with the appropriate personnel (e.g., cognizant engineer, technical authority, as needed). • Reviews applicable Job Risk Assessments, the Hazard Validation Tool (or Facility Risk Assessments where the HVT does not address the work area), and other procedures for hazards and established controls; • Perform an ESSH analysis and identifies hazards and controls (e.g., Job Safety Analysis [JSA], Phased Hazard Analysis [PHA], Safe Work Plan [SWP]) must be written and attached to the work permit. <p>Note: Reviewing work permits in a team setting is encouraged, as opposed to circulating the permit for review and sign-off in series. The team environment is more effective in ESSH reviews and in coordinating the required resources.</p>
Step 4	<p>The Review Team develops a work plan in accordance with section 3 of the Instructions for Filling out the Work Permit. The development of a work plan may include the setup and use of mockups, dry-runs, and other tools.</p> <p>The written work plan will contain the following, as it applies to the work to be performed:</p> <ul style="list-style-type: none"> • Work Instructions: this may include a few job steps or detailed step-by-step instructions. The following must be considered when determining the level of detail in the work plan:

	<ul style="list-style-type: none"> ◦ References to technical manual steps or procedures ◦ Skill level and experience of the workers ◦ Special training requirements ◦ Complexity of work ◦ Number of steps in the performance of the work <ul style="list-style-type: none"> • Prerequisites: preparatory actions to be performed before work can be started and any administrative and physical requirements; • Precautions: precautions that must be observed during performance of work; • Identification for hold points and other monitoring; • ESSH work controls for mitigating identified hazards based on the following hierarchy, as practical: <ul style="list-style-type: none"> ◦ elimination/substitution of hazards; ◦ engineering controls; ◦ administrative controls and work practices; and/or ◦ personal protective equipment (PPE). • Operational limits imposed; • Coordination of tasks; • Special conditions for working alone (see BNL Working Alone Guidance); • Scheduling, coordination and notification; • Changes impacting configuration management; and • Post Work Testing and Acceptance: guidance concerning post work testing to ensure proper completion of work and/or system readiness to return to service. <p>Note: As an alternative, work instructions may be documented in an approved internal or standard operating procedure, or referenced procedures that may be attached to do the work.</p>
Step 5	After the WCC concludes that the Review Team has adequately planned and documented the Work Permit, each team member signs off in the "Reviewed By" section (e.g., ESSH Professional, Work Control Coordinator, F&O Facility Project Manager, Research Space Manager, and Service Provider, as it applies to the work to be performed).
Step 6	The WCC or designee forwards the Work Permit to the Department's/Division's, or their equivalent's, Primary Reviewer(s) for review and approval for work screened other than worker planned work. Note: The Primary Reviewer conducts an independent review of the work plan on the Work Permit. The Primary Reviewer's signature means that: the Review Team members were appropriate for the work that was planned and familiar with the risks the work may involve, the Review Team member(s) visited the job site, and hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. Note: When the "Screening Tool for Worker Planned Work" indicates that a work permit is not required and a work permit is used, the Primary Reviewer is not required to review the work permit.
Step 7	After the Primary Reviewer signs the Work Permit, the Permit and supporting documents (if applicable) are forwarded to the WCC. The WCC ensures that scheduling, coordination and notification of stakeholder(s) has been accomplished.
Step 8	The WCC or job supervisor conducts a pre-job briefing with the work crew to review job hazards, permits, and/or work coordination requirements. The following is considered at the pre-job briefing: <ul style="list-style-type: none"> • What are the hazards associated with the work? Are they properly controlled? • What are the critical steps or phases to complete this work safely? • How can we make a mistake at these critical steps? • What is the worst thing that can go wrong? • What barriers or defenses are needed? • What are the necessary permits to do this work? Have they been obtained, completed, and permit conditions met? • What actions are to be taken if new hazards are identified? Should the WCC or job supervisors be contacted? • Are workers aware that if additional crew members arrive on the job after the original briefing, they must also be briefed before they can start work?
Step 9	After the pre-job briefing is complete, the job supervisor and workers sign Section 4 of the Work Permit, or an attached sign-off list, indicating that they understand the hazards, controls, and work permit requirements before they start working. Note: The workers must sign for themselves; it is not permissible for the job supervisor to sign for the workers. Note: If new workers or job supervisors are added to the job, they must attend a pre-job briefing and add their signatures to the permit prior to starting work.
Step 10	The Department/Division, or their equivalent, Line Manager or designee authorizes work to be performed within the established controls and conditions of the Work Permit. The person signing section 5 on the work permit indicates line manager responsibility for ESSH. Note: The work authorization (e.g., work permit, permits, procedures, and/or work instructions) must be at the job site.
Step 11	Work is performed within the established controls and conditions of the Work Permit. Refer to subsection Control of Work/Job Change Control if a change to the Work Permit is required. At the completion of work, proceed to the subsection Post Job Review, Feedback and Improvement .

2.5 Control of Work/Job Change Control

This subsection describes the process for controlling work and job change control.

Note: For projects involving a mix of subcontractor, BNL personnel, and/or scientific department personnel, the lead organization must ensure roles and responsibilities are clearly identified and documented for all project tasks, including change control, turnover, and project closure. This may be accomplished by establishing a specific written project management/execution plan (refer to the [Project Management](#) Subject Area) or by the use of a work permit. The plan/permit must clearly identify, as appropriate, owners of tasks, project scope, project responsibilities, actions resulting from routine and closeout inspections, and development/maintenance configuration management documents (electrical drawings, as-built drawings, and preventive maintenance checklists). The plan/permit must be updated as needed.

Note: Feedback and improvement is a key element within Integrated Safety Management and Work Planning and Control, as well as day to day management in general. For supervisors, one of the most important forms of obtaining feedback is through direct observation of work and interaction with workers (i.e., work oversight). The exhibit [Requirements and Expectations for Performing Work Oversight](#) provides the requirements and expectations for observing work as provided in supervisor training and the R2A2 for Supervisors and their Managers.

Step 1	The WCCs, job supervisor, or designees ensure that work is conducted according to the approved work plans, work instructions, and permits. Workers must work within the limits of the guidelines provided in the work authorization document (i.e., worker planned, prescribed, or work permit documentation permit) and the principles of HPI.
Step 2	If at any time while working, the planned work changes and a problem/situation or additional hazards are identified: <ul style="list-style-type: none"> • If imminent danger exists, issue a Stop Work Order. See the Stop Work Subject Area. • If radiological work does not meet Laboratory requirements, or could result in an exposure/release of radioactive material, issue a Radiological Stop Work. See the Radiological Stop Work Subject Area. • Pause work and inform the job supervisor, or Work Control Coordinator as appropriate. <p>Note: If the work interruption was due to an incident, then refer to the Event/Issues Management Subject Area.</p>
Step 3	The WCCs, job supervisor, or designees evaluate concerns to determine if additional or different work methods are required to complete the job/work. They must consider the following: <ul style="list-style-type: none"> • Put a temporary hold on the work; • Identify/implement additional hazard controls/mitigation strategies; and/or • Consult with the Review Team, workers, and subject matter experts, as appropriate to amend the work documents (e.g., work plan, permit, experimental safety review, job risk assessment or work instructions). <p>Note: If actions were not taken, the WCCs or job supervisor communicates those reasons to staff doing the work.</p>
Step 4	If necessary, amend the work authorization document(s) and conduct a job briefing to inform personnel of new hazards identified, mitigation controls, and training requirements. <p>Note: The WCC or job supervisor verifies that training/qualification requirements are met before re-authorizing work to proceed.</p>
Step 5	Job site staff/workers sign the revised work authorization document, or an attached sign-off list, indicating that they understand the new hazards and/or change in work authorization requirements before they start work. <p>Note: The workers must initial and date next to their original signature, or sign if they are new to the job. It is not permissible for the job site supervisor to initial or sign for the workers.</p>
Step 6	The affected Department/Division, or their equivalent, Line Manager or designee sign-off on and re-issue the work authorization document and authorize the job/work/activity to proceed.

2.6 Post Job Review, Feedback and Improvement

An important element in the Work Planning and Control process is worker, as well as contractor and vendor, feedback. Feedback can be received and distributed in many ways. Some examples are the following:

- Sections of the Work Permit;
- Pre-job briefings and walk downs;
- Post-job critiques/briefings;
- Safety meetings;
- Safety bulletins;
- Tool box meetings;
- Work in progress reviews;
- Standard operating procedure changes (after workers have reviewed them); and
- Lessons learned memorandums.

Step 1	At the completion of work, the WCC, job supervisor, or designee performs a post-job review, as it applies to the work performed, including the following: <ul style="list-style-type: none"> • Verifies that the work/job is complete and meets the specifications established in the work authorization document(s) and work plans; • Ensures that the work site is left in a clean and safe condition; and
---------------	--

	<ul style="list-style-type: none"> Obtains feedback from the workers, and provides feedback to the work requestor and/or Department/Division, or their equivalent.
Step 2	<p>The WCC or designee reviews the work/job performance by asking workers and/or job supervisor, as appropriate the following typical questions:</p> <ul style="list-style-type: none"> How usable (user-friendly) were the procedures/work authorization documents? <ul style="list-style-type: none"> Were procedures (or work authorization documentation) accurate? Were they sufficient? Were there any planning and/or scheduling errors? What unplanned for conditions or situations did you encounter? How did you handle them? Were there any unidentified hazards associated with the work? What actions were taken? Were there any critical steps or phases missing to complete this work safely? Were all necessary permits available, completed, and permit conditions met? Were additional crew members briefed before they started work? Were job-site resources and information sufficient? What training was missing/lacking, if any? <ul style="list-style-type: none"> Was training for the job appropriate? What lessons can be learned from this job? What could have been done better? How can things be improved (e.g., communication, procedures, training, tools, etc.)? What worked particularly well and helped get this job done safely and efficiently?
Step 3	<p>The WCC, job supervisor, or designee</p> <ul style="list-style-type: none"> Documents any feedback or pertinent information generated during the review of the work; Determines if facilities or work practices need to be changed as a result of worker feedback; Determines if the feedback should be incorporated into the BNL Lessons Learned Program (see the Lessons Learned Subject Area); and Incorporates feedback into the Department/Division, or their equivalent, processes, as appropriate.
Step 4	<p>Feedback incorporated into the Department/Division, or their equivalent, processes should be documented and tracked to closure, as appropriate.</p>

2.7 Permit-Planned Work Closeout

Step 1	<p>The WCC (authorizing Department/Division, or their equivalent) checks the quality of the completed permit and ensures that the work site is left in an acceptable condition. (The WCC can delegate clean up of work area to job supervisor). The WCC ensures that the change process to update drawings, placards, postings, procedures, etc. is initiated, if necessary (see Section 7 of work permit).</p>
Step 2	<p>The Department/Division, or their equivalent, is responsible for retaining the completed work permit.</p> <p>File work permits according to the Records Management Subject Area. Work Permits, except those used for Worker Planned Work, are required to be kept 75 years.</p>

2.8 Integrated Safety Management (ISM) Flowdown to Contractors and Suppliers

Before the Procurement and Property Management Division (PPM) issues a purchase order for contractor, supplier, or warranty services to be performed on-site, the proposed work must be reviewed for Integrated Safety Management (ISM) requirements and determination if a work permit and/or health and safety plan is required.

Note: As a minimum, a Phased Hazard Analysis, Job Safety Analysis, Experimental Safety Review (ESR), Work Permit, or equivalent, is required for all contractor and vendor work. Article 7 (Compliance with 10 CFR 851 and BSA's Worker Safety and Health Program) to "BSA's Supplemental Terms and Conditions for Work by Contractors On-site", found on the Procurement & Property Management (PPM) [Terms and Conditions Listing](#), provides the contractual flow down of requirements and work planning obligations of contractors and vendors.

Note: When performing work on-site using an escort consult the section [Using Escorts Instead of Providing Training](#) of the [Training and Qualifications](#) Subject Area.

Step 1	<p>The Requisitioner completes the ISM Flowdown questions in the Web Requisition header (refer to the Web Requisition Process for Work Planning and Control document on the Business Systems Division [BSD] home page).</p>
Step 2	<p>If it is determined that only desk/paperwork is to be performed in an office environment, no further action is needed from this subject area.</p> <p>If it is determined that non-experimental work (other than construction) is to be performed on-site, the WCM/WCC for the Department/Division where the work will be performed reviews the Web Requisition for work planning and control.</p> <p>If it is determined that construction work is to be performed on-site, a construction-qualified WCC reviews the Web Requisition for work planning and control. Follow the requirements in the Construction Safety Subject Area. No further action is required by this subject area.</p> <p>Note: For work performed off-site, refer to the section Off-site Work.</p>

Step 3	<p>The WCM/WCC defines/determines the work planning level by following the subsection Defining/Determining the Work Planning Level.</p> <p>If work meets the requirements of worker planned work, than as a minimum, a Phase Hazard Analysis, Job Safety Analysis, or equivalent, is required and must be reviewed and signed by all workers before starting work.</p> <p>If a work permit is required, the ESSH WCM/WCC processes the work permit in accordance with subsection Permit Planned Work Hazard Identification, Analysis and Controls before the contractor or supplier performs work on-site. Additionally, in consultation with the Environment, Safety, and Health (ESH) Coordinator, Training Coordinator, and Facility Support Representative, determine BNL site-specific training requirements and safety instructions for contractors and suppliers. Refer to the section Contractor/Vendor Training and Processing of the Training and Qualifications Subject Area for more information.</p> <p>Note: As a minimum, the contractor's signature on the work permit can serve as written acknowledgement of the hazards identified and controls specified in the work permit.</p>
Step 4	<p>The WCM/WCC processes the work permit in accordance with subsection Permit Planned Work Hazard Identification, Analysis and Controls before the contractor or supplier starts works on-site.</p>

2.9 Standing Work Permit

A Standing Work Permit can be used as a longer-term hazard analysis and work authorization tool for jobs where the ESSH concerns are static and the activities are repetitive. The organization issuing the Standing Work Permit processes the form by following these steps.

Standing work permits must be developed in accordance with the subsection [Permit Planned Work Hazard Identification, Analysis and Controls](#).

If you are writing repetitive standing work permits for work within your work area or group, then you should consider writing a Standard Operating Procedure.

Step 1	<p>The WCC or designee generating the work permit, completes the Work Permit Form in accordance with the subsection Permit Planned Work Hazard Identification, Analysis and Controls.</p> <p>Check off the Standing Work Permit box at the top right part of the Work Permit Form. The "start" and "end" dates in Section 1 of the work permit are the duration of the standing permit. The duration can only be for one year; then the permit must be reissued.</p>
Step 2	<p>The WCC generating the Standing Work Permit ensures that the workers are briefed and obtains their signatures in Section 4 of the Work Permit, or on an attached sheet. Their signatures are good for the duration of the permit (not to exceed one year).</p> <p>Note: The original Standing Work Permit should be kept with the Department/Division, or their equivalent, Work Control Manager. A copy of the Permit may be used in the field.</p>
Step 3	<p>Each time the Standing Work Permit is used, before starting work, conduct a pre-job briefing and authorize the start of work in accordance with subsection Permit Planned Work Hazard Identification, Analysis and Controls, step 9.</p>
Step 4	<p>Control work in accordance with Section 2.5.</p>

Guidelines

When working in work planning and control for operations areas (often this is in support of experimental work), use the following as general guidance for classifying work.

Guidance in preparing detailed work plans: For very detailed work plans, it is recommended the user refer to the [DOE Writer's Guide for Technical Procedures](#).

As previously stated, work in the low-hazard classification does not require use of a Work Permit Form; however, the form may still be used. Work in the moderate- and high-hazard classifications requires levels of planning, documentation, and control appropriate for the specific ESSH risks, work complexity, and coordination.

In addition, when a worker is working alone, assess the additional hazards that may be introduced and develop controls to address those hazards.

References

BNL [Lessons Learned](#)

[Brookhaven Training Management System \(BTMS\)](#)

[Business Systems Division \(BSD\)](#) home page

[Construction Safety](#) Subject Area

[Document Control](#) Subject Area

[Electronic Work Permit](#)

[Event/Issues Management](#) Subject Area

[Facility Hazard Analysis](#) Subject Area

[Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) Subject Area

[Radiological Stop Work](#) Subject Area

[Records Management](#) Subject Area

[Stop Work](#) Subject Area

[Terms and Conditions Listing, Procurement & Property Management \(PPM\)](#) website

[Training and Qualifications](#) Subject Area

[Work Control Managers/Coordinators List](#)

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Top of Subject Area](#) | [Instructions](#) | [Changes](#) |

[Questions/Comments](#)

[Disclaimer](#)

Search...

Search SBMS »

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

3. Worker Planned Work

Effective Date: **Aug 4, 2016**

Subject Matter Expert: [Raymond Costa](#)

Management System Executive: [Raymond Costa](#)

Applicability

This information applies to BNL and non-BNL staff who conduct work.

Required Procedure

The "Worker Planned" work concept recognizes the capabilities of the workforce. The personnel have the skill level and technical capabilities to handle a wide variety of jobs with minimum documentation and no direct supervision.

Worker planned work can only be performed when there are adequate barriers in place to reduce the hazards to acceptable levels in the areas of ESSH, complexity, and work coordination as determined by the [Screening Tool for Worker Planned Work](#). When determining if work is to be classified as "Worker Planned," the entire scope of work to be performed must be considered. For example, the vehicular movement of hazardous and radioactive materials, such as Sealed Sources, requires adherence to strict requirements provided in the [Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) and/or [Transportation of Hazardous and Radiological Materials Off-site](#) Subject Areas, as they pertain to the work to be performed. All work planning must consider compliance with these requirements.

Line Management ensures a work authorization process is in place, all hazard controls are in place, and hazard control methods were used based on the following hierarchy:

- Elimination/substitution of hazards;
- Engineering controls;
- Administrative controls and work practices; and/or
- Personal protective equipment (PPE).

This hierarchy is a pre-condition for worker planned work.

Each Department/Division, or their equivalent, determines the appropriate training requirements for the staff in their organization. Each Department/Division, or their equivalent, justifies the worker planned requirements for performing work rated as low-hazard within BNL Environment, Safety, Security, and Health (ESS&H) boundaries.

Note: For information and guidance on error, error precursors, and human performance improvement, see the Human Performance Improvement webpage, Improving Defenses <http://intraneto.bnl.gov/oii/hpi/improve-defenses.php>

Step 1	<p>Line management supervision may select one or more of the following or equivalent methods for documenting training and skill level required for workers:</p> <ul style="list-style-type: none"> • Job Training Assessments; • Job Risk Assessments (JRA); • Qualification Matrix exhibit; • Letters to file, training records from other sites, and documented level of expertise (degree, certification, license, resumes, etc). <p>Note: Contact your Training Coordinator for assistance.</p>
Step 2	<p>The responsible supervisor or designee assigns the work as worker planned work to a qualified worker by considering the worker's:</p> <ul style="list-style-type: none"> • Skill level • Experience with the task • Ability to complete the task safely • Training to accomplish the work • Understanding the requirements of this section. <p>Note: When a worker is working alone, assess the additional hazards that may be introduced and develop controls to address those hazards. For unfamiliar facilities or rooms within a facility, the BNL Hazard Validation Tool should be consulted for the area to identify hazards, measures to</p>

	mitigate the hazards, and procedures in-place to eliminate or control the risk, including engineering controls, work practices, and personal protective equipment.
Step 3	The worker (technician, operator, scientist, craft, etc.) <ul style="list-style-type: none"> • Conducts a walk through; • Plans the work; • Identifies the hazards and appropriate hazard controls to be used; • Determines that he or she has the skill, experience, and training to perform the job safely.
Step 4	Workers always consider the following before starting work and while working: <ul style="list-style-type: none"> • Is the scope and description of the work clearly defined? • What are the hazards associated with the work and in the surrounding work area? Are they properly controlled? • What are the critical steps or phases to complete this work safely? • What is the worst thing that can go wrong? And how can I make a mistake at that point? • What errors could occur and what can be done to avoid them? • Are conditions appropriate for work to proceed? • What actions are to be taken if new hazards are identified? • What are the necessary permits to do this work? Have they been obtained, completed, and permit conditions met? • Is the training I need to perform this work current? <p>If at any time the worker is unaware of answers to the above questions, then he/she must suspend work and contact the work assigner for assistance. When any staff member sees an unsafe act, activity, or condition that creates imminent danger, he or she exercises Stop Work authority. See the Stop Work Subject Area.</p> <p>Note: Staff can request that the proposed work be performed under permit planned work, or re-evaluation of task hazards, if they feel there are location hazards, changes at the job site, hazards not previously identified, and/or job complexity issues that need to be addressed (even if the task is rated low). They contact their supervisor, who will work with the appropriate Work Control Coordinator or subject matter expert to address concerns.</p> <p>Note: Facility area hazards can be found in the work area on Placards, signs, tags, temporary barricades, and labels.</p>
Step 5	If the authorized work is not proceeding as planned, or new hazards are introduced or identified, the worker must pause, stabilize, and re-evaluate the work before proceeding, or initiate Stop Work Authority if imminent danger exists. When re-evaluating work, repeat step 4. Note: When re-evaluating work, consider if reclassification of work level is required per Section 2.2.
Step 6	At the completion of work, the worker <ul style="list-style-type: none"> • Ensures that the work site is left in a clean and safe condition; • Provides feedback (e.g., impact on configuration management, lessons learned) to their manager, supervisor, work requestor, or appropriate subject matter expert. <p>Note: Refer to the subsection 2.6 Post Job Review, Feedback and Improvement.</p>

References

[BNL Hazard Validation Tool](#)

[Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) Subject Area

[Stop Work](#) Subject Area

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

[| SBMS Home Page](#) | [| Top of Subject Area](#) | [| Instructions](#) | [| Changes](#) |

Questions/Comments

Disclaimer

PROCEDURE: WORK OBSERVATIONS

Management System: Work Planning and Control		
Subject Area: Work Planning and Control for Experiments and Operations		
4. Work Observations		
Effective Date: Aug 15, 2014	Subject Matter Expert: Raymond Costa	Management System Executive: Raymond Costa

Applicability

This information applies to BNL line management.

Required Procedure

Line Organizations conduct work observations as part of the BNL Work Planning and Control process evaluation. Work observations can identify:

- Potential Problems/concerns;
- Areas of excellence;
- Lessons learned that improve the BNL ISM Process.

Step 1	Before performing an observation the Manager completes the BNL Worker Safety Observation Training or equivalent (contact Safety & Health Services for training).
Step 2	Observe work without distracting or interfering with the work. Initiate an open discussion with the worker to include the following: <ul style="list-style-type: none"> • Comments on safe behavior; • Consequences of any observed unsafe acts; • Ideas for safer or more efficient ways to do the work; • Thank the employee.
Step 3	During the safety observation discussion with the employee/worker on the work observation, the Line Manager should use some of the following safety questions, as appropriate for the work being performed: <ul style="list-style-type: none"> • What energy/hazards are present? • Are employees, supervisors, and work planners aware of the hazards? • What part of your job concerns you? • What training/knowledge is needed to do the task safely? • Why do people get hurt? • What is the safety climate here? • What are our standards for safety (intended & actual)? • How are our Safety Management Systems working?

	<ul style="list-style-type: none"> • What needs to be improved here? • Where are the Danger Zones? • What did the Task Briefing and/or pre-job walk down cover? • Do you feel you have adequate tools for the job?
Step 4	Document the work observation in the BNL Worker Safety Observation Database . If there were any lessons learned during the observation, contact the Work Control Manager or Experiment Review Coordinator.
Step 5	The Work Control Manager or Experiment Review Coordinator forwards lessons learned generated from the work observations to the Lessons Learned Coordinator .

References

[BNL Safety Observation Database](#)

[Training and Qualifications](#) Website

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Top of Subject Area](#) | [Instructions](#) | [Revision History](#) |

Questions/Comments

Disclaimer

https://sbms.bnl.gov/sbmsearch/subjarea/109/109_pro3.cfm

PROCEDURE: OFF-SITE WORK

Management System: Work Planning and Control		
Subject Area: Work Planning and Control for Experiments and Operations		
5. Off-site Work		
Effective Date: Aug 15, 2014	Subject Matter Expert: Raymond Costa	Management System Executive: Raymond Costa

Applicability

This information applies to all Departments/Divisions, or their equivalent, that send their staff off-site to conduct assigned work.

Required Procedure

This section discusses Work Planning and Control for work conducted off-site. This section also provides guidance for work at different locations off-site.

Step 1	<p>The WCM/WCC and ESH Representative/Coordinator and staff who will be working off-site to meet to discuss the following:</p> <ul style="list-style-type: none"> • What is the scope of work to be performed? • What are the known hazards and concerns about the work to be performed? • What controls should be in place to perform the work safely? • The work planning process in place at the off-site location? Will we need to provide our own work plan? • What training is required by the off-site worker? <p>Use the exhibit Guidance in Conducting Off-Site Work to help determine how to plan and control off-site work.</p>
Step 2	BNL staff conducting work at an off-site laboratory or industrial company follow the procedures and safety requirements of that organization supplemented by BNL procedures and processes, where needed.
Step 3	If the off-site work requires a Radiological Work Permit (RWP) and the laboratory or industrial company does not have an RWP program, then the lead BNL person contacts a Facility Support Representative to initiate an RWP.
Step 4	If any BNL worker on an off-site assignment needs to ship hazardous materials from that off-site location to BNL, or from BNL to that location, then he/she complies with the requirements in Transportation of Hazardous and Radiological Materials Off-site Subject Area.
Step 5	If the work taking place off-site is not performed within the confines or jurisdiction of an Industrial Facility or Laboratory Environment (e.g., drilling a sample well outside Laboratory boundaries or a marine study in Long Island Sound), then a Work Control Coordinator or Experimental Review Coordinator evaluates the work.
Step 6	If a work permit is required, then the Work Control Coordinator and the staff conducting the

	work, follow the section Work Planning and Control for Operations .
Step 7	The Experiment Review Coordinator reviews the proposed experiment to determine if an Experiment Safety Review should be written. If a review is required, then follow the requirements in the section Experimental Safety Review .

References

[Facility Support Standard Operating Procedures](#)

[Transportation of Hazardous and Radiological Materials Off-site](#) Subject Area

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

| [SBMS Home Page](#) | [Top of Subject Area](#) | [Instructions](#) | [Revision History](#) |

Questions/Comments

Disclaimer

https://sbms.bnl.gov/sbmsearch/subjarea/109/109_pro5.cfm

Search...

Search SBMS »

Definition: Work Planning and Control for Experiments and Operations

Term	Definition
basic research	Research that is conducted to acquire and disseminate new knowledge of a theoretical/experimental nature; it does not lend itself to the establishment of predetermined results.
bench top research	Research conducted in a laboratory environment where the researcher has over-all control of the experimental apparatus (i.e., there is no need to communicate between the researcher and a facility operator).
Configuration Management (CM)	A disciplined process for maintaining the physical configuration of facility structures, systems and components (SSCs) important to safety, the Laboratory's mission, and protecting the environment consistent with their design requirements. Doing so ensures that these SSCs safely and reliably serve their intended purpose.
construction work	Work that includes alteration, repair, demolition, remediation, erection, dismantling, painting, moving of buildings or other structures, hoisting or rigging in support of the aforementioned, land clearing, and excavating.
controls and limits	A specific set of criteria established for an experiment. They can include both physical and administrative items. They are clearly stated in the Experimental Safety Review, or referenced by the use of other procedures, in the Experimental Safety Reviews. Collectively they define the boundaries (safety envelope) by which the experiment must be operated. Note: Typically control and limits should be reserved for controlling situations that involve moderate or high risk of injury or significant property damage.
Credited Control	Controls determined through a contractor safety analysis, such as that found in a Safety Assessment Document (SAD), to be essential for safe accelerator operation directly related to the protection of personnel or the environment. Also, Credited Controls are identified in a DOE approved document such as an Accelerator Safety Envelope (ASE).
desk/paperwork	Paperwork or computer-related work performed at a desk in an office environment. Typically includes work at a computer station, management, administrative services, data entry, information gathering, filing, and clerical activities. Note: Repair and warranty work associated with copy machines is not considered desk/paperwork.
emergency	An event or uncontrolled release of hazardous substances or energy that requires immediate response to prevent death or serious injury to BNL employees, visitors and/or guests, BNL equipment, or the environment.
experiment	Processes and preparations necessary to conduct non-routine tests or investigations of physical phenomena utilizing equipment, materials, or energy.
Experimental Review Coordinator (ERC)	Assigned by the Department Chair/Division Manager. The ERC is the person (or persons) within the Department/Division who assists the Principal Investigator/Responsible Person in generating Experimental Safety Reviews and also coordinates the review of experiments. ERCs are members of the Experimental Safety Review Team (ESRT). The ERC serves as the interface between the operational groups and the experimental groups, and the ESRT and the experimental groups.
Experimental Safety Review (ESR)	The process/document used to review experimental activities to define the scope of work, analyze the ES&H hazards/risks, determine the controls, plan the work, review and approve the plan, authorize the start of work, communicate all to workers, and solicit worker feedback.
Experimental Safety Review Team (ESRT)	A Departmental/Divisional level committee with the responsibility for reviewing experiments (and significant modifications to experiments) for the following: <ul style="list-style-type: none"> • ES&H concerns; • Ensuring appropriate controls for each experiment (during set-up, operations, and tear-down) are established; • Based upon ES&H concerns, recommending to the Department/Division approval or disapproval. <p>Some Departments/Divisions may already have existing committees or committees with multiple responsibilities that may also perform the Experimental Safety Review. There is no need to change the makeup or names of these committees; however, for consistency, ESRC will be used in this Subject Area. In cases where the scope and hazard levels are sufficiently low, an appropriately sized subcommittee of the ESRC may be used.</p>
external work	Work that is performed by BNL or Non-BNL staff who are external to the facility or organization; these individuals are not as familiar with location hazards.
Facility Risk Assessment (FRA)	Some hazards may arise from activities or tasks not associated with a specific job. The facility itself and its general operations present certain exposures to hazards, e.g., electrical equipment, access and egress, fire hazards, heat or cold conditions, tripping hazards, noise exposures, radiation exposures and chemical exposures. These types of hazards are addressed with a facility-wide risk assessment. In this context, risk is the product of the occupancy, likelihood, and severity. Points for occupancy, likelihood, and severity are based on a stepwise numerical system. A specific range of point values for risk is associated with one of five descriptive classes of risk: negligible, acceptable, moderate, substantial and intolerable.
Facility Use Agreement (FUA)	A landlord-tenant contract that defines the operational safety envelope for each building and establishes an agreement among occupants and support services for conducting work within this framework. The FUA functions as an integrating reference document that links building specific operational criteria with Laboratory-wide management systems and information services.
hazard	A known source of danger where failure to designate it may lead to accidental injury or illness to staff, the public, or both, or to the environment (e.g., operation, radiation, chemical, high pressure, electrical, mechanical, etc.).
Human Performance Improvement (HPI)	

	HPI is a set of concepts and tools based on the knowledge of human behavior which helps us understand, and better manage, the interaction of people, equipment, processes, work environment, and the organization to <i>reduce errors</i> and foster <i>continuous improvement at every level</i> .
internal work	Work that is performed by individuals who reside in the facility or organization.
Job Risk Assessment (JRA)	A job is a sequence of separate steps or activities that together accomplish a work goal. Each of the steps or activities is analyzed for associated hazards. In this context, risk is the product of the occupancy, likelihood and severity. Points for occupancy, likelihood and severity are based on a stepwise numerical system. A specific range of point values for risk is associated with one of five descriptive classes of risk: negligible, acceptable, moderate, substantial and intolerable.
job supervisor	A qualified person who assigns staff tasks/jobs, ensures staff has the required training and qualifications for assigned tasks/jobs, holds staff accountable for performance, provides oversight of the work, acts to ensure safe and effective operations, and accepts work when it is completed.
manual/hand delivery	Any delivery by a supplier/shipper to BNL that does not require the use of special, powered equipment other than manual material-handling equipment.
office environment	A work environment where there are no known source(s) of danger that may lead to accidental injury or illness to staff, the public, or both, or to the environment. Typical work includes management, administrative duties, office support, and clerical activities.
operational safety envelope	The conditions/boundaries by which safe operation is maintained within a process or facility.
operations	Any activity involved with operating, monitoring, or maintaining a facility, grounds, machine, process system, or item of equipment.
Prescribed work	Use of work documents that are a formal set of instructions or guidelines (e.g., standard operating procedures (SOPs), contractor health and safety plan, contractor procedure, operating/maintenance manual.) The goal of prescribing the way work will be performed is to control the work such that the levels of hazard, complexity, and coordination are low.
Primary Reviewer	The person designated by the Line Organization to provide an independent review ensuring that due diligence has been accomplished in executing the work planning process to generate a work permit.
Responsible Person/Principal Investigator (RP/PI)	The person who takes responsibility for all the members of a team that carry out an experiment or experimental program at BNL. The RP/PI may or may not be a BNL employee, but they are able to act as a spokesperson for their experiment for the purposes of this Subject Area. The RP/PI is not solely responsible for the technical details and hazards associated with the experiment. This responsibility resides jointly with the RP/PI, ERC, ESRC and the processes covered by this Subject Area.
routine/repetitive experiments	Experiments that are <ul style="list-style-type: none"> • Repeated over time by appropriately qualified persons; • Have a well-understood set of hazards that have been reviewed; • Have established controls.
Significant Experimental Modifications	Any changes that would exceed the pre-established controls/limits approved by the Department Chair/Division Manager.
substitution of hazards	Substitution of a hazardous chemical/substance with one that is less or non-hazardous. Extreme care must be taken to ensure that one hazard is not being exchanged for another, especially one that could even be a more serious hazard. Note: Although substitution is the most direct method of reducing hazards, it is not always practical. A very careful evaluation must be done before any substitution.
work	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 ESSH 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 Permit (WP)	A document used to define the scope of work as per the work request, analyze the ES&H hazards, determine the work controls, plan the work, review and approve the plan, conduct a pre-job briefing, authorize the start of work, and solicit worker feedback.
work rated as high-hazard	Work requiring the coordinated actions of multiple organizations and outside contractors to prevent serious injury to staff, significant damage to equipment or structures, or releases of reportable quantities of potentially hazardous materials to the environment (e.g., any one of the ESS&H issues, work coordination, or work complexity categorized as a high hazard). See the exhibit Application of Graded Approach in the Graded Approach for Quality Requirements Subject Area.
work rated as low-hazard	Work requiring the attention of the average worker to prevent minor injury. Failure to correctly perform low-hazard work would not damage equipment or structures or release potentially hazardous materials to the environment, except as a result of gross negligence (e.g., ESS&H issues, work coordination, and work complexity categorized as low hazard levels). See the exhibit Application of Graded Approach in the Graded Approach for Quality Requirements Subject Area.
work rated as moderate-hazard	Work requiring the coordinated actions of multiple organizations or one or more person(s) to prevent any injury to staff, minor damage to equipment or structures, or a release of hazardous materials to the environment (e.g., any one of the ESS&H issues, work coordination, or work complexity categorized as a moderate hazard). See the exhibit Application of Graded Approach in the Graded Approach for Quality Requirements Subject Area.
worker planned work	The level of proficiency that allows a worker to perform tasks independently due to their level of training and documented experience. This concept applies to all staff from scientists and technicians to the trades persons and laborers.

It is applied to routine, low-hazard tasks that support fulfillment of a facility or group's function. The tasks can range from complex to simple day-to-day activities. Each organization determines their worker planned work tasks.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

BNL Working Alone Guidance

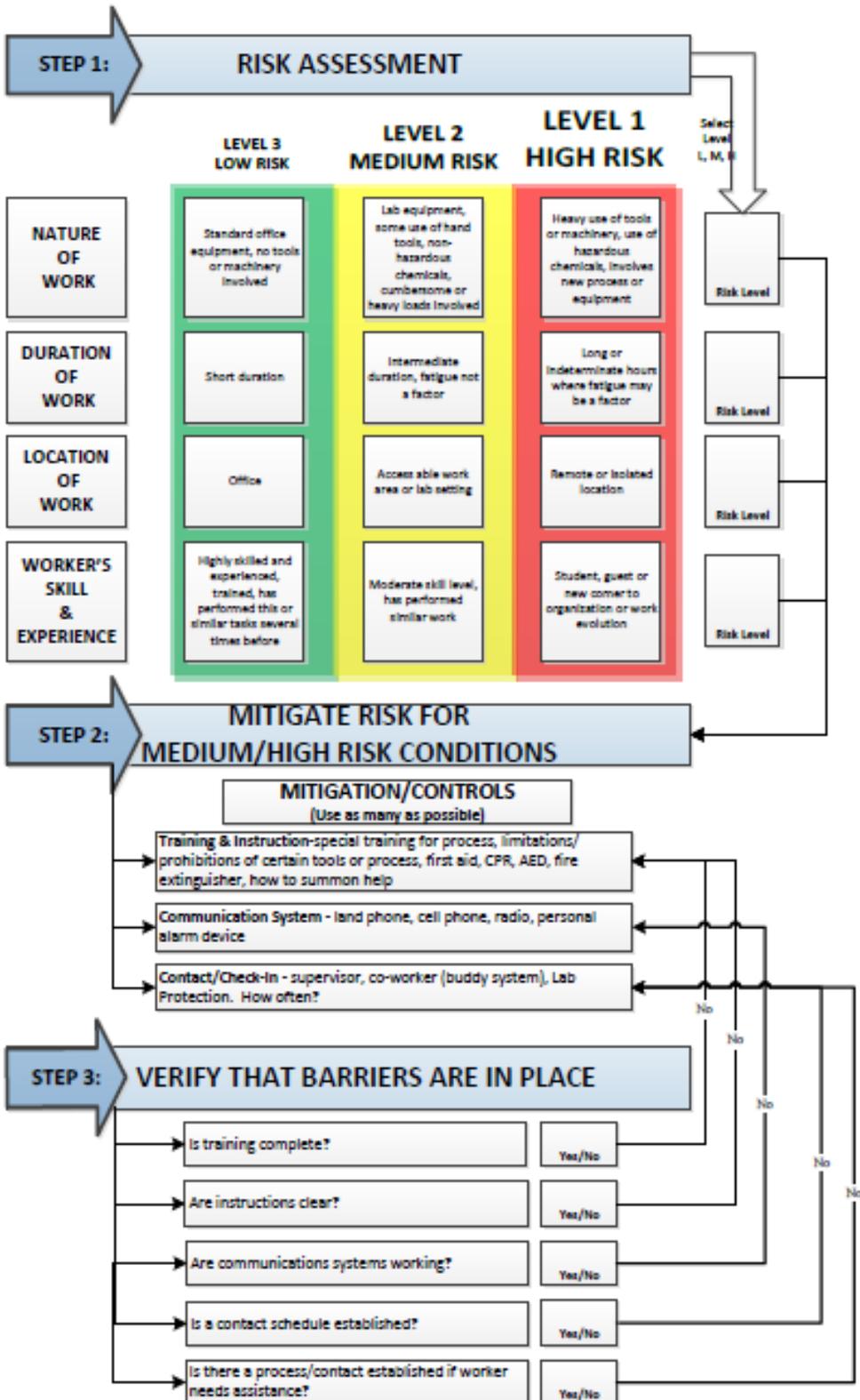
Purpose: To assist supervisors in determining whether activities performed by workers should be performed alone

Working alone has special hazards. If there is a need to work alone, consider what would be done if an emergency/accident occurred. When working alone is deemed necessary, line management is responsible for taking sufficient measures to protect employees and the institution.

This guidance has been assembled to assist supervisors in assessing the risk, establishing and verifying controls associated with the special hazards of working alone when it is deemed necessary. This guidance may assist supervisors in determining that workers should not work alone.

Working alone is defined as work in circumstances/location where assistance would not be readily available to a lone worker in case of emergency, injury, or illness; or, when working with a hazard that could incapacitate the worker so that he/she cannot “self-rescue” or activate emergency alarms. Furthermore, the worker is the only person in the work area and is not directly supervised or observed by another person at any time. This includes *working after hours* and *working in isolation*.

WORK ALONE GUIDANCE



Other Definitions:

<i>after hours</i>	With the exception of round the clock operating organizations (e.g., Fire /Rescue, Collider-Accelerator), a period of time when “normal” weekday or shift operations cease (i.e., between 5:30 p.m. and 7:00 a.m. weekdays, Saturday, Sunday, holidays, and any other day the Laboratory is officially closed).
<i>buddy system</i>	System of organizing work so that the worker can always be seen or heard by at least one other worker for the periodic checking of the person’s safety.
<i>workers</i>	Persons performing work at the BNL Upton site, including employees, guests, students, and subcontractors.
<i>working in isolation</i>	A setting where a worker performs work when there is nobody within sight or earshot who can assist the worker in the event of an emergency, injury, or ill health, and when the worker cannot expect a visit from another person.

Process Details/Questions

1) Assessing the Risk:

Consider the following items when assessing the risk of working alone or in isolated area. Each circumstance will be different, so adapt the questions to suit your situation.

- What type of *Work Alone* is involved?
- Work after normal hours?
- Work in an isolated area?
- Can this work be reasonably scheduled for another time or location to eliminate working alone?

What is the background of the worker working alone?

- Worker with many years of experience? Newcomer to organization? Undergraduate student?
- Guest from another location not familiar with BNL emergency services?
- Is it reasonable for the person to be alone at all?

Appropriateness of working alone/in isolation:

- Is it prohibited for the person to be alone while doing the activity? (For example, entry into a confined space without an attendant is prohibited/welding in certain areas without a fire watch).
- What are the consequences resulting from a “worst case” scenario. Is it an acceptable outcome?
- What are possible things that can go wrong? Can they be made acceptable with controls?
- What elevates the risk to the worker? Is there adequate self-rescue?

Location of the work:

- Is the work in a remote or isolated location?
- Is transportation necessary to get there? What kind of transportation is needed?
- Can emergency responders find the worker easily?
- If the person is working inside a locked building, will emergency services be able to get in?

Length of time the person will be working alone:

- What is a reasonable length of time for the person to be alone? How long will the work take?
- What time of the day will the person be alone? Is that a normal time for the worker to be awake?

Communication:

- Is it necessary to "see" the person, or is voice communication/remote camera adequate?
- Will anyone not associated with the work be able to see/hear if an adverse event has occurred? Is it reasonable to expect that by-stander to summon help based on what they will observe from their location?
- Will emergency communication systems work properly in the setting?
- What forms of communication are available for employees to contact emergency assistance?

Type or nature of work:

- Is there adequate training and education for workers to work alone safely?
- Is personal protective equipment adequate and in working order?
- What machinery, tools or equipment will be used? Is any machine more hazardous when operated alone?
- Is there a high risk activity involved?
- Is there risk of an animal attack, insect bite (poisonous or allergic reaction), etc.?

Characteristics of the individual who is working alone:

- Are there any pre-existing medical conditions that may increase the risk?
- Does the person have adequate levels of experience and training?
- Is the individual accustomed to working alone?
- Does the work involve a new process or new equipment?

2) Establishing Controls:

Items to Consider to Address Special Hazards of Work Alone/isolation:

- Observation (closed circuit video systems) and/or communication equipment
- "Person down" systems
- Changes procedures/methods/schedules
- Special training
- Limitations/prohibitions of certain tools
- Limitations/prohibitions on certain processes
- New equipment/ processes required

3) Verify that Controls and Barrier are in Place:

(Are these items present and in working order? Are they accessible and understood by the worker?)

Training and instruction:

- | | | | |
|-------------------------|------------------------------|---------------------------------|----------------------------------|
| • First aid | • CPR | • AED | • Fire Extinguisher |
| • Use of a special Tool | • How to summons assistance? | • Use of communication systems? | • How to do special work method? |

Communication systems

- | | | | |
|--------------|------------------|---------------|--------------------------|
| • Land phone | • Cellular phone | • 2-way radio | • Personal alarm devices |
|--------------|------------------|---------------|--------------------------|

Additional Information

Contact (check-in) systems

It may be important that a check-in procedure be in place for operations with significant hazards. Consider if a verbal check-in is adequate, or if the employee could be accounted for by a visual check.

When traveling, a contact person should know the following details:

- Destination;
- Estimated time of arrival;
- Return date & time;
- Contact information while away;
- Mode of travel (public transit, car, plane, etc.); and
- Alternate plans in the event of bad weather, traffic problems, etc.

For on-site work, consider a check-in procedure such as

- Daily plan so it is known where the lone employee will be and when.
- One person named to be the contact at the office, plus a back-up.
- Circumstances that trigger the lone employee to check in and how often.
- Visual check or call-in schedule.
- Contact person call or visit the lone employee periodically to make sure he or she is okay.
- Emergency action plan to be followed if the lone employee does not check-in when he/she is supposed to.

Buddy System

Some work operations have hazards that could suddenly incapacitate a person. Such operations should not be performed without the assistance of another individual who could immediately render assistance or summon help, if necessary (i.e., Buddy System). The “buddy” is to be constantly within sight or sound of other individual and trained to react appropriately to the hazard(s) involved and call Security in the case of an emergency.

Laboratory Protection Check-in Process

During hazardous operations, if the Buddy System is not feasible, an alternative can be achieved by contacting BNL’s Laboratory Protection Division at Building 50 (344-2238) prior to beginning work. Provide the name, telephone number and exact location of the lone worker. An agreed upon time period will be set for communications with the lone worker (e.g., every 30 minutes, four hours, etc.).

The alone worker may then contact Security at the agreed upon time period to let them know his/her status. If Security is not contacted at the agreed upon time interval, a Security Officer could respond to the area to investigate. A supervisor or co-worker can also fill the role of the person to be contacted if a similar process is developed.

Holidays

Access to the buildings during holidays should be only for non-hazardous areas and non-hazardous activities:

- People using buildings during holidays should consider how others will know of their presence in the event of an emergency incident, such as fire or medical emergency.
- People with pre-existing medical conditions that place them at high risk of being alone, can call the Laboratory Protection Division (LPD) at Building 50 (344-2238) and provide their name, building name, and room number. When made aware of those working alone, the LPD will provide periodic check in with those persons.

Emergency Planning

- What process is to be followed if the worker cannot be contacted?
- What process is to be followed if the worker needs assistance?

ESH&Q Considerations When Designing an Experiment

Effective Date: Jan 23, 2015

Note: These guidelines are not intended to be all-inclusive or mandatory. They are intended to provide guidance on experimental setup and review based on experience. The [BNL Hazard Validation Tool \(HVT\)](#) may also be used as a mechanism for hazard screening.

Environmental Issues	
Safety Issues	<ul style="list-style-type: none">-Loss of radioactive cooling water or fire-protection water-Inadvertent radioactive or gaseous air emissions-Loss of radioactive waste or hazardous waste to ordinary waste stream-Induced activity in soil and subsequent contamination of groundwater-Loss of hazardous material to trenches or to soil and groundwater
Potential Initiators of Safety Problems	<ul style="list-style-type: none">-Loss of pressure on domestic water supply-Violation of procedures for removal of waste-Cooling-water-pipe break and loss of water to a storm sewer and recharge basin-Inadequate containment between accelerator structures and the contiguous earth-Broken gas line or gas-filled chamber-Equipment leak or malfunction (i.e., transformer, capacitor, vacuum pump)
Items to Consider When Designing for Safety	<ul style="list-style-type: none">-Containment structure to protect soil and groundwater-Special shields to reduce soil activation to ALARA-Formal design reviews for modifications-Drawing configuration control-Domestic water supply equipped with back-flow preventors-A system to hold-up spilled liquids-A system for normal and emergency gas ventilation-Specific waste-handling training of operators-Lock-down of ordinary waste stream, hazardous waste stream, radioactive waste stream-Removal of or blocking-off storm-sewer drain-lines near accelerator-Alarms on local sumps and manual starting of sump pumps-Air or water Permits in place if required-Special procedures to inspect area or system for leaks periodically-Controls established specific to equipment/process-Intermittent energy release that may startle workers

Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Drinking Water • Engineering Design • Environmental Aspects and Impacts • Environmental Assessments and ESH Management Review • Environmental Monitoring • Hazardous Waste Management • Liquid Effluents • Mixed Waste Management • National Environmental Policy Act (NEPA) and Cultural Resources Evaluations • Non-Radioactive Airborne Emissions • PCB Management • Pollution Prevention and Waste Minimization • Radioactive Airborne Emissions • Radioactive Waste Management • Regulated Medical Waste Management • Underground Injection Control
Quality-related Issues	
Personnel Training	<p>Select Qualified personnel before work. Their training must be identified, completed, recorded, maintained, and reviewed before work. See the Training and Qualifications Subject Area.</p>
Documents	<p>Identify documents considered necessary for meeting objectives, and for the safe conduct of operations of the facility/experiment, described processes, specify requirements, or established design. See the Document Control Subject Area.</p>
Records	<p>Identify records documenting actions taken during an experiment/operation that have affected execution, milestones, or ESH&Q issues. See the Records Management Subject Area.</p>
Calibration	<p>Establish calibration procedures and frequency for equipment and devices considered necessary to meet the project's objectives and safe conduct of operations/experiments. See the Calibration Subject Area.</p>
Control of Nonconforming Items	<p>Identify, control, and correct items, services, and processes that do not meet established requirements. See the Event/Issues Management Subject Area.</p>
Design	<p>Prepare drawings, specifications, and other design documentation that are considered necessary to define the design parameter of the item/process. See the Engineering Design Subject Area.</p>
Procurement	<p>Select and apply quality-related requirements to be imposed upon a BNL supplier. Evaluate the capability of suppliers of critical, costly, or complex items.</p>

	See the Graded Approach for Requirements ; Purchase Requisition Review for Quality-related Requirements ; Supplier Pre-Award Evaluation Subject Areas.
Inspection and Acceptance Testing	Conduct source, receiving, in-process, and final inspection/testing of specified items, services, and processes using established acceptance and performance criteria. See the Inspections and Acceptance ; Suspect/Counterfeit Items Subject Area.
Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Calibration • Engineering Design • Event/Issues Management • Graded Approach for Requirements • Inspections and Acceptance • Document Control • Purchase Requisition Review for Quality-related Requirements • Records Management • Supplier Pre-Award Evaluation • Suspect/Counterfeit Items • Training and Qualifications
Personnel Exposure Issues	
Safety Issues	<ul style="list-style-type: none"> - Accidental exposure of workers to radioactive contamination or toxic materials - Failure to follow the design review procedures - Improper fabrication of accelerator devices - High temperatures or pressures - Cooling pipe break on systems with ethylene glycol - Oil leak from capacitors, transformers, pumps, motors - Unsafe practices for handling radioactive, hazardous, and toxic materials - Fire near uranium or other pyrophoric metal - Improperly designed or functioning lab hood - Chief Mechanical Engineer or Safety and Health Services Division certifies vessels, pressure chambers, relief valves - Chief Mechanical Engineer or Safety and Health Services Division certifies construction and testing procedures - Gas flow limits established - Operators trained on procedure for operation of gas or gas-mixing systems - Fail-safe temperature or pressure interlocks - Approved operator procedures and training for handling hazardous materials - BNL Hazard Communication Training for operators - Labeling of pipes and vessels as to contents - Inspection of chemical and hazardous materials inventories - Minimal combustible loading - Operators trained in appropriate emergency procedures - Controls established specific to equipment or process

<p>Applicable Radiological Control Procedure and Subject Areas</p>	<p>Subject Areas</p> <ul style="list-style-type: none"> • Bloodborne Pathogens • Chemical Safety • Compressed Gas Cylinders and Related Systems • Exhaust Ventilation • Facility Hazard Analysis • Fire Safety • Pressure Safety • Signs, Placards, and Labels for Environmental, Safety and Health (ESH) Hazards (see the section Piping Systems) <p>Standard Operating Procedures (Radiological Control Division) Personnel Monitoring (PM) Standard Operating Procedures</p>
<p>Flammable Or Combustible Materials Issues</p>	
<p>Safety Issues</p>	<ul style="list-style-type: none"> - Loss of life or severe injury - Damage to components or facilities - Impact on the experimental program due to fire-related interruptions - Damaged or improperly connected electrical cables - Ignition of flammable gases - Ignition of flammable liquids - Inadequate cooling design - Poor housekeeping - Sprinkler and halon protection systems for high-value areas or components - High-sensitivity fire-detection systems - Selection of materials that reduce the potential for flame spread - Emergency exhaust ventilation systems - Use of strategically located exits - Use of audible alarms to reduce the potential of loss of life - Elimination of potential ignition sources - On-site fire/rescue organization notified on movement of flammable materials - Emergency planning and drills - Limits on flammable gas or liquid inventory and on flow rates - Required safety review for any modification on use of flammable gases or liquids - On-site safety inspection for installed equipment or material containing large amounts of wood, paper, plastic or other combustible matter - Use of fire wire fire-detection systems - Electrical energy interlocks tripped by heat or smoke detectors - Using refrigerators or containers that meet the criteria of Underwriters Laboratories or Factory Mutual for flammable materials - Identifying and posting hazardous locations for flammable or combustible materials storage or use - Written procedures whenever temporarily impairing fire detection/protection systems - Fire watch - Controls established specific to equipment or process

Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Cryogenics Safety • Environment, Safety, Health and Quality (Tier I) Inspections • Fire Safety • Facility Hazard Analysis
Electrical Energy Issues	
Safety Issues	<ul style="list-style-type: none"> - Electrocution death and injury - Electrical arcing and molten-metal spray injury - Secondary injury from being thrown by electrical shock - Unsafe practices such as failing to follow lock out and tag out rules - Working and testing hot - Poor package design - Stored energy discharge - Failed captive key system - Approved procedures and training - Control zones around energized parts with signs and barriers - Use of permits to work hot - Equipment-specific lock out and tag out procedures - Externally controlled manual discharge devices - Automatic discharge of stored energy - Safety grounding - Installation of barriers on exposed bus, terminals, capacitor banks - Sufficient insulation and clearances - Captive-key system - Use of a safety watch or two-man rule where appropriate
Applicable Standards and Subject Areas	<p>Subject Area</p> <ul style="list-style-type: none"> • Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance Subject Area • Electrical Safety Subject Area
Oxygen Depletion Issues	
Safety Issues	<ul style="list-style-type: none"> -Asphyxiation - Rescue of a victim overcome by lack of oxygen - Inadvertent entry into gas-filled confined space - Release of asphyxiant during entry into a routinely occupied space - Entry into an existing oxygen deficient environment - Entry procedure required for confined space - Written procedures for purging any hazardous gases from confined spaces - Safety reviews and functional testing before specific operations - For complex systems, conduct Failure Mode and Effect analysis to assess potential release paths - Medical certification of workers - Access controls - Use of self-rescue self-contained breathing apparatus - Use of fixed and portable oxygen monitors to determine oxygen deficiency before entry - Emergency response procedures - Generic and site-specific training - If the oxygen deficiency hazard is caused by a cryogenic, review by Laboratory Environmental Safety and Health Committee

Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Confined Spaces • Oxygen Deficiency Hazards (ODH), System Classification and Controls • Personal Protective Equipment and Respirators
--------------------------	---

Hydrogen Issues

Safety Issues	<ul style="list-style-type: none"> - Physical injury (e.g., eye injury, broken bones) - Burns - Explosion, equipment damage
---------------	--

Potential Initiators of Safety Problems	<ul style="list-style-type: none"> - Fire near a hydrogen device - Electric sparking in or near a hydrogen enclosure - Leak in hydrogen distribution system
---	--

Items to Consider When Designing For Safety	<ul style="list-style-type: none"> - Vacuum sensors, where appropriate - Hydrogen gas detectors in vent lines - Fire wire around nearby equipment - No smoking or open flame boundaries defined and posed - Use of a separate hydrogen enclosure that meets Class I Division II criteria for electrical circuits in explosive atmospheres - Controls on the introduction of ordinary equipment into the hydrogen enclosure - Fire detectors in and around the enclosure - Interlocks to turn off power to potential ignition sources should a fire develop, a vacuum leak be detected, or hydrogen gas be detected - Automatic, fail-safe venting of hydrogen gas out a vent stack - Trained operators who have procedures to respond to alarms - Written procedures for the operators; for example, hydrogen venting, filling, testing for hydrogen gas leaks - Safety reviews and functional testing before specific operations - Evacuation alarms and training for operators and nearby personnel, if required - Verification of alarm annunciation - Limit the amount of hydrogen gas to the minimum necessary to conduct experiment
---	---

Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Cryogenics Safety • Fire Safety • Facility Hazard Analysis
--------------------------	--

Magnetic Fields and Electromagnetic Radiation Issues

Safety Issues	<ul style="list-style-type: none"> - Reaction with medical implants - Magnetic push or pull of heavy metal object - Hyperthermia, Cataracts, Lenticular Opacities (rf)
---------------	---

Potential Initiators of Safety Problems	<ul style="list-style-type: none"> - Inadvertent exposure to stray magnetic field near spectrometer magnet - Exposure to rf radiation or laser light from improperly enclosed devices - Failure or bypass of interlock system - Areas with strong magnetic fields are to be fenced and posted with
---	--

	<p>appropriate warnings</p> <ul style="list-style-type: none"> - Magnets with large gaps undergo and environmental review before turned on to ensure signs and warnings are present, to ensure loose ferrous objects are not present, and to ensure magnet will be properly restrained - Measurement of magnetic fields around spectrometer magnets should be used to ensure fencing and posting are locate appropriately - Doors are posed with warnings for persons using a cardiac pacemaker - Local barriers are placed around rf stations - RFI gaskets are used on equipment to prevent rf radiation leakage - Routine monitoring of rf radiation to determine if gaskets are effective - Interlocks on laser barriers - Eye protection of laser users
Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Electrical Safety Subject Area • Laser Safety • Non-ionizing Radiation Safety Subject Area • Static Magnetic Fields
Thermal Energy Issues	
Safety Issues	<ul style="list-style-type: none"> - Burns - Fires
Potential Initiators of Safety Problems	<ul style="list-style-type: none"> - Spills of cryogenic liquids - Contact with cold lines associated with liquid cryogenic systems - Contact with hot surfaces of machinery or soldering irons - Improper protective clothing for cutting and welding operations - Inadequate or lack of labeling of piping systems
Items To Consider When Designing For Safety	<ul style="list-style-type: none"> - Insulation on cold or hot surfaces - On-site review of installation - Use of a Cutting and Welding Permit - Posting or fencing in boundaries for cutting and welding
Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Cryogenics Safety • Natural Hazards in the Environment • Signs, Placards, and Labels for Environmental, Safety and Health (ESH) Hazards (see the section Piping Systems)
Kinetic Energy Issues	
Safety Issues	<ul style="list-style-type: none"> - Physical injury (e.g., eye injury, broken boned, hearing loss, fatal injury) - Misoperation of power tools or motorized equipment - Pressure testing with inappropriate vessels or piping - Inadvertent contact with rotating or moving machinery - Improper rigging of experimental apparatus or shielding - Failure to wear proper personnel protective equipment

Items to Consider When Designing For Safety	<ul style="list-style-type: none"> - Machine guards - Written procedures for large equipment moves - Person in Charge (PIC) of large equipment moves - Safety reviews and functional testing before specific operations - Personnel protective equipment requirements - Equipment operators training and certification - Dedicated lifting equipment with limits stenciled on device
Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Lifting Safety • Noise and Hearing Conservation
Potential Energy Issues	
Safety Issues	<ul style="list-style-type: none"> - Physical injury (e.g., eye injury, broken bones, hearing loss)
Potential Initiators of Safety Problems	<ul style="list-style-type: none"> - Release of stored energy associated with compressed gases or large vacuum spaces - Puncture of a vacuum window - Improper hoisting operation - Failure to wear proper personnel protective equipment - Pressure and vacuum equipment is designed to applicable codes - Safety reviews and functional testing before specific operations - Written procedures for use of compressed gas systems - Window covers and shutters on vacuum windows - Chief Mechanical Engineer certification of thin vacuum windows - Chief Mechanical Engineer certification of vacuum or pressure vessels - Written procedures for pressure testing or vacuum window testing - Written procedures for in-house assembly of vacuum or pressure vessels - Use of personnel protective equipment
Applicable Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Compressed Gas Cylinders and Related Systems • Pressure Safety
Biological/Chemical Hazards Issues	
Safety Issue	<ul style="list-style-type: none"> - Accidental exposure of workers to a biochemical hazard greater than TLV or IDLH - Release of a biochemical hazard to the environment - Failure to follow the experimental review process - Unsafe practices for handling biochemical hazards - Lack of appropriate personnel protective equipment - Change of material being evaluated without knowing hazards - Improper or lack of labeling of material - Improper storage of biochemical material - Exposure of material to heat/cold/radiation that alters its known properties
Items to Consider When Designing for Safety	<ul style="list-style-type: none"> - Peer review when working with unknown material - MSDS evaluation

	<ul style="list-style-type: none"> - Secondary containment - Minimization of material used - Conduct experiment in approved exhaust hood - Use of personal protective equipment - Adequate labeling - Approved operator procedures and training for handling hazardous materials - Hazard communication training - Eye wash and shower in area
Applicable Standards and Subject Areas	<p>Subject Areas</p> <ul style="list-style-type: none"> • Bloodborne Pathogens • Exhaust Ventilation • Chemical Safety
Criticality Safety Issues	
Safety Issues	<ul style="list-style-type: none"> - Inadvertent criticality - Release of fission products and radionuclides - Release of energy
Potential Initiators of Safety Problems	<ul style="list-style-type: none"> - Changes in moderation - Addition of fissionable materials - Changes in geometry - Changes in neutron poisons
Applicable Policy	Nuclear/Criticality Safety Subject Area

Radiation Issues Design Review Checklist

Note: ALARA Operations Review Checklist is included for reference and was developed by the Training Resources and Data Exchange (TRADE) network for use at DOE facilities.

In new facility/experimental design or modification, measures must be taken to maintain radiation exposure in controlled areas ALARA through facility and equipment design and administrative control. The primary methods used must be physical design features (e.g., confinement, ventilation, remote handling, and shielding).

Administrative controls and procedural requirement must be employed only as supplemental methods to control radiation exposures. For specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements must be used to maintain radiation exposures ALARA.

During the design of facilities/experiments or modifications to, the following objectives must be adopted:

- a. Optimization methods must be used to ensure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.
- b. This design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) must be to maintain exposure levels below and average of 0.5 mrem (5 microsieverts) per hour and as far below this average as is reasonably achievable. The design objectives or exposure rates for potential exposure to a radiological worker where occupancy differs from the above must be ALARA and must not exceed 20 percent of the applicable standards of 835.202.
- c. Regarding the control of airborne radioactive material, the design objective must be, under normal conditions, to avoid releases to the workplace atmosphere and in any

situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation must normally be used.

- d. The design or modification of a facility/experiment and the selection of materials must include features that facilitate operations, maintenance, decontamination, and decommissioning.

The following is a list of items that should be considered for applicability to the facility/experiment under consideration:

1. Shielding
 - a. Appropriate shielding material selection
 - b. No straight penetrations
 - c. Overlapping layers/shields
 - d. Appropriate maze design
2. Ventilation system
 - a. Air flow from clean to nonclean areas
 - b. Hoods and containment boxes under negative pressure or flow
 - c. Is HEPA filtering required?
 - d. Is air sampling required?
3. Material selection
 - a. Ease of surface decontamination
4. Access controls
 - a. Entry and exit arrangements for contamination and buffer areas
 - b. Radiological area separated from nonradiological areas where possible and transition to nonradiological areas
 - c. Interlock systems installed where required
 - d. Interlock systems documented and reviewed in accordance with 10 CFR 835 and [Electrical Safety](#) Subject Area
5. Dispersible materials operations
 - a. Are step off pads required?
 - b. Are quantities of materials greater than ALI quantities?
 - c. Bioassay requirements
 - d. Frisking/portal monitors
 - e. Decontamination facilities
 - f. Waste Handling operations
6. In-place radiation monitoring systems
 - a. Required fixed area monitors
 - i. Lights
 - ii. Alarms
 - b. CAM
 - i. Beta/Gamma
 - ii. Alpha
 - c. Warning lights/indicators
 - i. "X-ray on"
 - ii. "Beam On"
7. ALARA Pre-operational Review Checklist
 - a. For each phase of the operation, have the following been done?
 - i. Procedures established that include appropriate radiological steps or considerations;
 - ii. Number of workers, their positions, movements, and stay times estimated for each phase; and
 - iii. Estimates based on measured or calculated dose rates determined for each position noted for the
 1. whole body
 2. extremities
 3. skin and
 4. other, as applicable?
 - b. Dose estimates made for

- i. Each worker (or a typical worker) in each phase;
- ii. Collectively for each phase; and
- iii. ALARA goals (totals or for each phase)?
- c. Have the following been considered or planned?
 - i. Lowering radiation or airborne radioactivity levels by
 - 1. Shielding;
 - 2. Draining, flushing, or purging of components;
 - 3. Decontaminating components, areas, etc.; and
 - 4. Filtering ambient air;
 - ii. Minimizing time spent in radiological areas by
 - 1. Using special or remotely operated tools;
 - 2. Using experienced workers;
 - 3. Providing special or additional training for workers;
 - 4. Using mockups and run-through;
 - 5. Planning access paths, means of transport of heavy equipment;
 - 6. Having a prejob briefing;
 - 7. Removing physical interferences and blockages from area;
 - 8. Having appropriate portions of the work performed out of radiological areas;
 - 9. Listing and collecting all tools, parts, spares, etc., ahead of time;
 - 10. Providing adequate lay down space; and
 - 11. Providing service lines to area;
 - iii. Accommodating human factors by
 - 1. Providing extra lighting;
 - 2. Providing scaffolding, ladders, and supports as needed;
 - 3. Providing ventilation adequate for comfort; and
 - 4. Providing adequate communication methods (with backups if in dangerous or high radiation areas);
 - iv. Controlling the potential spread of contamination by
 - 1. Decontaminating components, areas.;
 - 2. Covering or spraying contaminated surfaces to reduce airborne;
 - 3. Covering or coating clean surfaces for ready decontamination;
 - 4. Providing containment or enclosure (tent, glove box, receiving bags for contaminated items, and the like);
 - 5. Providing means of collecting drainage, loose particles, and other escaping material (in pans, with vacuum suctioners or cleaners);
 - 6. Providing local ventilation ; and
 - 7. Filtering exhaust air;
 - v. Controlling access by
 - 1. Providing adequate procedures, checks and HP coverage for entries into appropriate radiological areas;
 - 2. Having area prominently posted by the HP group before the operation;
 - vi. Minimizing impact on other areas, systems, and operations by
 - 1. Weighing effects of increased dose rate on adjacent areas;
 - 2. Ensuring that air flow does not transport airborne contaminants out of the subject area;
 - 3. Isolating the subject system from other systems and uninvolved components in the same system, as appropriate;
 - 4. Coordinating the subject operation with other

- operations; and
- 5. Ensuring that any new installation or operation does not adversely affect future use of other systems (their operation, maintenance, inspection, calibration.);
- vii. Ensuring safety by
 - 1. Providing adequate procedures and safeguards when disabling or bypassing safety systems and components (e.g., overriding interlocks);
 - 2. Making sure contingency plans exist if rescue becomes necessary;
- d. Have radiological controls been planned?
 - i. Radiation work permit - review and approval?
 - ii. Posting
 - iii. HP coverage
 - iv. Hold points
 - v. Other
- e. Have the following been provided for the operational records, as appropriate?
 - i. Photographs
 - ii. Supplemental dosimetry
 - iii. Portable air samplers
 - iv. Other

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

- -





Standards-Based Management System



Home | MY SBMS | Documents | Forms & Exhibits | Requirements | Process Maps | Tools | Contacts | Lessons Learned | Help

SBMS Search

[Search Tips](#)

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

Experimental Safety Review Contents

Effective Date: **Aug 15, 2014**

The experimental documents, prepared in draft form by the Principal Investigator/Responsible Person (PI/RP) and reviewed by the Experimental Safety Review Committee (ESRC) (or subcommittee), should consider and address the following as applicable to the experiment. Other considerations to ensure the proper control of the experimental hazards may be added to the review, as appropriate, based on prior experience or input from subject matter experts and/or the ESRC.

1. The experiment purpose and scope;
2. Location of experiment (bldg./lab., off-site locations, etc.);
3. Expected duration of experiment, including setup and teardown
4. Personnel involved in the experiment;
5. Description of apparatus/equipment (including significant design- related documents to be managed as official records per the [Records Management](#) Subject Area);
6. Description of any material (purchased or collaborator-provided) to be used in the experiment that will require formal inspection and testing per the [Inspections and Acceptance](#) Subject Area;
7. The identification of any hazardous material that will require transfer between facilities and/or shipment off-site or from off-site to the Laboratory that are covered in the [Movement by Vehicle of Hazardous and Radioactive Materials On-site](#) Subject Area and [Transportation of Hazardous and Radioactive Materials Off-site](#) Subject Area;
8. Identification and evaluation of all hazards that will be present during setup, operation, and teardown of the experiment. You must have measures to control or mitigate these identified hazards:
 - a) Biological;
 - b) Physical (i.e., equipment hazards);
 - c) Chemical;
 - d) Radiological (including dose rates and beam/microwave intensities, as appropriate);
 - e) Quantities and types of gasses, chemicals, radioactive material/isotopes, and fissionable materials;
 - f) Working ranges of hazardous equipment (mechanical/electrical).

See the exhibit [ESH&O Considerations when Designing an Experiment](#) and the [BNL Hazard Validation Tool](#) for additional information.

9. Environmental Aspects: Refer to the [BNL Criteria for Significant Aspects](#) within the [Environmental Aspects and Impacts](#) Subject Area and identify any applicable significant environmental aspects. For each significant aspect deemed applicable, provide a detailed description. Contact your [Environmental Compliance Representative](#) for assistance;

10. The impact of the chemical and radiological inventory on the hazard classification of the facility where the experiment will be conducted and follow-up actions, including updating the Facility Use Agreement, as appropriate;

11. Any additional requirements due to the experiment being performed in an off-site location, e.g., WP&C Process, prophylactic vaccinations, travel permits/papers, out of country insurance coverage, traveling with hazardous materials. See the section [Off-site Work](#).

12. Training and qualification requirements for all participants of the experiment;

13. Any certifications or permits both internal and external to the Laboratory;
14. Any industrial hygiene controls, monitoring, and/or personnel protective equipment;
15. A Waste Disposal Plan as appropriate. Identification of waste generation and efforts to minimize waste. **Note:** See your Environmental Compliance Representative to determine if the experiment would constitute the treatment, storage or disposal of a waste not described in BNL's Radioactive Waste Management Basis (RWMB) Document.
16. List of experimental process/operating procedures/protocols (e.g., experiment operating procedures, emergency procedures, equipment maintenance requirements; calibration requirements (see the [Calibration](#) Subject Area);
17. Decommissioning and Decontamination plan, including the identification of hazards, controls necessary to tear down the experiment and funding required to terminate the experiment;
18. The need for any security requirements or notifications (see the exhibit [Security Checklist](#) for further guidance);
19. The need for Operational Readiness Evaluations. See the [Readiness Evaluations](#) Subject Area.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

Contacts

SBMS Staff
Management System Contact List
MS Roles/Responsibilities
Subject Matter Expert List

Lab-wide Contacts

Contact List (Laboratory Roles)
Employee Role Lookup

Help

SBMS Help Desk
SBMS Instructions
Frequently Asked Questions
Can't View PDFs?
Search Tips
Glossary/Definitions
Keywords

Lab-wide Resources

Lessons Learned
Recalled Products
Assessment Tracking System
Human Performance (HPI)
ESS&H Policy
SBMS External
Prime Contract



[Privacy and security notice](#) | [Report a problem with this page](#)



Standards-Based Management System



[Home](#) | [MY SBMS](#) | [Documents](#) | [Forms & Exhibits](#) | [Requirements](#) | [Process Maps](#) | [Tools](#) | [Contacts](#) | [Lessons Learned](#) | [Help](#)

SBMS Search

[Search Tips](#)

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

Guidance in Conducting Off-site Work

Effective Date: **Aug 15, 2014**

The following table provides some methods on how to approach assigned work that is not conducted on the BNL site, or controlled by BNL's Work Planning and Control Processes. Regardless of how you approach the work, always understand the following when off-site:

- Be aware that when you reach your destination, work conditions may be different than you expected. If necessary, call your supervisor and/or ES&H staff for guidance.
- Bring an emergency phone list with you: Security, your supervisor, SMEs per the work you will be doing, Work Control Coordinator, and/or ERC.
- If you are placed in an unsafe condition while off-site, attempt to stop the work and resolve the concern. If that is not possible, then you are responsible to remove yourself from the situation and not continue to work until the issue is resolved.

Work Location	Approach
Other Department of Energy Laboratories	1) Follow their Work Planning & Control (WP&C) Process.
Other U.S. Government Facilities	1) Follow their WP&C Process.
Other U.S. Research Facilities and U.S. Commercial/Manufacturing Facilities	1) Follow their WP&C Process. 2) Review work plan; and supplement, as necessary. 3) See Domestic Travel Subject Area.
Foreign Research Facilities and Foreign Commercial/Manufacturing Facilities	1) Within their WP&C process, identify the hazards and methods to mitigate those hazards. 2) Review work plan and supplement, as necessary. 3) See Official Foreign Travel Subject Area.
Aircraft/Marine	Contact the Chairperson of the Aviation and Marine Safety Committee.
Field Work (work done outside the confines or jurisdiction of a research or (e.g., collecting environmental samples off-site, drilling a well off BNL property)	Follow Appropriate WP&C Process (BNL's or host site's).

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

Contacts

[SBMS Staff](#)
[Management System Contact List](#)
[MS Roles/Responsibilities](#)
[Subject Matter Expert List](#)

Lab-wide Contacts

[Contact List \(Laboratory Roles\)](#)
[Employee Role Lookup](#)

Help

[SBMS Help Desk](#)
[SBMS Instructions](#)
[Frequently Asked Questions](#)
[Can't View PDFs?](#)
[Search Tips](#)
[Glossary/Definitions](#)
[Keywords](#)

Lab-wide Resources

[Lessons Learned](#)
[Recalled Products](#)
[Assessment Tracking System](#)
[Human Performance \(HPI\)](#)
[ESS&H Policy](#)
[SBMS External](#)
[Prime Contract](#)



[Privacy and security notice](#) | [Report a problem with this page](#)

Instructions for Filling out the Work Permit

Abbreviation/Acronym List

Bio = Biological

Dept = Department

Div = Division

ESSH = Environment, Safety, Security and Health

Est = Estimated

Ext = Phone extension

F&O = Facility & Operations Directorate

GHG = Greenhouse gas

Haz = Hazardous

HP = Health Physics

IH = Industrial Hygiene

No. = Number

NORM = Naturally Occurring Radioactive Material

OEM = Office of Emergency Management

PCB = Polychlorinated biphenyl

Rad = Radiological

Sup = Supervisor

TLD = Thermoluminescent Dosimeter

UIC = Underground Injection Control

USI = Unreviewed Safety Issue

WCC = Work Control Coordinator

WCM = Work Control Manager

Line management is directly responsible for the protection of the public, the workers, and the environment.

Header Information

The "Work Permit" line must be filled in by whatever numbering sequence a given department or group wants to use. The Work Control Coordinator (WCC) maintains a record (e.g., logbook, spreadsheet) of work permit numbers issued. The other three number lines are provided for tracking purposes and are filled in as appropriate. The "Standing Work Permit" box is checked if the permit is being used as such.

Section 1 – Work Request

The Work Control Coordinator (WCC) fills out the required information in this section using the work information collected from the requestor. The "Service Provider" line is the entity doing the work.

Section 2 – Hazard Analysis

The WCC or designee initially fills out this section identifying the **location hazards**, facility concerns, work controls, and specific training needs.

The WCC provides the work information to the service provider, identifies Review Team members and ensures a walkdown occurs (a job-site walk down is always required).

The WCC establishes a Review Team, considering the following as it applies to the work to be performed:

- ES&H professionals/SMEs
- F&O Facility Project Manager
- Research Space Manager
- Operations professionals
- Engineers
- Service provider
- Worker representatives.

NOTE: The Review Team must consist of at least the WCC, an ESH Professional/SME, and one additional member (serious consideration should be given to a worker representative as the additional member). These three signatures must be different and cannot be duplicated, that is to say the WCC cannot sign for the ESH Professional/SME or as the additional member, nor can the ESH Professional/SME sign for the WCC or as the additional member.

The service provider predominantly identifies the **task hazards** and appropriate controls.

The Review Team considers the following as it applies to the work to be performed:

- Visits the job site;
- Reviews and identifies the impact to experimental operations, hazard classification, Human Factors/HPI considerations, safety envelope of the facility, and the Facility Use Agreement, consulting with the appropriate personnel (e.g., cognizant engineer, technical authority, as needed).
- Reviews applicable Job/Facility Risk Assessments and procedures for hazards and established controls;
- Performs an ESSH analysis and identifies hazards and issues;

Note: Reviewing work permits in a team setting is encouraged, as opposed to circulating the permit for review and sign-off in series. The team environment is more effective in ESSH reviews and in coordinating the required resources.

NORM: NORM is an acronym for **N**aturally **O**ccurring **R**adioactive **M**aterial, which includes all radioactive elements found naturally in the environment. Long-lived radioactive elements such as uranium, thorium, and potassium, and any of their decay products, such as radium and radon, are examples of NORM. These elements have always been present in the Earth's crust and within tissues of all living beings. Many of these same elements are present in small quantities within soils as well as many building and everyday use materials. When in sufficient volume, the levels of radioactivity may be elevated enough to alarm the site vehicle radiation monitor. Examples of these materials are soil and cement products in quantities greater than 10 cu. yd., brick masonry, refractory or fire brick, rock salt, clay products (e.g., sewage pipe, some ceramics), fertilizers, oil absorbents, coal products, including sand blasting media (e.g., Black Beauty).

All vehicles transporting material off-site, to site maintenance, Transfer Station, Borrow Pit areas, or to the BNL scrap metal yard, must pass through the vehicle radiation monitor. Prior approval must be obtained from the affected Facility

Support (FS) group to bypass the site vehicle radiation monitor when removing large quantities of materials known to contain NORM, as described above.

DOE 151.1-C Screening Levels Are As Follows:

- Hazardous material screening criteria:
 - Dispersible with a vapor pressure >1 mm Hg (25 c);
 - NFPA Health Hazard rating of 3 or 4;
 - Quantity >5 gallons.
- Radioactive material screening criteria:
 - License-exempt materials, described in 10 CFR 30.11-30.19 (like timepieces, thermostats, etc.);
 - Non-dispersible materials, like sealed sources and other 'special form' radioactive materials, materials in compliant DOT Type B containers, and materials that cannot be reduced to <10 micron particles by some plausible mechanism;
 - Quantities less than DOE-STD-1027-92 Category 3 Value.
- Biological material screening criteria:
 - All hazardous biological agents and toxins that are subject to the requirements published in 42 CFR 73, 7 CFR 331, or 9 CFR 121 (including published updates).

ESSH

The "Screening Tool for Worker Planned Work" provides the process used to determine if work can be performed as worker planned work. The Screening Tool consists of for attributes: ESSH, Complexity, and Work Coordination.

If ESSH hazards are not clearly understood, controls not established or implemented, or there are security concerns (see the [Security Checklist](#)), then a work permit is required due to ESSH.

If equipment damage can occur if steps are performed out of sequence or omitted; the steps are not clearly understood; OR controls are not established, then a work permit is required due to work complexity.

If the work of others affects your work and your work affects others, OR work involves a Credited Control, then a work permit is required due to Work Coordination.

The bottom part of Section 2 is used by the WCC and/or Review Team to record the final attributes driving the work permit's **ESSH Level, Work Complexity Level, and Work Coordination**. A given task may meet the ESSH criteria for worker planned or prescribed work, but the complexity of the system or the work coordination involved can dictate a higher level of planning.

If the WCC or Review Team decides by using the "Screening Tool for Worker Planned Work" that the work can be performed as worker planned work the written work permit may be terminated at this point. If a permit will be used even though the work has been determined to be worker planned work, the service provider (supervisor, craft, or technician), and an individual authorizing work must sign in the lower right hand corner of the front side and use of the backside of the work permit is optional. Otherwise, the rest of the work permit form must be fully completed.

Section 3 – Work Plan

The work plan section is filled out predominantly by the Review Team, service provider and ESSH personnel or subject matter experts (SMEs) as needed. A written description must detail the job and any precautions that need to be taken.

The written work plan contains the following, as it applies to the work to be performed:

- A detailed description of the work: The instructions for accomplishing the work may be as simple as a few job steps or may be extremely detailed step-by-step instructions, using all the elements of the work control process. In some cases, they may reference technical manual steps. This planning may include the setup and use of mockups, dry-runs and other tools to ensure success of critical steps requiring special training and tools. Because of the broad range of work that may be included, the work control process is graded to match the hazards and complexity of the work and the Work Process/Procedure. The following must be considered, as a minimum, when determining the level of details for the description of work:
 - Skill level and experience of the workers
 - Special training requirements
 - Complexity of work
 - Number of steps in the performance of the work
- Prerequisites/Precautions: preparatory actions to be performed before work can be started and any administrative and physical requirements, and precautions that should be observed during performance of work;
- Directions: Steps that define how to do the work and that also identify those responsible for doing each task;

- Identification of industrial hygiene hold points and other monitoring;
- Hazard controls and mitigation strategies and/or operational limits imposed;
- Scheduling, coordination and notification;
- Changes impacting configuration management; and
- Post Work Testing: guidance concerning post work testing to ensure proper completion of work and/or system readiness to return to service.

Note: For very detailed work plans it is recommended the user refer to: [DOE Writer's Guide for Technical Procedures](#)

Note: As an alternative, work instructions may be documented in an approved internal or standard operating procedure, or referenced procedures that may be attached to do the work.

Note: The work plan must include required post-work testing and notifications to the Department/Division, or their equivalent, operations.

Primary Reviewer

After the WCC concludes that the Review Team has adequately planned and documented the Work Permit, each team member signs off in the "Reviewed By" section (i.e., ESSH Professional, Work Control Coordinator, F&O Facility Project Manager, and Service Provider, as it applies to the work to be performed).

The Primary Reviewer is appointed by the Department Chair/Division Manager, or their equivalent, or designee.

It is good practice to review work permits in a team setting as opposed to circulating the permit for review and signoff in series.

The Primary Reviewer conducts an independent review of the work plan on the Work Permit. The Primary Reviewer's signature means that: the Review Team members were appropriate for the work that was planned and familiar with the risks the work may involve, the Review Team visited the job site, and hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements.

After the Primary Reviewer signs the Work Permit, the Permit and supporting documents (if applicable) are forwarded to the WCC. The WCC ensures that scheduling, coordination and notification of stakeholder(s) has been accomplished.

Section 4 – Job Personnel (Supervisor and Worker) Signoffs

The WCC or job supervisor conducts a pre-job briefing with the work crew to review job hazards, permits, and/or work coordination requirements. The following is considered at the pre-job briefing:

- What are the hazards associated with the work? Are they properly controlled?
- What are the critical steps or phases to complete this work safely?
- What is the worst thing that can go wrong? How can we make a mistake at that point?
- What are the necessary permits to do this work? Have they been obtained, completed, and permit conditions met?
- What actions are to be taken if new hazards are identified? Should the WCC or job supervisors be contacted?
- Are workers aware that if additional crew members arrive on the job after the original briefing, they must also be briefed before they can start work?

After the pre-job briefing is complete, the job supervisor and workers sign Section 4 of the Work Permit, or an attached sign-off list, indicating that they understand the hazards, controls, and work permit requirements (including any attachments), and all training required for this permit is current/complete before they start working. The Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Note: The workers must sign for themselves; it is not permissible for the job supervisor to sign for the workers.

Note: If new workers or job supervisors are added to the job, they must attend a pre-job briefing and add their signatures to the permit prior to starting work.

Section 5 – Department/Division Line Manager, or their equivalent

The Department/Division Line Manager or designee authorizes work to be performed within the established controls and conditions of the Work Permit. The person signing section 5 on the work permit indicates line manager responsibility for ESSH.

Note: The work authorization (e.g., work permit, permits, procedures, and/or work instructions) must be at the job site.

Section 6 – Worker Feedback

This section is provided for the workers to feed back comments on ESSH issues from the job or on how to improve the work efficiency. The Work Control Manager or WCC solicits worker feedback in accordance with subsection 2.6.

At the completion of work, the WCC, job supervisor, or designee performs a post-job review, as it applies to the work performed, including the following:

- Verifies that the work/job is complete and meets the specifications established in the work authorization document(s) and work plans;
- Ensures that the work site is left in a clean and safe condition; and
- Obtains feedback from the workers, and provides feedback to the work requestor and/or Department/Division, or their equivalent.

The WCC or designee reviews the work/job performance by asking workers and/or job supervisor, as appropriate the following:

- How usable (user-friendly) were the procedures/work authorization documents?
 - Were procedures (or work authorization documentation) accurate? Were they sufficient?
- Were there any planning and/or scheduling errors?
- What unplanned for conditions or situations did you encounter? How did you handle them?
- Were there any unidentified hazards associated with the work? What actions were taken?
- Were there any critical steps or phases missing to complete this work safely?
- Were all necessary permits available, completed, and permit conditions met?
- Were additional crew members briefed before they started work?
- Were job-site resources and information sufficient?
- What training was missing/lacking, if any?
 - Was training for the job appropriate?
- What lessons can be learned from this job?
- What could have been done better?
- How can things be improved (e.g., communication, procedures, training, tools, etc.)?

The WCC, job supervisor, or designee

- Documents any feedback or pertinent information generated during the review of the work;
- Determines if facilities or work practices need to be changed as a result of worker feedback;
- Determines if the feedback should be incorporated into the BNL Lessons Learned Program (see the [Lessons Learned](#) Subject Area); and
- Incorporates feedback into the Department/Division, or their equivalent, processes, as appropriate

Section 7 – Post Job Review/Closeout

The original copy of the work permit is returned to the Work Control Coordinator who originated it initially.

The WCC (authorizing Department/Division or their equivalent) checks the quality of the completed permit and ensures that the work site is left in an acceptable condition. (The WCC can delegate clean up of work area to job supervisor). The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

The Work Control Coordinator reviews the permit for consistency, signs off to close it out, and files it. The WCC provides feedback to appropriate personnel if any permit discrepancies occur (e.g., administrative and operational closeout, missing signatures, procedure inaccurate).

The Department/Division, or their equivalent, is responsible for retaining the completed work permit.

File work permits according to the [Records Management](#) Subject Area.

Job Safety Analysis

I. Purpose

This procedure establishes a standard method for developing and using Job Safety Analyses (JSA).

II. Scope

The JSA process is available for use by all BNL employees, users, contractors, and subcontractors to analyze any work or operation that may present hazardous situations.

III. Procedure

1. Select the Job to Be Analyzed

A key element in a JSA Program is to effectively select which jobs and operations need to be analyzed. Selecting jobs at random reduces the focus of the program and the safety benefits. The supervisor of the work crew or the operation is responsible for identifying jobs that require safety analysis. The following factors should be considered in selecting a job to be analyzed.

- **Frequency of Accidents:** A job that has repeatedly produced accidents or near misses is a candidate for a JSA. The greater the number of accidents or near misses associated with a job activity or an operation, the greater is the need for a JSA. The JSA can also be a response to a Lessons Learned action item.
- **Severity Potential:** Some jobs may not have a history of accidents but may have the potential for severe injury.
- **New Operation:** A new piece of equipment or a new operation may need to be analyzed to uncover hazards or to establish the correct procedures.
- **New Job:** New jobs created by changes infield conditions, new technology, or methods of operation have no history of injuries, but their accident potential may not be fully appreciated.
- **High-rated Jobs:** As per the Work Planning and Control for Experiments and Operations Subject Area jobs rated as high hazard must have a JSA due to the level of hazards and job complexities.

2. Break the Job Down

Before the search for hazards begins, a job should be broken down into a sequence of steps, each describing what to do. Avoid two common errors: making the breakdown so detailed that an unnecessarily large number of steps result, or making it so general that basic steps are not recorded.

As shown in the attached example, each step is recorded consecutively in the left-hand column of the JSA form. Each step describes what is done, not how. The JSA form illustrates step-by-step how a complex engineering project is executed and how the hazards are mitigated.

3. Identify Hazards and Potential Accidents

To effectively identify the possible hazards associated with each job step, the safety analysis should include personnel who are knowledgeable of the particular job or operation. It is not enough to look at the obvious hazards; look at the entire environment and identify every conceivable hazard, “what if” situations, and potential accidents that are within reason. The potential hazards are recorded in the middle column of the JSA form. Use an ES&H professional in developing the JSA.

4. Control Measures

Using the first two columns as a guide, decide what control measures are necessary to eliminate or minimize the hazards. Items listed to mitigate hazards could be personal protective equipment, safety permits, task certification, operational instructions, and so on. Be specific. State exactly what needs to be done to correct each hazard listed in the second column.

5. Using The JSA

JSAs developed for jobs, projects, or operational activities help uncover hazards and potential situations that may not have been identified without the step-by-step analysis. Listing the sequential project steps and worker’s tasks also help identify coordination requirements. In conducting the JSA, the people involved in the analysis learn more about the job and enhance their overall safety awareness.

When a JSA is distributed, the supervisor's first responsibility is to explain its contents to employees and, if necessary, to give them further individual training. The entire JSA must be reviewed with the employees concerned so that they will know how the job is to be done - without accidents. The JSA will be available and maintained at the job location for employees performing the job.

Job Safety Analysis Example

JOB DESCRIPTION: Building 901 Tank Removals Support two 13.8-KV ductbanks using steel beams and remove two radiologically contaminated tanks from under the ductbanks. Survey and sample soil under each tank, remove surface soil that may be contaminated.	DATE OF ANALYSIS: February 24, 1999
SHOP: Electrical, Water Treatment, Site Maintenance, ESD Sampling Team Health Physics	PERFORMED BY: G. Flett and R. Lykins
REQUESTOR: G. Flett	LOCATION: Lawn area south of Building 901
EMPLOYEES OBSERVED: See Shops above	FREQUENCY OF JOB: One time only
PERSONAL PROTECTIVE EQUIPMENT (PPE): Hard hat required; See Radiological Work Permit	

Job Steps	Hazards/Potential Accidents	Control Measures
5. Hand excavate to expose top of tanks and overflow piping on south end of tank.	Cave-in potential Undermine adjacent ductbank Sudden rainstorm fills excavation	Slope side 1.5/1; competent person to be present onsite during activity. Determine depth and location of adjacent ductbank. Construct soil berm around excavation to prevent excessive runoff from entering the excavation.
6. Cut and remove 4-inch overflow piping	Interior radiological contamination	Cut pipe with pipe cutter; perform radiological survey; follow RWP for required PPE.
7. Excavate on north side of tanks to allow for tank removal.	Cave-in potential Undermine Bldg. 901 Foundation	Slope sides 1.5/1; competent person to be present onsite during activity. Soil at foundation base to remain undisturbed.
8. Place geotextile fabric and plastic sheeting into freshly excavated area, which will remain under tanks during removal.	Cave in potential	Slope sides 1.5/1; competent person to be present onsite during activity.
9. Drag tanks out from under ductbank onto geotextile fabric/plastic sheeting	Spread radiological contamination	Solidify sludge in tank with Radsorb or equivalent prior to moving.

Job Steps	Hazards/Potential Accidents	Control Measures
10. Lift tanks out of excavation and place in containers	Drop tanks Tank rupture/release of contents	Use BNL riggers with approved slings. If tank bottom is badly corroded, wrap geotextile fabric and plastic sheeting around tank and lift out of excavation with tank.



Standards-Based Management System



[Home](#) | [MY SBMS](#) | [Documents](#) | [Forms & Exhibits](#) | [Requirements](#) | [Process Maps](#) | [Tools](#) | [Contacts](#) | [Lessons Learned](#) | [Help](#)

SBMS Search

[Search Tips](#)

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

Qualification Matrix

Effective Date: **Aug 15, 2014**

1.0 Purpose

This procedure provides a methodology for generating qualification matrices to justify worker planned work tasks.

2.0 Scope

Organizations that use the Work Planning and Control for Experiments and Operations Subject Area to control internal work activities may use qualification matrices to justify worker planned work tasks.

3.0 Procedure

The purpose for establishing a qualification matrix is to provide a better understanding of what "worker planned work" means for each group. The matrices move the worker-planned-work decision making from being expert-based (i.e., "I know it when I see it") to a more defined standards-based position.

1. Establish How Many Matrices will be Generated

The first step toward establishing the matrices is to determine how many are needed within a Department/Division, or their equivalent. For example, the Photon Sciences Department has over fifty technicians in nine groups who provide services for various systems within NSLS. Therefore, NSLS could have nine matrices that list the personnel for each group and jobs for which they are qualified to work within the worker planned work practices.

2. Proposed List of Worker Planned Work Activities

For each proposed matrix, a list of proposed worker planned work activities is generated by a group of subject matter experts (i.e., supervisor and workers). The Work Control Manager or the area Work Control Coordinator should lead a brainstorm session with the appropriate personnel to list and discuss proposed worker planned work activities. These activities may be categorized or shown by

- Systems: i.e., qualified to work on certain systems
- Tools/Equipment: i.e., use of machinery in a shop or certain tools
- Materials: i.e., work with various epoxies, cryogenics
- Tasks: i.e., installing, removing, or fabricating

3. Establish Limitations on the Worker Planned Work Activities

After the group has agreed upon the list of worker planned work activities, limitations should be established for the activities where reasonable boundaries are needed. Examples of limits are shown below for tasks by technicians in the Chemistry Department.

- Minor repairs to pressure regulators, and pressure testing to 3,000 PSIG gas or 5,000 PSIG liquid (Pressure Safety HP-HS5050).

- Spot welding of nonhazardous materials using a welder with a maximum stored energy capability of 300 watt/seconds.
- Equipment relocation of objects weighing up to 2,000 #, which require the use of a forklift (Forklift training HP-Q-001 & HP-1-001A).
- Handling cryogenics, specifically liquid Helium and Nitrogen, for the purpose of filling vacuum traps and maintaining cryogen levels in solid-state detectors and superconducting magnets (Cryogen safety training HP-OSH-025 or demonstrated experience).
- Fabrication, modification, and repair/rebuilding of parts and equipment involving any nonhazardous material and accomplished using tools that the assigned personnel are qualified to operate safely (Machine Shop Safe Work Practices Training).

Note: Four of these examples have training course requirements as part of the limitations.

4. Determine which Workers are Qualified for Each Worker Planned Work Activity

The final step in establishing a qualification matrix is to determine which technicians and crafts are qualified for each activity listed. Draw up the matrix with the worker planned work activities on one axis and the worker's names on the other axis. Put an "X" into each box to show qualification by the name and activity. The activities can be abbreviated or shown by number on the axis from the established worker planned work skill list. A qualification matrix for a technician group with 10 worker planned work activities defined by systems, tasks, materials, or tools would look as follows.

	Worker Planned Work Activity									
--	-------------------------------------	--	--	--	--	--	--	--	--	--

Personnel	1	2	3	4	5	6	7	8	9	10
T. Bell	X	X		X		X			X	
J. Doe		X			X		X		X	
T. Smith		X	X		X	X				
M. White		X	X		X			X	X	

The qualification within any box can be shown as limited by putting an asterisk or indicator next to the "X" and then explaining the limitation in a footnote to the matrix. A common limitation is a trainee classification where certain activities must be done with a fully qualified person.

5. Work Activities not categorized as Worker Planned Work

The area Work Control Coordinator should screen all work activities not shown on the qualification matrix that are not covered by prescribed work documents (e.g., approved internal procedures.)

6. Administration of the Matrices

Each matrix must be dated and signed by the person who generated the matrix and approved by the area Work Control Coordinator (WCC), or by the Work Control Manager as applicable. The matrices must be updated as the personnel roster changes or individuals become qualified for additional worker planned work activities. The matrices should be maintained in the WCC's logbook for convenient reference.

7. Common Worker Planned Work Activities

If a group has several activities for which all personnel are qualified, it is permissible to categorize these activities as worker planned work activities for all personnel and show the activities on a separate list if so desired. The matrix would then be used to show those tasks and jobs that only certain personnel are qualified to perform under worker planned work practices.

Each group is encouraged to list activities for which work permits will be required or considered. This will provide the WCCs with better screening guidelines specific to their area.



Standards-Based Management System



[Home](#) | [MY SBMS](#) | [Documents](#) | [Forms & Exhibits](#) | [Requirements](#) | [Process Maps](#) | [Tools](#) | [Contacts](#) | [Lessons Learned](#) | [Help](#)

SBMS Search

[Search Tips](#)

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

Requirements and Expectations for Performing Work Oversight

Effective Date: **Aug 15, 2014**

Feedback and improvement is a key element within Integrated Safety Management and Work Planning and Control, as well as day to day management in general. For supervisors, one of the most important forms of obtaining feedback is through direct observation of work and interaction with workers (i.e., work oversight). Work oversight is a process of direct observation of work and interaction with workers to ensure work is being performed as planned and/or within the requirements established for that work. The benefits to supervisors in conducting work oversight of their staff include:

1. determining the level of performance (i.e., quality, efficiency, and effectiveness) in completing work;
2. assessing the implementation of training and identifying need for additional training;
3. identifying worker development needs in order to coach and mentor them;
4. assessing the execution of work plans and the quality of those work plans;
5. maintaining real-time operational awareness; and
6. setting and achieving goals for improvement of work conditions and work planning.

The following requirements and expectations are provided in your supervisor training and the R2A2 for Supervisors and their Managers.

1. Determining the proper level of work oversight

Establish a regular frequency for performing work oversight. When establishing a regular frequency, consider factors such as the risk, complexity, worker's familiarity and previous performance of the work, and impact to and mission.

- Consider job criteria
 - Hazards (energy source, height)
 - Complexity
 - Impact to mission
 - Worker Planned vs. Permit
 - The frequency job is performed
- Consider worker's
 - Experience
 - Skill
 - Reliability
 - Motivation and attitude
 - Training
- Consider union rules/contract
- Determine if work is performed
 - As planned in the field, observing for safety, quality, compliance, attitude, and skill

- Ongoing at the bench
- How work is performed when workers are faced with unforeseen obstacles

2. Acceptable practices in conducting work oversight

- Observe and interact with your staff at their work site
- Determine if work is performed as planned and changes to plans are reviewed and approved
- Hold workers accountable for following Lab policies and procedures
- Establish and enforce a safe work culture
- Demonstrate continuous improvement

3. Hold workers accountable for the work they perform

- Know the policies and procedures that apply to the work assigned.
- Demonstrate a clear understanding of the requirements, policies, and procedures related to your job and the work you assign.
- Ask questions and reinforce standards and positive behaviors.
- Provide feedback to workers on their compliance with procedures.
- Obtain feedback from workers on the quality and clarity of Laboratory policies and procedures.
- Ask questions to ensure workers understanding of Laboratory policies and procedures specific to the work being observed.
- Provide feedback to SME's on opportunities to improve policies and procedures.
- Review policies and procedures with workers when policies and procedures change or when deviations are noticed in the field.

4. Tailoring work oversight to meet the type of work performed

Work oversight requires both observation of and interaction with workers. In your regular routines and activity with your staff, either in the field, in a laboratory, or in the office, you have opportunities/situations in which you are doing both observing and interacting. The following are examples of when a work oversight can be conducted and what may be discussed:

- Monday Morning Meeting

- Review of the previous week and the coming week

- Plan of the Day meetings

- Review hazards and concerns
- Establish priorities
- Review policies and procedures
- Communicate changes to policies and procedures
- Use questioning to ensure worker understanding of requirements
- Engagement that fosters an environment that encourages a questioning attitude

- Walk-around meetings

- Create opportunities for regular 1:1 casual meetings
- Foster an attitude that you know your workers and care about them

- Toolbox meeting

- Discussions applying to Lessons Learned of assigned work
- Different topics that are relevant and interesting
- Fostering an open, friendly, cooperative environment

- Walk down of work site

- Looking for unidentified hazards, and obstacles
- Review of work plan at the site
- Observe workers in the workplace for quality and compliance.
- The observation based on:
 - Hazards
 - Complexity
 - Worker qualifications
 - Mission importance

- Debrief workers
 - Discuss Lessons Learned
- Seated at the bench alongside a scientist
 - Interacting with the person all day
- PETs (Positron Emission Tomography) Morning Meeting , e.g., negotiable who uses the equipment that particular day

While there were opportunities when you might just be interacting with staff, rarely, if ever, would there be a situation in which a supervisor might simply observe a worker. Anytime you observe a person at work, you are likely to see something that warrants feedback, either something you like and want to reinforce, or something that needs to be corrected.

5. Supervisors accountability in performing work oversight

The R2A2 establishes the understanding between an employee and their supervisor regarding the employee's performance expectations, based on the employee's roles. To meet part of the expectations of the [R2A2 for Supervisors](#) work oversight must be performed.

6. The Manager's roles in holding their supervisors accountable for work oversight

The R2A2 establishes the understanding between an employee and their supervisor regarding the employee's performance expectations, based on the employee's roles. To meet part of the expectations of the [R2A2 for Managers](#) you must ensure your supervisors are performing oversight of work.

7. Demonstrating work oversight is being performed

Managers need to ensure their supervisors are performing work oversight. They should be having feedback discussions with supervisors who report to them, either formally or informally, as a way to confirm that work oversight is being conducted.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

Contacts

SBMS Staff
Management System Contact List
MS Roles/Responsibilities
Subject Matter Expert List

Lab-wide Contacts

Contact List (Laboratory Roles)
Employee Role Lookup

Help

SBMS Help Desk
SBMS Instructions
Frequently Asked Questions
Can't View PDFs?
Search Tips
Glossary/Definitions
Keywords

Lab-wide Resources

Lessons Learned
Recalled Products
Assessment Tracking System
Human Performance (HPI)
ESS&H Policy
SBMS External
Prime Contract



[Privacy and security notice](#) | [Report a problem with this page](#)



Standards-Based Management System



[Home](#) | [MY SBMS](#) | [Documents](#) | [Forms & Exhibits](#) | [Requirements](#) | [Process Maps](#) | [Tools](#) | [Contacts](#) | [Lessons Learned](#) | [Help](#)

SBMS Search

[? Search Tips](#)

Management System: [Work Planning and Control](#)

Subject Area: [Work Planning and Control for Experiments and Operations](#)

Security Checklist

Effective Date: **Aug 15, 2014**

If you need any assistance, call Security at extension 4691 or 4496 to determine what (if any) requirements are needed to address the security concerns for work that involves or requires the following:

- **Access Controls** (card readers, special locks, motion detectors, cameras, etc);
- **Nuclear Material Control and Accountability Issues** (Isotopes & Special Materials Group, extension 4051);
- **Classified Materials** (information security);
- **Counterintelligence** (CI Office, extension 2234);
- **BNL Equipment Outside the Laboratory** in a potentially unsecured area;
- **Foreign Visitors and Assignments** (See [Guests and Visitors](#) Subject Area);
- **Import/Export Controls**;
- **Property Protection Areas or Physical Security** of a building or part of a building;
- **Personnel Security** (security clearances, badging & vehicle stickers);
- **Operational Security** issues;
- **Cyber Security** (Information Technology Division, extension 2223);
- **Protection of Valuable Materials** (e.g., precious metals, controlled substances).

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

Contacts

[SBMS Staff](#)
[Management System Contact List](#)
[MS Roles/Responsibilities](#)
[Subject Matter Expert List](#)

Help

[SBMS Help Desk](#)
[SBMS Instructions](#)
[Frequently Asked Questions](#)
[Can't View PDFs?](#)
[Search Tips](#)

Lab-wide Resources

[Lessons Learned](#)
[Recalled Products](#)
[Assessment Tracking System](#)
[Human Performance \(HPI\)](#)
[ESS&H Policy](#)

Lab-wide Contacts

Contact List (Laboratory Roles)
Employee Role Lookup

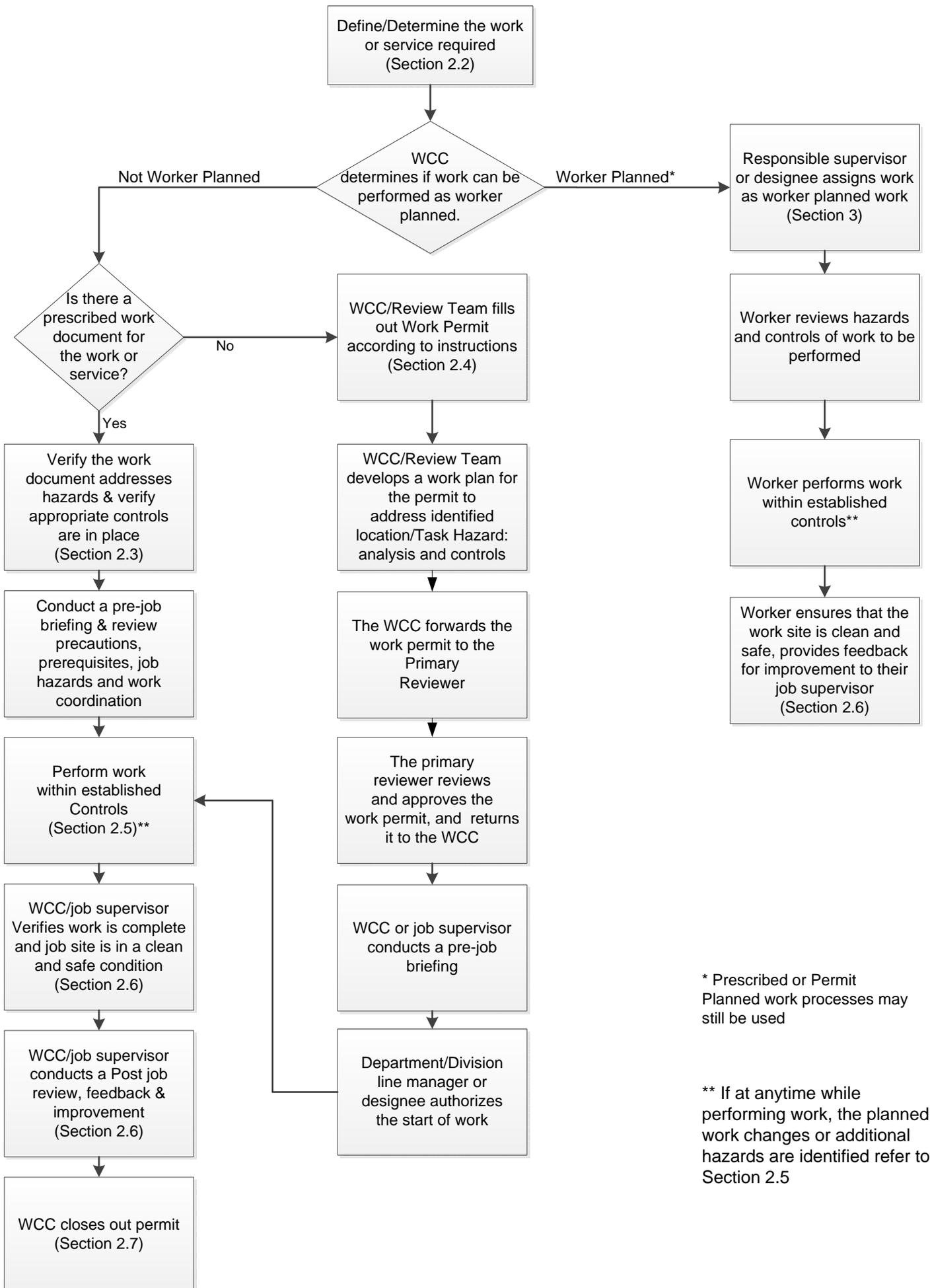
Glossary/Definitions
Keywords

SBMS External
Prime Contract



[Privacy and security notice](#) | [Report a problem with this page](#)

Work Planning and Control Operations Flowchart



* Prescribed or Permit Planned work processes may still be used

** If at anytime while performing work, the planned work changes or additional hazards are identified refer to Section 2.5

Before using a copy of this form, verify that it is an acceptable version by checking with your Experiment Review Coordinator (ERC). Double-click to change the state of a checkbox, or type "X" over the box, or paste this

EXPERIMENT SAFETY REVIEW FORM

REVIEW NUMBER (supplied by ERC):

PRINCIPAL INVESTIGATOR:

GROUP:

EXT:

E-MAIL:

LIFE NUMBER:

Project Title:
Location(s):
Proposed Start Date and Duration:

SIGNATURES:

Principal Investigator:	Date:
Experiment Review Coordinator:	Date:
	Date:
Approval Department Chairperson, or their equivalent:	Date:
Review/Approval Comments:	
Walkthrough Signature:	Date:
Expiration Date (max 1 yr.):	
FUA Change Required? <input type="checkbox"/> Y <input type="checkbox"/> N	Fire Rescue Run Card Changes Required? <input type="checkbox"/> Y <input type="checkbox"/> N
Has a NEPA Review been Performed for this Project? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Don't know	
Required Approvals (i.e., IACUC, IBC):	
Project Termination Acceptance Signature:	Date:
Comments:	

I. DEFINE THE SCOPE OF EXPERIMENT

A. Description

1. Describe the experiment purpose/scope. Identify all apparatus that will be used, and associated requirements. Describe any modifications of the facility (building) that are required. Include set-up and decommissioning phases (Work Permit process/form may better address set-up/tear-down; indicate if Work Permit will be used).

Enter text here...

2. List equipment manuals and/or procedures that describe ESH-critical systems. Such manuals and/or procedures must be controlled following the [Document Control](#) Subject Area.

Enter text here...

B. Human Performance Factors

In this section consider [Human Performance Factors](#) that may effect the experiment as a whole (success, data quality, etc.), not just ESH concerns.

- What can go wrong (what keeps you up at night)?
- What measures or controls are in place to prevent that from happening?
- Consider how do (or which of) the most important controls depend on human (or personnel) actions or behavior. Where might an error or omission impair the effectiveness of an important control?
- Error precursors are conditions or attitudes that increase the chances of an error during the performance of a specific task by a particular individual. Are there precursors that, if reduced or eliminated, would make the controls more likely to be effective?

Enter text here...

C. Waste Minimization/Pollution Prevention

Describe how you plan to minimize generation of the wastes described above, and identify pollution prevention opportunities.

Enter text here...

II. IDENTIFY AND ANALYZE HAZARDS ASSOCIATED WITH THE EXPERIMENT

In this section, indicate all potential hazards. Include all phases of the experiment, such as set up, testing, decommissioning, and ancillary tasks. For each hazard checked, there must be a control in Section III.

Physical Hazards (check all that apply)		<input type="checkbox"/> None
<input type="checkbox"/> Noise > 85 dBA	<input type="checkbox"/> Oxygen deficient atmosphere	<input type="checkbox"/> Non-medical sharps
<input type="checkbox"/> Cryogenics (any substance or device capable of producing temperatures \leq 170K)		
<input type="checkbox"/> Fall hazards (working >4 ft. e.g., ladders, elevated platforms, towers)		
<input type="checkbox"/> Material handling equipment (e.g., cranes, hoists, forklifts)		
<input type="checkbox"/> Machine shop or nonportable powered tools use	<input type="checkbox"/> Powered Hand Tools	
<input type="checkbox"/> Electrical hazards >50 V, >10 J (exposed conductors, capacitors, etc)		
<input type="checkbox"/> Confined space	<input type="checkbox"/> Trenching/soil excavation	
<input type="checkbox"/> Working in extreme temperature conditions	<input type="checkbox"/> Remote location	
<input type="checkbox"/> Compressed gases (lecture bottles, cylinders, gas lines)		

<input type="checkbox"/> Pressurized vessels or systems with operating pressure greater than >15 psi and/or with largest dimension (length, width or diagonal) >6 in			
<input type="checkbox"/> Vacuum chambers or systems with >100,000 J stored energy (>35 cu ft. total volume)			
<input type="checkbox"/> Autoclaves or high temperature ovens		<input type="checkbox"/> Soldering of electronic components	
<input type="checkbox"/> Open flames		<input type="checkbox"/> Welding, brazing, silver soldering >1" diameter	
<input type="checkbox"/> Flammable gases		<input type="checkbox"/> Flammable liquids	
<input type="checkbox"/> Flammable solids		<input type="checkbox"/> Other spark producing activity (grinding)	
<input type="checkbox"/> Other (specify):			
Chemical Hazards (check all that apply)			<input type="checkbox"/> None
<input type="checkbox"/> Carcinogens	<input type="checkbox"/> Highly acute toxins	<input type="checkbox"/> Reproductive toxins	<input type="checkbox"/> Corrosives
<input type="checkbox"/> Flammable liquids	<input type="checkbox"/> Flammable solids	<input type="checkbox"/> Strong oxidizers	<input type="checkbox"/> Oils
<input type="checkbox"/> Explosives	<input type="checkbox"/> Peroxidizables	<input type="checkbox"/> Pyrophoric materials	<input type="checkbox"/> PCBs
<input type="checkbox"/> Asbestos	<input type="checkbox"/> Pesticides/herbicides	<input type="checkbox"/> Controlled substances	
<input type="checkbox"/> Perchlorates	<input type="checkbox"/> Hydrofluoric acid, any use	<input type="checkbox"/> Highly reactive materials	
<input type="checkbox"/> OSHA regulated chemicals, any use		<input type="checkbox"/> Methylene chloride, any use	
<input type="checkbox"/> Storage or use of Beryllium or Beryllium articles. Attach Beryllium Use Review Form if checked.			
<input type="checkbox"/> Mercury or Mercury compounds, any use		<input type="checkbox"/> Lead used in a chemical process (not as shielding)	
<input type="checkbox"/> Production or use of engineered nanomaterials that are fixed within a solid or strongly bonded to a substrate			
<input type="checkbox"/> Production or use of engineered nanomaterials that are dispersed in a liquid matrix			
<input type="checkbox"/> Production or use of engineered free particulate nanomaterials			
<input type="checkbox"/> Toxic metals (e.g., As, Ba, Be, Cd, Cr, Hg, Pb, Se, Ag)			
<input type="checkbox"/> On-site or off-site transportation of chemicals (see SBMS)			
<input type="checkbox"/> Other (specify):			
Ionizing and Non-ionizing Radiation Hazards (check all that apply)			<input type="checkbox"/> None
<input type="checkbox"/> Sealed radioactive sources		<input type="checkbox"/> Windowless radioactive sources	
<input type="checkbox"/> Dispersible radioactive materials		<input type="checkbox"/> Neutron-emitting radioactive sources	
<input type="checkbox"/> Non-fissionable radioactive materials		<input type="checkbox"/> Fissionable radionuclides	
<input type="checkbox"/> Ionizing radiation-generating devices (x-ray sources)			
<input type="checkbox"/> Any atmospheric discharge of radiological materials			
<input type="checkbox"/> On-site or off-site transportation of radiological materials (see SBMS)			
<input type="checkbox"/> Class II, IIIa, or IIIb (visible <15mW) lasers		<input type="checkbox"/> Class IIIb (nonvisible >15mW) or IV lasers	

<input type="checkbox"/> Dynamic magnetic fields >1G at 60 Hz or dynamic electric fields >1kV/m at 60 Hz		
<input type="checkbox"/> Static magnetic fields <5 G. No Exposure Form is required		
<input type="checkbox"/> Static magnetic fields >5 G and <600 G (attach exposure form)		
<input type="checkbox"/> Static magnetic fields ≥600 G (attach exposure form)		
<input type="checkbox"/> Radio frequency (RF) or Microwave sources exceeding 10 mW radiated output		
<input type="checkbox"/> Infrared sources >10 W	<input type="checkbox"/> Ultraviolet sources >1 W	
<input type="checkbox"/> Extremely low frequency (ELF) radio sources		
<input type="checkbox"/> Other (specify):		
Biological Hazards (check all that apply)		<input type="checkbox"/> None
<input type="checkbox"/> Regulated etiological agent	<input type="checkbox"/> Recombinant DNA	<input type="checkbox"/> Small Animals
<input type="checkbox"/> Nonhuman primates	<input type="checkbox"/> Human subjects	<input type="checkbox"/> Human blood/components, human tissue/body fluids
<input type="checkbox"/> Other (specify):		
Offsite Work (check appropriate box)		<input type="checkbox"/> None
<input type="checkbox"/> Reviewed or controlled by ES&H programs at the offsite location	<input type="checkbox"/> Requires additional controls (include in the next section)	
<input type="checkbox"/> Other (specify):		
Other Issues (Security, Notifications, Community, etc.)		<input type="checkbox"/> None
<input type="checkbox"/> Specify:		

Materials Used /Waste Generated

List materials to be used and wastes generated. You may use generic chemical class descriptions for commonly used materials (e.g., organic solvents, acids). However, chemicals that require additional controls should be specifically listed (e.g., HF, TCE). Use the disposal method codes below.

Materials Used & Wastes Generated	Disposal Method (below)	Estimated Quantity Used (provide units)		Comments
		Per Use	Total/Yr	

Disposal Method Codes:

Air Emissions	Liquid Effluents	Wastes
P = Point Source	S = Sanitary	H = Hazardous R = Radioactive
F = Fugitive	ST = Storm water	I = Industrial (Non-hazardous waste e.g., oils)
	O = Other	M = Mixed (Radioactive + Hazardous)
	RE = Recycle	MW = Medical RM = Radioactive Medical
		T = Trash RE = Recycle

See [Environmental Aspects and Impacts Subject Area](#) or your ECR if you need assistance completing the following table.

Significant Environmental Aspects (check all that apply)	<input type="checkbox"/> None
<input type="checkbox"/> Any amount of hazardous waste generation	
<input type="checkbox"/> Any amount of radioactive waste generation	
<input type="checkbox"/> Any amount of mixed waste generation (radioactive hazardous waste)	
<input type="checkbox"/> Any amount of transuranic waste generation	
<input type="checkbox"/> Any amount of industrial waste generation (e.g., oils, vacuum pump oil)	
<input type="checkbox"/> Any amount of Regulated Medical Waste	
<input type="checkbox"/> Production or use of, or waste containing, engineered nanomaterials	
<input type="checkbox"/> Any atmospheric discharges that require engineering controls	
<input type="checkbox"/> Any liquid discharges that require engineering controls	
<input type="checkbox"/> Storage or use of any chemicals or radioactive materials that require engineering controls – see Storage and Transfer of Hazardous and Nonhazardous Materials Subject Area	
<input type="checkbox"/> On-site or off-site transportation of chemicals or dispersible radioactive materials	
<input type="checkbox"/> Any use of once-through cooling water with a flow of 4 gpm – 24 hrs/day (10 gpm – 8 hrs/day, daily use of >15 gpm for >60 days) and discharging to the sanitary sewer	
<input type="checkbox"/> Soil contamination or activation	
<input type="checkbox"/> Any underground pipes/ductwork that contains chemical or radioactive material/contamination	
<input type="checkbox"/> Any products or services resulting from this work that could significantly impact the environment	
<input type="checkbox"/> Other environmental aspects related to your work (specify):	
<input type="checkbox"/> Process Assessment Form required (determined by ECR or other qualified person)	

III. DEVELOP AND IMPLEMENT HAZARD CONTROLS AND ASSESS RISK

For each hazard identified in Section II, describe how that hazard is controlled, in consultation with personnel who perform the work.

When developing controls apply the following hierarchy:

1. Elimination – Do you really need to introduce this hazard into the work?
2. Substitution – e.g. replacing one substance or activity with a less hazardous one.
3. Engineering – e.g. using a chemical fume hood, interlocks, shielding, etc.
4. Administration – policies and procedures for safe work practices.
5. Personal Protective Equipment –gloves, earplugs, etc.

Assess the Risk associated with each hazard or attach relevant Job Risk Assessments (JRAs)

Guidance for numerical assessment of Risk involved in working within this ESR.							
	Value:	1	2	3	4	5	Value
A	# Persons doing the work						≥ 1
B	Frequency – how often:	1/yr	1/mo	1/wk	1/day	>1/day	1 – 5
C	Severity of injury:	1 st Aid	Medical	Lost time	Disabled	Death	1 – 5
D	Likelihood of injury occurring:	Rare	Unlikely	Possible	Probable	Multiple	1 – 5
Risk	Calculate: A × B × C × D						

Risk Ranking and Action Criteria.

Risk	Severity	Required Action
0 – 20	Negligible	None, the controls are adequate.
21 – 40	Acceptable	None, the controls are adequate.
41 – 60	Moderate	Explain below why additional controls cannot be used to reduce the risk.
61 – 80	Substantial	The PI is required to develop and implement a remedial action program.
> 80	Intolerable	Work cannot begin or continue until controls are established that reduce the risk to < 81. If work has already begun, it must stop immediately, and an investigation into working conditions must be carried out. Special permission by the Department Chair, Division Manager, or their equivalent is required to work in this range.

Note: Include required calibration or maintenance of controls in section(s) below.

A. Physical Hazards, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

B. Chemical Hazards, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

Note: Refer to the [Working with Chemicals Subject Area](#) for requirements regarding particularly hazardous chemicals such as carcinogens, reproductive toxins, and highly acute toxins, including postings, decontamination plan, and address above.

C. Significant Environmental Aspects, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

D. Ionizing and Non-ionizing Radiation Hazards, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

Note: List sources/materials. Attach or refer to Radiation Work Permits.

E. Biological Hazards, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

Note: List additional approvals/permits/reviews required (e.g., BNL Biosafety Committee approval).

F. Off-site Work Hazards, Tasks, Controls and Risks

Hazard/Task	Controls (include training and PPE requirements)	A	B	C	D	Risk

Note: Identify off-site location, host organization, and additional controls needed.

G. Other Issues (Security, Notifications to Other Organizations, Community Involvement, etc.)

Issue	Controls/Plan	A	B	C	D	Risk

H. Exposure Monitoring – The SHSD Representative completes this section.

Indicate Industrial Hygiene monitoring for this project. The SHSD Representative determines the schedule for monitoring, if required.

Exposure Monitoring	<input type="checkbox"/> None
<input type="checkbox"/> Noise	<input type="checkbox"/> RF/Microwave
<input type="checkbox"/> Magnetic fields	<input type="checkbox"/> Ionizing radiation
<input type="checkbox"/> Ionizing radiation contamination	<input type="checkbox"/> Airborne particulates
<input type="checkbox"/> Airborne chemical exposure for (specify):	
<input type="checkbox"/> Surface wipes for Be, Pb, Cd, Hg, or other metals (specify):	
<input type="checkbox"/> Surface wipes for chemicals not listed above (specify):	
<input type="checkbox"/> Other (specify):	

Describe specific monitoring:

IV. PERFORM EXPERIMENT WITHIN CONTROLS

The PI is responsible to ensure this document is kept up-to-date, that staff have read the ESR, and work is performed within controls, including work permits, RWPs and other work planning documents. Changes in experiment scope, hazards, apparatus, materials, or procedures can often be accomplished by an addendum that explains these changes. The ERC will determine if additional review is required.

A. OSHA/DOE Required Medical Surveillance

Indicate if potential exposure is in excess of trigger levels listed. Exposure evaluation and/or medical surveillance may be required. Additional [training](#) may be required for any indicated agent. See the [SBMS](#) for additional information and controls on the hazards listed. If work meets or exceeds the Medical Surveillance Exposure Trigger level, contact OMC to update Job Assessment Form(s).

Regulated Hazard	Hazard Specific Training Trigger	Medical Surveillance Exposure Trigger
<input type="checkbox"/> None		

Regulated Hazard	Hazard Specific Training Trigger	Medical Surveillance Exposure Trigger
<input type="checkbox"/> Inorganic Arsenic	Any day above the OSHA action level (without regard to respirator use)	30 days/year above the action level (without regard to respirator use)
<input type="checkbox"/> Lead	Any day above the OSHA action level	30 or more days/year at or above the action level
<input type="checkbox"/> Cadmium	Any day above the OSHA action level	30 or more days/year at or above the action level
<input type="checkbox"/> Methylene Chloride	Any day above the OSHA action level	<ul style="list-style-type: none"> - 30 days/year at or above the action level - 10 days/year above the 8-hour TWA PEL or the STEL - Any time above the 8-hour TWA PEL or STEL for any period of time where an employee at risk from cardiac disease or other serious MC-related health condition and employee requests inclusion in the program
<input type="checkbox"/> OSHA Regulated Chemicals <i>Acrylonitrile Benzene</i> <i>Benzidine 1,3 Butadiene</i> <i>4-Dimethyl aminoazobenzene</i> <i>Ethylene oxide Ethyleneimine</i> <i>Formaldehyde Vinyl Chloride</i>	Any day above the OSHA PEL	<ul style="list-style-type: none"> - Routinely above the action level (or in the absence of an action level, the PEL) - Event such as a spill, leak or explosion results in the likelihood of a hazardous exposure
<input type="checkbox"/> Engineered Nanoparticles	Any work with nanoparticles that are either loose particulate or in solutions.	-Indicate on the JAF. Submit ESR or other documentation to OMC for review and protocol requirements.
<input type="checkbox"/> Etiologic Agent or Biological toxin	None	See Biosafety in Research Subject Area for guidance
<input type="checkbox"/> Bloodborne Pathogens	Any use	Any use
<input type="checkbox"/> Health Care Protocol	Any use	Any use
<input type="checkbox"/> Small Animal	Any use	Any use
<input type="checkbox"/> Non Human Primate	Any use	Any use
<input type="checkbox"/> Lasers	Use Class IIIb or Class IV Lasers	Use Class IIIb or Class IV Lasers
<input type="checkbox"/> Static Magnetic Fields	Worker who routinely works in magnetic field	Any exposure at ≥ 0.5 mT (5 G)
<input type="checkbox"/> Radiological bioassay	As specified in RWP	As specified in RWP or other procedure
<input type="checkbox"/> Noise	Any day above the ACGIH TLV	Any time equal or greater then 85 dBA TWA 8-hour dose

B. Training/Qualification

List all project personnel, indicating they are authorized and competent to perform the work described. The PI is responsible for maintaining a complete up-to-date list of personnel and their full training requirements, and for ensuring that training and qualifications are maintained.

Employee/Guest Name	Life/Guest #	Required Training Course

C. Emergency Procedures

Identify any emergency actions, procedures, or equipment that must be in place to insure personnel safety and environmental protection. Include the Building Local Emergency Plan, location of emergency shutoffs, and spill control materials.

Enter text here...

D. Transportation

Identify materials, hazards and controls for any on-site and off-site transportation of hazardous and/or radioactive materials. See relevant SBMS Subject Areas.

Will you be transporting any materials or samples onsite or to/from offsite? Yes No

Enter text here...

E. Notifications

The PI or designee should notify building occupants of any activities that might impact them or their work, and document this here. List external personnel/organizations that require notification related to experimental activities and/or to be notified of changes (e.g., a BNL Committee for review/approval, Occupational Medicine Clinic, Fire/Rescue).

Enter text here...

F. Termination/Decommissioning

Describe any decommissioning plan, including decontamination (radioactive, chemical, or biohazard) of the area at termination of the experiment. Identify any hazards and controls, special precautions or procedures. Include chemical and waste reconciliation. Indicate if Work Permit Form/Procedure will be used.

A plan is **required** here...

V. PROVIDE FEEDBACK

Discuss feedback on operational experiences that can lead to improvements:

- *Was the work accomplished with the expected results?*
- *What did you change in the course of the experiment?*
- *Is this the way this type of project should be performed in the future?*
- *What didn't go as planned; how did that affect the outcome?*
- *Were there working conditions associated with errors, flawed defenses or near misses?*
- *Were there any experiences that should be passed on to others?*

Enter text here...

VI. ATTACHMENTS

Use this section to include any supporting documents, hazard assessments, figures, tables, etc. that were not entered into the previous sections of the form.

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section. Standing Work Permit

Requester:	Date:	Ext.:	Dept/Div/Group:
Other Contact person (if different from requester):			Ext.:
Work Control Coordinator:	Start Date:	Est. End Date:	
Brief Description of Work:			
Building:	Room:	Equipment:	Service Provider:

2. WCC, Requester/Designee, Service Provider, and ESSH (as necessary) fill out this section or attach analysis

ESSH ANALYSIS							
Radiation Concerns	<input type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> NORM	<input type="checkbox"/> Other
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group				<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
Radiation Generating Devices:	<input type="checkbox"/> Radiography		<input type="checkbox"/> Moisture Density Gauges		<input type="checkbox"/> Soil Density Gauges		<input type="checkbox"/> X-ray Equipment
Safety and Security Concerns	<input type="checkbox"/> None		<input type="checkbox"/> Explosives		<input type="checkbox"/> Transport of Haz/Rad Material		<input type="checkbox"/> Pressurized Systems
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift	<input type="checkbox"/> Fumes/Mist/Dust*		<input type="checkbox"/> Magnetic Fields*		<input type="checkbox"/> Railroad Work	
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Heat/Cold Stress		<input type="checkbox"/> Nanomaterials/particles*		<input type="checkbox"/> Rigging	
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic		<input type="checkbox"/> Noise*		<input type="checkbox"/> Silica*	
<input type="checkbox"/> Biohazard*	<input type="checkbox"/> Elevated Work	<input type="checkbox"/> Lasers*		<input type="checkbox"/> Non-ionizing Radiation*		<input type="checkbox"/> Security Concerns	
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lead*		<input type="checkbox"/> Oxygen Deficiency*		<input type="checkbox"/> Suspect/Counterfeit Items	
<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*	<input type="checkbox"/> Material Handling		<input type="checkbox"/> Penetrating Fire Walls		<input type="checkbox"/> Vacuum	
Ladder Access Required: <input type="checkbox"/> Portable Ladder <input type="checkbox"/> Fixed Ladder- Status/Restrictions:							
* Safety Health Rep. Review Required		<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM				<input type="checkbox"/> Other	
Environmental Concerns				<input type="checkbox"/> None		<input type="checkbox"/> Work impacts Environmental Permit No.	
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad/GHG)		<input type="checkbox"/> Land Use Institutional Controls		<input type="checkbox"/> Soil Activation/contamination		<input type="checkbox"/> Waste-Mixed	
<input type="checkbox"/> Chemical or Rad Material Storage or Use		<input type="checkbox"/> Liquid Discharges		<input type="checkbox"/> Waste-Clean		<input type="checkbox"/> Waste-Radioactive	
<input type="checkbox"/> Cesspools (UIC)		<input type="checkbox"/> PCB Management		<input type="checkbox"/> Waste-Hazardous		<input type="checkbox"/> Waste-Regulated Medical	
<input type="checkbox"/> High water/power consumption		<input type="checkbox"/> Spill potential		<input type="checkbox"/> Waste-Industrial		<input type="checkbox"/> Historical Environmental Hazards	
Waste disposition by: <input type="checkbox"/> Other							
Pollution Prevention (P2)/Waste Minimization Opportunity: <input type="checkbox"/> No <input type="checkbox"/> Yes				Environmental Preferable Products Available: <input type="checkbox"/> No <input type="checkbox"/> Yes			
FACILITY CONCERNS		<input type="checkbox"/> None		<input type="checkbox"/> Intermittent Energy Release			
<input type="checkbox"/> Access/Egress Limitations		<input type="checkbox"/> Electrical Noise		<input type="checkbox"/> Potential to Cause a False Alarm		<input type="checkbox"/> Vibrations	
<input type="checkbox"/> Credited Controls (Use USI Process)		<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change		<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Management		<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions			
WORK CONTROLS							
Work Practices							
<input type="checkbox"/> None		<input type="checkbox"/> Exhaust Ventilation		<input type="checkbox"/> Lockout/Tagout		<input type="checkbox"/> Spill Containment	
<input type="checkbox"/> Back-up Person/Watch		<input type="checkbox"/> HP Coverage		<input type="checkbox"/> Posting/Warning Signs		<input type="checkbox"/> Time Limitation	
<input type="checkbox"/> Barricades		<input type="checkbox"/> IH Survey		<input type="checkbox"/> Scaffolding-requires inspection		<input type="checkbox"/> Warning Alarm (i.e. "high level")	
						<input type="checkbox"/> Electrical Inspection Required	
Personal Protective Equipment							
<input type="checkbox"/> None		<input type="checkbox"/> Ear Plugs		<input type="checkbox"/> Gloves		<input type="checkbox"/> Lab Coat	
<input type="checkbox"/> Coveralls		<input type="checkbox"/> Ear Muffs		<input type="checkbox"/> Goggles		<input type="checkbox"/> Respirator*	
<input type="checkbox"/> Disposable Clothing		<input type="checkbox"/> Face Shield		<input type="checkbox"/> Hard Hat		<input type="checkbox"/> Safety Shoes	
						<input type="checkbox"/> High visibility cloths/vest	
						<input type="checkbox"/> Other	
Permits Required (Permits must be valid when job is scheduled.)							
<input type="checkbox"/> None		<input type="checkbox"/> Cutting/Welding		<input type="checkbox"/> Impair Fire Protection Systems			
<input type="checkbox"/> Concrete/Masonry Penetration		<input type="checkbox"/> Digging/Core Drilling		<input type="checkbox"/> Rad Work Permit-RWP No			
<input type="checkbox"/> Confined Space Entry		<input type="checkbox"/> Electrical Working Hot		<input type="checkbox"/> Other			
Dosimetry/Monitoring							
<input type="checkbox"/> None		<input type="checkbox"/> Heat Stress Monitor		<input type="checkbox"/> Real Time Monitor		<input type="checkbox"/> TLD	
<input type="checkbox"/> Air Effluent		<input type="checkbox"/> Noise Survey/Dosimeter		<input type="checkbox"/> Self-reading Pencil Dosimeter		<input type="checkbox"/> Waste Characterization	
<input type="checkbox"/> Ground Water		<input type="checkbox"/> O ₂ /Combustible Gas		<input type="checkbox"/> Self-reading Digital Dosimeter		<input type="checkbox"/> Other	
<input type="checkbox"/> Liquid Effluent		<input type="checkbox"/> Passive Vapor Monitor		<input type="checkbox"/> Sorbent Tube/Filter Pump			
Training Requirements (List specific training requirements)							
Work screening has identified the following as the reason for permitted work:				When work is categorized as worker planned work and a permit is used only the following signatures are required: (Although allowed, there is no need to use back of form)			
<input type="checkbox"/> ESSH				WCC:		Date:	
<input type="checkbox"/> Complexity				Service Provider:		Date:	
<input type="checkbox"/> Work Coordination				Authorization to start:		Date:	
<input type="checkbox"/> Permit Not Required (Sections 3 through 7 optional)				(Department/Division, or their equivalent, Sup/WCC/Designee)			

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail):				
Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)				
Notifications to operations and Operational Limits Requirements:				
Post Work Testing, Notification or Documentation Required:				
Job Safety Analysis Required: <input type="checkbox"/> Yes <input type="checkbox"/> No			Review Done: <input type="checkbox"/> in series <input type="checkbox"/> team	
Reviewed by: * Primary Reviewer signature (not required for Worker Planned Work) means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.				
Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator				
Safety Health Representative				
Research Space Manager				
Other				
Other				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ESSH concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)
a) WCM/WCC: Are there any changes as a result of worker feedback? <input type="checkbox"/> Yes <input type="checkbox"/> No
Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

Work Planning & Control for Operations

Using the Screening Tool for Worker Planned Work

Prepared by Ray Costa
WP&C Management System Executive
(Revised May 27, 2014)



Using the Screening Tool for Worker Planned Work

- **Worker Planned Work can only be performed if the required number of barriers (controls) are in place as determined by the following screenings.**
 - All other work will require a work permit, prescribed work procedure, and/or additional controls.
- **Instructions: For each job/task/activity that will be performed evaluate the following attributes against the criteria provided in the Screening Tool:**
 - ESSH,
 - Complexity, and
 - Coordination
 - Unless the indicated minimum number of questions are answered “YES” a work permit, prescribed work procedure, and/or additional controls are required.
 - Note: A “NO” answer for a specific attribute does not mean the attribute is not required, but that it is being addressed by or included in another attribute.

The ESSH Evaluation

▪ ESSH:

- If there are no ESSH hazards associated with the work or in the area where the work will be performed, than this attribute can be skipped, otherwise the following criteria must be met:
 - ESSH hazards are clearly understood
 - If the ESSH hazards are not clearly understood you cannot perform worker planned work
 - Examples of hazards that are not clearly understood include monitoring to identify a potential hazard, e.g., noise, air quality, contamination
 - Controls are established and implemented
 - Example, LOTO used to prevent hazardous energy release when implemented by trained and qualified people
 - There are no security concerns
 - Security concerns could include work in a designated security area, or where enhance security systems are deployed
 - Contact LP Security to determine if work can be conducted as worker planned or if a permit is required
 - **AND**, at least 4 of the following questions are answered “YES”:

The ESSH Attribute

- **ESSH - Continued**

- If all of the preceding criteria has been met, than at least 4 of the following questions must answered “YES” to conduct worker planned work

Yes	No	
		Have all known hazard(s) and associated control(s) been evaluated using an institutional document (e.g., ESR, JRA, JSA, PHA, HASP or SWP) and have control(s) been implemented? (REQUIRED FOR ALL CONTRACTOR/VENDOR WORK.)
		Have all known hazard(s) and control(s) been documented (e.g., organizational procedure) and worker’s provided verifiable training in how to properly verify hazard(s) and implement the required control(s)?
		Does an SBMS Subject Area(s) exist for the hazard(s) and workers have verifiable training in its implementation? Example: Confined Space, LOTO, and Fall Protection Subject Areas
		Will the cognizant supervisor or engineer describe the job and its associated hazards and controls to workers and provide them an opportunity to ask questions prior to the start of work (e.g., job walk down, pre-job brief, Toolbox)?

The ESSH Attribute

- **ESSH - Continued**

Yes	No	
		Will a dedicated and knowledgeable (e.g., trained to recognize the hazard(s) of the job) work oversight person be present at all times throughout the job?
		Will Contractor Vendor Orientation (CVO), Guest Site Orientation (GSO), or site-specific training be completed, or will an escort be assigned, for by those in need prior to start of work? (REQUIRED FOR ALL CONTRACTOR/VENDOR WORK)
		Will PPE be clearly identified for known hazard(s) and communicated (e.g., by supervisor, ESH, and/or area postings) to the worker(s) prior to commencement of work?
		Are engineered controls for known hazards in place and operational?

- If at least 4 of the above questions were answered “YES” than ESSH is acceptable for worker planned work
 - However, the remaining two attributes must also be evaluated to determine if work can be performed as worker planned work

Work Complexity Evaluation

- **Work Complexity**

- All the following must be met:

- All steps of the work to be accomplished are clearly understood by all workers involved
- controls are established
- **AND**, at least 5 of the following questions are answered “YES”

Work Complexity Evaluation

■ Work Complexity

- At least 5 of the following questions must be answered “YES”:

Yes	No	
		Does the work activity contain less than 15 undocumented steps to complete?
		Can the job be performed without a written procedure, permit, or documented checklist that is required by any applicable SBMS Subject Area or regulation (e.g., Complex LOTO procedure, 2C Confined Space Entry Permit, Energized Electrical Work Permit)?
		Have personnel been trained in the proper use and execution of equipment(s), process(es), task(s), and tool(s) used to perform this job?
		Are workers familiar with the work location?
		Is the equipment clearly labeled and is the work location clearly identified?

Work Complexity Evaluation

- **Work Complexity**

- At least 5 of the following questions must be answered “YES”:

Yes	No	
		Can the job be performed without stressor(s) (e.g., time pressure, excessive overtime, heat, cold, etc.) and without verification of the worker’s Fit for Duty status under this/these stressor(s) for this job?
		Can the job be performed without ergonomic challenges (e.g., awkward positions, repetitive motions for long periods, contact stress, excessive force, and ladder work for long periods, etc.)?
		Can the job be performed without cross checking look-alike equipment and location (e.g., similar areas & equipment are easily identified)?
		Can the job be performed without independent testing or inspection required by procedure, SBMS Subject Area or regulation (e.g., electrical inspection)?

- If at least 5 of the above questions have been answered “YES” than Complexity is acceptable for worker planned work
 - However, the remaining attribute must also be evaluated to determine if work can be performed as worker planned work

Work Coordination Evaluation

■ Work Coordination:

- Work does not involve a Credited Control
 - controls determined through a contractor safety analysis, such as that found in a Safety Assessment Document (SAD), to be essential for safe accelerator operation directly related to the protection of personnel or the environment.
 - Also, Credited Controls are identified in a DOE approved document such as an Accelerator Safety Envelope (ASE)) Work can be accomplished without coordination with other groups in the work area or without coordination with ESH personnel during the job/activity
- **AND**, at least 2 of the following questions are answered “YES”

Work Coordination Evaluation

- **Work Coordination:**

- At least 2 of the following barriers apply:

Yes	No	
		Has work has been scheduled through a maintenance coordinator or equivalent? (e.g., Research Space Manager, Cognizant Space Manager, Shop Supervisor)?
		Can work be performed without disabling, altering or changing an engineered safety related system (e.g., access controls, fire protection system, interlocks, fume hoods, shielding)?
		Will the work be conducted under one job supervisor for the entire job? (e.g., no supervisor/shift turnover during job)?

- If all the criteria above is met than work can proceed as worker planned work following the requirements of the WP&C Subject Area
 - A work permit can still be used for worker planned work activities

Screening Tool for Worker Planned Work

Worker Planned Work can only be performed if the required number of barriers (controls) are in place as determined by the following screenings. All other work will require a work permit, prescribed work procedure, and/or additional controls.

Instructions: For each job/task/activity that will be performed, evaluate the ESSH, Complexity and Coordination attributes against the questions below. Unless the indicated minimum number of control questions are answered “YES” a work permit, prescribed work procedure, and/or additional controls are required. Note: A “NO” answer for a specific attribute does not mean the attribute is not required, but that it is being addressed by or included in another attribute.

1. **ESSH:** (Check this box if there are no ESSH hazards) ESSH hazards are clearly understood; controls are established and implemented, there are no security concerns, and at least 4 of the following control questions are answered “YES”:

Yes	No	
		Have all known hazard(s) and associated control(s) been evaluated using an institutional document (e.g., ESR, JRA, JSA, PHA, HASP or SWP) and have control(s) been implemented? (REQUIRED FOR ALL CONTRACTOR/VENDOR WORK.)
		Have all known hazard(s) and control(s) been documented (e.g., organizational procedure) and worker’s provided verifiable training in how to properly verify hazard(s) and implement the required control(s)?
		Does an SBMS Subject Area(s) exist for the hazard(s) and workers have verifiable training in its implementation?
		Will the cognizant supervisor or engineer describe the job and its associated hazards and controls to workers and provide them an opportunity to ask questions prior to the start of work (e.g., job walk down, pre-job brief, Toolbox)?
		Will a dedicated and knowledgeable (e.g., trained to recognize the hazard(s) of the job) work oversight person be present at all times throughout the job?
		Will Contractor Vendor Orientation (CVO), Guest Site Orientation (GSO), or site-specific training be completed, or will an escort be assigned, for by those in need prior to start of work? (REQUIRED FOR ALL CONTRACTOR/VENDOR WORK)
		Will PPE be clearly identified for known hazard(s) and communicated (e.g., by supervisor, ESH, and/or area postings) to the worker(s) prior to commencement of work?
		Are engineered controls for known hazards in place and operational?

2. **Work Complexity:** All steps of the work to be accomplished are clearly understood by all workers involved, controls are established and implemented, and at least 5 of the following control questions are answered “YES”:

Yes	No	
		Does the work activity contain less than 15 undocumented steps to complete?
		Can the job be performed without a written procedure, permit, or documented checklist that is required by any applicable SBMS Subject Area or regulation (e.g., Complex LOTO procedure, 2C Confined Space Entry Permit, Energized Electrical Work Permit)?
		Have personnel been trained in the proper use and execution of equipment(s), process(es), task(s), and tool(s) used to perform this job?
		Are workers familiar with the work location?
		Is the equipment clearly labeled and is the work location clearly identified?
		Can the job be performed without stressor(s) (e.g., time pressure, excessive overtime, heat, cold, etc.) and without verification of the worker’s Fit for Duty status under this/these stressor(s) for this job?
		Can the job be performed without ergonomic challenges (e.g., awkward positions, repetitive motions for long periods, contact stress, excessive force, and ladder work for long periods, etc.)?
		Can the job be performed without cross checking look-alike equipment and location (e.g., similar areas & equipment are easily identified)?
		Can the job be performed without independent testing or inspection required by procedure, SBMS Subject Area or regulation (e.g., electrical inspection)?

3. **Work Coordination:** Work does not involve a Credited Control (controls determined through a contractor safety analysis, such as that found in a Safety Assessment Document (SAD), to be essential for safe accelerator operation directly related to the protection of personnel or the environment. Also, Credited Controls are identified in a DOE approved document such as an Accelerator Safety Envelope (ASE)); work can be accomplished without coordination with other groups in the work area or without coordination with ESH personnel during the job/activity; and at least 2 of the following control questions are answered “YES”:

Yes	No	
		Has work has been scheduled through a maintenance coordinator or equivalent? (e.g., Research Space Manager, Cognizant Space Manager, Shop Supervisor)?
		Can work be performed without disabling, altering or changing an engineered safety related system (e.g., access controls, fire protection system, interlocks, fume hoods, shielding)?
		Will the work be conducted under one job supervisor for the entire job? (e.g., no supervisor/shift turnover during job)?

Subject Area Revisions: Work Planning and Control for Experiments and Operations

Revision History

Subscribe

Revision Number	Revision Type	Revision Date	Revision Description
10.5	Minor	01/23/2015	This was a minor revision to remove the reference to the retired Process Assessment Subject Area from References and the exhibit ESH&Q Considerations When Designing an Experiment.
10.4	Minor	01/14/2015	This was a minor revision to clarify that the subject area uses the Integrated Safety Management (ISM) core functions and guiding principles to establish a process that all work, both operational and experimental, is properly planned and implemented to prevent accidents, injuries, and regulatory violations. All work must be evaluated for potential Environment, Safety, Security, and Health (ESSH) hazards, those hazards must be analyzed and addressed appropriately to prevent injury to people or damage to assets by using a graded approach. It should be noted that work not covered by this subject area must also be evaluated for potential ESSH hazards and mitigative actions. For example, office work should be evaluated, as a minimum, against the requirements of the Ergonomics, Occupational Subject Area. The definition for "work" was revised to reflect the clarifications made to the subject area.
10.3	Minor	10/24/2014	This was a minor revision to the Experiment Safety Review Form to delete the link to the exhibit Experiment Safety Review (ESR) Form: Frequently Asked Questions, which was removed in a recent revision.
10.2	Minor	08/15/2014	The subject area was completely reviewed and no changes were needed.
10.1	Minor	07/23/2014	The exhibit Instructions for Filling out the Work Permit was updated to add a list of abbreviations and acronyms for clarification.
10.0	Major	06/27/2014	This was a major revision to the subject area and the following changes were made: <ul style="list-style-type: none"> Removed the "Low, Moderate, and High" risk levels for the determination of work from section 2.2 Defining/Determining the Work Planning Level, the Work Permit Form, the Instructions for Filling out the Work Permit. and

			<p>the Introduction section of the title sheet of the subject area;</p> <ul style="list-style-type: none"> • Added a barrier (control) screening process for determination if Worker Planned Work can be performed to: Section 2.2 Defining/Determining the Work Planning Level, the Work Permit Form, the Instructions for Filling out the Work Permit and the Introduction section of the title sheet of the subject area; • Revised the Work Planning and Control Operations Flowchart to reflect the removal of the "Low, Moderate, and High" risk levels; • Removed the "BNL's Integrated Assessment Subject Area sets the requirements for assessing the performance of these processes and the section Work Planning & Control Self-Assessment, within this subject area, provides the requirements." from the Introduction section of the title sheet of the subject area; • Added the new form Screening Tool for Worker Planned Work to the subject area. • Added the new exhibit Using the Screening Tool for Worker Planned Work to the subject area. • Added the term "Credited Control" to the Definitions section and a link from section 2.2. Defining/Determining the Work Planning Level, step 3. <p>The following exhibits were removed:</p> <ul style="list-style-type: none"> • Screening Guidelines for Work Permit Determination • Examples of Low, Moderate, and High Tasks;
9.1	Minor	04/16/2014	This was a minor revision to remove the exhibit Experiment Safety Review (ESR) Form: Frequently Asked Questions.
9.0	Major	04/11/2014	<p>This was a major revision and the following changes were made:</p> <ul style="list-style-type: none"> • Removed the requirement for a Primary Reviewer to sign a Work Permit for work identified as Worker Planned Work and when a Work Permit is used in section 2.1 Selection, Training, and Qualification for Work Control Managers and Coordinators. Primary Reviewers. and Work

			<p>Supervisors, step 4, the Work Permit Form, and Instructions for Filling out the Work Permit;</p> <ul style="list-style-type: none"> • Clarified the Prescribed Work process in section 2.3 Prescribed Work Hazard Identification, Analysis and Controls; • Added PHA, JSA, or equivalent for all contractor/vendor work to section 2.8 Integrated Safety Management (ISM) Flowdown to Contractors and Suppliers to align with the Procurement and Property Management terms and conditions for contractors; • Clarified the process for evaluating work off-site and added a note and link to the Global and Regional Solutions (GARS) Directorate's Travel Safety brochure in section 5. Off-site Work; • Added working alone guidance to section 1.2 Initiating an Experimental Safety Review, step 5, and section 2.4 Permit Planned Work Hazard Identification, Analysis and Controls, step 4; • Added the new exhibit BNL Working Alone Guidance to the subject area. <p>The following exhibits were removed :</p> <ul style="list-style-type: none"> • Work Control Self-assessment • Contractor Health and Safety Plan (HASP) Checklist • Contractor Health and Safety Plan (HASP) Template
8.0	Major	04/11/2013	<p>This was a major revision and the following changes were made:</p> <ul style="list-style-type: none"> • The new exhibit Requirements and Expectations for Performing Work Oversight was added to incorporate requirements established in "Work Oversight" training for supervisors and the R2A2s for Supervisors and Managers in meeting work oversight responsibilities as identified in their R2A2s; • In the Introduction section, Work Planning and Control for Operations was expanded to include the following <p style="text-align: center;">All work is to be categorized according to all recognized hazards, including routine</p>

			<p>hazards, during all phases of the work, including estimating, planning, and pre-job briefs.</p> <p>Worker planned work can only be conducted when all recognized hazards are categorized as low ESS&H Risk, Complexity and work coordination levels.</p> <p>The “permit planned work” practice requires use of a site-wide Work Permit Form when the ESS&H risk, complexity or coordination level is categorized as moderate or high hazard work that is not covered by prescribed work documents.</p> <p>Feedback and improvement is a key element within Work Planning and Control. For supervisors, one of the most important forms of obtaining feedback is through direct observation of work and interaction with workers (i.e., work oversight). The exhibit Requirements and Expectations for Performing Work Oversight provides the requirements and expectations for observing work as provided in supervisor training and the R2A2 for Supervisors and their Managers.</p> <ul style="list-style-type: none">• In the section Work Planning and Control for Operations, subsection 2.2 Defining/Determining the Work Planning Level, the following was added <p>All work must be categorized according to all recognized hazards, including routine hazards, and during all phases of the work, including estimating, planning, and pre-job briefs.</p> <p>This screening process (i.e., the Low, Moderate, or High hazard work determination) provides the decision path for determining when permitted work and worker planned work applies.</p> <ul style="list-style-type: none">• The following note was added to subsection 2.5 Control of Work/Job Change Control: Feedback and improvement is a key element within Integrated Safety Management and Work Planning and Control, as well as day to day management in general. For supervisors, one of the most important forms of obtaining
--	--	--	---

			<p>feedback is through direct observation of work and interaction with workers (i.e., work oversight). The exhibit Requirements and Expectations for Performing Work Oversight provides the requirements and expectations for observing work as provided in supervisor training and the R2A2 for Supervisors and their Managers.</p>
7.4	Minor	01/10/2013	<p>Screening Guidelines for Work Permit Determination was revised to clarify the definition under "Security Concerns".</p>
7.3	Minor	09/11/2012	<p>Step 3 in the <i>Off-site Work</i> procedure was modified to clarify that the Facility Support Representative should be contacted in certain cases when the off-site work requires a Radiological Work Permit.</p>
7.2	Minor	03/06/2012	<p>As part of a corrective action, the following note was added for clarity to section 2.4 Permit Planned Work Hazard Identification, Analysis and Controls and section 2.5 Control of Work/Job Change Control: For projects involving a mix of subcontractor, BNL personnel, and/or scientific department personnel, the lead organization must ensure roles and responsibilities are clearly identified and documented for all project tasks, including change control, turnover, and project closure. This may be accomplished by establishing a specific written project management/execution plan (refer to the Project Management Subject Area) or by the use of a work permit. The plan/permit must clearly identify, as appropriate, owners of tasks, project scope, project responsibilities, actions resulting from routine and closeout inspections, and development/maintenance configuration management documents (electrical drawings, as-built drawings, and preventive maintenance checklists). The plan/permit must be updated as needed.</p>
7.1	Minor	01/19/2012	<p>The introduction, step 2 of the subsection Defining/Determining the Work Planning Level, and the section Worker Planned Work were revised to add emphasis to ensure that the entire scope of work is considered during the planning process.</p>
7.0	Major	09/26/2011	<p>The Work Planning and Control for Experiments and Operations Subject Area was completely reviewed and revised. This major revision addresses Blueprint Project WBS 3.4: Work Planning and Control, which is to improve consistency and rigor of work planning and control at BNL. Below is a summary of the changes to the</p>

subject area followed by Implementation Instructions for Work Control Managers and Experimental Review Coordinators.

Subject Area Cover Page

- A. Emrick was identified as the SME for Section 1, Experimental Safety Review.
- R. Costa was identified as the SME for Sections 2 through 5.

The section Experimental Safety Review was revised to include

- Screening of work to identify impact on other experiments or work in the area;
- Off hours and working alone considerations;
- Nuclear criticality as it relates to isotope inventories for radiological facilities;
- Work related to the nuclear fuel cycle; and
- Reconciliation of documents and responsibilities upon termination of an experiment.

The section Work Planning and Control for Operations was revised and the following changes were made:

- Adding contractors, vendors and services providers to the Applicability statement;
- Clarifying the appointment of Primary Reviewers and their role in work planning;
- Identifying JTAs for WCM, WCC, and Primary Reviewer;
- Providing a clear flow for defining and determining work planning levels;
- Adding considerations for pre-job briefings;
- Clarifying responsibilities for the WCC in work screening and permit generation;
- Renaming "Walk Down Team" to "Review Team";
- Revising the consideration for selecting Review Team members;
- Providing instructions for determining the detail required for work plans and provided guidance document;
- Revising feedback questions; and
- Adding considerations and guidance for working alone.

The section Worker Planned Work was revised and the following changes were made:

- In step 2, adding supervisor responsibility to assign work, verify training, and consider additional hazards when workers are working alone;
- In step 3, adding that the worker conducts a walk through prior to starting work; and
- In step 4, revising the questions for workers to consider prior to and during work.

The section Work Observations was revised and the following changes were made:

- In step 1, adding Safety and Health Services as the contact for Worker Safety Observation Training; and
- In step 5, adding the BNL Worker Safety Observation Database to document the work observation.

The Work Planning and Control Operations Flowchart was updated.

The Work Permit Form and the Instructions for Filling out the Work Permit exhibit were revised:

- The ESS&H Analysis section of the work permit was updated:
 - Adding the Nuclear Safety Officer as the contact when Fissionable/Radiological materials are identified;
 - Adding a checkbox for silica.
- The Work Control section of the work permit was updated:
 - Adding Electrical Inspection;
 - Adding high visibility clothes/vest; and
 - Removing the permanent check next to safety glasses.
- The Work Section of the work permit was updated:
 - Adding identification of special training to the Reviewed by section;
 - Adding the following titles to the list of Review Team members for signature:
 - Safety Health Representative;
 - Research Space Manager; and
 - Additional space for other reviewers.

			<ul style="list-style-type: none"> ○ Adding an acknowledgement that the required walkdown was completed. • The Job Site personnel section was updated: <ul style="list-style-type: none"> ○ Adding signature approval for the verification of special training by the Job Supervisor/Contractor Supervisor • Modifying the work planning instruction to align with changes from the section Work Planning and Control for Operations. <p>The Screening Guidelines for Work Permit Determination form was revised for clarification and the following changes were made:</p> <ul style="list-style-type: none"> • BNL Hazard Categorization Screening Report was added to section A; • Energized Electrical Work, Excavation, Ergonomics, Pressurized Systems, and Intermittent Energy Release were added to section B; • "Rad Material transfers in and out of facility" was added to section D. <p>The following terms were added to the Definitions section: Configuration Management (CM); emergency, experiment, Job Supervisor, and Primary Reviewer.</p>
6.1	Minor	10/01/2010	<p>This is a minor revision to incorporate changes resulting from the implementation of Integrated Facility Management (IFM). In the section 1.2, Initiating an Experimental Safety Review, "F&O Facility Complex Core Team" replaces "Building Manager" in steps 5 and 7. "F&O Facility Project Manager" replaces "Building Manager" in the section Work Planning and Control for Operations. In the section Worker Planned Work, second paragraph of the Required Procedure, "Facility Line Management" was changed to "Line Management". In the Definitions section, the following terms were added: F&O Facility Complex Core Team; F&O Facility Complex Engineer; F&O Facility Complex Manager; and F&O Facility Project Manager. In section 3 of the Work Permit Form, "Building Manager" was replaced with "F&O Facility Project Manager". The Experiment Safety Review (ESR) Form: Frequently Asked Questions was revised to replace the "Building Manager" with "F&O Facility Project Manager".</p>
6.0	Major	06/15/2010	<p>This was a major revision and part of a corrective action to add intermittent energy release to BNL hazard identification checklists (ATS 4866.2.10). The Work</p>

			Permit Form was updated to include an Intermittent Energy Release check box. The exhibit ESH&Q Considerations When Designing an Experiment was updated to include the statement "Intermittent energy release that may startle workers" as the last bulleted item within the section Items to Consider When Designing for Safety. Minor editorial updates were made throughout the subject area.
5.6	Minor	03/26/2010	This was a minor change to delete the outdated version of the Contractor Health and Safety Plan (HASP) Template from the subject area and replace it with a link to the Health and Safety Plan Outline/Template that is maintained in the Construction Safety Subject Area.
5.5	Minor	10/26/2009	In the Contractor Health and Safety Plan (HASP) Checklist, the link to the Contractor Health and Safety Plan (HASP) Template was corrected.
5.4	Minor	06/24/2009	<p>This is a minor revision and the following changes were made to close out ISM Corrective Action C-3.2, ATS 4015.3.2, and Emergency Management Corrective Action (ATS 4264.2.3 - 1.3): Links to the On-line Experiment Safety Review (ESR) Form were added to sections 1.2 and 1.4 and a bullet for EPHA screening was added to section 1.2, step 5.</p> <p>The Work Permit Form was also revised to add a checkbox for Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM in section 2. The exhibit Instructions for Filling out the Work Permit was revised to add DOE 151.1-C Screening Levels.</p>
5.3	Minor	10/08/2008	A check box for "NORM" was added to section 2 of the Work Permit Form. A description for NORM was added to the Instructions for Filling Out the Work Permit.
5.2	Minor	08/06/2008	Updated the wording in the ESR form to match the BNL Significant Aspects Criteria.
5.1	Minor	07/21/2008	A minor change was made to correct the formatting of the table in the exhibit Guidance in Conducting Off-site Work.
5.0	Major	07/16/2008	The Experimental Safety Review section was revised. The enhancements are now in-line with the Integrated Safety Management (ISM) five core functions. This major revision simplifies and clarifies requirements and incorporates new or revised requirements and processes. Revisions include the following: • Addition of training/qualification of Experimental Review Coordinators (ERC). • Deletion of Subsection 1.8 –ISM Flowdown for Experimental Work through the Web Req. Process in the Experimental Safety Review section. •

			<p>Addition of nanosafety requirements to reflect the interim procedure "Approach to Nanomaterial ESH" Revision 3.</p> <ul style="list-style-type: none"> • Addition of Human Performance enhancements to incorporate HPI principles. (Subsection 1.5 Performing Work within Controls was added). • Incorporation of risk assessment (section III) and the additions of exposure monitoring to the Experimental Safety Review Form. • Deletion of the following exhibits: Experimental Safety Review Flowchart, Department Notifications Table, Personnel Safety During Foreign Travel, Medical Precautions While on Foreign Travel, and Self-assessment Aid for Planning and Control of Experiments.
4.5	Minor	05/14/2008	<p>A link to the Approach to Nanomaterial Environment, Safety and Health interim procedure was added to subsection 1.1 Experimental Safety Review in the section Experimental Safety Review. The Experiment Safety Review Form, chemical hazards section, was revised to include nanomaterials as an example.</p>
4.4	Minor	03/20/2008	<p>The definitions for work rated as low, moderate, or high were revised to align with changes made to the Application of the Graded Approach exhibit in the Graded Approach for Quality Requirements Subject Area. This exhibit was revised to include suspect and counterfeit items, work complexity/uncertainty issues, and work coordination guidelines. The definition for manual/hand delivery of procurement items was also added.</p>
4.3	Minor	10/22/2007	<p>A link to the Electronic Work Permit was added to subsection 2.4 Permit Planned Work Hazard Identification, Analysis and Controls in the section Work Planning and Control for Operations.</p>
4.2	Minor	10/18/2007	<p>On the Work Planning and Control Operations Flowchart, section 2.7 was changed to section 2.6 in the box for Post job review, feedback & improvement.</p>
4.1	Minor	10/09/2007	<p>Minor changes were made. Examples of on-the-job training were added to the first bullet of step 4 in subsection 2.1 in the section Work Planning and Control for Operations. A statement also was added to step 4: Forward a note to the Training and Qualifications Office to document the completion of the qualification. Finally, on the Work Permit Form, Part 6. Worker Provides Feedback, in the note, section 2.7 was changed to 2.6.</p>
4.0	Major	10/02/2007	<p>The subject area is divided into five sections: 1. Experiment Safety Review 2. Work Planning and Control for Operations 3. Worker Planned Work 4. Work Observations 5. Off-Site Work The Work Planning and Control for Operations section was revised to include three approaches for work planning and control: (1)</p>

			<p>worker planned, (2) prescribed, and (3) permit planned. The revised subject area follows the integrated safety management core function format (i.e., identification, analysis, and control of hazards). Key changes to work planning and control requirements include: selection, training, and qualification of work control managers and coordinators; defining/determining the work planning mode; hazard identification, analysis, and controls of worker planned work and of prescribed work; and enhancements to the permit planned work and work permit development. Post job reviews and feedback and improvement sections provide specific guidance on post job reviews, lessons learned, and improvement opportunities. New sections on Work Observations and Worker Planned Work were added. The section Guest and Visitors Performing Work was deleted. The exhibits Guidelines for Handling Guests and Visitors; In Progress Job/Work Change Control Flowchart; Outline for Implementing Procedure; Relationship of the Job Risk Assessment (JRA) Process and Experimental Activities Flowchart; Relationship of the Job Risk Assessment (JRA) Process and Formal Operations Work; and Work permit Flowchart also were deleted. • Update SBMS Document Status Report. • Send out the subscriber message with the Implementation Plan (The Subscriber Notice and the Revision History are different). Send it also to the Work Control Managers and Coordinators, and the Building Managers.</p>
3.2	Minor	07/25/2007	<p>The exhibit Screening Guidelines for Work Planning & Control and the Application of the Quality Graded Approach was removed from this subject area, and added to the Graded Approach for Quality Requirements Subject Area as the exhibit Application of the Graded Approach.</p>
3.1	Minor	01/17/2007	<p>References to Supplier Evaluation subject area where changed to Supplier Pre-Award Subject Area.</p>
3.0	Major	12/06/2006	<p>This subject area was revised and the following changes were made: To address gaps in the Integrated Safety Management flowdown to contractors and suppliers, subsection 1.8 Integrated Safety Management (ISM) Flowdown for Experimental Work through the Web Requisition Process was added to the section Experimental Safety Review. Also, the section Work Planning and Control for Operations, subsection 2.9 Use of the Work Permits by Vendors and Contractors was renamed Integrated Safety Management (ISM) Flowdown to Contractors and Suppliers and revised to clarify the process of ISM flowdown to contractors and suppliers who perform work on-site. Subsection 2.3 Screening</p>

		<p>Work Requests for Work Permit Determination was revised to clarify reviews by appropriate personnel (i.e., if the job being screened could impact the hazard classification of the facility, consult with the Building and/or Facility Manager). Subsection 2.4 Categorizing Work Requests and Filling Out Work Permit Sections 1 and 2 was revised to include the review of lessons learned associated with the work to be performed. Subsection 2.5 Filling out Work Permit Sections 3 - 5 for Moderate- and High-Hazard Activities was revised to provide guidance on what should be included in a work plan; review of lessons learned; hierarchy for selecting hazard controls; staff that should be involved in the analysis of hazards; and guidance for conducting pre-job briefings. Subsection 2.6 Control of Work was renamed Control of Work/Job Change Control and revised to provide guidance and required actions to be taken when additional work that was not screened for hazards and/or new hazards outside of the work authorization are identified. Subsection 2.7 Feedback (Sections 6 and 7 of the Work Permit) was renamed Feedback and Improvement (Sections 6 and 7 of the Work Permit) and revised to include work site condition expectations and to obtain feedback from workers at the completion of a job or activity. The terms desk/paper work, office environment, and substitution of hazards were added to the Definitions section. The exhibit In Progress Job/Work Change Control Flowchart was added to the subject area. The Contractor Health and Safety Plan (HASP) Checklist and Contractor Health and Safety Plan (HASP) Template forms were added to the subject area. The title of the exhibit Relationship of JRA Process and Experimental Activities Flowchart was expanded to Relationship of the Job Risk Assessment (JRA) Process and Experimental Activities Flowchart and the title of the exhibit Relationship of JRA Process and Formal Operations Work Planning and Control Flowchart was expanded to Relationship of the Job Risk Assessment (JRA) Process and Formal Operations Work Planning and Control Flowchart. The Corrective and Preventive Action Subject Area and the Critiques Subject Area were replaced by the Event/Issues Management Subject Area. Standard Practice Instruction (SPI) 5-09, Visits and Assignments of Foreign Nationals was replaced by the Foreign National Visits and Assignments (Unclassified) Subject Area. ES&H Standard 1.14.0, Identification of Piping Systems was replaced by the Piping Systems, Identification of Subject Area. The following ES&H Standards were replaced by the Fire Safety Subject Area: ES&H Standard 4.0.0. Fire Safety Program: ES&H</p>
--	--	--

			Standard 4.1.2, Means-of-Egress (Exits); ES&H Standards 4.2.0, Impairment of Fire Protection Systems and Fire Alarm Systems; ES&H Standard 4.3.0, Cutting and Welding; ES&H Standard 4.4.0, Local Fire Protection Signaling Systems; ES&H Standard 4.10.2, Flammable Liquids: Storage, Use and Disposal; ES&H Standard 4.11.0, Installation of Flammable Gas Systems (Experimental & Temporary Installations); ES&H Standard 4.12.0, Special Precautions for Locations Containing Flammable Atmospheres; and ES&H Standard 4.12.1, Refrigerators for Flammable Liquid Storage.
2.0	Major	05/02/2006	The form Screening Guidelines for Work Permit Determination was updated. The Work Planning and Control for Experiments and Operations Flowchart was deleted from the subject area and replaced with the new Relationship of JRA Process and Experimental Activities Flowchart and the Relationship of JRA Process and Formal Operations Work Planning and Control Flowchart. The references to the Operational Readiness Evaluation (ORE) Subject Area were changed to the Readiness Evaluations Subject Area.
1.30	Minor	01/13/2006	Changed links to retired RAD subject areas to direct user to radiological control procedures.
1.29	Minor	12/15/2005	References were changed from ESH 5.1.0 Nonflammable Cryogenic Liquids and 5.2.0 Flammable Cryogenic Liquids to the Cryogenics Safety Subject Area.
1.28	Minor	12/12/2005	Changes were made to reflect that the Transportation of Hazardous Materials Off-Site Subject Area and the Transportation of Radioactive Material Off-Site Subject Area were combined for greater efficiency and renamed as the Transportation of Hazardous and Radiological Materials Off-site Subject Area.
1.27	Minor	10/27/2005	Changed self-assessment frequency from periodic to biennial and added another self assessment tool.
1.26	Minor	09/28/2005	The Radiological Stop Work Subject Area replaced references to the Radiological Stop Work Procedure. Also updated to reflect that LD-18, Stop Work - Imminent Danger has been rescinded and replaced by the Stop Work Subject Area.
1.25	Minor	08/11/2005	The Screening Guidelines for Work Permit Determination was revised. Job Risk Analysis was added under ES&H Permits Needed, and a link was added to the Physical Limitations Form under Safety Concerns. Under Environmental Waste Concerns a checkbox was added for Land Use Institutional Controls.

1.24	Minor	05/16/2005	Part IV., section D. Transportation of the Experimental Safety Review Form is updated to include the need for a driver's license, forklift or crane certification, and other relevant qualifications associated with the movement of materials onsite
1.23	Minor	04/01/2005	The Work Permit Form was replaced. The box labeled Land Use Institutional Control was added at the request of the E&WMD
1.22	Minor	03/14/2005	The exhibit Security Checklist was revised to include extension numbers, examples, and clarifications. Also, references to the Radiological Stop Work Procedure were changed to the Radiological Stop Work Subject Area.
1.21	Minor	12/17/2004	The reference to ESH Standard 2.3.2, RF and Microwaves are replaced by the Radiofrequency/Microwave Radiation Subject Area.
1.20	Minor	11/23/2004	Minor change.
1.19	Minor	11/09/2004	References to Off-Site Radiological Work Permits were changed to Radiological Work Permits because the Off-Site Radiological Permit Subject Area was removed from SBMS.
1.18	Minor	09/21/2004	The Work Permit Form was revised: the following categories were added to Section 2, ESH Analysis, Radiation Concerns: Radiography, Moisture Density Gauges, Soil Density Gauges, X-Ray Equipment
1.17	Minor	08/16/2004	The Environment, Safety, Health and Quality (Tier 1) Inspections Subject Area replaces ES&H Standard 1.2.0 Departmental Environment, Safety and Health Inspections.
1.16	Minor	07/16/2004	Construction Safety Subject Area replaces ES&H Standard 1.3.1, Construction Safety. Supplier Evaluation Subject Area replaces the title of Evaluation Seller Quality Assurance (QA) Programs Subject Area.
1.15	Minor	06/02/2004	Minor Change.
1.14	Minor	05/21/2004	Minor Change.
1.13	Minor	05/05/2004	Minor Change.
1.12	Minor	04/28/2004	Minor Change.
1.11	Minor	04/19/2004	Minor Change.
1.10	Minor	02/03/2004	Minor Change.
1.9	Minor	01/14/2004	Minor Change.
1.8	Minor	10/22/2003	Minor Change.
1.7	Minor	09/16/2003	Minor Change.
1.6	Minor	09/12/2003	Minor Change.

1.5	Minor	06/26/2003	Minor Change.
1.4	Minor	05/12/2003	Minor Change.
1.3	Minor	04/10/2003	Minor Change.
1.2	Minor	01/14/2003	Minor Change.
1.1	Minor	01/13/2003	Minor Change.
1.0	Major	10/21/2002	This subject area establishes work control processes based on the Integrated Safety Management (ISM) Core Functions to define the scope of work, identify the hazards, develop controls, work within the controls, and provide feedback and continuous improvement. The subject area provides a graded approach to manage a wide range of operational and experimental activities from routine to highly complex, and integrates other systems and subject areas such as hazard analysis tools, training requirements, and environmental management into the processes. This subject area also provides requirements for work off-site, guests and visitors, and self-assessments for work planning and control activities. This subject area replaces ES&H Standards 1.3.5, Planning and Control of Experiments and 1.3.6, Work Planning and Control for Operations.

NOTE: The dates for "Major Revisions" match the Subject Area Effective Date. Major and/or Minor revisions may not always match with the "Last Modified Date", since this date could reflect changes to links or spelling. Records of changes are maintained in the SBMS documentation for each subject area.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.