

# AFRD Integrated Safety Management Plan 2006

Accelerator and Fusion Research Division  
Ernest Orlando Lawrence Berkeley National Laboratory

## Accelerator and Fusion Research Division Integrated Safety Management Plan

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## **Accelerator and Fusion Research Division Integrated Safety Management Plan**

The Accelerator and Fusion Research Division (AFRD) will conduct all of its operations in a manner that protects the health and safety of employees and the general public and that does not endanger the environment, as defined by the Laboratory's Environment, Health & Safety (EH&S) policies and requirements contained in the Regulations and Procedures Manual (RPM), PUB-3000, and the Berkeley Lab Integrated EH&S Management Plan (ISMS). This Plan has been established to assist in ensuring that the Division's Environment, Safety & Health (ES&H) objectives are met.

### **Accountability**

#### **Division Director**

The Division Director is responsible and accountable for assuring that all AFRD activities are carried out in a safe manner, in accordance with all Laboratory requirements. The Division Deputy assists the Division Director and acts on his behalf when the Director is off-site. The Division Director and Deputy prepare and implement Supervisor Safety Plans describing their personal commitment to assessing workplace safety conditions and communicating safety.

The Division Director is responsible for the timely reporting of adverse and/or abnormal occurrences that occur at AFRD facilities or operations. The Division Director has overall responsibility for ensuring occurrence reporting procedures are properly implemented and corrective actions are instituted to prevent recurrence of the occurrences. The division director must concur with the decision that a given incident is a reportable occurrence through the Department of Energy (DOE) Occurrence Reporting and Processing System (ORPS) in order for it to be reported; and, if so, must approve the final ORPS reports before submission to the DOE ORPS database.

#### **ES&H Coordinator**

The AFRD ES&H Coordinator reports to the Division Director and is responsible for managing the Division ES&H program, including:

- Serving as a point of contact for all division staff regarding the implementation and interpretation of the Lab's ES&H policies;
- Serving as a member of the AFRD ES&H Operations Committee;
- Consulting and coordinating with the EH&S Division (and other) resources as needed;
- promoting ES&H awareness, communication, safe work practices, and compliance within AFRD;
- Maintaining familiarity with division staff, work activities and potential hazards;
- Ensuring the division has a proactive ergonomic safety program which minimizes injuries;
- Serving as a member of the Division Safety Coordinator's Committee and attending this and other meetings as necessary;

- Overseeing the coordination and management of required safety documentation, which includes:
  - Reviewing and approving the AFRD ISM Plan, AFRD Self-Assessment Report, Supervisor Accident Analysis Reports (SAARs), 10CFR851 reports; and Activity Hazard Documents (AHDs);
  - Monitoring the status of records and taking measures to improve performance in Job Hazards Questionnaire (JHQ) and training completion, corrective action completion, chemical inventory maintenance, hazards review, laser inventory maintenance, hazardous waste management, and ergonomics;
- Participating as requested and reviewing the results of audits external to AFRD, including Integrated Functional Appraisals (IFA); Management of Environment, Safety and Health (MESH) reviews; DOE/LBNL Operational Awareness (OA) activities; and independent reviews;
- Informing the Division Director of audit/ assessment findings and other opportunities for improvement, and recommending changes to improve performance;
- Initiating reviews for first aid and Occupational Safety and Health Administration (OSHA) recordable injuries by organizing the review team and scheduling review activities. Supporting the supervisor in the review process by facilitating interviews, advising the Supervisor on the completion of the Supervisors Accident Analysis Report (SAAR), and working with the review team to facilitate completion of the Investigation Report; and
- Serving as a division point of contact for Occurrence Reporting, assists in the notification, recommended categorization, investigation, mitigation, and report preparation of all reportable occurrences within the division.

ES&H Administrator The AFRD ES&H Administrator reports to the AFRD ES&H Coordinator and is responsible for the general administration and day-to-day functioning of the ES&H program, including:

- Serving as a point of contact for all division staff regarding the implementation and interpretation of the Lab's ES&H policies and serving as a conduit for feedback on how safety is being implemented (including point of contact for Lessons Learned);
- Serving as a member of the AFRD ES&H Operations Committee;
- Ensuring that division-specific safety training, if needed, is developed and implemented effectively;
- Consulting and coordinating with the EH&S Division (and other) resources as needed;
- Promoting ES&H awareness, communication, safe work practices, and compliance within AFRD;
- Maintaining familiarity with division staff, work activities, and potential hazards;
- Serving as the division point of contact for the Work Smart Standards and perform an ongoing review of work hazards to ensure the adequacy of the existing Work Smart Standards;
- Serving as a member of the Division Safety Coordinator's Committee and attending this and other meetings as necessary;
- Coordinating and managing required safety documentation, which includes:
  - Updating the AFRD ISM Plan;
  - Monitoring and communicating the status of training and JHQ records, and Corrective Action Tracking System (CATS) corrective actions;

- Entering the findings of walkthrough and inspection reports into CATS;
  - Monitoring the status and coordinating the performance of hazards reviews and work authorizations, chemical inventory, 10 CFR 851 reporting, laser inventory, Satellite Accumulation Areas (SAAs), and ergonomic evaluations;
- Working with the EH&S Liaison and appropriate subject matter experts to assess the adequacy of hazard controls through frequent inspections and monitoring of work activities. Facilitating the implementation of appropriate hazard controls by Line Managers;
- Managing the division self assessment, including: development of the QUEST<sup>1</sup> Program Guide, scheduling the QUEST review period and collecting findings, tracking and trending of appropriate ES&H performance indicators, writing and coordinating the approval of the annual assessment report, ensuring findings are entered into CATS, and tracking and validating corrective actions;
- Serving as the division point of contact for audits external to the division, including Integrated Functional Appraisals, MESH reviews, DOE/LBNL Operational Awareness (OA) activities, and independent reviews;
- Monitoring the status of building manager and emergency teams and informing the Division Director and ES&H Coordinator of the need for appointments;
- Investigating incidents as requested by the ES&H Coordinator, performing root cause analyses; assisting the supervisor in identifying corrective actions, and assisting the EH&S Liaison in completion of the Investigator's Report;
- Serving as a division point of contact for Occurrence Reporting, assisting in the notification, recommended categorization, investigation, mitigation, and report preparation of all reportable occurrences within the division; and
- Serving as the Division Space Coordinator. This combination of duties provides additional opportunities for participation in the work planning process, to ensure facilities provided are appropriate to the work to be performed in the space. Space coordination activities require the ES&H Administrator to visit work areas frequently, providing opportunities to observe work in progress and assist in identifying potential hazards.

### **ES&H Operations Committee**

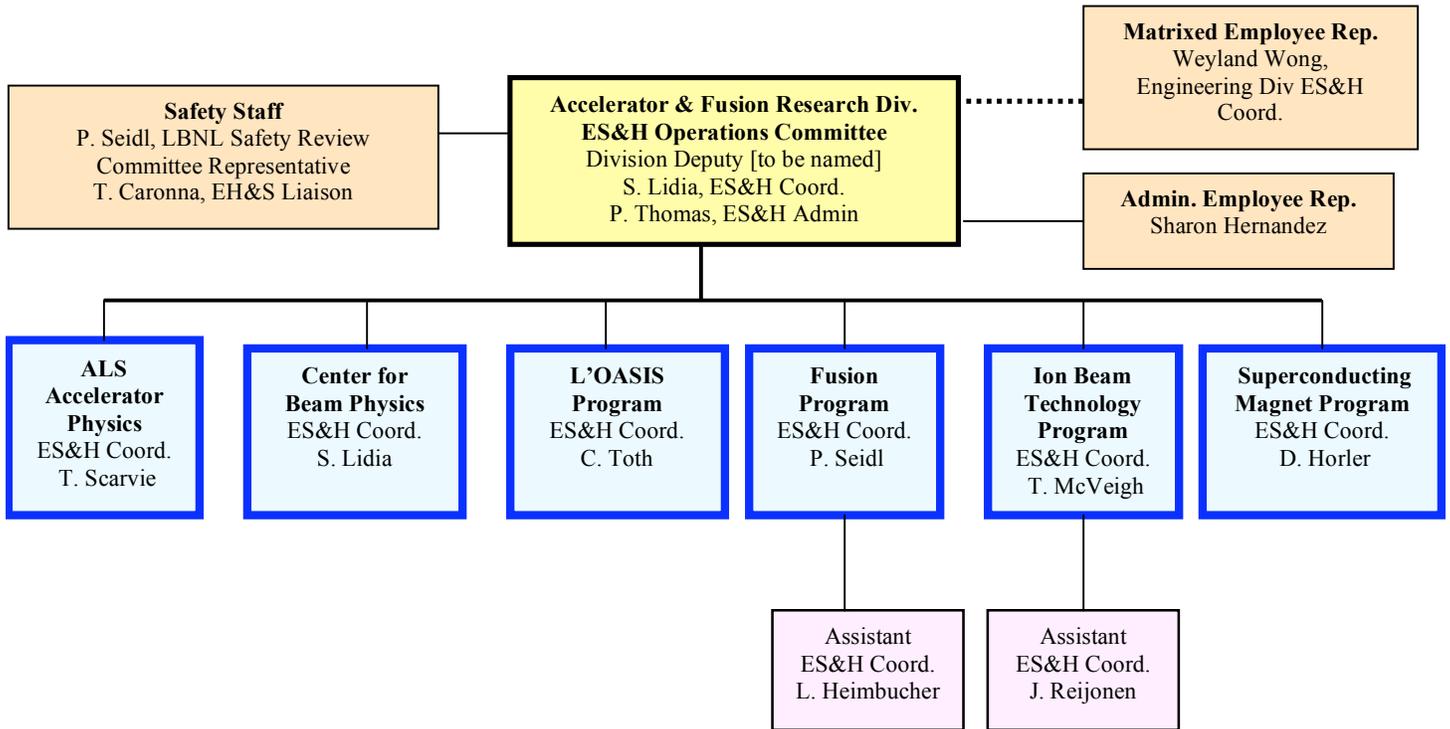
The structure and function of AFRD's safety organization is illustrated in Figure 1 and described in detail in the QUEST Program Guide. The AFRD ES&H Operations Committee consists of the ES&H Coordinator, ES&H Administrator, and Program/Project ES&H Coordinators. The EH&S Liaison and representatives for administrative and matrixed personnel also participate. The EH&S Liaison provides technical support to AFRD operations and coordinates requests for additional EH&S services. The ES&H Operations Committee discusses ES&H concerns of the programs and projects, lessons learned from them, and information on lab-wide ES&H issues.

AFRD's Advanced Light Source (ALS) Accelerator Physics Program is also subject to the ALS Division ISM Plan, as described in the Memorandum of Understanding (MOU) between AFRD and ALS. The AFRD ES&H Administrator attends ALS Division safety committee meetings.

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<sup>1</sup> QUEST is an integrated way to examine **Q**uality Assurance/Improvement and **E**nvironment, Safety, and Health through **S**elf-Assessment and **T**eamwork. It is described in the QUEST Program Guide.

**Figure 1, AFRD ES&H Operations Committee**



## **Program Heads and Project Leaders**

Program Heads and Project Leaders are responsible for establishing, implementing, and maintaining effective ES&H procedures for their Programs/Projects and ensuring correction of ES&H deficiencies on a timely basis. All Program Heads and Project Leaders are expected to:

- Provide leadership and encourage participation in the ES&H activities of their Program/Project;
- Review and approve Activity Hazard Documents for their Program/Project activities;
- Communicate regularly with their Program/Project ES&H Coordinator and maintain awareness of their Program/Project ES&H performance;
- Develop and implement a Supervisor Safety Plan describing their commitment to personally assess the safety of their Program/Project's workplace conditions and activities, including walkthroughs of spaces and observation of activities. [AFRD expectation: walkthrough of the Program/Project spaces at least quarterly.]; and
- In the Supervisor Safety Plan, describe how they (1) communicate safety information to their Program/Project and (2) receive and address safety concerns from their Program/Project and then follow this plan. [AFRD expectation: incorporation of safety discussions into regular meetings with groups and supervisors.]

## **Program ES&H Coordinators**

Each Program Head appoints one or more Program ES&H Coordinators. In most Programs, this position is a part-time responsibility for a senior researcher or engineer. Projects appoint an ES&H Coordinator when significant fabrication and experimental work begins. Program/Project ES&H Coordinators are expected to:

- Participate in AFRD ES&H Operations Committee activities;
- Inform the Committee of planned activities in their Program/Project and assist in hazard review and work authorization activities;
- Organize QUEST teams and report findings to the Committee;
- Report any accidents, occurrences, hazardous conditions, or concerns that require action and report completion of action items; and
- Maintain awareness of their Program/Project ES&H performance, including JHQ/Training completion and CATS completion. Communicate relevant ES&H information to their Program Head, Project Leaders, and other affected personnel.

## **Group Leaders**

The Programs may be further divided into Groups concentrating on certain areas of operations and/or research. Each Group is headed by a Group Leader who reports to the Program Head and is responsible for ensuring that work performed by members of the group is conducted in accordance with applicable ES&H programs, procedures, and requirements.

## **Supervisors and Principal Investigators**

All supervisors (including Principal Investigators) are responsible for that ensuring work is planned considering ES&H risks, all assigned personnel are trained in ES&H responsibilities

appropriate to the tasks performed, and work is performed in accordance with all applicable ES&H recommended work practices, work authorizations, and requirements. All supervisors are expected to:

- Inform their Program/Project ES&H Coordinator of planned changes to work scope that modify existing hazards or introduce new hazards;
- Review hazards and controls, determine authorization requirements, ensure that required documentation is prepared, and ensure that authorizations are approved before beginning work;
- Exercise adequate ongoing oversight of work activities to maintain safe work conditions and practices;
- Develop and implement a Supervisor Safety Plan describing their commitment to personally assess the safety of their group's workplace conditions and activities, including walkthroughs of spaces and observation of activities. [AFRD expectation: walkthrough at least quarterly];
- In the Supervisor Safety Plan, describe how they (1) communicate safety information to their group and (2) receive and address safety concerns from their group. [AFRD expectation: experimental groups: group meeting where safety is discussed at least weekly. Theory groups: group meeting where safety is discussed at least monthly.] Keep records of safety discussions (meeting minutes or logbook entries);
- Ensure that findings from walkthroughs are either resolved immediately (during the walkthrough) or are entered into the CATS database and closed in a timely manner;
- Report safety concerns needing Division or institutional attention to their Program/Project ES&H Coordinator;
- Maintain safe and orderly work areas, including identifying and removing unused equipment from active work areas to storage areas whenever practical;
- Ensure that each person who uses a computer >4 hours/day completes ergonomics training and receives an ergonomic evaluation of their workstation. Ensure that recommendations from evaluations are completed and the status of the evaluation is updated in the Ergonomics database;
- Provide a workplace safety orientation to newly assigned personnel and document that it has taken place. Ensure each new person completes / updates the JHQ and review to ensure it includes the correct hazards;
- Evaluate the training needs of assigned personnel whenever their job hazards change;
- Verify that each assigned person has either completed all required training for the hazards of the work, or is working under the direct supervision of a trained person;
- Document completion of on-the-job training;
- Evaluate employee ES&H performance during the annual Performance Review;
- Ensure that any accidents involving assigned personnel, whether on-site or off-site during official travel, are promptly reported to LBNL Health Services;
- Ensure that any near-misses or other abnormal events that raise safety concerns or unexpected releases of chemicals to the environment are promptly reported to the AFRD ES&H Coordinator or or the ES&H Administrator; and
- Participate in reviews of any accidents or occurrences involving assigned personnel. Ensure Supervisor's Accident Analysis Reports are completed promptly and accurately. Identify, enter into CATS, and perform appropriate corrective actions.

## **All AFRD Personnel**

All AFRD personnel (including AFRD employees, matrixed employees, visitors, temporary employees, students, and participating guests) are assigned to a QUEST self-assessment team, with the exception of short-term personnel. Persons whose participation in work activities at AFRD are anticipated to occur over a period of less than 90 days may be included in a QUEST team as determined by the Program Head. ALS Accelerator Physics personnel are assigned to ALS Division QUEST Circles. Each QUEST team has charge of self-assessment for the workspace of its members.

All AFRD personnel are encouraged to report any workplace safety or environmental concerns to their supervisor. All accidents, on-site or off-site during official travel, must be reported to the supervisor and LBNL Health Services. All personnel are responsible for stopping any work activity considered an imminent danger, defined in Section 1.5 of Pub-3000 as any condition or practice that could reasonably be expected to cause death or serious injury, or environmental harm. All personnel are responsible for responding to corrective actions assigned to them through CATS.

## **Contractors**

Program Heads, Project Leaders, and supervisors (including Principal Investigators) take responsibility for the safety of contracted work by assuring that qualified contractors are selected, hazards are identified, and work is performed safely.

AFRD contractor oversight will comply with the requirements of the Integrated Safety Management System (ISMS). In accordance with Chapter 10 of PUB-3000, the safety rights and obligations of contract employees are the same as those of LBNL employees. AFRD supervisors assigned to direct the work of contract employees must provide instruction and conditions equivalent to those provided to LBNL employees, and require the use of equivalent safety equipment. (Equipment may be provided by LBNL or the contractor, as specified in the contract.)

Construction work must be authorized by LBNL Facilities. The safety and health of construction subcontractor employees is the responsibility of the construction subcontractor.

## **Matrixed Personnel**

A person is considered "matrixed" if the person has a "home" division or department from which he/she is assigned to work in a "host" division or department which provides daily work instructions and oversight. Personnel from other divisions are matrixed to AFRD, and some AFRD personnel are matrixed to other divisions.

Persons performing short-term tasks for another division without being assigned a host supervisor, such as Facilities personnel responding to Work Requests or Engineering Division technicians working on AFRD equipment in the Bldg. 77 shop, are not considered matrixed personnel. The safety of these workers remains the primary responsibility of the home division. AFRD personnel requesting work from another division are expected to inform the workers of any hazards or safety precautions associated with the work.

In accordance with Section 7.01 D of the LBNL Regulations and Procedures Manual, the employee's supervisor from the home division or department retains all health and safety responsibilities pertaining to matrixed employees, except where some of the responsibilities have been transferred to the host division or department through a formal Memorandum of Understanding. Whenever an MOU is established, it remains the responsibility of the home supervisor to assure that the MOU is appropriately implemented. AFRD has established MOUs with the Engineering Division and the ALS Division.

Supervisors are always responsible for maintaining the safety of the workspaces under their control. All personnel are responsible for stopping any work activities they observe that appear to be an imminent danger, regardless of the status of the persons performing the work.

Occurrences related to matrixed assignments are reported by the division whose operations are most affected, as determined by the host and home Division Directors. Home and host division

personnel and EH&S Liaisons will assist in the Occurrence investigation, reporting, and corrective actions as requested by the reporting Division Director.

The home division supervisor retains primary responsibility for completing the Supervisors Accident Analysis Report for accidents involving their personnel who are matrixed to other divisions in accordance with the home division ISM Plan. Home and host division personnel and EH&S Liaisons will assist in accident investigation, reporting, and corrective actions as requested by the home division ES&H Coordinator/Administrator.

The host and home division supervisors discuss corrective actions for ES&H performance issues relative to the matrixed assignment. The host supervisor refers matrixed personnel to their home division supervisor to address issues that are not directly related to the day-to-day tasks of the matrix assignment, but is responsible for ensuring implementation of those that are related to those day-to-day tasks. The host supervisor and home division supervisor stay appropriately informed of and sensitive to personnel issues that may be covered by collective bargaining agreements.

## **Students**

Education and training of future generations is one of the University's missions and Berkeley Lab has a special responsibility to teach students to work safely. Young students do not have the skills and judgment that develop after years of professional experience. As part of their educational experience with AFRD, students should acquire an understanding and habit of planning work, analyzing hazards, obtaining authorizations, and working safely within controls. Supervisors are responsible for ensuring that students are provided a safe and healthful workplace. Students are responsible for following the direction of their supervisors. As a condition of continuing their work at AFRD, students must meet the same requirements for training, work authorization, and safe work practices as employees and guests.

Supervisors are responsible for assigning work and providing supervision as appropriate to each student's age, training, and experience level. All personnel (students, guests, or employees) under the age of 18 are restricted by law from performing certain types of hazardous work. Supervisors of minors should discuss plans for work assignments with the General Sciences Human Resources Center personnel.

Both supervisors and co-workers of students must recognize their special responsibility to serve as role models because their work practices may significantly influence the behaviors students adopt. Supervisors and co-workers are expected to communicate, cultivate, and enforce robust safe-work practices in students.

## **Work at UC Berkeley**

Principal Investigators have an obligation to provide a safe workplace on campus for all LBNL-sponsored work. Lab-sponsored work on the UCB campus (exclusive of Donner and Calvin Laboratories) is to follow the ES&H policies and procedures within the "Partnership Agreement Between UCB and LBNL Concerning Environment, Health and Safety Policy and Procedures".

Students need to be included in campus line management work authorizations before beginning work, trained to the campus standards prior to doing work, and properly supervised.

### **Work Off-Site**

Supervisors and Principal Investigators have an obligation to be aware of the safety conditions and requirements their people (employees, students, or guests) may encounter while working off-site on LBNL projects. A hazard assessment should be performed for work other than other than attendance at conferences and meetings, such as laboratory, shop, industrial, or field work. Where personal site visits are not practical, information can be obtained by discussions with safety and research personnel at the host site and the people who are working off-site. The AFRD ES&H Coordinator and Administrator and LBNL EH&S personnel will assist in the assessment of hazards and controls.

AFRD expects all personnel working off-site to continue to implement Integrated Safety Management by:

- Planning and defining the scope of your work before you begin;
- Analyzing the hazards;
- Developing and implementing controls;
- Performing the work within controls; and
- Continuously assessing safety conditions, seeking feedback from safety staff, and making improvements as needed.

Hazard controls should follow safety rules (LBNL or host site, whichever is stricter, except where LBNL requirements are prohibited or impossible to implement at the off-site location). **If you are asked to do anything you believe is unsafe or to work under unsafe conditions off-site, you have the right and obligation to stop work and contact LBNL for guidance.**

Discuss your training with off-site safety staff and ensure you have completed all required training to do the work. If the host site does not provide safety training for a work hazard, the LBNL courses for the work hazard should be completed.

Ensure that you are familiar with the emergency response and accident reporting procedures at the host site. If you become injured or ill during off-site work, first obtain any urgently needed first aid or medical treatment, then as soon as you can, call LBNL Health Services at 510-486-6266 to inform the Lab of your situation.

### **Heavy Ion Fusion Virtual National Laboratory**

Lawrence Livermore National Laboratory (LLNL), Princeton Plasma Physics Laboratory (PPPL), and Lawrence Berkeley National Laboratory (LBNL) are jointly engaged in Heavy Ion Fusion (HIF) research, with the goal of producing ion-beam based investigations of high energy density physics and Inertial Fusion Energy using accelerators as drivers. The staff of the three Laboratories carries out this research in a coordinated manner, as a Virtual National Laboratory (VNL). The Safety Plan for the VNL is in Appendix 1.

## **Scope of Work**

The scope of AFRD research activities is defined by the Mission Statement of our Division Charter: “The Accelerator and Fusion Research Division is broadly charged with conducting basic and applied research and development in all areas pertaining to the physics and technology of beams. In addition, it operates major LBNL facilities that exploit accelerated beams for use in basic and technological research.” Divisional activities encompass the conception, design, construction, and operation of accelerators and storage rings for scientific and technological research, for fusion-energy experimentation, and for industrial and medical applications, as well as the development of superconducting magnets, beamlines, and other components for use in such machines. Current AFRD operations include particle beams, superconducting and normal conducting magnets, lasers, laboratories, machine shops, fabrication areas, warehouse space, and office spaces.

Some AFRD personnel conduct work at the Advanced Light Source and other LBNL facilities. AFRD personnel may also work on the University of California campus and at other off-site locations. Personnel from other organizations, including visitors, guests, and students, work at AFRD facilities.

The hazards associated with operations at LBNL are described in the Hazards, Equipment, Authorizations and Review (HEAR) database. The HEAR database is one of the tools used by the division for describing its authorized scope of work and for identifying the hazards associated with its work activities. The database information is reviewed at least annually and updated whenever there are significant changes in hazards by the AFRD ES&H Administrator. Program/Project ES&H Coordinators inform the Administrator of planned changes to work scope and associated hazards.

## **Operations and Work Authorization**

Division, Program, and Project managers and supervisors (including Principal Investigators) are responsible for considering ES&H hazards, risks, and concerns during the work planning process and for determining appropriate controls prior to authorizing work. AFRD work authorization procedures are tailored to the level of hazard of the work. General duties, such as office work or routine shop work not requiring formal authorization are authorized by the employee job descriptions and by completion of training requirements determined by the supervisor. Hazards for routine work are identified in the HEAR database.

Work recognized as posing special hazards is planned and authorized as described in Chapter 6 of PUB 3000, the ISMS, Section 1.3 of the Operating and Assurance Plan, and AFRD and Program/Project procedures. Work authorization methods commonly utilized for AFRD operations are described below.

Major projects (according to DOE classification criteria) undergo a formal Operational Readiness Review (ORR) or Accelerator Readiness Review (ARR) under DOE direction. Smaller projects undergo an internal readiness review and work authorization process performed by program and division management as described below.

The hazards of new laboratory experiments and new fabrication or testing operations are analyzed using the AFRD Hazards, Equipment, and Authorizations Review form to determine the work authorization(s) required. If the work does not require formal work authorization (such as an AHD or RWA), it is authorized by the AFRD Line Manager having responsibility for the work using the AFRD Line Management Authorization form. Major work area clean-up projects (beyond routine housekeeping) require a clean-up plan describing the scope of work, hazards, and controls, and listing personnel. Clean-up projects may be authorized by the Line Management Authorization form or by project-specific authorization forms as described in the clean-up plan. The AFRD ES&H Administrator and EH&S Liaison, with appropriate subject matter experts, provide guidance to the responsible Line Manager in analyzing the hazards and ensuring controls for Line-Management authorized work. The AFRD Line Manager with responsibility for the work signs the Line Management Authorization form to approve start-up of the work. (AFRD hazard review and Line-Management Authorization forms are found in Appendix 2.)

For experiments or facilities that require an Activity Hazard Document (AHD), the AHD is reviewed and signed by the Division Director, AFRD ES&H Coordinator, the Principal Investigator, the Program Head, and appropriate EH&S Division representatives.

Work requiring a Radiological Work Authorization, Sealed Source Authorization, or other ES&H permit or authorization will be performed in accordance with the authorization issued by the EH&S Division.

### **Qualification**

AFRD selects, assigns, and retains personnel in accordance with the RPM and AFRD procedures. In selecting from a group of applicants, the division director, program head, or project leader evaluates the applicants' qualifications and selects the person who possesses the qualifications to perform the duties of the position most effectively. In making this judgment, the division director, program head, or project leader compares the knowledge, skills, abilities, and other qualifications of the applicants with those required for successful performance of the duties of the position. AFRD contractor selection will comply with the requirements the RPM and ISMS. Effective and successful performance of duties includes performance in a manner that protects the health and safety of employees and the general public and that does not endanger the environment, as defined by the Laboratory's EH&S policies and requirements contained in the RPM, PUB-3000, ISMS, and OAP.

### **Training**

Each AFRD supervisor is responsible for ensuring that all assigned employees, students, visitors, and guests whose anticipated assignment with AFRD exceeds 60 days have completed a Job Hazards Questionnaire (JHQ) within the first month of work. JHQs are strongly encouraged for people who will be at LBNL for less than 60 days, particularly anyone doing laboratory or shop

work. People who have not completed a JHQ and all training required by their JHQ must work under supervision. Whenever an employee's job assignment changes, the ES&H Training Profile is reviewed to ensure that the required training is appropriate to the employee's job hazards, program assignments, and safety roles. Annually, in conjunction with the Performance Review process, the ES&H Training Profile and the employee's completion of required training is reviewed, and a training plan is developed for each employee for the next twelve-month period.

Work authorizations, such as Activity Hazard Documents, Radiological Work Authorizations, and Sealed Source Authorizations, may specify training requirements for authorized personnel. The AFRD ES&H Administrator ensures that EH&S training courses required by AFRD work authorizations are included in the Training Profiles of authorized personnel. The training records of authorized personnel are reviewed for completion of required EH&S courses prior to approval, modification, or renewal of formal work authorizations. The Principal Investigator or Activity Supervisor designated by the work authorization is responsible for ensuring that authorized personnel have completed required training, including on-the-job training in activity-specific procedures, before being allowed to work without direct supervision.

### **Funding of EH&S Requirements**

Principal Investigators must incorporate appropriate resource allocation for ES&H concerns in all research proposals, including the cost of safety equipment, permits, training, maintenance, waste disposal, and facilities modifications, unless covered by institutional funding sources.

### **Resources**

To facilitate implementation and execution of the Division ES&H Program, the following Division resources are made available:

0.2 FTE Division ES&H Coordinator

1.0 FTE Division ES&H Administrator\*

0.1 FTE General Sciences ES&H Assistant

\*The AFRD ES&H Administrator's duties include providing approximately 1 day per month in support to the ALS Division ES&H Coordinator, 1 day per month in support of the Safety Review Committee, and 0.5 days per month on average on space coordination.

ES&H efforts are an integral part of all AFRD activities and are performed by all AFRD personnel as needed and appropriate to the job task. The estimated level of effort is anticipated to include, but is not limited to:

≥ 4 hr/Program or Project/month Program for Project ES&H Coordinator duties

≤ 1.5 hr/employee/month QUEST self-assessment team

AFRD will require support from EH&S Division professionals on an as-needed basis. EH&S estimates that direct support activities may require a level of effort of approximately 0.47 FTE, as described in Appendix 1, "Estimated EHS Support of AFRD". AFRD also expects to receive EH&S general programmatic support as described in PUB-3000, including, but not limited to, EH&S training courses.

### **Validation, Feedback, and Improvement**

AFRD's primary method of assessing and validating the effective implementation of this Plan is our self-assessment process, described in detail in the QUEST Program Guide. AFRD Self-Assessment is an on-going, year-round process which includes walkthroughs by AFRD Line Management in accordance with their Supervisor Safety Plans; quarterly walkthroughs by the AFRD ES&H Administrator, EH&S Liaison, and Program ES&H Coordinators; and annual QUEST assessments with employee and matrixed staff participation. Our self-assessment process is evaluated annually and findings are summarized in the annual AFRD Self-Assessment Report. Performance measurement criteria for this report are described in Appendix 4. Walkthrough and QUEST action items are tracked to completion on the CATS database. Action item completion status, trends, and root causes are summarized in the AFRD Self-Assessment Report.

Additional opportunities for improvement will be identified through LBNL self-assessment activities, as described in PUB-5344, ES&H Self-Assessment Program, including Integrated Functional Appraisals, Integrated Hazard Assessments, Safety Review Committee MESH reviews, and Appendix F performance reports. If any discrepancies between authorization information provided by EH&S and records maintained by AFRD are noted, these discrepancies will be discussed with the appropriate EH&S personnel and the relevant documents will be corrected or clarified as necessary. DOE, UC, and ES&H regulatory agency oversight activities may identify necessary improvements. The action items from oversight activities are also assigned to responsible persons and tracked to completion in the CATS database. Applicable information from the LBNL Lessons Learned program will be disseminated by the ES&H Administrator as another means to share information for accident prevention and hazard awareness.

Employee ES&H performance is evaluated annually in the Performance Review and Development (PRD) documents, and discussed with the employee by his/her supervisor at the employee's annual appraisal discussion.

This ISM Plan will be reviewed and updated annually, and may be revised more frequently as needed to facilitate compliance with regulatory and contract requirements and enhance the effectiveness of the Plan.

**Accelerator and Fusion Research Division  
Environment, Safety & Health Management Plan**

**Review and Approval**

**Signatures:**

*Submitted by*

\_\_\_\_\_  
Steve Gourlay, Director  
Accelerator and Fusion Research Division

\_\_\_\_\_  
date signed

*EH&S Resource Commitment:*

\_\_\_\_\_  
Howard Hatayama, Acting Director  
Environment, Safety & Health Division

\_\_\_\_\_  
date signed

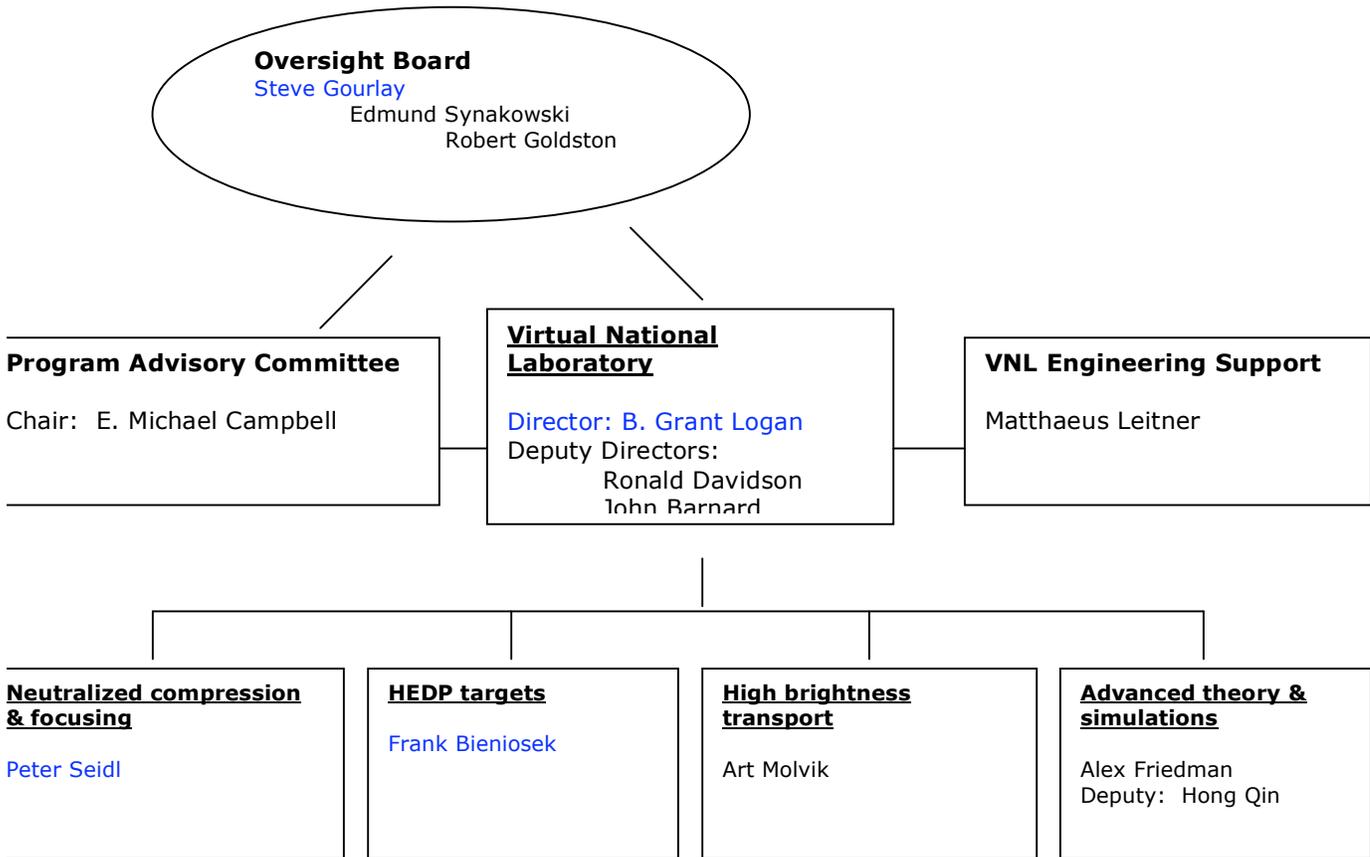
*Accepted:*

\_\_\_\_\_  
Steven Chu, Director  
E. O. Lawrence Berkeley National Laboratory

\_\_\_\_\_  
date signed

**APPENDIX 1. Heavy-Ion Fusion Virtual National Laboratory Safety Plan**

**Figure A. Organization Chart for the Heavy Ion Fusion Virtual National Laboratory for 2006 – 2011 (LBNL Employees in Blue)**



Lawrence Livermore National Laboratory (LLNL), Princeton Plasma Physics Laboratory (PPPL), and Lawrence Berkeley National Laboratory (LBNL) are jointly engaged in Heavy Ion Fusion (HIF) research, with the goal of producing ion-beam based investigations of high energy density physics and Inertial Fusion Energy using accelerators as drivers. The staff of the three Laboratories carries out this research in a coordinated manner, as a Virtual National Laboratory (VNL). The terms of this coordination are outlined in a Memorandum of Agreement between the Laboratory directors. An Oversight Board governs the HIF VNL. The VNL Director provides strategic direction to the fusion energy science program and coordinates research efforts. The line management of each Laboratory retains supervisory authority of their personnel and responsibility for the safety of work at their home Laboratory. The VNL Deputies for PPPL and LLNL keep the VNL Director informed about their Laboratory’s management and ES&H organization structures.

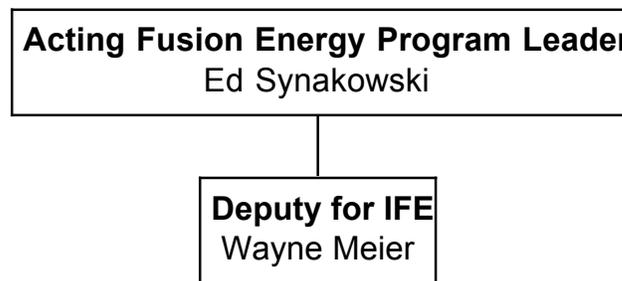
As part of this coordinated research effort, many VNL staff members spend a fraction of their time at the three laboratories, and use the facilities of the three laboratories at least occasionally. The general principle to be followed by HIF VNL staff in all activities is to follow the operational procedures associated with the workplace where they are working at any given time. Integrated Safety Management principles are to be followed by HIF VNL staff wherever they are working, and by all personnel working at LLNL, PPPL, or LBNL. Office work at all three sites is to be carried out in a safe, responsible manner, with due regard to ergonomic safety considerations. Staff members are to be kept aware that their workplace environment will be adapted to meet their needs in this regard. (AFRD will provide ergonomic evaluations for HIF VNL personnel at LBNL in response to requests.) For LBNL employees working offsite, the guidance in the AFRD ISM Plan in the section “Work Off Site” must be followed, along with the instructions in sections to follow on work at LLNL and PPPL. The training requirements of the laboratory where the work is performed must be met.

Any safety concerns by HIF VNL personnel are to be communicated to the VNL Director and the Line Management where the concern occurs and the employee’s home Laboratory.

***Work at LLNL***

HIF VNL personnel working at LLNL must comply with the LLNL ES&H Manual ([http://www.llnl.gov/es\\_and\\_h/esh-manual.html](http://www.llnl.gov/es_and_h/esh-manual.html)) and any Facility Safety Plan (FSP), Operational Safety Procedures (OSP) and other safety procedures that apply. Safety responsibilities at LLNL follow line management. For a VNL member working at LLNL, the first point of contact for safety concerns is the leader of the LLNL activity in which the individual is involved. ***NOTE: All injuries to LBNL employees at LLNL must be reported to LBNL Health Services (510-486-6266) and the employee's LBNL supervisor.***

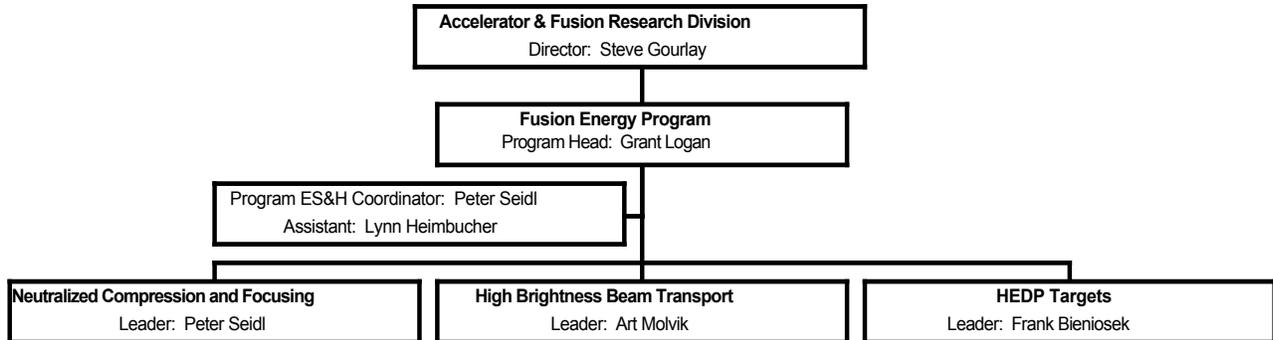
**Figure B. LLNL HIF Organization**



## ***Work at LBNL***

The Fusion Energy Program Head is responsible for the safety of VNL work at LBNL. The Fusion Energy Research Program Safety Coordinator assists the Program Head in implementing the safety program. LBNL and AFRD requirements, including PUB-3000 (<http://www.lbl.gov/ehs/pub3000/>) and the AFRD ISM Plan, govern all work at LBNL. Work procedures and authorizations are established for specific activities. Every person performing work at LBNL must be familiar with and implement applicable LBNL safety standards. Section 1.3.2 of PUB-3000 describes responsibilities for all personnel working at LBNL. These responsibilities include taking the initiative to seek assistance or advice as needed to carry out operations safely.

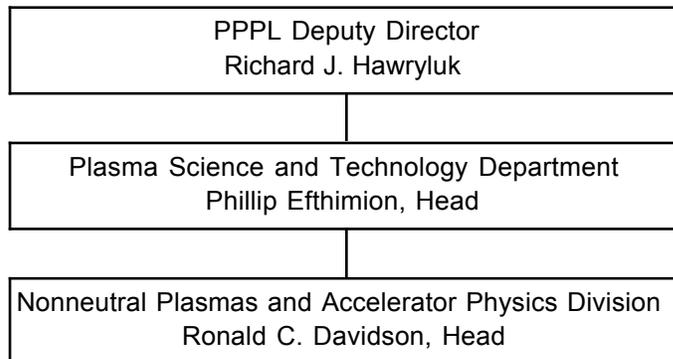
**Figure C. LBNL HIF Organization**



***Work at PPPL***

HIF VNL personnel working at PPPL must comply with the requirements described in the PPPL ES&H Manual ([http://www.pppl.gov/eshis/ESHD\\_MANUAL/sm.html](http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html)) and the PPPL Visitor Guide (<http://www.pppl.gov/guide/>), including completion of General Employee Training. In addition, HIF VNL personnel must follow requirements specified in project or facility specific documents such as Safety Assessment Documents (SADs) and operating procedures. All workers must be trained commensurate with their assignments to perform work safely. Safety responsibilities at PPPL follow line management. For a VNL member working at PPPL, the first point of contact for safety concerns is the leader of the PPPL activity in which the individual is involved. All individuals working at PPPL, including HIF VNL personnel, have the authority and responsibility to require that work, which is creating an imminent danger, be immediately stopped. **NOTE: All injuries to LBNL employees at PPPL must be reported to LBNL Health Services (510-486-6266) and the employee's LBNL supervisor.**

**Figure D. PPPL HIF Organization**



**APPENDIX 2**  
**AFRD Hazard Identification and Work Authorization Forms**

# AFRD Hazards, Equipment, and Authorizations Review Form

1. *Location Information:*

**Building** \_\_\_\_\_ **Room** \_\_\_\_\_

2. *Project Information*

**AFRD Program or Project** \_\_\_\_\_

**Experiment/Operation**

\_\_\_\_\_

**AFRD Line Management Responsible Person\*** \_\_\_\_\_

**Other Contact Person for the Room** \_\_\_\_\_

**Other Authorized Personnel** \_\_\_\_\_

**Description/ Notes:**

\_\_\_\_\_

\_\_\_\_\_

3. *Summary*

The proposed work and the information below has been reviewed. The proposed work needs:
<input type="checkbox"/> Formal authorizations as listed below. I will obtain the required authorizations prior to beginning this work.
<input type="checkbox"/> Line Management authorization.
<input type="checkbox"/> No additional authorization. I have assigned people to do this work who have training and qualifications to do this work safely.
<b>*Responsible Person (signature):</b> <b>Date:</b>

4. Hazard Information

Hazard	Hazard Present	Formal Authorization	Trigger Level for Formal Authorization	Comments
Biohazards – pathogenic/opportunistic organisms, recombinant DNA, cell cultures, human blood or body fluids	<input type="checkbox"/>	<input type="checkbox"/>	Registration, authorization by the Institutional Biosafety Committee (IBC) required for all amounts	
Chemicals – office, cleaning, etc.	<input type="checkbox"/>	n/a		
Chemicals – toxic, carcinogenic, reproductive toxin, sensitizer, corrosive	<input type="checkbox"/>	<input type="checkbox"/>	Activity Hazard Document required whenever glovebox is required for safety, or whenever failure of other primary engineering controls would result in a significant exposure or safety hazard	
Chemicals – flammable, combustible, pyrophoric, oxidizer, reactive/unstable	<input type="checkbox"/>	<input type="checkbox"/>		
Compressed Gas – inert, non-hazardous			Engineering Safety Note and/or Activity Hazard Document required for: <ul style="list-style-type: none"> <li>Any pressure system with &gt;75,000 lb-feet stored energy (not including cylinders);</li> <li>Flammable &gt;2 full size cylinders per room;</li> <li>any pyrophoric, reactive or health hazard gases; or</li> <li>any potential oxygen deficiency</li> </ul>	
Compressed Gas – flammable, oxidizer				
Compressed Gas – pyrophoric, reactive, health hazard				
Cryogenics Usage	<input type="checkbox"/>	<input type="checkbox"/>	Activity Hazard Document required for stored energy greater than 75,000 ft-lb or where there is a possibility of asphyxiation (e.g., confined or unventilated space)	
Computer use – ergonomic issues	<input type="checkbox"/>	n/a		

Hazard	Hazard Present	Formal Authorization	Trigger Level for Formal Authorization	Comments
Confined Space	<input type="checkbox"/>	<input type="checkbox"/>	<i>Confined Space Permit</i> required for Administrative or Permit-Required Confined Space	
Electrical – high voltage / high energy				
Electrical – repair, assembly, testing				
Environmental – specify BAAQMD permit, EBMUD permit, Waste water treatment unit	<input type="checkbox"/>	<input type="checkbox"/>	Depends upon specific permit; contact EH&S	
Ergonomic issues – lab/industrial	<input type="checkbox"/>	n/a		
<i>Hazardous Material Storage</i> > 55 gal	<input type="checkbox"/>	n/a		
Lasers	<input type="checkbox"/>	<input type="checkbox"/>	<i>Activity Hazard Document</i> required for Class 3b or 4	
Lead (shielding)	<input type="checkbox"/>	<input type="checkbox"/>	[depends upon why shielding is in place - see radioactive materials, below]	
Machine Tools	<input type="checkbox"/>	n/a		
Non-Ionizing Radiation -- RF	<input type="checkbox"/>	n/a		
Non-Ionizing Radiation -- Microwaves		n/a		
Non-Ionizing Radiation -- Magnetic Fields		n/a		
PCB-containing items > 500 ppm > 3 lbs.	<input type="checkbox"/>	n/a		

Hazard	Hazard Present	Formal Authorization	Trigger Level for Formal Authorization	Comments
Pressure (>150 psi or large volume)	<input type="checkbox"/>	<input type="checkbox"/>	<i>Engineering Safety Note and Activity Hazard Document</i> required for <ul style="list-style-type: none"> <li>• Non-commercial or modified pressure vessel;</li> <li>• Stored energy greater than 75,000 ft-lb (not including gas cylinders);</li> <li>• Pressure &gt;150 psig (gas) or 1500 psig (liquid);</li> <li>• Radioactive Contents</li> </ul>	
Radiation – Ionizing Accelerator	<input type="checkbox"/>	<input type="checkbox"/>	<i>Activity Hazard Document and Radiological Work Authorization</i> required for all; <i>Safety Analysis Document and Accelerator Readiness Review</i> required if the accelerator creates a radiological area.	
Radiation – Ionizing Isotope	<input type="checkbox"/>	<input type="checkbox"/>	<i>Radiological Work Authorization or Radiological Work Permit</i> required for any amount	
Radiation – Ionizing Sealed Source	<input type="checkbox"/>	<input type="checkbox"/>	<i>Sealed Source Authorization</i> required for all amounts	
Radiation – Ionizing X-ray	<input type="checkbox"/>	<input type="checkbox"/>	<i>X-ray Authorization</i> required for X-ray machine	
Soldering	<input type="checkbox"/>	n/a		
Silver Soldering	<input type="checkbox"/>	n/a		
Thermal - e.g., oven, furnace, heat tape	<input type="checkbox"/>	n/a		
Waste – hazardous, mixed or radioactive	<input type="checkbox"/>	<input type="checkbox"/>	<i>Satellite Accumulation Area</i> required for <55 gallons; <i>Waste Accumulation Area</i> required for >55 gallons	

Welding	<input type="checkbox"/>	<input type="checkbox"/>	<i>Burn Permit</i> (Fire Department0 required for open flame or arc)	
Other Hazards	<input type="checkbox"/>	<input type="checkbox"/>	Depends upon other hazard; contact EH&S	

5. *Equipment Information*

<b>Equipment</b>	<b>Check If Present</b>	<b>Equipment Comments</b>
<i>Autoclave</i>	<input type="checkbox"/>	
Biosafety Cabinet	<input type="checkbox"/>	
Clean Room	<input type="checkbox"/>	
Crane, Hoist	<input type="checkbox"/>	
Eyewash / Safety Shower	<input type="checkbox"/>	
Flammables Cabinet/Refrig.	<input type="checkbox"/>	
Fume Hood	<input type="checkbox"/>	
Glove Box	<input type="checkbox"/>	
Local Exhaust System	<input type="checkbox"/>	
Monitoring / Alarm System	<input type="checkbox"/>	
Photoprocessing Equipment	<input type="checkbox"/>	
<i>Sonicator</i>	<input type="checkbox"/>	
<i>Ultracentrifuge</i>	<input type="checkbox"/>	
Other		

6. *Environmental Performance*

<b>Environmental Performance</b>	<b>Comments</b>
Waste Reduction	
Emissions Reduction	
Resource Conservation	

## AFRD Line Management Authorization

Description: \_\_\_\_\_

---

Location: \_\_\_\_\_ Start/duration: \_\_\_\_\_

Hazards	Controls

People	Roles
	AFRD Line Manager

### Safety Review

EH&S Reviewer(s) \_\_\_\_\_

AFRD Reviewer(s) \_\_\_\_\_

Action Items: \_\_\_\_\_

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\_\_\_\_\_  
Authorized to Start Up \_\_\_\_\_

\_\_\_\_\_  
AFRD Line Manager sign/date

**APPENDIX 3**  
**Estimated EHS Support of AFRD**  
**From the EH&S Division**

<b>Function</b>	<b>FTE</b>
<b>Division Liaison Function</b>	
Liaison -- AHD Reviews	.05
Liaison -- Inspections (IFA, SA, etc.)	.10
Liaison -- Consultations, meetings, etc.	<u>.05</u>
	<b>.20</b>
<b>Other EH&amp;S Support</b>	
Electrical safety	.02
IH Hazard evaluations (includes chemical issues, respirators, lead, noise, confined space, air quality, project support)	.10
Emergency coordination and management	.03
ORPS	.05
Waste -- Training, consultations	.05
Ergonomics	<u>.02</u>
	<b>.27</b>
<b>Total</b>	<b>.47</b>

**Note: EH&S support of ALS is included in the ALS Division ISM Plan.**

## APPENDIX 4. AFRD PY 2006 Self-Assessment Performance Measures

### 1. Define Work

Lab Expectations (for annual SA Report)	AFRD Actions (to implement expectations)	Evidence (for OCA validation)
<p><b>E1.</b> Line management regularly communicates ES&amp;H policy, procedures, management safety expectations, and lessons learned to all staff. Division staff has clear lines of communication to convey ES&amp;H issues, concerns, and suggested improvements to Lab and Division management. Examples of appropriate communications include:</p> <ul style="list-style-type: none"> <li>• Annual all-hands division meeting</li> <li>• <b><i>Active and effective Division Safety Committee or equivalent</i></b></li> <li>• <b><i>Safety recognition</i></b></li> <li>• Group safety meetings</li> <li>• Division ES&amp;H web page or links to ESH resources</li> <li>• Roles and responsibilities detailed in ISM plan</li> <li>• Division-wide emails</li> <li>• <b><i>Managers will set aside a portion of group meetings on a frequency specified in the Division ISM Plan and discuss safety issues relevant to the group. Alternatively, managers may conduct safety meetings (a specific meeting where the entire agenda is dedicated to safety for that workgroup).</i></b></li> <li>• <b>Management conveys safety expectations and “actively listens” to employee safety ideas and concerns in regular personal contacts.</b></li> </ul>	<p>E1.1 Division Director sends annual safety memo to all Division employees.</p> <p>E1.2 AFRD ES&amp;H Operations Committee meetings are held every month. Division management and each Program* are represented at each meeting. The Division ES&amp;H Plan, its implementation status, and ES&amp;H issues are discussed at these meetings.</p> <p>E1.3 AFRD ES&amp;H Coordinator and/or Administrator discuss ES&amp;H news, Lessons Learned, and performance status at Program Heads meetings at least 3 times/year.</p> <p>E1.4 Each Program* holds at least one annual “all-hands” meeting with the Division Director and Program Head at which safety is discussed.</p> <p>E1.5 Each AFRD Supervisor develops and implements a Supervisor Safety Plan, which describes their commitment to communicating safety.</p> <p>E1.6 AFRD ISM Plan is posted on AFRD website.</p> <p>E1.7 Each Program* Head appoints a Program ES&amp;H Coordinator to facilitate communication of ES&amp;H issues and concerns between Program staff and Division management.</p> <p>E1.8 The Division ISM Plan is reviewed at least annually and updated as necessary.</p>	<p>E1.1 Copy of safety memo maintained in Division Office.</p> <p>E1.2 Copy of meeting agendas, minutes, and attendance sheets maintained in Division Office.</p> <p>E1.3 Copy of attendance sheets maintained in Division Office.</p> <p>E1.4 Copies of Program all-hands safety meeting agendas and attendance sheets maintained in Program offices.</p> <p>E1.5 Website address.</p> <p>E1.6 AFRD ES&amp;H Committee organization chart.</p> <p>E1.7 Copy of signed and dated ISM Plan maintained in Division Office.</p>
<p><b>E2.</b> Work planning for new and existing work includes environmental performance reviews. Review includes waste reduction, emission reduction, and/or resource conservation.</p>	<p>E2.1. Reviews of new work and AHD renewals include review of environmental performance.</p> <p>E2.2 Generators implement appropriate waste minimization efforts.</p>	<p>E2.1 Report submitted to EH&amp;S Waste Management.</p> <p>E2.2 Waste generation data maintained by EH&amp;S.</p>

## 2. Identify Hazards

<b>Lab Expectations</b> (for annual SA Report)	<b>AFRD Actions</b> (to implement expectations)	<b>Evidence</b> (for OCA validation)
<p><b>E3.</b> Workspaces are inspected / observed and evaluated on a regular basis.</p> <p><i>All workspaces should be inspected. Manager's need only inspect a portion of the areas/employee-work-activities they are responsible for during each inspection (peer reviews between managers is encouraged), but all workspaces must be inspected during year. These inspections must be documented. Managers are encouraged to involve employees in these inspections.</i></p>	<p>E3.1 Division ES&amp;H Administrator walks through all AFRD workspaces at least annually.</p> <p>E3.2 AFRD Supervisors prepare and implement a Supervisor Safety Plan, which describes their commitment to assessing workplace safety.</p>	<p>E3.1 % Division workspace inspected documented in Walkthrough records maintained in Division Office.</p>
<p><b>E4.</b> Divisions review work activities to identify, analyze, and categorize hazards and environmental impacts for the associated work.</p> <p>Examples of hazard inventory include:</p> <ul style="list-style-type: none"> <li>• HEAR database (or equivalent)</li> <li>• Project safety review</li> <li>• Workspace safety review</li> <li>• <b>Job Hazard or Safety Analyses (JHA/JSA)</b></li> </ul>	<p>E4.1 Principal Investigators or designated project participants complete AHDs or HEAR Client Input Forms for new experimental activities and modifications to experiments, which add new hazards or increase the level of hazards. .</p> <p>E4.2 Work not requiring formal EH&amp;S authorizations is authorized by identification of hazards in the HEAR database and identification of appropriate training in Training Profiles. Hazards inventory for all AFRD workspaces is reviewed and updated annually.</p> <p>E4.3 For all projects requiring AHDs, Division review and approval will be obtained before project start-up. The Division will review AHDs for active projects annually or when changes in hazards or controls are anticipated.</p> <p>E4.4 Current Radiological Work Authorizations and Sealed Source Authorizations will be maintained for all projects requiring these authorizations.</p>	<p>E4.1 Current AHDs are on file in the Division Office and posted at the work area for all projects requiring AHDs.</p> <p>E4.2 Hazards inventory information is maintained on the HEAR database. Training profiles are maintained on the EH&amp;S Training database.</p> <p>E4.3 A spreadsheet of AHD renewal dates and current status is maintained in the Division office.</p> <p>E4.4 Current Radiological Work Authorizations and Sealed Source Authorizations are on file in the Division Office and maintained at the work area for all projects requiring these authorizations.</p>

### 3. Control Hazards

<b>Lab Expectations</b> (for annual SA Report)	<b>AFRD Actions</b> (to implement expectations)	<b>Evidence</b> (for OCA validation)
<p><b>E5.</b> Divisions ensure engineering and other safety/environmental controls are in place and maintained. Examples of engineering controls include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Guards</li> <li>• Fume hoods</li> <li>• Interlocks</li> <li>• Exhaust system filtration</li> <li>• Secondary spill containment</li> <li>• Personal protective equipment</li> <li>• In-lab and stack emission monitors</li> <li>• <i>Cranes and hoists</i></li> <li>• <i>Lockout/tagout</i></li> <li>• <i>Eyewashes and safety showers</i></li> <li>• <i>Ergonomic workstation modifications (furniture, equipment and/or accessories)</i></li> <li>• <i>Manual material handling lift assist devices</i></li> </ul>	<p>E5.1 Line Management ensures lab and shop safety ventilation systems and required monitors under their control are checked, serviced, calibrated and/or certified as required by PUB-3000, work procedures and manufacturers' recommendations.</p> <p>E5.2 Principle Investigators ensure interlock systems are tested as specified in AHDs (at least twice annually).</p> <p>E5.3 Where applicable, QUEST teams check engineering controls in their areas at least annually.</p>	<p>E5.1 Documentation of equipment inspection and servicing maintained in Program Office or at work site.</p> <p>E5.2 QUEST team assessment records/meeting notes maintained in Program Office.</p>
<p><b>E6.</b> Divisions ensure administrative controls are in place and maintained. Examples of administrative controls for self-authorized work include:</p> <ul style="list-style-type: none"> <li>• Work procedures</li> <li>• Project safety reviews</li> <li>• Assurance letters</li> <li>• <i>Job rotation/sharing</i></li> </ul>	<p>E6.1 Line Management ensures administrative controls are in place and maintained.</p>	<p>E6 Documentation of administrative controls maintained at applicable work sites.</p>
<p><b>E7. Divisions ensure that ergonomic hazards (computer, laboratory, and material handling) are adequately controlled and that employees are knowledgeable and engaged in this process including the early reporting of ergonomic pain or discomfort (before an injury):</b>  <i>- Ergonomic issues/concerns/discomfort/pain are reported promptly for immediate corrective action</i></p>	<p>E7.1 Workstation evaluations are required for new and relocated employees who work on computers &gt;4 hours/day.</p> <p>E7.2 Line managers request ergonomic evaluations for personnel with ergonomic concerns.</p> <p>E7.3 Ergonomics evaluators ensure evaluations are performed within required time limits.</p> <p>E7.4 Line managers provide funding for ergonomic equipment identified in ergonomic evaluations and ensure corrective actions are completed and maintained.</p> <p>E7.5 Division ES&amp;H Administrator ensures ergonomics training is made available to Division personnel.</p>	<p>E7.1 Records of ergonomic evaluations maintained on EH&amp;S ergonomics and training databases.</p> <p>E7.2 Purchase requisitions maintained in Division or Program offices; worksite verification.</p> <p>E7.3 Ergonomics training records maintained on EH&amp;S Training database.</p>

<b>E8.</b> Divisions maintain accurate chemical inventory.	E8.1 Chemical inventory is updated at least annually in AFRD areas.	E8.1 Chemical Management System database records
<b>E9.</b> Division-specific OSHA instances from the 2004 OSHA inspection are corrected in a timely manner.	E9.1 OSHA deficiencies from 2004 inspection assigned to AFRD have been corrected.	E9.1 LCATS/CATS records and quarterly spreadsheet update reports to EH&S.
<b>E10.</b> <i>Division laser safety program is effective in controlling exposure to laser hazards.</i>	E10.1 Safety review of L'OASIS lab by laser safety program manager and LSO in conjunction with laser AHD renewal. E10.2 Laser inventory database will be updated.	E10.1 CATS entries from laser safety review.
<b>E11.</b> <i>Divisions control chemical, radiological, and bio hazards during lab moves and when PIs depart (change of accountability).</i>	E11.1 AHDs reviewed and transferred when PIs depart or change assignments. E11.2 Chemical ownership reassigned when owners depart or change assignments.	E11.1 AHDs on file in division office, posted at experiments, submitted to database E11.3 Chemical Management System records
<b>E12.</b> Divisions ensure that peroxide forming chemicals are effectively controlled.	E12.1 Chemical inventory screened for peroxide-forming chemicals at least annually. E12.2 Owners ensure peroxide-forming chemicals are labeled and tested as required.	E12.1 Chemical Management System records E12.2 Industrial Hygienist review

#### 4. Perform Work

<b>Lab Expectations</b> (for annual SA Report)	<b>AFRD Actions</b> (to implement expectations)	<b>Evidence</b> (for OCA validation)
<b>E13.</b> Work is performed within the ES&H conditions and requirements specified by Lab policies and procedures.	E13.1 Principal Investigators/Activity Supervisors ensure continuous compliance with the work scope and hazard controls specified in work authorizations. E13.2 Hazardous waste generators assigned custodianship of Satellite Accumulation Areas (SAAs) maintain them in accordance with Guidelines for Generators, PUB-3092. Generators maintain control of SAAs, categorize and label wastes properly, and request pick-up by EH&S before accumulation time limits are exceeded. E13.3 Supervisors identify hazards and take actions necessary to reduce the rate of accidents and occurrences. All	E13.1 Reports of noncompliance. E13.2 % compliance for SAAs determined by EH&S inspection; %QA waste samples and number of NCARs reported by EH&S waste management. E13.3 Accident reports (SAARs) maintained by EH&S and in Division Office. Accident statistics reported by EH&S. Occurrence Reports maintained by EH&S and in Division Office.

	personnel report accidents and occurrences as required by PUB-3000.	
<b>E14.</b> Staff is properly trained.	E14.1 Division ES&H Administrator reviews training needs with Programs at AFRD ES&H Operations Committee meetings. E14.2 Supervisors review Training Profiles and training records with employees during Performance Review period and when duties change significantly. E14.3 Division and Principal Investigator/Activity Supervisor review training records of personnel when reviewing authorizations. Principal Investigators/ Activity Supervisors ensure personnel complete on-the-job training required by authorizations and maintain records of training.	E14.1 Training profiles and completion rates maintained in training database. E14.2 Copies of signed JHQs or Training Profiles maintained in General Sciences Human Resources Office or Program offices. E14.3 Training review memos maintained in AHD files. Records of on-the-job training maintained by PI or Activity Supervisor
<b>E15.</b> Division ensures that student safety issues are effectively addressed.	E15.1 Student safety issues described in ISM Plan. E15.2 Program Heads ensure shop use policies are posted in each shop.	

## 5. Feedback and Improvement

<b>Lab Expectations</b> (for annual SA Report)	<b>AFRD Actions</b> (to implement expectations)	<b>Evidence</b> (for OCA validation)
<b>E16.</b> ES&H deficiencies identified from workspace inspections, self-assessment activities, and external appraisals are corrected in a timely manner.	E16.1 AFRD ES&H Administrator maintains LCATS/ CATS database. E16.2 Assigned Taskmasters / Responsible Persons ensure LCATS/CATS are closed in a timely manner.	E16.1/16.2 LCATS/CATS databases.

<p><b>E17.</b> ES&amp;H programmatic deficiencies identified from Management of ES&amp;H (MESH) Reviews, Integrated Functional Appraisals (IFAs), and previous Division Self-Assessments are corrected in a timely manner.</p>	<p>E17. Responsible personnel ensure programmatic deficiencies are corrected in a timely manner.</p>	<p>E17 LCATS / CATS and OCA reports.</p>
<p><b>E18.</b> Division <i>employees report injuries and near miss events and the Division</i> performs thorough review of all staff injuries, accidents, <i>and near-miss events</i> including analysis of conditions that led to injury. <i>Corrective actions to prevent recurrence are identified and effectively implemented.</i></p>	<p>E18.1 Supervisors ensure accident causes and corrective actions are effectively identified on SAARs. E18.2 Corrective actions identified on SAARs are implemented.</p>	<p>E18.1 SAARs maintained in EH&amp;S database. E18.2 Completion status of SAARs-related LCATS / CATS.</p>